ENVIRONMENTAL ASSESSMENT

MUSKINGUM ISLAND
WELL PLUGGING PROJECT
WOOD COUNTY, WEST VIRGINIA

USFWS Project Number: 2025-0018623

29 April 2025

Prepared for:

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1.0 Introduction

In 2024, the U.S. Fish and Wildlife Service (USFWS), Ohio River Islands National Wildlife Refuge (Refuge), received federal funding through the Infrastructure Investment and Jobs Act (Public Law 117-58) to plug orphaned oil and/or gas wells leaking into the Ohio River. This Environmental Assessment (EA) evaluates and publicly discloses environmental impacts potentially resulting from plugging five oil and/or natural gas wells on the Refuge (Proposed Action). The EA was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), its implementing regulations at 40 CFR § 1500-1508, and USFWS policies and procedures for compliance with those laws and regulations and by using best available commercial and scientific information. The wells are proximate Muskingum Island in the Ohio River (Belleville Pool) in Wood County, West Virginia (Figure 1). The USFWS was the lead federal agency for preparation of the EA.

The EA describes and analyzes two alternatives: a “no action” alternative and the USFWS Proposed Action. A discussion of the environments potentially affected by the alternatives provides a context and baseline influencing significance determinations. Determinations include relevant aspects of the physical, biological, and socioeconomic environment. The scope of analysis covers reasonably foreseeable and potentially significant impacts. The EA process concludes with one of two decisions:

1. a finding that none of the environmental impacts are significant and a decision to issue a “Finding No Significant Impact”, or
2. a finding that one or more of the environmental impacts are significant and a decision to issue a Notice of Intent to prepare an Environmental Impact Statement (EIS).

The Refuge is a unit of the National Wildlife Refuge System (NWRS) and is administered by the U.S. Department of the Interior, U.S. Fish and Wildlife Service (USFWS). The mission of the NWRS is "... to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (Public Law 105-57).

The Refuge was established in 1990 under the authority of the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, as amended) "for the development, management, advancement, conservation, and protection of fish and wildlife resources through research, acquisition of land and water or interests therein, development of existing facilities, and other means". The Refuge currently consists of all or part of 24

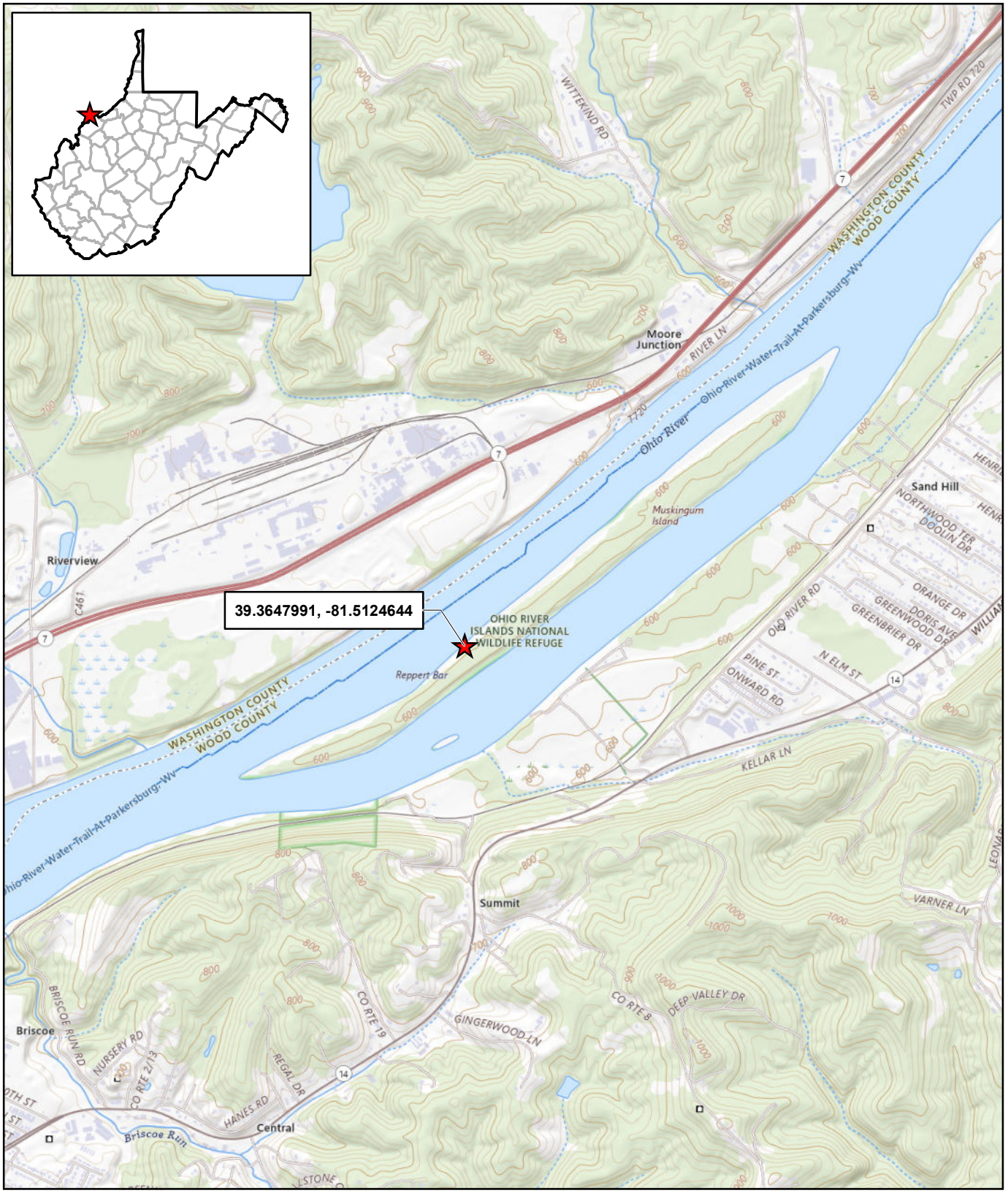


Figure 1. Location of the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

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islands and four mainland tracts encompassing 1,392.3 hectares (3,440.4 ac) scattered along 587 kilometers (365 mi) of the upper Ohio River in Pennsylvania, West Virginia, and Kentucky.

2.0 Purpose and Need for Action

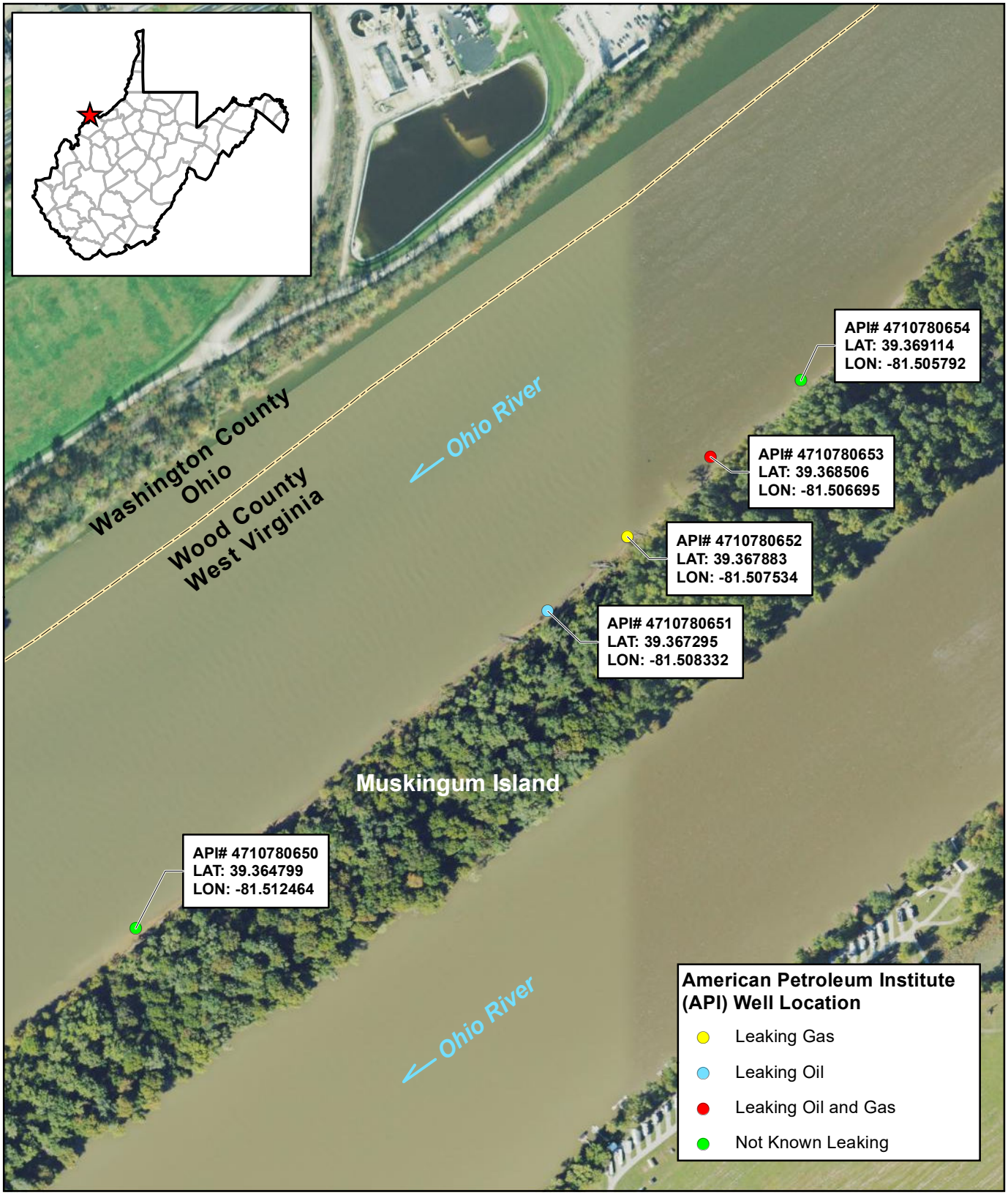
2.1 Purpose

The purpose of the project is to restore high quality habitat for resident mussel populations on the Refuge and remove a persistent source of petroleum pollution in the Ohio River. A primary goal of the Refuge is to "preserve and restore wetland, riverine and riparian habitat in order to maintain a natural abundance and diversity of native species which are endemic to the Ohio River floodplain (with emphasis on trust resources, endangered and threatened species, and other species of concern)" (USFWS 2002). The Refuge is home to more than 40 species of freshwater mussels and actively manages and restores freshwater mussel populations (USFWS 2023). Management actions seek to offset the historic and continuing loss and degradation of instream, riparian, and floodplain habitats within the Ohio River ecosystem through protection, restoration, and active management of priority lands (e.g., tree plantings, control of exotic species, re-introduction of extirpated species, augmentation of depleted species) in cooperation with federal, state, and local partners.

2.2 Need for Action

Previous testing indicates three of the five wells proximate Muskingum Island are leaking oil and/or natural gas into the Ohio River (Figure 2). Although not observed during testing, the two remaining wells also offer potential for intermittent petroleum leaks. Petroleum products are toxic to mussels and many other species of wildlife at multiple temporal and physical scales (Keller et al. 1998, Perhar and Arhonditsis 2014). Toxicity ranges from acute, where mortality occurs shortly after exposure (Keller et al. 1998, Humphries 2006, Archambault et al. 2017b), to chronic, where impacts result in increased oxygen uptake (Balamurugan and Veerasamy 2022) — an indication of increased energy use indicative of stress. Impacts of petroleum exposure are further exacerbated by other stressors. For example, sediments have potential to clog the gills of aquatic species and, depending on the source, possibly contain petroleum and other toxic materials (Archambault et al. 2017a, Archambault et al. 2017b).

Historically, all five instream wells were above normal water levels on Muskingum Island. To maintain navigability, the Ohio River is currently managed via a series of pools controlled by locks and dams thus water levels fluctuate less dramatically but are often maintained at higher than historic levels. Erosion resulting from historic



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Figure 2. Location and status of five, submerged, orphaned wells on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

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0 100 200 Meters

Base Map: NAIP Natural Color Imagery

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farming practices and associated with wave action from watercraft also contributed to reducing the island's landmass. Thus, the five wells proximate the island are now below the normal pool elevation and are leaking directly into the river in an area known to contain both naturally occurring and reintroduced populations of federally listed mussels.

A primary focus of the Refuge is mussel management and recovery (USFWS 2023). Removing a persistent and proximate source of petroleum benefits federally listed mussels and fish serving as hosts for larval mussels (glochidia) and removes a known point source of pollution, reduces the Ohio River's pollutant load, and removes a threat to ongoing efforts to reclaim island habitat and restore historical bottomland and riparian forest.

Limiting release of pollutants into the river and surrounding watershed represents a logical approach in support of the Refuge's conservation efforts and objectives. Further, pollution and habitat degradation are listed as threats to aquatic species' survival and managing, protecting, and enhancing known habitat are identified as conservation priorities in recovery plans and five-year reviews for most species associated with the project (USFWS 1985; 1991; 1992; 1994; 2022; 2024).

2.3 Proposed Action

The USFWS Proposed Action is to permanently seal five orphaned wells proximate Muskingum Island in the Ohio River. The Proposed Action assumes involvement of the U.S. Army Corps of Engineers (USACE) for authorization of certain well plugging activities. Authorizations include section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. The analysis contained in this EA will provide information for site-specific project review and USACE permitting. The Proposed Action will be carried-out by Hydrocarbon Well Services (well plugging contractor) under the direct supervision of USFWS. The Proposed Action comprises four primary components:

- Mussel salvage and relocation,
- Gaining Access to wells by dredging space for a work barge,
- Well plugging/sealing, and
- Monitoring mussel status in the Proposed Relocation Area.

2.3.1 Mussel salvage and relocation

Prior to beginning work, a team of qualified biologists focuses on removing all mussels from the Salvage Zone (i.e., areas where negative impacts are expected to occur) (Figure 3). Salvage Zones encompass each Dredge Area plus a salvage buffer within 10 meters (32.8 ft) upstream, downstream, and channelward of each of the five Dredge Areas. Upon capture, each federally listed mussel is identified, measured, photographed, and marked with a permanent numeric vinyl tag (e.g., Floy shellfish

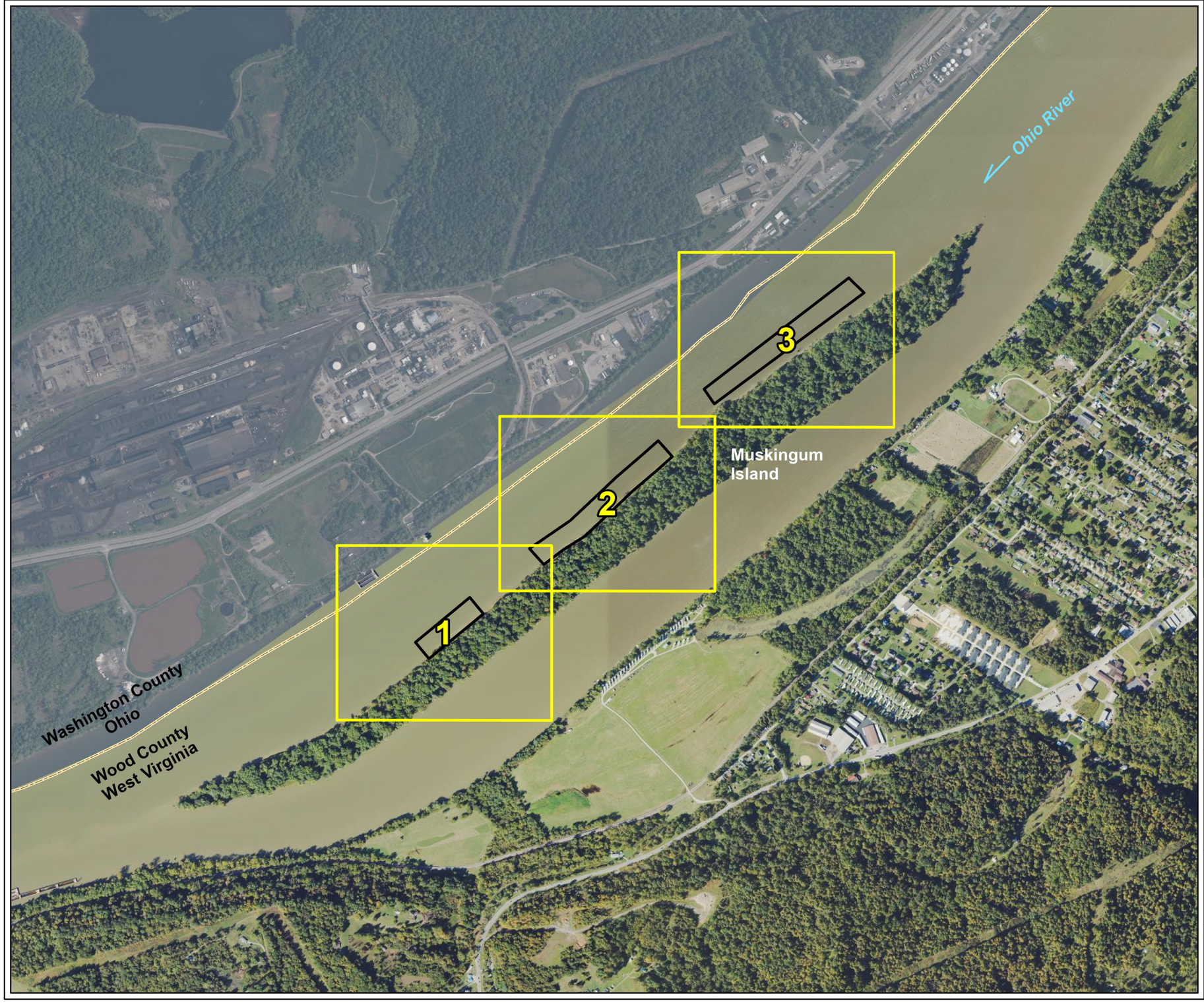
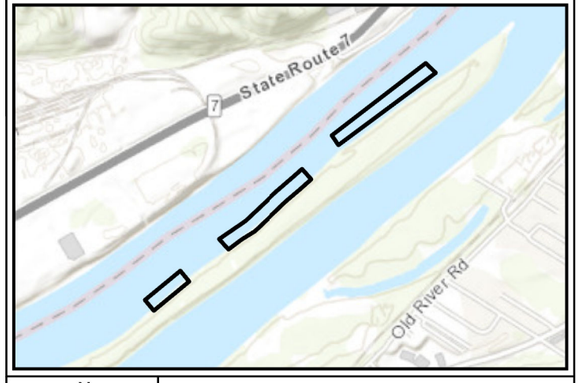


Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map Key

- Area Detailed on Subsequent Maps 1 through 3
- State Boundary
- Action Area



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Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
USA NAIP Imagery: Natural Color: Esri, USDA Farm Service Agency

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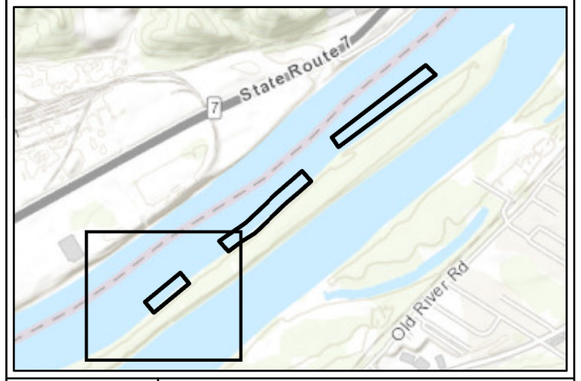
Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map 1 of 3

- American Petroleum Institute (API) Well Location
- Area of Direct Effect (ADE)
- Area of Indirect Effect (AIE)
- Dredging Area
- Salvage Zone
- Upstream Buffer
- Downstream Buffer
- Lateral Buffer
- State Boundary

Live Listed Species

- Fanshell
- Pink mucket
- Round hickorynut
- Sheepnose



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Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
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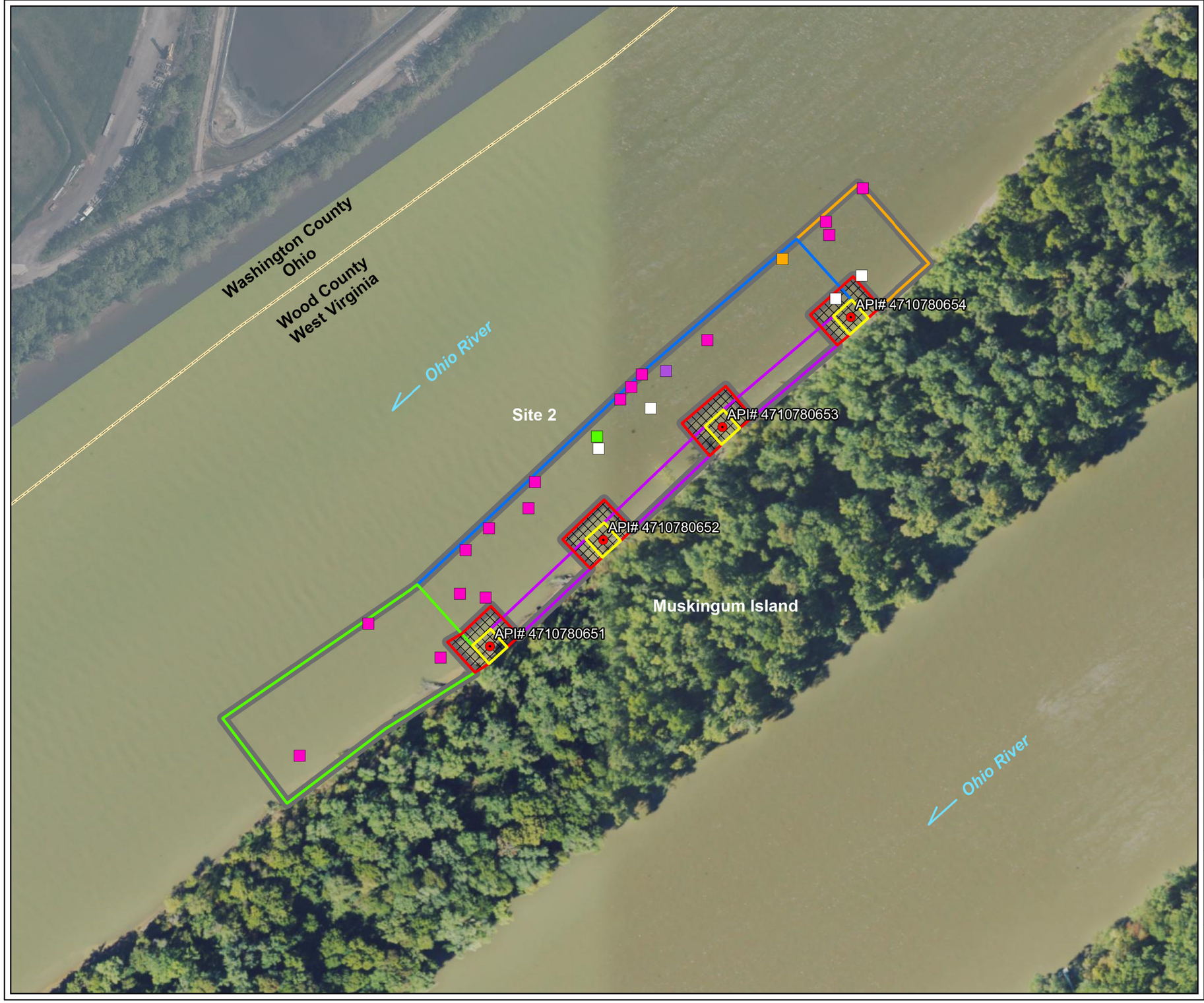


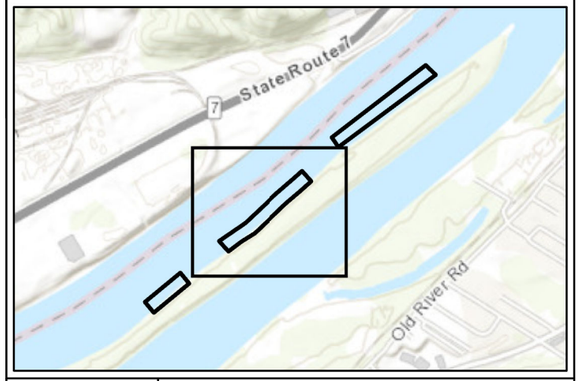
Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map 2 of 3

- American Petroleum Institute (API) Well Location
- Area of Direct Effect (ADE)
- Area of Indirect Effect (AIE)
- Dredging Area
- Salvage Zone
- Upstream Buffer
- Downstream Buffer
- Lateral Buffer
- Intermediate Buffer
- State Boundary

Live Listed Species

- Longsolid
- Clubshell
- Fanshell
- Round hickorynut
- Sheepnose



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Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
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Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

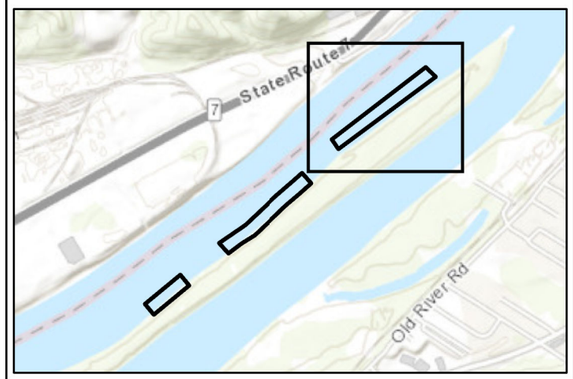
Map 3 of 3

State Boundary

Proposed Relocation Area

Live Listed Species

Longsolid



N
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Meters
0 50 100

Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
USA NAIP Imagery: Natural Color: Esri, USDA Farm Service Agency

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tag). Per the West Virginia Mussel Survey Protocol (WVMSP), common mussels are identified, measured, and salvaged concurrently with federally listed mussels. Mussels are removed from the water for no more than five minutes at a time, consistent with the WVMSP. Salvaged mussels are held in mesh bags and stored in aerated live wells (e.g., coolers, onboard circulation tanks) filled with river water. Livewell temperatures are monitored, and regular water changes occur to alleviate temperature stresses. Alternatively, mussels are potentially held in mesh bags directly submerged in the river. Federally listed mussels are transported to and released in the Proposed Relocation Area along transects running parallel to flow (Figure 3). Salvaged mussels are stocked at a density of one federally listed mussel per square meter (10.7 ft^2). All federally listed mussels are hand placed in the substrate.

2.3.2 Well Access

Well access is requisite in advance of initiating plugging efforts, the riverbed is dredged to remove sediment proximate each well to afford work barge access. Prior to dredging and regardless of method, sediment curtains are installed around the dredge site to reduce the amount of sediment entering the river. A qualified dredger removes enough material for barge access to the site. Water depth at each well varies from 0.3 to 2.4 meters (1.0 to 7.9 ft) therefore the amount of material requiring removal varies and is contingent upon local conditions. Dredged material is removed from the water and loaded into a hopper barge for lime treatment, temporary storage, and transport to an approved landfill. The hopper barge is either anchored to the work barge or moored with spuds adjacent each well. Based on current information, dredging and well site set up is anticipated to take up to three days per well and up to 15 days in total.

Conservation measures implemented when gaining access to wells include installation of sediment curtains and marine oil booms left in place until well plugging is complete. Conservation measure implementation ensures impacts associated with well access are confined to the smallest possible footprint.

2.3.3 Well Plugging

2.3.3.1 Preparation for Plugging

ESI assumes the work barge is a flat deck barge commonly used for nearshore dredging, drafting between 0.6 to 1.2 meters (2.0 to 4.0 ft). Water depths at well locations are approximately 1.5 to 4.9 meters (5.0 to 16.0 ft) (ESI 2024). Therefore, the barge operates in water approximately 1.52 to 4.87 meters (5.0 to 16 ft) deep. The spud size used on flat deck barges depends on water depth at the anchoring site, substrate conditions, and total barge weight. Spud diameter is assumed as between 30.5 and 61.0 centimeters (12.0 to 24.0 inches). Once the work barge is anchored in place via spuds next to a well, timber mats serving as floats for tubing material are placed on the opposite side of the well. Each well is then tested and depressurized if needed. Existing tubing and casings are inspected. A damaged casing is replaced with a new casing of similar diameter and is potentially taller than the original casing, such

that it extends to a suitable working height. A marine oil boom and sediment curtain are installed around each well site and an appropriate wellhead is installed followed by a cellar comprising a 50.8-centimeter (20-in) pipe driven into the riverbed. The cellar and oil booms are designed to capture leaking petroleum. Existing tubing and any debris are removed and the well depth is verified. If total depth is not reached, cleanout occurs to a depth set by an inspector.

2.3.3.2 Plugging

The following well plugging plan from engineers employed by Hydrocarbon Well Services (well plugging contractor) assumes wells extend 714.1 meters (2,343.0 ft) deep targeting the Berea Sandstone formation at an estimated depth of 567.5 meters (1,852.0 ft). The casing is cleaned using pressurized water to blow material out of the well and accommodate insertion of the hose used to force concrete into the well. Any recovered water and debris are held in tanks and disposed of as produced water. A hose is fed to the bottom of the well and liquid concrete is pumped down the hose as it is slowly withdrawn thus filling a predetermined portion of the shaft with concrete. A minimum of four plugs are installed, including one beginning at the bottom of the well and extending upward 164.8 meters (541.0 ft), from an estimated depth of 714.1 meters (2343.0 ft) to 549.3 meters (1,802.0 ft). Above the initial plug, the casing is stretched or cut to determine a free point to remove it from the well. A second 30.5-meter (100.0-ft) plug is set from 15.2 meters (50.0 ft) inside the casing cut to 15.2 meters (50.0 ft) outside the casing cut. A third 78.9-meter (259.0-ft) plug is installed 15.2 meters (50.0 ft) inside the casing extending 210.9 meters (692.0 ft) above elevation, and finally a fourth plug is installed beginning 76.2 meters (250.0 ft) from the surface and ending at the surface covering the casing seat.

Beginning with the bottom plug, each plug is allowed to dry for eight hours and its depth is confirmed before proceeding to the next plug. If the plug is deeper than expected (an indication some concrete fell out the bottom) or other signs indicate the plug was not successful, an additional plug is installed. Between each plug the well is filled with a gel of Bentonite clay and water thus preventing pressure from pushing the plug out of the well. Using a staged plugging approach to (i.e., monitoring each cement plug for eight hours before proceeding) allows time for detection of leaking Bentonite if any leaks occur. As noted above, marine and oil booms are installed around the work area to contain any oil or Bentonite leaks. Additionally, turbidity curtains are installed to further contain potential leaks. Following well sealing, the cellar and oil boom are removed, a monument is placed to mark the site, and all equipment is removed. Well plugging is assumed to require up to 12 days per well and 60 days in total.

2.3.4 Mussel Monitoring

Monitoring relocated mussels tracks long-term success of individuals relocated as a result of the Proposed Action additional to resident mussels identified in the Proposed Relocation Area. Monitoring data are provided to USFWS (both ORINWR and the West Virginia Field Office [WVFO]) and to WVDNR and are used to facilitate future relocation and restoration efforts.

Success of relocation efforts is evaluated by monitoring relocated mussels across two survey events. Qualified biologists complete the first monitoring survey 30 to 60 days after relocation to determine apparent initial survivorship; a second monitoring survey is completed approximately one year following relocations to assess longer-term survival. Although no consensus on post-relocation monitoring frequency, timeframe, or methods exists, a review of 33 mussel relocation projects, Cope and Waller (1995) indicates the greatest percentage of post-relocation mortality often occurs within the first year. The 30-to-60-day post-relocation monitoring survey is planned to ensure the selected Relocation Area provides adequately suitable conditions by confirming targeted survivorship. Additionally, mortality skewed toward smaller individuals shortly after relocations potentially indicates the relocation site is not suitable and the initial survey provides early detection of possible inadequacies (Hart et al. 2016). The rationale for the one-year follow-up monitoring survey is based on previous reports indicating most mortality occurs within the first year of relocation. As such, if survivorship after one year of relocation is within the target goal, relocation success becomes a reasonable assumption.

Monitoring comprises qualitative searches along pre-established transects parallel to flow and progresses in an upriver direction. Divers search a pre-established transect at a rate of 1 minute per square meter (110.7 ft^2) along a 1-meter (3.3-ft) wide swath on each side to capture mussels that potentially “traveled” since they were planted in the substrate. Mussels encountered during monitoring events are held in mesh bags and brought to the surface for morphometric processing and identification. Federally listed mussels encountered and not previously documented are tagged, photographed, and reported to USFWS-WVFO and WVDNR within 48 hours. Captured mussels are released unharmed and replaced along the transect; federally listed mussels are distributed as encountered.

All deadshell tagged and non-tagged federally listed specimens collected during relocation and monitoring surveys are submitted to the WVDNR via mail or personal transfer. A report is submitted to the USFWS and WVDNR within 30 days of the initial survey’s completion and within 30 days of completion of each monitoring effort.

Short-term mussel monitoring objectives associated with the Proposed Action include documenting greater than 75 percent survivorship. Optimal long-term goals for mussel relocation and monitoring include greater than a 50 percent survival rate for relocated

individuals in tandem with observation of normal behaviors (e.g., female gravidity, normal positioning). Thresholds for survivorship are based on the Michigan Mussel Survey Protocols and Relocation Procedures (Hanshue et al. 2016) indicating anything greater than 75 percent survivorship represents acceptable short-term mussel survivorship goals, while acceptable long-term, post-relocation survival is greater than 50 percent.

Documenting survival rates prescribed by Hanshue et al. (2016) requires greater than the WVMSP 50 percent detection rate, thus up to three search passes are completed along relocation transects ensuring accurate survivorship documentation.

2.4 Scoping of Issues and Concerns

The USFWS encouraged public participation in development of this EA. Public notices, press releases, and postings on social media were used to contact the public and request comments and input. In addition, scoping letters were mailed to federal, state, and local partners and other potentially interested individuals. Letters and postings were published during the week of May 19, 2025. Thirty days were provided for input.

In response to the Proposed Action and incorporation of questions and comments raised in conversations and correspondence with individuals and organizations within and outside the agency, the USFWS identified the following issues and concerns:

- Gaining access to instream wells through dredging and operation of a work barge offers potential to impact native mussels, including six federally listed species, and
- Dredging activities disrupting sensitive historic and archaeological resources potentially occurring at Muskingum Island.

2.5 Compliance with Laws, Regulations, Policies, Guidance, and Plans

The Proposed Action and alternatives comply with applicable Federal statutes, regulations, Executive Orders, and other compliance documents.

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Bald Eagle Protection Act, as amended (16 U.S.C. 668-668d)
- Clean Air Act of 1972, as amended (42 U.S.C. 7401etseq.)
- Clean Water Act of 1972, as amended (33 U.S.C.1251etseq,)
- Endangered Species Act of 1973, (ESA), as amended (16 U.S.C,1451et seq.)
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661etseq.)
- Fish and Wildlife Improvement Act of 1958, as amended (16 U.S.C. 7421)

- Floodplain Management (Executive Order 11988)
- Migratory Bird Treaty Act, as amended (16 U.S.C. 703-712)
- National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee) by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321etseq.)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 etseq.)
- National Historic Preservation Act of 1966, as amended (16 U.S.C 470 etseq.)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001etseq.)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- National Pollutant Discharge Elimination System, as amended (33 U.S.C 1251etseq.)
- Rivers and Harbors Act of 1899 (33 U.S.C. § 403)
- Soil and Water Conservation Act of 1977, as amended (16 U.S.C. 2001-2009)

In 2002, the Refuge completed a Comprehensive Conservation Plan (CCP) outlining management goals and objectives (USFWS 2002). The Proposed Action and alternatives facilitates fulfilling goals and objectives and is compatible with all aspects of the CCP.

The Proposed Action also complies with applicable state and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered and threatened plants and animals, and cultural resources.

2.6 Decisions To Be Made

Two alternatives are presented in this EA: a No Action alternative and an alternative to permanently seal five wells proximate Muskingum Island in the Ohio River (Proposed Action).

The NEPA process culminates with a decision by the USFWS Northeast Regional Director on one of the two alternatives. Once an alternative is selected, the Regional

Director decides whether the EA is adequate to support a Finding of No Significant Impact (FONSI). If the EA is determined to be adequate, the project is implemented. If the EA is determined inadequate, an EIS is prepared, and the project is not implemented until the document is completed and approved.

3.0 Description of Alternatives

Pursuant to the NEPA, federal agencies must consider a range of reasonable alternatives to the Proposed Action when evaluating the impacts of its actions (40 CFR 1505.1(e)) including consideration of a No Action or "Status Quo" alternative.

In developing the alternatives, a variety of factors were considered, including current threats, stressors, and conservation needs of federally listed species proximate the leaking wells; input from the public, species experts, and agency stakeholders; future ESA compliance obligations; and on-going, reasonably foreseeable mussel conservation efforts.

3.1 Alternative 1 – No Action

Under this alternative USFWS will not seal any wells in the Ohio River proximate Muskingum Island.

3.2 Alternative 2

Permanently seal five wells proximate Muskingum Island; three known to be leaking oil and/or natural gas into the Ohio River and two offering potential to leak oil and/or natural gas into the Ohio River.

3.3 Other Alternatives Considered but Dismissed from Consideration

Permanently sealing only the three wells leaking petroleum in the Ohio River proximate Muskingum Island. Although considered, the alterative was dismissed from consideration because potential adverse effects to mussels and the human environment remained virtually the same as the Proposed Action (Alternative 2) while potential benefits to mussels and the human environment considerably decreased.

3.4 Comparison of Alternatives

The Proposed Action's goal to restore high quality habitat for resident mussel populations on the Refuge and remove a persistent source of petroleum pollution in the Ohio River is achieved following Alternative 2. The other option, Alternative 1 – No Action, implements no changes to the wells and allows unchecked oil and gas releases to continue.

4.0 Affected Environment

The affected environment comprises the area and its resources (e.g., physical, biological, social) potentially impacted by the Proposed Action and Alternatives. Describing the affected environment defines the context in which impacts occur. To make an informed decision regarding appropriate actions for implementation, the first step includes understanding what is being affected by the alternatives and what are the potential impacts. The affected environment section of this EA provides a basis for understanding. The Biological Assessment for the Proposed Action is provided in Appendix A.

4.1 Terrestrial Habitat

Upland areas on Muskingum Island support floodplain forest habitat characterized by vegetative communities adapted to periodic inundation by flood waters. The island shoreline consists of sharp cut banks with dense riparian vegetation extending up the slope to the floodplain. Dominant overstory species present include silver maple (*Acer saccharinum*), sycamore (*Platanus occidental*), cottonwood (*Populus deltoides*), and black willow (*Salix nigra*). Less dominant trees include slippery elm (*Ulmus rubra*), pin oak (*Quercus palustris*), river birch (*Betula nigra*), sweet gum (*Liquidambar styraciflua*), and hickories (*Carya* spp.). Lower canopy species include hackberry (*Celtis occidentalis*), black locust (*Robinia pseudoacacia*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), pawpaw (*Asimina triloba*), buckeye (*Aesculus glabra*), and black walnut (*Juglans nigra*). Shrubs include spice bush (*Lindera benzoin*), Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), dogwoods (*Cornus spp.*), black elderberry (*Sambucus nigra*), and grape species (*Vitis spp.*). Ground cover includes wingstem (*Verbesina alternifolia*), touch-me-nots (*impatiens sp.*), white snakeroot (*Ageratina altissima*), and a profusion of invasive exotic plants (Japanese knotweed [*Reynoutria japonica*], garlic mustard [*Alliaria petiolate*], mile-a-minute [*Persicaria perfoliate*], Japanese hops [*Humulus japonicus*], and kudzu [*Pueraria spp.]*) (USFWS 2002).

4.2 Aquatic Habitat

Riverine island habitat is characterized by dynamic depth and current ranges maintaining a diversity of habitat niches used by numerous aquatic species. Side-channel habitat provides refuge from swift currents for energy conservation, additional to depositional areas for organic material consumed by benthic organisms. Muskingum Island includes approximately 3 kilometers (1.87 mi) of side-channel habitat and additionally supports extensive shallow water features as the river bottom gradually slopes from the shoreline to the channel, typically 0.3 to 5.5 meters (1.0 to 18.0 ft). Substrate composition around Muskingum Island includes mixtures of sand, gravel,

and cobble, with occasional boulders, woody debris, submerged and emergent aquatic beds, and nearshore clay and silty sand benches. Contiguous habitats provide fish spawning, nesting, nursery, and foraging locations additional to colonization areas for mussels and other invertebrates. Sand, gravel, cobble, and boulder habitat supports a diversity of freshwater mussels, the most common including threeridge (*Amblema plicata*), monkeyface (*Theliderma metanevra*), and black sandshell (*Ligumia recta*) (ESI 2024). Other common mussel species at Muskingum Island include Ohio pigtoe (*Pleurobema cordatum*), butterfly (*Ellipsaria lineolate*), pimpleback (*Cyclonaias pustulosa*), and pink heelsplitter (*Potamilus alatus*). Freshwater mussels are an indicator of habitat quality, requiring clean-swept sand, gravel, cobble and boulder habitat, and well oxygenated and nutrient rich waters, habitats abundant around the island. Submerged aquatic vegetation occupies shallow areas (typically < 1.5 meters [5 ft]) with common species such as freshwater eelgrass (*Vallisneria americana*), milfoil (*Myriophyllum spp*.), naiad weed (*Najas spp*.), pondweeds (*Potamogeton spp*.), and invasive hydrilla (*Hydrilla verticillata*). River depths, current patterns, substrates, and associated riparian forest support a diverse assemblage of fish, mussels, and other aquatic life.

4.3 Wetlands

Currently, no recognized emergent wetland habitats exist on or around the island; shoreline areas are classified by the National Wetlands Inventory as riverine, lower perennial, unconsolidated bottom, permanently flooded habitat (R2UBH) and riverine, lower perennial, unconsolidated shore, seasonally flooded habitat (R2USC).

4.4 Water Quality

As water quality is a primary concern for mussels within the project area, the Ohio River Valley Water Sanitation Commission's (ORSANCO's) water quality and biological monitoring efforts in the Ohio River between 2018 and 2022 were reviewed and results determined the entire Ohio River fully supports the commission's aquatic life use designation (ORSANCO 2022), indicating conditions are favorable for the continued persistence of federally listed mussel species. However, extensive periods of turbidity (resulting from high suspended sediments) and subsequent sedimentation of substrates affect water quality. Erosion of islands and banks, and sedimentation and siltation of shallow water embayment areas adversely affect water quality and general bottom habitat conditions for mussels and other benthic invertebrates and fish populations (available at: https://www.fws.gov/refuge/ohio-river-islands/what-we-do; data accessed January 2025). Sand and gravel dredging for navigation purposes also physically impacts island stability.

4.5 Cultural Resources

The Refuge has a statutory obligation to protect historic and archaeological resources potentially occurring on its lands. In support of this EA and the Refuge's cultural review, ESI completed a desktop review of known cultural resources on 25 February 2025 using an online GIS Map viewer maintained by the West Virginia Department of Arts,

Culture & History, the agency serving in the role of the State Historic Preservation Office (West Virginia SHPO). Review identified all cultural resource surveys, known cultural resources (e.g., archeological sites), and known cemeteries within 1.6-kilometers (1 mi) of the Dredging Area and known historic architectural resources within 0.40 kilometer (0.25 mi) of the Dredging Area. To assess potential for unknown sites, a probability analysis was completed assuming unknown sites are most likely to occur in areas close to water, on flat ground, and near other known cultural sites.

Dredging Areas contain no known archeological sites, historic sites, cemeteries, or examples of historic architecture and are within an area investigated during two previous archeological studies. One previous study, completed by Archaeological and Historical Consultants, Inc. in 1998, identified five precontact village sites along the island's northern shoreline dating to the Woodland period (800 BC–AD 1200) (AHC 1998). Based on information contained on existing site forms, eligibility status of the five precontact village sites is currently unknown; however, the high density of features and presence of diagnostic artifacts likely indicate the sites are eligible for listing on the National Register of Historic Places (NRHP). Three likely eligible sites are between wells API# 4710780650 and API# 4710780651 on the current shore; the two remaining sites are farther downstream along the current shore.

Proposed Dredging Areas offer a substantially high probability of historic use based on flat topography, proximity to the river, and position near known cultural sites. Muskingum Island likely originated as part of the mainland West Virginia floodplain, cut off from the mainland by natural river re-channelization. Historically, the island likely provided high probability sites for human activity as travelers along the river made short-term visits to the banks with longer-term habitations possible within the island's interior. Over time, erosion and maintenance of a deeper navigational pool modified the shoreline indicating the current shoreline was once the center of the island and prime occupation land. Historically, sediments accumulated on the island's upstream and downstream banks, burying and protecting older sediments likely containing precontact Paleoindian habitation sites (AHC 1998). Areas proposed for dredging regularly endure sediment deposition and erosion.

4.6 Threatened and Endangered Species

Pre-construction surveys in the Impact Area (i.e., the Action Area excluding the Proposed Relocation Area) yielded captured of 35 federally listed mussels representing six species including: clubshell (*Pleurobema clava*; n=1), fanshell (*Cyprogenia stegaria*; n=3), longsolid (*Fusconaia subrotunda*; n=1), pink mucket (*Lampsilis abrupta*; n=1), round hickorynut (*Obovaria subrotunda*; n=5), and sheepnose (*Plethobasus cyphyus*; n=24). One additional longsolid was captured during relocation site scoping dives upstream of the Proposed Action (ESI 2024). In 2014, the Refuge began stocking northern riffleshell (*Epioblasma rangiana*) in waters near Muskingum Island (USFWS 2019a). Three other federally listed mussels occur within the Refuge's boundaries (in total, comprising 24 Ohio River Islands); however,

no additional species are anticipated present in the Impact Area. Although Indiana bat (*Myotis sodalis*), tricolored bat (*Perimyotis subflavus*), and monarch butterfly (*Danaus plexippus*) are known or likely to occur proximate the Proposed Action, the Proposed Action is isolated entirely within the Ohio River, precluding potential effects on bat or insect species.

4.7 Migratory Birds and Eagles

Year-round residents include great blue heron (*Ardea herodias*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), killdeer (*Charadrius vociferus*), and belted kingfisher (*Megaceryle alcyon*); landbirds such as northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Poecile carolinensis*), tufted titmouse (*Baeolophus bicolor*), Carolina wren (*Thryothorus ludovicianus*), song sparrow (*Melspiza melodia*), and various species of woodpeckers; and raptors such as red-tailed hawk (*Buteo jamaicensis*) and great horned owl (*Bubo virginianus*). Seasonal migrants include osprey (*Pandion haliaetus*), spotted sandpiper (*Actitis macularius*), warblers, vireos, flycatchers, swallows, cuckoos, and tanagers. The island's exposed banks offer nesting habitat for birds such as belted kingfishers and swallows. Great blue heron rookeries also occur on the island.

Although not specifically pinpointed on Muskingum Island, bald eagles (*Haliaeetus leucocephalus*) were previously observed wintering on the Refuge. A breeding pair of bald eagles was observed nesting on Neal Island, approximately 3.1 kilometers (5 mi) from Muskingum Island.

4.8 Native Fish and Wildlife

Muskingum Island harbors diverse assemblages of native fish and wildlife likely attributable to the interspersion of bottomland and riparian habitats with shallow and deepwater habitats. Migratory birds (shore and wading birds, waterfowl, raptors, landbirds), mammals, reptiles and amphibians, fish, mussels, and other invertebrates use the island and surrounding habitats, some as year-round residents and some as seasonal visitors.

Common mammals on Refuge islands include white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), American mink (*Neovison vison*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), groundhog (*Marmota monax*), and fox squirrel (*Sciurus niger*). Although the island was not specifically surveyed for bats, the West Virginia portion of the Refuge supports red (*Lasiurus borealis*), hoary (*Lasiurus cinereus*), tricolored (*Pipistrellus subflavus*), little brown (*Myotis lucifugus*), and big brown (*Eptesicus fuscus*) bats, known to extensively feed on insects over the river.

Off-channel environments provide escape areas for prey fish, ambush areas for predators, refugia for resting, and sanctuaries for rearing young. Waters surrounding Refuge islands support a diverse fish and mussel fauna including over 100 species of

freshwater fish occupying aquatic habitat adjacent Refuge islands (USFWS 2002). Muskingum Island's underwater habitat supports one of the richest freshwater mussel populations anywhere in the Ohio River, with 28 species and an average density of 12 live mussels per square meter (USFWS 2002). In 2024, ESI completed a freshwater mussel survey at Muskingum Island following the WVMSP. Surveys encompassing a combined area of 36,400 square meters (9.0 ac) yielded collection of 6,111 live mussels comprising 25 species including six federally listed species (ESI 2024).

4.9 Human Health and Safety

Oil and natural gas leakage from wells potentially poses significant health and safety risks for humans. As a source of drinking water and use for recreational activities, contamination from the Ohio River offers potential for both direct and indirect effects. Exposure potentially increases risk of nausea, headaches, dizziness, skin irritation, and cancer (available at: https://www.sierraclub.org/articles/2023/08/silent-threat-health-impacts-living-near-idle-wells; data accessed January 2025).

4.10 Socioeconomic Resources

Muskingum Island is in Wood County, West Virginia, between the towns of Moore Junction, Ohio and Boaz, West Virginia. Like many islands scattered along the upper Ohio River, Muskingum Island has a rich history. In the 19th century, the island was primarily used for farming corn, wheat, potatoes, and orchards. In the early 20th century, the island was marked by numerous oil wells; 33 were present before 1929. Over time wells led to significant degradation of the island's resources. Collection pipes, well casings and other debris in areas where erosion removed the soil, remain visible from the island's banks (USFWS 2002).

Recreational use of the island reflects seasonal opportunities and locations for specific activities. Popular public uses currently include fishing, motorized boating, canoeing, kayaking, water-skiing, swimming and wading, picnicking, wildlife observation, and hunting. Gradual improvements in water quality over the past 30 years and improved public access increased the public's interest in the river. Overnight camping and boat mooring is prohibited, but considerable day use occurs along the shorelines. The Refuge allows fishing from boats and along shorelines; hunting for white-tailed deer (archery only), waterfowl, and small game; trapping; and wildlife observation and photography. The undisturbed island shorelines, particularly heads and backchannel areas, are favored fishing areas (USFWS 2002). Currently, no commercial use nor active human residences are maintained on the island.

5.0 Environmental Consequences

This section compares the alternatives described in Section 3, including potential environmental consequences of each alternative's implementation. The EA's conclusions are based on impact analysis and the following assumptions:

- Well plugging activities would occur at the same location and point in time for each action alternative.
- Well plugging activities would be implemented as described in Section 2.3.3.
- Well plugging Contractor would comply with all applicable laws and regulations.

5.1 Alternative 1 (No Action/Status Quo)

5.1.1 Impacts to Terrestrial Habitat

Under Alternative 1 the USFWS implements neither action alternative. No impacts to terrestrial habitat occur as a result of well plugging activities.

5.1.2 Impacts to Aquatic Habitat

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to aquatic habitat occur as a result of well plugging activities. Aquatic habitat proximate and downstream from the island remains adversely impacted from leaking oil and/or natural gas wells in the Ohio River, including several federally listed mussels with known occupancy.

5.1.3 Impacts to Wetlands

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to wetlands occur as a result of well plugging activities.

5.1.4 Impacts to Water Quality

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to water quality occur as a result of well plugging activities. Water quality in the Ohio River remains adversely impacted from leaking oil and/or natural gas wells in the river. This alternative also relinquishes an opportunity to remove a known point source of pollution and reduce the Ohio River's pollutant load.

5.1.5 Impacts to Cultural Resources

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to cultural resources occur from dredging. Oil continues to contaminate any material present.

5.1.6 Impacts to Threatened and Endangered Species

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to threatened and endangered species occur as a result of well plugging activities. Threatened and endangered species proximate and downstream Muskingum Island remain adversely impacted from leaking oil and/or natural gas wells in the Ohio River. This alternative relinquishes an opportunity to restore high quality habitat for six threatened and endangered mussel species and contribute to their recovery.

5.1.7 Impacts to Migratory Birds and Eagles

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to migratory birds and eagles occur as a result of well plugging activities.

5.1.8 Impacts to Native Fish and Wildlife

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to native fish and mussels occur as a result of well plugging activities. Native fish and mussels proximate and downstream Muskingum Island remain adversely impacted from leaking oil and/or natural gas wells in the Ohio River. This alternative relinquishes an opportunity to restore high quality habitat for native mussels and fish serving as hosts for larval mussels (glochidia).

5.1.9 Impacts to Human Health and Safety

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to human health and safety occur as a result of well plugging activities. Water quality in the Ohio River remains adversely impacted from leaking oil and/or natural gas wells in the river. This alternative would also relinquishes an opportunity to remove a known point source of pollution and reduce the Ohio River's pollutant load.

5.1.10 Socioeconomic Resources

Under Alternative 1, the USFWS does not implement well plugging activities. No impacts to socioeconomic resources occur as a result of well plugging activities. Public use of the shoreline and nearshore waters (e.g., hunting, fishing, wildlife observation, boat mooring) at Muskingum Island remain impacted by exposed and submersed oil and/or natural gas wells leaking petroleum into the Ohio River.

5.2 Alternative 2 - Permanently Seal Five Wells Proximate Muskingum Island in the Ohio River (Proposed Action)

5.2.1 Impacts to Terrestrial Habitat

Because well plugging activities occur proximate Muskingum Island via a work barge, no significant impacts to terrestrial habitat are anticipated.

5.2.2 Impacts to Aquatic Habitat

The Proposed Action permanently seals five oil and/or gas wells, including three leaking into the Ohio River in an area known to contain federally listed mussels and where the Refuge and the WVDNR are actively working to restore mussel populations. In addition to removing a persistent, local source of petroleum pollution, river bottom restoration using substrate suitable for mussel occupancy suggests the Dredge Area is likely to quickly regain viability as mussel habitat. Therefore, the Proposed Action results in neither a permanent loss of aquatic habitat nor a permanent loss of habitat function for mussels, but rather retains suitable mussel habitat and increases overall habitat quality and function in the area. Further, impacts are short-term and minor due to the relatively small area of the waterbody affected. No significant impacts to aquatic habitat are anticipated to occur from the Proposed Action.

5.2.3 Impacts to Wetlands

As with aquatic habitat, the Proposed Action permanently seals five oil and/or gas wells, including three known to be leaking into the Ohio River. Removing a persistent source of petroleum pollution and restoring wetland habitat to baseline conditions or better yields neither a permanent loss of wetland habitat nor a permanent loss of wetland habitat function. Further, impacts are short-term and minor considering the Proposed Action's size compared to the waterbody (Bellville Pool). Inherent in all alternatives, well plugging activities (i.e., dredging) potentially affecting wetland habitat are subject to regulatory approval, including permits from the USACE. Conditions of approval potentially include notification requirements and implementation of additional conservation measures, dependent upon the specific activity. No significant impacts to wetlands are anticipated from the Proposed Action.

5.2.4 Impacts to Water Quality

Impacts to water quality from well plugging activities proximate the island possibly include short-term erosion and sedimentation, substrate compaction, and inadvertent spills or contamination. However, conservation measures are implemented to avoid and minimize potential impacts to water quality including temporary erosion control, stockpiling dredge material for disposal off-site, and standard spill prevention, containment, and control practices (Section 2.3). No significant impacts to water quality are expected as a result of well plugging activities.

5.2.5 Impacts to Cultural Resources

Potential for impacts to cultural resources is primarily offset by current conditions at the Dredging Areas and their respective sizes. In-field data collected during mussel surveys documented the areas as dominated by highly mobile substrates (e.g., sand, silt; ESI 2024); wave action (due to both wind and boat wakes) constantly redistributes substrates, floods induce debris movement, and USACE controls water levels. The plastic nature of the shoreline and its substrates, including substrates in the Dredging Area, are unlikely original to Muskingum Island as sediment is constantly deposited and subsequently eroded here. The Refuge addressed cultural resource concerns for

the Proposed Action and received project clearance from the USFWS Northeast Regional Historic Preservation Officer, Ms. Amy Wood, on 11 February 2022 (Appendix B).

5.2.6 Impacts to Threatened and Endangered Species

Dredging is the primary activity potentially affecting freshwater unionid mussel communities and habitat. Dredging aspects possibly affecting mussels include physical disturbance within the Dredged Area, sedimentation due to downstream dispersal of disposed material, increased turbidity during dredging operations, and release of contaminants from dredged sediments.

Use of sediment curtains, marine oil booms, and cellars around wells all serve to minimize impacts to mussels outside the Dredging Area. Overlooking individuals during salvage efforts thus subsequently failing to relocate them prior to dredging likely poses the greatest potential for impacts to mussels. Individuals in the Indirect Effects Area (0.78 ha [1.92 ac]) are potentially subject to harm; however, potential for mortality by sedimentation is limited by implementation of conservation measures. Mussels open their valves to feed, thus individuals in heavily silt-laden water are forced to close their valves up to 90 percent of the time, as opposed to 50 percent for individuals living in silt-free environments (Brim Box and Mossa 1999). Extended valve closure potentially results in starvation or a state of semi-starvation. Extensive exposure to suspended sediment in the water column also affects individuals by clogging gill filaments, significantly reducing feeding efficiency and filtering clearance rates, potentially resulting in mortality (Brim Box and Mossa 1999). However, the small size and short duration of dredging activities suggest effects are temporary. Minimal sedimentation is anticipated during plugging efforts and the combined installation of cellars, oil booms, and sediment curtains around existing wells during plugging efforts is anticipated to maintain at or reduce petroleum leakage to below levels already experienced by local mussels.

The Proposed Action involves plugging actively leaking oil and gas wells consistently contributing to diminished water quality and possibly sediments within the area. Although the Proposed Action results in temporary loss of marginal habitat potentially supporting a small number of federally listed mussels. Mussel survey results from 2024 indicate habitat quality and functionality in the Dredging Area is lower than the channelward habitats present at water depths greater than 4.6 meters (15 ft).

. River bottom restoration coupled with completing the Proposed Action affords benefits for downstream mussel populations anticipated to last in perpetuity. Water quality improvements following removal of petroleum material and impacted sediments likely increase mussel fecundity, sperm survival rate, fish host presence, and juvenile survivability, among other short- and long-term benefits.

Avoidance and minimization are attained through conservation measures described in Section 2.3, particularly salvaging and relocating mussels upstream of temporary impacts during the Proposed Action; however, mussels are cryptic, juveniles are small, and individuals potentially burrow in substrate, precluding detection. Further, survey transects cover only a small portion of the Proposed Action. The WVMSP estimates only half of the mussels within any given search area are located. Approximately 9.91 percent of the Impact Area and 7.16 percent of the Salvage Zone were sampled during pre-construction surveys. Thus, missing or overlooking some individuals remains a possibility during salvage efforts. Any mussels missed or overlooked within the Dredging Area are likely killed either by crushing or dewatering. In addition, animals within the remainder of the Salvage Zone are potentially affected by sedimentation during dredging operations or from petroleum leaks prior to and during well plugging efforts.

5.2.7 Impacts to Migratory Birds and Eagles

Well plugging activities potentially impact various native fish and wildlife proximate the Proximate Action including migratory birds and eagles contingent upon the activity, timing, and location. Potential impacts include noise-related disturbances from work barge operation and well plugging equipment, habitat degradation from dredging, and temporary habitat loss (use) from human activity and presence of the equipment barge during plugging operations. However, impacts are not anticipated to significantly contribute to, or result in, reduced use of the area, breeding success, or loss or degradation of habitat resources, including vegetation and prey species, for migratory birds and eagles. No significant impacts are anticipated.

5.2.8 Impacts to Native Fish and Wildlife

Well plugging activities offer potential to affect fish habitat via dredging resulting in increased turbidity and sedimentation and decreased dissolved oxygen, thereby potentially suffocating eggs and larvae of fish and invertebrates. Siltation increases impair aquatic plant growth, stress adult fish by damaging gill membranes, destroy the eggs of fish and other aquatic organisms, and degrade local spawning and nursery areas. Sedimentation also displaces more mobile species and potentially smothers benthic invertebrates, decreasing prey availability for fish. Effects potentially degrade habitat quality, making it unsuitable for spawning and rearing activities. Dredging impacts are temporary and limited to locations and areas immediately downstream. As impacts are generally limited to a few days, and no longer than one month following completion of well plugging activities both displaced fish and wildlife are likely to return to the area and adjacent, undisturbed areas following completion. Less mobile species, such as small mammals, reptiles, and amphibians, potentially experience displacement and minor harassment if competition for some resources increases. Overall, impacts to native fish and wildlife are minor and short-term, as the area's habitat is planned for restoration and enhancement beyond baseline conditions, particularly from removal of petroleum and impacted sediments resulting in increased

fish and wildlife species diversity and abundance. No significant impacts are anticipated.

5.2.9 Impacts to Human Health and Safety

The Proposed Action of plugging the oil and gas wells actively leaking into the Ohio River removes the direct effects of contaminant exposure to individuals engaged in nearby recreational water activities (e.g., swimming) and reduces the indirect effects of contaminated drinking water supply.

Increased barge traffic resulting from the Proposed Action could affect recreational and commercial boaters in the area. However, barges are common on the Ohio River. Additionally, the dredging barge is anchored near shore and out of the navigation channel most of the time it is on the water. No significant impacts to human health and safety are anticipated due to the increased barge traffic.

5.2.10 Socioeconomic Resources

Implementation of the Proposed Action is not expected to have any direct or indirect impact to future land use. No measurable direct or indirect impact to employment, income, population, housing, or public services are expected to occur as a result of the Proposed Action.

The Proposed Action is associated with public land and as such, existing land use restrictions guide allowable land uses including well plugging activities. Depending on time of year, well plugging activities potentially result in short-term impacts to localized recreation activities (e.g., hunting, fishing, boating) and visual resources, although impacts are not large in scale nor of long duration. No significant impacts are anticipated.

5.3 Cumulative Effects

Cumulative effects are additive effects of future non-federal activities that are reasonably certain to occur within the Proposed Action's vicinity. Past and present actions caused the cumulative loss and degradation of large amounts of fish and wildlife habitat that historically supported a diversity of fish and wildlife species. Clearing and converting land for agricultural and industrial use, urban and rural development, utility infrastructure, roads, and other uses led to cumulatively increased wildlife disturbance from human activity, while the spread of non-native species led to significant reductions in species abundance and habitat diversity. Timber production activities converted large tracts of old-growth forest to other uses, causing human disturbance, habitat loss and fragmentation, and reduced habitat diversity. Past and present actions also resulted in cumulative impacts to fish and mussels including agricultural and timber harvest activities, transportation infrastructure, and other human developments, particularly in floodplains. Past actions caused loss of streamside riparian cover and function, loss of large in-stream woody debris sources, and addition of sediment into streams.

To gain an understanding of activities potentially contributing to a cumulative effect, historical events, proposed county commission plans, and municipality data from Wood County, West Virginia and adjoining Washington County, Ohio were reviewed. As water quality is a primary concern for mussels within the Proposed Action, ORSANCO's water quality and biological monitoring efforts in the Ohio River between 2018 and 2022 were reviewed and results determined the entire Ohio River is fully supporting its aquatic life use designation (ORSANCO 2022), indicating conditions are favorable for continued persistence of federally listed mussel species. Non-federal actions with potential to adversely affect mussels include contaminants/pollutants entering the river system from point and non-point sources. Near the Proposed Action, the Ohio River shoreline's substantial history of industrial, extractive, and agricultural uses likely contributed runoff potentially containing contaminants and sediments into the river thus adversely affecting mussels. In 1999, contaminants from a ferro-alloy manufacturing facility resulted in 100 percent mussel mortality at the spill source and affected over 30 river miles of the Belleville Pool in the Ohio River (USFWS 2019b). Extensive measures are now in place to treat effluent discharge and prevent catastrophic spills/runoff from entering aquatic systems. No similar spills were reported since the 1999 event and risk of such catastrophic events is greatly reduced. Dilution associated with increased water quantity and flows potentially reduces the risk of acute toxicity if a harmful pollutant enters via storm runoff. No combined sewage outfalls are within or near the Proposed Action. Therefore, sources of potential adverse effects on federally listed mussel species are not anticipated to increase or add to short-term, temporary adverse effects associated with the Proposed Action. The 2024 Wood County, West Virginia Comprehensive Plan indicates upgrades and expansions to the county's public water and sewer services are in progress (Wood County Planning Commission 2023 approved 2024.). The plan emphasizes the importance of meeting environmental standards and mentions current evaluation of separating sanitary sewers from storm water drains to reduce effluent discharge into stream systems during heavy rains (Wood County Planning Commission 2023 approved 2024.). Overall, no apparent reason exists to suspect short-term impacts from dredging and associated sedimentation from the Proposed Action have potential to interact with other ongoing non-federal actions and result in adverse cumulative effects. Plugging the wells represents a component of a long-term pattern aimed at improving the Ohio River's water quality. Assuming improvements continue, the Proposed Action contributes to long-term beneficial cumulative effects. In summary, permanently sealing wells in the Ohio River proximate Muskingum Island combined with on-going mussel reintroduction efforts likely continue to provide long-term beneficial effects for federally listed mussel species at the Proposed Action.

Well plugging activities are not expected to significantly contribute to loss or adverse impacts to social and/or economic resources, including land use, transportation and utilities, cultural resources, recreation, visual resources or noise, nor considered to

create a separate, additive cumulative effect to any social and/or economic resources beyond that which already exists within the Proposed Action.

6.0 Summary

This EA documents and discloses the Proposed Action, the environment where the Action would take place, an alternative to the Proposed Action, and the unbiased analysis of how the Proposed Action and alternative will impact the environment. The USFWS Proposed Action is to permanently seal five orphaned wells proximate Muskingum Island in the Ohio River.

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APPENDIX A
BIOLOGICAL ASSESSMENT

RESTORATION/RECOVERY BIOLOGICAL ASSESSMENT
MUSKINGUM ISLAND RIVERINE
WELL PLUGGING PROPOSED ACTION
ON THE OHIO RIVER IN
WOOD COUNTY, WEST VIRGINIA

USFWS Project Number: 2025-0018623

21 March 2025

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Appendix

Appendix A: ORINWR Upland Well Consultation
Appendix B: USFWS Information for Planning and Consultation (IPaC)
Appendix C: Freshwater mussel (Unionidae) surveys for the Muskingum Island Well Plugging Proposed Action on the Ohio River in Wood County, West Virginia.

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1.0 Introduction

The U.S. Fish and Wildlife Service (USFWS) proposes permanently sealing (i.e., plugging) 13 orphaned oil and gas wells at the Ohio River Islands National Wildlife Refuge (ORINWR), including eight wells on Muskingum Island and five wells proximate the island in the Ohio River in Wood County, West Virginia (Proposed Action). The Proposed Action focuses on the five in-stream wells proximate the island as Section 7 compliance for the eight upland wells on the island is addressed through a separate mechanism (Appendix A). The Proposed Action appears on the Parkersburg U.S. Geologic Survey 7.5-minute topographic map at approximately Ohio River Mile (RM) 175 Belleville navigational pool (39.3647991, -81.5124644; Figure 1).

The ORINWR focuses on mussel management and recovery within the refuge (USFWS 2023); therefore, limiting release of pollutants into the river and surrounding watershed represents a logical approach for supporting conservation efforts, as described below. Environmental Solutions & Innovations, Inc. (ESI) was retained by USFWS-ORINWR to conduct surveys and evaluate potential effects of the Proposed Action on federally listed mussels. This Biological Assessment (BA) describes the restoration/recovery action, establishes the area's environmental baseline (based on results of surveys conducted by ESI), evaluates effects of the action, and provides a determination of effects for consideration by the USFWS.

Because Endangered Species Act (ESA) and National Environmental Protection Act (NEPA) compliance are proceeding along separate routes specific to on- and off-shore portions of the Proposed Action, this BA specifically addresses in-water work.

2.0 Description of the Restoration / Recovery Action

2.1 Description of the Restoration / Recovery Objective(s)

Conservation efforts are rarely straightforward and often require trade-offs between potential short-term negative effects and long-term benefits. Long-term benefits potentially necessitate short-term impacts. Freshwater mussels are sensitive to a variety of pollutants including petroleum products (Humphries 2006, Archambault et al. 2017a, Archambault et al. 2017b, Balamurugan and Veerasamy 2022). This BA addresses impacts to aquatic species associated with plugging five orphaned oil and gas wells in the Ohio River with at least three wells actively leaking pollutants into the river.

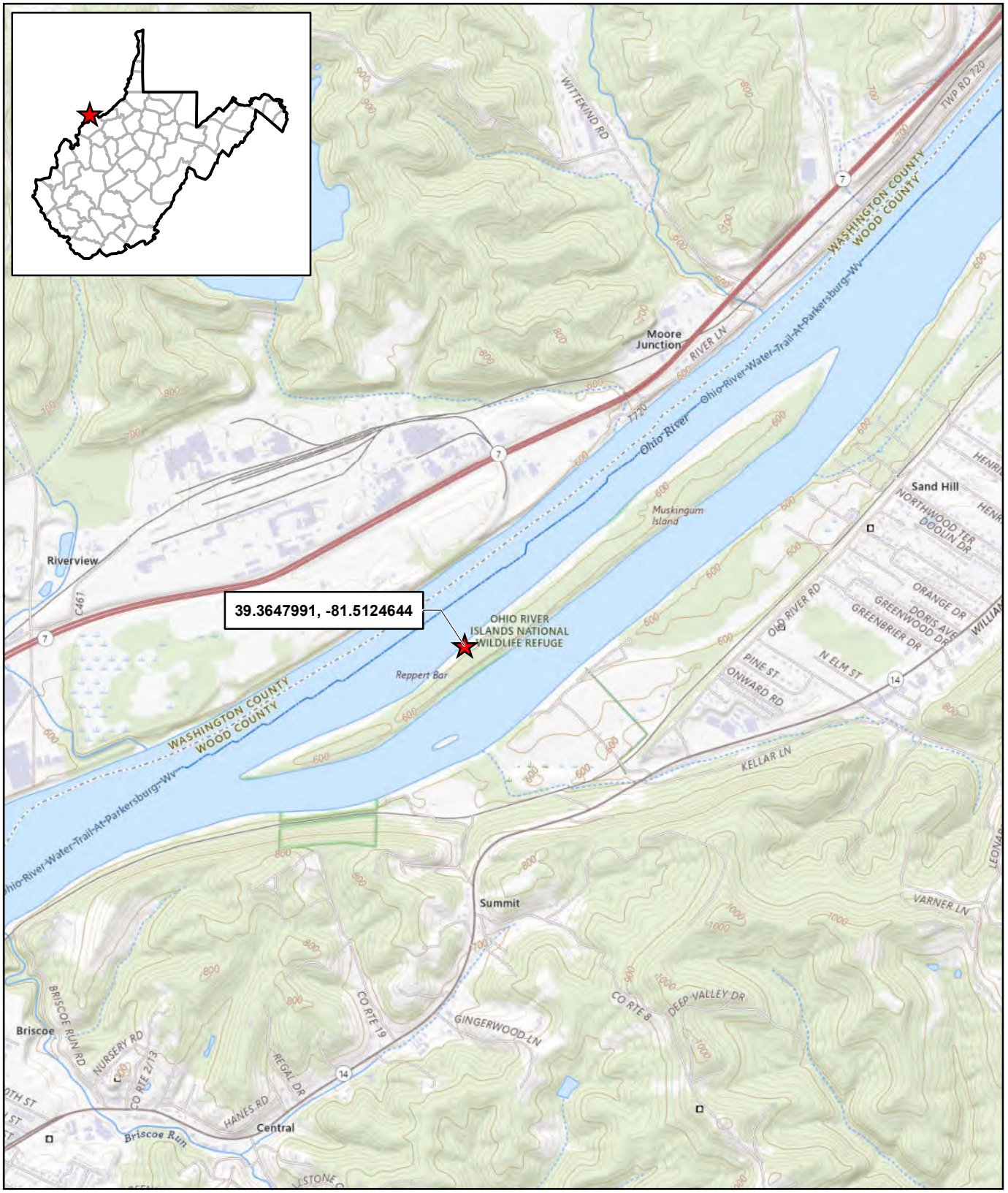


Figure 1. Location of the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Project No. 2312	0 500 1,000 Meters Base Map: USGS Topo Map	ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Sealing the wells reduces the Ohio River's pollutant load proximate aquatic wildlife thus improving habitat for mussels and other aquatic species. However, orphaned wells are positioned along the left descending bank (LDB) of Muskingum Island, a part of ORINWR, and the location of extensive, ongoing efforts to manage and recover mussel populations (USFWS 2023).

Accessing orphaned wells requires dredging enough space for a work barge to access the area enabling crews to seal each well and preclude additional pollutants from entering the river. Without conservation measures, all mussels in the Dredge Area are potentially affected by either crushing or dewatering. Similarly, mussels in surrounding waters are possibly exposed to short-term sedimentation increases resulting from dredging and in-water work associated with sealing the orphaned wells. Thus, this BA focuses on: 1) documenting efforts to avoid and minimize negative impacts to mussels, 2) elucidating unavoidable negative impacts, and 3) describing expected long-term benefits of sealing orphaned oil and gas wells proximate federally listed mussels at the ORINWR.

2.1.1 Action Description and Anticipated Recovery Benefit

2.1.1.1 Why Plug the Wells?

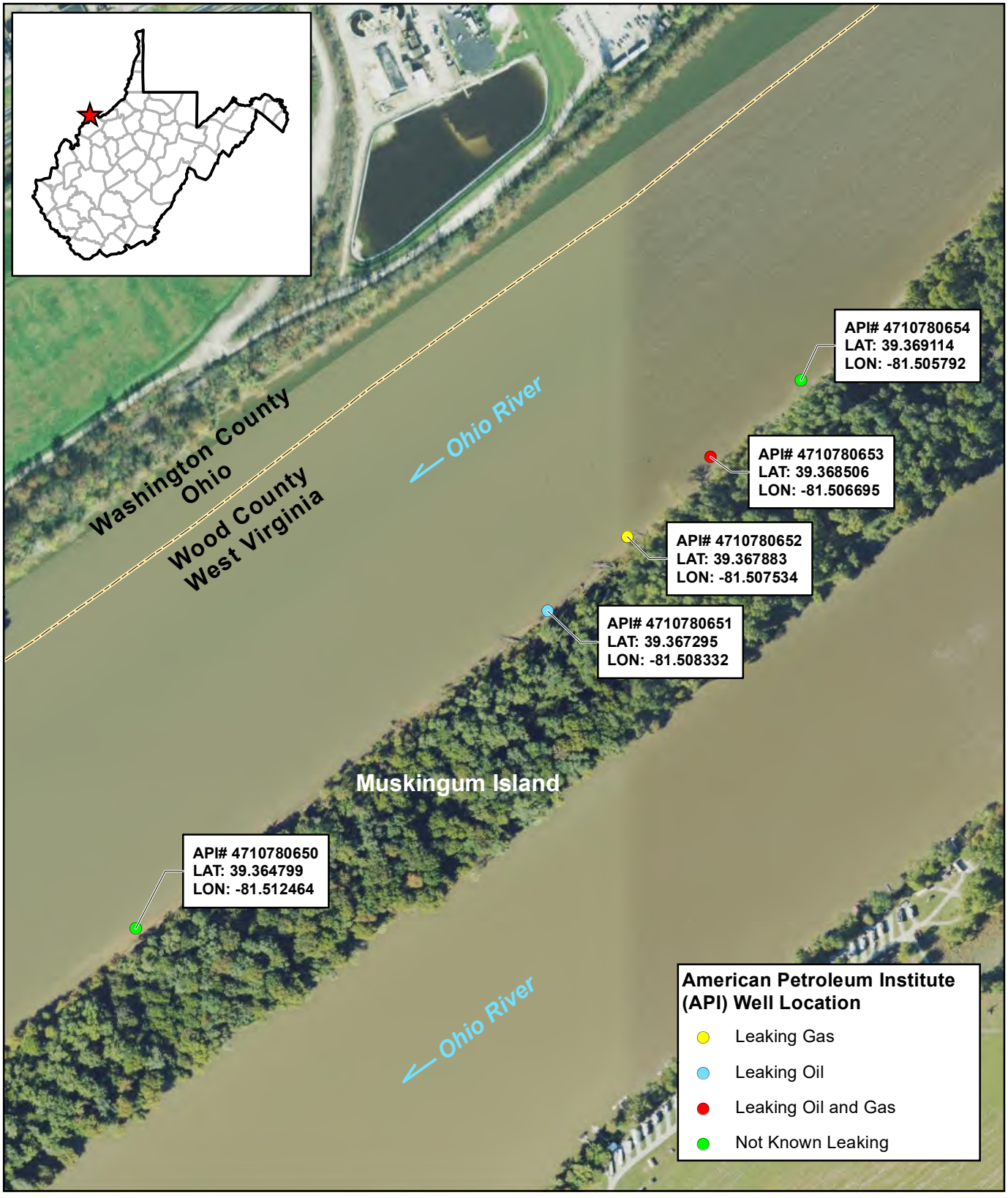
Previous test results indicate three of five wells (Figure 2) are leaking oil and/or natural gas into the Ohio River. Although not observed during testing, the two remaining wells also offer potential for intermittent petroleum leaks. Because oil is detrimental to aquatic organisms, plugging the wells removes known point source pollution negatively affecting aquatic organisms, including freshwater mussels downstream of the wells (Balamurugan and Veerasamy 2022).

2.1.1.2 Federally Listed Mussels Are Present

ORINWR actively engages in managing and restoring freshwater mussel populations (USFWS 2023). The ORINWR is home to more than 40 species of freshwater mussels and the USFWS Information for Planning and Consultation (IPaC; accessed 21 March 2025; Appendix B) tool indicates nine species proximate the Proposed Action are protected under the ESA (Table 1). Surveys conducted by ESI from 27 August through 10 September 2024 confirmed presence of 36 federally listed mussels representing six species proximate the Proposed Action (ESI 2024; Appendix C). A seventh species was reintroduced near the island in 2014 (Table 1; USFWS 2019c).

2.1.2 Description of Habitat Improvements

As described in Section 1.0, the Proposed Action involves plugging five orphaned oil and gas wells in the Ohio River. At least two wells are leaking oil into the river and a third is leaking natural gas. Whether or not the remaining two wells are currently leaking remains unclear; however, given 60 percent of wells are known as currently leaking, failure is likely imminent.



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Figure 2. Location and status of five, submerged, orphaned wells on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Project No. 2312

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Base Map: NAIP Natural Color Imagery

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Table 1. Listing status, critical habitat presence, and number of live individuals detected during surveys for federally threatened or endangered species on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Species	ESA Status	Critical Habitat Present	Listed in IPaC	Previously Documented on ORINWR	# Detected During Survey[2]
Clubshell (*Pleurobema clava*)	Endangered	No	Yes	Yes[1]	1
Fanshell (*Cyprogenia stegaria*)	Endangered	No	Yes	Yes[1]	3
Longsolid (*Fusconaia subrotunda*)	Threatened	No	No	Yes	2
Northern Riffleshell (*Epioblasma rangiana*)	Endangered	No	Yes	Yes[1]	0
Pink Mucket (*Lampsilis abrupta*)	Endangered	No	Yes	Yes[1]	1
Purple Cat's Paw (*Epioblasma obliquata obliquata*)	Endangered	No	Yes	Yes	0
Rayed Bean (*Villosa fabalis*)	Endangered	No	No	Yes	0
Round Hickorynut (*Obovaria subrotunda*)	Threatened	No	Yes	Yes	5
Sheepnose (*Plethobasus cyphyus*)	Endangered	No	Yes	Yes	24
Salamander Mussel (*Simpsonaias ambigua*)	Proposed Endangered	No	Yes	Yes	0
Snuffbox (*Epioblasma triquetra*)	Endangered	No	Yes	Yes	0
Indiana Bat (*Myotis sodalis*)	Endangered	No	Yes	Yes[3,4]	NA
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	No	Yes	Yes[4]	NA
Monarch Butterfly (*Danaus plexippus*)	Candidate	No	Yes	Yes[4]	NA

[1]Species stocked by ORINWR staff near Muskingum Island in the ORINWR.
[2]Surveys conducted by ESI from 27 August through 10 September 2024 (ESI 2024; Appendix C).
[3]USFWS Environmental Conservation Online System Indiana bat species profile (available at: https://ecos.fws.gov/ecp/species/10515; accessed 10 March 2025).
[4]ORINWR Feature Species (available at: https://www.fws.gov/refuge/ohio-river-islands/species; accessed 10 March 2025).

Historically, all five wells were above normal water levels on Muskingum Island. To maintain navigability, the Ohio River is currently managed via a series of pools controlled by locks and dams thus water levels fluctuate less dramatically but are often maintained at higher than historic levels. Erosion resulting from historic farming

practices and associated with wave action from watercraft also contributed to reducing the island's landmass. Thus, the five wells are now below the normal pool elevation and are leaking directly into the river in an area known to contain both naturally occurring and reintroduced populations of federally listed mussels.

2.1.3 Expectation of Success

Petroleum products are toxic to mussels and many other species of wildlife at multiple temporal and physical scales (Keller et al. 1998, Perhar and Arhonditsis 2014). Toxicity ranges from acute, where mortality occurs shortly after exposure (Keller et al. 1998, Humphries 2006, Archambault et al. 2017b), to chronic, where impacts result in increased oxygen uptake (Balamurugan and Veerasamy 2022) — an indication of increased energy use indicative of stress. Impacts of petroleum exposure are further exacerbated by other stressors. For example, sediments have potential to clog the gills of aquatic species and, depending on the source, possibly contain petroleum and other toxic materials (Archambault et al. 2017a, Archambault et al. 2017b). As such, removing a persistent and proximate source of petroleum is highly likely to benefit federally listed mussel species and plugging orphaned wells is also anticipated to benefit fish serving as hosts for larval mussels (glochidia).

Pollution and habitat degradation are listed as threats to aquatic species' survival and managing, protecting, and enhancing known habitat are identified as conservation priorities in recovery plans and five-year reviews for most species associated with the Proposed Action (USFWS 1985; 1991; 1992; 1994; 2022a; 2024b). Thus, the Proposed Action is consistent with reducing threats and implementing conservation priorities identified by USFWS.

2.1.4 Time and Location of Conservation Benefits

Sealing orphaned wells offers immediate and long-term conservation benefits for aquatic organisms both proximate and downstream of well locations. In the near-term, well sealing reduces the amount of petroleum present in the Ohio River through elimination of the point source pollutant. Long-term, preventing petroleum from entering the river reduces the overall pollutant load in the Ohio River. Similarly, sealing wells reduces pollution loads within the ORINWR and downstream of the area.

2.2 Action Area

As part of a pre-construction mussel surveys, ESI coordinated with USFWS and the West Virginia Division of Natural Resources (WVDNR) to identify areas of direct and indirect effects. Figure 3 depicts the overall Action Area (Map Key), Site 1 (the southernmost well [Map 1 of 3]), Site 2 (the 4 remaining wells [Map 2 of 3]), and the relocation area (Map 3 of 3). Dimensions of individual Action Area components are described in subsections below. The overall size of the Action Area is approximately 9.0 hectares (22.1 ac).

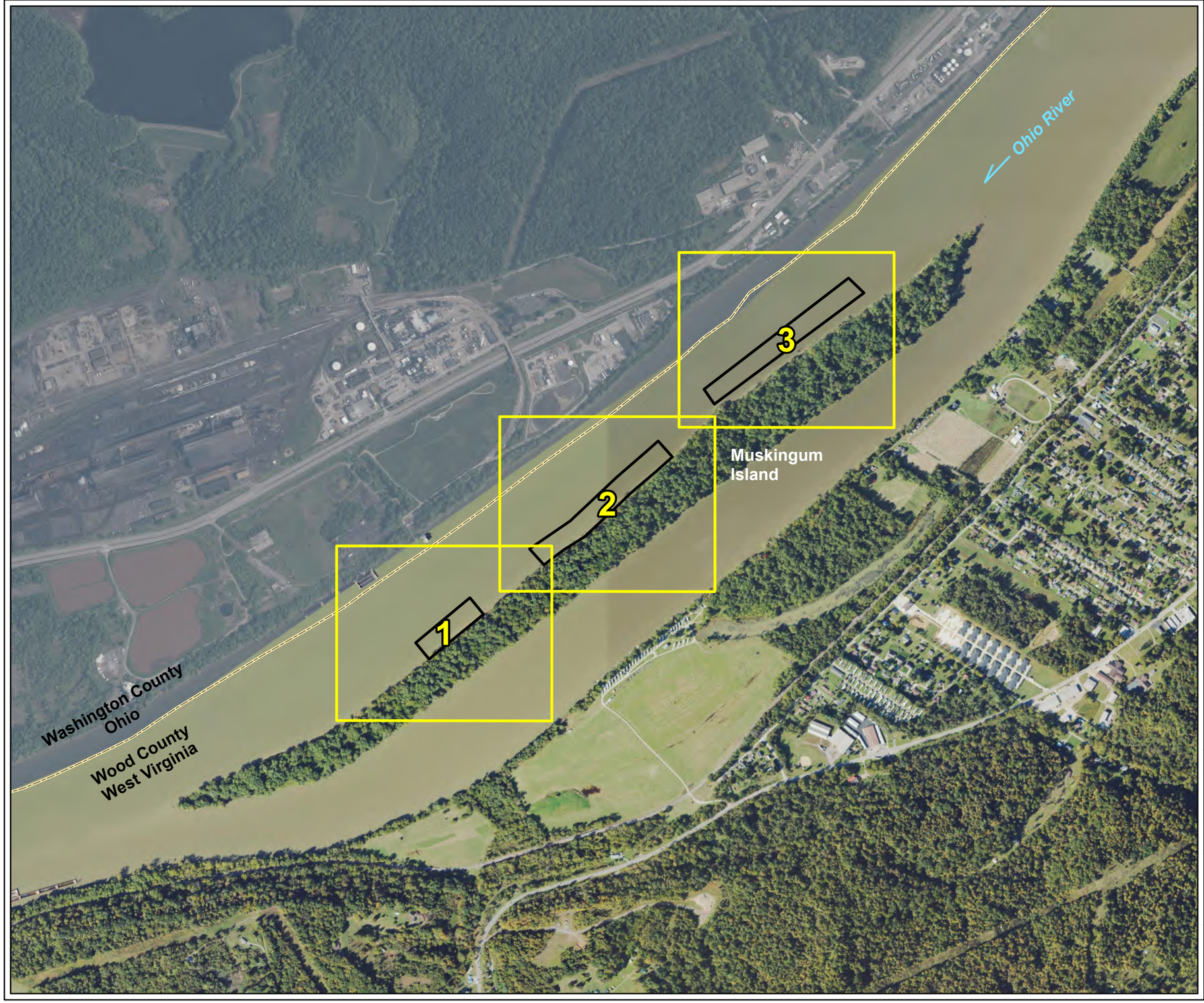
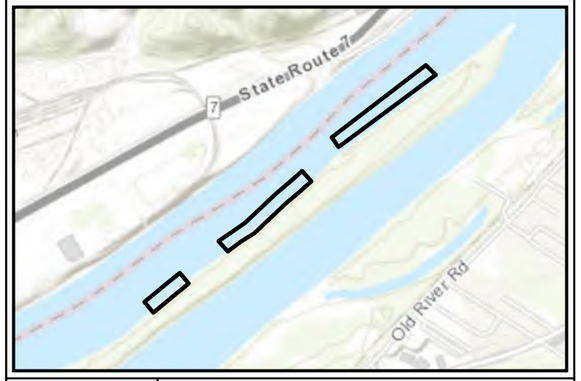


Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map Key

- Area Detailed on Subsequent Maps 1 through 3
- State Boundary
- Action Area



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Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
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Washington County
Ohio
Wood County
West Virginia
Site 1
API# 4710780650
Ohio River
Muskingum Island
Ohio River

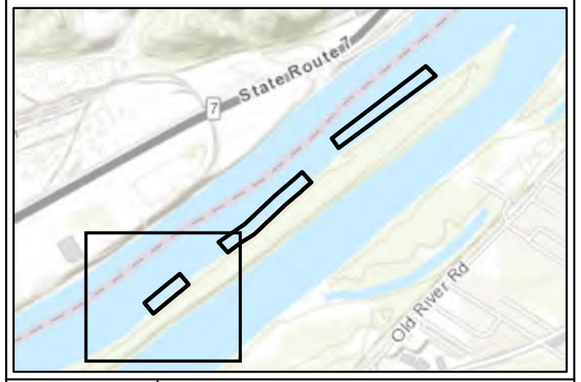
Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map 1 of 3

- American Petroleum Institute (API) Well Location
- Area of Direct Effect (ADE)
- Area of Indirect Effect (AIE)
- Dredging Area
- Salvage Zone
- Upstream Buffer
- Downstream Buffer
- Lateral Buffer
- State Boundary

Live Listed Species

- Fanshell
- Pink mucket
- Round hickorynut
- Sheepnose



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Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA
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Washington County
Ohio

Wood County
West Virginia

Ohio River

Site 2

API# 4710780654

API# 4710780653

API# 4710780652

Muskingum Island

API# 4710780651

Ohio River

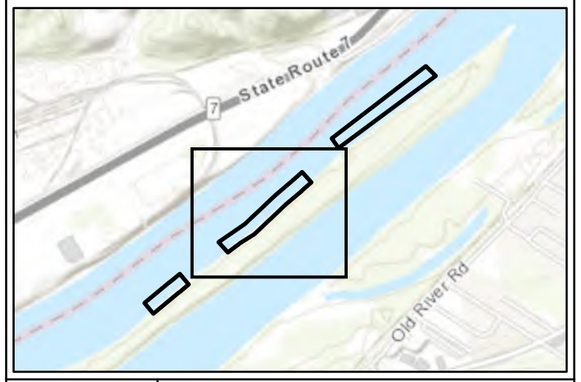
Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Map 2 of 3

- American Petroleum Institute (API) Well Location
- Area of Direct Effect (ADE)
- Area of Indirect Effect (AIE)
- Dredging Area
- Salvage Zone
- Upstream Buffer
- Downstream Buffer
- Lateral Buffer
- Intermediate Buffer
- State Boundary

Live Listed Species

- Longsolid
- Clubshell
- Fanshell
- Round hickorynut
- Sheepnose



N
W
E
S

Meters
0 50 100

Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA, EPA, USDA
USA NAIP Imagery: Natural Color: Esri, USDA Farm Service Agency

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Figure 3. Action Area for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

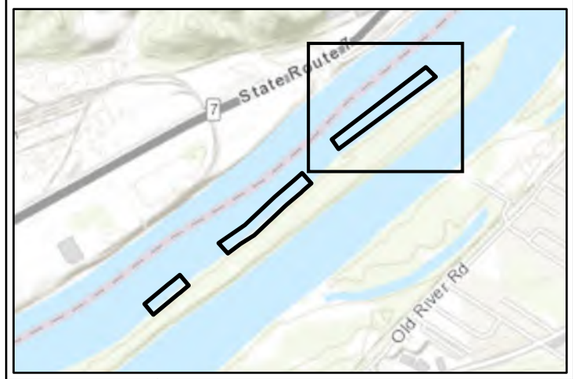
Map 3 of 3

State Boundary

Proposed Relocation Area

Live Listed Species

Longsolid



N
W
E
S

Meters
0 50 100

Service Layer Credits: World Topographic Map: VITA, West Virginia GIS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
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The Action Area (Figure 3) comprises in-water areas adjacent Muskingum Island where:

- dredging via a barge enables work crew access to plug the five orphaned oil and gas wells,
- mussels are salvaged to prevent mortality, and
- salvaged mussels are relocated and monitored.

2.2.1 Area of Direct Effects

The Areas of Direct Effects (ADE; Figure 3) consist of in-water areas where federally listed mussels are potentially directly affected by barging, spudding, dredging, and mussel salvage and relocation activities.

Wells are located along the north-western shore of Muskingum Island with four wells in relatively close proximity (approximately 95 to 103 meters [311.7 to 337.9 ft] distance between one another) and the fifth well is located approximately 451 meters (1,479.7 ft) further downstream (Figure 3). The in-water wells are the focal point of each ADE, defining the dredging area and mussel salvage location for each well. The relocation area is located upstream, between 261 and 822 meters (856.3 and 2,696.9 ft) upstream of the northernmost well.

Depth of wells below the water surface ranges from 0.3 to 2.4 meters (1.0 to 7.9 ft). The channelward-most boundary of Salvage Zones ranges from 2.4 to 4.3 meters (7.9 to 14.1 ft).

2.2.1.1 Dredging Areas

Five Dredging Areas accommodating dredging, spudding, and barging are established, one for each of five in-water wells anticipated for plugging. The Dredging Area also encompasses the location of plugging activities. Individual Dredging Areas are approximately centered on each well and span 15 meters (49.2 ft) along the shore and 15 meters (49.2 ft) channelward, equating to approximately 225 square meters (2,421.9 ft^2) per Dredging Area with a maximum combined area of 1,125 square meters (12,109.4 ft^2) of river bottom exposed. Depth among Dredging Areas ranges from 1.5 to 3 meters (4.9 to 9.8 ft). Enough material is dredged to allow spudding the barge adjacent wells. Spoils from dredging are loaded onto a spoils hopper barge, where they are dewatered, limed, and hauled to an approved landfill. The Dredging Area is equivalent to the West Virginia Mussel Survey Protocol's (WVSMP's) Area of Direct Impact (ADI), as dredging, spudding, and barging activities can directly impact freshwater mussels therein.

2.2.1.2 Mussel Salvage Zone

Per the WVMSP, the ADI is buffered by 10 meters (32.8 ft) upstream, downstream, and channelward for small dredging projects and all mussels within the ADI and

additional salvage buffers are salvaged and relocated. The ADI plus prescribed salvage buffers yield a Salvage Zone and equates to approximately 625 square meters (6,727.4 ft^2) per Salvage Zone. In total, the five Salvage Zones encompass 4,375 square meters (47,092.1 ft^2). While only one of five Salvage Zones revealed presence of federally listed species during pre-construction surveys, common mussel presence in all Salvage Zones necessitates completing salvage activities in each.

2.2.1.3 Relocation Area

During pre-construction surveys, ESI completed relocation scoping spot dives at six locations. Sixty minutes of spot-dive searching yielded 169 live mussels, comprising 13 species, including a single federally threatened longsolid (*Fusconaia subrotunda*). Habitat in spot dive locations was similar to habitat in the Salvage Zones with substrates dominated by sand and gravel interspersed with fine sediment and cobble. Based on suitable habitat conditions and mussel presence at all scoped relocation areas, one Proposed Relocation Area comprising all six scoping areas and encompassing 33,750 square meters (8.3 ac) was established (Figure 3).

The Proposed Relocation Area is between approximately 261 and 822 meters (856.3 and 2,696.9 ft) upstream of the upstream-most well thus precluding relocated mussel exposure to sediment during dredging or plugging activities. Mussels are mobile and most frequently move downstream. Thus, relocating mussels upstream encourages long-term recolonization of the Salvage Zone following completion of the Proposed Action.

2.2.2 Area of Indirect Effects

The Areas of Indirect Effects (AIE) are in-water areas where federally listed mussels are potentially indirectly affected by sedimentation resulting from dredging and in-water work associated with well plugging. The WVMSP recommends establishing specific survey buffers around different types of work sites based on size of the water body, expected flow, and anticipated sediment disturbance. While some sediment is likely transported outside WVMSP-recommended boundaries, sediment rapidly becomes diluted below background levels through assimilation with sediment already present in the water.

The Proposed Action's AIE is based on WVMSP-prescribed buffers for dredging projects less than 1,000 square meters (0.25 ac.) and extends 50 meters (164.0-ft) upstream, 50 meters (164.0-ft) laterally, and 150 meters (492.1-ft) downstream of the ADI. Applying lateral, up-, and downstream buffers to all five wells yields a single, continuous AIE encompassing four wells and one disjunct set of buffers for the fifth well. Thus, applying WVMSP-prescribed small dredge impact buffers yields AIE for each site as follows:

- Site 1 encompasses one well plugging site (American Petroleum Institute [API] #47-107-80650) totaling 13,975 square meters (3.5 ac; Figure 3, Map 1 of 3), and
- Site 2 encompasses the four remaining well-plugging sites (API #47-107-80651, #47-107-80652, #47-107-80653, and #47-107-80654) totaling 36,400 square meters (9.0 ac; Figure 3, Map 2 of 3).

In total, the AIE comprises 50,375 square meters (12.4 ac) along the right descending bank (RDB) of Muskingum Island and buffers the dredging areas upstream, downstream, and channelward.

The WVMSP-prescribed buffers for Group 4 new dredging projects are the largest buffers of all disturbance activities described in the protocol and are similar to those prescribed in other state mussel survey protocols (e.g., Ohio) (ODNR and USFWS 2024). Buffers for dredging projects are large relative to other instream disturbance buffers to account for the high probability of sediment transport and increased turbidity downstream. The extent of sediment transport from dredging activities is directly related to the dredging method and conservation measures employed. For example, navigation channel maintenance dredging regularly involves a cutter head that disturbs the substate to enable it to be suctioned into a floating pipe with the spoils pumped to a disposal area, often within the same waterbody potentially increasing the dredging footprint. The Proposed Action involves clam shell style dredging that scoops material from the substrate and directly transfers spoils to a hopper. Therefore, the distance and degree of downstream sedimentation and turbidity is a function of river velocity and substrate composition in the dredging area. Substrate in the dredging area includes a mixture of sand, gravel, fines, and woody debris. Sand and gravel disturbed during dredging activities will quickly settle back to the riverbed and the position of the riverine wells along Muskingum Island' RDB shelters the dredging areas from strong flow thereby further limiting downstream sediment transport. These combined factors were used in determining a rational buffer area. The upstream-most edge of the Site 1 AIE is approximately 238 meters (780.8 ft) downstream of the downstream-most edge of the Site 2 AIE and the upstream-most edge of the Site 2 AIE is approximately 205 meters downstream of the downstream-most edge of the Relocation Area (Figure 3).

2.3 Proposed Action Implementation

Four distinct components comprising the Proposed Action include (Table 2):

- mussel salvage and relocation efforts,
- gaining access to wells via dredging space for a work barge and installing two spuds (steel rods used to anchor the barge) in the river bottom,
- well plugging/sealing, and
- monitoring mussel status in the Proposed Relocation Area.

In total, activities during the year wells are plugged are anticipated to require up to 100 days pending conditions outlined below are met. The following year, 5 additional days of impact are anticipated for the follow-up monitoring event. In total, 105 days of impact are anticipated.

Table 2. Components, potential impacts, and duration of potential impacts on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Proposed Action Component	Activity	Mussel Impact Potential	Duration of Impact (per mussel)	Total Duration of Impact
Mussel salvage and relocation	Capture mussels in the Salvage Zone and move individuals upstream to the Proposed Relocation Area.	Stress from being handled, temporary removal from water, and being moved to a new location.	Up to five minutes out of water and held no more than 8 hours between recovery and relocation.	Up to 4 days per well; therefore, 20 days total
Accessing Wells	Mechanically dredge channel for barge access. Install two spuds at each well site for barge anchoring. Pending conditions and barge compatibility, install two additional spuds for securing a hopper barge.	Crushing, being buried, or removed with spoil in the Dredging Area. Exposure to increased sediment load outside the Dredging Area.	Permanent loss of mussels remaining in the Dredging Area. Exposure to increased silt and sediment for up to one week outside the Dredging Area.	Up to 3 days per well; therefore, 15 days total
Well plugging	Feed a hose down the existing pipe to the bottom of the well. Force concrete down the hose as it is slowly extracted and create a concrete plug at the bottom of the well. Repeat the process at least three times to ensuring long-term well closure.	Limited sedimentation during in-water work.	Up to 15 days per well; permanent removal of petroleum leaking from wells.	10-15 days per well; therefore, 50-75 days
Mussel monitoring	Recapture mussels in the relocation/monitoring area, measure, document tag numbers, and take photographs before replacing mussels on the river bottom.	Stress from being handled, temporary removal from water, and being moved to a new location.	Up to five minutes out of water and up to one hour between capture and release.	Up to 5 days per visit

2.3.1 Mussel Salvage and Relocation

Mussel salvage and relocation follows the WVMSP (WVDNR 2022), which originates from a close collaborative effort to refine protocols for working with listed mussels between the USFWS and WVDNR (Clayton et al. 2018). Prior to beginning Proposed Action work, a team of qualified biologists focuses on removing all mussels from the Salvage Zone (i.e., areas where negative impacts are expected to occur). Salvage Zones encompass each Dredge Area plus a salvage buffer within 10 meters (32.8 ft) upstream, downstream, and channelward of each of the five Dredge Areas. Qualified mussel collectors employ multi-pass depletion cells as described in Section 10 of the WVMSP and continue searching until criteria in Section 10.7 are met. At present, ESI assumes mussel salvage and relocation may require up to 4 days per well and 20 days in total.

Upon capture, each federally listed mussel is identified, measured, photographed, and marked with a permanent numeric vinyl tag (e.g., Floy shellfish tag). Per the WVMSP, common mussels are identified, measured, and salvaged concurrently with federally listed mussels. Mussels are removed from the water for no more than five minutes at a time, consistent with the WVMSP. Salvaged mussels are held in mesh bags and stored in aerated live wells (e.g., coolers, onboard circulation tanks) filled with river water. Livewell temperatures are monitored, and regular water changes occur to alleviate temperature stresses. Alternatively, mussels are potentially held in mesh bags directly submerged in the river.

Federally listed mussels are transported to and released in the Proposed Relocation Area along transects running parallel to flow. Salvaged mussels are stocked at a density of one federally listed mussel per square meter (10.7 ft^2). All federally listed mussels are hand placed in the substrate.

2.3.2 Well Access

As well access is requisite in advance of initiating plugging efforts, the river is dredged to remove enough sediment proximate each well to afford a work barge site access. Prior to dredging and regardless of method, sediment curtains are installed around the dredge site to reduce the amount of sediment entering the river. A qualified dredger removes enough material for barge access to the site. Water depth at each well varies from 0.3 to 2.4 meters (1.0 to 7.9 ft) therefore the amount of material requiring removal varies and is contingent upon local conditions. Dredged material is removed from the water and loaded into a hopper barge for lime treatment, temporary storage, and transport to an approved landfill. The hopper barge is either anchored to the work barge or moored with spuds adjacent each well. Based on current information, dredging and well site set up is anticipated to take up to 3 days per well and up to 15 days in total.

2.3.3 Well Plugging

2.3.3.1 Preparation for Plugging

ESI assumes the work barge is a flat deck barge commonly used for nearshore dredging, drafting between 0.6 to 1.2 meters (2.0 to 4.0 ft). Water depths at well locations are approximately 1.5 to 4.9 meters (5.0 to 16.0 ft) (ESI 2024; Appendix B). Therefore, the barge operates in water approximately 1.52 to 4.87 meters (5.0 to 16 ft) deep. The spud size used on flat deck barges depends on water depth at anchoring site, substrate conditions, and total barge weight. ESI assumes the spud diameter will be between 30.5 and 61.0 centimeters (12.0 to 24.0 inches). Additionally, spudding of the work barge is expected within the Dredging Area. Once the work barge is spudded in place next to a well, timber mats serving as floats for tubing material are placed on the opposite side of the well. Each well is then tested and depressurized if needed. Existing tubing and casings are inspected. A damaged casing is replaced with a new casing of similar diameter and is potentially taller than the original casing, such that it extends to a suitable working height. A marine oil boom and sediment curtain are

installed around each well site and an appropriate wellhead is installed followed by a cellar comprising a 50.8-centimeter (20-in) pipe driven into the riverbed. The cellar and oil booms are designed to capture leaking petroleum. Existing tubing and any debris are removed and the well depth is verified. If total depth is not reached, cleanout occurs to a depth set by an inspector.

2.3.3.2 Plugging

The following well plugging plan from Hydrocarbon Well Services (well plugging contractor), engineers assume wells extend 714.1 meters (2,343.0 ft) deep targeting the Berea Sandstone formation at an estimated depth of 567.5 meters (1,852.0 ft). The casing is cleaned using pressurized water to blow material out of the well and accommodate insertion of the hose used to force concrete into the well. Any recovered water and debris are held in tanks and disposed of as produced water. A hose is fed to the bottom of the well and liquid concrete is pumped down the hose as it is slowly withdrawn thus filling a predetermined portion of the shaft with concrete. A minimum of four plugs are installed, including one beginning at the bottom of the well and extending upward 164.8 meters (541.0 ft), from an estimated depth of 714.1 meters (2343.0 ft) to 549.3 meters (1,802.0 ft). Above the initial plug, the casing is stretched or cut to determine a free point to remove it from the well. A second 30.5-meter (100.0-ft) plug is set from 15.2 meters (50.0 ft) inside the casing cut to 15.2 meters (50.0 ft) outside the casing cut. A third 78.9-meter (259.0-ft) plug is installed 15.2 meters (50.0 ft) inside the casing extending 210.9 meters (692.0 ft) above elevation, and finally a fourth plug is installed beginning 76.2 meters (250.0 ft) from the surface and ending at the surface covering the casing seat.

Beginning with the bottom plug, each plug is allowed to dry for eight hours and its depth is confirmed before proceeding to the next plug. If the plug is deeper than expected (an indication some concrete fell out the bottom) or other signs indicate the plug was not successful, an additional plug is installed. Between each plug the well is filled with a gel of Bentonite clay and water thus preventing pressure from pushing the plug out of the well. Using a staged plugging approach to (i.e., monitoring each cement plug for eight hours before proceeding) allows time for detection of leaking Bentonite should any leaks occur. As noted above, marine and oil booms are installed around the work area to contain any oil or Bentonite leaks. Additionally, turbidity curtains are installed to further contain potentially leaks. Following well sealing, the cellar and oil boom are removed, a monument is placed to mark the site, and all equipment is removed. Well plugging is assumed to require up to 12 days per well and 60 days in total.

2.3.4 Mussel Monitoring

As described in Section 2.5 below, two monitoring events are planned; the first 30 to 60 days after relocation and the second approximately one year after relocation. Per event, ESI assumes monitoring events require less than a week per event.

2.4 Conservation Measures

As described in the following subsections, implementation of various conservation measures are anticipated to avoid, reduce, and mitigate potential impacts to federally listed mussels.

2.4.1 Site Selection and Minimization

Impact minimization is constrained by well locations and work barge size. Each dredging site occupies as small a footprint as possible while concurrently providing an area large enough to accommodate well plugging efforts. Notably, all 36 federally listed mussels captured during pre-construction surveys were observed outside of Dredging Areas (Figure 3). One round hickorynut (*Obovaria subrotunda*) was observed in one of five Salvage Zones surrounding wells.

2.4.2 Mussel Salvage and Relocation

Mussel salvage and relocation objectives include removing as many mussels as possible from all areas anticipated for dredging and within 10 meters (32.8 ft) upstream, downstream, and channelward of Dredging Areas most likely posing risk of impacts to mussels. Moving mussels upstream affords individuals an opportunity to continue living and reproducing and possibly eventually returning to areas where they were originally found. Relocations are supervised by qualified malacologists, including at least one person holding a valid permit to handle federally endangered mussels. Relocation techniques, staffing, and locations are approved by USFWS and WVDNR prior to salvage and relocation efforts. Federally listed mussels are placed along pre-established transects parallel to flow within the Proposed Relocation Area at a maximum density of one individual per linear transect meter.

2.4.3 Well Access

Conservation measures implemented during well-access efforts include installation of sediment/turbidity curtains and marine oil booms on the river with measures remaining in place until well plugging is completed. During localized dredging activities, work areas are encircled by sediment/turbidity curtains and all spoils are retained. Spoils from dredging for well access are loaded onto a hopper barge, dewatered, limed, and hauled to an approved landfill reducing sediment load within the Action Area. As noted in Section 2.4.1, impacts associated with well access are confined to the smallest possible footprint.

2.4.4 Well Plugging

Conservation measures implemented during well plugging include careful, attentive depressurization (greatly reducing the risk of spills) and installation of cellars (capturing products leaking from the well) around each well. Extensive depressurizations are not anticipated based on overall lack of maintenance for the last several decades and the wells are currently leaking. However, if a well is not already in equilibrium, any remaining pressurized gas is released to the atmosphere and liquid/solid products are retained in tanks for proper disposal.

Installation of marine and oil booms around the work area with addition of sediment curtains ensures containment of any potential leaks occurring during the plugging process

As noted in Section 2.1 above, plugging the wells is anticipated to benefit local mussel populations over the long term.

2.5 Monitoring and Reporting Plan

Monitoring relocated mussels tracks long-term success of individuals relocated as a result of the Proposed Action additional to resident mussels identified in the Proposed Relocation Area. Monitoring data are provided to USFWS (both ORINWR and the West Virginia Field Office [WVFO]) and to WVDNR and used to facilitate future relocation and restoration efforts.

Success of relocation efforts is evaluated by monitoring relocated mussels across two survey events. Qualified biologists complete the first monitoring survey 30 to 60 days after relocation to determine apparent initial survivorship; a second monitoring survey is completed approximately one year following relocations to assess longer-term survival. There is no consensus on post-relocation monitoring frequency, timeframe or methods. However, in a review of 33 mussel relocation projects, Cope and Waller (1995) found that the greatest percentage of post-relocation mortality often occurred within the first year. The 30-to-60-day post-relocation monitoring survey is planned to ensure an adequate relocation area was selected by confirming targeted survivorship. Additionally, mortality skewed towards smaller individuals shortly after relocations could indicate the relocation site is not suitable and the initial survey would allow this to be detected early on (Hart et al. 2016). The rationale for the one-year follow-up monitoring survey is based on previous reports that observed most mortality occurring within the first year of relocation. As such, it is reasonable to assume that if survivorship after one year of relocation is within the target goal, then the relocation was a success.

Monitoring comprises qualitative searches along pre-established transects parallel to flow and progresses in an upriver direction. Divers search a pre-established transect at a rate of 1 minute per square meter (0.09 min/ft^2) along a 1-meter (3.3-ft) wide swath on each side to capture mussels that potentially traveled since planting in the substrate. Mussels encountered during monitoring events are held in mesh bags and brought to the surface for morphometric processing and identification. Federally listed mussels encountered and not previously documented are tagged, photographed, and reported to USFWS-WVFO and WVDNR within 48 hours. Captured mussels are released unharmed and replaced along the transect; federally listed mussels are distributed as encountered.

All deadshell tagged and non-tagged federally listed specimens collected during relocation and monitoring surveys are submitted to the WVDNR via mail or personal

transfer. A report is submitted to the USFWS and WVDNR within 30 days of completion of the initial survey. A report is also submitted within 30 days of completion of each monitoring effort.

Short-term mussel monitoring objectives associated with the Proposed Action include documenting greater than 75 percent survivorship. Optimal long-term goals for mussel relocation and monitoring include greater than a 50 percent survival rate for relocated individuals and observation of normal behaviors (e.g., female gravidity, normal positioning). Thresholds for survivorship are based on the Michigan Mussel Survey Protocols and Relocation Procedures (Hanshue et al. 2016) that indicate anything greater than 75 percent survivorship represents acceptable short-term mussel survivorship goals, while acceptable long-term, post-relocation survival is greater than 50 percent.

Documenting survival rates prescribed by Hanshue et al. (2016) requires greater than the WVMSP 50 percent detection rate, thus up to three search passes are completed along relocation transects ensuring accurate survivorship documentation.

3.0 Environmental Baseline

3.1 Species Status in the Action Area

Table 1 provides an overview of federally listed mussels known from the ORINWR. Pre-construction surveys in the Impact Area (i.e., the Action Area excluding the Proposed Relocation Area) yielded captured of 35 federally listed mussels representing six species including: clubshell (*Pleurobema clava*; *n*=1), fanshell (*Cyprogenia stegaria*; *n*=3), longsolid (*n*=1), pink mucket (*Lampsilis abrupta*; *n*=1), round hickorynut (*n*=5), and sheepnose (*Plethobasus cyphyus; n*=24). One additional longsolid was captured during relocation site scoping dives upstream of the Proposed Action. In 2014, ORINWR began stocking northern riffleshell (*Epioblasma rangiana*) in waters near Muskingum Island (USFWS 2019c). Three other federally listed mussels occur within the ORINWR's boundaries (in total, comprising 24 Ohio River Islands); however, none are anticipated present in the Action Area. Although Indiana bat (*Myotis sodalis*), tricolored bat (*Perimyotis subflavus*), and monarch butterfly (*Danaus plexippus*) are known or likely to occur proximate the Action Area, the Proposed Action is isolated entirely to within the Ohio River precluding potential effects on these species. Additionally, as noted in Section 1.0, the ORINWR is pursuing Section 7 compliance for these terrestrial species through another mechanism.

3.1.1 Estimated Number of Federally Listed Mussels in the Impact Area

Pre-construction surveys were completed only to document federally listed mussel presence. WVMSP indicates mussel surveys are unlikely to reveal more than 50 percent of individuals within the survey area. Further, not all areas are surveyed. Current surveys included approximately 9.9 percent of the Impact Area. Although no northern riffleshell were physically captured during surveys, for estimating impacts, one individual was assumed "missed" or "overlooked". Table 3 estimates the number of each species assumed present in the Impact Area. Given round hickorynut's preference for softer substrates similar to the Salvage Zone, more thorough survey of the Salvage Zone is likely to yield higher densities of round hickorynut than of other federally listed mussels discussed herein (MSU 2004, USFWS 2019d).

3.1.2 Estimated Number of Federally Listed Mussels in the Salvage Zone

A similar approach (Table 4) is used to estimate the number of mussels in the Salvage Zone where mussels are captured and moved to the Proposed Relocation Area. A single round hickorynut represents the only federally listed mussel recovered from the Salvage Zone. The individual was found on the channelward side of the upstream-most well, outside the Dredging Area. Analysis assumes one individual of each of six species known to occur proximate the Proposed Action was not detected or overlooked during initial surveys. Additionally, based on round hickorynut's preference for soft substrates dominating Salvage Zones, a greater density of round hickorynut is assumed actually present (MSU 2004, USFWS 2019d) at a rate of 3:1 instead of 2:1.

Table 3. Estimated population of federally listed mussels in the Impact Area on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Species	# Detected in 2024 Survey	# Estimated in Sampling Transects[1]	# Estimated in Impact Area[2]
Clubshell (*Pleurobema clava*)	1	2	20
Fanshell (*Cyprogenia stegaria*)	3	6	61
Longsolid (*Fusconaia subrotunda*)	1	2	20
Northern Riffleshell (*Epioblasma rangiana*)	0	1[3]	10
Pink Mucket (*Lampsilis abrupta*)	1	2	20
Purple Cat's Paw (*Epioblasma obliquata obliquata*)	0	1[3]	10
Rayed Bean (*Villosa fabalis*)	0	1[3]	10
Round Hickorynut (*Obovaria subrotunda*)	5	15	151
Sheepnose (*Plethobasus cyphyus*)	24	48	484
Salamander Mussel (*Simpsonaias ambigua*)	0	1[3]	10
Snuffbox (*Epioblasma triquetra*)	0	1[3]	10
Total	**35**	**80**	**806**

[1] WVMSP estimates only 50 percent of mussels present are detected, thus the number of mussels detected is doubled. The detection rate for round hickorynut is assumed higher than than others at 3:1 instead of 2:1 as the Salvage Zone primarliy consists of soft substrate indicated as optimal by USFWS (2019d).
[2] Sampling transects are 1 meter (3.3 ft) wide but covered only 9.91 percent of the Impact Area. Thus, the number of mussels estimated to occur in transects is multiplied by a correction factor of 10.09 to account for unsampled areas.
[3] Species not detected during the pre-construction survey, but the species is known to occur in the area. Thus estimates conservatively assume one was overlooked during the survey.

Table 4. Estimated population of federally listed mussels in the Salvage Zone on the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Species	# Detected in 2024 Survey	# Estimated in Sampling Transects[1]	# Estimated in Salvage Zone[2]
Clubshell (*Pleurobema clava*)	0	1	14
Fanshell (*Cyprogenia stegaria*)	0	1	14
Longsolid (*Fusconaia subrotunda*)	0	1	14
Northern Riffleshell (*Epioblasma rangiana*)	0	1[3]	14
Pink Mucket (*Lampsilis abrupta*)	0	1	14
Purple Cat's Paw (*Epioblasma obliquata obliquata*)	0	1[3]	14
Rayed Bean (*Villosa fabalis*)	0	1[3]	14
Round Hickorynut (*Obovaria subrotunda*)	1	3	42
Sheepnose (*Plethobasus cyphyus*)	0	1	14
Salamander Mussel (*Simpsonaias ambigua*)	0	1[3]	14
Snuffbox (*Epioblasma triquetra*)	0	1[3]	14
Total	**1**	**13**	**182**

[1] WVMSP estimates only 50 percent of mussels present are detected, thus the number of mussels detected is doubled.
[2] Sampling transects are 1 meter (3.3 ft) wide but covered only 7.16 percent of the Salvage Zone. Thus, the number of mussels estimated to occur in transects is multiplied by a correction factor of 13.96.
[3] No northern riffleshells were deteced during the pre-construction survey, but the species is known to occur in the area. Thus estimates conservatively assume one mussel of each undetected species was overlooked during Salvage Zone survey efforts.

3.2 Freshwater Mussel Ecology and Life History

3.2.1 Description

The eastern U.S. is a global hotspot for freshwater mussel diversity and is home to approximately 300 species (Williams et al. 2017) comprising two families: Unionidae and Margaritiferidae (Haag 2012). Freshwater mussels are bivalves and characterized by the presence of two shells held together by a hinge ligament (Watters et al. 2009, Haag 2012). The inner soft organs of unionid mussels include a mantle encapsulating the organs, incurrent and excurrent siphons that draw water in and out of the shell, gills, adductor muscles to hold the shells closed, and a fleshy foot to anchor the mussel into the substrate (Haag 2012). Adult mussels are filter feeders, spending their entire lives partially or completely buried with substrate.

Freshwater mussels have a complicated reproductive cycle and are obligatory parasites on host fishes or amphibians (Woolnough 2006, Haag 2012). Reproduction

requires a stable, undisturbed habitat and a sufficient population of host species to complete the mussel's larval development. In spring males release sperm into the water column; sperm are then taken in by females through their siphons during feeding and respiration. Females retain fertilized eggs in their gills until the larvae (glochidia) fully develop. Two basic brooding periods exist: short term or tachytictic and long term or bradytictic. Tachytictic mussels release larvae during mid- to late-summer while bradytictic mussels retain larvae in the female mussels' gill pouches over winter.

Upon reaching the end of the brooding cycle, glochidia are released from the female and must come in contact with a passing fish and attach to the gills, fins, or body of a fish host to survive. Mussels use a variety of adaptations to ensure glochidia are exposed to a host. Some mussel species are generalists and can metamorphosize on a variety of hosts while others are specialists and reliant on a single host species or genus (Woolnough 2006). Once attached to the appropriate fish host gills or fins, glochidia develop into juvenile mussels. After development is complete, juveniles detach from the host fish and settle into the streambed (USFWS 2012b). Once established, some species may live for over 100 years (Haag 2012).

3.2.2 Conservation Status and Impacts

Freshwater mussels are highly sensitive to habitat alteration (Watters and Flaute 2010). With the growth of industry, construction of dams, and urbanization, freshwater mussel populations sharply declined throughout the 20th and 21st centuries (Haag 2012). Approximately 70 percent of the freshwater mussels in the U.S. are in need of conservation measures (Williams et al. 1993).

Heightened total suspended solids from construction negatively impact freshwater fauna by decreasing light attenuation, smothering interstitial spaces, and impairing respiration (Kundell and Rasmussen 1995, Henley et al. 2000).

3.3 Clubshell (*Pleurobema clava*)

3.3.1 Description

The clubshell has a small- to medium-sized, rather thick, elongate triangular shell that is moderately inflated with a pointed umbo, and rarely exceeds 8.0 centimeters (3.2 in) in length. The exterior of the shell is tan, yellowish, or greenish in color and darkens with age. Juvenile shells have bold green stripes that often form a checkerboard pattern. The shell sculpture is smooth with a weak sulcus and two to three weak angulations on the posterior or rear half of the shell. The clubshell has a porcelain white nacre (inner shell covering) often iridescent on the posterior of the shell, and occasionally with gold or brown Tullberg layers (Watters et al. 2009).

3.3.2 Status

The clubshell was listed as federally endangered by the USFWS in 1993 (58 FR 5638). Sand and gravel dredging can negatively affect clubshell populations (USFWS 2019a)

3.3.3 Ecology

In mid- to late-summer, females expel glochidia into the water current via fragile, white, non-elastic conglutinates (packets of glochidia trailed out in the stream current and attached to the mussel by a clear strand), meant to attract a passing fish. When the fish host attacks, the larva attach to the gills, fins, or body of the fish host (Watters et al. 2009). Potential fish hosts include a variety of minnows (*Cyprinidae*) and darters (*Percidae*) (Watters et al. 2009).

3.3.4 Habitat and Geographic Distribution

The clubshell inhabits medium to large rivers in areas of moderate current with clean sand and cobble substrates and is typically found downstream of riffles and islands (Watters et al. 2009). Currently, the 13 known clubshell populations are restricted to the Ohio River and Lake Erie Basins. Locations that support, or might still support the species comprise 21 streams, with recent recruitment reported in 10 streams (USFWS 2019a). A pre-construction survey conducted by ESI on 27 August to 10 September 2024 located one tagged (T007 Gray) clubshell. The tagged clubshell was captured approximately 1,100 meters (3,608.9 ft) downstream from the initial tagging location (Mr. Kevin Eliason, email communication).

3.4 Fanshell (*Cyprogenia stegaria*)

3.4.1 Description

The fanshell has a medium sized, thick, circular to triangular shell that rarely exceeds 8.0 centimeters (3.2 in) in length. The exterior of the shell is a dull yellowish or tan color overlain with broad green rays. The shell sculpture is coarse with distinct, concentric growth rings covered by numerous small pustules or bumps, particularly on the posterior or rear half of the shell. The fanshell has a porcelain white nacre (inner shell covering) often iridescent on the posterior of the shell (Watters et al. 2009).

3.4.2 Status

The fanshell was listed as federally endangered by the USFWS in 1990 (55 FR 25591). Sand and gravel dredging can negatively affect fanshell populations and suitable habitats (USFWS 1997; 2019b). Naturally recruited (non-stocked) fanshell were observed near the Action Area (USFWS 2019b).

3.4.3 Ecology

In mid- to late-summer, females expel glochidia into the water current via a spiral orange or pink worm-like conglutinate (packets of glochidea trailed out in the stream current and attached to the mussel by a clear strand), meant to attract a passing fish. When the fish host attacks, the larva attach to the gills, fins, or body of the fish “host” (Watters et al. 2009). Potential fish hosts include a variety of sculpins (Cottidae) and darters (Percidae) (Watters et al. 2009).

3.4.4 Habitat and Geographic Distribution

The fanshell is endemic to the Ohio River drainage, occupying medium to large rivers in areas of moderate current with stable gravel and sand substrates (Watters et al. 2009). It buries itself leaving only the edge of the shell and siphons exposed. Currently, the fanshell is found in 15 rivers and streams throughout the Ohio River system, with the strongest populations occurring in the Licking River (Kentucky), Green River (Kentucky), Rolling Fork rivers (Kentucky), and Clinch River (Tennessee and Virginia) (Watters et al. 2009, USFWS 2019b). A pre-construction survey conducted by ESI on 27 August to 10 September 2024 located three fanshell.

3.5 Longsolid (*Fusconaia subrotunda*)

3.5.1 Description

The longsolid has a medium, oval or squarish shell reaching lengths of 11.0 centimeters (4.3 in) (Watters et al. 2009). Overall, the shell is thick and either inflated or compressed depending on the population. The shell's exterior is smooth, yellow or reddish brown with dark annular growth rings, while the interior is porcelain white with posterior iridescence (Watters et al. 2009).

3.5.2 Status

The longsolid was listed as federally threatened by USFWS in 2023 (88 FR 14794).

3.5.3 Ecology

The longsolid is tachytictic; viable larvae occur in the gills of females in June through August and are released into the water column as semi-buoyant, cylindrical conglutinates presumably targeted by fish hosts, although specific hosts are unknown (Watters et al. 2009).

3.5.4 Habitat and Geographic Distribution

The longsolid occurs in both small streams and large rivers, occupying sand and gravel substrates in small streams and gravel and cobble substrate in larger rivers, and in water depths ranging from 0.6 to 6.1+ meters (2.0 to 20.0+ ft) (Gordon and Layzer 1989, Parmalee and Bogan 1998). At present, 60 populations of longsolid occupy three basins: the Ohio (39), Cumberland (1), and Tennessee River (20) basins (USFWS 2022b). No recent reports of the species occurring in the ORINWR exist. However, a pre-construction survey on 27 August to 10 September 2024 revealed presence of two longsolid individuals including one within the Proposed Relocation Area.

3.6 Northern Riffleshell (*Epioblasma torulosa rangiana*)

3.6.1 Description

The northern riffleshell is a medium-sized mussel with a shell that reaches approximately 6.5 centimeters (2.5 in). The outline is irregularly ovate, elliptical, or

obovate. The shell's exterior is greenish to tan with many darker green rays, while the interior of the shell is white, iridescent, or rarely pink (Watters et al. 2009).

3.6.2 Status

The northern riffleshell was listed as endangered by the USFWS on 22 January 1993 (58 FR 5638) (USFWS 1993).

3.6.3 Ecology

Life history of northern riffleshell is primarily unknown but general unionid biology is applicable. The gilt darter (*Percina evides*) is a known host of the northern riffleshell (USFWS 2019c). In the wild, the riffleshell is recorded as gravid in September (and probably August). During spawning, the female riffleshell displays a spongy, pure white mantle lining visible from several meters away in clear water. The white mantle potentially functions to lure hosts.

3.6.4 Habitat and Geographic Distribution

The northern riffleshell occurs in a wide variety of streams, large and small, preferring runs with bottoms composed of firmly packed sand and fine to coarse gravel (Watters et al. 2009). The northern riffleshell was once widespread throughout most of the Ohio River drainage (USFWS 2019c). At the time of listing (1993), a few isolated, small, and peripheral populations existed. The largest remaining populations were along several reaches of French Creek in Pennsylvania. Apparently viable populations were also scattered along approximately 128 kilometers (80 mi) of the Allegheny River, although populations at some locations apparently exhibited depressed vigor (USFWS 2019c). Currently, four known successfully recruiting northern riffleshell populations are restricted to six streams in the Ohio and Saint Lawrence/Great Lakes basins (East Branch Sydenham River, Allegheny River, French Creek, and the Ausable River population) (USFWS 2019c). An additional nine populations were reintroduced or supplementally stocked across 16 streams between 2010 and 2018, including 3,092 individuals between 2014 and 2016 at the Muskingum Island refuge area (Belleville Pool) (USFWS 2019c). However, a pre-construction survey from 27 August to 10 September 2024 failed to reveal presence of northern riffleshell.

3.7 Pink mucket (*Lampsilis abrupta*)

3.7.1 Description

The pink mucket has a medium-sized, very dense shell averaging 1.1 centimeter (4.3 in) in length. Shells are oval or round and moderately inflated (Watters et al. 2009). The shell's exterior is waxy yellow or tan, whereas the inside is white, pink, or salmon colored with posterior iridescence often present (Watters et al. 2009).

3.7.2 Status

The pink mucket was listed by the USFWS as federally endangered in 1976 (41 FR 24062) (USFWS 2011).

3.7.3 Ecology

The pink mucket is bradytictic; eggs are fertilized by September but glochidia overwinter in the female marsupia (Ortmann 1919, Watters et al. 2009). Fish hosts include black basses (*Micropterus* sp.) and walleye (*Sander vitreus*) (FOC 2013).

3.7.4 Habitat and Geographic Distribution

The pink mucket typically occurs in large rivers and streams with sand, gravel, and cobble substrates, although the species sporadically occurs in smaller streams. Currently, 29 streams contain pink mucket populations. Populations occur in both the Upper and Lower Mississippi River basins, and include six major drainages: the Missouri River, the Ohio River, the Tennessee River, the Cumberland River, the White River, and the Red River (Watters et al. 2009, USFWS 2018). Over one-third of 29 extant populations consist of only one or two observations over the past 30 years (USFWS 2018). A pre-construction survey from 27 August to 10 September 2024 located one pink mucket.

3.8 Purple cat's paw (*Epioblasma obliquata obliquata*)

3.8.1 Description

The purple cat's paw is one of two subspecies of catspaw (*Epioblasma obliquata obliquata*) and is a medium-sized mussel with a thick, heavy shell that reaches about 7.0 centimeters (2.7 in); females are notably smaller than males. The shell is moderately flattened and oval with a brownish tan exterior with many dark green rays. The shell's interior is deep purple with white margins and posterior iridescence (Watters et al. 2009).

3.8.2 Status

The purple cat's paw was listed as endangered by the USFWS in 1990 (55 FR 28209) (USFWS 1993).

3.8.3 Ecology

The purple cat's paw is bradytictic; females holding viable larvae were observed from September to April (Hoggarth et al. 1995) Potential fish hosts include rock bass (*Ambloplites rupestris*), darters, sculpin, and stonecat (*Noturus flavus*) (Watters et al. 2009). Individuals live up to 25 years.

3.8.4 Habitat and Geographic Distribution

The purple cat's paw occurs in medium to large rivers in various substrates and requires swift currents to avoid being buried in silt. The subspecies was historically distributed in the Ohio, Cumberland, and Tennessee river systems. However, it is currently found in the Ohio River and four of its tributaries (Killbuck Creek, Walhonding River, Green River, and Licking River), and in a Tennessee River tributary (Duck River). All but the Killbuck Creek population resulted from reintroduction efforts. The species is known to occur within the ORINWR, but past monitoring efforts at the

Muskingum Island area failed to yield any individuals. A pre-construction survey conducted from 27 August to 10 September 2024 also failed to locate purple cat's paw. As such, the species is assumed absent from the Action Area.

3.9 Rayed bean (*Villosa fabalis*)

3.9.1 Description

The rayed bean is a relatively small species, and its shell rarely exceeds 4.0 centimeters (1.6 in). The shell is solid and rounded, tapering posteriorly to a posterior point in males, more rounded in females (Watters et al. 2009). 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 obscured in older, blackened specimens).

3.9.2 Status

The USFWS listed the rayed bean as endangered on 14 February 2012 (77 FR 8632).

3.9.3 Ecology

The rayed bean is a long-term brooder; females brood glochidia from May through October (Parmalee and Bogan 1998). Like other species, females expel mature glochidia into the water and glochidia must attach to an appropriate fish host's gills or fins to complete development. Confirmed hosts include: the Tippecanoe darter (*Etheostoma tippecanoe*), spotted darter (*Etheostoma maculatum*), greenside darter (*Etheostoma blennioides*), rainbow darter (*Etheostoma caeruleum*), mottled sculpin (*Cottus bairdi*), and largemouth bass (*Micropterus salmoides*) (USFWS 2024b). Rayed bean have an estimated age lifespan of 15 years (USFWS 2024b).

3.9.4 Habitat and Geographic Distribution

The rayed bean typically occurs in sand and cobble substrates in smaller headwater streams but is occasionally found in large rivers and littoral regions of glacial lakes, high quality creeks, and small rivers. The species is found in and near riffles, generally in water weeds, and deeply buried in sand and gravel bound together by roots (Watters et al. 2009). Rayed bean was detected in 115 streams, lakes, and some human-made canals in across 10 states: Illinois, Indiana, Kentucky, Michigan, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia; and one province: Ontario, Canada (USFWS 2024b). The species is known to occur within the ORINWR, but past monitoring efforts at the Muskingum Island area failed to yield any individuals. A pre-construction survey from 27 August to 10 September 2024 also failed to locate rayed bean. As such, the species is assumed absent from the Action Area.

3.10 Round hickorynut (*Obovaria subrotunda*)

3.10.1 Description

The round hickorynut mussel has a small to medium and nearly circular shell averaging 4.4 centimeters (1.7 in) in length. Shells are moderately thick and compressed and exhibit broad growth rings and fine green rays in younger individuals (Watters et al. 2009). The shell's exterior is brown with a distinct yellowish-brown posterior, while the interior is usually white with an iridescent posterior (Watters et al. 2009).

3.10.2 Status

The round hickorynut was listed by the USFWS as threatened in 2023 (88 FR 14794). Dredging and spoil material negatively affect round hickorynut populations and habitat (USFWS 2019d).

3.10.3 Ecology

The round hickorynut is bradytictic; eggs are fertilized by September but glochidia overwinter in the female marsupia (Ortmann 1919, Watters et al. 2009). The round hickorynut uses darters and sculpins as hosts (FOC 2013). Round hickorynut longevity is estimated at 12 years (Watters et al. 2009).

3.10.4 Habitat and Geographic Distribution

The round hickorynut occurs in all stream sizes and in various habitats ranging from sandy mud to coarse gravel (Watters et al. 2009). Currently, 301 populations of round hickorynut are known across 12 states. Populations occur in the Great Lakes, Ohio, Cumberland, Tennessee, and Lower Mississippi basins (USFWS 2019d). The species is known to occur within the ORINWR, and past monitoring efforts at the Muskingum Island area revealed species presence. A pre-construction survey from 27 August to 10 September 2024 located five individuals including one in the Salvage Zone.

3.11 Sheepnose (*Plethobasus cyphyus*)

3.11.1 Description

The sheepnose mussel has a medium-sized, elongate and ovate shell seldom exceeding 14.0 centimeters (5.5 in) in length. Overall, the shell is thick and moderately inflated. Identifying species characteristics include a row of large tubercular knobs on the center of the valve, extending from the hinge of each valve, toward the ventral ridge (the bottom of the shell opposite the hinge), and a broad, shallow depression running posterior to the knobs (Watters et al. 2009). The shell's exterior is yellow and waxy in younger individuals and reddish-yellow to brown with dark concentric rings in adults (USFWS 2012b). The shell's interior is usually white but may be pinkish to cream colored (Watters et al. 2009). Sexual dimorphism is not apparent in this species (Butler 2002).

3.11.2 Status

The sheepnose mussel was listed as endangered by USFWS on 13 March 2012 (77 FR 14914). USFWS indicated habitat loss and degradation as primary threats (USFWS 2012a). On 9 June 2019 USFWS agreed to designate critical habitat for sheepnose by 2024 (The Center for Biological Diversity 2019). Recently proposed critical habitat is designated in the Chippewa, Kankakee, Meramec, Bourbeuse, Allegheny, Green, Tippecanoe, Walhonding, Tennessee, Clinch, Powell, and Big Sunflower rivers (USFWS 2024a). The Ohio River was not previously designated as critical habitat and is not among currently proposed waterbodies, thus disturbance resulting from the Proposed Action will not affect sheepnose designated critical habitat.

3.11.3 Ecology

The sheepnose is tachytictic; eggs develop in June and glochidia appear in July (Ortmann 1919). Glochidia are discharged in pink or red, narrow, oval-shaped conglutinates (Ortmann 1919) and are expelled in an unbroken line resembling small worms to attract fish hosts. Fish hosts eat the conglutinate and become infested with glochidia that attach to the fish host's gills, fins, or body. In the laboratory, more than 30 species of fish have some viability as hosts for sheepnose, although wild glochidia were found only on sauger (*Sander canadensis*) and mimic shiners (*Notropis volucellus*) (USFWS 2024b). Sheepnose longevity is estimated at 30 years old (Watters et al. 2009).

3.11.4 Habitat and Geographic Distribution

The sheepnose is primarily a large river species, but occurs in habitats ranging from sandy mud and gravel in larger rivers to coarse sand and gravel in smaller streams (Butler 2002). Currently, populations of sheepnose are known from 22 streams across 14 states: Alabama, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin (USFWS 2024b). Populations occur in the Upper Mississippi River, Ohio River, and Tennessee and Lower Mississippi River basins. The species is known to occur within the ORINWR, and past monitoring efforts at the Muskingum Island area revealed species presence. A pre-construction survey conducted from 27 August to 10 September 2024 located 24 individuals.

3.12 Snuffbox (*Epioblasma triquetra*)

3.12.1 Description

The snuffbox mussel is about 5.0 centimeters (2.0 in) in length with triangular and thick, very inflated shells. The shell's exterior is yellowish and covered with numerous, broken, dark green rays (Carman and Goforth 2004). Females are generally smaller than males (Parmalee and Bogan 1998). Hinged teeth are elevated and compressed, and beak sculpture is double looped (Clarke 1981).

3.12.2 Status

The snuffbox was listed by the USFWS as federally endangered on 14 February 2012 (77 FR 8632).

3.12.3 Ecology

Snuffbox mussel reproduction occurs in early to mid-August. Females take in sperm released by males into the water and glochidia (the parasitic stage of mussels) are released from May to mid-July. The logperch (*Percina caprodes*) is the primary host fish, but multiple darters and sculpins in the genera *Etheostoma*, *Percina*, and *Cottus* also potentially serve as hosts (USFWS 2024b). After completing the parasitic stage, snuffbox remain relatively sessile on the river bottom, living to an age of approximately 20 years (USFWS 2024b).

3.12.4 Habitat and Geographic Distribution

The snuffbox is found in small creeks and large rivers, as well as lakes. In rivers and streams, it occupies areas of swift current in riffles and shoals with gravel and cobble substrate. The species is also found in wave-washed lake shores over a variety of substrates (Cummings and Mayer 1992, Parmalee and Bogan 1998). Sheepnose currently occur in 85 streams across 14 states and one Canadian province and are considered extirpated from Iowa, Kansas, Mississippi, and New York (USFWS 2024b). The species is known to occur within the ORINWR, but past monitoring efforts at the Muskingum Island area failed to yield capture of any individuals. A pre-construction survey from 27 August to 10 September 2024 also failed to locate snuffbox. As such, the species is assumed absent from the Action Area.

3.13 Critical Habitat in the Action Area

No critical habitat is designated for any federally listed mussels detected during 2024 surveys. Thus, the Proposed Action will have ***No Effect*** on Designated Critical Habitat.

4.0 Effects of the Action and Cumulative Effects

The Proposed Action involves plugging actively leaking oil and gas wells to prevent further diminishment of local water quality and deposition of sediments within the Action Area. The Proposed Action itself will result in a temporary loss of habitat currently supporting a small number of federally listed mussels, despite its marginal quality: based on the catch-per-unit-effort described below, habitat quality and functionality of areas surrounding the wells are generally lower than for the surrounding extant mussel assemblage

However, the Proposed Action aims to improve habitat for resident mussel populations in the long-term. Following restoration of the river bottom, completion of the Proposed Action offers benefits for downstream mussel populations anticipated to last in perpetuity. Water quality improvements from removal of petroleum material and impacted sediments have potential to increase mussel fecundity, sperm survival rate, fish host presence, and juvenile survivability, among other short- and long-term benefits.

During the Proposed Action, Conservation Measures (see Section 2.4) are instituted to minimize and avoid adverse effects on federally listed mussels in the short-term. Specifically, salvage and relocation of mussels upstream of temporary impacts will occur during the Proposed Action. However, mussels are cryptic, juveniles are small, and individuals burrowed in substrate could avoid detection. Further, survey transects cover only a small portion of the Proposed Action. The WVMSP estimates only half of the mussels within any given search area are located. Approximately 9.9 percent of the Impact Area and 7.2 percent of the Salvage Zone were sampled during pre-construction surveys. Thus, missing or overlooking some individuals during salvage efforts is possible.

Any mussels missed or overlooked within the Dredging Area are likely killed by either crushing by dredging equipment and installation of spuds or during dewatering or treatment of dredged material if embedded in excavated substrates. Upon treatment, dredged material is transported to a landfill and not reintroduced back into the river, precluding further effects on salvaged mussels.

Harassment and potentially harm of mussels during salvage, relocation, and placement in the Relocation Area is likely. The Relocation Area's placement upstream of the Proposed Action minimizes effects on relocated mussels from sedimentation caused by dredging operations and from petroleum leaks prior to, and during, well-plugging efforts. Addition of mussels to the relocation area is not forecast to have a negative effect on the existing population as listed mussels are hand placed in the substrate along transects by qualified malacologists. During hand placement, divers visually assess mussel presence to ensure listed mussels are not placed within crowded areas thus precluding local overpopulation. Further, placement along transects facilitates rediscovery during monitoring events. Mussel relocation is a standard practice in multiple states as a mitigation measure and is a net benefit over leaving mussels within the impact area.

Effects of the Proposed Action on individual species are discussed below.

4.1 Clubshell (*Pleurobema clava*)

The clubshell detected within the Action Area is part of the Ohio River population. This population comprises three subpopulations: 1) Muskingum Island, Belleville Pool (~RM 176) where 4,619 individuals were reintroduced between 2013 and 2016; 2) Buckley

Island, Belleville Pool (~RM 170) where 4,917 individuals were reintroduced during the same period; and 3) a location in the Greenup Pool (~RM 284) where 5,660 were also reintroduced during the same period. Mortality is reported as low at each location (USFWS 2019a). One clubshell was detected during pre-construction surveys (Table 3).

4.1.1 Direct Effects

4.1.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including clubshell (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual clubshell mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 clubshell) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Use of sediment curtains, marine oil booms, and cellars around wells all serve to minimize impacts on mussels outside the Dredging Area. Overlooking individual clubshell mussels during salvage efforts and not subsequently relocating them prior to dredging poses the greatest potential for mortality. Individuals in the AIE (5 ha [12.4 ac]) are not likely subject to harm or mortality directly from dredging equipment but similar effects from sedimentation caused by dredging are possible. Mussels open their valves to feed, thus individuals in heavily silt-laden water are forced to close their valves up to 90 percent of the time, as opposed to 50 percent for individuals living in silt-free environments (Brim Box and Mossa 1999). Extended valve closure potentially results in starvation or a state of semi-starvation. Extensive exposure to suspended sediment in the water column also affects individuals by clogging gill filaments, significantly reducing feeding efficiency and filtering clearance rates, potentially resulting in mortality (Brim Box and Mossa 1999).

However, the small size and short duration of dredging activities suggest effects are temporary. Minimal sedimentation is anticipated during plugging efforts due to Conservation Measures such as the combination of cellars, oil booms, and sediment curtains around existing wells during plugging efforts. Conservation Measures likely reduce petroleum leakage to or below levels already experienced by local mussels.

No federally listed mussels were recovered within the Dredging Area during initial surveys. However, given the cryptic habits of mussels (and thus low detectability), analysis assumes one clubshell mussel is present within the Dredging Area to be likely missed or overlooked during salvage/relocation efforts. The Proposed Action is likely to result in potential lethal take of this individual. Mussels not salvaged and occurring

outside the Dredging Area are assumed to suffer sublethal effects (i.e., harm) resulting from the Proposed Action.

4.1.1.2 Effects on Habitat

As described in Section 2.1.2, the Proposed Action improves mussel habitat in the Ohio River by removing a persistent, local source of petroleum pollution. Restoration of the river bottom using substrate suitable for mussel occupancy also suggests the Dredge Area is likely to quickly regain viability as mussel habitat. Therefore, the Proposed Action results in neither a permanent loss of habitat nor a permanent loss of habitat function for mussels but rather retains suitable mussel habitat and increases overall habitat quality and function in the Action Area (Section 2.1.2).

Furthermore, numerous other areas in the Belleville Pool contain habitat supporting both non-listed and federally listed mussel populations (personal communication with WVDNR, and V. Elam; USFWS 2018; 2019c; b; a). Belleville Pool's mussel habitat quantity and quality led USFWS and WVDNR to select the area as a reintroduction site. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Based on the Proposed Action's small size relative to the amount of surrounding suitable mussel habitat available, the impact is unlikely to cause lasting harm to mussel populations or habitat. Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances are anticipated beyond the scope of the Proposed Action's in-water work described herein. Federally listed and common mussel populations realize long-term benefits from the isolated, short-term negative effects of the Proposed Action.

4.1.2 Indirect Effects

Based on anticipated relocation success (Section 2.4.2), conservation benefits (Section 2.4) associated with the Proposed Action and ongoing restoration efforts, affected mussel populations are likely to experience higher survivorship rates and retention once oil and gas wells are plugged and no longer leaking. Notably, no federally listed species were detected in the Dredge Area and most federally listed mussels were found some distance from well locations. Adverse effects of the Proposed Action on federally listed mussels are localized and temporary and thus not anticipated to cause population-level effects.

Furthermore, additional suitable habitat, not yet surveyed, exists (including the Proposed Relocation Area) within the Ohio River. High connectivity exists among various mussel beds previously proximate the Action Area. Based on connectivity among mussel beds, location of the Proposed Relocation Area upstream of Salvage Zones, and ORINWR's ongoing stocking efforts, repopulation of the Salvage Zone is anticipated.

4.2 Fanshell (*Cyprogenia stegaria*)

Fanshell mussels were observed within and proximate the Action Area during recent monitoring surveys (USFWS 2019b). In 2010, 200 fanshell were stocked to augment the Muskingum Island (Bellville Pool) population. Numerous unstocked individuals were observed throughout Belleville Pool including around Buckley Island, downstream of Willow Island, and along the RDB of Muskingum Island (USFWS 2019b). Natural recruitment is frequently observed around Muskingum Island. Three fanshell were detected during pre-construction surveys (Table 3).

4.2.1 Direct Effects

4.2.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including fanshell (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual fanshell mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 fanshell) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on fanshell mussels are similar to those discussed regarding the clubshell mussel above. Harm and mortality is expected for fanshell mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Fanshell mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the fanshell despite the negative, short-term effects.

4.2.1.2 Effects on Habitat

Existing habitat for the fanshell within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including fanshell, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.2.2 Indirect Effects

Adverse effects of the Proposed Action on fanshell mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of fanshell in the Action Area is expected to increase following plugging of petroleum wells.

4.3 Longsolid (*Fusconaia subrotunda*)

Prior to the pre-construction survey, the longsolid was not known from the ORINWR including the Action Area. In 2016, Dr. Mike Hoggarth reported 29 individuals in the Willow Island Pool but no vouchers or photos were available for confirmation (USFWS 2022b). Two longsolid were detected during pre-construction surveys (Table 3); one in the Impact Area and one in the Proposed Relocation Area.

4.3.1 Direct Effects

4.3.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including longsolid (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual longsolid mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 longsolid) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on longsolid mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for longsolid mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Longsolid mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the longsolid despite the negative, short-term effects.

4.3.1.2 Effects on Habitat

Existing habitat for the longsolid within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including longsolid, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance

dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.3.2 Indirect Effects

Adverse effects of the Proposed Action on longsolid mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of longsolid in the Action Area is expected to increase following plugging of petroleum wells.

4.4 Northern Riffleshell (*Epioblasma torulosa rangiana*)

Between 2014 and 2016 northern riffleshell mussels were reintroduced at three locations to supplement the Ohio River population: 3,092 individuals at Muskingum Island, Belleville Pool; 2,595 individuals at Buckley Island, Bellville Pool; and 1,894 individuals at Ohio RM 284, Greenup Pool (USFWS 2019c). Mortality of reintroduced individuals is reportedly low; however, relocation success is also reportedly low (USFWS 2019c). No northern riffleshell mussels were observed during pre-construction surveys but the species is assumed present.

4.4.1 Direct Effects

4.4.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including northern riffleshell (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual northern riffleshell mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 northern riffleshell) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on northern riffleshell mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for northern riffleshell mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Northern riffleshell mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the northern riffleshell despite the negative, short-term effects.

4.4.1.2 Effects on Habitat

Existing habitat for the northern riffleshell within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the

Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including northern riffleshell, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.4.2 Indirect Effects

Adverse effects of the Proposed Action on northern riffleshell mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of northern riffleshell in the Action Area is expected to increase following plugging of petroleum wells.

4.5 Pink Mucket (*Lampsilis abrupta*)

The pink mucket observed in the Action Area is from one of two Ohio River subpopulations. Individuals from this subpopulation sporadically occur between Ohio and West Virginia, and are considered rare (USFWS 2018). ORINWR stocked the species near Muskingum Island in 2013 through 2015 and one individual was captured during pre-construction surveys (Table 3).

4.5.1 Direct Effects

4.5.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including pink mucket (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual pink mucket mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 pink mucket) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on pink mucket mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for pink mucket mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Pink mucket mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the pink mucket despite the negative, short-term effects.

4.5.1.2 Effects on Habitat

Existing habitat for the northern riffleshell within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including northern riffleshell, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.5.2 Indirect Effects

Adverse effects of the Proposed Action on pink mucket mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of pink mucket in the Action Area is expected to increase following plugging of petroleum wells.

4.6 Purple Cat's Paw (*Epioblasma obliquata obliquata*)

Purple cat's paw is known to occur within the ORINWR, but past monitoring efforts at the Muskingum Island area failed to yield any individuals. No northern riffleshell mussels were observed during pre-construction surveys but the species is assumed present.

4.6.1 Direct Effects

4.6.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including purple cat's paw (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual purple cat's paw mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 purple cat's paw) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on purple cat's paw mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for purple cat's paw mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if present within excavated substrates during dredging. Purple cat's paw mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by

the Proposed Action are expected benefit to benefit the purple cat's paw despite the negative, short-term effects.

4.6.1.2 Effects on Habitat

Existing habitat for the purple cat's paw within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including purple cat's paw, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.6.2 Indirect Effects

Adverse effects of the Proposed Action on purple cat's paw mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of purple cat's paw in the Action Area is expected to increase following plugging of petroleum wells.

4.7 Rayed Bean (*Villosa fabalis*)

Rayed bean is known to occur within the ORINWR, but past monitoring efforts at the Muskingum Island area failed to yield any individuals. No rayed bean mussels were observed during pre-construction surveys but the species is assumed present.

4.7.1 Direct Effects

4.7.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including rayed bean (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual rayed bean mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 rayed bean) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on rayed bean mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for rayed bean mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if present within excavated substrates during dredging. Rayed bean mussels outside the Dredging Area but within

the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the rayed bean despite the negative, short-term effects.

4.7.1.2 Effects on Habitat

Existing habitat for the rayed bean within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including rayed bean, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.7.2 Indirect Effects

Adverse effects of the Proposed Action on rayed bean mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of rayed bean in the Action Area is expected to increase following plugging of petroleum wells.

4.8 Round Hickorynut (*Obovaria subrotunda*)

The round hickorynut mussels observed during pre-construction surveys belong to the Belleville Pool population, one of the last two populations remaining in the Ohio River's mainstem, with the other population occurring in Willow Island Pool (USFWS 2019d). The exact number of individuals belonging to either population is unknown, but five individual round hickorynut mussels were captured during pre-construction surveys (Table 3).

4.8.1 Direct Effects

4.8.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including round hickorynut (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 42 individual round hickorynut mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 21 round hickorynut) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on round hickorynut mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for round hickorynut mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Round hickorynut mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the round hickorynut despite the negative, short-term effects.

4.8.1.2 Effects on Habitat

Existing habitat for the round hickorynut within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including round hickorynut, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.8.2 Indirect Effects

Adverse effects of the Proposed Action on round hickorynut mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of round hickorynut in the Action Area is expected to increase following plugging of petroleum wells.

4.9 Sheepnose (*Plethobasus cyphyus*)

The sheepnose observed during pre-construction surveys belong to one of 15 extant populations occurring in the Ohio River Basin. Twenty-four individuals were captured during pre-construction surveys (Table 3).

4.9.1 Direct Effects

4.9.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including sheepnose (Table 3). Of the 806 federally listed mussels estimated in the Action Area, 182 are assumed in the Salvage Zone including 14 individual sheepnose mussels (Table 4). Estimates assume half of the individuals in the Salvage Zone (91 mussels; 7 sheepnose) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via

removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on sheepnose mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for sheepnose mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Sheepnose mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the sheepnose despite the negative, short-term effects.

4.9.1.2 Effects on Habitat

Existing habitat for the sheepnose within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including sheepnose, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.9.2 Indirect Effects

Adverse effects of the Proposed Action on sheepnose mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of sheepnose in the Action Area is expected to increase following plugging of petroleum wells.

4.10 Snuffbox (*Epioblasma triquetra*)

Snuffbox is known to occur within the ORINWR, but past monitoring efforts at the Muskingum Island area failed to yield any individuals. No snuffbox mussels were observed during pre-construction surveys but the species is assumed present.

4.10.1 Direct Effects

4.10.1.1 Effects on Individuals

Estimates suggest the Impact Area likely contains 806 federally listed mussels representing seven species, including snuffbox (Table 3). Of the 806 federally listed mussels estimated in the Impact Area, 182 are assumed in the Salvage Zone including 14 individual snuffbox mussels (Table 4). Estimates assume half of the individuals in

the Salvage Zone (91 mussels; 7 snuffbox) are salvaged and moved to the Proposed Relocation Area. Salvaged mussels are subject to harassment/harm via removal from the substrate, handling, temporary holding, transport, and hand placement within the Proposed Relocation Area.

Effects on snuffbox mussels are similar to those discussed regarding the other affected mussel species above. Harm and mortality is expected for snuffbox mussels overlooked during salvage efforts either from dredging equipment or dewatering, treatment, and disposal of dredged material if individuals are excavated with substrates during dredging. Rayed bean mussels outside the Dredging Area but within the AIE may experience negative effects related to sedimentation, however Conservation Measures will minimize such effects. The long-term effects caused by the Proposed Action are expected benefit to benefit the rayed bean despite the negative, short-term effects.

4.10.1.2 Effects on Habitat

Existing habitat for the snuffbox within the Dredging Area is disturbed and removed during the Proposed Action, and habitat within the larger Action Area is degraded through sedimentation caused by the Proposed Action. However, the Proposed Action includes replacing dredged material with substrate suitable for mussel occupancy to encourage expedient repopulation by mussels, including snuffbox, and increase overall habitat suitability for the species. Outside of the Dredging Area, effects are limited on both temporal and geographic scales and preventative measures are in place to further reduce potential negative effects (e.g., sediment curtains and oil booms). Aside from relocation monitoring, no follow-up activities, maintenance dredging, and/or other instream disturbances associated with the Proposed Action are anticipated.

4.10.2 Indirect Effects

Adverse effects of the Proposed Action on rayed bean mussels are localized and temporary, and thus not anticipated to cause population-level effects. Dispersal, retention, and survivorship of snuffbox within the Action Area is expected to increase following plugging of petroleum wells.

4.11 Indiana Bat (*Myotis sodalis*)

4.11.1 Direct Effects

Terrestrial work (i.e., tree clearing) is not anticipated as part of the Proposed Action. Effects on individual Indiana bats are not anticipated.

4.11.2 Indirect Effects

The Proposed Action will not result in effects on the physical and chemical nature of habitats used by the Indiana bat. Similarly, Proposed Action activities will be completed during daytime hours and effects on day-roosting Indiana bats are not anticipated.

4.12 Tricolored Bat (*Perimyotis subflavus*)

4.12.1 Direct Effects

Terrestrial work (i.e., tree clearing) is not anticipated as part of the Proposed Action. Effects on individual tricolored bats are not anticipated.

4.12.2 Indirect Effects

The Proposed Action will not result in effects on the physical and chemical nature of habitats used by the tricolored bat. Similarly, Proposed Action activities will be completed during daytime hours and effects on day-roosting tricolored bats are not anticipated.

4.13 Monarch Butterfly (*Danaus plexippus*)

4.13.1 Direct Effects

The Proposed Action is entirely sited within aquatic environments. Effects on individual monarch butterflies and its terrestrial habitats are not anticipated.

4.13.2 Indirect Effects

The Proposed Action will not alter any resources or regimes on which the monarch butterfly depends on or those that rely on the monarch butterfly. As such, indirect effects related to the monarch butterfly are not anticipated.

4.14 Cumulative Effects

Cumulative effects are those effects of future non-federal activities, that are reasonably certain to occur within the Action Area. To gain an understanding of activities potentially contributing to a cumulative effect, historical events, proposed county commission plans, and municipality data from Wood County, West Virginia and adjoining Washington County, Ohio were reviewed.

As water quality is a primary concern for mussels within the Action Area, The Ohio River Valley Water Sanitation Commission's (ORSANCO's) water quality and biological monitoring efforts in the Ohio River between 2018 and 2022 were reviewed and the document determined the entire Ohio River is fully supporting its aquatic life use designation (ORSANCO 2022), indicating conditions are favorable for the continued persistence of federally listed mussel species. Non-federal action sources with potential to adversely affect mussels include contaminants/pollutants entering the river system from point and non-point sources. The Ohio River shoreline near the Action Area has a substantial history of industrial, extractive, and agricultural uses. Runoff entering the river from these sources potentially contains contaminants and sediments adversely affecting mussels. In 1999, contaminants from a ferro-alloy manufacturing facility resulted in 100 percent mussel mortality at the spill source and affected over 30 river miles of the Belleville Pool in the Ohio River (USFWS 2019d). Extensive measures are now in place to treat effluent discharge and prevent

catastrophic spills/runoff from entering aquatic systems. No similar spills were reported since the 1999 event, and current risk of a similar catastrophic event is greatly reduced since 1999.

Dilution associated with increased water quantity and flows potentially reduces the risk of acute toxicity if a harmful pollutant enters via storm runoff. No combined sewage outfall locations are within or near the Action Area. Therefore, these sources of potential adverse effects on federally listed mussel species are not expected to increase or add to short-term, temporary adverse effects associated with the Proposed Action.

The 2024 Wood County, West Virginia Comprehensive Plan notes upgrades and expansions to the county's public water and sewer services are in progress (Wood County Planning Commission 2023 approved 2024.). The plan emphasizes the importance of meeting environmental standards and mentions current evaluation of separating sanitary sewers from storm water drains to reduce effluent discharge into stream systems during heavy rains (Wood County Planning Commission 2023 approved 2024.). Overall, no apparent reason exists to suspect short-term impacts from dredging and associated sedimentation from the Proposed Action will interact with other ongoing non-federal actions and result in adverse cumulative effects. Plugging the wells represents a component of a long-term pattern of improving water quality in the Ohio River. Assuming improvements continue, the Proposed Action contributes to long-term beneficial cumulative effects in the Action Area.

Although not technically considered part of the cumulative effects analysis under ESA, plugging wells on and off Muskingum Island combined with on-going mussel reintroduction efforts likely continue to provide long-term beneficial effects for federally listed mussel species in the Action Area.

5.0 Conclusion-Determination of Effect

Take may occur from remediation activities associated with the Proposed Action and during mussel salvage/relocation efforts. Analysis assumes all 806 federally listed mussels representing seven species within the Impact Area will be taken. However, lethal take is expected to be much lower (i.e., 50 percent of all individuals in the Salvage Zone), with a conservative estimate of 91 federally listed individuals. Determinations for each species potentially affected by the Proposed Action are summarized below and in Table 5.

Table 5. Affects determination summary for the Muskingum Island Well Plugging Proposed Action on the Ohio River, Wood County, West Virginia.

Species	ESA Status	Affects Determination[1]
Clubshell (*Pleurobema clava*)	Endangered	MA-LAA
Fanshell (*Cyprogenia stegaria*)	Endangered	MA-LAA
Longsolid (*Fusconaia subrotunda*)	Threatened	MA-LAA
Northern Riffleshell (*Epioblasma rangiana*)	Endangered	MA-LAA
Pink Mucket (*Lampsilis abrupta*)	Endangered	MA-LAA
Purple Cat's Paw (*Epioblasma obliquata obliquata*)	Endangered	MA-LAA
Rayed Bean (*Villosa fabalis*)	Endangered	MA-LAA
Round Hickorynut (*Obovaria subrotunda*)	Threatened	MA-LAA
Sheepnose (*Plethobasus cyphyus*)	Endangered	MA-LAA
Salamander Mussel (*Simpsonaias ambigua*)	Proposed Endangered	MA-LAA
Snuffbox (*Epioblasma triquetra*)	Endangered	MA-LAA
Indiana Bat (*Myotis sodalis*)	Endangered	NE
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	NE
Monarch Butterfly (*Danaus plexippus*)	Candidate	NE

[1] MA-LAA = May Affect - Is Likely to Adversely Affect; NE = No Effect

5.1 Clubshell (*Pleurobema clava*)

Sealing five historic petroleum wells where clubshell mussels are known to occur and where ORINWR and the WVDNR are actively working to restore mussel populations is beneficial to the species in the long-term. Eliminating sources of petroleum leaks into the Ohio River contributes to conserving and protecting existing clubshell populations and their habitats. Such actions are also anticipated to benefit other aquatic organisms, including host species necessary for the reproduction and dispersal of individual clubshell mussels.

Harassment and potential harm of clubshell mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual clubshell missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Therefore, the Proposed Action **May Affect – Is Likely to Adversely Affect** the clubshell.

5.2 Fanshell (*Cyprogenia stegaria*)

Harassment and potential harm of fanshell mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual fanshell missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are

potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to clubshell, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the fanshell.

5.3 Longsolid (*Fusconaia subrotunda*)

Harassment and potential harm of longsolid mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual longsolid mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the longsolid.

5.4 Northern Riffleshell (*Epioblasma torulosa rangiana*)

The northern riffleshell was not observed during pre-construction surveys in the Action Area during initial surveys, but the species is assumed present. Harassment and potential harm of northern riffleshell mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual northern riffleshell missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the northern riffleshell.

5.5 Pink Mucket (*Lampsilis abrupta*)

Harassment and potential harm of pink mucket mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual pink mucket mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the pink mucket.

5.6 Purple Cat's Paw (*Epioblasma obliquata obliquata*)

Harassment and potential harm of purple cat's paw mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual purple cat's paw mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the purple cat's paw.

5.7 Rayed Bean (*Villosa fabalis*)

Harassment and potential harm of rayed bean mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual rayed bean mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the rayed bean.

5.8 Round Hickorynut (*Obovaria subrotunda*)

Harassment and potential harm of round hickorynut mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual round hickorynut mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the round hickorynut.

5.9 Sheepnose (*Plethobasus cyphyus*)

Harassment and potential harm of sheepnose mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual sheepnose mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel

species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the sheepnose.

5.10 Snuffbox (*Epioblasma triquetra*)

Harassment and potential harm of snuffbox mussels is anticipated during salvage from the Dredging Area and hand placement within the Proposed Relocation Area. Individual snuffbox mussels missed during salvage efforts could be crushed by equipment or killed while embedded in dredged material which is planned for dewatering, treatment, and discard at landfill. Individuals outside the Dredging Area but within the AIE are potentially exposed to some amount of sedimentation caused during spudding, dredging, and plugging of wells. Similar to other affected mussel species, beneficial effects brought about by plugging petroleum wells are expected in the long-term. The Proposed Action **May Affect – Is Likely to Adversely Affect** the snuffbox.

5.11 Indiana Bat (*Myotis sodalis*)

Proposed Action activities take place entirely within the Ohio River, are short-term in length, and are planned to occur during daytime hours. A **No Effect** determination for the Indiana bat is appropriate.

5.12 Tricolored Bat (*Perimyotis subflavus*)

Proposed Action activities take place entirely within the Ohio River, are short-term in length, and are planned to occur during daytime hours. A **No Effect** determination for the tricolored bat is appropriate.

5.13 Monarch Butterfly (*Danaus plexippus*)

Proposed Action activities take place within the Ohio River and are short-term in length. Terrestrial lands will not be affected. A **No Effect** determination for the monarch butterfly is appropriate.

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APPENDIX A
ORINWR UPLAND WELL CONSULTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ohio River Islands National Wildlife Refuge
3982 Waverly Road
Williamstown, WV 26187
304-375-2923 (Phone)
304-375-2926 (Fax)

March 17, 2025

In Regard to the Endangered Species Act:

Having worked on oil rigs and being therefore, knowledgeable about what impacts will be imparted to the Ohio River Islands National Wildlife Refuge at Muskingum Island, I Victor Elam, Refuge Manager, have determined that the activities involved in plugging orphaned wells on the island will have no effect on Federally Listed Species found there.

Also, the refuge has conducted bat surveys relatively close to and in very similar habitats to Muskingum Island and have found no endangered species of bats. We did detect one tricolored bat on a survey, but it was away from the Ohio River in hilly terrain with upland forest.

There are no Eagle nests on Muskingum Island, and the impact of well-plugging would only have a beneficial impact on migratory birds due to the following forestation efforts with native trees that will provide high quality habitat for bird species that have been displaced by the non-native tree species that would occupy the site otherwise.

There is no suitable habitat for monarch butterflies on this island, but the pollinator mix that will be planted should provide some useful habitat.

The scope of work for the well plugging set forth by the refuge, requires all fluids involved in the well plugging operation to be collected and removed from the site. There would be no negative impact to freshwater mussels from the well plugging activities. Mussels stand to benefit from the reduced risk of future pressurization of the wells from nearby brine injection wells that are operating at 7000 psi (pounds per square inch) and higher. If sub-surface pressurization makes its way to any of these wells, oil, gas, and brine may be pushed to the surface and contaminate mussel habitat surrounding the island.

Victor Elam
Refuge Manager
Ohio River Islands NWR
3982 Waverly Road
Williamstown, WV 26187

APPENDIX B
USFWS INFORMATION FOR PLANNING AND CONSULTATION (IPAC)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
West Virginia Ecological Services Field Office
6263 Appalachian Highway
Davis, WV 26260-8061
Phone: (304) 866-3858 Fax: (304) 866-3852

In Reply Refer To: 03/21/2025 16:53:40 UTC
Project Code: 2025-0018623
Project Name: U.S. Fish and Wildlife Service – Ohio River Islands National Wildlife Refuge Orphan Well Plugging

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). If you determine that other federally protected species not listed in this Official Species List are present in your action area, you are still responsible to analyze your potential effects to those species and consult with the U.S. Fish and Wildlife Service if consultation is required.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of

this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

West Virginia Ecological Services Field Office
6263 Appalachian Highway
Davis, WV 26260-8061
(304) 866-3858

PROJECT SUMMARY

Project Code: 2025-0018623
Project Name: U.S. Fish and Wildlife Service – Ohio River Islands National Wildlife Refuge Orphan Well Plugging
Project Type: Oil &Gas Well Abandonment
Project Description: Plug 13 orphaned oil and gas wells on or adjacent to Muskingum Island, Ohio River, West Virginia on Ohio River Islands National Wildlife Refuge
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.36467235,-81.51309420458713,14z



Counties: Wood County, West Virginia

ENDANGERED SPECIES ACT SPECIES

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 5 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
This species only needs to be considered under the following conditions:

- All activities in this location should consider potential effects to this species. This project is not within a known-use area, but potentially occupied habitat may exist. Please contact the WVFO for further coordination.

Species profile: https://ecos.fws.gov/ecp/species/5949

Tricolored Bat *Perimyotis subflavus*	Proposed Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/10515

CLAMS

NAME	STATUS
Clubshell *Pleurobema clava*	Endangered

Population: Wherever found; Except where listed as Experimental Populations
No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/3789
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6454.pdf

Fanshell *Cyprogenia stegaria*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/4822
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6470.pdf

Northern Riffleshell *Epioblasma rangiana*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/527
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6462.pdf

Pink Mucket (pearlymussel) *Lampsilis abrupta*	Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- This project is in close proximity of a stream known to support this species; all activities in this location should consider potential effects to the species. Review the project design guidelines for information about next steps and contacting the WVFO.

Species profile: https://ecos.fws.gov/ecp/species/7829
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6463.pdf

NAME	STATUS
Purple Cat's Paw (=purple Cat's Paw Pearlymussel) *Epioblasma obliquata* Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: ▪ This project is in close proximity of a stream known to support this species; all activities in this location should consider potential effects to the species. Review the project design guidelines for information about next steps and contacting the WVFO. Species profile: https://ecos.fws.gov/ecp/species/5602 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6469.pdf	Endangered
Round Hickorynut *Obovaria subrotunda* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9879	Threatened
Salamander Mussel *Simpsonaias ambigua* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6208	Proposed Endangered
Sheepnose Mussel *Plethobasus cyphyus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: ▪ This project is in close proximity of a stream known to support this species; all activities in this location should consider potential effects to the species. Review the project design guidelines for information about next steps and contacting the WVFO. Species profile: https://ecos.fws.gov/ecp/species/6903 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6465.pdf	Endangered
Snuffbox Mussel *Epioblasma triquetra* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: ▪ This project is in close proximity of a stream known to support this species; all activities in this location should consider potential effects to the species. Review the project design guidelines for information about next steps and contacting the WVFO. Species profile: https://ecos.fws.gov/ecp/species/4135 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UNMV52OATBDP5N65FFOSF3EEMM/documents/generated/6466.pdf	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Proposed Threatened

NAME	STATUS
There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
OHIO RIVER ISLANDS NATIONAL WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22OHIO+RIVER+ISLANDS+NATIONAL+WILDLIFE+REFUGE%5C%22"	3,354.619

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

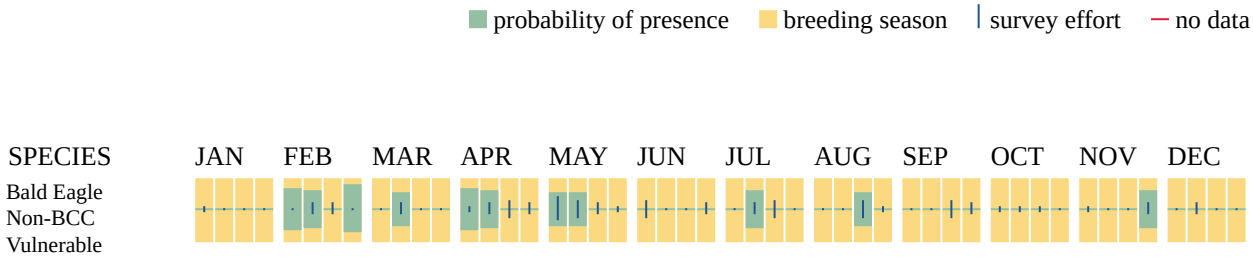
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Black-capped Chickadee *Poecile atricapillus practicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10645	Breeds Apr 10 to Jul 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Cerulean Warbler *Setophaga cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 27 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Kentucky Warbler *Geothlypis formosa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31

NAME	BREEDING SEASON
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

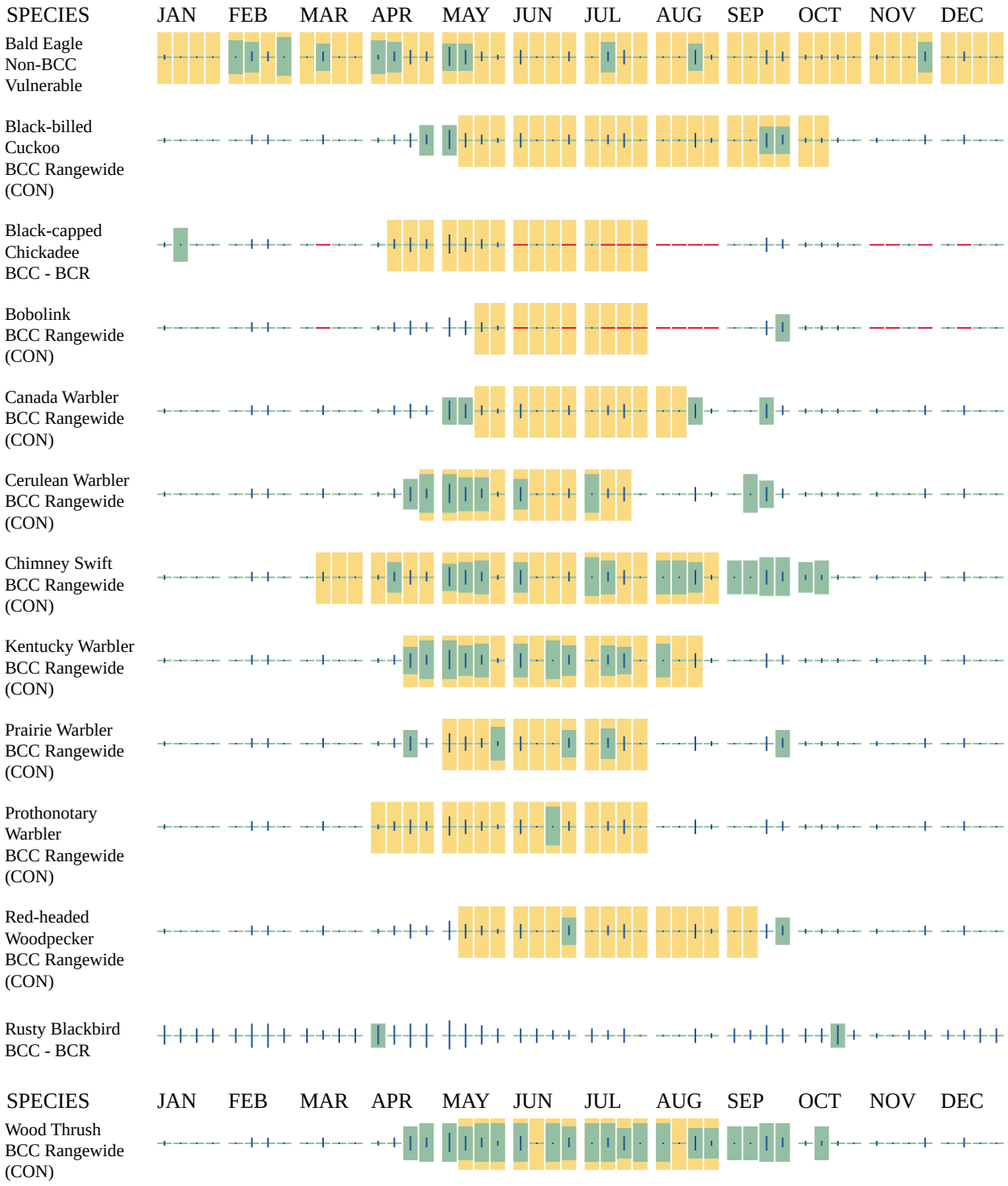
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R2UBH
- R2USC

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Brandon Yates
Address: 4525 Este Avenue
City: Cincinnati
State: OH
Zip: 45232
Email byates@envsi.com
Phone: 5134511777

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Interior

You have indicated that your project falls under or receives funding through the following special project authorities:

- BIPARTISAN INFRASTRUCTURE LAW (BIL) (OTHER)

APPENDIX C
FRESHWATER MUSSEL (UNIONIDAE) SURVEYS FOR THE MUSKINGUM ISLAND RIVERINE WELL PLUGGING PROJECT ON THE OHIO RIVER IN WOOD COUNTY, WEST VIRGINIA

Pesi 2312

FRESHWATER MUSSEL (UNIONIDAE) SURVEYS FOR THE MUSKINGUM ISLAND RIVERINE WELL PLUGGING PROJECT ON THE OHIO RIVER IN WOOD COUNTY, WEST VIRGINIA

7 November 2024

Submitted to:

U.S. Fish and Wildlife Service
West Virginia Field Office - Ecological Services
6263 Appalachian Hwy.
Davis, WV 26260

Mr. Kevin Eliason
West Virginia Division of Natural Resources, Wildlife Diversity Unit
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Elkins, WV 26241

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U.S. Fish and Wildlife Service
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Prepared by:

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1.0 Introduction and Project Background

1.1 Project Description

U.S. Fish and Wildlife Service (USFWS), Ohio Island National Wildlife Refuge (NWR) proposes plugging 15 orphaned oil/gas wells on Muskingum Island in the Ohio River in Wood County, West Virginia (Project). The Project appears on the Parkersburg USGS 7.5-minute topographic map at approximately Ohio River Mile 176 Belleville navigational pool at coordinates: Latitude: 39.3647991, Longitude: -81.5124644 (Figure 1).

Muskingum Island is exclusively accessible via watercraft; therefore, well plugging plans include minimal dredging affording work barge (drafting 1.5 meters [5.0 ft]) access. Further, 5 of 13 wells slated for plugging are now at or below the Ohio River's normal pool elevation and require in-water work; this report addresses five well sites now within the Ohio River (Figure 2).

For ease of use, this report is book-marked and provides a site-specific appendix for each of the above-referenced Project sites (Figure 2) with documentation subdivided as follows: Figures, Data Tables, WVDNR Scope of Work Form, WVDNR Mussel Summary Form, Datasheets, and Representative Site Photos.

1.2 Regulatory Setting

All mussels are protected in the State of West Virginia (including eleven federally listed species), under the auspices of the West Virginia Division of Natural Resources (WVDNR). If impacts cannot be avoided, all streams known to harbor mussels must be surveyed. Mussels present must be relocated prior to any streambed disturbance. WVDNR and U.S. Fish and Wildlife Service (USFWS), West Virginia Field Office implemented the West Virginia Mussel Survey Protocol (WVMSP) revised March 2022 (WVDNR 2022). Following this protocol, streams known to contain mussel resources are classified into Groups (1-4) based on county, stream size, and potential for a federally listed species (FLS) to occur. The Ohio River is designated as WVDNR Group 4 (large river where FLS are expected) at the Project location. As FLS are anticipated, both WVDNR and USFWS coordination is required.

Environmental Solutions & Innovations, Inc. (ESI) was retained by Ohio River Islands NWR to conduct a freshwater mussel survey. This document contains ESI's methods for conducting mussel survey efforts at the Project on the Ohio River.

Mussel surveys are carried out under West Virginia Scientific Collecting Permits 2024.194 (Brandon L. Yates) and 2024.170 (Paul Robert) and site-specific authorizations from WVDNR and USFWS are provided in Appendix A.

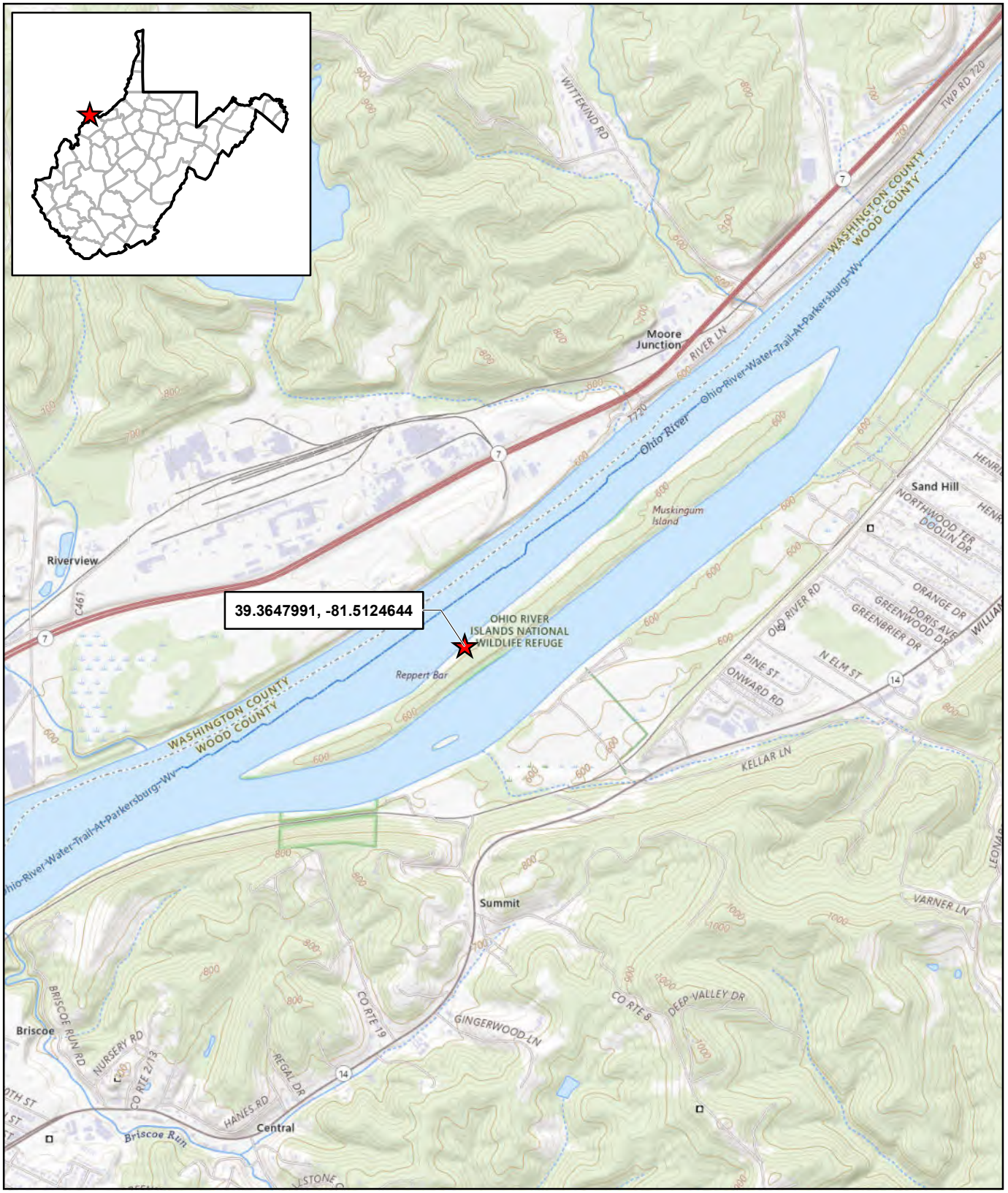
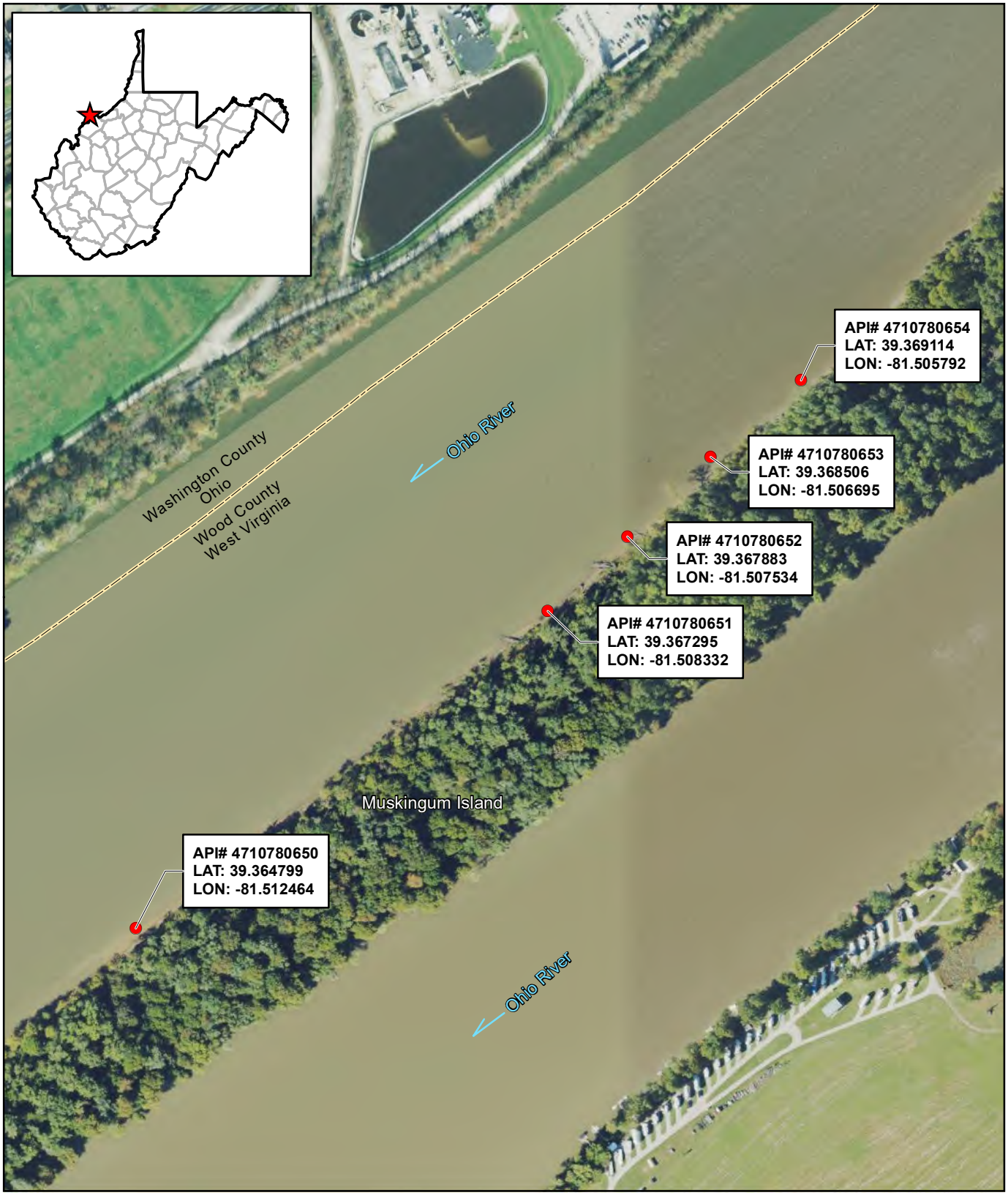


Figure 1. Location of the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312	0 500 1,000 Meters Base Map: USGS Topo Map	ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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American Petroleum Institute (API) Well Location

State Boundary

N
W
E
S

Figure 2. Location of five, submerged, orphaned wells on the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 100 200 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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2.0 Methods

Mussel surveys follow methods outlined in the WVMSP for Group 4 large rivers where FLS are expected. Surveys are conducted during daylight hours when stream conditions are at low or base flows with minimum visibility at depth of survey via natural (i.e., sunlight) or artificial light (i.e., dive lights) greater than or equal to 0.5 meter (1.67 ft).

2.1 Survey Area

The area of direct impact (ADI) includes locations with potential for direct impacts to mussel resources resulting from Project activities. The ADI for each of five wells slated for plugging spans 15 meters (49.2 ft) along the shore and 15 meters (49.2 ft) channelward from the shoreline (Table 1; Figure 3). The maximum combined dredging area is 940 square meters (10,118.1 ft^2). Using small dredging impact buffers, the WVMSP prescribes 50-meter (164.0 ft) upstream (US), 50-meter lateral (164.0 ft), and 150-meter (492.1 ft) downstream (DS) buffers. Four wells within approximately 100 meters (328.0 ft) of their respective nearest neighbors, result in overlapping buffers, thus creating intermediate buffers. The fifth well's (American Petroleum Institute [API] #4710780650) distance from the other four precludes buffer overlap. Applying small dredge impact buffers yields two survey areas, Site 1 encompasses one well plugging site (API #4710780650) totaling 13,975 square meters (3.5 ac) of survey area, Site 2 encompasses the four remaining well-plugging sites (API #4710780651, #4710780652, #4710780653, and #4710780654) totaling 36,400 square meters (9.0 ac; Figure 3).

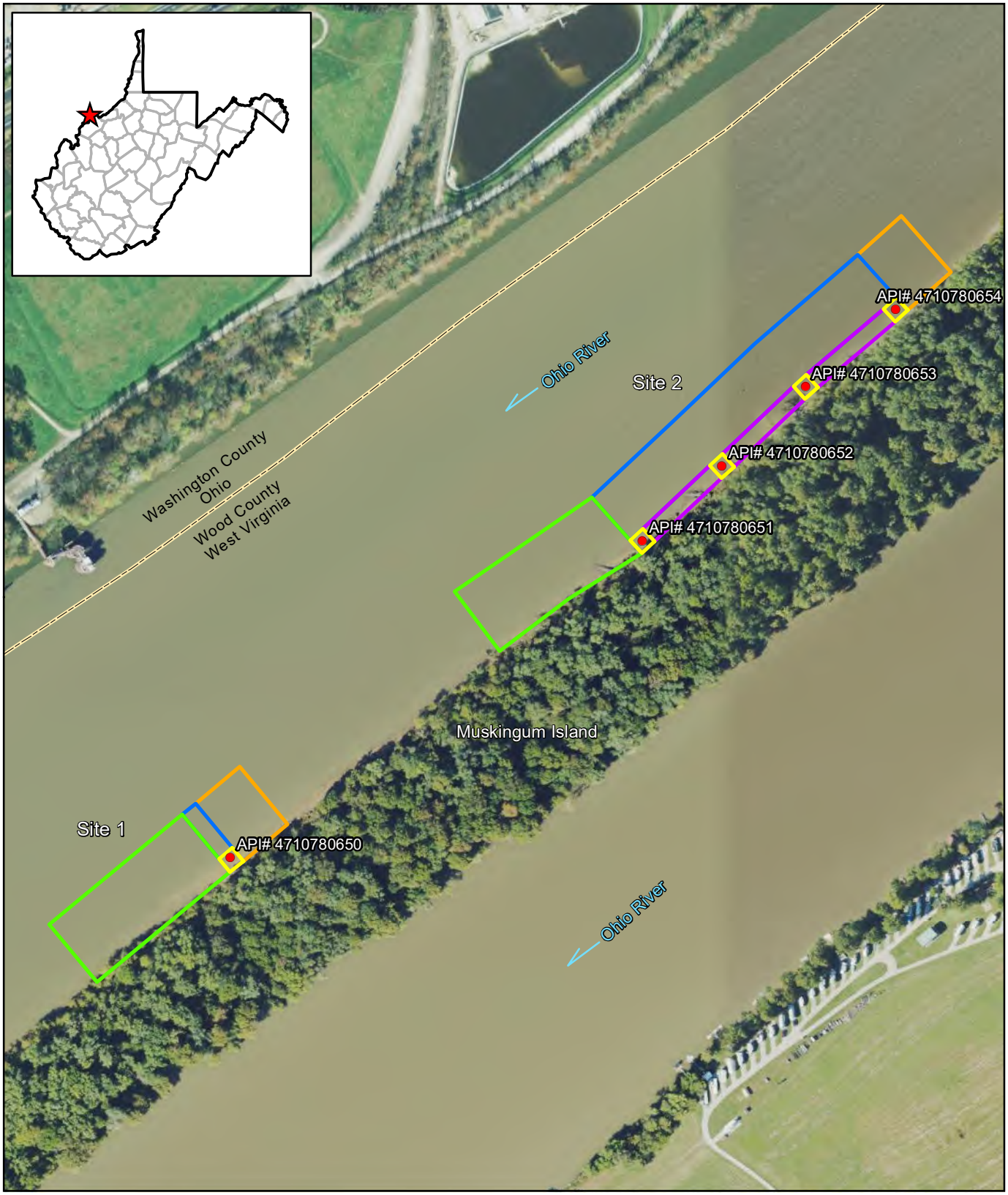
Table 1. Well coordinates for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Well API[1] Number	Survey Area	Latitude	Longitude
4710780650	1	39.364799	-81.512464
4710780651	2	39.367295	-81.508332
4710780652	2	39.367883	-81.507534
4710780653	2	39.368506	-81.506695
4710780654	2	39.369114	-81.505792

[1] API = American Petroleum Institute

2.2 Mussel Survey

Project boundaries are established in the field using Global Positioning Systems (GPS) coordinates, survey stakes, buoys, and maps. As prescribed in the WVMSP, transect surveys are employed to ensure adequate survey area coverage and consist of lead-core ropes placed on the riverbed perpendicular to flow. Searches via SCUBA or surface supplied air (i.e., Hookah) are conducted at a rate of 1 minute per transect



Area of Direct Impact | Downstream Buffer | Intermediate Buffer | State Boundary

Upstream Buffer | Lateral Buffer | American Petroleum Institute (API) Well Location

N

W E

S

Figure 3. Mussel survey extent for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 100 200 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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meter (0.3 min/transect ft). Divers search a 1-meter (3.3-ft) wide swatch along each transect and record habitat conditions per 10-meter (32.8-ft) segment. Additionally, mussels collected are held in mesh bags and separated by transect segment until processed.

The Project ADI (as provided) requires a total of 72 transects, Site 1 consists of 20 transects and Site 2 consists of 52 transects extending 65 meters (213.3 ft) channelward (Figure 4). Transects within the ADIs, 50 meters (164.0 ft) upstream, and 100 meters (328.0 ft) downstream of the ADIs are spaced no more than 10 meters (32.8 ft) apart. Transects exceeding 100 meters (328.0 ft) downstream of the ADIs are spaced 25 meters (82.0 ft) apart.

2.3 Species Richness Curve

Species richness curves are generated independently for each of the two survey areas and collections comprise an adequate number of animals to detect presence of most species per the WVMSP. Because four well sites create one large, conjoined survey area, one species richness curve is created for area assessment. A series of 10-minute spot dives within areas of mussel concentration identified by transect searches are required to produce a species richness curve. Spot dives continue until six consecutive dives yield no new species. Species richness curves are generated by plotting the cumulative number of individuals (x-axis) against the cumulative number of species (y-axis) and developing a logarithmic regression curve. Using the generated logarithmic regressions, the anticipated number of individuals required for collection to detect a new species at each of two survey areas is calculated.

2.4 Mussel Salvage and Relocation

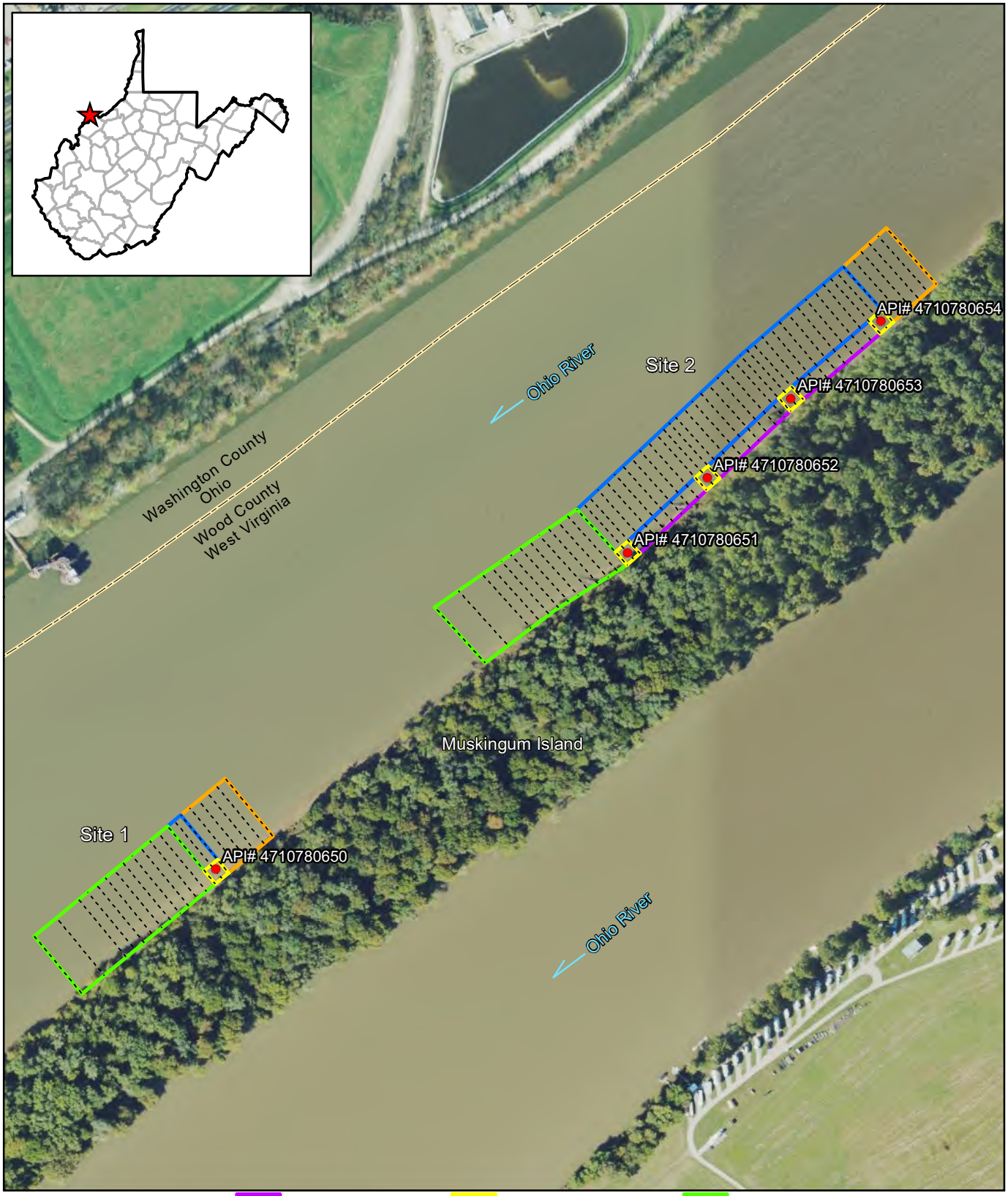
No live mussels were salvaged or relocated at the time of survey.

2.5 Relocation Site Scoping

Relocation site scoping is concurrently completed with mussel surveys as use of transects spaced no farther than 10 meters (32.8 ft) apart precludes Phase 2 survey requirements for a substantial portion of the survey. Candidate relocation sites are upstream of Project impacts and have similar mussel species and density presence, are equal to or larger than salvage zones (SZ; ADI plus Project-specific buffers), and possess similar habitats. At minimum, one (1) hour of qualitative searches (six, 10-minute searches) are completed to delineate a proposed relocation site

2.6 Mussel Capture

No live mussels are retained or injured during any survey activities. Live mussels are held in mesh bags during survey and are removed from the water for no more than 5 minutes for identification, morphometric processing, and photographic documentation.



Survey Transect | Intermediary Buffer | Area of Direct Impact | Downstream Buffer

State Boundary | Upstream Buffer | Lateral Buffer | American Petroleum Institute (API) Well Location

N W E S

Figure 4. Transect layout for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 100 200 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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From 1 May through 1 September, non-FLS individuals are dropped from the boat back into the water within delineated survey areas; after 1 September, all mussels are hand placed in the substrate compliant with Section 6.11 of the WVMSP. Regardless of time of year, all FLS are hand placed in the substrate.

2.7 Endangered Species

If a FLS is encountered within the survey area, the USFWS (West Virginia Field Office) and WVDNR are contacted within 48 hours (or by the next business day). A GPS coordinate is recorded at the exact capture location. At the time of capture, the individual is photographed, measured, and receives a numeric Floy® Shellfish Tag before being returned to the substrate at the exact capture location.

3.0 Results

Each section below corresponds to each survey area with an associated dedicated appendix (Appendices B through D) containing site-specific supporting documentation (Figures [including species richness curves], Data Tables, West Virginia Mussel Survey Scope of Work Summary Sheet, West Virginia Mussel Summary Sheets, Datasheets, and Representative Site Photographs) as follows:

- Survey Area 1 – Appendix B
- Survey Area 2 – Appendix C
- Relocation Site Scoping – Appendix D

Appendix E provides mussel photographic vouchers for all mussel species collected Project-wide (Floy® Shellfish tag color and number provided as relevant). Because FLS were collected at multiple locations, Appendix F provides one comprehensive table of Project-related FLS data.

3.1 Project-wide Weather and Stream Conditions

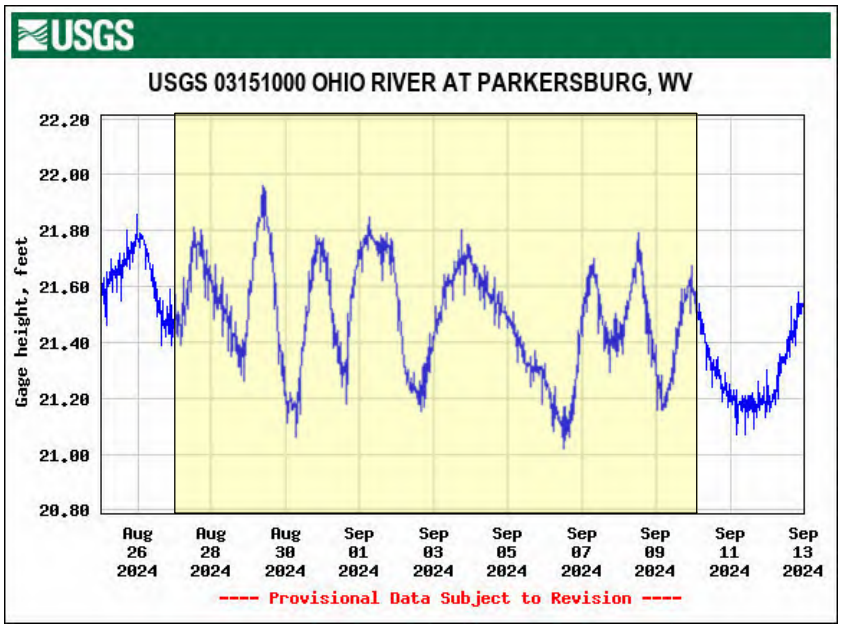
Mussel surveys were conducted 27 through 31 August 2024 and 1 through 10 September 2024 in the Ohio River. Water temperatures during field efforts ranged from 26.0 to 27.7 degrees Celsius (78.8 to 81.8°F; Table 2). Visibility ranged from 91.4 to 243.8 centimeters (36.0 to 96.0 in) during survey; thus providing suitable conditions for detection of freshwater mussels. Survey conditions at the Project were favorable with air temperatures ranging from 12.0 to 36.7 degrees Celsius (53.6-98.0°F). Stream discharge levels were monitored via the Parkersburg West Virginia stream gage on the Ohio River (Figure 5).

Table 2. Daily weather and stream data during the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Weather Condition	Air Temperature (°C)	Water Temperature (°C)	Visibility (cm)[1]	Secchi (m)[2]
August 27	Sunny	19.4 to 36.7	27.7	243.8	2.5
August 28	Sunny/scattered storms	20.5 to 36.7	27.5	243.8	2.5
August 29	Sunny/scattered storms	21.1 to 33.4	27..5	182	2.0
August 30	Sunny	18.4 to 35.2	27.0	182	2.0
August 31	Sunny/scattered storms	21.6 to 30.8	27.2	152	1.6
September 1	Overcast to sunny	18.7 to 29.4	26.5	182	2.0
September 2	Overcast to sunny	15.7 to 25.7	26.5	182	1.8
September 3	Sunny	12.0 to 26.2	26.4	152	1.6
September 4	Sunny	12.3 to 27.9	26.7	152	1.6
September 5	Sunny	12.0 to 29.0	26.2	152	1.6
September 6	Sunny/scattered storms	12.1 to 30.3	26.5	152	1.6
September 7	Sunny/scattered storms	12.8 to 20.7	26.2	91.4	1.2
September 8	Sunny	12.0 to 21.1	26.7	91.4	1.2
September 9	Overcast to sunny	11.5 to 24.5	26.2	91.4	1.2
September 10	Overcast to sunny	11.7 to 28.0	26.0	91.4	1.3

[1] Recorded at depth of survey.
[2] Recorded at the surface.

Figure 5. Ohio River gage height during the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.



Note: Yellow box reflects mussel survey period

3.2 Site 1 Survey

Supporting documentation for the Site 1 mussel survey is provided in Appendix B, subdivided as follows:

- B-1: Figures B1 and B5
- B-2: Data Tables B1 through B6
- B-3: WVDNR Scope of Work Form
- B-4: WVDNR Mussel Summary Form
- B-5: Datasheets
- B-6: Representative Site Photos

3.2.1 Survey Area Description

Site 1 encompasses one well (API #4710780650) at coordinates 39.364799, -81.512464. The well is approximately 22.9 meters (75 ft) channelward from the ordinary highwater mark (OHWM; Appendix B, Figure B1).

Dredging approximately 15 meters (49.2 ft) channelward of the shoreline is required to provide site access. Site 1 contains one ADI measuring 15 meters (49.2 ft) long and 15 meters (49.2 ft) wide. Site 1 is approximately 234.7 meters (770 ft) downstream of Site 2 and comprises 20 transects encompassing one ADI, an upstream buffer, a downstream buffer, and a lateral buffer totaling 14,051 square meters (3.5 ac; Appendix B, Figure B2).

3.2.2 Habitat Characteristics

Substrate composition throughout the survey area was predominantly fines (43.3%) gravel (26.9%), sand (16.6%), interspersed with cobble (5.6%), woody debris (7.1%) vegetation (0.5%; Appendix B, Table B1). Within the survey area, water depths ranged from 0.3 to 5.5 meters (1.0 to 18.0 ft) and gradually increased channelward.

Shoreward of the survey area, sharp cut banks were observed with dense riparian vegetation extending up the slope to the floodplain

3.2.3 Mussel Survey

During survey efforts, 1,598 minutes of search time were expended within the survey area yielding collection of 1,692 live mussels representing 22 species (Appendix B, Figure B2 and Tables B2 through B4). The three most abundant species included threeridge (*Amblema plicata; n*=335), black sandshell (*Ligumia recta*; *n*=238), and monkeyface (*Theliderma metanevra, n*=233; Appendix B, Tables B3 and B4). Site 1 yielded multiple FLS including two fanshell (*Cyprogenia cyphyus*), one pink mucket (*Lampsilis abrupta*), one round hickorynut (*Obovaria subrotunda*), and seven sheepnose (*Plethobasus cyphyus*; Appendix B, Figure B3 and Tables B3 through B5; Appendix F).

3.2.4 Quality Assurance / Quality Control (QA/QC)

During survey efforts, 10 percent of the area surveyed by a non-approved collector was resurveyed by a WVDNR approved mussel collector, minutes resurveyed were added to the overall survey time per transect interval (Appendix B, Table B2).

3.2.5 Site 1 Spot Dives

During survey efforts, nine, 10-minute spot dives were conducted within areas of mussel concentrations (Appendix B, Figure B4). Survey efforts yielded collection of 325 live mussels representing 19 species. The three most abundant species included threeridge (*n*=104), butterfly (*Ellipsaria lineolata, n*=47), pimpleback (*Cyclonaias pustulosa*; *n*=34; Appendix B, Tables B3 and B5). Multiple FLS were encountered during spot dives, including one fanshell and one sheepnose (Appendix B, Table B5; Appendix F).

Substrate composition throughout the spot dives was predominantly fines (50.0%) and gravel (32.2%), interspersed with cobble (10.6%), sand (6.7%), and woody debris (0.6%; Table B6).

3.2.6 Species Richness Curve

A species richness curve relating the cumulative number of individuals collected to the cumulative number of species is represented by the logarithmic regression $y=4.4515\ln(x)-4.7721$ with an R^2 value of 0.9096 (Appendix B, Figure B5). Regression predicts approximately 209 additional individuals require collecting to reveal one additional species.

The Site 1 WVDNR Scope of Work Form, Mussel Survey Form, Datasheets, and Representative Site Photos are provided in Appendix B.

3.3 Site 2 Survey

Supporting documentation for the Site 2 mussel surveys is provided in Appendix C, subdivided as follows:

- C-1: Figures C1 through C5
- C-2: Data Tables C1 through C6
- C-3: WVDNR Scope of Work Forms
- C-4: WVDNR Mussel Summary Forms
- C-5: Datasheets
- C-6: Representative Site Photos

As land access precludes well plugging from shore, dredging is required to facilitate repairs.

3.3.1 Survey Area Description

Four wells (API #4710780651, #4710780652, #4710780653, and #4710780654) comprise Site 2 with coordinates provided above in Table 1. Each well is approximately 22.9 meters (75 ft) channelward from the OHWM (Appendix C, Figure C1).

Dredging approximately 15 meters (49.2 ft) channelward of the shore at each well is required to provide site access to the four wells. Four ADIs measuring 15 meters (49.2 ft) long by 15 meters (49.2 ft) wide are positioned within approximately 100 meters (328,0 ft) of each other. Site 2 is approximately 234.7 meters (770 ft) upstream of Site 1 and comprises four ADIs, an upstream buffer, a downstream buffer, intermediate buffers, and a lateral buffer, totaling 36,400 square meters (9.0 ac; Appendix C, Figure C2).

3.3.2 Habitat Characteristics

Substrate composition throughout the survey area was predominantly fines (49.0%) sand (23.1%), and gravel (20.9%), interspersed with cobble (4.3%), boulder (0.2%), hardpan (0.4%), woody debris (1.6%), vegetation (0.4%), and concrete (0.1%, Appendix C, Table C1). Within the survey area, water depths ranged from 0.0 to 5.2 meters (0.0 to 17.0 ft) and gradually increased channelward.

Shoreward of the survey area, sharp cut banks were observed with dense riparian vegetation extending up the slope to the floodplain

3.3.3 Mussel Survey

During survey efforts, 4,077 minutes of search time were expended yielding collection of 4,250 live mussels representing 22 species (Appendix C, Figure C2 and Tables C2 through C4). The three most abundant species include threeridge (*n*=949), black sandshell (*n*=830), and monkeyface (*n*=590; Appendix C, Tables C3 and C4). Multiple FLS were encountered within Site 2, including 1 fanshell, 1 longsolid (*Fusconaia subrotunda*), 4 round hickorynut, 17 sheepnose, and 1 clubshell (Appendix C, Figure C3 and Tables C3 through C5; Appendix F).

3.3.4 Quality Assurance / Quality Control (QA/QC)

During survey efforts, 10 percent of the area surveyed by a non-approved collector was resurveyed by a WVDNR approved mussel collector, minutes resurveyed were added to the overall survey time per transect interval (Appendix C, Table C2).

3.3.5 Site 2 Spot Dives

During survey efforts, 12, 10-minute spot dives were conducted within areas of mussel concentrations yielding collection of 346 live mussels representing 16 species (Appendix C, Figure C4). The three most abundant species included monkeyface (*n*=113), threeridge (*n*=67), and black sandshell (*n*=32; Appendix C, Tables C3 through

C5). Multiple FLS were encountered during spot dives, including one longsolid, three sheepnose, and one clubshell (Appendix C, Table C5; Appendix F).

Substrate composition throughout the spot dives was predominantly sand (44.2%) gravel (32.5%), and sand (20.8%) interspersed with cobble (2.5%; Appendix C, Table C6).

3.3.6 Species Richness Curve

A species richness curve relating the cumulative number of individuals collected to the cumulative number of species is represented by the logarithmic regression $y=4.1082\ln(x)-5.8925$ with an R^2 value of 0.8709 (Appendix C, Figure C5). Regression predicts approximately 263 additional individuals require collecting to reveal one additional species.

The Site 2 WVDNR Scope of Work Form, Mussel Survey Form, Datasheets, and Representative Site Photos are provided in Appendix C.

3.4 Relocation Site Scoping

Supporting documentation for the relocation scoping spot dives is provided in Appendix D as follows:

- D-1: Figures D1 and D2
- D-2: Data Tables D1 through D3
- D-3: Datasheets
- D-4: Representative Site Photos

3.4.1 Habitat Characteristics

Substrate composition throughout the relocation scoping areas is approximately similar and comparable to substrates recorded at Sites 1 and 2, primarily comprising sand and gravel, interspersed with fines and cobble (Appendix D, Table D1).

3.4.2 Mussel Survey

Collection of live mussels during survey efforts warranted relocation site scoping. Relocation site scoping comprised six, 10-minute spot dives along the RDB of Muskingum Island starting approximately 230 meters (754.6 ft) upstream of Site 2 (i.e., upstream of all well locations; Appendix D, Figure D1). In total, 60 minutes of search time yielded 169 live mussels representing 13 species, including the federally listed longsolid (*n*=1; Appendix D, Figure D2 and Tables D2 and D3; Appendix F). The three most abundant species include monkeyface (*n*=58), threeridge (*n*=44), and butterfly (*n*=24; Appendix D, Tables D2 and D3).

The Relocation Site Datasheets and Representative Site Photos are provided in Appendix D.

4.0 Conclusion

In summary, approximately 95.6 hours of underwater search time were expended at two survey sites encompassing five well locations and yielding collection of 6,111 live mussels representing 25 live species. In total, 36 live, federally listed mussels were collected representing six live species, fanshell (*n*=3), longsolid (*n*=2), pink mucket (*n*=1), round hickorynut (*n*=*5*), sheepnose (*n*=24), and clubshell (*n*=1; Appendix F).

Based on results of six scoping dives yielding suitable habitat and mussel populations similar to Site 1 and 2 survey areas, ESI recommends relocating anywhere within the areas scoped.

On behalf of USFWS-NWR, ESI respectively requests concurrence with survey techniques and findings from USFWS and WVDNR. Based on federally listed mussel species presence, USFWS-NWR requested preparation of both a mussel salvage and relocation plan and a Biological Assessment. Both documents are currently in preparation.

ESI respectfully requests survey results presented herein remain valid until 10 September 2029.

5.0 Literature Cited

WVDNR. 2022. West Virginia mussel survey protocol. West Virginia Division of Natural Resources, Wildlife Resources Section, Elkins Operation Center, Elkins, West Virginia. 29 pp.

APPENDIX A
WVDNR SCIENTIFIC COLLECTION PERMIT AND AGENCY COORDINATION

WEST VIRGINIA
DNR

Governor Jim Justice

Director Brett W. McMillion

2288 EQM MOSAD004 Pipeline – Arnold Creek, Doddridge County

GROUP 1

NUMBER 2024.194

SCIENTIFIC COLLECTING PERMIT

Under Authority Conferred by Chapter 20, Article 2, Section 50, Code of West Virginia, As Amended

Brandon Yates
Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232

is hereby permitted to collect specimens according to the attached application and the Special Provisions on the reverse side of this permit.

This permit is not transferable and expires on October 1, 2024.

A complete list of all specimens collected will be kept and reported to the Director of the Division of Natural Resources of West Virginia no later than 45 days after the expiration date of this permit.

PERMIT PROVISIONS

I understand that (1) The privileges granted under this permit are not transferable, and to allow anyone other than myself to use my permit is unlawful and will be considered cause for revocation of said permit; (2) A Federal Scientific Collection Permit issued by the U.S. Department of Interior must be obtained before any migratory birds, or their nests or eggs, are collected or held in captivity; (3) The Federal Permit does not extend the privileges of the permittee beyond those granted by the Division of Natural Resources; (4) Permission must be obtained from either the owner or the custodian of any fenced or posted land before entering same for the purpose of collecting scientific specimens; (5) It is unlawful to sell, offer for sale, barter, or offer to barter any wildlife collected; (6) When traps or nets or other devices are used UNATTENDED while exercising the privileges of this permit, said traps, nets, or devices must have attached thereto a tag bearing the name, address and number of the Scientific Collecting Permit; (7) It is unlawful to take or attempt to take any wildlife under said permit except for scientific and propagation purposes; (8) A hunting or fishing license must be obtained before specimens may be taken for sport; (9) Only those species or classes of wildlife listed below, and in the numbers stated, may be lawfully taken under said permit; and (10) I am required by law to carry my Scientific Collecting Permit, on my person while exercising the privileges granted thereunder, and to exhibit the permit to anyone requesting to see the same.

Must be signed before valid.

Signature of permittee

Director, WVDNR

Date of issue 4/15/2024

IMPORTANT

THE ATTACHED APPLICATION FORM INDICATING SPECIES TO BE COLLECTED, LOCATIONS OF COLLECTIONS, MANNER OF COLLECTION, AND PURPOSE OF COLLECTION IS TO BE CONSIDERED A PART OF THIS PERMIT AND SHOULD REMAIN ATTACHED.

YOU ARE SUBJECT TO THE FOLLOWING COLLECTING AND REPORTING PROVISIONS. FAILURE TO MEET THESE CRITERIA IS GROUNDS FOR REVOCATION OF THE PERMIT AND/OR DENIAL OF FUTURE PERMIT APPLICATIONS AND/OR PENALTIES OR OTHER STRICTURES.

SPECIAL PROVISIONS:
This permit will allow the handling of freshwater mussels, including endangered species, for the purpose of the stated project only. For the purpose of this project you will be covered under the WVDNRs Endangered Species permit as set forth in a cooperative agreement between the WVDNR and the U.S. Fish & Wildlife Service (USFWS). Violation of the federal Endangered Species Act or Chapter 20 of the WV State Code may lead to arrest and prosecution.

This is a permit for the handling of freshwater mussels within Arnold Creek near Central Station for survey and salvage for the MOSAD004 Pipeline construction. Survey proposals for work in endangered mussel streams or potential endangered mussel streams must be approved by the US Fish and Wildlife Service prior to conducting surveys. This is a permit only for the Middle Island Creek location, if surveys are needed at additional locations **it is not valid until project-specific information is provided and permit addenda have been issued.**

1. Contact local WVDNR law enforcement officers, WVDNR district fisheries biologists, and WVDNR malacologist (Kevin.M.Eliason@wv.gov) at least one week prior to survey work to give notification of survey dates and locations. If it is anticipated that endangered species may be encountered during the survey, coordination with the US Fish and Wildlife Service is required.

2. All surveys shall be conducted during suitable water conditions between May 1 and October 1, except as deemed necessary by the WVDNR. Surveys may not be conducted in federal crayfish streams from July 20 through October 31 unless crayfish surveys have been conducted prior to mussel surveys. USFWS concurrence is required for surveys conducted in federal crayfish streams.

3. Report any threatened or endangered species found, in any condition, during the surveys to the WVDNR (Kevin.M.Eliason@wv.gov), and the USFWS (FW5_WVFO@fws.gov) **within 48 hours**. Maps of the locations shall be submitted with the report. Live specimens shall be returned to the substrate in as near proximity as possible to where they were collected.

4. No live specimens of threatened or endangered or state rare species may be kept. Species and locations shall be documented with photographs, maps of the locations shall be submitted with the permit report, and all specimens shall be returned to the substrate in as near proximity as possible to where they were collected.

5. No dead shells of threatened or endangered species may be kept. All shall be surrendered to the WVDNR.

6. If your request to take voucher specimens has been approved by the WVDNR, then dead representations should be used first. If no suitable dead specimens are available then photo vouchers are preferred. If it is still necessary to collect a live specimen, then only one specimen may be taken of each species from each collection site. This does not apply to threatened or endangered species or state rare species; no live specimens of these species may be retained. Vouchers shall be turned over to a recognized museum collection, and voucher information given to the WVDNR.

7. Reporting: Provide a report detailing your survey work within 45 days after the expiration date of your permit using the Access database provided on the WVDNR website: https://wvdnr.gov/plants-animals/freshwater-mussels/. All reporting materials resulting from the work should be submitted to the state malacologist: Kevin.M.Eliason@wv.gov.

194

RENEWAL

APPLICATION FOR WEST VIRGINIA SCIENTIFIC COLLECTING PERMIT

RECEIVED
APR 04 2024
BY:

Name: Brandon L. Yates

Institution\Affiliation: Environmental Solutions & Innovations, Inc.

Street: 4525 Este Avenue

City: Cincinnati State: OH Zip: 45232

Telephone: 513-451-1777 Email: jgarofalo@envsi.com

Profession: Biologist Major professor: N/A

Specific manner of collection Hand collection with aid of snorkeling, surface supplied air, and/or SCUBA

Purpose for which specimens are to be collected (include project name; attach project proposal): Mussel survey and salvage for the MOSAD004 Pipeline construction project

How will specimens be disposed? Relocated upstream to an appropriate relocation site.

Date on which collecting is to be: 1 May 2024 (Commence) 1 October 2024 (Terminate)

County(s) & nearest town(s): Doddridge County

If aquatic, indicate stream(s) and nearest town(s): Arnold Creek (Group 1) near Central Station, WV

Attach separate pages if additional space is required.
(Over)

Report, publication or thesis that will result from studies and additional comments or information which may be pertinent to issuing this permit:

Data and final technical report will be submitted to your office upon completion.

Have you received a WV permit in previous years? yes Most recent year 2023.187

SPECIES TO BE COLLECTED OR HANDLED

SCIENTIFIC NAME		
GENUS	SPECIES	NUMBER
All freshwater mussels		unknown

Where will vouchered specimens be deposited? Deadshell material is vouchered per protocol instructions. No live specimens are retained.

Signature

3 April 2024
Date

Send application to:

Scientific Collecting Permit
Wildlife Resources
P.O. Box 67, 738 Ward Road
Elkins, WV 26241
barbara.d.sargent@wv.gov

11/2019

ESI

ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
Cincinnati, OH 45232
Phone: 513-451-1777 Fax: 513-451-3321

4 April 2024

Mr. Jared Varner, PWS
Environmental Resources Specialist 2
West Virginia Division of Natural Resources
Elkins Operations Center
738 Ward Road, Box 67
Elkins, WV 26241

Dear Mr. Varner:

RE: ESI 2024 Scientific Collection Permit Renewal and NEW Application for Freshwater Mussel Survey/Salvage in Arnold Creek, Doddridge County

Please find a scientific collection permit renewal application for Mr. Brandon L. Yates (2023.187) and a NEW application for Mrs. Vanessa Vest attached. Mrs. Vest's qualifications for addition to the list of West Virginia Approved Mussel Surveyors were submitted via email to Mr. Kevin Eliason on 28 March 2024; however, approval is not yet received (our understanding is that Mr. Eliason returns to work next week). A brief project description follows and figures are attached. Credit card information to cover the$400 permit fees will be phoned in to Jessica Swecker at 304-637-0245. A complete project study plan was submitted to your office and Mr. Kevin Eliason via email on 1 April 2024.

PROJECT DESCRIPTION

EQM Gathering OpCo, LLC (EQM) proposes to construct the MOSAD004 natural gas pipeline in Doddridge County, West Virginia (Project). The Project appears on the West Union USGS 7.5-minute topographic map at approximate coordinates: Latitude: 39.281189, Longitude: -80.803902 (Figure 1, attached). The Project's centerline is approximately 6.4 kilometers (4 mi) long and predominantly co-located in the existing MOSAD003 pipeline's limits of disturbance. The MOSAD004 pipeline crosses Arnold Creek twice and one access road requires instream disturbance facilitating bridge construction (Figure 2, attached).

Mussel survey and salvage follow methods outlined in the West Virginia Mussel Survey Protocol (WVMSP) for Group 1 small to mid-sized streams where federally listed species (FLS) are not expected. The areas of direct impact (ADI) for the pipeline ROW crossings

spans 30.5 meters (100 ft) and the ADI for the access road crossing spans 10 meters (32.8 ft). Mussel and habitat data are recorded and reported per the WVMSP.

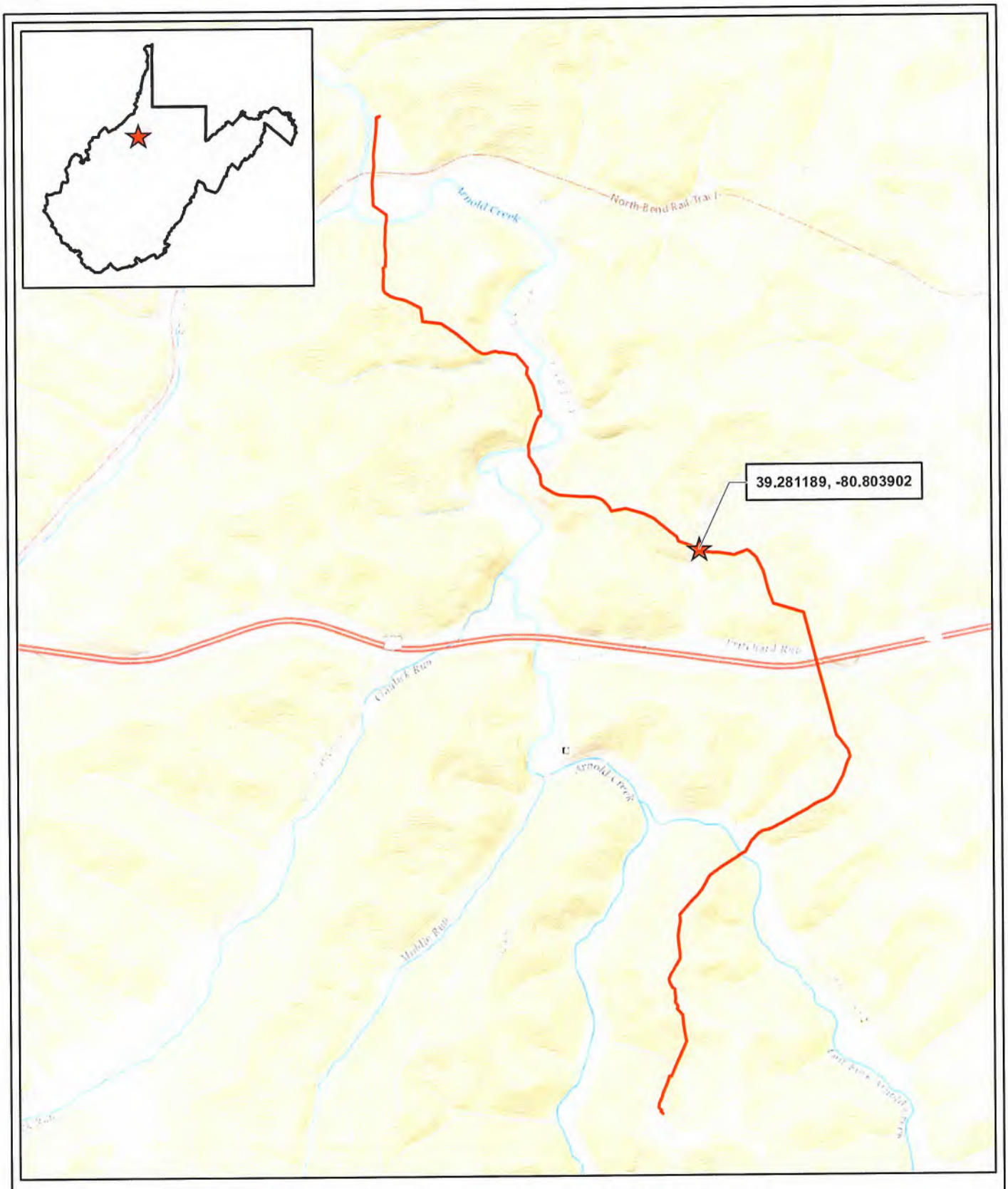
Mussel salvage is requested concurrent with survey efforts at the three (3) Project crossings of Arnold Creek. Salvaged mussels are transported upstream to suitable relocation area(s) identified and delineated during infield survey activities. Potential relocation sites are evaluated using qualitative 10-minute spot dive searches to identify areas exhibiting habitats and mussel presence similar to the salvage zone (SZ). At minimum, six, 10-minute spot dives are conducted to determine an appropriate relocation area.

End of Year permit reporting was submitted to your office via email by Mr. Brandon L. Yates on Monday, 13 November 2023 at 9:55 AM completing ESI's 2023 permit reporting obligation. Please contact me if additional information is required. Thank you.

Sincerely,

Jo Garofalo
Email:jgarofalo@envsi.com
And
Brandon Yates
Email: byates@envsi.com

Attachments
Figures 1 and 2
Applications for Vanessa Vest and Brandon Yates



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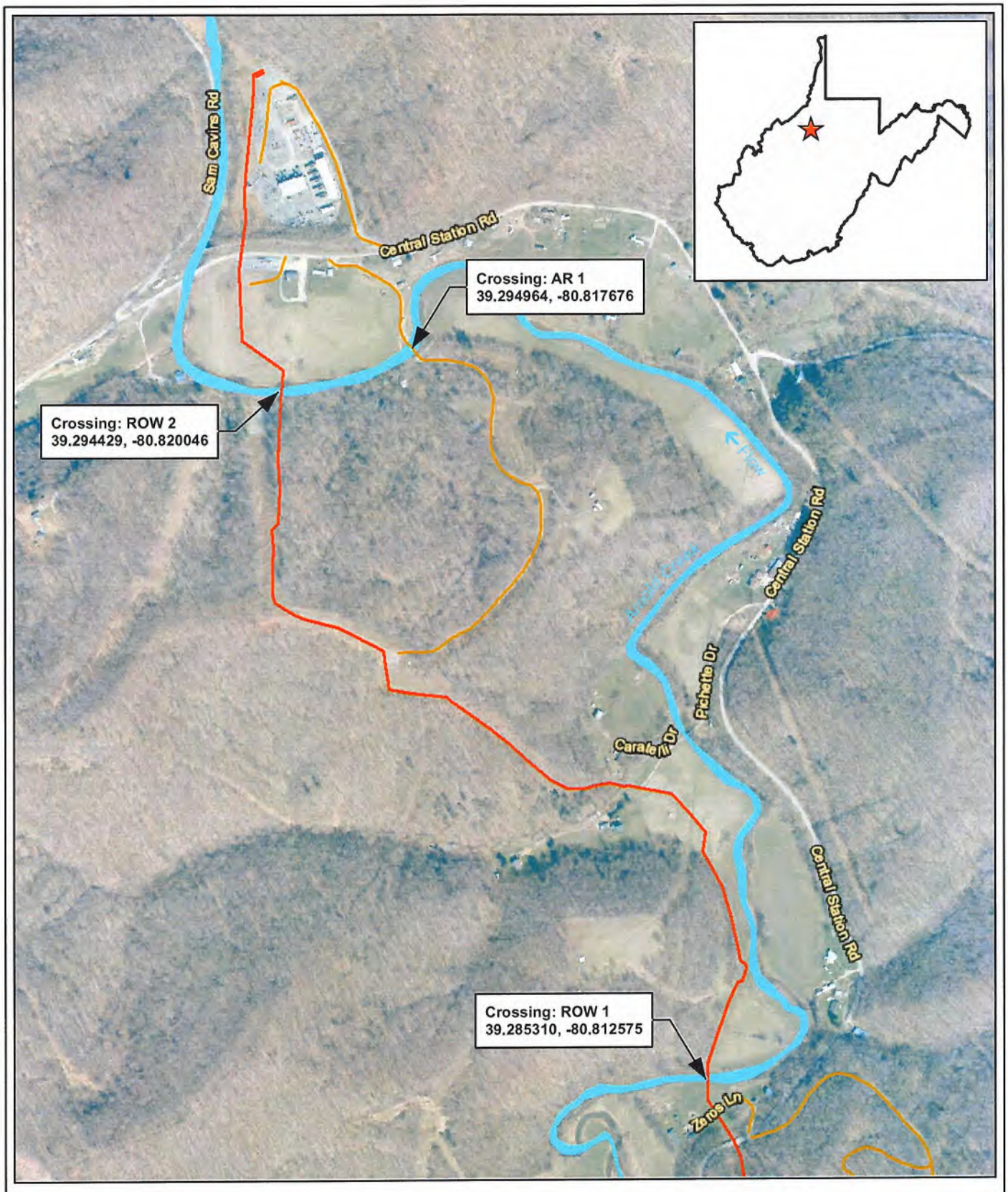
Figure 1. Location of the proposed MOSAD004 Pipeline Project in Arnolds Creek, Doddridge County, West Virginia.

Project No. 2288.03

0 500 1,000 Meters

Base Map: USGS Topographic Map

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Figure 2. Pipeline and access road crossings for the proposed MOSAD004 Pipeline Project in Arnold Creek, Doddridge County, West Virginia.

Project No. 2288.03

0 150 300 Meters

Base Map: West Virginia Leaf-Off Mosaic

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

ADDENDUM TO SCIENTIFIC COLLECTING PERMIT NO. 2024.194

Permittee: Brandon Yates
Address: Environmental Solutions & Innovations, Inc.
4525 Este Avenue
Cincinnati, OH 45232

2312 – USFWS Ohio River Island NWR Muskingum Island Well Plugging Project in Wood County

Expiration date: October 1, 2024

THE FOLLOWING PROVISIONS ARE ADDED TO THIS PERMIT: Mussel surveys are permitted in the Ohio River in Wood County (Muskingum Island Orphan Well Plugging Project).

Concurrence from U.S. Fish & Wildlife Service in need before surveys are conducted.

THIS ADDENDUM MUST BE ATTACHED TO ORIGINAL PERMIT.

Must be signed before valid.

Signature of permittee

Jared Varner

Scientific Collecting Permit Coordinator

Date of Issue: August 20, 2024

not valid for mussels until project-specific information is provided and permit addenda have been issued.

ADDENDUM TO SCIENTIFIC COLLECTING PERMIT NO. 2024.170

Permittee: Paul Robert
Address: Environmental Solutions & Innovations
4525 Este Avenue
Cincinnati, OH 45232

Expiration date: October 1, 2024

THE FOLLOWING PROVISIONS ARE ADDED TO THIS PERMIT:

This addendum will allow the handling of freshwater mussels, including endangered species, for the purpose of stated projects only. For the purpose of this permit you will be covered under the WVDNRs Endangered Species permit as set forth in a cooperative agreement between the WVDNR and the U.S. Fish & Wildlife Service (USFWS). Violation of the federal Endangered Species Act or Chapter 20 of the WV State Code may lead to arrest and prosecution.

Mussels

This is a general permit addendum allowing for mussel surveys. **It is not valid until project-specific information is provided and permit addenda have been issued.** Survey proposals for work in endangered mussel streams or potential endangered mussel streams must be approved by the US Fish and Wildlife Service prior to conducting surveys.

1. Contact local WVDNR law enforcement officers, WVDNR district fisheries biologists, and WVDNR malacologist (Kevin.M.Eliason@wv.gov) at least one week prior to survey work to give notification of survey dates and locations. If it is anticipated that endangered species may be encountered during the survey, coordination with US Fish and Wildlife Service is required.

2. All surveys shall be conducted during suitable water conditions between May 1 and October 1, except as deemed necessary by the WVDNR. Surveys may not be conducted in federal crayfish streams from July 20 through September 10 unless crayfish surveys have been conducted prior to mussel surveys. USFWS concurrence is required for surveys conducted in federal crayfish streams.

3. Report any threatened or endangered species found, in any condition, during the surveys to the WVDNR (Kevin.M.Eliason@wv.gov), and the USFWS (FW5_WVFO@fws.gov) **within 48 hours**. Maps of the locations shall be submitted with the report. Live specimens shall be returned to the substrate in as near proximity as possible to where they were collected.

4. No live specimens of threatened or endangered or state rare species may be kept. Species and locations shall be documented with photographs, maps of the locations shall be submitted with the permit report, and all specimens shall be returned to the substrate in as near proximity as possible to where they were collected.

5. No dead shells of threatened or endangered species may be kept. All shall be surrendered to the WVDNR.

6. If your request to take voucher specimens has been approved by the WVDNR, then dead representations should be used first. If no suitable dead specimens are available then photo vouchers are preferred. If it is still necessary to collect a live specimen, then only one specimen may be taken of each species from each collection site. This does not apply to threatened or endangered species or state rare species; no live specimens of these species may be retained. Vouchers shall be turned over to a recognized museum collection, and voucher information given to the WVDNR.

7. Reporting: Provide a report detailing your survey work within 45 days after the expiration date of your permit using the Access database provided on the WVDNR website: https://wvdnr.gov/plants-animals/freshwater-mussels/. All reporting materials resulting from the work should be submitted to the state malacologist: Kevin.M.Eliason@wv.gov.

If any work is planned to occur in a State Park or State Forest, a permit must be obtained from WVDNR – Parks and Recreation.

If any work is planned to occur on National Forest or National Park Service lands, a permit must be obtained from the appropriate agency.

Information on specimens, and all parts thereof, including tissue samples, will be included in year-end reporting. Please provide disposition of any voucher specimens or samples, including the collection number if available.

Reporting: The report is due within 45 days of the expiration date of your permit, and should be sent to jared.i.varner@wv.gov and DNRScientificCollectingPermit@wv.gov .

THIS ADDENDUM MUST BE ATTACHED TO ORIGINAL PERMIT.

Must be signed before valid.

Signature of permittee

Jared Varner

Scientific Collecting Permit Coordinator

Date of Issue: June 10, 2024

ADDENDUM TO SCIENTIFIC COLLECTING PERMIT NO. 2024.170

2312 – USFWS Ohio River Island NWR Muskingum Island Well Plugging Project in Wood County

Permittee: Paul Robert
Address: Environmental Solutions & Innovations
4525 Este Avenue
Cincinnati, OH 45232

Expiration date: October 1, 2024

THE FOLLOWING PROVISIONS ARE ADDED TO THIS PERMIT: Mussel surveys are permitted in the Ohio River in Wood County (Muskingum Island Orphan Well Plugging Project).

Concurrence from U.S. Fish & Wildlife Service in need before surveys are conducted.

THIS ADDENDUM MUST BE ATTACHED TO ORIGINAL PERMIT.

Must be signed before valid.

Signature of permittee

Jared Varner

Scientific Collecting Permit Coordinator

Date of Issue: August 20, 2024

Outlook

RE: [EXTERNAL] Re: Study Plan - Freshwater Mussel Survey for the Muskingum Island Riverine Well Plugging Project on the Ohio River in Wood County, West Virginia

From Roth, Curtis J <curtis_roth@fws.gov>
Date Tue 8/20/2024 1:34 PM
To Eliason, Kevin M <kevin.m.eliason@wv.gov>; Jeremy Alberts <JAlberts@envsi.com>
Cc West Virginia FO, FW5 <FW5_WVFO@fws.gov>; Elam, Victor <victor_elam@fws.gov>; Brandon Yates <BYates@envsi.com>; Jo Garofalo <JGarofalo@envsi.com>; DNRScientificCollectingPermit@wv.gov <DNRScientificCollectingPermit@wv.gov>; Dale W. Sparks <DSparks@envsi.com>

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The U.S. Fish and Wildlife Service has no comments in addition to Kevin's response below.

Curtis Roth
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service | West Virginia Field Office
6263 Appalachian Highway | Davis, West Virginia 26260
304-866-3858 (Office)
https://www.fws.gov/office/west-virginia-ecological-services

From: Eliason, Kevin M <kevin.m.eliason@wv.gov>
Sent: Tuesday, August 20, 2024 12:52 PM
To: Jeremy Alberts <JAlberts@envsi.com>
Cc: Roth, Curtis J <curtis_roth@fws.gov>; West Virginia FO, FW5 <FW5_WVFO@fws.gov>; Elam, Victor <victor_elam@fws.gov>; Brandon Yates <BYates@envsi.com>; Jo Garofalo <JGarofalo@envsi.com>; DNRScientificCollectingPermit@wv.gov; Dale W. Sparks <DSparks@envsi.com>
Subject: [EXTERNAL] Re: Study Plan - Freshwater Mussel Survey for the Muskingum Island Riverine Well Plugging Project on the Ohio River in Wood County, West Virginia

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Jeremy,

The mussel survey scope of work for the Muskingum Island Orphan Well Plugging project on the Ohio River received 12 August 2024 have been reviewed and are approved. Approval is contingent on USFWS concurrence.

Let me know if you have any questions,

Kevin Eliason, *Mussel Biologist*
Wildlife Diversity Program
Phone (304) 630-0317 | Cell (304) 389-8526 | Fax (304) 637-0250

Elkins Operation Center

P.O. Box 67 | 738 Ward Road | Elkins, WV 26241



On Mon, Aug 12, 2024 at 3:24 PM Jeremy Alberts <JAlberts@envsi.com> wrote:

> Hi all,
>
> Attached is the study plan for the above-referenced project. Thank you again for taking the time to discuss the project this morning. If you have questions or need more information, please do not hesitate to let us know.
>
> Yours,
> Jeremy
>
> **Jeremy M. Alberts, Ph.D.**
> Chief Operating Officer
> Environmental Solutions & Innovations, Inc.
> 8 Betty Lane | Scott Depot, WV 25560 | USA
> **office:** 513.451.1777 **fax:** 513.451.3321
> **cell:** 304.308.0160
> JAlberts@envsi.com | www.envsi.com

Outlook

Re: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

From Paul Robert <PRobert@envsi.com>
Date Sat 9/7/2024 10:52 PM
To Eliason, Kevin M <kevin.m.eliason@wv.gov>; West Virginia FO, FW5 <FW5_WVFO@fws.gov>
Cc Jeremy Alberts <JAlberts@envsi.com>; Elam, Victor <victor_elam@fws.gov>; Brandon Yates <BYates@envsi.com>; Vanessa Vest <vvest@envsi.com>; Roth, Curtis J <curtis_roth@fws.gov>

All,

On 6 September 2024, we encountered 1 live Round hickorynut mussel (*Obovaria subrotunda*) and 3 live sheepnose (*Plethobasus cyphyus*) within the project area.

Sheepnose locations:

- 39.368655, -81.507419
- 39.368724, -81.507341
- 39.368652,-81.506980

Round hickorynut location:
- 39.368608, -81.507204

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,
Paul Robert

Sent from my iPhone

On Sep 6, 2024, at 7:55 AM, Paul Robert <PRobert@envsi.com> wrote:

All,

On 5 September 2024, we encountered 1 live Round hickorynut mussel (*Obovaria subrotunda*) within the project area.

Round hickorynut location:
- 39.368385, -81.507570

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section

Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,
Paul Robert
Sent from my iPhone

On Sep 5, 2024, at 7:10 AM, Brandon Yates <BYates@envsi.com> wrote:

All,

On 4 September 2024, we encountered 2 live sheepnose mussels (*Plethobasus cyphyus*) within the project area.

Sheepnose locations:
- 39.367944, -81.508342
- 39.368199, -81.508019

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,


Brandon Yates
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Brandon Yates
Sent: Tuesday, September 3, 2024 21:01
To: West Virginia FO, FW5 <FW5_WVFO@fws.gov>; Eliason, Kevin M <kevin.m.eliason@wv.gov>; Roth, Curtis J <curtis_roth@fws.gov>
Cc: Elam, Victor <victor_elam@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Paul Robert <PRobert@envsi.com>; Vanessa Vest <vvest@envsi.com>
Subject: RE: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

All,

On 2 September 2024, we encountered 3 live sheepnose mussels (*Plethobasus cyphyus*) and 1 live fanshell mussel (*Cyprogenia stegaria*) within the project area.

Fanshell location: 39.364360, -81.513713
Sheepnose locations:

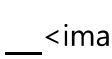
- 39.364360, -81.513713
- 39.367232, -81.508680
- 39.367416, -81.509196

On 3 September 2024, we encountered 3 live sheepnose mussels (*Plethobasus cyphyus*) within the project area.

Sheepnose locations:
- 39.367583, -81.508545
- 39.367563, -81.508364
- 39.367823, -81.508506

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,


Brandon Yates
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Brandon Yates
Sent: Monday, September 2, 2024 07:20
To: 'West Virginia FO, FW5' <FW5_WVFO@fws.gov>; 'Eliason, Kevin M' <kevin.m.eliason@wv.gov>; 'Roth, Curtis J' <curtis_roth@fws.gov>
Cc: 'Elam, Victor' <victor_elam@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Paul Robert <PRobert@envsi.com>; Vanessa Vest <vvest@envsi.com>
Subject: RE: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

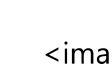
All,

On 31 August 2024, we encountered 1 live sheepnose mussel (*Plethobasus cyphyus*) within the project area.

Sheepnose location: 39.366689, -81.509677

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good weekend,


Brandon Yates

Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Brandon Yates
Sent: Saturday, August 31, 2024 07:22
To: 'West Virginia FO, FW5' <FW5_WVFO@fws.gov>; 'Eliason, Kevin M' <kevin.m.eliason@wv.gov>; 'Roth, Curtis J' <curtis_roth@fws.gov>
Cc: 'Elam, Victor' <victor_elam@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Paul Robert <PRobert@envsi.com>; Vanessa Vest <vvest@envsi.com>
Subject: RE: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

All,

Yesterday (30 August 2024), we encountered 1 live round hickorynut (*Obovaria subrotunda*), 1 live pink mucket (*Lampsilis abrupta*), and 4 live sheepnose mussels (*Plethobasus cyphyus*) within the project area.

Round hickorynut location: 39.365493, -81.512355
Pink mucket location: 39.365375, -81.512525
Sheepnose locations:

- 39.365375, -81.512525
- 39.365267, -81.512707
- 39.365267, -81.512716
- 39.365267, -81.512716

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good weekend,

__<image001.jpg> **Brandon Yates**
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Brandon Yates
Sent: Thursday, August 29, 2024 20:55
To: 'West Virginia FO, FW5' <FW5_WVFO@fws.gov>; 'Eliason, Kevin M'

<kevin.m.eliason@wv.gov>; 'Roth, Curtis J' <curtis_roth@fws.gov>
Cc: 'Elam, Victor' <victor_elam@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Paul Robert <PRobert@envsi.com>; Vanessa Vest <vvest@envsi.com>
Subject: RE: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

All,

Today (29 August 2024), we encountered 1 live fanshell mussel (*Cyprogenia stegaria*) and 1 live sheepnose mussel (*Plethobasus cyphyus*) within the project area.

Fanshell location: 39.365148, -81.512741
Sheepnose location: 39.365016, -81.5129721

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you,

<image001.jpg> **Brandon Yates**
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Brandon Yates
Sent: Thursday, August 29, 2024 07:34
To: West Virginia FO, FW5 <FW5_WVFO@fws.gov>; Eliason, Kevin M <kevin.m.eliason@wv.gov>; Roth, Curtis J <curtis_roth@fws.gov>
Cc: Elam, Victor <victor_elam@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Paul Robert <PRobert@envsi.com>
Subject: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

All,

Yesterday, we encountered 1 live federally endangered sheepnose mussel near 39.364923, -81.513171 within the downstreammost downstream buffer.

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,

__<image001.jpg> **Brandon Yates**
Scientist
Environmental Solutions & Innovations, Inc.
4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

<image001.jpg>

Outlook

RE: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

From Brandon Yates <BYates@envsi.com>
Date Wed 9/11/2024 11:33 AM
To Eliason, Kevin M <kevin.m.eliason@wv.gov>; Roth, Curtis J <curtis_roth@fws.gov>; West Virginia FO, FW5 <FW5_WVFO@fws.gov>
Cc Jeremy Alberts <JAlberts@envsi.com>; Elam, Victor <victor_elam@fws.gov>; Vanessa Vest <vvest@envsi.com>; Paul Robert <PRobert@envsi.com>

All,

On 10 September, we encountered 3 sheepnose (*Plethobasus cyphyus*), 2 longsolid (*Fusconaia subrotunda*), and 1 clubshell (*Pleurobema clava*) within the project area and relocation scoping sites. This is the last notification email as fieldwork concluded late yesterday. A traditional survey report will be prepared and submitted to your offices soon.

Clubshell location: 39.368813, -81.507097. This individual was previously tagged with a gray tag reading T007, further, this individual possesses a PIT tag. The PIT tag adhesive appears to be in good shape.

Sheepnose locations:
- 39.368055, -81.508064
- 39.369565, -81.505947
- 39.368984, -81.506805

Longsolid locations
- 39.372856, -81.501092
- 39.368451, -81.507582

Project totals:
- Sheepnose: 24
- Round hickorynut: 5
- Pink mucket: 1
- Fanshell: 3
- Longsolid: 2
- Clubshell: 1

Project: USFWS National Wildlife Refuge Muskingum Island Well Plugging Project
County: Wood County, WV
Waterbody: Ohio River – Group 4 Section
Approximate Location: Right descending side of Muskingum Island

Thank you and have a good day,

ESI **Brandon Yates**
Scientist
Environmental Solutions & Innovations, Inc.

4525 Este Ave. | Cincinnati, OH 45232 | USA
office: 513.451.1777 **fax:** 513.451.3321
cell: 606.831.4439
byates@envsi.com | www.envsi.com

From: Eliason, Kevin M <kevin.m.eliason@wv.gov>
Sent: Tuesday, September 10, 2024 08:54
To: Brandon Yates <BYates@envsi.com>
Cc: Roth, Curtis J <curtis_roth@fws.gov>; West Virginia FO, FW5 <FW5_WVFO@fws.gov>; Jeremy Alberts <JAlberts@envsi.com>; Elam, Victor <victor_elam@fws.gov>; Vanessa Vest <vvest@envsi.com>; Paul Robert <PRobert@envsi.com>
Subject: Re: Federal Species Encounter Notification - USFWS NWR Muskingum Island Well Plugging Project, Wood County, WV

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Brandon and Paul,

Thank you for the notifications, I will not respond to every one, but they are being received.

At current count I have:

Cyprogenia stegaria (3)
Lampsilis abrupta (1)
Obovaria subrotunda (5)
Plethobasus cyphyus (21)

Kevin Eliason, *Mussel Biologist*
Wildlife Diversity Program
Phone (304) 630-0317 | Cell (304) 389-8526 | Fax (304) 637-0250

Elkins Operation Center

P.O. Box 67 | 738 Ward Road | Elkins, WV 26241
WEST VIRGINIA
DNR

On Tue, Sep 10, 2024 at 8:31 AM Brandon Yates <BYates@envsi.com> wrote:

> All,
>
> On 8 September 2024, we encountered 1 live fanshell (*Cyprogenia stegaria*), and 1 live round

hickorynut (*Obovaria subrotunda*), within the project area.

Fanshell locations:39.369432, -81.506277

Round hickorynut:39.369215, -81.505899

On 9 September 2024, we encountered 2 live sheepnose (*Plethobasus cyphyus*), and 1 round hickorynut (*Obovaria subrotunda*) within the project area.

Sheepnose locations:39.369822, -81.505711

Sheepnose locations:39.369638, -81.505971

Round hickorynut:39.369324, -81.505748

Brandon L. Yates
(606)-831-4439

On Sep 8, 2024, at 21:19, Paul Robert <PRobert@envsi.com> wrote:

All,

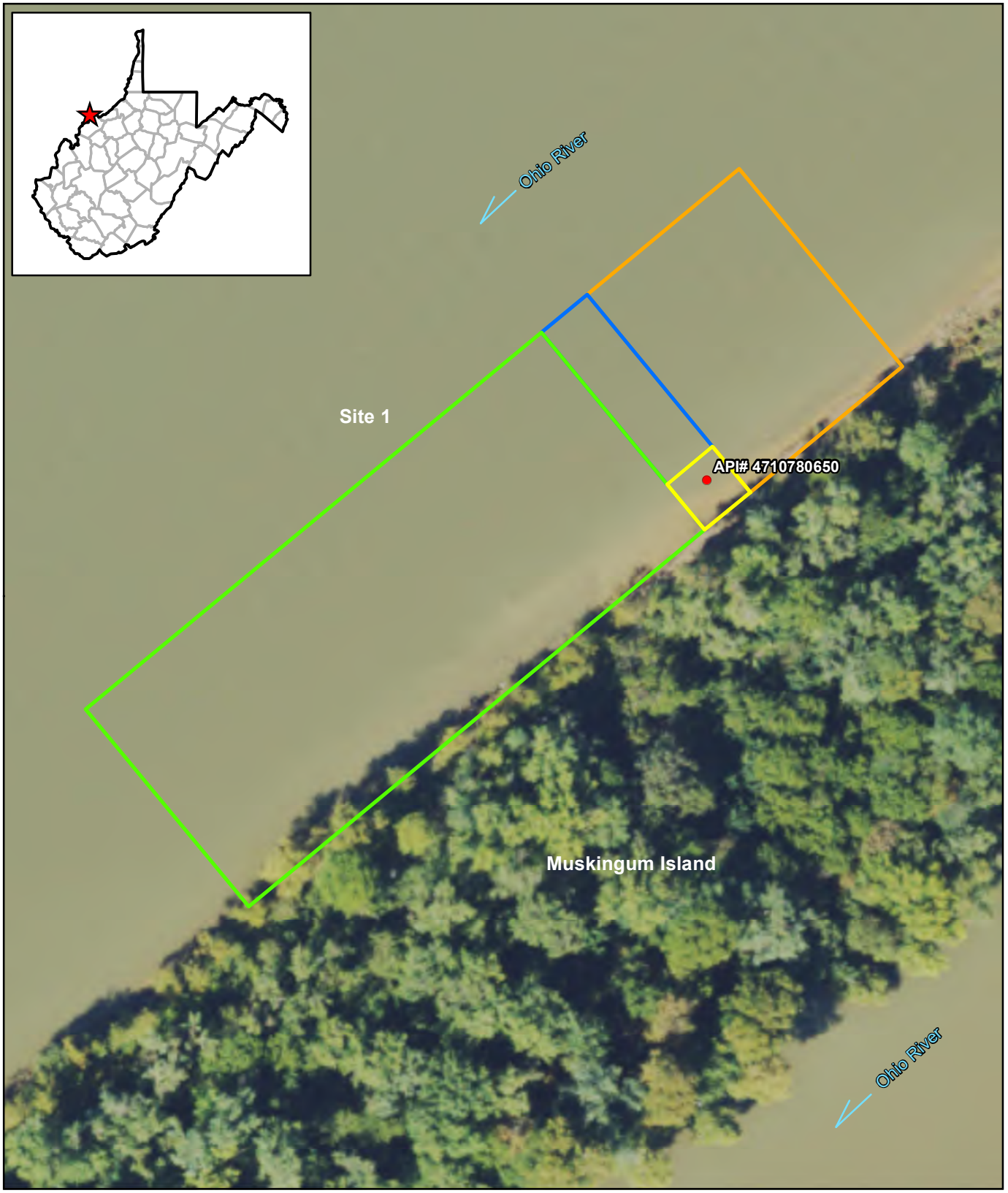
On 7 September 2024, we encountered 1 live sheepnose (*Plethobasus cyphyus*) within the project area.

Sheepnose locations:39.368793, -81.507267

APPENDIX B
SITE 1 SUPPORTING DOCUMENTATION

- B-1: Figures B1 through B5
- B-2: Data Tables B1 through B6
- B-3: WVDNR Scope of Work Form
- B-4: WVDNR Mussel Summary Form
- B-5: Datasheets
- B-6: Representative Site Photos

B-1
FIGURES B1 THROUGH B5



American Petroleum Institute (API) Well Location
Upstream Buffer
Lateral Buffer
Area of Direct Impact
Downstream Buffer

N
W
E
S

Figure B1. Site 1 mussel survey extent for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 25 50 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

G:\Current\2312_USFWS_Ohio_River_NWR_Mussels_WV\Maps\Aquatic\Report_Figures\FigureB1_2312_Site1_Location_20241028.mxd; creator: CKemmerer

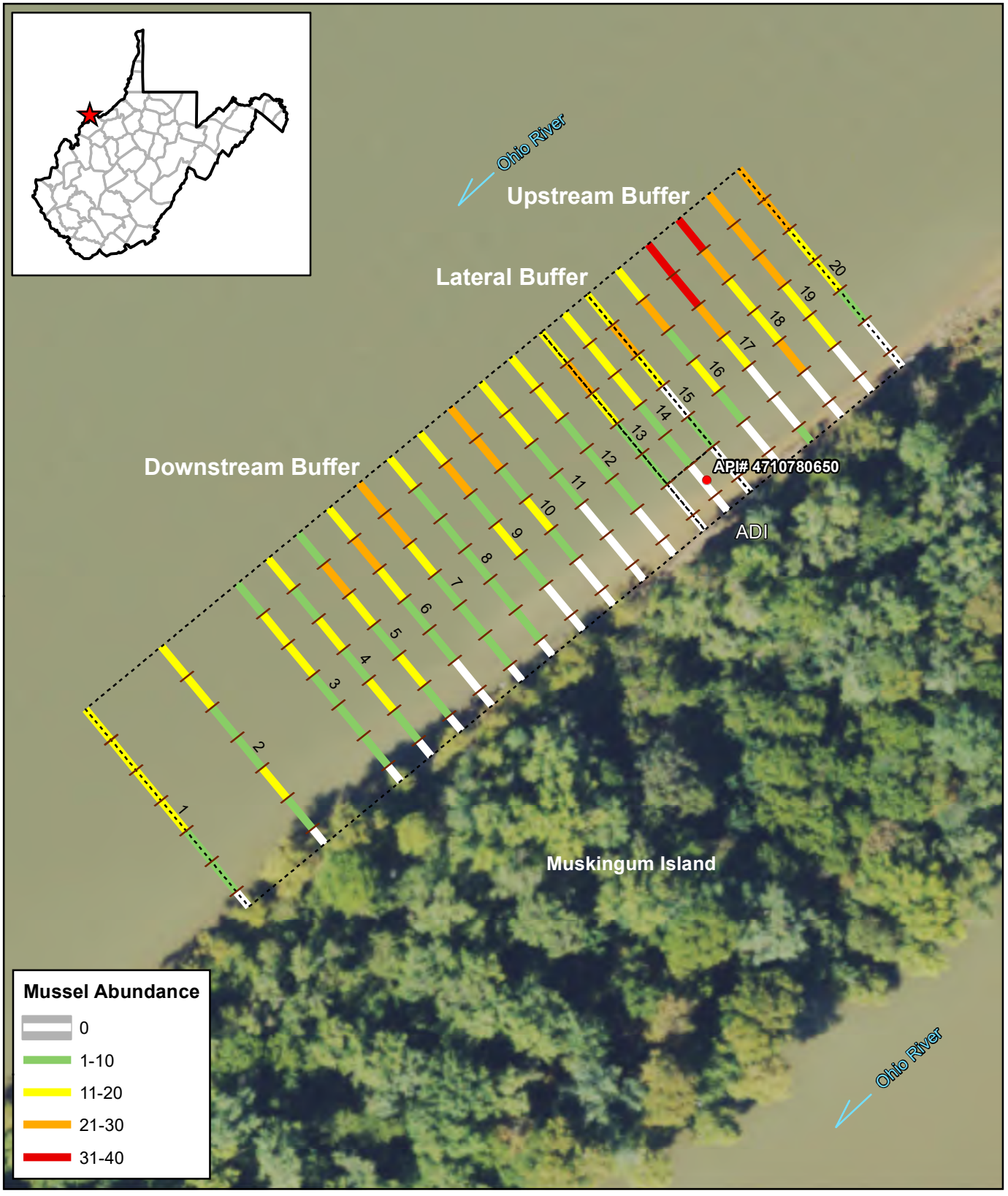


Figure B2. Site 1 live mussel abundance per transect interval for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

N W E S

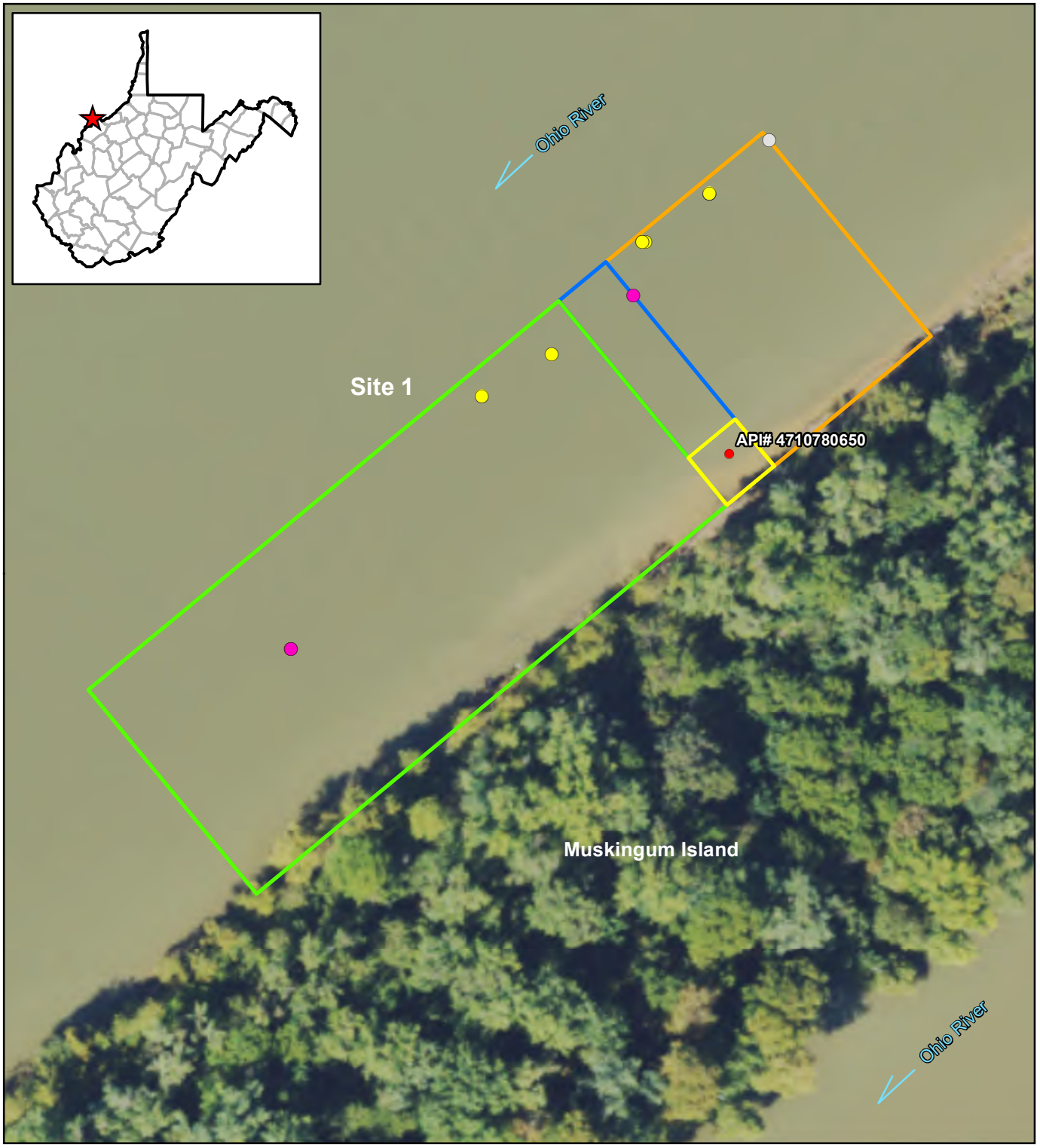
Project No. 2312

0 25 50 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

G:\Current\2312_USFWS_Ohio_River_NWR_Mussels_WV\Maps\Aquatic\Report_Figures\FigureB2_2312_Site1_Abundance_20241028.mxd; creator: CKemmerer



American Petroleum Institute (API) Well Location

Fanshell

Pink mucket

Round hickorynut

Sheepnose

Area of Direct Impact

Upstream Buffer

Downstream Buffer

Lateral Buffer

N

W E

S

Figure B3. Site 1 federally listed species occurrence for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

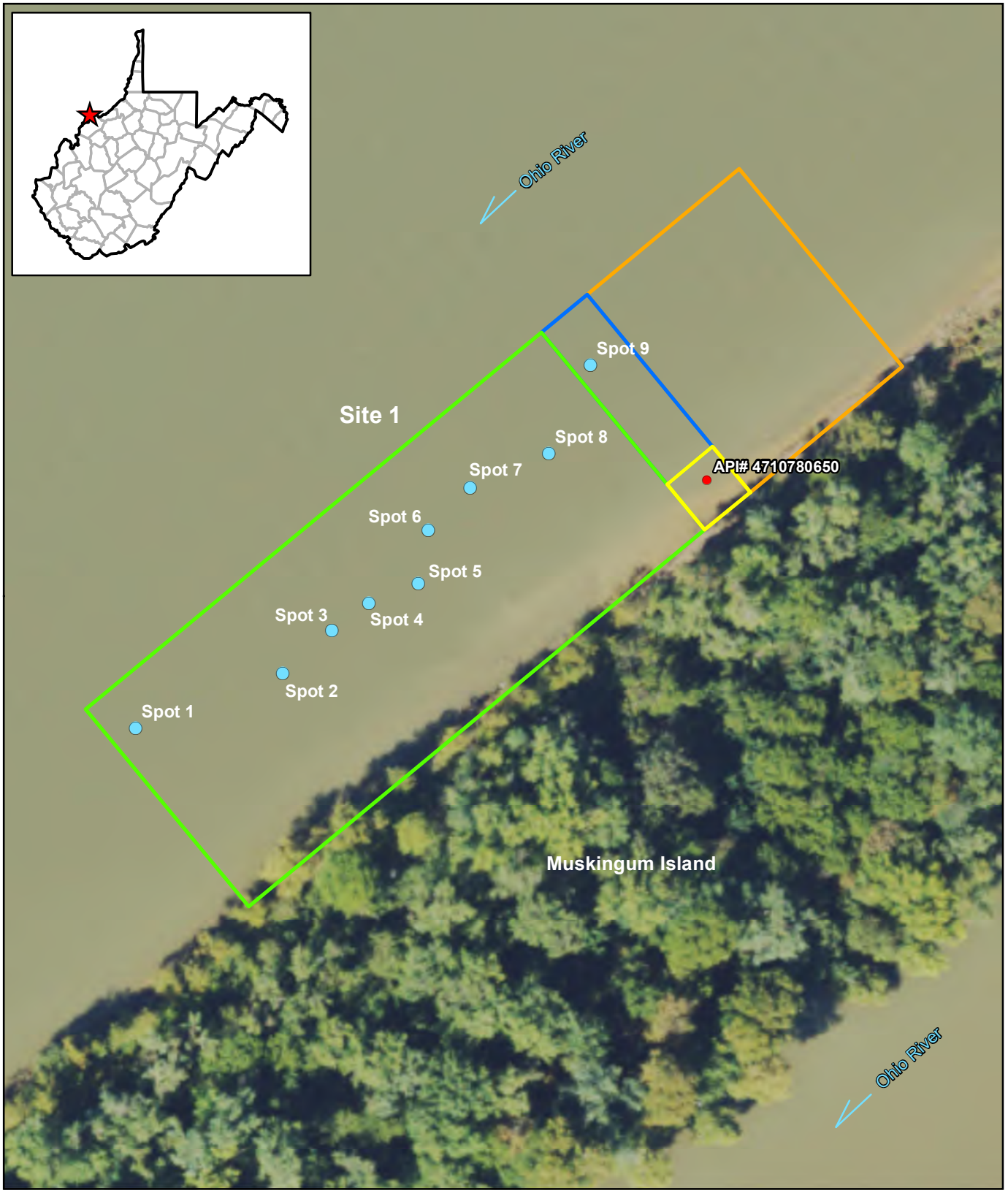
Project No. 2312

0 25 50 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Spot Dive Location
American Petroleum Institute (API) Well Location
Area of Direct Impact
Upstream Buffer
Downstream Buffer
Lateral Buffer

N
W E
S

Figure B4. Site 1 spot dive locations for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

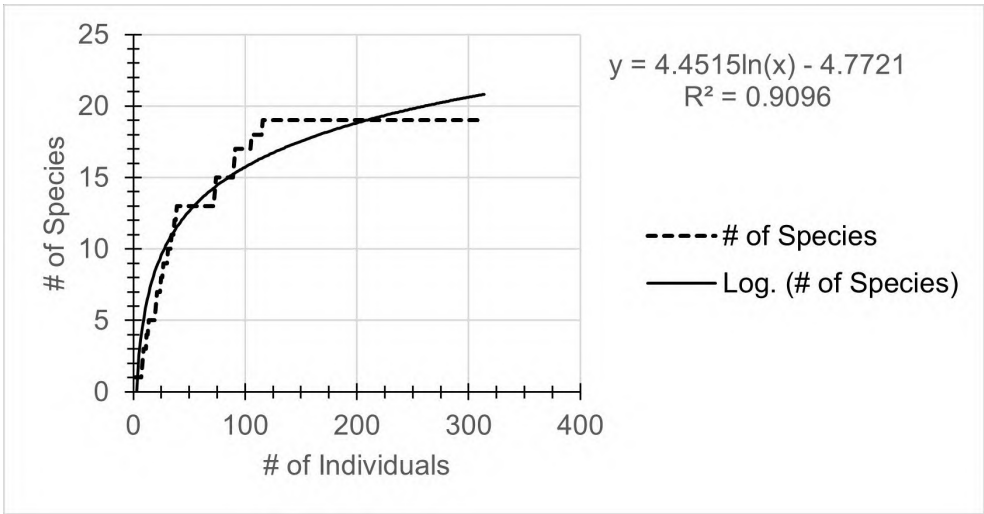
0 25 50 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Figure B5. Site 1 spot dive species richness curve for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.



B-2
DATA TABLES B1 THROUGH B6

Table B1. Site 1 habitat data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition						Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Woody Debris	Vegetation		
27 Aug	DSB	1	0-5	VV/KY	10	90					5	1.5
27 Aug	DSB	1	5-15	VV/KY	50	50					16	3.0
27 Aug	DSB	1	15-25	VV/KY	30	50	20				16	3.7
27 Aug	DSB	1	25-35	VV/KY	10	50	30		10		14	4.6
27 Aug	DSB	1	35-45	VV/KY	10	50	30		10		12	4.6
27 Aug	DSB	1	45-55	VV/KY	10	50	30		10		16	4.9
27 Aug	DSB	1	55-65	VV/KY	20	50	30		10		14	4.6
27 Aug	DSB	2	0-5	VV/KY	10	90			15		6	4.6
27 Aug	DSB	2	5-15	VV/KY	10	80			10		17	4.0
27 Aug	DSB	2	15-25	VV/KY	20	30	50		10		18	4.6
27 Aug	DSB	2	25-35	VV/KY	30		50	20	40		12	4.9
27 Aug	DSB	2	35-45	VV/KY	50		50		40		12	5.2
27 Aug	DSB	2	45-55	VV/KY	50		50		40		12	5.2
27 Aug	DSB	2	55-65	VV/KY	50		50		40		11	5.2
27 Aug	DSB	3	0-5	VV		100			10		7	0.9
27 Aug	DSB	3	5-15	VV/KY	15		85				12	4.3
27 Aug	DSB	3	15-25	VV/KY	50		50				12	4.6
27 Aug	DSB	3	25-35	VV/KY	50		50				12	5.2
27 Aug	DSB	3	35-45	VV/KY	50		50				12	5.2
27 Aug	DSB	3	45-55	VV/KY	50		50				12	5.2
27 Aug	DSB	3	55-65	VV/KY	50		50				12	5.2
27 Aug	DSB	4	0-5	VV/KY		100					7	0.9
27 Aug	DSB	4	5-15	VV/KY	35		50		15		12	3.7
27 Aug	DSB	4	15-25	VV/KY	50		50		10		12	4.6
27 Aug	DSB	4	25-35	VV/KY	50		50		10		12	5.2
27 Aug	DSB	4	35-45	VV/KY	50		50		40		12	5.2
27 Aug	DSB	4	45-55	VV/KY	50		50		40		12	5.2
27 Aug	DSB	4	55-65	VV/KY	50		50		40		12	5.2

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition						Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Woody Debris	Vegetation		
27 Aug	DSB	5	0-5	VV/KY		100			40		7	0.9
27 Aug	DSB	5	5-15	VV/KY		50	20	30	10		12	3.4
27 Aug	DSB	5	15-25	VV/KY	50		50		40		12	4.0
27 Aug	DSB	5	25-35	VV/KY	50		50		40		12	4.9
27 Aug	DSB	5	35-45	VV/KY	50		50		40		12	5.2
27 Aug	DSB	5	45-55	VV/KY	50		50		10		12	5.2
27 Aug	DSB	5	55-65	VV/KY	50		50				12	5.5
28 Aug	DSB	6	0-5	VV/BY	100						5	0.3
28 Aug	DSB	6	5-15	VV/BY	10	60			30		10	3.0
28 Aug	DSB	6	15-25	VV/BY	30	10	30	30			10	4.0
28 Aug	DSB	6	25-35	VV/BY	50		50				10	4.9
28 Aug	DSB	6	35-45	VV/BY	50		50				10	4.9
28 Aug	DSB	6	45-55	VV/BY	50	20	20	10			10	4.9
28 Aug	DSB	6	55-65	VV/BY	60		30	10			12	4.9
28 Aug	DSB	7	0-5	VV/BY	100						5	0.3
28 Aug	DSB	7	5-15	VV/BY	10	10	40	20	20		10	3.0
28 Aug	DSB	7	15-25	VV/BY	50		40	10			10	4.0
28 Aug	DSB	7	25-35	VV/BY	60		30	10			10	4.9
28 Aug	DSB	7	35-45	VV/BY	60		30	10			10	4.9
28 Aug	DSB	7	45-55	VV/BY	50	20	20	10			10	4.9
28 Aug	DSB	7	55-65	VV/BY	50	20	20	10			10	4.9
28 Aug	DSB	8	0-5	BY/KY	80	10	10				6	0.3
28 Aug	DSB	8	5-15	BY/KY	80		10		10		12	3.0
28 Aug	DSB	8	15-25	BY/KY	40	10	40		10		12	4.0
28 Aug	DSB	8	25-35	BY/KY	40	10	20	10	20		12	4.0
28 Aug	DSB	8	35-45	BY/KY	30	40		30			12	4.6
28 Aug	DSB	8	45-55	BY/KY	30	40		30			12	4.9
28 Aug	DSB	8	55-65	BY/KY	40	50		10			12	4.9
28 Aug	DSB	9	0-5	BY/KY	60		10	10	20		6	3.4
28 Aug	DSB	9	5-15	BY/KY	60		10	10	20		12	3.4

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition						Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Woody Debris	Vegetation		
28 Aug	DSB	9	15-25	BY/KY	50		40		10		12	4.0
28 Aug	DSB	9	25-35	BY/KY		30	40	20	10		12	4.6
28 Aug	DSB	9	35-45	BY/KY	10	10	40	30	10		12	4.9
28 Aug	DSB	9	45-55	BY/KY	10	10	40	30	10		12	4.9
28 Aug	DSB	9	55-65	BY/KY	50		30	20			12	5.2
28 Aug	DSB	10	0-5	BY/KY	30	70					6	0.6
28 Aug	DSB	10	5-15	BY/KY	60		20		20		12	3.0
28 Aug	DSB	10	15-25	BY/KY	60		40				12	4.0
28 Aug	DSB	10	25-35	BY/KY	50		20	30			12	4.0
28 Aug	DSB	10	35-45	BY/KY	40		30	30			12	4.0
28 Aug	DSB	10	45-55	BY/KY	40		30	30			12	4.3
28 Aug	DSB	10	55-65	BY/KY	50		10	20	20		10	5.2
28 Aug	DSB	11	0-5	BY/KY	40	50	10				6	0.3
28 Aug	DSB	11	5-15	BY/KY	20	40	30	10			12	4.3
28 Aug	DSB	11	15-25	BY/KY	40	20	30	10			12	4.3
28 Aug	DSB	11	25-35	BY/KY	30	20	30	20			12	4.9
28 Aug	DSB	11	35-45	BY/KY	30	20	30	20			12	4.9
28 Aug	DSB	11	45-55	BY/KY	30	20	30	20			12	4.9
28 Aug	DSB	11	55-65	BY/KY	30	20	30	20			12	4.9
29 Aug	DSB	12	0-5	VV/KY	30	70					6	0.6
29 Aug	DSB	12	5-15	VV/KY	50	40		10			12	3.7
29 Aug	DSB	12	15-25	VV/KY	50	40		10			12	4.9
29 Aug	DSB	12	25-35	VV/KY	50		50				12	4.6
29 Aug	DSB	12	35-45	VV/KY	50		50				12	4.6
29 Aug	DSB	12	45-55	VV/KY	50		50				12	4.9
29 Aug	DSB	12	55-65	VV/KY	50		50				12	5.2
29 Aug	ADI	13	0-5	VV/KY	100						6	0.3
29 Aug	ADI	13	5-15	VV/KY	70	30					12	1.5
29 Aug	LTB	13	15-25	VV/KY	50		50				12	3.7
29 Aug	LTB	13	25-35	VV/KY	60		40				12	4.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition						Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Woody Debris	Vegetation		
29 Aug	LTB	13	35-45	VV/KY	50		50				12	4.9
29 Aug	LTB	13	45-55	VV/KY	50		50				12	4.9
29 Aug	LTB	13	55-65	VV/KY	50		50				12	4.9
29 Aug	ADI	14	0-5	VV/KY	50	50					6	0.6
29 Aug	ADI	14	5-15	VV/KY	75	25					12	1.8
29 Aug	LTB	14	15-25	VV/KY	50		50				12	4.9
29 Aug	LTB	14	25-35	VV/KY	60	10	20		10		12	4.9
29 Aug	LTB	14	35-45	VV/KY	50		50				12	5.2
29 Aug	LTB	14	45-55	VV/KY	40		60				12	4.9
29 Aug	LTB	14	55-65	VV/KY	40		60				12	4.9
29 Aug	ADI	15	0-5	VV/KY	50	50					6	0.9
29 Aug	ADI	15	5-15	VV/KY	100						12	3.7
29 Aug	LTB	15	15-25	VV/KY	90				10		12	4.6
29 Aug	LTB	15	25-35	VV/KY	50	10			40		12	4.9
29 Aug	LTB	15	35-45	VV/KY	50		50				12	4.9
29 Aug	LTB	15	45-55	VV/KY	40		60				12	4.6
29 Aug	LTB	15	55-65	VV/KY	25	25	50				12	4.9
30 Aug	USB	16	0-5	BY/VV	60	40					5	0.3
30 Aug	USB	16	5-15	BY/VV	80	10			10		10	3.4
30 Aug	USB	16	15-25	BY/VV	60	20			20		10	3.4
30 Aug	USB	16	25-35	BY/VV	60	20	10		10		10	4.6
30 Aug	USB	16	35-45	BY/VV	50		50				10	5.2
30 Aug	USB	16	45-55	BY/VV	40	10	40	10			11	4.9
30 Aug	USB	16	55-65	BY/VV	40	10	40	10			10	5.2
30 Aug	USB	17	0-5	BY/VV	60	40					5	0.3
30 Aug	USB	17	5-15	BY/VV	90	10					10	2.1
30 Aug	USB	17	15-25	BY/VV	80	10		10			10	4.3
30 Aug	USB	17	25-35	BY/VV	50		40	10			10	4.9
30 Aug	USB	17	35-45	BY/VV	40		50	10			10	4.9
30 Aug	USB	17	45-55	BY/VV	35	15	40	10			10	5.2

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition						Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Woody Debris	Vegetation		
30 Aug	USB	17	55-65	BY/VV	30	20	35	15			10	4.9
30 Aug	USB	18	0-5	BY/VV	60	40					5	0.3
30 Aug	USB	18	5-15	BY/VV	60				40		10	3.0
30 Aug	USB	18	15-25	BY/VV	40	10	40	10			10	4.0
30 Aug	USB	18	25-35	BY/VV	40	10	40	10			10	4.9
30 Aug	USB	18	35-45	BY/VV	50		40	10			10	5.2
30 Aug	USB	18	45-55	BY/VV	50		40	10			11	4.9
30 Aug	USB	18	55-65	BY/VV	50		40	10			12	4.9
30 Aug	USB	19	0-5	BY/VV	60				40		5	0.3
30 Aug	USB	19	5-15	BY/VV	40		20		40		10	3.0
30 Aug	USB	19	15-25	BY/VV	45		10	30	15		10	4.0
30 Aug	USB	19	25-35	BY/VV	50		40	10			10	4.9
30 Aug	USB	19	35-45	BY/VV	50		40	10			11	4.9
30 Aug	USB	19	45-55	BY/VV	50		40	10			11	5.2
30 Aug	USB	19	55-65	BY/VV	50		30	20			12	5.2
30 Aug	USB	20	0-5	BY/VV	60	40					5	0.3
30 Aug	USB	20	5-15	BY/VV		30				70	10	2.4
30 Aug	USB	20	15-25	BY/VV	10	10	60	10	10		10	3.0
30 Aug	USB	20	25-35	BY/VV	50	40	10				10	4.3
30 Aug	USB	20	35-45	BY/VV	50	40	10				12	5.2
30 Aug	USB	20	45-55	BY/VV	50	40	10				10	5.2
30 Aug	USB	20	55-65	BY/VV	50	40	10				11	5.2

[1] ADI = Area of direct impact; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

[2] VV = Vanessa Vest; BY = Brandon Yates; KY = Kevin Yount

Table B2. Site 1 mussel survey summary for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
27 Aug	DSB	1	0-5	5	5	1	0	0	0
27 Aug	DSB	1	5-15	10	16	1.6	3	3	0.3
27 Aug	DSB	1	15-25	10	16	1.6	4	8	0.8
27 Aug	DSB	1	25-35	10	14	1.4	8	19	1.9
27 Aug	DSB	1	35-45	10	12	1.2	5	12	1.2
27 Aug	DSB	1	45-55	10	16	1.6	6	13	1.3
27 Aug	DSB	1	55-65	10	14	1.4	6	13	1.3
27 Aug	DSB	2	0-5	5	6	1.2	0	0	0
27 Aug	DSB	2	5-15	10	17	1.7	2	4	0.4
27 Aug	DSB	2	15-25	10	18	1.8	4	16	1.6
27 Aug	DSB	2	25-35	10	12	1.2	4	7	0.7
27 Aug	DSB	2	35-45	10	12	1.2	4	6	0.6
27 Aug	DSB	2	45-55	10	12	1.2	7	18	1.8
27 Aug	DSB	2	55-65	10	11	1.1	6	11	1.1
27 Aug	DSB	3	0-5	5	7	1.4	0	0	0
27 Aug	DSB	3	5-15	10	12	1.2	1	1	0.1
27 Aug	DSB	3	15-25	10	12	1.2	4	7	0.7
27 Aug	DSB	3	25-35	10	12	1.2	4	8	0.8
27 Aug	DSB	3	35-45	10	12	1.2	7	12	1.2
27 Aug	DSB	3	45-55	10	12	1.2	8	13	1.3
27 Aug	DSB	3	55-65	10	12	1.2	5	7	0.7
27 Aug	DSB	4	0-5	5	7	1.4	0	0	0
27 Aug	DSB	4	5-15	10	12	1.2	1	1	0.1
27 Aug	DSB	4	15-25	10	12	1.2	2	11	1.1
27 Aug	DSB	4	25-35	10	12	1.2	5	9	0.9
27 Aug	DSB	4	35-45	10	12	1.2	7	13	1.3
27 Aug	DSB	4	45-55	10	12	1.2	6	10	1
27 Aug	DSB	4	55-65	10	12	1.2	6	13	1.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
27 Aug	DSB	5	0-5	5	7	1.4	0	0	0
27 Aug	DSB	5	5-15	10	12	1.2	2	2	0.2
27 Aug	DSB	5	15-25	10	12	1.2	4	11	1.1
27 Aug	DSB	5	25-35	10	12	1.2	5	8	0.8
27 Aug	DSB	5	35-45	10	12	1.2	6	13	1.3
27 Aug	DSB	5	45-55	10	12	1.2	5	21	2.1
27 Aug	DSB	5	55-65	10	12	1.2	7	10	1
28 Aug	DSB	6	0-5	5	5	1	0	0	0
28 Aug	DSB	6	5-15	10	10	1	0	0	0
28 Aug	DSB	6	15-25	10	10	1	4	8	0.8
28 Aug	DSB	6	25-35	10	10	1	7	10	1
28 Aug	DSB	6	35-45	10	10	1	7	13	1.3
28 Aug	DSB	6	45-55	10	10	1	9	29	2.9
28 Aug	DSB	6	55-65	10	12	1.2	7	11	1.1
28 Aug	DSB	7	0-5	5	5	1	0	0	0
28 Aug	DSB	7	5-15	10	10	1	1	1	0.1
28 Aug	DSB	7	15-25	10	10	1	4	5	0.5
28 Aug	DSB	7	25-35	10	10	1	6	10	1
28 Aug	DSB	7	35-45	10	10	1	5	12	1.2
28 Aug	DSB	7	45-55	10	10	1	9	23	2.3
28 Aug	DSB	7	55-65	10	10	1	8	26	2.6
28 Aug	DSB	8	0-5	5		0	0	0	0
28 Aug	DSB	8	5-15	10	12	1.2	1	1	0.1
28 Aug	DSB	8	15-25	10	12	1.2	4	8	0.8
28 Aug	DSB	8	25-35	10	12	1.2	3	7	0.7
28 Aug	DSB	8	35-45	10	12	1.2	1	3	0.3
28 Aug	DSB	8	45-55	10	12	1.2	5	10	1
28 Aug	DSB	8	55-65	10	12	1.2	10	14	1.4
28 Aug	DSB	9	0-5	5	6	1.2	0	0	0
28 Aug	DSB	9	5-15	10	12	1.2	0	0	0

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
28 Aug	DSB	9	15-25	10	12	1.2	2	3	0.3
28 Aug	DSB	9	25-35	10	12	1.2	5	12	1.2
28 Aug	DSB	9	35-45	10	12	1.2	5	6	0.6
28 Aug	DSB	9	45-55	10	12	1.2	10	23	2.3
28 Aug	DSB	9	55-65	10	12	1.2	7	20	2
28 Aug	DSB	10	0-5	5	6	1.2	0	0	0
28 Aug	DSB	10	5-15	10	12	1.2	0	0	0
28 Aug	DSB	10	15-25	10	12	1.2	2	4	0.4
28 Aug	DSB	10	25-35	10	12	1.2	4	11	1.1
28 Aug	DSB	10	35-45	10	12	1.2	6	8	0.8
28 Aug	DSB	10	45-55	10	12	1.2	8	24	2.4
28 Aug	DSB	10	55-65	10	10	1	9	21	2.1
28 Aug	DSB	11	0-5	5	6	1.2	0	0	0
28 Aug	DSB	11	5-15	10	12	1.2	0	0	0
28 Aug	DSB	11	15-25	10	12	1.2	0	0	0
28 Aug	DSB	11	25-35	10	12	1.2	5	6	0.6
28 Aug	DSB	11	35-45	10	12	1.2	4	6	0.6
28 Aug	DSB	11	45-55	10	12	1.2	8	15	1.5
28 Aug	DSB	11	55-65	10	12	1.2	7	14	1.4
29 Aug	DSB	12	0-5	5	6	1.2	0	0	0
29 Aug	DSB	12	5-15	10	12	1.2	0	0	0
29 Aug	DSB	12	15-25	10	12	1.2	1	2	0.2
29 Aug	DSB	12	25-35	10	12	1.2	4	7	0.7
29 Aug	DSB	12	35-45	10	12	1.2	4	9	0.9
29 Aug	DSB	12	45-55	10	12	1.2	12	20	2
29 Aug	DSB	12	55-65	10	12	1.2	8	18	1.8
29 Aug	ADI	13	0-5	5	6	1.2	0	0	0
29 Aug	ADI	13	5-15	10	12	1.2	0	0	0
29 Aug	LTB	13	15-25	10	12	1.2	2	3	0.3
29 Aug	LTB	13	25-35	10	12	1.2	6	8	0.8

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
29 Aug	LTB	13	35-45	10	12	1.2	9	12	1.2
29 Aug	LTB	13	45-55	10	12	1.2	7	22	2.2
29 Aug	LTB	13	55-65	10	12	1.2	6	17	1.7
29 Aug	ADI	14	0-5	5	6	1.2	0	0	0
29 Aug	ADI	14	5-15	10	12	1.2	0	0	0
29 Aug	LTB	14	15-25	10	12	1.2	3	3	0.3
29 Aug	LTB	14	25-35	10	12	1.2	2	6	0.6
29 Aug	LTB	14	35-45	10	12	1.2	7	16	1.6
29 Aug	LTB	14	45-55	10	12	1.2	10	18	1.8
29 Aug	LTB	14	55-65	10	12	1.2	9	19	1.9
29 Aug	ADI	15	0-5	5	6	1.2	0	0	0
29 Aug	ADI	15	5-15	10	12	1.2	0	0	0
29 Aug	LTB	15	15-25	10	12	1.2	1	1	0.1
29 Aug	LTB	15	25-35	10	12	1.2	0	0	0
29 Aug	LTB	15	35-45	10	12	1.2	9	19	1.9
29 Aug	LTB	15	45-55	10	12	1.2	8	21	2.1
29 Aug	LTB	15	55-65	10	12	1.2	9	19	1.9
30 Aug	USB	16	0-5	5	5	1	0	0	0
30 Aug	USB	16	5-15	10	10	1	0	0	0
30 Aug	USB	16	15-25	10	10	1	3	4	0.4
30 Aug	USB	16	25-35	10	10	1	7	11	1.1
30 Aug	USB	16	35-45	10	10	1	5	8	0.8
30 Aug	USB	16	45-55	10	11	1.1	11	21	2.1
30 Aug	USB	16	55-65	10	10	1	8	20	2
30 Aug	USB	17	0-5	5	5	1	2	3	0.6
30 Aug	USB	17	5-15	10	10	1	0	0	0
30 Aug	USB	17	15-25	10	10	1	0	0	0
30 Aug	USB	17	25-35	10	10	1	8	20	2
30 Aug	USB	17	35-45	10	10	1	10	22	2.2
30 Aug	USB	17	45-55	10	10	1	10	33	3.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
30 Aug	USB	17	55-65	10	10	1	8	38	3.8
30 Aug	USB	18	0-5	5	5	1	0	0	0
30 Aug	USB	18	5-15	10	10	1	0	0	0
30 Aug	USB	18	15-25	10	10	1	7	25	2.5
30 Aug	USB	18	25-35	10	10	1	7	11	1.1
30 Aug	USB	18	35-45	10	10	1	8	19	1.9
30 Aug	USB	18	45-55	10	11	1.1	9	23	2.3
30 Aug	USB	18	55-65	10	12	1.2	12	37	3.7
30 Aug	USB	19	0-5	5	5	1	0	0	0
30 Aug	USB	19	5-15	10	10	1	0	0	0
30 Aug	USB	19	15-25	10	10	1	6	12	1.2
30 Aug	USB	19	25-35	10	10	1	6	17	1.7
30 Aug	USB	19	35-45	10	11	1.1	9	21	2.1
30 Aug	USB	19	45-55	10	11	1.1	9	21	2.1
30 Aug	USB	19	55-65	10	12	1.2	8	27	2.7
30 Aug	USB	20	0-5	5	5	1	0	0	0
30 Aug	USB	20	5-15	10	10	1	0	0	0
30 Aug	USB	20	15-25	10	10	1	3	7	0.7
30 Aug	USB	20	25-35	10	10	1	7	13	1.3
30 Aug	USB	20	35-45	10	12	1.2	8	15	1.5
30 Aug	USB	20	45-55	10	10	1	12	21	2.1
30 Aug	USB	20	55-65	10	11	1.1	7	25	2.5

[1] ADI = Area of direct impact; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

Table B3. Summary of live unionid mussels collected at Site 1 during mussel survey for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Live Mussel Species Scientific Name[1]	ADI[2]	DSS[2]	DSB[2]	LTB[2]	USB[2]	Total
Actinonaias ligamentina	0	3	10	3	13	29
Amblema plicata	0	96	132	34	73	335
Cyclonaias pustulosa	0	33	93	25	48	199
*Cyprogenia stegaria**	0	1	0	1	0	2
Ellipsaria lineolata	0	46	82	22	54	204
Elliptio crassidens	0	0	1	0	0	1
Fusconaia flava	0	2	3	0	1	6
*Lampsilis abrupta**	0	0	0	0	1	1
Lampsilis cardium	0	9	19	4	13	45
Lampsilis siliquoidea	0	2	6	2	10	20
Lasmigona complanata	0	1	2	0	1	4
Ligumia recta	0	33	105	25	75	238
Megalonaias nervosa	0	10	13	1	10	34
Obliquaria reflexa	0	20	68	11	22	121
*Obovaria subrotunda**	0	0	0	0	1	1
*Plethobasus cyphyus**	0	1	2	0	4	7
Pleurobema cordatum	0	6	24	10	24	64
Pleurobema sintoxia	0	4	13	2	7	26
Potamilus alatus	0	9	35	7	15	66
Ptychobranchus fasciolaris	0	1	1	0	0	2
Quadrula quadrula	0	7	21	8	18	54
Theliderma metanevra	0	30	90	29	84	233
	0	**314**	**934**	**242**	**542**	**1692**

[1] * = Federally listed species

[2] ADI = Area of direct impact; DSS = Downstream spot dives; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

Table B4. Site 1 mussel morphometric and occurance data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	1	0-5	No mussels					0		
27 Aug	DSB	1	5-15	*Fusconaia flava*	57.8				1	Live	
27 Aug	DSB	1	5-15	*Ligumia recta*	135.5				1	Live	
27 Aug	DSB	1	5-15	*Potamilus alatus*	111.1				1	Live	
27 Aug	DSB	1	15-25	*Pleurobema cordatum*	67.5				1	Live	
27 Aug	DSB	1	15-25	*Ligumia recta*	154.4			M	1	Live	
27 Aug	DSB	1	15-25	*Ligumia recta*	140.1			F	1	Live	
27 Aug	DSB	1	15-25	*Amblema plicata*	89.3				1	Live	
27 Aug	DSB	1	15-25	*Amblema plicata*	100				1	Live	
27 Aug	DSB	1	15-25	*Amblema plicata*	93.2				1	Live	
27 Aug	DSB	1	15-25	*Obliquaria reflexa*	59.9				1	Live	
27 Aug	DSB	1	15-25	*Obliquaria reflexa*	66.4				1	Live	
27 Aug	DSB	1	15-25	*Obliquaria reflexa*					1	WD	
27 Aug	DSB	1	15-25	*Potamilus alatus*					1	WD	
27 Aug	DSB	1	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	1	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	1	25-35	*Ellipsaria lineolata*	89.2				1	Live	
27 Aug	DSB	1	25-35	*Ellipsaria lineolata*	84				1	Live	
27 Aug	DSB	1	25-35	*Theliderma metanevra*	78.3				1	Live	
27 Aug	DSB	1	25-35	*Theliderma metanevra*					1	WD	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	56.7				1	Live	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	54				1	Live	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	47.2				1	Live	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	65.5				1	Live	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	53				1	Live	
27 Aug	DSB	1	25-35	*Cyclonaias pustulosa*	62.5				1	Live	
27 Aug	DSB	1	25-35	*Ligumia recta*	140			M	1	Live	
27 Aug	DSB	1	25-35	*Ligumia recta*	122.2			F	1	Live	
27 Aug	DSB	1	25-35	*Amblema plicata*	99.9				1	Live	
27 Aug	DSB	1	25-35	*Amblema plicata*	125.5				1	Live	
27 Aug	DSB	1	25-35	*Theliderma metanevra*	74.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	1	25-35	*Theliderma metanevra*	77				1	Live	
27 Aug	DSB	1	25-35	*Theliderma metanevra*	76				1	Live	
27 Aug	DSB	1	25-35	*Quadrula quadrula*	54.5				1	Live	
27 Aug	DSB	1	25-35	*Pleurobema sintoxia*	72.4				1	Live	
27 Aug	DSB	1	25-35	*Obliquaria reflexa*	48.8				1	Live	
27 Aug	DSB	1	25-35	*Obliquaria reflexa*					1	WD	
27 Aug	DSB	1	35-45	*Lampsilis cardium*	88.8				1	Live	
27 Aug	DSB	1	35-45	*Cyclonaias pustulosa*	61.1				1	Live	
27 Aug	DSB	1	35-45	*Cyclonaias pustulosa*	47.7				1	Live	
27 Aug	DSB	1	35-45	*Obliquaria reflexa*	39				1	Live	
27 Aug	DSB	1	35-45	*Obliquaria reflexa*	62.1				1	Live	
27 Aug	DSB	1	35-45	*Obliquaria reflexa*	46.5				1	Live	
27 Aug	DSB	1	35-45	*Ligumia recta*	116.8			F	1	Live	
27 Aug	DSB	1	35-45	*Ligumia recta*	131.5			F	1	Live	
27 Aug	DSB	1	35-45	*Ligumia recta*	139.9			F	1	Live	
27 Aug	DSB	1	35-45	*Ligumia recta*	146.3			F	1	Live	
27 Aug	DSB	1	35-45	*Ligumia recta*					1	WD	
27 Aug	DSB	1	35-45	*Potamilus alatus*	118.6				1	Live	
27 Aug	DSB	1	35-45	*Potamilus alatus*	69.3				1	Live	
27 Aug	DSB	1	35-45	*Potamilus alatus*					1	WD	
27 Aug	DSB	1	35-45	*Potamilus alatus*					1	WD	
27 Aug	DSB	1	45-55	*Lampsilis siliquoidea*	98.2			F	1	Live	
27 Aug	DSB	1	45-55	*Amblema plicata*	101.1				1	Live	
27 Aug	DSB	1	45-55	*Amblema plicata*	118.6				1	Live	
27 Aug	DSB	1	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	1	45-55	*Pleurobema sintoxia*	82.5				1	Live	
27 Aug	DSB	1	45-55	*Pleurobema sintoxia*	74.7				1	Live	
27 Aug	DSB	1	45-55	*Cyclonaias pustulosa*	59.5				1	Live	
27 Aug	DSB	1	45-55	*Ellipsaria lineolata*	52.6				1	Live	
27 Aug	DSB	1	45-55	*Ellipsaria lineolata*	57.9				1	Live	
27 Aug	DSB	1	45-55	*Ellipsaria lineolata*	79.2				1	Live	
27 Aug	DSB	1	45-55	*Ellipsaria lineolata*	70.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	1	45-55	*Cyclonaias pustulosa*	60.2				1	Live	
27 Aug	DSB	1	45-55	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	1	45-55	*Obliquaria reflexa*	48.8				1	Live	
27 Aug	DSB	1	45-55	*Amblema plicata*	66.6				1	Live	
27 Aug	DSB	1	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	1	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	1	55-65	*Amblema plicata*					1	WD	
27 Aug	DSB	1	55-65	*Ligumia recta*	120.5			F	1	Live	
27 Aug	DSB	1	55-65	*Ligumia recta*	127.5			M	1	Live	
27 Aug	DSB	1	55-65	*Ligumia recta*	132.2			M	1	Live	
27 Aug	DSB	1	55-65	*Ligumia recta*					1	WD	
27 Aug	DSB	1	55-65	*Actinonaias ligamentina*					1	WD	
27 Aug	DSB	1	55-65	*Lampsilis siliquoidea*					1	WD	
27 Aug	DSB	1	55-65	*Potamilus alatus*	115.5				1	Live	
27 Aug	DSB	1	55-65	*Potamilus alatus*					1	WD	
27 Aug	DSB	1	55-65	*Potamilus alatus*					1	WD	
27 Aug	DSB	1	55-65	*Obliquaria reflexa*	50.5				1	Live	
27 Aug	DSB	1	55-65	*Obliquaria reflexa*	53.4				1	Live	
27 Aug	DSB	1	55-65	*Obliquaria reflexa*					1	WD	
27 Aug	DSB	1	55-65	*Ligumia recta*	142.5			F	1	Live	
27 Aug	DSB	1	55-65	*Ligumia recta*	132.6			M	1	Live	
27 Aug	DSB	1	55-65	*Ligumia recta*					1	WD	
27 Aug	DSB	1	55-65	*Ellipsaria lineolata*	88.8				1	Live	
27 Aug	DSB	1	55-65	*Ellipsaria lineolata*	49.5				1	Live	
27 Aug	DSB	1	55-65	*Ellipsaria lineolata*					1	WD	
27 Aug	DSB	1	55-65	*Amblema plicata*	120				1	Live	
27 Aug	DSB	1	55-65	*Amblema plicata*					1	WD	
27 Aug	DSB	1	55-65	*Amblema plicata*					1	WD	
27 Aug	DSB	1	55-65	*Cyclonaias pustulosa*	63.7				1	Live	
27 Aug	DSB	1	55-65	*Cyclonaias pustulosa*	55.1				1	Live	
27 Aug	DSB	2	0-5	No mussels					0		
27 Aug	DSB	2	5-15	*Potamilus alatus*	85.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	2	5-15	*Amblema plicata*	95.6				1	Live	
27 Aug	DSB	2	5-15	*Amblema plicata*	93.1				1	Live	
27 Aug	DSB	2	5-15	*Amblema plicata*					1	WD	
27 Aug	DSB	2	5-15	*Amblema plicata*	51.9				1	Live	
27 Aug	DSB	2	15-25	*Amblema plicata*	106.2				1	Live	
27 Aug	DSB	2	15-25	*Amblema plicata*	109.1				1	Live	
27 Aug	DSB	2	15-25	*Amblema plicata*	103.5				1	Live	
27 Aug	DSB	2	15-25	*Amblema plicata*	92.4				1	Live	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	2	15-25	*Ligumia recta*	126.5			F	1	Live	
27 Aug	DSB	2	15-25	*Ligumia recta*	151.1			M	1	Live	
27 Aug	DSB	2	15-25	*Ligumia recta*	135.8			M	1	Live	
27 Aug	DSB	2	15-25	*Ligumia recta*	135.5			F	1	Live	
27 Aug	DSB	2	15-25	*Ligumia recta*	142			F	1	Live	
27 Aug	DSB	2	15-25	*Ligumia recta*					1	WD	
27 Aug	DSB	2	15-25	*Ligumia recta*					1	WD	
27 Aug	DSB	2	15-25	*Ligumia recta*					1	WD	
27 Aug	DSB	2	15-25	*Quadrula quadrula*	62.9				1	Live	
27 Aug	DSB	2	15-25	*Quadrula quadrula*	80.7				1	Live	
27 Aug	DSB	2	15-25	*Quadrula quadrula*	57.3				1	Live	
27 Aug	DSB	2	15-25	*Obliquaria reflexa*	53.1				1	Live	
27 Aug	DSB	2	15-25	*Obliquaria reflexa*	51				1	Live	
27 Aug	DSB	2	15-25	*Obliquaria reflexa*	58.2				1	Live	
27 Aug	DSB	2	15-25	*Obliquaria reflexa*	53.5				1	Live	
27 Aug	DSB	2	15-25	*Actinonaias ligamentina*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	2	25-35	*Lampsilis cardium*	121.1			M	1	Live	
27 Aug	DSB	2	25-35	*Amblema plicata*	111.5				1	Live	
27 Aug	DSB	2	25-35	*Amblema plicata*	103.3				1	Live	
27 Aug	DSB	2	25-35	*Ligumia recta*	142.2			F	1	Live	
27 Aug	DSB	2	25-35	*Ligumia recta*	129.9			F	1	Live	
27 Aug	DSB	2	25-35	*Ligumia recta*					1	WD	
27 Aug	DSB	2	25-35	*Ellipsaria lineolata*	60.8				1	Live	
27 Aug	DSB	2	25-35	*Ellipsaria lineolata*	61.5				1	Live	
27 Aug	DSB	2	25-35	*Actinonaias ligamentina*					1	WD	
27 Aug	DSB	2	35-45	*Ligumia recta*	143.5			F	1	Live	
27 Aug	DSB	2	35-45	*Ligumia recta*	136.5			F	1	Live	
27 Aug	DSB	2	35-45	*Ligumia recta*	145.6			M	1	Live	
27 Aug	DSB	2	35-45	*Cyclonaias pustulosa*	62.3				1	Live	
27 Aug	DSB	2	35-45	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	2	35-45	*Ellipsaria lineolata*	84.5				1	Live	
27 Aug	DSB	2	35-45	*Pleurobema cordatum*	76.5				1	Live	
27 Aug	DSB	2	35-45	*Pleurobema cordatum*					1	WD	
27 Aug	DSB	2	35-45	*Pleurobema cordatum*					1	WD	
27 Aug	DSB	2	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	2	35-45	*Lampsilis siliquoidea*					1	WD	
27 Aug	DSB	2	35-45	*Potamilus alatus*					1	WD	
27 Aug	DSB	2	35-45	*Potamilus alatus*					1	WD	
27 Aug	DSB	2	45-55	*Theliderma metanevra*	76.3				1	Live	
27 Aug	DSB	2	45-55	*Theliderma metanevra*					1	WD	
27 Aug	DSB	2	45-55	*Theliderma metanevra*					1	WD	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	56.6				1	Live	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	60				1	Live	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	47.8				1	Live	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	63.3				1	Live	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	63.4				1	Live	
27 Aug	DSB	2	45-55	*Cyclonaias pustulosa*	69.5				1	Live	
27 Aug	DSB	2	45-55	*Lampsilis cardium*	98				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	2	45-55	*Lampsilis cardium*	120.2				1	Live	
27 Aug	DSB	2	45-55	*Obliquaria reflexa*	52.2				1	Live	
27 Aug	DSB	2	45-55	*Ligumia recta*	111.1			F	1	Live	
27 Aug	DSB	2	45-55	*Ligumia recta*	134.2			F	1	Live	
27 Aug	DSB	2	45-55	*Ligumia recta*	150+			M	1	Live	
27 Aug	DSB	2	45-55	*Ligumia recta*	129.1			F	1	Live	
27 Aug	DSB	2	45-55	*Ligumia recta*	143.5			F	1	Live	
27 Aug	DSB	2	45-55	*Potamilus alatus*	75.2				1	Live	
27 Aug	DSB	2	45-55	*Ellipsaria lineolata*	45.5				1	Live	
27 Aug	DSB	2	45-55	*Ellipsaria lineolata*	73.1				1	Live	
27 Aug	DSB	2	45-55	*Ellipsaria lineolata*					1	WD	
27 Aug	DSB	2	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	2	55-65	*Theliderma metanevra*	82.2				1	Live	
27 Aug	DSB	2	55-65	*Theliderma metanevra*	73.4				1	Live	
27 Aug	DSB	2	55-65	*Theliderma metanevra*					1	WD	
27 Aug	DSB	2	55-65	*Cyclonaias pustulosa*	63				1	Live	
27 Aug	DSB	2	55-65	*Cyclonaias pustulosa*	64.4				1	Live	
27 Aug	DSB	2	55-65	*Cyclonaias pustulosa*	64				1	Live	
27 Aug	DSB	2	55-65	*Lampsilis cardium*	110.5				1	Live	
27 Aug	DSB	2	55-65	*Lampsilis cardium*	136.2				1	Live	
27 Aug	DSB	2	55-65	*Obliquaria reflexa*	62.2				1	Live	
27 Aug	DSB	2	55-65	*Obliquaria reflexa*	55.5				1	Live	
27 Aug	DSB	2	55-65	*Amblema plicata*	77.1				1	Live	
27 Aug	DSB	2	55-65	*Amblema plicata*					1	WD	
27 Aug	DSB	2	55-65	*Ellipsaria lineolata*	45.5				1	Live	
27 Aug	DSB	2	55-65	*Ellipsaria lineolata*					1	WD	
27 Aug	DSB	3	0-5	No mussels					0		
27 Aug	DSB	3	5-15	*Lampsilis siliquoidea*	110			M	1	Live	
27 Aug	DSB	3	15-25	*Quadrula quadrula*	63.1				1	Live	
27 Aug	DSB	3	15-25	*Amblema plicata*	92.2				1	Live	
27 Aug	DSB	3	15-25	*Amblema plicata*	100				1	Live	
27 Aug	DSB	3	15-25	*Amblema plicata*	118.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	3	15-25	*Amblema plicata*	102.2				1	Live	
27 Aug	DSB	3	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	3	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	3	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	3	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	3	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	3	15-25	*Lampsilis cardium*	103.8			F	1	Live	
27 Aug	DSB	3	15-25	*Ligumia recta*	128.4			F	1	Live	
27 Aug	DSB	3	15-25	*Ligumia recta*					1	WD	
27 Aug	DSB	3	25-35	*Obliquaria reflexa*	58.8				1	Live	
27 Aug	DSB	3	25-35	*Amblema plicata*	129.9				1	Live	
27 Aug	DSB	3	25-35	*Amblema plicata*	103.6				1	Live	
27 Aug	DSB	3	25-35	*Amblema plicata*	82.2				1	Live	
27 Aug	DSB	3	25-35	*Ellipsaria lineolata*	67.6				1	Live	
27 Aug	DSB	3	25-35	*Ellipsaria lineolata*	61.5				1	Live	
27 Aug	DSB	3	25-35	*Ligumia recta*	138.9			F	1	Live	
27 Aug	DSB	3	25-35	*Ligumia recta*	128.7			F	1	Live	
27 Aug	DSB	3	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	3	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	3	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	3	25-35	*Potamilus alatus*					1	WD	
27 Aug	DSB	3	35-45	*Amblema plicata*	81.5				1	Live	
27 Aug	DSB	3	35-45	*Amblema plicata*	65.6				1	Live	
27 Aug	DSB	3	35-45	*Amblema plicata*	50.5				1	Live	
27 Aug	DSB	3	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	3	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	3	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	3	35-45	*Quadrula quadrula*	66.3				1	Live	
27 Aug	DSB	3	35-45	*Cyclonaias pustulosa*	67.2				1	Live	
27 Aug	DSB	3	35-45	*Obliquaria reflexa*	52.1				1	Live	
27 Aug	DSB	3	35-45	*Obliquaria reflexa*	55.1				1	Live	
27 Aug	DSB	3	35-45	*Ellipsaria lineolata*	73.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	3	35-45	*Ellipsaria lineolata*	75.2				1	Live	
27 Aug	DSB	3	35-45	*Ellipsaria lineolata*	72.1				1	Live	
27 Aug	DSB	3	35-45	*Pleurobema sintoxia*	76.4				1	Live	
27 Aug	DSB	3	35-45	*Ligumia recta*	151.1			M	1	Live	
27 Aug	DSB	3	45-55	*Amblema plicata*	72.5				1	Live	
27 Aug	DSB	3	45-55	*Ellipsaria lineolata*	64.7				1	Live	
27 Aug	DSB	3	45-55	*Obliquaria reflexa*	45.1				1	Live	
27 Aug	DSB	3	45-55	*Obliquaria reflexa*	44				1	Live	
27 Aug	DSB	3	45-55	*Obliquaria reflexa*	35.5				1	Live	
27 Aug	DSB	3	45-55	*Obliquaria reflexa*	52.2				1	Live	
27 Aug	DSB	3	45-55	*Potamilus alatus*	64.8				1	Live	
27 Aug	DSB	3	45-55	*Cyclonaias pustulosa*	52.9				1	Live	
27 Aug	DSB	3	45-55	*Theliderma metanevra*	72.1				1	Live	
27 Aug	DSB	3	45-55	*Theliderma metanevra*	67.7				1	Live	
27 Aug	DSB	3	45-55	*Theliderma metanevra*	66.3				1	Live	
27 Aug	DSB	3	45-55	*Ligumia recta*	138.8			M	1	Live	
27 Aug	DSB	3	45-55	*Pleurobema cordatum*	90				1	Live	
27 Aug	DSB	3	45-55	*Pleurobema sintoxia*					1	WD	
27 Aug	DSB	3	45-55	*Lampsilis cardium*				F	1	WD	
27 Aug	DSB	3	45-55	*Quadrula quadrula*					1	WD	
27 Aug	DSB	3	55-65	*Ellipsaria lineolata*	55.5				1	Live	
27 Aug	DSB	3	55-65	*Cyclonaias pustulosa*	56.6				1	Live	
27 Aug	DSB	3	55-65	*Cyclonaias pustulosa*	57.2				1	Live	
27 Aug	DSB	3	55-65	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	3	55-65	*Potamilus alatus*	95.5				1	Live	
27 Aug	DSB	3	55-65	*Potamilus alatus*	112.1				1	Live	
27 Aug	DSB	3	55-65	*Theliderma metanevra*	78.7				1	Live	
27 Aug	DSB	3	55-65	*Theliderma metanevra*					1	WD	
27 Aug	DSB	3	55-65	*Fusconaia flava*	67.9				1	Live	
27 Aug	DSB	3	55-65	*Plethobasus cyphyus**					1	WD	
27 Aug	DSB	4	0-5	No mussels					0		
27 Aug	DSB	4	5-15	*Ligumia recta*	144.6			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	4	15-25	*Amblema plicata*	80.5				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	108.9				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	84.8				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	110.3				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	103				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	101.9				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	95.5				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	77.8				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*	109.4				1	Live	
27 Aug	DSB	4	15-25	*Potamilus alatus*	91				1	Live	
27 Aug	DSB	4	15-25	*Potamilus alatus*	118.4				1	Live	
27 Aug	DSB	4	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	4	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	4	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	4	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	4	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	4	25-35	*Ellipsaria lineolata*	86.3				1	Live	
27 Aug	DSB	4	25-35	*Ellipsaria lineolata*	71				1	Live	
27 Aug	DSB	4	25-35	*Ellipsaria lineolata*	79.7				1	Live	
27 Aug	DSB	4	25-35	*Ellipsaria lineolata*	68.2				1	Live	
27 Aug	DSB	4	25-35	*Ligumia recta*	129.9			M	1	Live	
27 Aug	DSB	4	25-35	*Ligumia recta*	189.2			F	1	Live	
27 Aug	DSB	4	25-35	*Lampsilis siliquoidea*	111.4			M	1	Live	
27 Aug	DSB	4	25-35	*Megalonaias nervosa*	128.2				1	Live	
27 Aug	DSB	4	25-35	*Amblema plicata*	110.7				1	Live	
27 Aug	DSB	4	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	4	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	4	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	4	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	4	35-45	*Obliquaria reflexa*	46.1				1	Live	
27 Aug	DSB	4	35-45	*Obliquaria reflexa*	46.2				1	Live	
27 Aug	DSB	4	35-45	*Obliquaria reflexa*	32.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	4	35-45	*Ligumia recta*	152.1				1	Live	
27 Aug	DSB	4	35-45	*Amblema plicata*	92.3				1	Live	
27 Aug	DSB	4	35-45	*Amblema plicata*	96.2				1	Live	
27 Aug	DSB	4	35-45	*Amblema plicata*	71.4				1	Live	
27 Aug	DSB	4	35-45	*Theliderma metanevra*	85.4				1	Live	
27 Aug	DSB	4	35-45	*Ellipsaria lineolata*	83.3				1	Live	
27 Aug	DSB	4	35-45	*Ellipsaria lineolata*	56.1				1	Live	
27 Aug	DSB	4	35-45	*Cyclonaias pustulosa*	56				1	Live	
27 Aug	DSB	4	35-45	*Cyclonaias pustulosa*	66.9				1	Live	
27 Aug	DSB	4	35-45	*Quadrula quadrula*	62.7				1	Live	
27 Aug	DSB	4	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	4	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	4	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	4	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	4	45-55	*Cyclonaias pustulosa*	62.5				1	Live	
27 Aug	DSB	4	45-55	*Cyclonaias pustulosa*	64.4				1	Live	
27 Aug	DSB	4	45-55	*Obliquaria reflexa*	42.9				1	Live	
27 Aug	DSB	4	45-55	*Ellipsaria lineolata*	74.4				1	Live	
27 Aug	DSB	4	45-55	*Ligumia recta*	144.3			M	1	Live	
27 Aug	DSB	4	45-55	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	4	45-55	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	4	45-55	*Theliderma metanevra*					1	WD	
27 Aug	DSB	4	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	4	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	4	45-55	*Obliquaria reflexa*					1	WD	
27 Aug	DSB	4	45-55	*Ligumia recta*					1	WD	
27 Aug	DSB	4	45-55	*Quadrula quadrula*	75.7				1	Live	
27 Aug	DSB	4	45-55	*Quadrula quadrula*	57.3				1	Live	
27 Aug	DSB	4	45-55	*Quadrula quadrula*	58.9				1	Live	
27 Aug	DSB	4	45-55	*Amblema plicata*	115.2				1	Live	
27 Aug	DSB	4	45-55	*Amblema plicata*	54.2				1	Live	
27 Aug	DSB	4	55-65	*Theliderma metanevra*	75.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	4	55-65	*Theliderma metanevra*	73.8				1	Live	
27 Aug	DSB	4	55-65	*Theliderma metanevra*	78.9				1	Live	
27 Aug	DSB	4	55-65	*Amblema plicata*	102.7				1	Live	
27 Aug	DSB	4	55-65	*Amblema plicata*	84.3				1	Live	
27 Aug	DSB	4	55-65	*Cyclonaias pustulosa*	46.2				1	Live	
27 Aug	DSB	4	55-65	*Cyclonaias pustulosa*	70.6				1	Live	
27 Aug	DSB	4	55-65	*Obliquaria reflexa*	42.8				1	Live	
27 Aug	DSB	4	55-65	*Obliquaria reflexa*	48.7				1	Live	
27 Aug	DSB	4	55-65	*Amblema plicata*	63.2				1	Live	
27 Aug	DSB	4	55-65	*Ellipsaria lineolata*	62.8				1	Live	
27 Aug	DSB	4	55-65	*Quadrula quadrula*	72.4				1	Live	
27 Aug	DSB	4	55-65	*Quadrula quadrula*	57.3				1	Live	
27 Aug	DSB	4	55-65	*Cyclonaias pustulosa*					1	WD	
27 Aug	DSB	4	55-65	*Theliderma metanevra*					1	WD	
27 Aug	DSB	4	55-65	*Potamilus fragilis*					1	WD	
27 Aug	DSB	4	55-65	*Potamilus fragilis*					1	WD	
27 Aug	DSB	5	0-5	No mussels					0		
27 Aug	DSB	5	5-15	*Ligumia recta*	128.8			F	1	Live	
27 Aug	DSB	5	5-15	*Potamilus alatus*	69				1	Live	
27 Aug	DSB	5	15-25	*Megalonaias nervosa*	150+				1	Live	
27 Aug	DSB	5	15-25	*Megalonaias nervosa*	150+				1	Live	
27 Aug	DSB	5	15-25	*Megalonaias nervosa*	150+				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*	98.4				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*	96				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*	107.5				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*	108.8				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*	84.5				1	Live	
27 Aug	DSB	5	15-25	*Ligumia recta*	144.6			M	1	Live	
27 Aug	DSB	5	15-25	*Ligumia recta*	137			M	1	Live	
27 Aug	DSB	5	15-25	*Ellipsaria lineolata*	90.8				1	Live	
27 Aug	DSB	5	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	5	15-25	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	5	15-25	*Amblema plicata*					1	WD	
27 Aug	DSB	5	25-35	*Ellipsaria lineolata*	81.2				1	Live	
27 Aug	DSB	5	25-35	*Ellipsaria lineolata*	79.3				1	Live	
27 Aug	DSB	5	25-35	*Obliquaria reflexa*	42				1	Live	
27 Aug	DSB	5	25-35	*Amblema plicata*	84.4				1	Live	
27 Aug	DSB	5	25-35	*Amblema plicata*	103.3				1	Live	
27 Aug	DSB	5	25-35	*Amblema plicata*	93.7				1	Live	
27 Aug	DSB	5	25-35	*Lampsilis cardium*	114.4			F	1	Live	
27 Aug	DSB	5	25-35	*Megalonaias nervosa*	150+				1	Live	
27 Aug	DSB	5	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	5	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	5	25-35	*Amblema plicata*					1	WD	
27 Aug	DSB	5	25-35	*Actinonaias ligamentina*					1	WD	
27 Aug	DSB	5	35-45	*Potamilus alatus*	103.2				1	Live	
27 Aug	DSB	5	35-45	*Ellipsaria lineolata*	72.2				1	Live	
27 Aug	DSB	5	35-45	*Ellipsaria lineolata*	86.3				1	Live	
27 Aug	DSB	5	35-45	*Cyclonaias pustulosa*	45.1				1	Live	
27 Aug	DSB	5	35-45	*Cyclonaias pustulosa*	62.5				1	Live	
27 Aug	DSB	5	35-45	*Ligumia recta*	121.7			M	1	Live	
27 Aug	DSB	5	35-45	*Obliquaria reflexa*	47				1	Live	
27 Aug	DSB	5	35-45	*Obliquaria reflexa*	58.9				1	Live	
27 Aug	DSB	5	35-45	*Obliquaria reflexa*	53				1	Live	
27 Aug	DSB	5	35-45	*Potamilus alatus*	71.2				1	Live	
27 Aug	DSB	5	35-45	*Amblema plicata*	67.1				1	Live	
27 Aug	DSB	5	35-45	*Amblema plicata*	62.3				1	Live	
27 Aug	DSB	5	35-45	*Amblema plicata*	92.4				1	Live	
27 Aug	DSB	5	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	5	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	5	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	5	35-45	*Amblema plicata*					1	WD	
27 Aug	DSB	5	35-45	*Ligumia recta*					1	WD	
27 Aug	DSB	5	45-55	*Cyclonaias pustulosa*	49.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
27 Aug	DSB	5	45-55	*Cyclonaias pustulosa*	51.6				1	Live	
27 Aug	DSB	5	45-55	*Cyclonaias pustulosa*	49.7				1	Live	
27 Aug	DSB	5	45-55	*Cyclonaias pustulosa*	66				1	Live	
27 Aug	DSB	5	45-55	*Cyclonaias pustulosa*	51.3				1	Live	
27 Aug	DSB	5	45-55	*Obliquaria reflexa*	55.9				1	Live	
27 Aug	DSB	5	45-55	*Obliquaria reflexa*	50.6				1	Live	
27 Aug	DSB	5	45-55	*Obliquaria reflexa*	40.8				1	Live	
27 Aug	DSB	5	45-55	*Obliquaria reflexa*	56.5				1	Live	
27 Aug	DSB	5	45-55	*Obliquaria reflexa*	55.5				1	Live	
27 Aug	DSB	5	45-55	*Quadrula quadrula*	54.3				1	Live	
27 Aug	DSB	5	45-55	*Ellipsaria lineolata*	76				1	Live	
27 Aug	DSB	5	45-55	*Ellipsaria lineolata*	80				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	78.2				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	62.1				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	77.9				1	Live	
27 Aug	DSB	5	45-55	*Amblema plicata*					1	WD	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	79.5				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	79.6				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	75.1				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	74				1	Live	
27 Aug	DSB	5	45-55	*Theliderma metanevra*	78.7				1	Live	
27 Aug	DSB	5	55-65	*Theliderma metanevra*	79				1	Live	
27 Aug	DSB	5	55-65	*Theliderma metanevra*	72.2				1	Live	
27 Aug	DSB	5	55-65	*Theliderma metanevra*	79.1				1	Live	
27 Aug	DSB	5	55-65	*Theliderma metanevra*	72.2				1	Live	
27 Aug	DSB	5	55-65	*Lampsilis cardium*	111.1			M	1	Live	
27 Aug	DSB	5	55-65	*Amblema plicata*	81.1				1	Live	
27 Aug	DSB	5	55-65	*Ellipsaria lineolata*	76.3				1	Live	
27 Aug	DSB	5	55-65	*Pleurobema sintoxia*	88.8				1	Live	
27 Aug	DSB	5	55-65	*Pleurobema cordatum*	89.2				1	Live	
27 Aug	DSB	5	55-65	*Ligumia recta*	150.1			M	1	Live	
28 Aug	DSB	6	0-5	No mussels					0		

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	6	5-15	No mussels					0		
28 Aug	DSB	6	15-25	*Obliquaria reflexa*	40.2				1	Live	
28 Aug	DSB	6	15-25	*Obliquaria reflexa*	48.5				1	Live	
28 Aug	DSB	6	15-25	*Obliquaria reflexa*	53.8				1	Live	
28 Aug	DSB	6	15-25	*Amblema plicata*	103.5				1	Live	
28 Aug	DSB	6	15-25	*Megalonaias nervosa*	150+				1	Live	
28 Aug	DSB	6	15-25	*Potamilus alatus*	120				1	Live	
28 Aug	DSB	6	15-25	*Potamilus alatus*	108.6				1	Live	
28 Aug	DSB	6	15-25	*Potamilus alatus*	107.9				1	Live	
28 Aug	DSB	6	15-25	*Ligumia recta*				F	1	WD	
28 Aug	DSB	6	15-25	*Amblema plicata*					1	WD	
28 Aug	DSB	6	15-25	*Amblema plicata*					1	WD	
28 Aug	DSB	6	15-25	*Potamilus alatus*					1	WD	
28 Aug	DSB	6	15-25	*Ellipsaria lineolata*					1	WD	
28 Aug	DSB	6	25-35	*Lampsilis siliquoidea*	72			F	1	Live	
28 Aug	DSB	6	25-35	*Amblema plicata*	105				1	Live	
28 Aug	DSB	6	25-35	*Amblema plicata*	107.2				1	Live	
28 Aug	DSB	6	25-35	*Obliquaria reflexa*	47.8				1	Live	
28 Aug	DSB	6	25-35	*Ligumia recta*	150+			M	1	Live	
28 Aug	DSB	6	25-35	*Ligumia recta*	147.3			M	1	Live	
28 Aug	DSB	6	25-35	*Ellipsaria lineolata*	85.3				1	Live	
28 Aug	DSB	6	25-35	*Potamilus alatus*	113.4				1	Live	
28 Aug	DSB	6	25-35	*Megalonaias nervosa*	150+				1	Live	
28 Aug	DSB	6	25-35	*Megalonaias nervosa*	150+				1	Live	
28 Aug	DSB	6	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	6	25-35	*Lampsilis siliquoidea*					1	WD	
28 Aug	DSB	6	35-45	*Cyclonaias pustulosa*	60				1	Live	
28 Aug	DSB	6	35-45	*Cyclonaias pustulosa*	58.3				1	Live	
28 Aug	DSB	6	35-45	*Ligumia recta*	150.2			M	1	Live	
28 Aug	DSB	6	35-45	*Ligumia recta*	129.3			F	1	Live	
28 Aug	DSB	6	35-45	*Ligumia recta*	119.6			M	1	Live	
28 Aug	DSB	6	35-45	*Amblema plicata*	71.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	6	35-45	*Amblema plicata*	87.3				1	Live	
28 Aug	DSB	6	35-45	*Amblema plicata*	100				1	Live	
28 Aug	DSB	6	35-45	*Amblema plicata*	105				1	Live	
28 Aug	DSB	6	35-45	*Quadrula quadrula*	60.5				1	Live	
28 Aug	DSB	6	35-45	*Ellipsaria lineolata*	69.3				1	Live	
28 Aug	DSB	6	35-45	*Obliquaria reflexa*	55.2				1	Live	
28 Aug	DSB	6	35-45	*Fusconaia flava*	60				1	Live	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	88.4				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	80.1				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	84.6				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	59.9				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	90.6				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	58.3				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	74.2				1	Live	
28 Aug	DSB	6	45-55	*Ellipsaria lineolata*	77.9				1	Live	
28 Aug	DSB	6	45-55	*Ligumia recta*	135			M	1	Live	
28 Aug	DSB	6	45-55	*Ligumia recta*	152.6			M	1	Live	
28 Aug	DSB	6	45-55	*Ligumia recta*	147.6			M	1	Live	
28 Aug	DSB	6	45-55	*Cyclonaias pustulosa*	63.3				1	Live	
28 Aug	DSB	6	45-55	*Cyclonaias pustulosa*	65.4				1	Live	
28 Aug	DSB	6	45-55	*Amblema plicata*	104.6				1	Live	
28 Aug	DSB	6	45-55	*Amblema plicata*	92.5				1	Live	
28 Aug	DSB	6	45-55	*Obliquaria reflexa*	56.7				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	75				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	75.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	6	45-55	*Theliderma metanevra*	68.3				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	74.2				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	73.3				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	82.7				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	79.4				1	Live	
28 Aug	DSB	6	45-55	*Theliderma metanevra*	83.1				1	Live	
28 Aug	DSB	6	45-55	*Pleurobema cordatum*	83.5				1	Live	
28 Aug	DSB	6	45-55	*Pleurobema cordatum*	71.6				1	Live	
28 Aug	DSB	6	45-55	*Pleurobema cordatum*	65.5				1	Live	
28 Aug	DSB	6	45-55	*Actinonaias ligamentina*	103.7				1	Live	
28 Aug	DSB	6	45-55	*Elliptio crassidens*	114				1	Live	
28 Aug	DSB	6	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	6	45-55	*Obliquaria reflexa*					1	WD	
28 Aug	DSB	6	55-65	*Cyclonaias pustulosa*	58.3				1	Live	
28 Aug	DSB	6	55-65	*Quadrula quadrula*	61.9				1	Live	
28 Aug	DSB	6	55-65	*Quadrula quadrula*	62.3				1	Live	
28 Aug	DSB	6	55-65	*Amblema plicata*	89.3				1	Live	
28 Aug	DSB	6	55-65	*Amblema plicata*	118.2				1	Live	
28 Aug	DSB	6	55-65	*Obliquaria reflexa*	28				1	Live	
28 Aug	DSB	6	55-65	*Theliderma metanevra*	82.6				1	Live	
28 Aug	DSB	6	55-65	*Theliderma metanevra*	74.6				1	Live	
28 Aug	DSB	6	55-65	*Theliderma metanevra*	73.4				1	Live	
28 Aug	DSB	6	55-65	*Ellipsaria lineolata*	59.5				1	Live	
28 Aug	DSB	6	55-65	*Ligumia recta*	123.5			F	1	Live	
28 Aug	DSB	6	55-65	*Theliderma metanevra*					1	WD	
28 Aug	DSB	7	0-5	No mussels					0		
28 Aug	DSB	7	5-15	*Amblema plicata*					1	WD	
28 Aug	DSB	7	5-15	*Lampsilis siliquoidea*	99.3			F	1	Live	
28 Aug	DSB	7	15-25	*Potamilus alatus*	92.3				1	Live	
28 Aug	DSB	7	15-25	*Amblema plicata*	101.7				1	Live	
28 Aug	DSB	7	15-25	*Amblema plicata*	88.6				1	Live	
28 Aug	DSB	7	15-25	*Ligumia recta*	128.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	7	15-25	*Ellipsaria lineolata*	77.5				1	Live	
28 Aug	DSB	7	15-25	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*	95.3				1	Live	
28 Aug	DSB	7	25-35	*Amblema plicata*	82.5				1	Live	
28 Aug	DSB	7	25-35	*Amblema plicata*	99.6				1	Live	
28 Aug	DSB	7	25-35	*Ligumia recta*	121.5			M	1	Live	
28 Aug	DSB	7	25-35	*Ligumia recta*	144.6			F	1	Live	
28 Aug	DSB	7	25-35	*Ligumia recta*	95.4			F	1	Live	
28 Aug	DSB	7	25-35	*Ellipsaria lineolata*	58.4				1	Live	
28 Aug	DSB	7	25-35	*Megalonaias nervosa*	147.8				1	Live	
28 Aug	DSB	7	25-35	*Cyclonaias pustulosa*	46.7				1	Live	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	7	25-35	*Ellipsaria lineolata*					1	WD	
28 Aug	DSB	7	25-35	*Potamilus alatus*					1	WD	
28 Aug	DSB	7	25-35	*Pleurobema cordatum*	94.3				1	Live	
28 Aug	DSB	7	35-45	*Lampsilis cardium*	121			M	1	Live	
28 Aug	DSB	7	35-45	*Lampsilis cardium*	130.1			M	1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*	94.2				1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*	106.6				1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*	89.4				1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*	82.2				1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*	57.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	7	35-45	*Ligumia recta*	139			M	1	Live	
28 Aug	DSB	7	35-45	*Ligumia recta*	140			M	1	Live	
28 Aug	DSB	7	35-45	*Obliquaria reflexa*	59.6				1	Live	
28 Aug	DSB	7	35-45	*Ellipsaria lineolata*	73.5				1	Live	
28 Aug	DSB	7	35-45	*Ellipsaria lineolata*	82.3				1	Live	
28 Aug	DSB	7	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	7	35-45	*Lampsilis cardium*					1	WD	
28 Aug	DSB	7	35-45	*Lampsilis cardium*					1	WD	
28 Aug	DSB	7	45-55	*Theliderma metanevra*	65.3				1	Live	
28 Aug	DSB	7	45-55	*Theliderma metanevra*	78.5				1	Live	
28 Aug	DSB	7	45-55	*Theliderma metanevra*	69				1	Live	
28 Aug	DSB	7	45-55	*Theliderma metanevra*	68.1				1	Live	
28 Aug	DSB	7	45-55	*Amblema plicata*	98				1	Live	
28 Aug	DSB	7	45-55	*Amblema plicata*	97.2				1	Live	
28 Aug	DSB	7	45-55	*Amblema plicata*	99.9				1	Live	
28 Aug	DSB	7	45-55	*Amblema plicata*	87.8				1	Live	
28 Aug	DSB	7	45-55	*Pleurobema sintoxia*	95.6				1	Live	
28 Aug	DSB	7	45-55	*Pleurobema sintoxia*	73				1	Live	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*	85.5				1	Live	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*	67.4				1	Live	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*	73.7				1	Live	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*	52.8				1	Live	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*	69.5				1	Live	
28 Aug	DSB	7	45-55	*Obliquaria reflexa*	59.8				1	Live	
28 Aug	DSB	7	45-55	*Pleurobema cordatum*	80				1	Live	
28 Aug	DSB	7	45-55	*Megalonaias nervosa*	148.5				1	Live	
28 Aug	DSB	7	45-55	*Cyclonaias pustulosa*	59.8				1	Live	
28 Aug	DSB	7	45-55	*Cyclonaias pustulosa*	68.3				1	Live	
28 Aug	DSB	7	45-55	*Cyclonaias pustulosa*	58.9				1	Live	
28 Aug	DSB	7	45-55	*Cyclonaias pustulosa*	53.7				1	Live	
28 Aug	DSB	7	45-55	*Quadrula quadrula*	60				1	Live	
28 Aug	DSB	7	45-55	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	7	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	7	45-55	*Ellipsaria lineolata*					1	WD	
28 Aug	DSB	7	45-55	*Theliderma metanevra*					1	WD	
28 Aug	DSB	7	55-65	*Pleurobema cordatum*	82.1				1	Live	
28 Aug	DSB	7	55-65	*Pleurobema cordatum*	83.8				1	Live	
28 Aug	DSB	7	55-65	*Pleurobema cordatum*	79.2				1	Live	
28 Aug	DSB	7	55-65	*Quadrula quadrula*	58.4				1	Live	
28 Aug	DSB	7	55-65	*Amblema plicata*	100.9				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*					1	WD	
28 Aug	DSB	7	55-65	*Amblema plicata*					1	WD	
28 Aug	DSB	7	55-65	*Ligumia recta*					1	WD	
28 Aug	DSB	7	55-65	*Obliquaria reflexa*	50.9				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	48.6				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	59.9				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	62.2				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	61.2				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	68.9				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	58.4				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	63.7				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	48.3				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	63				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	53.5				1	Live	
28 Aug	DSB	7	55-65	*Cyclonaias pustulosa*	64.8				1	Live	
28 Aug	DSB	7	55-65	*Ellipsaria lineolata*	83.5				1	Live	
28 Aug	DSB	7	55-65	*Ellipsaria lineolata*	83.1				1	Live	
28 Aug	DSB	7	55-65	*Pleurobema sintoxia*	85.6				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	79.7				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	70.2				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	86.4				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	76.4				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	75.6				1	Live	
28 Aug	DSB	7	55-65	*Theliderma metanevra*	79				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	8	0-5	No mussels					0		
28 Aug	DSB	8	5-15	*Lampsilis siliquoidea*	87.3				1	Live	
28 Aug	DSB	8	15-25	*Ligumia recta*	124.2			M	1	Live	
28 Aug	DSB	8	15-25	*Ligumia recta*	130			F	1	Live	
28 Aug	DSB	8	15-25	*Ligumia recta*	154			M	1	Live	
28 Aug	DSB	8	15-25	*Amblema plicata*	81.5				1	Live	
28 Aug	DSB	8	15-25	*Amblema plicata*	106.6				1	Live	
28 Aug	DSB	8	15-25	*Amblema plicata*	103.3				1	Live	
28 Aug	DSB	8	15-25	*Amblema plicata*					1	WD	
28 Aug	DSB	8	15-25	*Obliquaria reflexa*	56.7				1	Live	
28 Aug	DSB	8	15-25	*Megalonaias nervosa*	150+				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*	101.4				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*	95.4				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*	110.1				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*	108.4				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*	101.7				1	Live	
28 Aug	DSB	8	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	8	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	8	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	8	25-35	*Ellipsaria lineolata*	97.2				1	Live	
28 Aug	DSB	8	25-35	*Ellipsaria lineolata*					1	WD	
28 Aug	DSB	8	25-35	*Ligumia recta*	130			F	1	Live	
28 Aug	DSB	8	25-35	*Actinonaias ligamentina*					1	WD	
28 Aug	DSB	8	35-45	*Amblema plicata*	97.4				1	Live	
28 Aug	DSB	8	35-45	*Amblema plicata*	116.1				1	Live	
28 Aug	DSB	8	35-45	*Amblema plicata*	120				1	Live	
28 Aug	DSB	8	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	8	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	8	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	8	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	8	45-55	*Ligumia recta*	147.6			M	1	Live	
28 Aug	DSB	8	45-55	*Cyclonaias pustulosa*	56.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	8	45-55	*Cyclonaias pustulosa*	51.2				1	Live	
28 Aug	DSB	8	45-55	*Cyclonaias pustulosa*	64.8				1	Live	
28 Aug	DSB	8	45-55	*Cyclonaias pustulosa*	58.5				1	Live	
28 Aug	DSB	8	45-55	*Theliderma metanevra*	68.4				1	Live	
28 Aug	DSB	8	45-55	*Theliderma metanevra*	87.3				1	Live	
28 Aug	DSB	8	45-55	*Theliderma metanevra*					1	WD	
28 Aug	DSB	8	45-55	*Theliderma metanevra*					1	WD	
28 Aug	DSB	8	45-55	*Obliquaria reflexa*	49.5				1	Live	
28 Aug	DSB	8	45-55	*Obliquaria reflexa*	57.7				1	Live	
28 Aug	DSB	8	45-55	*Pleurobema cordatum*	54				1	Live	
28 Aug	DSB	8	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	8	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	8	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	8	55-65	*Theliderma metanevra*	69.2				1	Live	
28 Aug	DSB	8	55-65	*Theliderma metanevra*	82.6				1	Live	
28 Aug	DSB	8	55-65	*Quadrula quadrula*	64				1	Live	
28 Aug	DSB	8	55-65	*Amblema plicata*	81.8				1	Live	
28 Aug	DSB	8	55-65	*Ligumia recta*	137.7			F	1	Live	
28 Aug	DSB	8	55-65	*Ligumia recta*	150+			M	1	Live	
28 Aug	DSB	8	55-65	*Ligumia recta*	150+			M	1	Live	
28 Aug	DSB	8	55-65	*Ligumia recta*	141.4			F	1	Live	
28 Aug	DSB	8	55-65	*Cyclonaias pustulosa*	67.7				1	Live	
28 Aug	DSB	8	55-65	*Actinonaias ligamentina*	105.6				1	Live	
28 Aug	DSB	8	55-65	*Potamilus alatus*	102				1	Live	
28 Aug	DSB	8	55-65	*Pleurobema sintoxia*	92.8				1	Live	
28 Aug	DSB	8	55-65	*Pleurobema cordatum*	65				1	Live	
28 Aug	DSB	8	55-65	*Lampsilis cardium*	62.2				1	Live	
28 Aug	DSB	9	0-5	No mussels					0		
28 Aug	DSB	9	5-15	No mussels					0		
28 Aug	DSB	9	15-25	*Potamilus alatus*	96.2				1	Live	
28 Aug	DSB	9	15-25	*Ligumia recta*	111.1			M	1	Live	
28 Aug	DSB	9	15-25	*Ligumia recta*	128.6			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	9	25-35	*Obliquaria reflexa*	48.2				1	Live	
28 Aug	DSB	9	25-35	*Amblema plicata*	103.8				1	Live	
28 Aug	DSB	9	25-35	*Amblema plicata*	106.2				1	Live	
28 Aug	DSB	9	25-35	*Amblema plicata*	68				1	Live	
28 Aug	DSB	9	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	9	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	9	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	9	25-35	*Ellipsaria lineolata*	67.7				1	Live	
28 Aug	DSB	9	25-35	*Pleurobema cordatum*	64.5				1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	138.8			M	1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	136.6			M	1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	133.2			F	1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	150+			F	1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	149.7			M	1	Live	
28 Aug	DSB	9	25-35	*Ligumia recta*	138			M	1	Live	
28 Aug	DSB	9	25-35	*Potamilus alatus*					1	WD	
28 Aug	DSB	9	35-45	*Theliderma metanevra*	75.4				1	Live	
28 Aug	DSB	9	35-45	*Theliderma metanevra*	85				1	Live	
28 Aug	DSB	9	35-45	*Ligumia recta*	123.5				1	Live	
28 Aug	DSB	9	35-45	*Obliquaria reflexa*	63.4				1	Live	
28 Aug	DSB	9	35-45	*Cyclonaias pustulosa*	61.1				1	Live	
28 Aug	DSB	9	35-45	*Amblema plicata*	113.2				1	Live	
28 Aug	DSB	9	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	9	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	9	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	9	35-45	*Potamilus alatus*					1	WD	
28 Aug	DSB	9	45-55	*Amblema plicata*	65.4				1	Live	
28 Aug	DSB	9	45-55	*Amblema plicata*	91.1				1	Live	
28 Aug	DSB	9	45-55	*Amblema plicata*	95				1	Live	
28 Aug	DSB	9	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	9	45-55	*Cyclonaias pustulosa*	65.8				1	Live	
28 Aug	DSB	9	45-55	*Cyclonaias pustulosa*	65.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	9	45-55	*Cyclonaias pustulosa*	59.3				1	Live	
28 Aug	DSB	9	45-55	*Cyclonaias pustulosa*	58.4				1	Live	
28 Aug	DSB	9	45-55	*Obliquaria reflexa*	57.3				1	Live	
28 Aug	DSB	9	45-55	*Obliquaria reflexa*	53.2				1	Live	
28 Aug	DSB	9	45-55	*Obliquaria reflexa*	48.8				1	Live	
28 Aug	DSB	9	45-55	*Obliquaria reflexa*	62.7				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	73				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	68.8				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	76.6				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	77.7				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	82.2				1	Live	
28 Aug	DSB	9	45-55	*Theliderma metanevra*	76.7				1	Live	
28 Aug	DSB	9	45-55	*Quadrula quadrula*	70.3				1	Live	
28 Aug	DSB	9	45-55	*Pleurobema cordatum*	62.5				1	Live	
28 Aug	DSB	9	45-55	*Potamilus alatus*	103.3				1	Live	
28 Aug	DSB	9	45-55	*Ellipsaria lineolata*	72.5				1	Live	
28 Aug	DSB	9	45-55	*Pleurobema sintoxia*	97.6				1	Live	
28 Aug	DSB	9	45-55	*Actinonaias ligamentina*	95				1	Live	
28 Aug	DSB	9	55-65	*Ellipsaria lineolata*	85.9				1	Live	
28 Aug	DSB	9	55-65	*Ellipsaria lineolata*	80.6				1	Live	
28 Aug	DSB	9	55-65	*Ellipsaria lineolata*					1	WD	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	81.2				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	73.9				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	81.7				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	78.9				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	77.4				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	88.8				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*	78.6				1	Live	
28 Aug	DSB	9	55-65	*Theliderma metanevra*					1	WD	
28 Aug	DSB	9	55-65	*Cyclonaias pustulosa*	65.4				1	Live	
28 Aug	DSB	9	55-65	*Cyclonaias pustulosa*	96.4				1	Live	
28 Aug	DSB	9	55-65	*Cyclonaias pustulosa*	61.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	9	55-65	*Cyclonaias pustulosa*	65				1	Live	
28 Aug	DSB	9	55-65	*Cyclonaias pustulosa*	62.7				1	Live	
28 Aug	DSB	9	55-65	*Ligumia recta*	132.5			M	1	Live	
28 Aug	DSB	9	55-65	*Potamilus alatus*	96.7				1	Live	
28 Aug	DSB	9	55-65	*Pleurobema cordatum*	89.6				1	Live	
28 Aug	DSB	9	55-65	*Pleurobema cordatum*	84.3				1	Live	
28 Aug	DSB	9	55-65	*Pleurobema sintoxia*	77.2				1	Live	
28 Aug	DSB	9	55-65	*Pleurobema sintoxia*	94.6				1	Live	
28 Aug	DSB	10	0-5	No mussels					0		
28 Aug	DSB	10	5-15	No mussels					0		
28 Aug	DSB	10	15-25	*Ligumia recta*	134.8			F	1	Live	
28 Aug	DSB	10	15-25	*Ligumia recta*	129.7			F	1	Live	
28 Aug	DSB	10	15-25	*Potamilus alatus*	106				1	Live	
28 Aug	DSB	10	15-25	*Potamilus alatus*	102				1	Live	
28 Aug	DSB	10	25-35	*Ligumia recta*	150			M	1	Live	
28 Aug	DSB	10	25-35	*Ligumia recta*	148.9			M	1	Live	
28 Aug	DSB	10	25-35	*Ligumia recta*	138.3			M	1	Live	
28 Aug	DSB	10	25-35	*Ligumia recta*					1	WD	
28 Aug	DSB	10	25-35	*Potamilus alatus*	119.2				1	Live	
28 Aug	DSB	10	25-35	*Potamilus alatus*	108				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*	107.2				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*	75				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*	104.4				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*	104.9				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*	88.2				1	Live	
28 Aug	DSB	10	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	10	25-35	*Amblema plicata*					1	WD	
28 Aug	DSB	10	25-35	*Quadrula quadrula*	51				1	Live	
28 Aug	DSB	10	25-35	*Lampsilis siliquoidea*					1	WD	
28 Aug	DSB	10	35-45	*Ligumia recta*	140.4			M	1	Live	
28 Aug	DSB	10	35-45	*Ligumia recta*	128.2			F	1	Live	
28 Aug	DSB	10	35-45	*Amblema plicata*	104				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	10	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	10	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	10	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	10	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	10	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	10	35-45	*Ellipsaria lineolata*	74.4				1	Live	
28 Aug	DSB	10	35-45	*Ellipsaria lineolata*	90.3				1	Live	
28 Aug	DSB	10	35-45	*Potamilus alatus*	123				1	Live	
28 Aug	DSB	10	35-45	*Theliderma metanevra*	84.6				1	Live	
28 Aug	DSB	10	35-45	*Lampsilis cardium*	124.8			M	1	Live	
28 Aug	DSB	10	45-55	*Cyclonaias pustulosa*	61.1				1	Live	
28 Aug	DSB	10	45-55	*Cyclonaias pustulosa*	66.1				1	Live	
28 Aug	DSB	10	45-55	*Cyclonaias pustulosa*	63.3				1	Live	
28 Aug	DSB	10	45-55	*Cyclonaias pustulosa*	62				1	Live	
28 Aug	DSB	10	45-55	*Theliderma metanevra*	67.2				1	Live	
28 Aug	DSB	10	45-55	*Theliderma metanevra*	78.6				1	Live	
28 Aug	DSB	10	45-55	*Theliderma metanevra*	78.2				1	Live	
28 Aug	DSB	10	45-55	*Theliderma metanevra*					1	WD	
28 Aug	DSB	10	45-55	*Obliquaria reflexa*	55				1	Live	
28 Aug	DSB	10	45-55	*Obliquaria reflexa*	51.6				1	Live	
28 Aug	DSB	10	45-55	*Ellipsaria lineolata*	91.5				1	Live	
28 Aug	DSB	10	45-55	*Ellipsaria lineolata*	53				1	Live	
28 Aug	DSB	10	45-55	*Ellipsaria lineolata*	84.5				1	Live	
28 Aug	DSB	10	45-55	*Ellipsaria lineolata*	84.4				1	Live	
28 Aug	DSB	10	45-55	*Ellipsaria lineolata*	89.4				1	Live	
28 Aug	DSB	10	45-55	*Pleurobema cordatum*	66				1	Live	
28 Aug	DSB	10	45-55	*Pleurobema cordatum*	73.5				1	Live	
28 Aug	DSB	10	45-55	*Actinonaias ligamentina*	109.3				1	Live	
28 Aug	DSB	10	45-55	*Megalonaias nervosa*	137.8				1	Live	
28 Aug	DSB	10	45-55	*Ligumia recta*	122			F	1	Live	
28 Aug	DSB	10	45-55	*Ligumia recta*	132.2			F	1	Live	
28 Aug	DSB	10	45-55	*Ligumia recta*	142.3			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	10	45-55	*Ligumia recta*	137.7			F	1	Live	
28 Aug	DSB	10	45-55	*Ligumia recta*	148.4			F	1	Live	
28 Aug	DSB	10	45-55	*Actinonaias ligamentina*	115.8				1	Live	
28 Aug	DSB	10	45-55	*Actinonaias ligamentina*					1	WD	
28 Aug	DSB	10	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	10	55-65	*Plethobasus cyphyus**	105.5	49.5	75.9		1	Live	020 Yellow
28 Aug	DSB	10	55-65	*Theliderma metanevra*	84.3				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*	75.8				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*	75.1				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*	83				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*	76.5				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*	72.3				1	Live	
28 Aug	DSB	10	55-65	*Theliderma metanevra*					1	WD	
28 Aug	DSB	10	55-65	*Obliquaria reflexa*	44				1	Live	
28 Aug	DSB	10	55-65	*Obliquaria reflexa*	52.3				1	Live	
28 Aug	DSB	10	55-65	*Obliquaria reflexa*	48.8				1	Live	
28 Aug	DSB	10	55-65	*Obliquaria reflexa*					1	WD	
28 Aug	DSB	10	55-65	*Obliquaria reflexa*	57.2				1	Live	
28 Aug	DSB	10	55-65	*Ellipsaria lineolata*	69.9				1	Live	
28 Aug	DSB	10	55-65	*Amblema plicata*	112.2				1	Live	
28 Aug	DSB	10	55-65	*Amblema plicata*	106.3				1	Live	
28 Aug	DSB	10	55-65	*Pleurobema cordatum*	77.6				1	Live	
28 Aug	DSB	10	55-65	*Pleurobema cordatum*	86.5				1	Live	
28 Aug	DSB	10	55-65	*Cyclonaias pustulosa*	63.5				1	Live	
28 Aug	DSB	10	55-65	*Cyclonaias pustulosa*	67.3				1	Live	
28 Aug	DSB	10	55-65	*Cyclonaias pustulosa*	62				1	Live	
28 Aug	DSB	10	55-65	*Cyclonaias pustulosa*					1	WD	
28 Aug	DSB	10	55-65	*Actinonaias ligamentina*	110.1				1	Live	
28 Aug	DSB	10	55-65	*Ligumia recta*	150+			M	1	Live	
28 Aug	DSB	11	0-5	No mussels					0		
28 Aug	DSB	11	5-15	No mussels					0		
28 Aug	DSB	11	15-25	No mussels					0		

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	11	25-35	*Ligumia recta*	139.1			F	1	Live	
28 Aug	DSB	11	25-35	*Amblema plicata*	80.5				1	Live	
28 Aug	DSB	11	25-35	*Amblema plicata*	87.9				1	Live	
28 Aug	DSB	11	25-35	*Potamilus alatus*	112				1	Live	
28 Aug	DSB	11	25-35	*Potamilus alatus*					1	WD	
28 Aug	DSB	11	25-35	*Cyclonaias pustulosa*	61.3				1	Live	
28 Aug	DSB	11	25-35	*Lasmigona complanata*	115.6				1	Live	
28 Aug	DSB	11	35-45	*Potamilus alatus*	78.7				1	Live	
28 Aug	DSB	11	35-45	*Potamilus alatus*	86				1	Live	
28 Aug	DSB	11	35-45	*Theliderma metanevra*	86.1				1	Live	
28 Aug	DSB	11	35-45	*Amblema plicata*	117.2				1	Live	
28 Aug	DSB	11	35-45	*Amblema plicata*	102.2				1	Live	
28 Aug	DSB	11	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	11	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	11	35-45	*Amblema plicata*					1	WD	
28 Aug	DSB	11	35-45	*Lampsilis cardium*	99.4			F	1	Live	
28 Aug	DSB	11	35-45	*Obliquaria reflexa*					1	WD	
28 Aug	DSB	11	35-45	*Ligumia recta*					1	WD	
28 Aug	DSB	11	45-55	*Lampsilis cardium*	135.4			M	1	Live	
28 Aug	DSB	11	45-55	*Lampsilis cardium*	125				1	Live	
28 Aug	DSB	11	45-55	*Actinonaias ligamentina*	71.9				1	Live	
28 Aug	DSB	11	45-55	*Theliderma metanevra*	72.2				1	Live	
28 Aug	DSB	11	45-55	*Theliderma metanevra*	66.8				1	Live	
28 Aug	DSB	11	45-55	*Theliderma metanevra*	69.6				1	Live	
28 Aug	DSB	11	45-55	*Theliderma metanevra*	85.4				1	Live	
28 Aug	DSB	11	45-55	*Cyclonaias pustulosa*	44.8				1	Live	
28 Aug	DSB	11	45-55	*Cyclonaias pustulosa*	49.1				1	Live	
28 Aug	DSB	11	45-55	*Amblema plicata*	102.5				1	Live	
28 Aug	DSB	11	45-55	*Amblema plicata*	105				1	Live	
28 Aug	DSB	11	45-55	*Amblema plicata*	97.4				1	Live	
28 Aug	DSB	11	45-55	*Amblema plicata*					1	WD	
28 Aug	DSB	11	45-55	*Obliquaria reflexa*	67.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
28 Aug	DSB	11	45-55	*Ligumia recta*	92.1			M	1	Live	
28 Aug	DSB	11	45-55	*Ellipsaria lineolata*	97				1	Live	
28 Aug	DSB	11	55-65	*Ligumia recta*	120			M	1	Live	
28 Aug	DSB	11	55-65	*Ligumia recta*	122.3			M	1	Live	
28 Aug	DSB	11	55-65	*Ligumia recta*	146.5			M	1	Live	
28 Aug	DSB	11	55-65	*Theliderma metanevra*	84.4				1	Live	
28 Aug	DSB	11	55-65	*Pleurobema cordatum*	63.3				1	Live	
28 Aug	DSB	11	55-65	*Pleurobema cordatum*					1	WD	
28 Aug	DSB	11	55-65	*Cyclonaias pustulosa*	62.2				1	Live	
28 Aug	DSB	11	55-65	*Cyclonaias pustulosa*	58.9				1	Live	
28 Aug	DSB	11	55-65	*Cyclonaias pustulosa*	58.4				1	Live	
28 Aug	DSB	11	55-65	*Amblema plicata*	103.3				1	Live	
28 Aug	DSB	11	55-65	*Amblema plicata*	150+				1	Live	
28 Aug	DSB	11	55-65	*Ellipsaria lineolata*	87				1	Live	
28 Aug	DSB	11	55-65	*Ellipsaria lineolata*	67.1				1	Live	
28 Aug	DSB	11	55-65	*Actinonaias ligamentina*	104.4				1	Live	
28 Aug	DSB	11	55-65	*Actinonaias ligamentina*	106.7				1	Live	
29 Aug	DSB	12	0-5	No mussels					0		
29 Aug	DSB	12	5-15	No mussels					0		
29 Aug	DSB	12	15-25	*Ligumia recta*	139			F	1	Live	
29 Aug	DSB	12	15-25	*Ligumia recta*	122			F	1	Live	
29 Aug	DSB	12	25-35	*Amblema plicata*	108.5				1	Live	
29 Aug	DSB	12	25-35	*Amblema plicata*	102.1				1	Live	
29 Aug	DSB	12	25-35	*Amblema plicata*	88.6				1	Live	
29 Aug	DSB	12	25-35	*Amblema plicata*	112				1	Live	
29 Aug	DSB	12	25-35	*Amblema plicata*					1	WD	
29 Aug	DSB	12	25-35	*Amblema plicata*					1	WD	
29 Aug	DSB	12	25-35	*Ligumia recta*	140			M	1	Live	
29 Aug	DSB	12	25-35	*Ligumia recta*				M	1	WD	
29 Aug	DSB	12	25-35	*Potamilus alatus*	104.5				1	Live	
29 Aug	DSB	12	25-35	*Potamilus alatus*					1	WD	
29 Aug	DSB	12	25-35	*Theliderma metanevra*	86.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	DSB	12	35-45	*Amblema plicata*	106.5				1	Live	
29 Aug	DSB	12	35-45	*Amblema plicata*	99.3				1	Live	
29 Aug	DSB	12	35-45	*Amblema plicata*	116.7				1	Live	
29 Aug	DSB	12	35-45	*Amblema plicata*	104.5				1	Live	
29 Aug	DSB	12	35-45	*Amblema plicata*	99.4				1	Live	
29 Aug	DSB	12	35-45	*Ellipsaria lineolata*	71.8				1	Live	
29 Aug	DSB	12	35-45	*Ellipsaria lineolata*	87.5				1	Live	
29 Aug	DSB	12	35-45	*Obliquaria reflexa*	57.9				1	Live	
29 Aug	DSB	12	35-45	*Ptychobranchus fasciolaris*	117.5				1	Live	
29 Aug	DSB	12	45-55	*Actinonaias ligamentina*	107.1				1	Live	
29 Aug	DSB	12	45-55	*Amblema plicata*	76.5				1	Live	
29 Aug	DSB	12	45-55	*Amblema plicata*					1	WD	
29 Aug	DSB	12	45-55	*Amblema plicata*					1	WD	
29 Aug	DSB	12	45-55	*Cyclonaias pustulosa*	58.6				1	Live	
29 Aug	DSB	12	45-55	*Cyclonaias pustulosa*	57.3				1	Live	
29 Aug	DSB	12	45-55	*Cyclonaias pustulosa*	59.8				1	Live	
29 Aug	DSB	12	45-55	*Ellipsaria lineolata*	73.5				1	Live	
29 Aug	DSB	12	45-55	*Ellipsaria lineolata*	73.2				1	Live	
29 Aug	DSB	12	45-55	*Elliptio crassidens*					1	WD	
29 Aug	DSB	12	45-55	*Lasmigona complanata*	129.6				1	Live	
29 Aug	DSB	12	45-55	*Ligumia recta*	127.9			M	1	Live	
29 Aug	DSB	12	45-55	*Ligumia recta*	138.9			F	1	Live	
29 Aug	DSB	12	45-55	*Ligumia recta*	143.1			F	1	Live	
29 Aug	DSB	12	45-55	*Ligumia recta*	142.6			M	1	Live	
29 Aug	DSB	12	45-55	*Megalonaias nervosa*	144.1				1	Live	
29 Aug	DSB	12	45-55	*Obliquaria reflexa*	43.1				1	Live	
29 Aug	DSB	12	45-55	*Obliquaria reflexa*	48				1	Live	
29 Aug	DSB	12	45-55	*Plethobasus cyphyus**	110.5	49.8	80.7		1	Live	1760 Yellow
29 Aug	DSB	12	45-55	*Pleurobema cordatum*	66				1	Live	
29 Aug	DSB	12	45-55	*Potamilus alatus*	92.7				1	Live	
29 Aug	DSB	12	45-55	*Potamilus alatus*	110.2				1	Live	
29 Aug	DSB	12	45-55	*Potamilus alatus*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	DSB	12	45-55	*Potamilus alatus*					1	WD	
29 Aug	DSB	12	45-55	*Theliderma metanevra*	72				1	Live	
29 Aug	DSB	12	55-65	*Amblema plicata*					1	WD	
29 Aug	DSB	12	55-65	*Amblema plicata*					1	WD	
29 Aug	DSB	12	55-65	*Amblema plicata*					1	WD	
29 Aug	DSB	12	55-65	*Cyclonaias pustulosa*	63.7				1	Live	
29 Aug	DSB	12	55-65	*Cyclonaias pustulosa*	58.2				1	Live	
29 Aug	DSB	12	55-65	*Ellipsaria lineolata*	62.3				1	Live	
29 Aug	DSB	12	55-65	*Ellipsaria lineolata*	79				1	Live	
29 Aug	DSB	12	55-65	*Ellipsaria lineolata*	91.2				1	Live	
29 Aug	DSB	12	55-65	*Lampsilis cardium*	112.6			M	1	Live	
29 Aug	DSB	12	55-65	*Lampsilis cardium*	117			F	1	Live	
29 Aug	DSB	12	55-65	*Lampsilis cardium*	116.5			M	1	Live	
29 Aug	DSB	12	55-65	*Ligumia recta*	140			F	1	Live	
29 Aug	DSB	12	55-65	*Ligumia recta*	141.5			F	1	Live	
29 Aug	DSB	12	55-65	*Megalonaias nervosa*					1	WD	
29 Aug	DSB	12	55-65	*Obliquaria reflexa*	46.2				1	Live	
29 Aug	DSB	12	55-65	*Pleurobema sintoxia*	85				1	Live	
29 Aug	DSB	12	55-65	*Potamilus alatus*	88.2				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*	67.3				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*	80.5				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*	73.4				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*	80.4				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*	78				1	Live	
29 Aug	DSB	12	55-65	*Theliderma metanevra*					1	WD	
29 Aug	ADI	13	0-5	No mussels					0		
29 Aug	ADI	13	5-15	No mussels					0		
29 Aug	LTB	13	15-25	*Potamilus alatus*	114.6				1	Live	
29 Aug	LTB	13	15-25	*Ligumia recta*	146			M	1	Live	
29 Aug	LTB	13	15-25	*Ligumia recta*	128.2			F	1	Live	
29 Aug	LTB	13	25-35	*Actinonaias ligamentina*	80				1	Live	
29 Aug	LTB	13	25-35	*Ligumia recta*	147.6			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	13	25-35	*Amblema plicata*	84.9				1	Live	
29 Aug	LTB	13	25-35	*Amblema plicata*	98.1				1	Live	
29 Aug	LTB	13	25-35	*Potamilus alatus*	103.6				1	Live	
29 Aug	LTB	13	25-35	*Ligumia recta*	129			F	1	Live	
29 Aug	LTB	13	25-35	*Ellipsaria lineolata*	77.3				1	Live	
29 Aug	LTB	13	25-35	*Cyclonaias pustulosa*	69.5				1	Live	
29 Aug	LTB	13	35-45	*Ligumia recta*	89			M	1	Live	
29 Aug	LTB	13	35-45	*Ligumia recta*	150+			M	1	Live	
29 Aug	LTB	13	35-45	*Ellipsaria lineolata*	68				1	Live	
29 Aug	LTB	13	35-45	*Ellipsaria lineolata*	82.1				1	Live	
29 Aug	LTB	13	35-45	*Pleurobema cordatum*	81.9				1	Live	
29 Aug	LTB	13	35-45	*Pleurobema sintoxia*	85.3				1	Live	
29 Aug	LTB	13	35-45	*Theliderma metanevra*	81.6				1	Live	
29 Aug	LTB	13	35-45	*Quadrula quadrula*	61.6				1	Live	
29 Aug	LTB	13	35-45	*Amblema plicata*	104.5				1	Live	
29 Aug	LTB	13	35-45	*Amblema plicata*	99.1				1	Live	
29 Aug	LTB	13	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	13	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	13	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	13	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	13	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	13	35-45	*Cyclonaias pustulosa*	56.7				1	Live	
29 Aug	LTB	13	35-45	*Cyclonaias pustulosa*					1	WD	
29 Aug	LTB	13	35-45	*Obliquaria reflexa*	47.7				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	77.5				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	83.3				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	73.5				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	69.5				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	73.4				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*	70.1				1	Live	
29 Aug	LTB	13	45-55	*Theliderma metanevra*					1	WD	
29 Aug	LTB	13	45-55	*Theliderma metanevra*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	13	45-55	*Theliderma metanevra*					1	WD	
29 Aug	LTB	13	45-55	*Quadrula quadrula*	56				1	Live	
29 Aug	LTB	13	45-55	*Quadrula quadrula*	60.1				1	Live	
29 Aug	LTB	13	45-55	*Quadrula quadrula*	73.3				1	Live	
29 Aug	LTB	13	45-55	*Cyclonaias pustulosa*	56.7				1	Live	
29 Aug	LTB	13	45-55	*Cyclonaias pustulosa*	50				1	Live	
29 Aug	LTB	13	45-55	*Cyclonaias pustulosa*	51.7				1	Live	
29 Aug	LTB	13	45-55	*Cyclonaias pustulosa*	52.4				1	Live	
29 Aug	LTB	13	45-55	*Amblema plicata*	77.7				1	Live	
29 Aug	LTB	13	45-55	*Amblema plicata*	86.3				1	Live	
29 Aug	LTB	13	45-55	*Amblema plicata*	106.1				1	Live	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	13	45-55	*Ligumia recta*	125			F	1	Live	
29 Aug	LTB	13	45-55	*Ellipsaria lineolata*	79.8				1	Live	
29 Aug	LTB	13	45-55	*Ellipsaria lineolata*	79.2				1	Live	
29 Aug	LTB	13	45-55	*Ellipsaria lineolata*	75				1	Live	
29 Aug	LTB	13	45-55	*Ellipsaria lineolata*	87.7				1	Live	
29 Aug	LTB	13	45-55	*Ellipsaria lineolata*					1	WD	
29 Aug	LTB	13	45-55	*Lampsilis cardium*	117.2			M	1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	78.2				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	79.5				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	79.4				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	81.7				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	77.2				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	77.3				1	Live	
29 Aug	LTB	13	55-65	*Theliderma metanevra*	65.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	13	55-65	*Theliderma metanevra*					1	WD	
29 Aug	LTB	13	55-65	*Cyclonaias pustulosa*	63.7				1	Live	
29 Aug	LTB	13	55-65	*Cyclonaias pustulosa*	62.8				1	Live	
29 Aug	LTB	13	55-65	*Cyclonaias pustulosa*	56.8				1	Live	
29 Aug	LTB	13	55-65	*Amblema plicata*	104.9				1	Live	
29 Aug	LTB	13	55-65	*Amblema plicata*					1	WD	
29 Aug	LTB	13	55-65	*Amblema plicata*					1	WD	
29 Aug	LTB	13	55-65	*Amblema plicata*					1	WD	
29 Aug	LTB	13	55-65	*Potamilus alatus*	122.4				1	Live	
29 Aug	LTB	13	55-65	*Pleurobema cordatum*	73.5				1	Live	
29 Aug	LTB	13	55-65	*Pleurobema cordatum*	63.1				1	Live	
29 Aug	LTB	13	55-65	*Pleurobema cordatum*	87.5				1	Live	
29 Aug	LTB	13	55-65	*Ligumia recta*	143.4			M	1	Live	
29 Aug	LTB	13	55-65	*Ligumia recta*	146.7			F	1	Live	
29 Aug	LTB	13	55-65	*Ligumia recta*				F	1	WD	
29 Aug	LTB	13	55-65	*Obliquaria reflexa*					1	WD	
29 Aug	ADI	14	0-5	No mussels					0		
29 Aug	ADI	14	5-15	No mussels					0		
29 Aug	LTB	14	15-25	*Potamilus alatus*	71.1				1	Live	
29 Aug	LTB	14	15-25	*Ligumia recta*	138.4			F	1	Live	
29 Aug	LTB	14	15-25	*Amblema plicata*	99.8				1	Live	
29 Aug	LTB	14	25-35	*Obliquaria reflexa*	38.7				1	Live	
29 Aug	LTB	14	25-35	*Amblema plicata*	97.8				1	Live	
29 Aug	LTB	14	25-35	*Amblema plicata*	115.3				1	Live	
29 Aug	LTB	14	25-35	*Amblema plicata*	114.3				1	Live	
29 Aug	LTB	14	25-35	*Amblema plicata*	104				1	Live	
29 Aug	LTB	14	25-35	*Amblema plicata*	106.5				1	Live	
29 Aug	LTB	14	25-35	*Lampsilis siliquoidea*					1	WD	
29 Aug	LTB	14	25-35	*Pleurobema cordatum*					1	WD	
29 Aug	LTB	14	35-45	*Cyclonaias pustulosa*	58.3				1	Live	
29 Aug	LTB	14	35-45	*Obliquaria reflexa*	54.7				1	Live	
29 Aug	LTB	14	35-45	*Obliquaria reflexa*	155.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	14	35-45	*Ellipsaria lineolata*	52.5				1	Live	
29 Aug	LTB	14	35-45	*Ellipsaria lineolata*	83.6				1	Live	
29 Aug	LTB	14	35-45	*Ellipsaria lineolata*	90				1	Live	
29 Aug	LTB	14	35-45	*Ligumia recta*	150+			M	1	Live	
29 Aug	LTB	14	35-45	*Amblema plicata*	103.2				1	Live	
29 Aug	LTB	14	35-45	*Amblema plicata*	99.9				1	Live	
29 Aug	LTB	14	35-45	*Amblema plicata*	100.1				1	Live	
29 Aug	LTB	14	35-45	*Amblema plicata*	103				1	Live	
29 Aug	LTB	14	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	14	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	14	35-45	*Ligumia recta*	137.5			F	1	Live	
29 Aug	LTB	14	35-45	*Ligumia recta*	139.6			F	1	Live	
29 Aug	LTB	14	35-45	*Theliderma metanevra*	83.6				1	Live	
29 Aug	LTB	14	35-45	*Cyclonaias pustulosa*	56.5				1	Live	
29 Aug	LTB	14	35-45	*Lampsilis cardium*	105.7			M	1	Live	
29 Aug	LTB	14	35-45	*Plethobasus cyphyus**					1	WD	
29 Aug	LTB	14	45-55	*Actinonaias ligamentina*	109.2				1	Live	
29 Aug	LTB	14	45-55	*Theliderma metanevra*	70.9				1	Live	
29 Aug	LTB	14	45-55	*Theliderma metanevra*	73.6				1	Live	
29 Aug	LTB	14	45-55	*Ellipsaria lineolata*	83.2				1	Live	
29 Aug	LTB	14	45-55	*Ellipsaria lineolata*	57.1				1	Live	
29 Aug	LTB	14	45-55	*Lampsilis siliquoidea*	101.5			F	1	Live	
29 Aug	LTB	14	45-55	*Amblema plicata*	74.1				1	Live	
29 Aug	LTB	14	45-55	*Amblema plicata*	103.2				1	Live	
29 Aug	LTB	14	45-55	*Amblema plicata*	87.4				1	Live	
29 Aug	LTB	14	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	14	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	14	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	14	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	14	45-55	*Cyclonaias pustulosa*	63.5				1	Live	
29 Aug	LTB	14	45-55	*Cyclonaias pustulosa*	63.5				1	Live	
29 Aug	LTB	14	45-55	*Cyclonaias pustulosa*	61.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	14	45-55	*Cyclonaias pustulosa*					1	WD	
29 Aug	LTB	14	45-55	*Cyclonaias pustulosa*					1	WD	
29 Aug	LTB	14	45-55	*Pleurobema cordatum*	79.3				1	Live	
29 Aug	LTB	14	45-55	*Pleurobema cordatum*					1	WD	
29 Aug	LTB	14	45-55	*Quadrula quadrula*	56.1				1	Live	
29 Aug	LTB	14	45-55	*Ligumia recta*	141.5			F	1	Live	
29 Aug	LTB	14	45-55	*Ligumia recta*	151.3			F	1	Live	
29 Aug	LTB	14	45-55	*Ligumia recta*	149.8			F	1	Live	
29 Aug	LTB	14	45-55	*Obliquaria reflexa*	38.2				1	Live	
29 Aug	LTB	14	45-55	*Obliquaria reflexa*					1	WD	
29 Aug	LTB	14	45-55	*Lampsilis cardium*					1	SF	
29 Aug	LTB	14	55-65	*Amblema plicata*	43.6				1	Live	
29 Aug	LTB	14	55-65	*Amblema plicata*	68.3				1	Live	
29 Aug	LTB	14	55-65	*Amblema plicata*	82.6				1	Live	
29 Aug	LTB	14	55-65	*Amblema plicata*	83				1	Live	
29 Aug	LTB	14	55-65	*Amblema plicata*					1	WD	
29 Aug	LTB	14	55-65	*Ellipsaria lineolata*	51.9				1	Live	
29 Aug	LTB	14	55-65	*Ligumia recta*	150+			F	1	Live	
29 Aug	LTB	14	55-65	*Obliquaria reflexa*	50.6				1	Live	
29 Aug	LTB	14	55-65	*Ligumia recta*	148			M	1	Live	
29 Aug	LTB	14	55-65	*Ligumia recta*	127.1			M	1	Live	
29 Aug	LTB	14	55-65	*Quadrula quadrula*	63.7				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	79.4				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	76				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	85				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	78				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	60				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*	78				1	Live	
29 Aug	LTB	14	55-65	*Theliderma metanevra*					1	WD	
29 Aug	LTB	14	55-65	*Theliderma metanevra*					1	WD	
29 Aug	LTB	14	55-65	*Lampsilis cardium*	123.5			F	1	Live	
29 Aug	LTB	14	55-65	*Cyclonaias pustulosa*	59.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	14	55-65	*Potamilus alatus*	94.3				1	Live	
29 Aug	ADI	15	0-5	No mussels					0		
29 Aug	ADI	15	5-15	No mussels					0		
29 Aug	LTB	15	15-25	*Lampsilis siliquoidea*	101.1			F	1	Live	
29 Aug	LTB	15	15-25	*Potamilus alatus*					1	WD	
29 Aug	LTB	15	25-35	No mussels					0		
29 Aug	LTB	15	35-45	*Ellipsaria lineolata*	75.3				1	Live	
29 Aug	LTB	15	35-45	*Ellipsaria lineolata*	71.5				1	Live	
29 Aug	LTB	15	35-45	*Ellipsaria lineolata*	76.3				1	Live	
29 Aug	LTB	15	35-45	*Cyclonaias pustulosa*	52.6				1	Live	
29 Aug	LTB	15	35-45	*Cyclonaias pustulosa*	52.7				1	Live	
29 Aug	LTB	15	35-45	*Cyclonaias pustulosa*	55				1	Live	
29 Aug	LTB	15	35-45	*Cyclonaias pustulosa*	59.8				1	Live	
29 Aug	LTB	15	35-45	*Obliquaria reflexa*	51.5				1	Live	
29 Aug	LTB	15	35-45	*Obliquaria reflexa*	44.6				1	Live	
29 Aug	LTB	15	35-45	*Amblema plicata*	72.3				1	Live	
29 Aug	LTB	15	35-45	*Amblema plicata*	80.3				1	Live	
29 Aug	LTB	15	35-45	*Amblema plicata*	115				1	Live	
29 Aug	LTB	15	35-45	*Amblema plicata*	108.4				1	Live	
29 Aug	LTB	15	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	15	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	15	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	15	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	15	35-45	*Amblema plicata*					1	WD	
29 Aug	LTB	15	35-45	*Theliderma metanevra*	79.6				1	Live	
29 Aug	LTB	15	35-45	*Theliderma metanevra*	86.3				1	Live	
29 Aug	LTB	15	35-45	*Quadrula quadrula*	67.5				1	Live	
29 Aug	LTB	15	35-45	*Ligumia recta*	129.1			F	1	Live	
29 Aug	LTB	15	35-45	*Actinonaias ligamentina*	118				1	Live	
29 Aug	LTB	15	35-45	*Lampsilis cardium*	110			F	1	Live	
29 Aug	LTB	15	35-45	*Potamilus alatus*					1	WD	
29 Aug	LTB	15	35-45	*Lasmigona complanata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	15	35-45	*Lasmigona complanata*					1	WD	
29 Aug	LTB	15	45-55	*Pleurobema cordatum*	81.2				1	Live	
29 Aug	LTB	15	45-55	*Ellipsaria lineolata*	75.3				1	Live	
29 Aug	LTB	15	45-55	*Ellipsaria lineolata*	84.9				1	Live	
29 Aug	LTB	15	45-55	*Ellipsaria lineolata*					1	WD	
29 Aug	LTB	15	45-55	*Cyprogenia stegaria**	50.5	49.7	30.9		1	Live	0504 Yellow
29 Aug	LTB	15	45-55	*Cyclonaias pustulosa*	63.5				1	Live	
29 Aug	LTB	15	45-55	*Cyclonaias pustulosa*	63.2				1	Live	
29 Aug	LTB	15	45-55	*Cyclonaias pustulosa*	64.7				1	Live	
29 Aug	LTB	15	45-55	*Cyclonaias pustulosa*	53.1				1	Live	
29 Aug	LTB	15	45-55	*Cyclonaias pustulosa*	48.7				1	Live	
29 Aug	LTB	15	45-55	*Obliquaria reflexa*	55.5				1	Live	
29 Aug	LTB	15	45-55	*Obliquaria reflexa*	41.6				1	Live	
29 Aug	LTB	15	45-55	*Ligumia recta*	116.3			F	1	Live	
29 Aug	LTB	15	45-55	*Ligumia recta*	130.3			F	1	Live	
29 Aug	LTB	15	45-55	*Ligumia recta*	133.3			F	1	Live	
29 Aug	LTB	15	45-55	*Ligumia recta*	150+			M	1	Live	
29 Aug	LTB	15	45-55	*Ligumia recta*				M	1	WD	
29 Aug	LTB	15	45-55	*Amblema plicata*	69.4				1	Live	
29 Aug	LTB	15	45-55	*Amblema plicata*	94.6				1	Live	
29 Aug	LTB	15	45-55	*Amblema plicata*	94.8				1	Live	
29 Aug	LTB	15	45-55	*Amblema plicata*	116.3				1	Live	
29 Aug	LTB	15	45-55	*Amblema plicata*	97.3				1	Live	
29 Aug	LTB	15	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	15	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	15	45-55	*Amblema plicata*					1	WD	
29 Aug	LTB	15	45-55	*Megalonaias nervosa*	145				1	Live	
29 Aug	LTB	15	45-55	*Lampsilis cardium*					1	WD	
29 Aug	LTB	15	55-65	*Ellipsaria lineolata*	66.3				1	Live	
29 Aug	LTB	15	55-65	*Ellipsaria lineolata*	66.8				1	Live	
29 Aug	LTB	15	55-65	*Ellipsaria lineolata*	55.9				1	Live	
29 Aug	LTB	15	55-65	*Ellipsaria lineolata*	57.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
29 Aug	LTB	15	55-65	*Ellipsaria lineolata*					1	WD	
29 Aug	LTB	15	55-65	*Potamilus alatus*	115.3				1	Live	
29 Aug	LTB	15	55-65	*Potamilus alatus*	105.7				1	Live	
29 Aug	LTB	15	55-65	*Obliquaria reflexa*	42.7				1	Live	
29 Aug	LTB	15	55-65	*Obliquaria reflexa*					1	WD	
29 Aug	LTB	15	55-65	*Quadrula quadrula*	60				1	Live	
29 Aug	LTB	15	55-65	*Theliderma metanevra*	86.4				1	Live	
29 Aug	LTB	15	55-65	*Theliderma metanevra*	87.7				1	Live	
29 Aug	LTB	15	55-65	*Theliderma metanevra*	65.3				1	Live	
29 Aug	LTB	15	55-65	*Theliderma metanevra*	75.5				1	Live	
29 Aug	LTB	15	55-65	*Theliderma metanevra*					1	WD	
29 Aug	LTB	15	55-65	*Pleurobema cordatum*	69.5				1	Live	
29 Aug	LTB	15	55-65	*Pleurobema cordatum*	89.9				1	Live	
29 Aug	LTB	15	55-65	*Pleurobema cordatum*	76.4				1	Live	
29 Aug	LTB	15	55-65	*Pleurobema cordatum*	88.6				1	Live	
29 Aug	LTB	15	55-65	*Pleurobema sintoxia*	79.6				1	Live	
29 Aug	LTB	15	55-65	*Ligumia recta*	143			M	1	Live	
29 Aug	LTB	15	55-65	*Cyclonaias pustulosa*	48.3				1	Live	
30 Aug	USB	16	0-5	No mussels					0		
30 Aug	USB	16	5-15	No mussels					0		
30 Aug	USB	16	15-25	*Lampsilis siliquoidea*	110			F	1	Live	
30 Aug	USB	16	15-25	*Lampsilis siliquoidea*	113.4			F	1	Live	
30 Aug	USB	16	15-25	*Lampsilis cardium*	100			F	1	Live	
30 Aug	USB	16	15-25	*Ligumia recta*	137.7			F	1	Live	
30 Aug	USB	16	25-35	*Obliquaria reflexa*	48.1				1	Live	
30 Aug	USB	16	25-35	*Obliquaria reflexa*	52.2				1	Live	
30 Aug	USB	16	25-35	*Obliquaria reflexa*	48.1				1	Live	
30 Aug	USB	16	25-35	*Amblema plicata*	94.5				1	Live	
30 Aug	USB	16	25-35	*Amblema plicata*	108				1	Live	
30 Aug	USB	16	25-35	*Amblema plicata*					1	WD	
30 Aug	USB	16	25-35	*Amblema plicata*					1	WD	
30 Aug	USB	16	25-35	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	16	25-35	*Cyclonaias pustulosa*	56.8				1	Live	
30 Aug	USB	16	25-35	*Lampsilis siliquoidea*	110.1			M	1	Live	
30 Aug	USB	16	25-35	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	16	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	16	25-35	*Potamilus alatus*	78.9				1	Live	
30 Aug	USB	16	25-35	*Potamilus alatus*					1	WD	
30 Aug	USB	16	25-35	*Lampsilis cardium*	109			F	1	Live	
30 Aug	USB	16	25-35	*Actinonaias ligamentina*					1	WD	
30 Aug	USB	16	35-45	*Ellipsaria lineolata*	90				1	Live	
30 Aug	USB	16	35-45	*Ellipsaria lineolata*	52.1				1	Live	
30 Aug	USB	16	35-45	*Lampsilis siliquoidea*	104.5			F	1	Live	
30 Aug	USB	16	35-45	*Cyclonaias pustulosa*	60.7				1	Live	
30 Aug	USB	16	35-45	*Cyclonaias pustulosa*	52.8				1	Live	
30 Aug	USB	16	35-45	*Cyclonaias pustulosa*	60				1	Live	
30 Aug	USB	16	35-45	*Theliderma metanevra*	69.3				1	Live	
30 Aug	USB	16	35-45	*Amblema plicata*	98.7				1	Live	
30 Aug	USB	16	35-45	*Amblema plicata*					3	WD	
30 Aug	USB	16	35-45	*Potamilus alatus*					1	WD	
30 Aug	USB	16	45-55	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	16	45-55	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	16	45-55	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	16	45-55	*Ligumia recta*	133			F	1	Live	
30 Aug	USB	16	45-55	*Pleurobema sintoxia*	82				1	Live	
30 Aug	USB	16	45-55	*Pleurobema cordatum*	83.3				1	Live	
30 Aug	USB	16	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	16	45-55	*Actinonaias ligamentina*	122.4				1	Live	
30 Aug	USB	16	45-55	*Theliderma metanevra*	75				1	Live	
30 Aug	USB	16	45-55	*Theliderma metanevra*	79.8				1	Live	
30 Aug	USB	16	45-55	*Theliderma metanevra*	79.6				1	Live	
30 Aug	USB	16	45-55	*Theliderma metanevra*					1	WD	
30 Aug	USB	16	45-55	*Theliderma metanevra*					1	WD	
30 Aug	USB	16	45-55	*Lampsilis cardium*	77				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	16	45-55	*Quadrula quadrula*	58.6				1	Live	
30 Aug	USB	16	45-55	*Potamilus alatus*	123				1	Live	
30 Aug	USB	16	45-55	*Potamilus alatus*	100.5				1	Live	
30 Aug	USB	16	45-55	*Cyclonaias pustulosa*	68				1	Live	
30 Aug	USB	16	45-55	*Cyclonaias pustulosa*	59.9				1	Live	
30 Aug	USB	16	45-55	*Cyclonaias pustulosa*	60.4				1	Live	
30 Aug	USB	16	45-55	*Ellipsaria lineolata*	83.7				1	Live	
30 Aug	USB	16	45-55	*Ellipsaria lineolata*	75.5				1	Live	
30 Aug	USB	16	45-55	*Ellipsaria lineolata*	67.1				1	Live	
30 Aug	USB	16	45-55	*Ellipsaria lineolata*					1	WD	
30 Aug	USB	16	45-55	*Lampsilis siliquoidea*	99.8			F	1	Live	
30 Aug	USB	16	55-65	*Plethobasus cyphyus**	108.4	42.7	73		1	Live	1310 Blue
30 Aug	USB	16	55-65	*Theliderma metanevra*	66.5				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	81.5				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	82				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	83				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	79.8				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	74				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	83				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*	83				1	Live	
30 Aug	USB	16	55-65	*Theliderma metanevra*					1	WD	
30 Aug	USB	16	55-65	*Cyclonaias pustulosa*	59				1	Live	
30 Aug	USB	16	55-65	*Cyclonaias pustulosa*	56				1	Live	
30 Aug	USB	16	55-65	*Ellipsaria lineolata*	77				1	Live	
30 Aug	USB	16	55-65	*Ellipsaria lineolata*	67.7				1	Live	
30 Aug	USB	16	55-65	*Ellipsaria lineolata*	85				1	Live	
30 Aug	USB	16	55-65	*Ellipsaria lineolata*	81				1	Live	
30 Aug	USB	16	55-65	*Obliquaria reflexa*	50.1				1	Live	
30 Aug	USB	16	55-65	*Potamilus alatus*	102.2				1	Live	
30 Aug	USB	16	55-65	*Amblema plicata*	75				1	Live	
30 Aug	USB	16	55-65	*Ligumia recta*	144			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	17	0-5	*Amblema plicata*	106				1	Live	
30 Aug	USB	17	0-5	*Amblema plicata*	104				1	Live	
30 Aug	USB	17	0-5	*Amblema plicata*					1	WD	
30 Aug	USB	17	0-5	*Lampsilis siliquoidea*	103			F	1	Live	
30 Aug	USB	17	5-15	No mussels					0		
30 Aug	USB	17	15-25	No mussels					0		
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	17	25-35	*Ligumia recta*	109.2			M	1	Live	
30 Aug	USB	17	25-35	*Lampsilis siliquoidea*	79.4			F	1	Live	
30 Aug	USB	17	25-35	*Amblema plicata*	102.5				1	Live	
30 Aug	USB	17	25-35	*Amblema plicata*	85				1	Live	
30 Aug	USB	17	25-35	*Amblema plicata*	82.8				1	Live	
30 Aug	USB	17	25-35	*Amblema plicata*	90				1	Live	
30 Aug	USB	17	25-35	*Amblema plicata*					3	WD	
30 Aug	USB	17	25-35	*Obliquaria reflexa*	46.9				1	Live	
30 Aug	USB	17	25-35	*Megalonaias nervosa*	150+				1	Live	
30 Aug	USB	17	25-35	*Megalonaias nervosa*	150+				1	Live	
30 Aug	USB	17	25-35	*Cyclonaias pustulosa*	54.5				1	Live	
30 Aug	USB	17	25-35	*Theliderma metanevra*	76.3				1	Live	
30 Aug	USB	17	25-35	*Ellipsaria lineolata*	50.5				1	Live	
30 Aug	USB	17	25-35	*Potamilus alatus*					1	WD	
30 Aug	USB	17	35-45	*Actinonaias ligamentina*	104.7				1	Live	
30 Aug	USB	17	35-45	*Theliderma metanevra*	83.3				1	Live	
30 Aug	USB	17	35-45	*Theliderma metanevra*	78.5				1	Live	
30 Aug	USB	17	35-45	*Fusconaia flava*	74.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	17	35-45	*Ellipsaria lineolata*	70				1	Live	
30 Aug	USB	17	35-45	*Ellipsaria lineolata*	89.2				1	Live	
30 Aug	USB	17	35-45	*Ellipsaria lineolata*	60.8				1	Live	
30 Aug	USB	17	35-45	*Obliquaria reflexa*	58.2				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	105				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	105				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	105				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	97.5				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	103.3				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*	82.5				1	Live	
30 Aug	USB	17	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	17	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	17	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	17	35-45	*Cyclonaias pustulosa*	59.9				1	Live	
30 Aug	USB	17	35-45	*Pleurobema cordatum*	92.5				1	Live	
30 Aug	USB	17	35-45	*Pleurobema cordatum*	81				1	Live	
30 Aug	USB	17	35-45	*Pleurobema cordatum*	71.5				1	Live	
30 Aug	USB	17	35-45	*Lampsilis cardium*	115.1			M	1	Live	
30 Aug	USB	17	35-45	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	17	35-45	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	17	35-45	*Ligumia recta*	121.5			F	1	Live	
30 Aug	USB	17	45-55	*Megalonaias nervosa*	150+				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	96.4				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	98.3				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	67				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	75.5				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	66.9				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	85.6				1	Live	
30 Aug	USB	17	45-55	*Ellipsaria lineolata*	89.4				1	Live	
30 Aug	USB	17	45-55	*Amblema plicata*	90				1	Live	
30 Aug	USB	17	45-55	*Amblema plicata*	84.5				1	Live	
30 Aug	USB	17	45-55	*Amblema plicata*	69.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	17	45-55	*Amblema plicata*	90				1	Live	
30 Aug	USB	17	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	17	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	17	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	17	45-55	*Cyclonaias pustulosa*	56.3				1	Live	
30 Aug	USB	17	45-55	*Cyclonaias pustulosa*	62.4				1	Live	
30 Aug	USB	17	45-55	*Cyclonaias pustulosa*	56.3				1	Live	
30 Aug	USB	17	45-55	*Cyclonaias pustulosa*	52.2				1	Live	
30 Aug	USB	17	45-55	*Cyclonaias pustulosa*	52.3				1	Live	
30 Aug	USB	17	45-55	*Quadrula quadrula*	60				1	Live	
30 Aug	USB	17	45-55	*Actinonaias ligamentina*	101.5				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	89				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	70.8				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	68.4				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	78.3				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	82.5				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	81.6				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	81.1				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*	76.4				1	Live	
30 Aug	USB	17	45-55	*Theliderma metanevra*					1	WD	
30 Aug	USB	17	45-55	*Lampsilis cardium*	97				1	Live	
30 Aug	USB	17	45-55	*Lampsilis cardium*	80				1	Live	
30 Aug	USB	17	45-55	*Lampsilis cardium*					1	WD	
30 Aug	USB	17	45-55	*Obliquaria reflexa*	68.9				1	Live	
30 Aug	USB	17	45-55	*Obliquaria reflexa*	49.3				1	Live	
30 Aug	USB	17	45-55	*Pleurobema cordatum*	79				1	Live	
30 Aug	USB	17	45-55	*Pleurobema cordatum*	71				1	Live	
30 Aug	USB	17	55-65	*Ligumia recta*	139.8			M	1	Live	
30 Aug	USB	17	55-65	*Ligumia recta*	138.3			F	1	Live	
30 Aug	USB	17	55-65	*Pleurobema cordatum*	85.3				1	Live	
30 Aug	USB	17	55-65	*Pleurobema cordatum*	90.3				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	81.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	17	55-65	*Theliderma metanevra*	73.9				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	84				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	79				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	90.3				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	73.8				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	64.2				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	81.3				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	72.2				1	Live	
30 Aug	USB	17	55-65	*Obliquaria reflexa*	42.3				1	Live	
30 Aug	USB	17	55-65	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	17	55-65	*Amblema plicata*	104				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	116.4				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	108.4				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	113.3				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	116				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	107				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	112.2				1	Live	
30 Aug	USB	17	55-65	*Amblema plicata*	103				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	71				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	75.8				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	83.3				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	83.1				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	72.2				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	76.3				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	68.5				1	Live	
30 Aug	USB	17	55-65	*Theliderma metanevra*	74.5				1	Live	
30 Aug	USB	17	55-65	*Cyclonaias pustulosa*	54				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	56				1	Live	
30 Aug	USB	17	55-65	*Ellipsaria lineolata*	79				1	Live	
30 Aug	USB	17	55-65	*Obliquaria reflexa*	56				1	Live	
30 Aug	USB	17	55-65	*Lampsilis cardium*	98.8			F	1	Live	
30 Aug	USB	17	55-65	*Pleurobema cordatum*	97				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	17	55-65	*Ligumia recta*	127			M	1	Live	
30 Aug	USB	17	55-65	*Ligumia recta*	125			F	1	Live	
30 Aug	USB	18	0-5	No mussels					0		
30 Aug	USB	18	5-15	No mussels					0		
30 Aug	USB	18	15-25	*Ligumia recta*	140.1			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	134.2			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	139.9			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	129.6			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	139.2			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	132.4			F	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	138			F	1	Live	
30 Aug	USB	18	15-25	*Megalonaias nervosa*	129				1	Live	
30 Aug	USB	18	15-25	*Megalonaias nervosa*	150+				1	Live	
30 Aug	USB	18	15-25	*Quadrula quadrula*	69				1	Live	
30 Aug	USB	18	15-25	*Quadrula quadrula*	66.8				1	Live	
30 Aug	USB	18	15-25	*Quadrula quadrula*	59.2				1	Live	
30 Aug	USB	18	15-25	*Quadrula quadrula*	53.3				1	Live	
30 Aug	USB	18	15-25	*Ellipsaria lineolata*	61.1				1	Live	
30 Aug	USB	18	15-25	*Amblema plicata*	97				1	Live	
30 Aug	USB	18	15-25	*Amblema plicata*					1	WD	
30 Aug	USB	18	15-25	*Lampsilis siliquoidea*	102.4			F	1	Live	
30 Aug	USB	18	15-25	*Megalonaias nervosa*	140				1	Live	
30 Aug	USB	18	15-25	*Lampsilis siliquoidea*	111.5			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	144.4			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	145.7			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*	152.2			M	1	Live	
30 Aug	USB	18	15-25	*Ligumia recta*				F	1	WD	
30 Aug	USB	18	15-25	*Amblema plicata*	81				1	Live	
30 Aug	USB	18	15-25	*Cyclonaias pustulosa*	55				1	Live	
30 Aug	USB	18	25-35	*Actinonaias ligamentina*	102.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	18	25-35	*Ligumia recta*	150.5			M	1	Live	
30 Aug	USB	18	25-35	*Ligumia recta*	148.9			M	1	Live	
30 Aug	USB	18	25-35	*Amblema plicata*	99.3				1	Live	
30 Aug	USB	18	25-35	*Amblema plicata*	84.6				1	Live	
30 Aug	USB	18	25-35	*Quadrula quadrula*	59.2				1	Live	
30 Aug	USB	18	25-35	*Quadrula quadrula*	67.3				1	Live	
30 Aug	USB	18	25-35	*Ellipsaria lineolata*	74.2				1	Live	
30 Aug	USB	18	25-35	*Lampsilis siliquoidea*	92.8				1	Live	
30 Aug	USB	18	25-35	*Potamilus alatus*	95.1				1	Live	
30 Aug	USB	18	25-35	*Potamilus alatus*	82.3				1	Live	
30 Aug	USB	18	35-45	*Megalonaias nervosa*	150+				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*	72.2				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*	75.1				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*	76				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*	68.2				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*	80.4				1	Live	
30 Aug	USB	18	35-45	*Theliderma metanevra*					1	WD	
30 Aug	USB	18	35-45	*Ligumia recta*	72			M	1	Live	
30 Aug	USB	18	35-45	*Ligumia recta*	141.3			M	1	Live	
30 Aug	USB	18	35-45	*Cyclonaias pustulosa*	70.8				1	Live	
30 Aug	USB	18	35-45	*Cyclonaias pustulosa*	52.7				1	Live	
30 Aug	USB	18	35-45	*Ellipsaria lineolata*	78				1	Live	
30 Aug	USB	18	35-45	*Ellipsaria lineolata*	106				1	Live	
30 Aug	USB	18	35-45	*Amblema plicata*	87				1	Live	
30 Aug	USB	18	35-45	*Amblema plicata*	95.4				1	Live	
30 Aug	USB	18	35-45	*Amblema plicata*	119.2				1	Live	
30 Aug	USB	18	35-45	*Amblema plicata*	74				1	Live	
30 Aug	USB	18	35-45	*Amblema plicata*					3	WD	
30 Aug	USB	18	35-45	*Obliquaria reflexa*	56.2				1	Live	
30 Aug	USB	18	35-45	*Lampsilis cardium*	107.7			F	1	Live	
30 Aug	USB	18	35-45	*Lampsilis cardium*	122.7			M	1	Live	
30 Aug	USB	18	35-45	*Potamilus alatus*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	18	45-55	*Actinonaias ligamentina*	111.5				1	Live	
30 Aug	USB	18	45-55	*Fusconaia flava*					1	WD	
30 Aug	USB	18	45-55	*Amblema plicata*	98.4				1	Live	
30 Aug	USB	18	45-55	*Amblema plicata*	119.3				1	Live	
30 Aug	USB	18	45-55	*Amblema plicata*	102.1				1	Live	
30 Aug	USB	18	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	18	45-55	*Ellipsaria lineolata*	76				1	Live	
30 Aug	USB	18	45-55	*Ellipsaria lineolata*	75.6				1	Live	
30 Aug	USB	18	45-55	*Theliderma metanevra*	79.3				1	Live	
30 Aug	USB	18	45-55	*Theliderma metanevra*	83				1	Live	
30 Aug	USB	18	45-55	*Theliderma metanevra*	78.9				1	Live	
30 Aug	USB	18	45-55	*Theliderma metanevra*	79.9				1	Live	
30 Aug	USB	18	45-55	*Theliderma metanevra*	73.1				1	Live	
30 Aug	USB	18	45-55	*Quadrula quadrula*	63				1	Live	
30 Aug	USB	18	45-55	*Quadrula quadrula*	58				1	Live	
30 Aug	USB	18	45-55	*Quadrula quadrula*					1	WD	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*	50.1				1	Live	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*	63.1				1	Live	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*	52.5				1	Live	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*	56				1	Live	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*	66.8				1	Live	
30 Aug	USB	18	45-55	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	18	45-55	*Ligumia recta*	143			F	1	Live	
30 Aug	USB	18	45-55	*Pleurobema cordatum*	66				1	Live	
30 Aug	USB	18	45-55	*Pleurobema cordatum*	64.9				1	Live	
30 Aug	USB	18	45-55	*Pleurobema cordatum*	96.5				1	Live	
30 Aug	USB	18	45-55	*Potamilus alatus*	98.9				1	Live	
30 Aug	USB	18	55-65	*Obliquaria reflexa*	48.2				1	Live	
30 Aug	USB	18	55-65	*Obliquaria reflexa*	84.4				1	Live	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	49.5				1	Live	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	67.3				1	Live	
30 Aug	USB	18	55-65	*Ligumia recta*	146.7			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	18	55-65	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	18	55-65	*Ligumia recta*	81.6			M	1	Live	
30 Aug	USB	18	55-65	*Lampsilis cardium*	113			F	1	Live	
30 Aug	USB	18	55-65	*Lampsilis cardium*	115.5			F	1	Live	
30 Aug	USB	18	55-65	*Actinonaias ligamentina*	118.5				1	Live	
30 Aug	USB	18	55-65	*Lampsilis abrupta**	120	66.4	90.5		1	Live	0276 Orange
30 Aug	USB	18	55-65	*Plethobasus cyphyus**	105.1	48.7	73.4		1	Live	1976 Yellow
30 Aug	USB	18	55-65	*Theliderma metanevra*	75.2				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	84.5				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	84.1				1	Live	
30 Aug	USB	18	55-65	*Ellipsaria lineolata*	83				1	Live	
30 Aug	USB	18	55-65	*Pleurobema cordatum*	93.3				1	Live	
30 Aug	USB	18	55-65	*Obovaria subrotunda**					1	WD	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	63.9				1	Live	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	65.2				1	Live	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	64.1				1	Live	
30 Aug	USB	18	55-65	*Cyclonaias pustulosa*	64				1	Live	
30 Aug	USB	18	55-65	*Quadrula quadrula*	65.8				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	78.4				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	83.1				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	77.4				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	87				1	Live	
30 Aug	USB	18	55-65	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	18	55-65	*Ellipsaria lineolata*	66.3				1	Live	
30 Aug	USB	18	55-65	*Ellipsaria lineolata*	73				1	Live	
30 Aug	USB	18	55-65	*Ellipsaria lineolata*	88.1				1	Live	
30 Aug	USB	18	55-65	*Amblema plicata*	103				1	Live	
30 Aug	USB	18	55-65	*Amblema plicata*	91				1	Live	
30 Aug	USB	18	55-65	*Ligumia recta*	43			M	1	Live	
30 Aug	USB	18	55-65	*Pleurobema cordatum*	84.1				1	Live	
30 Aug	USB	18	55-65	*Pleurobema cordatum*	70.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	18	55-65	*Pleurobema cordatum*	87.2				1	Live	
30 Aug	USB	19	0-5	No mussels					0		
30 Aug	USB	19	5-15	No mussels					0		
30 Aug	USB	19	15-25	*Ellipsaria lineolata*	67.2				1	Live	
30 Aug	USB	19	15-25	*Ellipsaria lineolata*	54.9				1	Live	
30 Aug	USB	19	15-25	*Cyclonaias pustulosa*	60				1	Live	
30 Aug	USB	19	15-25	*Obliquaria reflexa*	63.1				1	Live	
30 Aug	USB	19	15-25	*Amblema plicata*	107.3				1	Live	
30 Aug	USB	19	15-25	*Amblema plicata*					1	WD	
30 Aug	USB	19	15-25	*Amblema plicata*					1	WD	
30 Aug	USB	19	15-25	*Potamilus alatus*	108.5				1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	134.7			F	1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	140.8			F	1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	138.9			M	1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	138.5			F	1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	138.3			M	1	Live	
30 Aug	USB	19	15-25	*Ligumia recta*	139.9			F	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	133.4			F	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	141.5			M	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	138			F	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	150+			M	1	Live	
30 Aug	USB	19	25-35	*Ligumia recta*	126.5			F	1	Live	
30 Aug	USB	19	25-35	*Megalonaias nervosa*	138.6				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	87.2				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	118.2				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	107				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	111.3				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	106.3				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*	111.2				1	Live	
30 Aug	USB	19	25-35	*Amblema plicata*					1	WD	
30 Aug	USB	19	25-35	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	19	25-35	*Obliquaria reflexa*	66.6				1	Live	
30 Aug	USB	19	25-35	*Obliquaria reflexa*	62.8				1	Live	
30 Aug	USB	19	25-35	*Obliquaria reflexa*					1	WD	
30 Aug	USB	19	25-35	*Ellipsaria lineolata*	73.8				1	Live	
30 Aug	USB	19	25-35	*Cyclonaias pustulosa*	59.1				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	92.8				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	111.4				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	98.5				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	104				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	86.2				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*	92				1	Live	
30 Aug	USB	19	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	19	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	19	35-45	*Amblema plicata*					1	WD	
30 Aug	USB	19	35-45	*Obliquaria reflexa*	39.1				1	Live	
30 Aug	USB	19	35-45	*Obliquaria reflexa*	48.6				1	Live	
30 Aug	USB	19	35-45	*Ellipsaria lineolata*	67.7				1	Live	
30 Aug	USB	19	35-45	*Ellipsaria lineolata*	63.2				1	Live	
30 Aug	USB	19	35-45	*Ellipsaria lineolata*	88.8				1	Live	
30 Aug	USB	19	35-45	*Theliderma metanevra*	83				1	Live	
30 Aug	USB	19	35-45	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	19	35-45	*Cyclonaias pustulosa*	54.9				1	Live	
30 Aug	USB	19	35-45	*Cyclonaias pustulosa*	64.5				1	Live	
30 Aug	USB	19	35-45	*Ligumia recta*	145			M	1	Live	
30 Aug	USB	19	35-45	*Actinonaias ligamentina*	108				1	Live	
30 Aug	USB	19	35-45	*Actinonaias ligamentina*	127				1	Live	
30 Aug	USB	19	35-45	*Pleurobema cordatum*	67				1	Live	
30 Aug	USB	19	35-45	*Pleurobema cordatum*	92.5				1	Live	
30 Aug	USB	19	35-45	*Quadrula quadrula*	54.1				1	Live	
30 Aug	USB	19	35-45	*Potamilus alatus*					1	WD	
30 Aug	USB	19	45-55	*Cyclonaias pustulosa*	60				1	Live	
30 Aug	USB	19	45-55	*Cyclonaias pustulosa*	50.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	19	45-55	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	19	45-55	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	19	45-55	*Amblema plicata*	92				1	Live	
30 Aug	USB	19	45-55	*Amblema plicata*	106				1	Live	
30 Aug	USB	19	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	19	45-55	*Quadrula quadrula*	55				1	Live	
30 Aug	USB	19	45-55	*Quadrula quadrula*	67.8				1	Live	
30 Aug	USB	19	45-55	*Quadrula quadrula*	63.5				1	Live	
30 Aug	USB	19	45-55	*Quadrula quadrula*	63				1	Live	
30 Aug	USB	19	45-55	*Theliderma metanevra*	78				1	Live	
30 Aug	USB	19	45-55	*Theliderma metanevra*	75.4				1	Live	
30 Aug	USB	19	45-55	*Theliderma metanevra*	72				1	Live	
30 Aug	USB	19	45-55	*Theliderma metanevra*					1	WD	
30 Aug	USB	19	45-55	*Theliderma metanevra*					1	WD	
30 Aug	USB	19	45-55	*Ellipsaria lineolata*	73.1				1	Live	
30 Aug	USB	19	45-55	*Ellipsaria lineolata*	75.1				1	Live	
30 Aug	USB	19	45-55	*Ellipsaria lineolata*	59.5				1	Live	
30 Aug	USB	19	45-55	*Ellipsaria lineolata*					1	WD	
30 Aug	USB	19	45-55	*Pleurobema cordatum*	70				1	Live	
30 Aug	USB	19	45-55	*Pleurobema cordatum*	79				1	Live	
30 Aug	USB	19	45-55	*Actinonaias ligamentina*	113.2				1	Live	
30 Aug	USB	19	45-55	*Actinonaias ligamentina*	107.5				1	Live	
30 Aug	USB	19	45-55	*Pleurobema sintoxia*	80.1				1	Live	
30 Aug	USB	19	45-55	*Obliquaria reflexa*	107.5				1	Live	
30 Aug	USB	19	45-55	*Obliquaria reflexa*	55				1	Live	
30 Aug	USB	19	55-65	*Lampsilis cardium*	107.2			F	1	Live	
30 Aug	USB	19	55-65	*Amblema plicata*	85				1	Live	
30 Aug	USB	19	55-65	*Amblema plicata*	119				1	Live	
30 Aug	USB	19	55-65	*Ellipsaria lineolata*	87				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	66.7				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	84.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	19	55-65	*Theliderma metanevra*	78.9				1	Live	
30 Aug	USB	19	55-65	*Ligumia recta*	130			M	1	Live	
30 Aug	USB	19	55-65	*Plethobasus cyphyus**	106.3	47.6	77.3		1	Live	1418 Yellow
30 Aug	USB	19	55-65	*Plethobasus cyphyus**	108.9	49.7	81.3		1	Live	0774 Yellow
30 Aug	USB	19	55-65	*Amblema plicata*	69.3				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	88.6				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*					1	WD	
30 Aug	USB	19	55-65	*Ellipsaria lineolata*	83.5				1	Live	
30 Aug	USB	19	55-65	*Ellipsaria lineolata*					1	WD	
30 Aug	USB	19	55-65	*Ligumia recta*	135.3			M	1	Live	
30 Aug	USB	19	55-65	*Ligumia recta*	137.6			M	1	Live	
30 Aug	USB	19	55-65	*Ligumia recta*	135.2			M	1	Live	
30 Aug	USB	19	55-65	*Cyclonaias pustulosa*	63.5				1	Live	
30 Aug	USB	19	55-65	*Pleurobema cordatum*	82.3				1	Live	
30 Aug	USB	19	55-65	*Pleurobema cordatum*	88.6				1	Live	
30 Aug	USB	19	55-65	*Pleurobema cordatum*	88.5				1	Live	
30 Aug	USB	19	55-65	*Lampsilis cardium*	83.2				1	Live	
30 Aug	USB	19	55-65	*Amblema plicata*	101.5				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	84.9				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	73.2				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	73.1				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*	75.6				1	Live	
30 Aug	USB	19	55-65	*Theliderma metanevra*					1	WD	
30 Aug	USB	20	0-5	No mussels					0		
30 Aug	USB	20	5-15	No mussels					0		
30 Aug	USB	20	15-25	*Ligumia recta*	150+			F	1	Live	
30 Aug	USB	20	15-25	*Ligumia recta*	129.6			F	1	Live	
30 Aug	USB	20	15-25	*Ligumia recta*	127			M	1	Live	
30 Aug	USB	20	15-25	*Potamilus alatus*	130.6				1	Live	
30 Aug	USB	20	15-25	*Potamilus alatus*	114				1	Live	
30 Aug	USB	20	15-25	*Potamilus alatus*	98.7				1	Live	
30 Aug	USB	20	15-25	*Lasmigona complanata*	115.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	20	25-35	*Ligumia recta*	143			F	1	Live	
30 Aug	USB	20	25-35	*Ligumia recta*	138			F	1	Live	
30 Aug	USB	20	25-35	*Ligumia recta*	132			F	1	Live	
30 Aug	USB	20	25-35	*Amblema plicata*	98.5				1	Live	
30 Aug	USB	20	25-35	*Amblema plicata*	81				1	Live	
30 Aug	USB	20	25-35	*Amblema plicata*	91				1	Live	
30 Aug	USB	20	25-35	*Amblema plicata*	106.4				1	Live	
30 Aug	USB	20	25-35	*Amblema plicata*	93.3				1	Live	
30 Aug	USB	20	25-35	*Obliquaria reflexa*	53				1	Live	
30 Aug	USB	20	25-35	*Quadrula quadrula*	61.7				1	Live	
30 Aug	USB	20	25-35	*Actinonaias ligamentina*	134				1	Live	
30 Aug	USB	20	25-35	*Cyclonaias pustulosa*	62.3				1	Live	
30 Aug	USB	20	25-35	*Potamilus alatus*	128.4				1	Live	
30 Aug	USB	20	35-45	*Amblema plicata*	112.5				1	Live	
30 Aug	USB	20	35-45	*Amblema plicata*	101				1	Live	
30 Aug	USB	20	35-45	*Amblema plicata*	101.8				1	Live	
30 Aug	USB	20	35-45	*Cyclonaias pustulosa*	72.4				1	Live	
30 Aug	USB	20	35-45	*Cyclonaias pustulosa*	67.3				1	Live	
30 Aug	USB	20	35-45	*Ellipsaria lineolata*	57.7				1	Live	
30 Aug	USB	20	35-45	*Ligumia recta*	135			F	1	Live	
30 Aug	USB	20	35-45	*Ligumia recta*	128.6			M	1	Live	
30 Aug	USB	20	35-45	*Actinonaias ligamentina*	101.4				1	Live	
30 Aug	USB	20	35-45	*Potamilus alatus*	72.9				1	Live	
30 Aug	USB	20	35-45	*Potamilus alatus*	85.6				1	Live	
30 Aug	USB	20	35-45	*Ellipsaria lineolata*	80.7				1	Live	
30 Aug	USB	20	35-45	*Cyclonaias pustulosa*	63.7				1	Live	
30 Aug	USB	20	35-45	*Megalonaias nervosa*	147.5				1	Live	
30 Aug	USB	20	35-45	*Theliderma metanevra*	73.7				1	Live	
30 Aug	USB	20	45-55	*Amblema plicata*	113				1	Live	
30 Aug	USB	20	45-55	*Amblema plicata*	64.4				1	Live	
30 Aug	USB	20	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	20	45-55	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	20	45-55	*Amblema plicata*					1	WD	
30 Aug	USB	20	45-55	*Theliderma metanevra*	70.5				1	Live	
30 Aug	USB	20	45-55	*Theliderma metanevra*	77.7				1	Live	
30 Aug	USB	20	45-55	*Theliderma metanevra*	80.8				1	Live	
30 Aug	USB	20	45-55	*Quadrula quadrula*	63.8				1	Live	
30 Aug	USB	20	45-55	*Ligumia recta*	117.9			F	1	Live	
30 Aug	USB	20	45-55	*Ligumia recta*	120.6			F	1	Live	
30 Aug	USB	20	45-55	*Obliquaria reflexa*	56.2				1	Live	
30 Aug	USB	20	45-55	*Megalonaias nervosa*	135.4				1	Live	
30 Aug	USB	20	45-55	*Cyclonaias pustulosa*	53.8				1	Live	
30 Aug	USB	20	45-55	*Cyclonaias pustulosa*	63				1	Live	
30 Aug	USB	20	45-55	*Cyclonaias pustulosa*	61.3				1	Live	
30 Aug	USB	20	45-55	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	20	45-55	*Ellipsaria lineolata*	91				1	Live	
30 Aug	USB	20	45-55	*Ellipsaria lineolata*	64.4				1	Live	
30 Aug	USB	20	45-55	*Ellipsaria lineolata*					1	WD	
30 Aug	USB	20	45-55	*Pleurobema sintoxia*	94.6				1	Live	
30 Aug	USB	20	45-55	*Pleurobema sintoxia*	99.6				1	Live	
30 Aug	USB	20	45-55	*Pleurobema sintoxia*	78.3				1	Live	
30 Aug	USB	20	45-55	*Potamilus alatus*	97				1	Live	
30 Aug	USB	20	45-55	*Pleurobema cordatum*	66.4				1	Live	
30 Aug	USB	20	45-55	*Lasmigona complanata*					1	WD	
30 Aug	USB	20	45-55	*Actinonaias ligamentina*	108.7				1	Live	
30 Aug	USB	20	55-65	*Amblema plicata*	92				1	Live	
30 Aug	USB	20	55-65	*Amblema plicata*	93.7				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	71.4				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	76.5				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*					1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	61				1	Live	
30 Aug	USB	20	55-65	*Cyclonaias pustulosa*	55				1	Live	
30 Aug	USB	20	55-65	*Cyclonaias pustulosa*	60				1	Live	
30 Aug	USB	20	55-65	*Ellipsaria lineolata*	87.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
30 Aug	USB	20	55-65	*Ligumia recta*	131.3			M	1	Live	
30 Aug	USB	20	55-65	*Ligumia recta*	148.7			F	1	Live	
30 Aug	USB	20	55-65	*Ligumia recta*	144.5			F	1	Live	
30 Aug	USB	20	55-65	*Cyclonaias pustulosa*	63				1	Live	
30 Aug	USB	20	55-65	*Cyclonaias pustulosa*					1	WD	
30 Aug	USB	20	55-65	*Theliderma metanevra*	82				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	75				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*					1	WD	
30 Aug	USB	20	55-65	*Theliderma metanevra*					1	WD	
30 Aug	USB	20	55-65	*Theliderma metanevra*	84				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	80				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	84.6				1	Live	
30 Aug	USB	20	55-65	*Theliderma metanevra*	74.2				1	Live	
30 Aug	USB	20	55-65	*Pleurobema sintoxia*	89				1	Live	
30 Aug	USB	20	55-65	*Pleurobema sintoxia*	88.3				1	Live	
30 Aug	USB	20	55-65	*Ellipsaria lineolata*	94.2				1	Live	
30 Aug	USB	20	55-65	*Ellipsaria lineolata*					1	WD	
30 Aug	USB	20	55-65	*Ellipsaria lineolata*	81.6				1	Live	
30 Aug	USB	20	55-65	*Amblema plicata*	53.8				1	Live	
30 Aug	USB	20	55-65	*Obovaria subrotunda**	43.9	24.7	41.4		1	Live	1606 Yellow

[1] ADI = Area of direct impact; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

[2] * = Federally listed species

[3] F = Female; M = Male

[4] WD = Weathered deadshell; SF = Subfossil

Table B5. Site 1 spot dive mussel morphometric and occurance data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 1	*Amblema plicata*	70.0				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	110.0				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	107.2				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	82.3				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	103.6				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	73.7				1	Live	
2 Sep	DSS	Spot 1	*Amblema plicata*	84.2				1	Live	
2 Sep	DSS	Spot 1	*Pleurobema cordatum*	68.3				1	Live	
2 Sep	DSS	Spot 1	*Ligumia recta*	131.2			M	1	Live	
2 Sep	DSS	Spot 1	*Ligumia recta*	140.0			M	1	Live	
2 Sep	DSS	Spot 1	*Ligumia recta*	134.2			M	1	Live	
2 Sep	DSS	Spot 1	*Obliquaria reflexa*	52.4				1	Live	
2 Sep	DSS	Spot 1	*Obliquaria reflexa*	55.6				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	51.6				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	73.2				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	72.5				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	94.2				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	71.3				1	Live	
2 Sep	DSS	Spot 1	*Ellipsaria lineolata*	52.7				1	Live	
2 Sep	DSS	Spot 1	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 1	*Cyclonaias pustulosa*	63.4				1	Live	
2 Sep	DSS	Spot 1	*Cyclonaias pustulosa*	67.5				1	Live	
2 Sep	DSS	Spot 1	*Cyclonaias pustulosa*	55.2				1	Live	
2 Sep	DSS	Spot 1	*Cyclonaias pustulosa*	54.0				1	Live	
2 Sep	DSS	Spot 1	*Theliderma metanevra*	84.1				1	Live	
2 Sep	DSS	Spot 1	*Theliderma metanevra*	76.2				1	Live	
2 Sep	DSS	Spot 1	*Lampsilis cardium*	98.2			F	1	Live	
2 Sep	DSS	Spot 1	*Lampsilis cardium*	121.2			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 1	*Lampsilis cardium*	109.2			M	1	Live	
2 Sep	DSS	Spot 1	*Obliquaria reflexa*	58.2				1	Live	
2 Sep	DSS	Spot 1	*Actinonaias ligamentina*	99.4				1	Live	
2 Sep	DSS	Spot 1	*Actinonaias ligamentina*	123.2				1	Live	
2 Sep	DSS	Spot 1	*Actinonaias ligamentina*	119.5				1	Live	
2 Sep	DSS	Spot 1	*Quadrula quadrula*					1	WD	
2 Sep	DSS	Spot 1	*Pleurobema sintoxia*	86.2				1	Live	
2 Sep	DSS	Spot 1	*Pleurobema sintoxia*	93.7				1	Live	
2 Sep	DSS	Spot 1	*Pleurobema sintoxia*	92.8				1	Live	
2 Sep	DSS	Spot 1	*Fusconaia flava*	82.5				1	Live	
2 Sep	DSS	Spot 1	*Pleurobema cordatum*	86.3				1	Live	
2 Sep	DSS	Spot 1	*Potamilus alatus*	120.1				1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	148.0			M	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	123.2			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	136.0			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	149.2			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	123.8			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	133.2			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	148.2			M	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	130.0			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	138.0			M	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	123.0			F	1	Live	
2 Sep	DSS	Spot 2	*Ligumia recta*	134.0			M	1	Live	
2 Sep	DSS	Spot 2	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 2	*Potamilus alatus*	121.0				1	Live	
2 Sep	DSS	Spot 2	*Potamilus alatus*	118.3				1	Live	
2 Sep	DSS	Spot 2	*Potamilus alatus*	120.7				1	Live	
2 Sep	DSS	Spot 2	*Potamilus alatus*	98.6				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	91.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	98.0				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	74.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 2	*Amblema plicata*	110.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	93.0				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	71.7				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	98.6				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	99.6				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	57.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	103.8				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	108.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	100.1				1	Live	
2 Sep	DSS	Spot 2	*Cyclonaias pustulosa*	60.2				1	Live	
2 Sep	DSS	Spot 2	*Cyclonaias pustulosa*	55.2				1	Live	
2 Sep	DSS	Spot 2	*Cyclonaias pustulosa*	54.5				1	Live	
2 Sep	DSS	Spot 2	*Ellipsaria lineolata*	82.3				1	Live	
2 Sep	DSS	Spot 2	*Ellipsaria lineolata*	69.7				1	Live	
2 Sep	DSS	Spot 2	*Cyprogenia stegaria**	62.0	41.1	61.5		1	Live	1725 Yellow
2 Sep	DSS	Spot 2	*Plethobasus cyphyus**	100.7	43.0	71.5		1	Live	1765 Yellow
2 Sep	DSS	Spot 2	*Theliderma metanevra*	69.2				1	Live	
2 Sep	DSS	Spot 2	*Theliderma metanevra*	85.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	112.0				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	110.3				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	100.7				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	98.7				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	102.8				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	94.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	95.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	63.8				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	79.3				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	83.5				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	94.2				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*	93.3				1	Live	
2 Sep	DSS	Spot 2	*Lampsilis cardium*	118.7			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 2	*Quadrula quadrula*	59.7				1	Live	
2 Sep	DSS	Spot 2	*Amblema plicata*					3	WD	
2 Sep	DSS	Spot 2	*Lampsilis siliquoidea*	106.3				1	Live	
2 Sep	DSS	Spot 3	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 3	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 3	*Megalonaias nervosa*	131.5				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	113.5				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	102.8				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	99.2				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	99.7				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	113.3				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	92.4				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	96.7				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	113.0				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	103.7				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	85.8				1	Live	
2 Sep	DSS	Spot 3	*Amblema plicata*	90.1				1	Live	
2 Sep	DSS	Spot 3	*Ptychobranchus fasciolaris*	115.0				1	Live	
2 Sep	DSS	Spot 3	*Ellipsaria lineolata*	51.1				1	Live	
2 Sep	DSS	Spot 3	*Ellipsaria lineolata*	60.3				1	Live	
2 Sep	DSS	Spot 3	*Ellipsaria lineolata*	68.2				1	Live	
2 Sep	DSS	Spot 3	*Obliquaria reflexa*	58.4				1	Live	
2 Sep	DSS	Spot 3	*Obliquaria reflexa*	48.6				1	Live	
2 Sep	DSS	Spot 3	*Obliquaria reflexa*	43.1				1	Live	
2 Sep	DSS	Spot 3	*Theliderma metanevra*	75.0				1	Live	
2 Sep	DSS	Spot 3	*Theliderma metanevra*	77.2				1	Live	
2 Sep	DSS	Spot 3	*Ligumia recta*	142.3			M	1	Live	
2 Sep	DSS	Spot 3	*Lasmigona complanata*	128.0				1	Live	
2 Sep	DSS	Spot 3	*Lampsilis cardium*	115.4			M	1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	102.2				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	100.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 4	*Amblema plicata*	78.7				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	94.5				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	98.0				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	93.4				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	86.2				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	72.3				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	70.8				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	92.4				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	103.4				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	96.6				1	Live	
2 Sep	DSS	Spot 4	*Megalonaias nervosa*	120.1				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	105.2				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	89.4				1	Live	
2 Sep	DSS	Spot 4	*Amblema plicata*	82.6				1	Live	
2 Sep	DSS	Spot 4	*Obliquaria reflexa*	50.2				1	Live	
2 Sep	DSS	Spot 4	*Obliquaria reflexa*	53.4				1	Live	
2 Sep	DSS	Spot 4	*Obliquaria reflexa*	58.2				1	Live	
2 Sep	DSS	Spot 4	*Obliquaria reflexa*	45.6				1	Live	
2 Sep	DSS	Spot 4	*Obliquaria reflexa*	50.1				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	93.4				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	50.6				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	88.2				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	64.1				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	73.3				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	68.0				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	69.2				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	71.4				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	73.2				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	72.0				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	83.5				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	76.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	59.2				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	58.3				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	64.8				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	53.4				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	61.2				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	53.1				1	Live	
2 Sep	DSS	Spot 4	*Cyclonaias pustulosa*	70.1				1	Live	
2 Sep	DSS	Spot 4	*Theliderma metanevra*	73.0				1	Live	
2 Sep	DSS	Spot 4	*Theliderma metanevra*	75.2				1	Live	
2 Sep	DSS	Spot 4	*Theliderma metanevra*	79.0				1	Live	
2 Sep	DSS	Spot 4	*Theliderma metanevra*	72.3				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	82.5				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	68.4				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	67.4				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	44.6				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	71.2				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	85.4				1	Live	
2 Sep	DSS	Spot 4	*Ellipsaria lineolata*	92.0				1	Live	
2 Sep	DSS	Spot 4	*Ligumia recta*	125.0			F	1	Live	
2 Sep	DSS	Spot 4	*Ligumia recta*	138.2			M	1	Live	
2 Sep	DSS	Spot 4	*Ligumia recta*	143.1			F	1	Live	
2 Sep	DSS	Spot 4	*Quadrula quadrula*	58.0				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	100.2				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	92.3				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	84.4				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	93.8				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	78.2				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	88.4				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	79.4				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	84.7				1	Live	
2 Sep	DSS	Spot 5	*Amblema plicata*	104.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 5	*Amblema plicata*					4	WD	
2 Sep	DSS	Spot 5	*Megalonaias nervosa*	120.1				1	Live	
2 Sep	DSS	Spot 5	*Ligumia recta*	145.0			M	1	Live	
2 Sep	DSS	Spot 5	*Ligumia recta*	132.8			M	1	Live	
2 Sep	DSS	Spot 5	*Ligumia recta*	124.1			F	1	Live	
2 Sep	DSS	Spot 5	*Ligumia recta*	130.8			F	1	Live	
2 Sep	DSS	Spot 5	*Potamilus alatus*	131.1				1	Live	
2 Sep	DSS	Spot 5	*Theliderma metanevra*	69.1				1	Live	
2 Sep	DSS	Spot 5	*Ellipsaria lineolata*	76.2				1	Live	
2 Sep	DSS	Spot 5	*Ellipsaria lineolata*	83.1				1	Live	
2 Sep	DSS	Spot 5	*Ellipsaria lineolata*	88.2				1	Live	
2 Sep	DSS	Spot 5	*Ellipsaria lineolata*					1	WD	
2 Sep	DSS	Spot 5	*Quadrula quadrula*	61.2				1	Live	
2 Sep	DSS	Spot 5	*Pleurobema cordatum*	75.0				1	Live	
2 Sep	DSS	Spot 5	*Pleurobema sintoxia*	94.2				1	Live	
2 Sep	DSS	Spot 5	*Lampsilis cardium*	103.1			M	1	Live	
2 Sep	DSS	Spot 5	*Lampsilis cardium*	108.1			F	1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	107.2				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	98.0				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	88.3				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	108.6				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	96.2				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	86.4				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	100.1				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	104.3				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	116.1				1	Live	
2 Sep	DSS	Spot 6	*Amblema plicata*	69.0				1	Live	
2 Sep	DSS	Spot 6	*Ellipsaria lineolata*	85.0				1	Live	
2 Sep	DSS	Spot 6	*Ellipsaria lineolata*	53.1				1	Live	
2 Sep	DSS	Spot 6	*Ellipsaria lineolata*	63.1				1	Live	
2 Sep	DSS	Spot 6	*Cyclonaias pustulosa*	49.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 6	*Cyclonaias pustulosa*	64.0				1	Live	
2 Sep	DSS	Spot 6	*Theliderma metanevra*	77.4				1	Live	
2 Sep	DSS	Spot 6	*Theliderma metanevra*	86.5				1	Live	
2 Sep	DSS	Spot 6	*Theliderma metanevra*	75.5				1	Live	
2 Sep	DSS	Spot 6	*Ligumia recta*	133.1			F	1	Live	
2 Sep	DSS	Spot 6	*Ligumia recta*	139.4			F	1	Live	
2 Sep	DSS	Spot 6	*Ligumia recta*	138.2			F	1	Live	
2 Sep	DSS	Spot 6	*Ligumia recta*	115.3			F	1	Live	
2 Sep	DSS	Spot 6	*Ligumia recta*	118.0			M	1	Live	
2 Sep	DSS	Spot 6	*Potamilus alatus*	100.1				1	Live	
2 Sep	DSS	Spot 6	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 6	*Pleurobema cordatum*	53.4				1	Live	
2 Sep	DSS	Spot 6	*Obliquaria reflexa*	60.0				1	Live	
2 Sep	DSS	Spot 6	*Obliquaria reflexa*	55.5				1	Live	
2 Sep	DSS	Spot 6	*Obliquaria reflexa*	54.2				1	Live	
2 Sep	DSS	Spot 6	*Obliquaria reflexa*	59.3				1	Live	
2 Sep	DSS	Spot 6	*Cyclonaias pustulosa*					1	WD	
2 Sep	DSS	Spot 7	*Megalonaias nervosa*	146.0				1	Live	
2 Sep	DSS	Spot 7	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*	92.3				1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*	87.4				1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*	114.0				1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*	73.2				1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*	76.4				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	81.0				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	80.2				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	79.4				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	77.8				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	60.2				1	Live	
2 Sep	DSS	Spot 7	*Theliderma metanevra*	78.0				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	62.0				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	57.1				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	55.6				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	62.5				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	54.2				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	45.0				1	Live	
2 Sep	DSS	Spot 7	*Cyclonaias pustulosa*	52.4				1	Live	
2 Sep	DSS	Spot 7	*Quadrula quadrula*	54.8				1	Live	
2 Sep	DSS	Spot 7	*Quadrula quadrula*	60.1				1	Live	
2 Sep	DSS	Spot 7	*Obliquaria reflexa*	45.0				1	Live	
2 Sep	DSS	Spot 7	*Obliquaria reflexa*	46.5				1	Live	
2 Sep	DSS	Spot 7	*Ellipsaria lineolata*	75.2				1	Live	
2 Sep	DSS	Spot 7	*Ellipsaria lineolata*	78.0				1	Live	
2 Sep	DSS	Spot 7	*Lampsilis cardium*	115.0			F	1	Live	
2 Sep	DSS	Spot 7	*Pleurobema cordatum*	83.4				1	Live	
2 Sep	DSS	Spot 7	*Ligumia recta*	138.1			M	1	Live	
2 Sep	DSS	Spot 7	*Ligumia recta*	135.4			M	1	Live	
2 Sep	DSS	Spot 7	*Ligumia recta*	140.0			M	1	Live	
2 Sep	DSS	Spot 7	*Amblema plicata*					1	WD	
2 Sep	DSS	Spot 8	*Amblema plicata*	88.4				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	95.4				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	72.0				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	109.5				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	96.6				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	103.5				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	89.0				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	76.2				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	110.0				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	105.0				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	99.5				1	Live	
2 Sep	DSS	Spot 8	*Amblema plicata*	110.2				1	Live	
2 Sep	DSS	Spot 8	*Ellipsaria lineolata*	54.0				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 8	*Ellipsaria lineolata*	70.7				1	Live	
2 Sep	DSS	Spot 8	*Cyclonaias pustulosa*	44.6				1	Live	
2 Sep	DSS	Spot 8	*Cyclonaias pustulosa*	59.4				1	Live	
2 Sep	DSS	Spot 8	*Cyclonaias pustulosa*	65.5				1	Live	
2 Sep	DSS	Spot 8	*Theliderma metanevra*	85.0				1	Live	
2 Sep	DSS	Spot 8	*Theliderma metanevra*	86.7				1	Live	
2 Sep	DSS	Spot 8	*Theliderma metanevra*	79.0				1	Live	
2 Sep	DSS	Spot 8	*Theliderma metanevra*	75.5				1	Live	
2 Sep	DSS	Spot 8	*Obliquaria reflexa*	53.0				1	Live	
2 Sep	DSS	Spot 8	*Ligumia recta*	139.1			F	1	Live	
2 Sep	DSS	Spot 8	*Ligumia recta*	122.0			M	1	Live	
2 Sep	DSS	Spot 8	*Lampsilis cardium*	120.0			M	1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	73.1				1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	74.0				1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	65.2				1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	90.0				1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	89.5				1	Live	
2 Sep	DSS	Spot 9	*Ellipsaria lineolata*	88.5				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	54.0				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	57.2				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	56.3				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	56.5				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	54.3				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	58.0				1	Live	
2 Sep	DSS	Spot 9	*Cyclonaias pustulosa*	56.5				1	Live	
2 Sep	DSS	Spot 9	*Amblema plicata*	84.4				1	Live	
2 Sep	DSS	Spot 9	*Amblema plicata*	72.0				1	Live	
2 Sep	DSS	Spot 9	*Amblema plicata*	78.5				1	Live	
2 Sep	DSS	Spot 9	*Lampsilis siliquoidea*	100.0			F	1	Live	
2 Sep	DSS	Spot 9	*Theliderma metanevra*	81.2				1	Live	
2 Sep	DSS	Spot 9	*Theliderma metanevra*	85.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition	Tag Number
2 Sep	DSS	Spot 9	*Theliderma metanevra*	74.6				1	Live	
2 Sep	DSS	Spot 9	*Theliderma metanevra*	73.7				1	Live	
2 Sep	DSS	Spot 9	*Theliderma metanevra*	66.9				1	Live	
2 Sep	DSS	Spot 9	*Theliderma metanevra*	67.4				1	Live	
2 Sep	DSS	Spot 9	*Obliquaria reflexa*	59.1				1	Live	
2 Sep	DSS	Spot 9	*Obliquaria reflexa*	45.5				1	Live	
2 Sep	DSS	Spot 9	*Potamilus alatus*	104.6				1	Live	
2 Sep	DSS	Spot 9	*Potamilus alatus*	91.0				1	Live	
2 Sep	DSS	Spot 9	*Pleurobema cordatum*	72.5				1	Live	
2 Sep	DSS	Spot 9	*Fusconaia flava*	71.0				1	Live	
2 Sep	DSS	Spot 9	*Quadrula quadrula*	58.4				1	Live	
2 Sep	DSS	Spot 9	*Quadrula quadrula*	59.0				1	Live	
2 Sep	DSS	Spot 9	*Ligumia recta*	150.0			M	1	Live	

[1] DSS = Downstream spot dive

[2] * = Federally listed species

[3] F = Female; M = Male

[4] WD = Weathered deadshell

Table B6. Site 1 spot dive habitat data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Survey Area[1]	Transect[1]	Divers	Percent Substrate Composition					Survey Time (mins)	Depth (m)
				Fines	Sand	Gravel	Cobble	Woody Debris		
2 Sep	DSS	Spot 1	BY	50		30	20		10	4.9
2 Sep	DSS	Spot 2	BY	50	20	20	10		10	4.9
2 Sep	DSS	Spot 3	BY	50	20	20	10		10	4.3
2 Sep	DSS	Spot 4	BY	50	20	20	10		10	5.2
2 Sep	DSS	Spot 5	BY	50		40	5	5	10	5.2
2 Sep	DSS	Spot 6	BY	50		40	10		10	5.2
2 Sep	DSS	Spot 7	BY	50		40	10		10	5.2
2 Sep	DSS	Spot 8	BY	50		40	10		10	5.2
2 Sep	DSS	Spot 9	BY	50		40	10		10	5.2

[1] DSS = Downstream spot dive

[2] BY = Brandon Yates

B-3
WVDNR SCOPE OF WORK FORM

Mussel Survey Scope of Work Summary Sheet

Form Date **3/16/2020**

Project Title: Site 1 USFWS-NWR Muskingum Island Well Plugging Project

Project Company: USFWS - National Wildlife Refuge
Date Submitted: 29-Jul-24
Mussel Contractor: Environmental Solutions & Innovations
Date Revised: 28-Oct-24
Lead Malacologist: Brandon L. Yates
Project Contractor: Environmental Solutions & Innovations
Collectors: if applicable Brandon L. Yates, Paul Robert, Vanessa Vest, Kevin Yount, Brian Dennis
County: Wood
Group (Circle One): 1 2 3 (4)
Stream: Ohio River
Location Description: Along right descending bank of Muskingum Island
Navigational Pool if Applicable: Belleville Pool
If Group 1 or 2, Receiving Stream:

Project Type: Dredging Area < 1,000 m^2 (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length:	15 m	ADI Width:	15 m	Salvage area (m^2):	
US Buffer Length:	50 m	US Buffer Width:	65 m	USS Buffer Length:	
DS Buffer Length:	150 m	DS Buffer Width:	65 m	DSS Buffer Length:	
Lateral Buffer Length:	15 m	Lateral Buffer Width:	50 m	Lateral S Buffer Width:	

Phase 1 Survey Method Transect [X] Cells [ ] Other [ ]

# Transects/Length (m):		Cell Size (mxm):	Cell Search Effort (Min/m^2)
3 transects @ 65 m	ADI:		
5 transects @ 65 m	USB:		
12 transects @ 65 m	DSB:		

Spacing Between Transects (M)

≤10 m in ADI, USB, and first 100m of DSB; 25m in 100 to 150m portion of DSB

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long.	-81.511935	Lat.	39.365120
Upstream End ADI:	Long.	-81.512394	Lat.	39.364832
ADI Center:	Long.	-81.512465	Lat.	39.364792
Downstream End ADI:	Long.	-81.512535	Lat.	39.364750
Downstream End DS Buffer:	Long.	-81.513896	Lat.	39.363902
RELOCATION AREA:	Long.		Lat.	

Map: Show ADI, USB, DSB and survey layout with outine of proposed impact.

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods	[X] Yes	Provide Description in Scope
Addressed Alternative Sites	[X] Yes	Provide Description in Scope

Phase 2 requested?: [X] Yes [ ] No

Request for Relocation: [ ] Yes [X] No

Method: (check one)
[ ] Cell Size (mxm):
[ ] Moving Transect:
[ ] Other:_____

Multiple passes are to be made through the area until less than 5 % of the number collected on the first two passes combined are recovered on the

B-4
WVDNR MUSSEL SUMMARY FORM

Mussel Survey Summary Datasheet

Event Information

Project title: USFWS-NWR Muskingum Island Well Plugging Project

Location (Stream name, Site name): Ohio River, Site 1

Date (mm / dd / yyyy): 08 / 27 / 2024 - 09/10/2024

Section A – Survey Method			Section B – Surveys Conducted
Primary (select one)	☐ Waterscope	☐ Snorkel	(select all that apply)
	☒ SCUBA/SSA	☐ Other	☐ Quantitative (cells)
Secondary (select one)	☐ Waterscope	☐ Snorkel	☐ Quantitative with excavation
	☐ SCUBA/SSA	☐ Bank search	☒ Semi-quantitative (transects)
	☐ Hand picking	☐ Midden	☐ Qualitative
	Other/Additional		Other

Collector Names

Brandon Yates	Vanessa Vest	
Kevin Yount	Brian Denis	
Paul Robert		

Section C – Species Counts (additional lines on back)

Species	Area/Collector					Total live	Fresh dead	Weathered dead	Notes
	ADI	DSS	DSB	LTB	USB				
1) *Actinonaias ligamentina*	0	3	10	3	13	29	0	7	
2) *Amblema plicata*	0	96	132	34	73	335	0	193	
3) *Cyclonaias pustulosa*	0	33	93	25	48	199	0	18	
4) *Cyclonaias stegaria*	0	1	0	1	0	2	0	0	FLS
5) *Ellipsaria lineolata*	0	46	82	22	54	204	0	17	
6) *Ellptio crassidens*	0	0	1	0	0	1	0	1	
7) *Fusconaia flava*	0	2	3	0	1	6	0	1	
8) *Lampsilis abrupta*	0	0	0	0	1	1	0	0	FLS
9) *Lampsilis cardium*	0	9	19	4	13	45	0	6	
10) *Lampsilis siliquodiea*	0	2	6	2	10	20	0	5	

Section D – Survey Time and Area

Search effort (min)	54	90	938	180	336	Total effort	1,598 min
Search area (m^2)	225		9,750	750	3,250	Total area	13,975 m^2

Section E – Notes

Mussel Survey Summary Datasheet

Event Information

Project title – Enter the project title, corresponding with that on the Mussel Survey Scope of Work Summary Sheet Protocol Form.

Stream name – Enter name of stream.

Site name – Enter the name of the site.

Date – Enter date in mm/dd/yyyy format.

Section A – Survey Method

Primary – Select one option indicating the primary survey method.

Secondary – If applicable, select or write in one option indicating the secondary survey method. If "Other" was selected as the primary survey method, select or write in the primary survey method.

Section B – Surveys Conducted

Select or write-in all surveys conducted.

Section C – Species Counts

Species – Enter the species name.

Area/Collector – Enter species count by area or collector, if applicable.

Total live – Sum the total number of live mussels of each species.

Fresh dead – Sum the total number of fresh dead mussels of each species.

Weathered dead – Sum the total number of weathered dead mussels of each species.

Notes – Enter any notes about the species.

Section D – Survey Time and Area

Search effort, Total effort – Enter time (in minutes) spent searching per area/collector and overall.

Search area, Total area – Enter the area (in m^2) searched per area/collector and sum overall.

Section E – Notes

Include any important notes about the survey methods.

Section C – Species Counts (continued)

Species	Area/Collector					Total live	Fresh dead	Weath. dead	Notes
11) *Lasmigona complanata*									
12) *Ligumia recta*									
13) *Megalonaias nervosa*									
14) *Obliquaria reflexa*									
15) *Obovaria subrotunda*									
16) *Plethobasus cyphyus*									
17) *Pleurobema cordatum*									
18) *Pleurobema sintoxia*									

Mussel Survey Summary Datasheet

Event Information

Project title – Enter the project title, corresponding with that on the Mussel Survey Scope of Work Summary Sheet Protocol Form.

Stream name – Enter name of stream.

Site name – Enter the name of the site.

Date – Enter date in mm/dd/yyyy format.

Section A – Survey Method

Primary – Select one option indicating the primary survey method.

Secondary – If applicable, select or write in one option indicating the secondary survey method. If "Other" was selected as the primary survey method, select or write in the primary survey method.

Section B – Surveys Conducted

Select or write-in all surveys conducted.

Section C – Species Counts

Species – Enter the species name.

Area/Collector – Enter species count by area or collector, if applicable.

Total live – Sum the total number of live mussels of each species.

Fresh dead – Sum the total number of fresh dead mussels of each species.

Weathered dead – Sum the total number of weathered dead mussels of each species.

Notes – Enter any notes about the species.

Section D – Survey Time and Area

Search effort, Total effort – Enter time (in minutes) spent searching per area/collector and overall.

Search area, Total area – Enter the area (in m^2) searched per area/collector and sum overall.

Section E – Notes

Include any important notes about the survey methods.

Section C – Species Counts (continued)

Species	Area/Collector					Total live	Fresh dead	Weath. dead	Notes
	ADI	DSS	DSB	LTB	USB				
19) *Potamilus alatus*	0	9	35	7	15	66	0	23	
20) *Ptychobranchus fasciolaris*	0	1	1	0	0	2	0	0	
21) *Quadrula quadrula*	0	7	21	8	18	54	0	3	
22) *Theliderma metanevra*	0	30	90	29	84	233	0	33	
) *Potamilus fragilis*	0	0	0	0	0	0	0	2	
)									
)									
)									

B-5
DATASHEETS

Current Stream and Weather Conditions

Event Information

Project title: USFWS- NWR Muskingum Island Well Plugging Project

Location (Stream name, Site name): Ohio River, site1

Date (mm / dd / yyyy): ___/___/_____ @ 8/27 -> 09/12/2024

Section A – Weather Conditions

Precipitation (select one)
- ☐ Intermittent rain
- ☐ Light rain
- ☒ Moderate rain
- ☐ Heavy rain
- ☐ None

Cloud cover (select one)
- ☐ 0 %
- ☒ 25 %
- ☐ 50 %
- ☐ 75 %
- ☐ 100 %

Heavy rain

Has there been a heavy rain in the last 7 days?

☐ Yes ☒ No

Air temp

15.7-36.7 °C

Section B – Sediment/Substrate

Sediment odor (select one)
- ☒ Normal
- ☐ None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic (methane)
- ☐ Other

Sediment deposits (select one)
- ☐ Sludge
- ☐ Leaf litter
- ☒ Sand
- ☐ Relict shells
- ☐ Paper/Fiber
- ☐ Other

Substrate type
(rank top three, no "ties")
- ☐ Bedrock
- ☐ Boulder
- ☐ Cobble
- 3 Gravel
- 2 Sand
- 1 Silt
- ☐ Clay

Section C – Streambank and Riparian Zone Characterization

Canopy cover
(select one)
- ☒ None
- ☐ Mostly open
- ☐ Mostly shaded
- ☐ Shaded

Riparian zone fully intact?
(select one; within 10 meters)
- ☒ Left descending bank
- ☒ Right descending bank of Island
- ☐ Both banks
- ☐ Neither bank

Stream bank failure?
(select one; within survey reach)
- ☐ Left descending bank
- ☒ Right descending bank of Island
- ☐ Both banks
- ☐ Neither bank

Section D – Aquatic Vegetation

Dominant vegetation type (select all applicable)
- ☐ Rooted floating
- ☐ Rooted emergent
- ☒ Rooted submergent
- ☐ Free floating
- ☐ Floating algae
- ☐ Attached algae
- ☐ Moss
- ☐ None

Dominant species

Other significant species

Percent of reach with aquatic vegetation
(in terms of area)

1 %

Current Stream and Weather Conditions

Section E – Water Quality

Water surface oil (select one)
- ☐ Slick
- ☐ Globs
- ☐ Sheen
- ☐ Flecks
- ☒ None
- ☐ Other

Water odor (select one)
- ☒ Normal/None
- ☐ Petroleum
- ☐ Fishy
- ☐ Sewage
- ☐ Chemical
- ☐ Other

Turbidity (visual)
- 91.4-243.8 cm
- ☒ Clear
- ☐ Opaque
- ☐ Slightly turbid
- ☐ Stained
- ☐ Turbid

Water temp	26.0-27.7 °C	**Turbidity**	mg/L	**Water sample collected** (for lab tests)	☐Yes ☒No
Conductivity	uS/cm	**Flow**	cfs		
Dissolved O_2	mg/L	**Gage height**	ft		
pH		**Secchi depth**	1.2-1.5 m	**Hach kit used**	☐Yes ☒No

Section F – Stream Characterization

Human influence (select all applicable)
- ☐ Engineered dam
- ☐ Channelized
- ☐ Ford
- ☐ Riprap
- ☒ Island
- ☒ Trash
- ☒ Other: well present
- ☐ Bridge (pillars in stream)
- ☐ Bridge (no pillars in stream)
- ☐ Pipeline (parallel to stream)
- ☐ Pipeline crossing
- ☒ Pipes (inlet/outlet)
- ☐ Wall/Dike/Revetment

In stream cover (select all applicable)
- ☐ Beaver dam
- ☐ Blow down
- ☐ Debris dam
- ☒ Woody debris
- ☐ Other

Section G – Watershed Features

Human influence/Watershed features (within survey reach)

Proximity: Mark each applicable feature. **P** (Present) >10m from shore, **C** (Close) <10m from shore, **B** (On bank/stream).
Dominant land use: Mark up to two features. Use **R** or **L** for right or left bank; use **X** for both banks.

Feature	Prox.	Dom.	Feature	Prox.	Dom.	Feature	Prox.	Dom.
Residential building			Mining activity			Row crops		
Non-residential building			Forest	PR		Hay field		
Commercial/Industrial			Logging			Pasture		
Railroad (active)			Park/Lawn			Feed lot		
Railroad (inactive)			Pavement			Old field		
Railroad (rails to trails)			Road			Landfill		

Local watershed erosion (select one; pertains to land use, not failing stream banks)

☐None ☒Light ☐Moderate ☐Heavy

Section H – Notes

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE 27 Aug 2024

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** _____

Downstream site

Substrate Composition (Rank top 3) 1=Dominate

Total time includes QC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1	OSB	01	30-40	VV/KY	10	90						5	5	No Mussels	VV: 2500 KY: 3000
2		01	40-50		50	50						16	10	Yes	
3			50-60		30	50	20					16	12	Yes	
4			60-70		10	50	30				10LWD	17	15	Yes	
5			70-80		10	50	30				10LWD	12	15	Yes	
6			80-90		10	50	30				10LWD	16	16	Yes	
7			90-100		20	50	30					14	15	Yes	VV: 1800 KY: 1800
8		02	35-40	VV/KY	10	90						10	15	No	VV: 1600 KY: 1800
9			40-50		10	80					10LWD	14	13	Yes	
10			50-60		20	30	50					18	15	Yes	VV: 1500 KY: 1500
11			60-70		30		50	20				12	16	Yes	
12			70-80		50		50					12	17	Yes	
13			80-90		50		50					12	17	Yes	VV: 1200 KY: 1000
14			90-100									11	17	Yes	VV: KY:
15		03	35-40	VV		100						7	3	No	VV: 3100 KY: 3000
16			40-50	VV/KY	15	[redacted]	85					12	14	Yes	
17			50-60		[redacted]	[redacted]	50					12	15	Yes	
18			60-70		50		50					12	17	Yes	
19			70-80		50		50					12	17	Yes	VV: 2500 KY: 2400
20			80-90		50		50					12	17	Yes	
21			90-100		50		50					12	17	Yes	VV: 2200 KY: 2000
22		04	35-40	VV/KY		100						7	3	No	
23			40-50		35		50				15LWD	12	12		
24			50-60		50		50					12	15		
25			60-70		50		50					12	17		VV: 2000 KY: 1600
26			70-80		50		50					12	17		
27			80-90		50		50					12	17		
28			90-100		50		50					12	17		VV: 1600 KY: 1000
29		05	35-40			100						7	5		VV: 1600 KY: 3000
30			40-50			50	200	300				12	11		
31			50-60		[redacted]		50						13		
32			60-70		50		50						16		
33			70-80		50		50						17		
34			80-90		50		50						17		
35			90-100		40		60						18		W: 1000 KY: 2900

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 7
DATE 8-27-24

Project/Task: 23120.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	1	40-50			flava	57.8						Green
2	"	"	"			recta	135.5				F		
3			"			P. alatus	111.1						
4			90-100			E. Lin	89.2	84.0					Orange 128
5			"			T. met	78.3		WD(1)				
6			"			C. pust	56.7	54.0	47.2	65.5	53.0	62.5	
7			"			L. recta	140.0(M)	122.2	(F)				
8			"			A. plica	99.9						
9			"			A. plic	125.5						
10			"			T. met	74.4	77.0	76.0				
11			"			Q Q	54.5						
12			"			Sintox	72.4						
13			"			O. ref	48.8		WD(1)				
14			"			Cardium	88.8						
15			"			C. pust	61.1	47.7					
16			60-70			O. ref	59.0	62.1	46.5				Blue
17			"			L. recta	116.8(F)	131.5(F)	139.9(F)	146.3(F)	WD(1)		
18			"			Pink heel	118.6	69.3	WD(2)				
19			"			Sili	98.2(F						
20			"			A plic	101.1	118.6	WD(1)				
21			"			Sintox	82.5	74.7					
22			"			C. pust	59.5						
23			"			E. Lin	52.6	57.9					
24			70-80			E. Lin	79.2	70.8					Purple
25						C. pust	60.2	WD(1)					
26						O. ref	48.8						
27						A. plic	66.6	WD(3)					
28						(recta	120.5(F	127.5(M	132.2(M	WD(1)			
29						A lig	WD(1)					(cordatum WD ?)	
30						Sili	WD(1)						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 7
DATE 8-27-24

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1	DSB	1	80-90			Pink heel	115.5		WD (2)						Orange
2						O. ref	50.5	53.4	WD (1)						
3						Tecta	142.5 (F	132.6 (M	WD (1)						
4						E. lin	88.8	49.5	WD (1)						
5						A. plic	120.0		WD (2)						
6						C. pust	63.7	55.1							
7			50-60			Cordatum	67.5								Blue 126
8						L. recta	154.4M	140.1 (F							
9						A plic	89.3	100.0	93.2						
10						~~C~~ O. ref	59.9	66.4	WD (1)						
11						Pink heel	1 WD								
12						A plic	2 WD								
13		2	80-90			~~C~~ T. met	76.3	WD 2							Y018
14						C. pust	56.6	60.0	47.8	63.3	63.4	69.5			
15						Cordum	98	120.2							
16						O. ref	52.2								
17						Recta	111.1 F	134.2 F	150+ (M)	129.1 (F)	(43.5 (F				
18						Pink heel	75.2								
19						E. lin	45.5	73.1	WD 1						
20						3 ridge	1 WD								
21			60-70			Cordum	121.1 M								Y10
22						A. plic	111.5	103.3							
23						L recta	142.2 (F	129.9 (F	1WD						
24						E lin	60.8	61.5							
25						mucket	1WD								
26			90-100			T met	82.2	73.4	1 WD						Orage 6
27						C. pust	63.0	64.4	64.0						
28						cordum	110.5	136.2							
29						O. ref	62.2	55.5							
						3 ridge	117.1	1WD							
						E. lin	45.5	1WD							

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 7
DATE 8-27-24

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	2	70-80			Recta	143.5 F	136.5 F	145.6 M				YOZO
2	"	"	"			C. Dust	62.3	1 WD					
3	"	"	"			E lin	84.5						
4	"	"	"			Cordatum	76.5	2 WD					
5	"	"	"			3 ridge	1 WD						
6	"	"	"			Silic	1 WD						
7	"	"	"			Pink hinge	2 WD						
8	"	"	40-50			P Alatus	~~85.5~~						Blue 90
9	"	"	"			3. ridge	95.6	93.1	1 WD				
10	"	"	"			0 ref	51.9						
11	"	"	50-60			3 ridge	106.2	109.1	103.5	~~135.5 F~~	92.4	WP8	YO13
12	"	"	"			1 recta	126.5 F	151.1 M	135.8M	135.5 F	142.0 F	WD3	
13	"	"	"			QQ	62.9	80.7	57.3				
14	"	"	"			~~Dead~~ O. ref	53.1	51.0	58.2	53.5			
15	"	1	1			Mucket	1 WD						
16	"	3	70-80			A. plic	81.5	65.6	50.5	3 WD			YO13
17	"	"	"			Q Q	66.3						
18	"	"	"			C. Dust	67.2						
19	"	"	"			O. ref	52.1	55.1					
20	"	"	"			E. lin	73.3	75.2	72.1				
21	"	"	"			Sintox	76.4						
22	"	1	1			L. recta	151.1 M						
23	"	3	40-50			Silic	~~110.0~~	M					Blue
24	"	3	50-60			QQ	63.1						YO18
25	"	"	"			A plic	92.2	100.0	118.9	102.2	WD5		
26	"	"	"			cardium	103.8 F						
27	"	1	1			recta	128.4 F	WD1					
28	"	3	60-70			O. ref	58.8						Blue 90
29	"	"	"			A. plic	129.9	103.6	82.2				
30	"	"	"			E. Lin	67.6	61.5					

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 7
DATE 8-27-24

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	3	60-70			L. recta	138.9 F	128.7F					Blue 90
2	"	"	"			A Plic	3WD						
3	"	"	"			Palatus	1WD						
4	"	3	90-100			E lin	55.5						Yellow 10(c)
5	"	"	"			C. pust	56.6	57.2	1WD				
6	"	"	"			P Alatus	95.5	112.1					
7	"	"	"			T met	78.7	1WD					
8	"	"	"			flava	67.9						
9	"	"	"			Sheep	1WD						
10	"	3	80-90			A.plic	72.5						Yellow 020
11	"	"	"			E lin	64.7						
12	"	"	"			O. ref	45.1	44.0	35.5	52.2			
13	"	"	"			P. Alatus	64.8						
14	"	"	"			C. Pust	52.9						
15	"	"	"			T met	72.1	67.7	66.3				
16	"	"	"			L. recta	138.8M						
17	"	"	"			Cordatum	90.0						
18	"	"	"			Sintox	1WD						
19	"	"	"			Cardium	1WDF						
20	"	"	"			QQ	1WD						
21	"	3	90-100			T. mut	79.0, 72.2, 79.1, 72.2,						Yellow 007
22	"	"	"			L. cardium	♂ 111.1						
23	"	"	"			A. plic	81.1						
24	"	"	"			E. Lin	710.5						
25	"	"	"			P. sin	80.8						
26	"	"	"			Cordatum	89.2						
27	"	"	"			L. recta	150.1♂						
28	"	5	50-60			M. nervosa	150+	150+	150+				Yellow 006
29	"	"	"			A. plic	98.4	96.0	107.5	108.8	91.5		

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 7
DATE 8-27-24

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	4	80-90			C. pust	62.5,	64.4					GRA
2						O. ref	42.9						
3						E. lin	74.4						
4						L. recta	144.3♂						
5						C. pust	2 WD						
6						T. met	WD						
7						A. plic	2 WD						
8						O. ref	WD						
9		—	—			L. recta	WD						
10		4	50-60			A. plic	80.5, 1	08.9, 84	.8, 110.3,	103.0, 101.9,	99.5,	778, 094	Blue 1260
11		1	1			E. elatus	91.0, 118.4						
12		—	—			A. plic	5 WD						
13		4	70-80			O. ref	46.1, 4	6.2, 3	2.7				Green
14						L recta	132.1						
15						A. plic	92.3, 9	6.2, 7	4				
16						T. met	69.4						
17						E. lin	83.3, 9	6.1,					
18						C. pust	86.0, 6	6.9,					
19						QQ	62.7						
20		—	—			A. plic	4 WD						
21		40-50 ↔ 4				L. recta	144.6♂						
22		4	60-70			E. lin	86.3, 7	1.0, 79.7,	68.2				Green 020
23						L. recta	129.9♂,	184.2♀					
24						L. sili	111.4♂						
25						M. nervosa	128.2						
26						A. plic	110.7						
27		—	—			A. plic	4 WD						
28		4	90-100			T. met	75.3, 7	3.8, 7	8.9				Orange 1228
29	—	1	1			A. plic	102.7, 8	4.3					

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 7
DATE 8-27-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	3	60-60			L. recta	144.6♂	137.0♂					Yellow QQ6
2	1	1	1			E. lin	90.8						
3						A. plic	WD×3						
4		5	60-70			E. lin	81.2, 79.3,						Yellow 009
5		1	1			O. ref	42.0						
6						A. plic	84.4, 105.3, 93.7						
7						Cardium	114.9						
8						M. nervosa	190+						
9						A. plic	3 WD						
10		1	1			A. lig	WD						
11		5	70-80			P. elatus	103.2						Yellow 017
12		1	1			E. lin	72.2, 86.3,						
13						C. pust	45.1, 62.5						
14						L. recta	121.7♂						
15						O. ref	47.0, 58.9, 35						
16						P. Elatus	71.2						
17						A. plic	67.1, 62.3, 92.4						
18						A. plic	4 WD						
19		1	1			L. recta	WD						
20		5	80-90			C. pust	49.1, 51.6, 49.7,	66.0, 8	9.3				Orange 6
21		1	1			O. ref	55.9, 50.6, 40.8,	54.5, 55.9					
22						QQ	51.3,						
23						E. lin	76.8, 80.0						
24						T. met	78.2, 62.1, 77.9						
25		1	1			A. plic	WD						
26		5	40-50			L. recta	128.8♂						
27		1	1			P. elatus	69.0,						
28		4	80-90			T. met	79.5, 79.6, 79	1, 74.0, 78	7				GRA
29		1	1			QQ	75.7, 57.3, 58.9						
30	1	1	1			A. plic	115.2, 84.2						

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 787
DATE 8-27-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		4	90-100			C. pust	46.2,	70.0					Orange 128
2		|	|			Q. nf	42.8,	43.7					
3		|	|			A. plic	63.2,						
4		|	|			E. lin	62.8						
5		|	|			QQ	72.4,	87.3					
6		|	|			C. pust	WD						
7		|	|		T.	Met	WD						
8		|	|			P. frag	WD						
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1
DATE 8-28-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth	Live/ Dead_Mussel	Notes
1	DSB	6	40-50	VV/BY	10	90					50	10	12	NO	
2			60-60		30	10	30	30				10	13	Yellow 012	
3			60-70		50		50					10	16	Yellow 005	
4			70-80		50		50					10	16	Yellow 006	2500BY 2250KY
5			80-90		50	20	20	10				10	16	Yellow 017	
6			90-100		60		30	10				10	16	Yellow 004	700BY 2000KY
7		7	35-40		100							5	1	NO	
8		7	35-40	VV/BY								5	1	NO	
9			40-50		10	10	40	20			20 Woody Debris	10	10	YC1	
10			50-60		50		40	10				10	13	Blue	
11			60-70		60		30	10				10	16	Y018	1700BY 1600KY
12			70-80		100		50	10				10	16	B40	
13			80-90		50	20	20	10				10	16	Y013	
14		8	90-100		50	20	20	10				10	16	Y020	
15			90-100	BY/KY	40	50		10				12	16	Y005	3100BY 3000KY
16			80-90		30	40		30				12	16	~~Y005~~ Y012	
17			70-80		30	40		30				12	15	~~Y016~~ Y016	
18			60-70		40	10	20	10			20WP	12	13	~~Yellow~~ orange	
19			50-60		40	10	40				10WP	12	13	~~Orange~~ Y013	
20			40-50		80		10				10WP	12	10	~~Yellow~~ Y013	
21		9	35-40		80	10	10						1	~~Y016~~	2000BY 1600KY
22			35-40	KY/BY	60		10	10			20WD	6	9	Blue	2000BY 1600KY
23			40-50		60		10	10			20WD	12	11	B 90	
24			50-60		50		40				10WP	12	13	Y 013	
25			60-70			30	40	20			10WD	12	15	Yellow 007	1700BY 1200KY
26			70-80		10	10	40	30			10WD	12	16	Yellow 10	
27			80-90		10	10	40	30			10WD	12	16	Shift Down 1	1400BY 900KY
28			90-100		50		30	20				12	17	↓ TWO ↓	
29		10	90-100	KY/BY	50		10	30			20WD	6	17	Yellow 009	2700BY 3000KY
30			80-90		40		30	30				12	14	Yellow 013	
31			70-80		40		30	30				12	13	Orange 60	
32			60-70		50		20	30				12	13	Orange	
33			50-60		60		40					12	13	Yellow 018	
34			40-50		60		20				20WD	6	11	11	
35			35-40		30	70									2000BY 2300KY

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 202
DATE 8-28-14

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth FT	Live/ Dead_Mussel	Notes
1	OSB	1↑	30-40	BY/MY	40	50	10					6	1	–	
2	"	"	40-50	"	20	40	30	10				13	14	–	
3	"	"	50-60	"	40	20	30	10				12	14	–	
4	"	"	60-70	"	30	20	30	20				12	16	Green, 1 Red	
5	"	"	70-80	"	30	20	30	20				12	16	Purple	
6	"	"	80-90	"	1	1	1	1				12	16	Green	
7	"	"	90-100	"	"	"	"	"				12	16	Yellow, 1 Red	
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

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Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 8
DATE 8-22-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1	DSB	60	80-90		E.	lin	88.4, 80.1, 84.6,	59.7, 90		60.9, 8.3,		74.2, 77.4			Yellow 07
2					L.	recta	155.0♂	152.6♂	147.6♂						
3					C.	pust	65.3, 63.4,								
4					A.	plic	104.6, 92.5,								
5					O.	ref	56.7,								
6					T.	tet	75.0, 75.5, 68.3, 74.2, 73.3, 82.7, 79.4, 83.1								
7					P	cordatum	83.5, 71.6, 65.5,								
8					A.	market lig	103.7,								
9					E.	crass	114.0								
10		4			A.	plic	WD								
11		—	—		O.	ref	WD								
12		60	50-60		O.	ref	46.2, 48.5, 53.8								Yellow 02
13					A.	plic	105.5,								
14					M.	nervosa	180+								
15					P.	elatus	180.0, 108.6, 107.9,								
16					L.	recta	WD♀								
17					H.	plic	2 WD								
18					P.	elatus	WD								
19		—	—		E.	lin	WD								
20		6	70-80		C.	pust	60.0, 58.3,								Yellow 006
21					L.	recta	150.2♂, 124.3♀, 119.6♂								
22					A.	plic	71.2, 87.3, 100.0, 150+,								
23					O.	O.	60.5								
24					E.	lin	69.3,								
25					O.	ref	55.2								
26					F.	flava	60.0,								
27		—	—		A.	plic	7 WD								V
28		6	60-70		C.	silic	72.0♀,								Yellow 05
29		1	1		A.	plic	103.0, 107.2,								
30	—	1	1		O.	ref	47.8,								

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# [illegible]
DATE 8-28-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	7	35-40			No mussels							
2		8	40-50			S. il	87.3						Yo16
3		8	50-60			L. recta	124.2 M	130.0 F	154. M				Yo20
4			[illegible]			A. plic	81.5	106.6	103.3	1WD			[illegible]
5						O. ret	56.7						
6						M. nerv	150+						
7		8	60-70			A. plic	101.4	95.4	110.1	108.4, 101.7	3WD		Orange
8						E. lin	97.2	1WD					
9						L. recta	130.0F						
10						Mucket	1WD						
11		8	70-80			A. plic	97.4	116.1	120.0	4WD			Yo18
12			80-90			L. recta	147.6M						Yo12
13						C. pust	56.7	51.2	64.8	58.5			
14						T. met	68.4	87.3	2WD				
15						O. ret	49.5	57.7					
16						Cordatum	54.0						
17						A. plic	3 WD						
18		8	90-100			T. met	69.2	82.6					Yo05
19						Q. Q	64.0						
20						A. plic	81.8						
21						L. recta	137.7F	150+ M	150+ M	141.4 F			
22						C. pust	67.7						
23						Mucket	105.6						
24						Palatus	102.0						
25						Sintoja	92.8						
26						P. cordatum	65.0						
27						Cardium	62.2						
28													
29													

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 3
DATE 8-[illegible]-09

Project/Task: R312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	90-100	90-100		P.	cord	82.1, 83.8, 79.2						
2					Q.	G	58.4						
3					A.	Plic	100.9						
4					C	Rus	1 WD						
5					A	Plic	1 WD						
6					L	rect	1 WD						
7		50-60	50-60		P	alatus	92.3						3 live
8					A	plic	101.7, 88.6						
9					L	recta	138.7,						
10					E	lin	77.5						
11					A	plic	1 WD						
12		70-80	70-80		L	cardium	121.0♂, 130.1♂						3 90
13					A	plic	94.2, 101.6, 89.4,	82.2, 57.3,					
14					L	recta	139.0♂, 140.0♂,						
15					O	ref	59.6						
16					E	lin	73.5, 83.3,						
17					A	plic	1 WD						
18					L	cardium	2 WD						
19													
20		80-90	80-90		T	met	65.3, 73.5, 69.0,	69.1					Yellow 013
21					A	plic	98.0, 97.8, 99.9, 87.3						
22					P	sin	95.6, 73.0						
23					E	lin	85.5, 67.4, 73.7,	52.8, 69.5					
24					O	ref	59.8						
25					P	cord	80.0						
26					M	nervosa	148.5						
27					C	pus	59.8, 63.3, 58.9,	53.7,					
28					O	G	60.0,						
29					A	plic	2 WD						
					E	lin	1 WD						
					T	met	1 WD						

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 8
DATE 8-28-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	6	60-70		L.	recta	150+♂, 147.5♂						Yellow 005
2					E.	lin	89.5,						
3					P.	elatus	113.4,						
4					M.	nervosa	150+, 150+						
5					A.	plic	WD						
6					L.	Sili	WD						
7		6	90-100		C.	pust	58.3,						Yellow 004
8					Q.	Q	61.9, 68.3,						
9					A.	plic	89.3, 118.2,						
10					O.	ref	28.0,						
11					T.	met	82.6, 74.6, 73.4						
12					E.	Lin	59.5,						
13					L.	recta	123.5♀						
14					T.	met	WD						
15		7	40-50		A	Plic	WD						Yellow CI
16			60-70		L	Sil	99.3♂				F		
17			60-70		A	Plic	95.3,	82.5, 99.6,					Yellow 018
18					L	Rec	121.5♂,	144.6♂,	95.4♂				
19					E	lin	58.4						
20					m	nervosa	147.3						
21					C	pus	46.7,						
22					A	Plic	1 WD						
23					E	lin	1 WD						
24					P	alatus	1 WD						
25			90-100		O	ref	50.9						Yellow 020
26					C	pus	48.6, 59.9, 62.2, 61.2, 60.9, 58.4, 63.7, 48.3, 63.0, 53.5, 64.8						
27			60-70		P	cord	94.3						Yellow 018
28			90-100		E	lin	83.5,	83.1,					Yellow 020
29					P	sintox	85.6						
30					T	met	79.7, 70.2, 86.4, 76.4, 75.6, 79.0						

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 5
DATE 8-28-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	PSB	9	50-60		P.	elatus	96.2						Blue
2			↓		L.	recta	111.18, 128 6↑						
3			70-80		T.	met	75.4, 85.0,						Yellow 013
4					L.	recta	123.5						
5					O.	ret	63.4						
6					C.	pust	61.1						
7					A.	plic	113.9						
8					A.	plic	3 WD						
9			↓		P.	elatus	WD						
10			90-100		E.	lin	89.9, 80.9, 1 WD						Yellow 010
11					T.	mut	81.2, 73.9, 81.7, 78.9, 77.4, 78.8, 75.6, 1 WD						
12					C.	pust	18.4, 9 6.4, 61.6, 65.0, 62.7						
13					L.	recta	132.5 ↑						
14					P.	elatus	96.7						
15						cordatum	89.6, 84.3,						
16			↓			Sintaxia	77.2, 94.6						
17			80-90		A.	plic	65.4, 91.1, 95.0, 1 WD						Yellow 007
18					E.	pust	68.8, 65.2, 59.3, 58.4						
19					O.	ret	57.3, 53.2, 48.8, 62.7						
20					T.	mut	73.0, 68.8, 87 6.6, 77.7, 82.2, 76.7						
21					Q.	Q.	70.5,						
22						cordatum	62.5						
23					P.	elatus	103.3						
24					E.	lin	72.5						
25						Sintaxia	97.6						
26	↓	↓	↓		A.	lig	95.0						
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 8
DATE 8-22-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	9	60-70		O.	ref	48.2						Blue 90
2					A.	plic	103.8,	106.2,	68.0, 3	WD			
3					E.	lin	67.7,						
4						cordatum	64.5,						
5					L.	recta	132.8 ♂	136.6 ♂	133.2 ♀	150+ ♀	149.7 ♂	138.0 ♂	
6					P.	elatus	1 WD.						
7		11	60-70		L.	recta	139.1 F						Red Green
8					A	plic	80.5	87.9					
9						P alatus	112.0	1 WD					
10						C pust	61.3						
11						Complanata	115.6						
12		11	70-80			P alatus	78.7	86.0					Purple
13						T met	86.1						
14						A plic	117.3	102.2	3 WD				
15						Cardium	99.4 F						
16						O ref	1 WD						
17						L Recta	1 WD						
18		11	80-90			Cardium	135.4 M	125.0					Green
19						A lig	71.9						
20						T mer	72.2	66.8	69.6	55.4			
21						C pust	44.8	49.1					
22						A plic	102.5	105.0	97.4	1 WD			
23						O ref	67.7						
24						L recta	92.1 M						
25						E. lin	97.0						Y
26		11	90-100			L. recta	120.0 M	122.3 M	146.5 M				Yellow 01 B
27						T met	84.4						
28						cordatum	63.3	1 WD					
29						C pust	62.2	58.9	58.4				

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Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7
DATE 23 Aug 2011

Project/Task: 2312.05 Stream Ohio River State WV County Mead

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		11	90-100			A plic	103.3	150+					Yellow 018
2		⊥	⊥			E. Lin	87.0	67.1					
3		⊥	⊥			Mucket	104.4	106.7					
4		10	50-60			L recta	134.8F	129.7 F					Yellow 012
5		⊥	⊥			P. alatus	106.0	102.0					
6		10	60-70			L recta	150.0 M	1489 M	138.3M	1WD			Orange
7		⊥	⊥			P alatus	119.2	108.0					
8		⊥	⊥			A. plic	107.2	75.0	104.4	104.9	88.2	2WD	
9		⊥	⊥			QQ	51.0						
10		⊥	⊥			Still	1WD						
11		10	90-100		P.	Cyphus	105.5	W 49.5	H 75.9				Yellow 020
12		⊥	⊥			T met	84.3	75.8	75.1	83.0	76.5	72.3	1WD
13		⊥	⊥			O. ref	44.0	52.3	48.8	1WD	57.2		
14		⊥	⊥			E. Lin	59.9						
15		⊥	⊥			A plic	112.2	106.3					
16		⊥	⊥			Cordatum	77.6	86.5					
17		⊥	⊥			O. pust	63.5	67.3	62.0	1 WP			
18		⊥	⊥			A. Lig	110.1						
19		⊥	⊥			L recta	150+M						
20		10	80-90			C pusa	61.1	66.1	63.3	62.0			Yellow 005
21		⊥	⊥			T met	67.2	78.6	78.2	1WD			
22		⊥	⊥			O ref	55.0	51.6					
23		⊥	⊥			E. Lin	91.5	53.0	84.5	84.4	89.4		
24		⊥	⊥			Cordatum	66.0	73.5					
25		⊥	⊥			A Lig	109.3						
26		⊥	⊥			M. Nervosa	137.8						
27		⊥	⊥			L recta	122.0 F	132.2F	142.3F	137.7F	148MF		
28		⊥	⊥			Mucket	115.8	1WD					
29		⊥	⊥			A plic	1WD						
30													

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 8 of 58
DATE 23 Aug 24

Project/Task: 2312.05 Stream Ohio River State WV County Lincoln

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSB	10	70-80		L	recta	140.4 M	128.2 F					Orange
2						Aplic	104.0	5 WD					
3						E. lin	74.4	90.3					
4						Palatus	123.0						
5						+ met	84.6						
6	—	—				Cordium	124.8 M						
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													

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Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE [illegible] 2024

Project/Task: 2312.005 Stream Ohio River State WV County [illegible]

Substrate Composition (Rank top 3) 1=Dominate

Job w/ QC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth	Live/ Dead Mussel	Notes
1	OSB	12	35-40	VV/KY	30	70						[illegible]	2	[illegible]	VV [illegible]
2			40-50	"	50	40		10				12	[illegible]	[illegible]	
3			50-60	"	50	40		10				12	[illegible]	[illegible]	
4			60-70	"	50		50					12	15	[illegible]	
5			70-80	"	50		50					12	16	[illegible]	
6			80-90	"	50		50					12	17	[illegible]	
7		—	90-100	—	50		50					12	15	Yellow [illegible]	VV: 2500 KY: 2000
8	AOI	13	35-40	VV/KY								[illegible]	[illegible]	[illegible]	
9			40-50	"	70	30						12	5	[illegible]	
10			50-60	"	50		50					[illegible]	12	[illegible]	
11			60-70	"	60		40					[illegible]	16	[illegible]	1500 KY 1800 VV
12			70-80	"	50		50					[illegible]	16	[illegible]	
13			80-90	"	50		50					[illegible]	16	[illegible]	1100 KY 1500 VV
14		—	90-100	—	50		50					[illegible]	16	Bag	[illegible]
15		14	35-40	VV/KY								[illegible]	[illegible]	[illegible]	[illegible]
16			40-50	"	75	25						12	6	[illegible]	
17			50-60	"	50		50					12	16	[illegible]	
18			60-70	"	60	10	20				[illegible]	12	16	[illegible]	
19			70-80	"	50		50					12	17	[illegible]	VV: 2800 KY: 2400
20			80-90	"	40		60					12	16	[illegible]	
21		—	90-100	—	40		60					12	16	[illegible]	VV: 2100 KY 1900
22		15	35-40	VV/KY								6	3	[illegible]	
23			40-50	"	[illegible]						[illegible]	12	[illegible]	[illegible]	
24			50-60	"	90						[illegible]	12	15	[illegible]	
25			60-70	"	50	10					[illegible]	12	16	[illegible]	
26			70-80	"	50		50					12	16	Bag	VV: 2500 KY: 1500
27			80-90	"	40		60					12	[illegible]	[illegible]	
28	—	—	90-100	"	25	25	50					12	16	[illegible]	VV: 1800 KY: 1000
29	OSB	16	35-40												
30			40-50												
31			50-60												
32			60-70												
33			70-80												
34			80-90												
35			90-100												

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 5
DATE 29 Aug

Project/Task: 2312.005 Stream Ohio State WV County Lincoln

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height/Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	ADI	15	90-100		E	lin	66.3, 60.8, 55.9, 57.9,			1-WD			Gold tag
2					P	alatus	115.3, 105.7,						
3					O	ref	42.7		1-WD				
4					Q	quad	60.0						
5					T	met	86.4, 87.7, 65.3, 78.5			1-WD			
6					P	cord	69.5, 89.9, 76.4, 88.6						
7					P	sin	79.6						
8					L	recta ♂	143.0						
9		⊥	⊥		C	rust	48.3						
10		15'	80-90		P	cord	81.2						[illegible]
11					E	lin	75.3, 84.9		1-WD				
12				☆	C	stigasia	50.5	49.7	30.9				Tag #: 0[illegible] yellow
13					C	rust	63.5, 63.2, 64.7, 53.1,			48.7			
14					O	ref	55.5, 41.6,						
15					L	recta ♀	116.3, 130.3, 135.3						
16					L	recta ♂	150+		1-WD				
17					A	plic	69.4, 94.6, 94.8, 116.8, 97.3				3-WD		
18					M	nervosa	145.0						
19		⊥	⊥		L	cardium	1-WD						
20		15	50-60		L	sili ♀	101.1						Yellow 018
21		⊥	⊥		P	alatus	1-WD						
22			70-80		E	lin	75.3, 71.5, 76.3,						Gold tag
23					C	rust	52.6, 52.7, 55.0, 59.8,						
24					O	ref	51.5, 44.6						
25					A	plic	72.3, 80.3, 115.0, 108.4			5-WD			
26					T	met	79.6, 86.3						
27					Q	quad	67.5,						
28					L	recta ♀	129.1						
29					A	lig	118.0						
30		⊥	⊥		L	cardium ♀	110.0						
					P	alatus	1-WD						
					L	comp	2-WD						

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 5
DATE 29 Aug

Project/Task: 2312.05 Stream Ohio River State OV County Leeds

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	ADI	14	60-70		O	ref	38.7						
2					A	plic	97.8, 115.3, 114.3, 104.0, 106.5,						
3					L	sili	1-WD						
4					P	cord	1-WD						
5			70-80		C	rust	58.3,						Yellow 002
6					O	ref	54.7, 55.3						
7					E	lin	52.5, 83.6, 90.0,						
8					L	recta ♂	150+						
9					A	plic	103.2, 99.9, 100.1, 103.0,			2-WD			
10					L	recta ♀	137.5, 135.6,						
11					T	met	83.6						
12					C	rust	56.5						
13					L	cord ♂	105.7						
14					P	cyphyus	1-WD						
15			90-100		A	plic	43.6, 68.3, 82.6, 83.0,			1-WD			Yellow 017
16					E	lin	51.9,						
17					L	recta ♀	150+						
18					O	ref	50.6						
19					L	recta ♂	148.0,	127.1,					
20					Q	quad	63.7						
21					T	met	79.4, 76.0, 85.0, 78.0, 100.0,				78.0	2-WD	
22					L	cordium ♀	123.5						
23					C	Rust	59.8,						
24					P	olatus	94.3						
25			50-60		P	olatus	71.1						Yellow 001
26					L	recta ♀	138.4						
27					A	plic	99.8						
28			80-90		A	lig	109.2						Yellow 005
29					T	met	70.9, 73.6						

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 5
DATE 29 Aug

Project/Task: 2312.05 Stream Ohio River State WV County [illegible]

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	ADI	14	80-90		E	lin	83.2, 57.1,						
2					L	sili ♀	101.5,						
3					A	plic	74.1, 103.2, 87.4,		4-WD				
4					C	pust	103.5, 63.5, 61.6		2-WD				
5					P	cord	79.3	1-WD					
6					Q	quad	56.1						
7					L	recta ♀	141.5, 137.3, 149.8						
8					O	ref	38.2	1-WD					
9					L	card	1-SF						
10		13	50-60		P	alatus	114.6,						Sarge ☺
11					L	recta ♂	146.0						
12					L	recta ♀	128.2						
13			70-80		L	recta ♂	89.0, 150+						[illegible]
14					E	lin	68.0, 82.1,						
15					P	cord	81.9,						
16					P	sin	85.3						
17					T	met	81.6						
18					Q	quad	61.6						
19					A	plic	104.5, 99.1		5-WD				
20					C	pust	56.7		1-WD				
21					O	ref	47.7						
22			60-70		A	lig	800						Yellow 999
23					L	recta ♂	147.6						
24					A	plic	84.9, 98.1						
25					P	alatus	103.6						
26					L	recta ♀	129.0						
27					E	lin	77.3						
28					C	pust	89.5						
29			90-100		T	met	78.2, 79.5, 79.4, 81.7, 77.2, 77.3, 65.6,		1-WD				Blue 26
30					C	pust	63.7, 62.8, 56.8						

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 5
DATE 29 Aug

Project/Task: 2312.05 Stream Ohio River State WV County [illegible]

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	API	13	90-100		A	plic	164.9	3-WD					Alive [illegible]
2					P	alatus	122.4						
3					P	cord	73.5, 63.1, 87.5						
4					L	recta ♂	143.4						
5					L	recta ♀	146.7	1-WD					
6			⊥		O	ref	1-WD						
7			80-90		T	met	77.5, 83.3, 73.5, 69.5, 73.4, 70.1,					3-WD	Yellow Tag
8					Q	cuad	56.0, 60.1, 73.3						
9					C	rust	56.7, 50.0, 51.7, 52.4						
10					A	plic	77.7, 86.3, 106.1			7-WD			
11					L	recta ♀	125.0						
12					E	lin	79.8, 79.2, 75.0, 87.7			1-WD			
13	/	⊥	⊥		L	cardium ♂	117.2						
14	DSB	12	80-90	☆	P	cyphyus	110.5	49.8	80.7				Tag [illegible]
15					M	nervosa	144.1						
16					L	recta ♂	127.9						
17					P	alatus	92.7,	110.2	2-WD				
18					E	crass	1-WD						
19					L	complanata	129.6						
20					L	recta ♀	138.9, 143.1						
21					L	card ♂	142.6						
22					O	ref	43.1, 46.0						
23					C	rust	58.6, 57.3, 59.8						
24					A	lig	107.1						
25					T	met	72.0						
26					E	lin	73.5, 73.2						
27					A	plic	76.5	2-WD					
28		⊥	⊥		P	cord	66.0						
29	⊥	12	70-80		P	fas	117.5						

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Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 5
DATE 29 Aug

Project/Task: 2312.05 Stream Ohio River State Ohio County Brown

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	OSB	12	70-80		E	lin	71.8, 87.5						
2			⊥		A	plic	106.5, 99.3, 116.7, 104.5, 99.4						
3			⊥		O	ref	57.9						
4			60-70		P	alatus	104.5						
5			⊥		A	plic	108.5, 102.1, 88.6, 112.0			2-WD			
6			⊥		T	met	86.6						
7			⊥		L	recta ♂	140.0	1-WD					
8			⊥		P	alatus	1-WD						
9		⊥	50-60		L	recta ♀	139.0, 123.0						
10		12	90-100		O	ref	46.2						
11		⊥	⊥		T	met	67.3, 80.5, 73.4, 82.1, 78.0			1-WD			
12		⊥	⊥		E	lin	62.3, 79.0, 41.2						
13		⊥	⊥		L	card ♂	112.6						
14		⊥	⊥		C	pust	63.7, 58.2						
15		⊥	⊥		L	recta ♀	140.0, 141.5						
16		⊥	⊥		L	cardium ♀	117.0						
17		⊥	⊥		L	card ♂	116.5						
18		⊥	⊥		P	alatus	88.2						
19		⊥	⊥		P	sin	85.0						
20		⊥	⊥		M	nervosa	1-WD						
21	⊥	⊥	⊥		A	plic	3-WD						
22													
23													
24													
25													
26													
27													
28													
29													
30													

WD flagellas 40-50, 70-80

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE 8-30-24

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1		16	40-50	BY/VV	90	10					10 WD	10	11	ND	2900 BY / 3000 VV
2			50-60		60	20					20	10	11	Yellow L	
3			60-70		60	20	10				10 WD	10	15	Yellow C1	
4			80-70		50		90					10	17	Yellow 014	
5			80-90		40	10	40	10				11	16	Yellow 004	
6			90-100		40	10	40	10				10	17	Blue 136	1800 BY / 1800 VV
7			39-40		100	40						5	1	No	
8		17	40-50		90	10					Potamo. pus.	10	7	No mussels	1800 BY / 1800 VV
9			50-60		80	10		10				10	14	No mussels	
10			39-40		100	40						5	1	Orange 128	
11			60-70		50		40	10				10	16	Yellow 010	
12			70-80		40		50	10				10	19	Yellow 007	
13			80-90		35	15	40	10				10	17	Yellow 003	1000 BY / 1000 VV
14			90-100		30	20	35	15				10	18	Yellow 008 &	Yellow 002
15		18	39-40		60	40						5	1	No mussels	300 VV / 1900 BY
16			40-50		60					40		10	10	Yellow 017	
17			50-60		40	10	40	10				10	13	Yellow 001 / Green	
18			60-70		40	10	40	10				10	16	Green / Black	
19			70-80		50		40	10				10	17	Yellow 020	2400 VV / 2200 BY
20			80-90		50		40	10				11	16	Yellow 019	
21			90-100		50		40	10				12	16	Yellow 009 / 016	1820 BY / 2000 VV
22		19	39-40		60	40				40		5	1	No mussels	1750 BY / 2000 VV
23			40-50		40		20			40		10	10	No mussels	
24			50-60		45		10	30			15 WD	10	13	Yellow 018	
25			60-70		50		40	10				10	16	Yellow 005	
26			70-80		50		40	10				11	16	B26	1500 VV / 1100 BY
27			80-90		50		40	10				11	17	B70	
28			90-100		50		30	20				12	17	Yellow 011 / 013	700 BY / 1000 VV
29		20	39-40		60	40						5	8 1	No mussels	3200 BY / 3000 VV
30			40-50			30					70 veg.	10	8	No mussels	
31			50-60		10	10	60	10			10 wood	10	10	Green	
32			100-70		50	40	10					10	14	Yellow 001	
33			70-80		50	40	10					12	17	Yellow 020	
34			80-90		50	40	10					10	17	Yellow 019	
35			90-100	↓	50	40	10					11	17	Yellow 016 / 008	

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 8
DATE 8.30.2024

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		Mo	80-90		L.	recta	3x8 15	+, 133.0							Yellow 004
2					P.	sin	82.0,								
3					P.	cord	83.3								
4					A.	plic	1 WD								
5		20	90-100		A	plic	92.0	93.7							Yellow 016
6					T	Met	71.4	76.5	1WD	61.0					
7					C	Post	65.0	60.0							
8					E	Lin	87.7								
9					E	recta	131.3M								
10		Lo	60-70		C	rect	143.0F	138.0F	132.0F						Yellow 001
11					A	plic	98.5	81.0	91.0	106.4	93.3				
12					O	ref	53.0								
13						QQ	61.7								
14					A	Lig	134.0								
15					C	post	62.3								
16					P	alatus	128.4								
17		20	90-100		L	recta	148.7F	144.5F							Yellow 008
18					C	Post	63.0		1 WD						
19					+	Met	82.0	75.0	2 WD	74.0	80.0	84.6			74.2
20						sintoxia	89.0	88.3							
21					E	lin	94.2	1WD	81.6						
22						plic	53.8								
23					O	Sub	L 43.9	W24.7	H 41.4						Tag Yellow 1606 ★
24		20	50-60			recta	150+F	129.6F	127.0M						Green
25					P	alatus	130.6	114.0	98.7						
26						Complanata	115.4								
27		20	70-80		A	plic	112.5	101.0	101.8						Yellow 020
28						Post	72.4	67.3							
29					E	Lin	57.7								

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 8
DATE 30 Aug

Project/Task: 2312.005 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		20	70-80		L	recta	135.0 F	128.6 M					
2			↑		A	Lig	101.4						
3					P	alatus	72.9	85.6					
4					E	Lin	80.7						
5					C	Dust	63.7						
6					M	nervosa	147.5						
7			↓		+	met	73.7						
8		20	80-90		A	plic	113.0	64.4	3 WD				Yellow 019
9			↑		+	met	70.5	77.7	80.8				
10						QQ	63.8						
11					L	recta	117.9 F	120.6 F					
12					D	ref	56.2						
13					M	Nervosa	136.4						
14					C	Dust	53.8	63.0	61.3	1 WD			
15					E	Lin	91.0	[illegible]	64.4	1 WD			
16						Sintoxia	94.6	99.6	78.3				
17						alatus	97.0						
18						cordatum	66.4						
19						complanata	1 WD						
20			↓		A	lig	108.7						
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 8
DATE 8-30-2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		LR	80-90		A.	lig.	111.5,						Yellow 019
2			↓		F.	flava	1 WD						
3		18	90-100		O.	ref.	48.2, 84.4,						Yellow 009
4			↓		C.	pust	49.5, 107.3,						
5					L.	recta	146.7♂, 150+♂, 81.6♂,						
6						carolium	113.0♀, 119.5♀,						
7					A.	lig	118.5,						
8					L.	abrupta ✱	120.0 L.	106.4 W.	90.5 H.				0876 Orange (TAG)
9					P.	cuphyus ✱	105.1 L.	48.7 W.	73.4 H.				1976 Yellow (TAG)
10					T.	met.	75.2, 80.0, 84.8, 84.1,						
11					E.	lin	83.0,						
12					P.	cord	93.3,						
13			↓		O.	subrotunda	1 WD						
14		18	90-100		C.	pust	103.9, 105.2, 104.1, 104.0,						Yellow 016
15					O.	o.	109.8						
16					T.	met	78.4, 83.1, 77.4, 87.0, 80.0,						
17					E.	lin	106.3, 73.0, 88.1						
18					A.	dic	103.0, 91.0						
19					L.	recta	143.0♂						
20			↓		P.	cord	84.1, 70.7, 87.2,						
21		18	70-80		M.	nerv.	150+,						Yellow 020
22					T.	met	72.2, 75.1, 76.0, 68.2, 80.4, 1 WD						
23					L.	recta	72.0♂, 141.3♂						
24					C.	pust	70.8, 52.7,						
25					E.	lin	78.0, 106.0						
26					A.	dic	87.0, 95.4, 119.2, 74.0, 3 WD						
27					O.	ref	96.2,						
28					L.	card.	107.7♀, 120.7♂						
29			↓		P.	elatus	1 WD						
30													

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 8
DATE 30 Aug

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		18	50-60		L.	recta	140.1♀,	34.2♀,	39.9♀,	150+♂,	150+♂,	129.6♀, 139.2♀	Green
2			↓				132.4♀,	38.0♀,					
3					M.	nerv.	129.0,	150+,					
4					Q.	q.	69.0,	66.8,	59.2,	53.3			
5					E.	lin	61.1,						
6					A.	plic	97.0,	1 WD					
7			↓		L.	sili	102.4♀						
8		18	50-60		M.	nev.	140.0,						Yellow 001
9			↓		L.	sili	111.5♂						
10					L.	recta	144.4♂,	145.7♂,	152.2♂,	1 WD♀			
11					A.	plic	81.0,						
12			↓		C.	pust	55.0,						
13		17	90-100		L.	recta	139.8♂,	138.3♀					Yellow 008
14			↓		P.	cord	85.3,	90.3,					
15					T.	met	81.3,	73.9,	84.0	79.0,	90.3,		
16					E.	lin	73.8,	69.2,	81.3,	72.2,			
17					O.	ref	42.3,						
18			↓		C.	pust	1 WD						
19		17	35-40		A.	plic	106.0,	104.0,	1 WD				Orange 005
20			↓		L.	sili	103.0♀,						
21		17	80-90		M.	nerv	150+,						Yellow 003
22			↓		E.	lin	96.4,	98.3,	67.0	75.5,	66.9,	85.4, 89.4	
23					A.	plic	90.0,	84.5,	69.1,	90.0,	3 WD		
24					C.	pust	56.3,	62.4,	56.3,	52.2,	52.3		
25					Q.	q.	60.0,						
26					A.	lig	101.5						
27					T.	met	89.0,	71.8,	68.4,	78.3,	82.5,	81.6, 81.1, 76.4, 1 WD	
28					L.	card	97.0,	80.0,	1 WD				
29			↓		O.	ref,	68.9,	49.3,					
					P.	Cord	79.0,	71.0					

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 8
DATE 8-30-2024

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		17	70-80		A.	lig	104.7,						Yellow 007
2					T.	met	83.3, 78.5,						
3					F.	flava	74.4						
4					E.	lin	70.0, 89.2, 60.8						
5					O.	ref	98.2						
6					A.	plic	105.0, 103.0, 103.0, 97.5, 103.3, 82.5, 3 WD						
7					C.	pust	59.9						
8					P.	cond	92.5, 81.0, 71.5,						
9					L.	card	119.1♂						
10					L.	recta	150+♂, 150+♂, 121.3♀						
11		17	90-100		A.	plic	104.0, 116.4, 108.4, 118.3, 116.0, 107.0, 112.2, 103.0						Yellow 002
12					T.	met	71.0, 75.8, 83.3, 83.1, 72.2, 76.3, 68.5, 74.5						
13					C.	pust	94.0						
14					E.	lin	86.0, 79.0						
15					O.	ref	96.0						
16					L.	card	98.8♀						
17					P.	cond	97.0						
18					L.	recta	127.0♂, 128.0♀						
19		17	60-70		L	recta	8x♀ 150+, 109.2♂						Yellow 010
20					L.	sili	79.4♀						
21					A.	plic	102.5, 85.0, 82.8, 90.0, 3 WD						
22					O.	ref	46.9,						
23					M.	nerv	2x 150+,						
24					C.	pust	54.3						
25					T.	met	76.3						
26					E.	lin	50.5						
27					P.	elatus	1 WP						
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 8
DATE 8.30.2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		16	80-70		E.	lin	90.0, 52.1						Yellow 014
2					L.	sili	104.5♀						
3					C.	pust	60.7, 52.8, 60.0						
4					T.	met	69.3						
5					A.	plic	98.7, 3 WD						
6					P.	elatus	1 WD						
7		16	90-100		P.	cyphyus	108.4 L.	42.7 W.	73.0 H.				Blue 1310
8					T.	met	(ele.5, 81.5, 82.0	83.0, 79.8, 80.0, 74.0, 83.0, 85.0, 1 WD					
9					C.	pust	89.0, 56.0						
10					E.	lin	77.0, (77.7, 85.0, 81.0,						
11					A.	ref	80.1,						
12					P.	elatus	102.2,						
13					A.	plic	75.0						
14					L.	recta	141.0♂						
15		16	50-60		L.	sili	110.0♀, 113.4♀,						Yellow L
16					L.	card	100.0♀						
17					L.	recta	137.7♀						
18		16	60-70		O.	ref	48.1, 52.2, 48.1,						Yellow C1
19					A.	plic	94.5, 108.0, 3 WD						
20					C.	pust	56.8						
21					L.	sili	110.1♂						
22					L.	recta	150+♂, 150+♀						
23					P.	elatus	78.9, 1 WD						
24					L.	card	109.0♀						
25					A.	lig	1 WD						
26		16	80-90		A.	lig	122.4						Yellow 004
27					T.	met	75.0, 79.8, 79.6, 2 WD						
28					L.	card	77.0,						
29					O.	q.	58.6						
					P.	elatus	123.0, 100.5,						
					L.	pust	68.0, 59.9, 60.4						
					E.	lin	83.7, 78.5, 67.1, 1 WD						
					L.	sili	99.3♀						

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DATASHEET# 7 of 8
DATE 30 Aug

Project/Task: 2312.05 Stream Ohio River State WV County Lincoln

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	~~Depth~~ Height (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		19	90-100		L.	cardium	107.2 ♀						OLLY
2					A.	plic	85.0, 119.0,						
3					E.	lin	87.0						
4					T.	met	80.0, 66.7, 84.2, 78.9,						
5					L.	recta	130 ♂						
6					P.	cyphius ✱	106.3 Lig	47.6 Wd.	77.3 H				Yellow 1418 (TAG)
7					P.	cyphus ✱	108.9 L	49.7 W	81.3 H				Yellow 07-74 (TAG)
8					A.	plic	69.3						
9					T.	met	88.6, 1 WD						
10		19	80-90		C.	rust	60.0, 50.9, 2 WD						B7O
11					A.	plic	92.0, 106.0, 1 WD						
12					Q.	q.	58.0, 67.8, 63.5 (63.0,						
13					T.	met	78.0, 75.4, 72.0, 2 WD						
14					E.	Lin	73.1, 79.1, 59.5, 1 WD						
15						cordatum	70.0, 79.0						
16					A.	lig	113.2, 107.5						
17						sintoxia	80.1						
18					O.	ref	107.5, 85.0,						
19		18	60-70		A.	lig	102.3,						Green/Black
20					L.	recta	150.5 ♂,	148.9 ♂					
21					A.	plic	99.3, 84.6						
22					Q.	q.	59.2, 67.3						
23					E.	lin	74.2						
24					L.	sili	92.8						
25					P.	elatus	95.1, 82.3						
26		18	80-90		A.	plic	98.4, 114.3, 108.1, 1 WD						Yellow 019
27					E.	lin	76.0, 79.6						
28					T.	met	79.3, 83.0, 78.9, 79.9, 73.1						
29					Q.	q.	63.0, 58.0, 1 WD						
30					C.	rust	50.1, 63.1, 52.5, 56.0, 66.8, 1 WD						
					L.	recta	143.0 ♀						
						cordatum	68.0, 64.9, 96.5						
					P.	elatus	98.9						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 8 of 8
DATE 8-30-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		19	50-60		E.	lin	107.2, 54.9,						OIBY
2					C.	pust	60.0,						
3					O.	ref	63.1,						
4					A.	plic	107.3, 2	WD					
5					P.	elatus	108.5,						
6					L.	recta	134.7♀,	140.8♀,	138.9♂,	138.5♀,	138.3♂,	139.9♀	O
7		19	90-100		E.	lin	83.5, 1	WD					OIBY
8					L.	recta	138.3♂	137.6♂	135.2♂				
9					C.	pust	63.5						
10						cordatum	82.3, 88.6, 88.5,						
11						cardium	83.2,						
12					A.	plic	101.5,						
13					~~Q.~~	~~O~~							
14					T.	mut	84.9, 73.2, 73.1, 75.6, 1	WD					
15		19	60-70		L.	recta	133♀,	150+♀,	141.5♂,	138.0♀,	150+♂,	186.5♀	005Y
16					M.	nerv.	138.6						
17					A.	plic	87.2, 118.2, 107.0, 111.3,			106.3, 111.8, 2	WD		
18					O.	ref	106.6, 62.8, 1	WD					
19					E.	lin	73.8,						
20					C.	pust	69.1						
21		19	70-80		A.	plic	92.8, 111.4, 98.5,			104.0, 86.2, 92.0, 3	WD		2COB
22					O.	ref	39.1, 48.6						
23					E.	lin	107.7, 63.2, 88.8						
24					T.	mut	83.0, 80.0,						
25					C.	pust	54.9, 64.5,						
26					L.	recta	145.0♂						
27					A.	lig	108.0, 127.0,						
28						cordatum	67.0, 92.5						
29					Q.	Q	54.1						
					P.	elatus	1 WD						

Spot Dives

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DATASHEET# 1 of 1
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1	DSS	Spot 1		BY	50		30	20				10	16	Y016 / Y004	2200 → 2400 BY
2	"	Spot 2		"	50	20	20	10				10	16	Y004/Y002	2400 → 2600 BY
3	"	Spot 3		"	50	20	20	10				10	14		2000 → 1700 BY
4	"	Spot 4		"	50	20	20	10				10	17		1700 → 1400 BY
5	"	Spot 5		"	50		40	5			SWD	10	17		1400 → 1000 BY
6	"	Spot 6		"	50		40	10				10	17		1000 → 500 BY
7	"	Spot 7		"	50		40	10				10	17		2500 → 2100 BY
8	"	Spot 8		"	50		40	10				10	17		2100 → 1800 BY
9	"	Spot 9		"	50		40	10				10	17		1800 → 1500 BY
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

Spot Dives

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 4
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSS	Spot 1			A	plic	70, 110.0, 107.2	82.3, 103.6, 73.	7, 84.2				Y
2					P	cord	68.3,						
3					L	recta	131.2♂,	140.0♂,	134.2♂				
4					O	ref	52.4, 55.6						
5					E	lin	51.6, 73.2, 72.5, 94.2, 71.3, 52.7						
6					M	merv	>150+						
7					C	pus	63.4, 72.5, 55.2, 54.0,						
8					T	met	84.1, 76.2,						
9					L	cardium	98.2♀,	121.2♂,	109.2♂				
10					O	ref	58.2						
11					A	lig	99.4, 123.2, 119.5						
12					Q	Q	1 WD						
13		Spot 2			L	recta	1480♂,	123.2♀,	136.8♀, 149.2♀, 123.8♀, 133.2♀, 148.2♂, 130.2♀, 15[illegible]				134.0♂
14					M	merv	>50,						
15					P	alatus	121, 118.3, 120.7, 98.6						
16					A	plic	91.2, 98.0, 74.2, 110.2, 93.0, 71.7, 98.6, 99.6, 57.2, 125.3, 108.2, 100.1						
17					C	pus	60.2, 55.2, 54.5						
18					E	lin	82.3, 69.7						
19					C.	stigeria	62.0	41.1	61.5				tag Yell[illegible] 2.5 *
20					P	cuphuys	100.7	43.0	71.5				tag Yell[illegible] 7.2 = *
21					T	met	69.2, 85.2						
22					A	plic,	112.0, 110.3, 100.7, 98.7, 102.8, 94.2, 95.2, 63.8, 79 = 33.5, 94.2, 93.3						
23					L	cardium	118.7♂						
24					Q	Q	59.7						
25					A	plic	3 WD						
26		Spot 1			P	sin	86.2, 93.7, 92.8						
27					F	Flava	82.5						
28					P	cord	86.3						
29					P	alatus	120.1						
30		Spot 2			L	sil	106.3						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 2 of 4
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSS	Spot 3			M	nerv	>150,	>150,	131.5,				
2					A	plic	113.5,	102.8,	99.2,	99.7, 113.3,	92.4,	96.7, 113.0,	103.7, 85.8, 96.1,
3					P	fas	115.0						
4					E	lin	51.1,	60.3,	68.2				
5					O	ref	58.4,	48.6,	43.1,				
6					T	met	75.0,	77.2					
7					L	recta	142.3♂						
8					L	complinat	128.0						
9					L	cardium	115.4♂						
10		Spot 4			A	plic	102.2,	100.3,	78.7,	94.5, 98.0,	93.4,	86.2, 72.3,	70.8, 92.4, 103.4, 90
11					M	nerv	120.1						
12					A	plic	105.2,	89.4,	82.6				
13					O	ref	50.2,	53.4,	58.2,	45.6, 50.1			
14					E	lin	93.4,	50.6,	88.2,	64.1, 73.8,	68.9,	69.2, 71.4,	73.2, 72.0, 83.5, 76.
15					C	pus	59.2,	58.3,	64.8,	53.4, 61.2,	53.1,	70.1	
16					T	met	73.0,	75.2,	79.0,	78.3,			
17					E	lin	82.5,	68.4,	67.4,	44.6, 71.2,	85.4,	92.0	
18					L	recta	125.0♀,	138.8♂,	143.1♀				
19					Q	Q	58.0						
20		Spot 5											
21					A	plic	100.2,	92.3,	84.4,	93.8, 78.2,	88.4,	79.4, 84.7,	104.8,
22					A	plic	4WD						
23					M	nervosa	120.1,						
24					L	recta	145.0♂,	132.8♂,	124.1♀,	130.8♀			
25					P	alatus	131.1,						
26					T	met	69.1						
27					E	lin	76.2,	83.1,	88.2				
28					E	lin	1WD						
29					Q	Q	61.2						
					P	cord	75.0						
					P	sin	94.2						
					L	card	103.1♂,	108.1♀					

* Male / Juvenile / Female Spot Dives *Diver (initials only)

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DATASHEET# 3 of 4
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSS	Spot 6			A	plic	107.2,	8.0, 88	3, 10	8 6.9	6.2, 86.4	100.1,	104.3, 116.1, 69.0
2					E	lin	85.0,	53.1,	63.1,				
3					C	pus	49.2,	64.0					
4					T	met	77.4,	86.5,	75.5,				
5					L	recta	133.1♀,	139.4♀,	138.2♀,	115.3♀,	118.0♂		
6					P	alatus	100.1,						
7					M	nerv	>150						
8					P	cord	53.4						
9					O	ref	60.0,	55.5,	54.2,	59.3			
10					C	pus	1WD						
11		Spot 7			M	nerv	146.0,	>50,					
12					A	plic	92.3,	87.4,	114.0,	73.2,	76.4		
13					T	met	81.0,	80.2,	79.4,	77.8,	60.2,	78.0,	
14		Spot 7			C	pus	62.0,	57.1,	55.6,	62.5,	54.2,	45.0, 52.4	
15					Q	Q	54.8,	60.1,					
16					O	ref	45.0,	46.5					
17					E	lin	75.2,	78.0,					
18					L	cardium	115.0♀						
19					P	cord	83.4						
20					L	recta	138.1♀,	135.4♀,	140.0♂,				
21					A	plic	1WD						
22		Spot 8			A	plic	88.4,	95.4,	72.0,	109.5,	90.6,	102.5, 89.0,	76.2, 110.0, 105.0, 99.5, 110.2
23					E	lin	54.0,	70.7,					
24					C	pus	44.6,	59.4,	65.5,				
25					T	met	85.0,	86.7,	79.0,	75.5,			
26					O	ref	53.0,						
27					L	recta	139.1♀,	122.0♂,					
28					L	cardium	120.0♂						
29													

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DATASHEET# 4 of 4
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1	DSS	Spot 9			E	lin	73.1,	74.0,	65.2,	90.0,	89.5,	88.5,	
2					C	pus	54.0,	57.2,	56.3,	56.5,	54.3,	58.0,	56.5,
3					A	plic	84.4,	72.0,	78.5,				
4					L	sili	100.0?						
5					T	met	81.2,	85.5,	74.6,	73.7,	66.9,	67.4,	
6					O	ref	59.1,	45.5,					
7					P	alatus	104.6,	91.0,					
8					P	cord	72.5,						
9					F	Flava	71.0,						
10					Q	Q	58.4,	59.0,					
11	—	—			L	recta	150♂						
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

B-6
REPRESENTATIVE SITE PHOTOS



Site 1 looking downstream



Site 1 looking at the channel



Site 1 looking at shore



Site 1 looking upstream

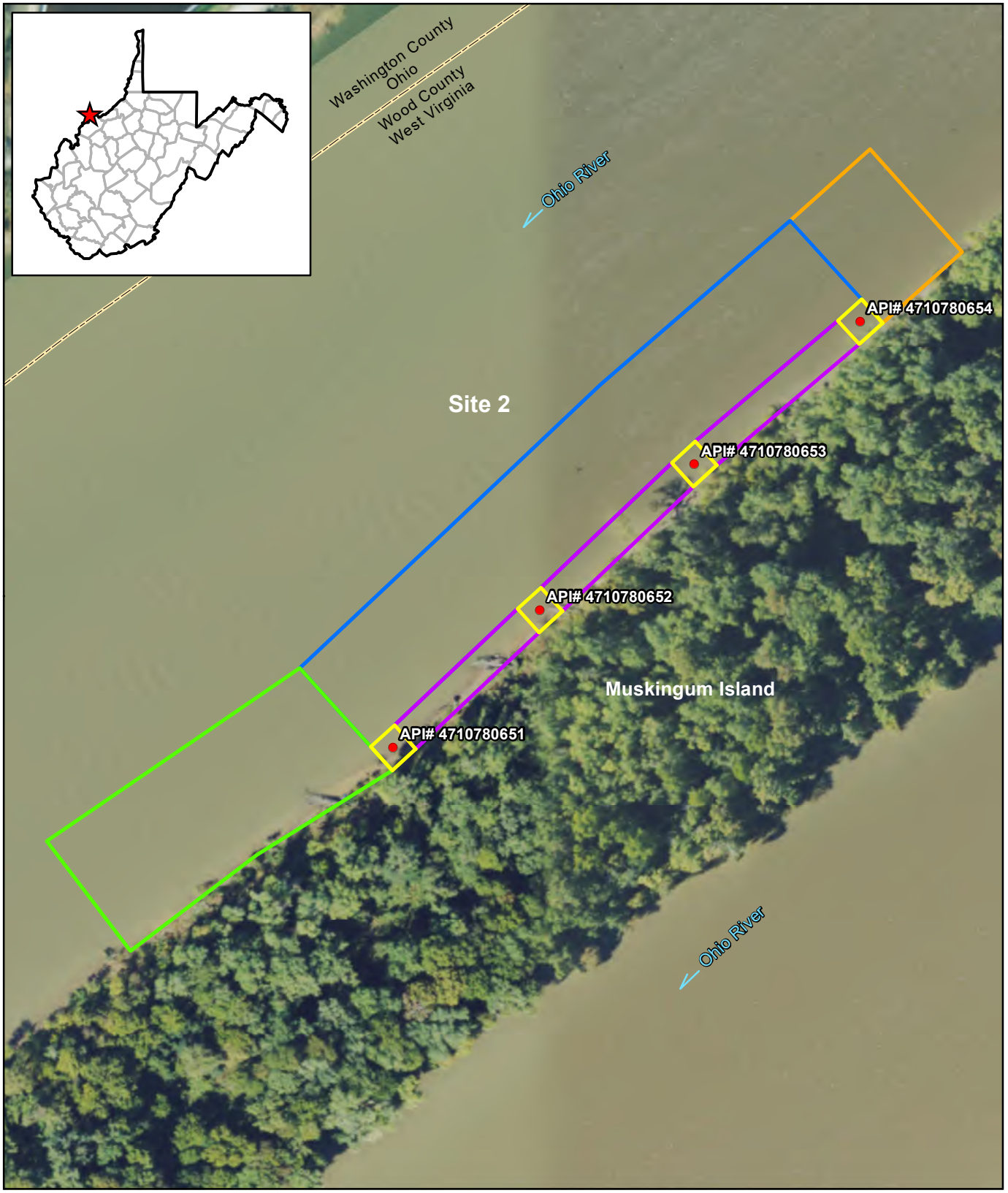


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APPENDIX C
SITE 2 SUPPORTING DOCUMENTATION

- C-1: Figures C1 through C5
- C-2: Data Tables C1 through C6
- C-3: WVDNR Scope of Work Form
- C-4: WVDNR Mussel Summary Form
- C-5: Datasheets
- C-6: Representative Site Photos

C-1
FIGURES C1 THROUGH C5



American Petroleum Institute (API) Well Location
Area of Direct Impact
Upstream Buffer
Downstream Buffer
Lateral Buffer
Intermediate Buffer

N
W
E
S

Figure C1. Site 2 mussel survey extent for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 50 100 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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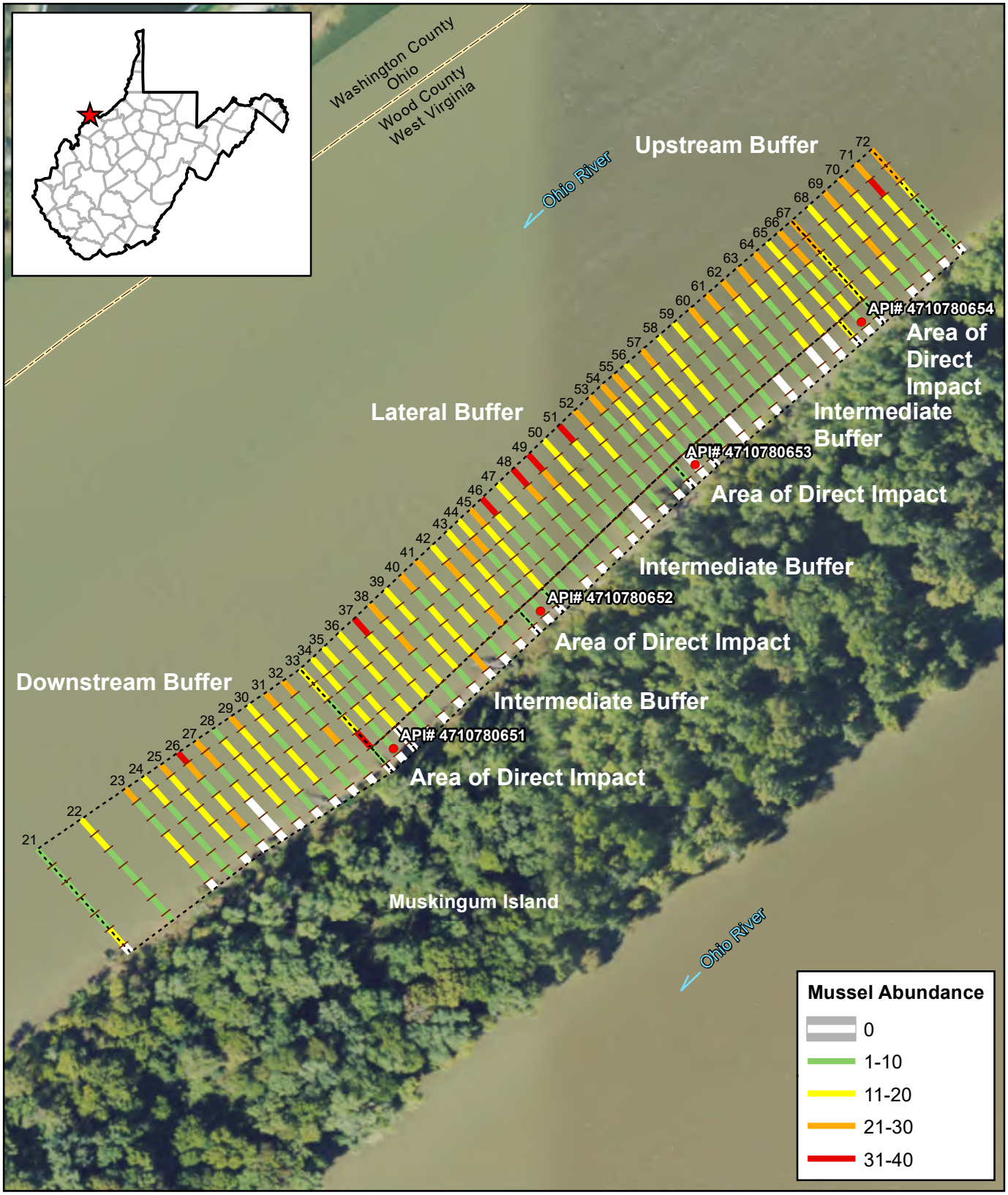


Figure C2. Site 2 live mussel abundance per transect interval for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

N W E S

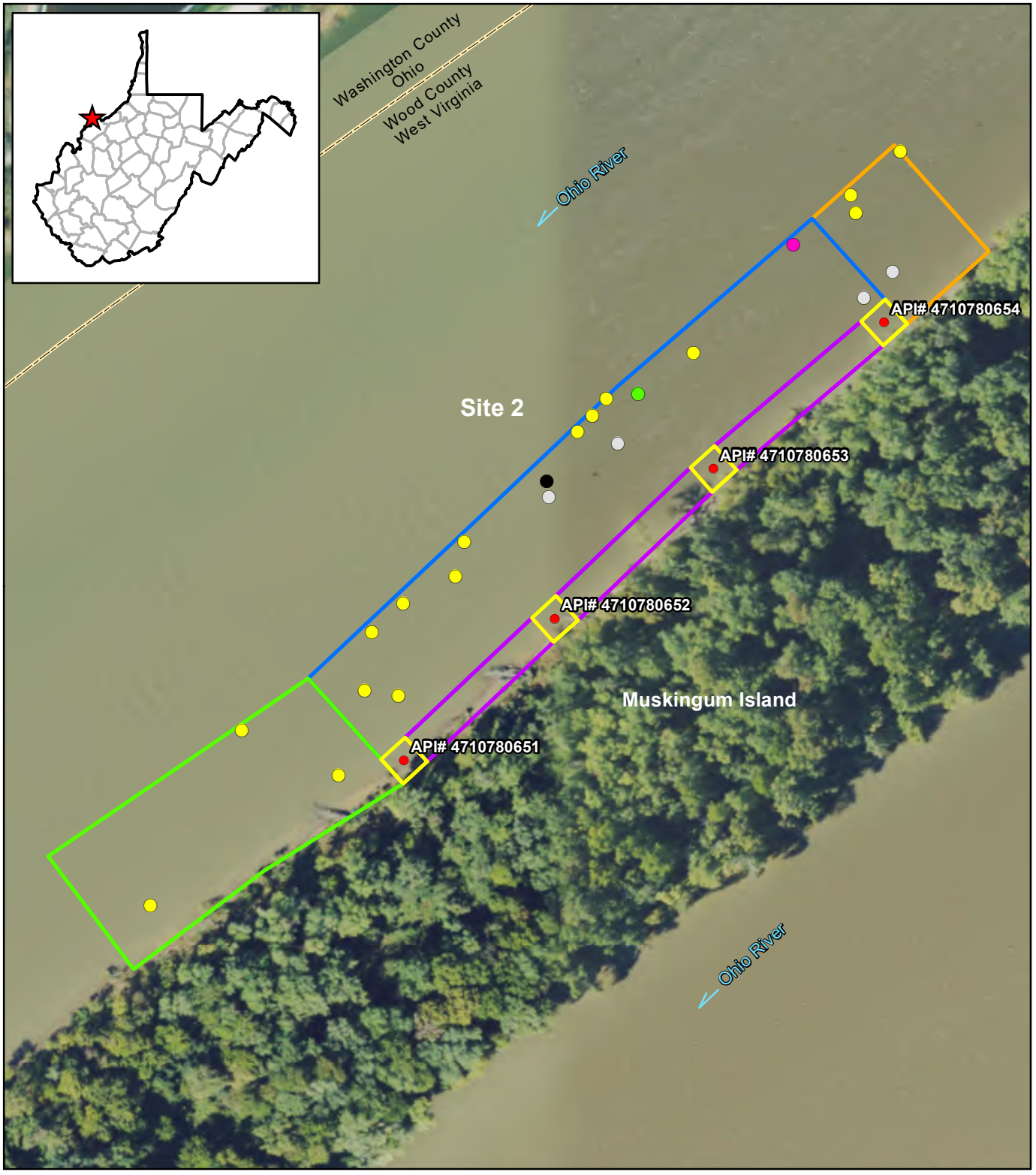
Project No. 2312

0 50 100 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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N
W E
S

Figure C3. Site 2 federally listed species occurrence for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

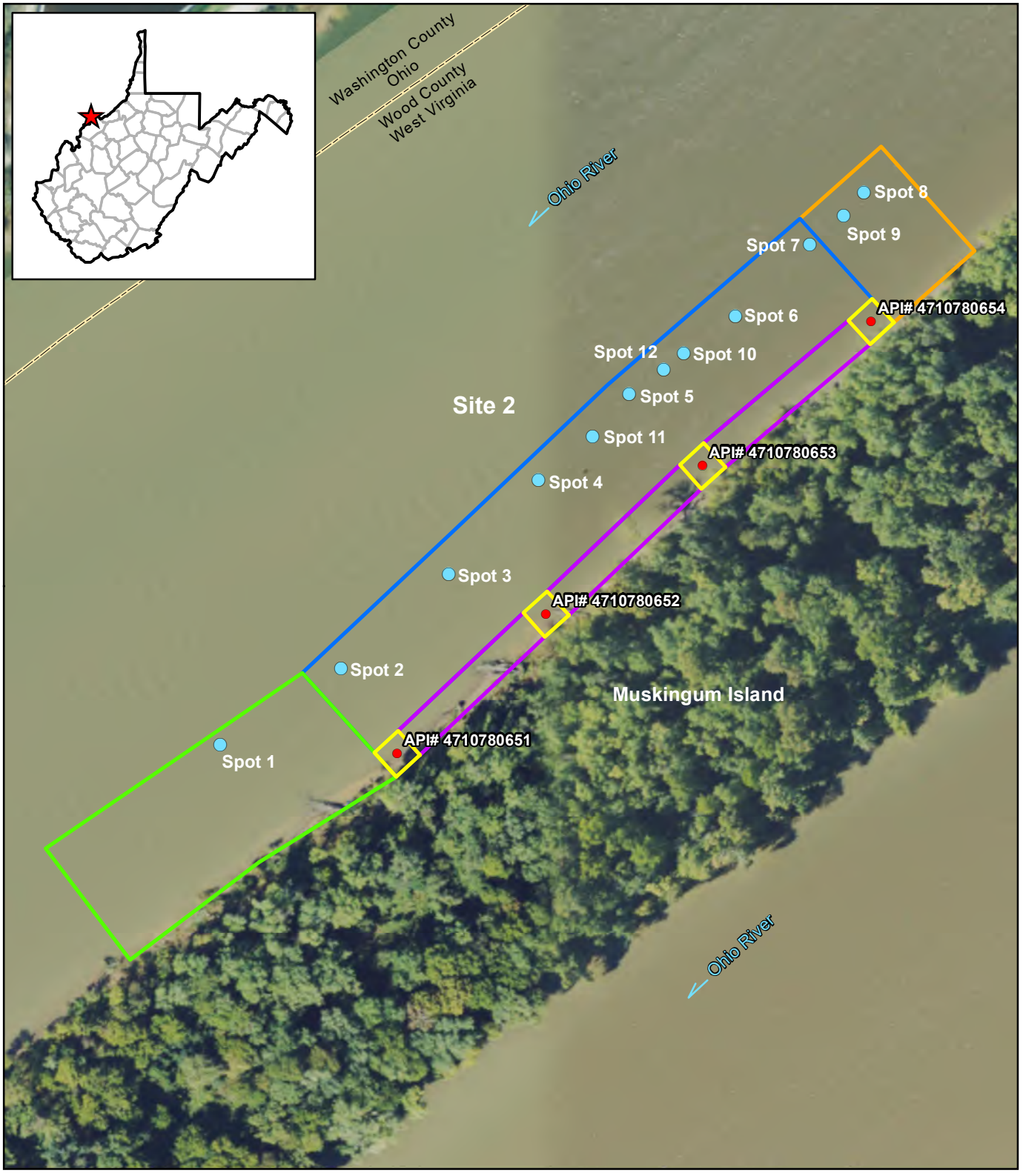
Project No. 2312

0 50 100 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Spot Dive Location

American Petroleum Institute (API) Well Location

Area of Direct Impact

Upstream Buffer

Downstream Buffer

Lateral Buffer

Intermediate Buffer

N

W E

S

Figure C4. Site 2 spot dive locations for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

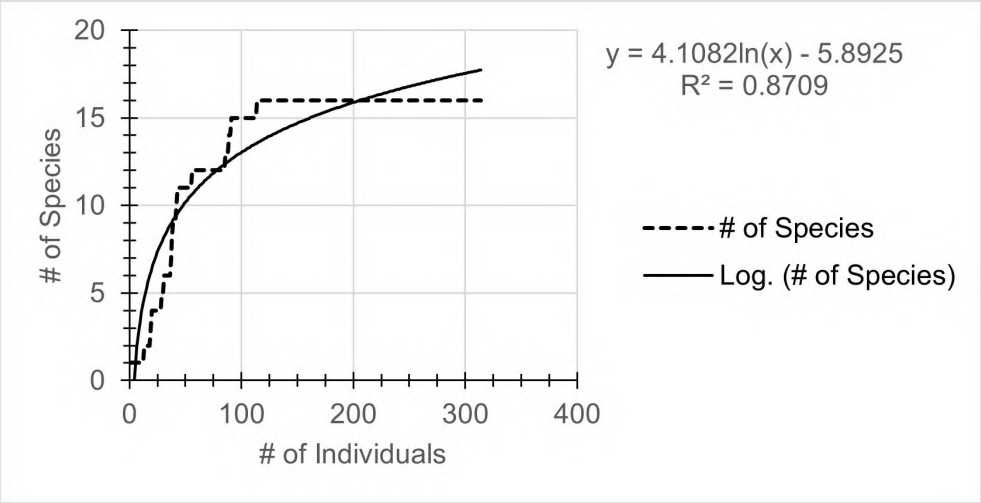
0 50 100 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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Figure C5. Site 2 spot dive species richness curve for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.



C-2
DATA TABLES C1 THROUGH C6

Table C1. Site 2 habitat data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
31 Aug	DSB	21	0-5	BY/KY	50	20							30	6	0.3
31 Aug	DSB	21	5-15	BY/KY	30	10		40			20			12	1.5
31 Aug	DSB	21	15-25	BY/KY	20	10		50			20			12	1.5
31 Aug	DSB	21	25-35	BY/KY	50		20	30						12	2.7
31 Aug	DSB	21	35-45	BY/KY	50		40	10						12	4.0
31 Aug	DSB	21	45-55	BY/KY	50		40	10						12	4.9
31 Aug	DSB	21	55-65	BY/KY	60		40							12	5.2
31 Aug	DSB	22	0-5	BY/KY	50	40	10							6	0.3
31 Aug	DSB	22	5-15	BY/KY	80	20								12	1.5
31 Aug	DSB	22	15-25	BY/KY	50	20	30							12	1.8
31 Aug	DSB	22	25-35	BY/KY	20	20	60							12	2.7
31 Aug	DSB	22	35-45	BY/KY	20	20	60							12	3.4
31 Aug	DSB	22	45-55	BY/KY	20	20	60							12	3.7
31 Aug	DSB	22	55-65	BY/KY	20	20	50				10			12	5.2
31 Aug	DSB	23	0-5	BY/KY	60	40								6	0.3
31 Aug	DSB	23	5-15	BY/KY	60	30	10							12	1.5
31 Aug	DSB	23	15-25	BY/KY	10		80	10						12	1.8
31 Aug	DSB	23	25-35	BY/KY	10		80	10						12	2.7
31 Aug	DSB	23	35-45	BY/KY	60	10		30						12	3.4
31 Aug	DSB	23	45-55	BY/KY	60	10		30						12	4.0
31 Aug	DSB	23	55-65	BY/KY	50	50								12	5.2
31 Aug	DSB	24	0-5	BY/KY	50	40	10							6	0.3
31 Aug	DSB	24	5-15	BY/KY	50	50								12	1.8
31 Aug	DSB	24	15-25	BY/KY	100									12	3.0
31 Aug	DSB	24	25-35	BY/KY	100									12	3.7
31 Aug	DSB	24	35-45	BY/KY	100									12	4.3
31 Aug	DSB	24	45-55	BY/KY	100									12	4.9
31 Aug	DSB	24	55-65	BY/KY	100									12	5.2
1 Sep	DSB	25	0-5	VV/KY	40	60								6	1.5
1 Sep	DSB	25	5-15	VV/KY	40	50	10							12	2.4
1 Sep	DSB	25	15-25	VV/KY	40	10	50							12	3.0
1 Sep	DSB	25	25-35	VV/KY	40	10	50							12	3.7
1 Sep	DSB	25	35-45	VV/KY	40	10	50							12	4.6
1 Sep	DSB	25	45-55	VV/KY	40		50	10						12	5.2

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
1 Sep	DSB	25	55-65	VV/KY	40	10	50							12	5.2
1 Sep	DSB	26	0-5	VV/KY	50	40					10			6	1.2
1 Sep	DSB	26	5-15	VV/KY	30	30	30				10			12	2.4
1 Sep	DSB	26	15-25	VV/KY	40	30	30							12	3.0
1 Sep	DSB	26	25-35	VV/KY	40	30	30							12	3.7
1 Sep	DSB	26	35-45	VV/KY	30	20	40	10						12	4.3
1 Sep	DSB	26	45-55	VV/KY	30	20	40	10						12	4.9
1 Sep	DSB	26	55-65	VV/KY	30	20	40	10						12	5.2
1 Sep	DSB	27	0-5	VV/KY	50	50								6	1.5
1 Sep	DSB	27	5-15	VV/KY	80	20								12	3.0
1 Sep	DSB	27	15-25	VV/KY	30	30	30	10						12	3.0
1 Sep	DSB	27	25-35	VV/KY	30	30	30	10						12	3.4
1 Sep	DSB	27	35-45	VV/KY	30	30	30	10						12	4.0
1 Sep	DSB	27	45-55	VV/KY	30	30	30	10						12	4.6
1 Sep	DSB	27	55-65	VV/KY	30	30	30	10						12	4.9
1 Sep	DSB	28	0-5	VV/KY	50	50								6	1.2
1 Sep	DSB	28	5-15	VV/KY	60	10	30							12	2.7
1 Sep	DSB	28	15-25	VV/KY	60	10	30							12	3.0
1 Sep	DSB	28	25-35	VV/KY	60	10	30							12	3.4
1 Sep	DSB	28	35-45	VV/KY	60	10	30							12	4.0
1 Sep	DSB	28	45-55	VV/KY	60	10	30							12	4.6
1 Sep	DSB	28	55-65	VV/KY	50		50							12	5.2
2 Sep	DSB	29	0-5	BY/VV	60	40								6	1.5
2 Sep	DSB	29	5-15	BY/VV	60	10	20				10			12	2.1
2 Sep	DSB	29	15-25	BY/VV	40	20	30	10						12	2.7
2 Sep	DSB	29	25-35	BY/VV	40	20	30	10						12	3.4
2 Sep	DSB	29	35-45	BY/VV	40	20	30	10						12	3.7
2 Sep	DSB	29	45-55	BY/VV	40	10	40	10						12	4.3
2 Sep	DSB	29	55-65	BY/VV	40	10	40	10						12	4.9
2 Sep	DSB	30	0-5	BY/VV	70	20					10			6	1.5
2 Sep	DSB	30	5-15	BY/VV	60	5	30	5						12	2.7
2 Sep	DSB	30	15-25	BY/VV	50		40	10						12	3.0
2 Sep	DSB	30	25-35	BY/VV	50		40	10						12	3.7
2 Sep	DSB	30	35-45	BY/VV	50	10	30	10						12	4.3
2 Sep	DSB	30	45-55	BY/VV	50	10	30	10						12	4.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
2 Sep	DSB	30	55-65	BY/VV	50	10	30	10						12	4.6
2 Sep	DSB	31	0-5	BY/VV	80							20		6	0.6
2 Sep	DSB	31	5-15	BY/VV	50		50							12	2.4
2 Sep	DSB	31	15-25	BY/VV	50		50							12	3.4
2 Sep	DSB	31	25-35	BY/VV	50	45		5						12	3.4
2 Sep	DSB	31	35-45	BY/VV	50	45		5						12	4.0
2 Sep	DSB	31	45-55	BY/VV	50	45		5						12	4.0
2 Sep	DSB	31	55-65	BY/VV	50	45		5						12	4.6
3 Sep	DSB	32	0-5	BY/KY	50	50								6	0.6
3 Sep	DSB	32	5-15	BY/KY	70	10	10					10		12	2.4
3 Sep	DSB	32	15-25	BY/KY	70		20				10			12	3.0
3 Sep	DSB	32	25-35	BY/KY	60	10	30							12	4.0
3 Sep	DSB	32	35-45	BY/KY	60	10	30							12	4.0
3 Sep	DSB	32	45-55	BY/KY	30	30					40			12	4.9
3 Sep	DSB	32	55-65	BY/KY	30	30	30	10						12	5.2
3 Sep	ADI	33	0-5	BY/KY	50	40						10		6	0.6
3 Sep	ADI	33	5-15	BY/KY	30	30	20				20			12	2.4
3 Sep	LTB	33	15-25	BY/KY	30	30	30		10					12	4.3
3 Sep	LTB	33	25-35	BY/KY	30	30	30		10					12	4.6
3 Sep	LTB	33	35-45	BY/KY	40	30	10	10	10					12	4.6
3 Sep	LTB	33	45-55	BY/KY	30	30	30	10						12	5.2
3 Sep	LTB	33	55-65	BY/KY	30	30	30	10						12	5.2
3 Sep	ADI	34	0-5	BY/KY	80						20			6	0.6
3 Sep	ADI	34	5-15	BY/KY	50		10	20		20				12	1.5
3 Sep	LTB	34	15-25	BY/KY	50		10	20		20				12	1.8
3 Sep	LTB	34	25-35	BY/KY	50		20			30				12	2.4
3 Sep	LTB	34	35-45	BY/KY	40		20			40				12	3.0
3 Sep	LTB	34	45-55	BY/KY	20		20	20		40				12	4.6
3 Sep	LTB	34	55-65	BY/KY	40		40	20						12	4.6
3 Sep	ADI	35	0-5	BY/KY	30	60						10		6	0.6
3 Sep	ADI	35	5-15	BY/KY	90	10								12	2.1
3 Sep	LTB	35	15-25	BY/KY	80	10	10							12	3.4
3 Sep	LTB	35	25-35	BY/KY	40			20			40			12	3.4
3 Sep	LTB	35	35-45	BY/KY	30	30	10	30						12	4.0
3 Sep	LTB	35	45-55	BY/KY	30	30	10	30						12	4.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
3 Sep	LTB	35	55-65	BY/KY	40	30	20	10						12	4.9
3 Sep	IB	36	0-5	BY/KY	90	10								6	0.0
3 Sep	IB	36	5-15	BY/KY	90							10		12	1.2
3 Sep	LTB	36	15-25	BY/KY	40	30	30							12	3.0
3 Sep	LTB	36	25-35	BY/KY	40	30	30							12	3.0
3 Sep	LTB	36	35-45	BY/KY	30	30	30	10						12	4.6
3 Sep	LTB	36	45-55	BY/KY	30	30	30	10						12	4.6
3 Sep	LTB	36	55-65	BY/KY	30	30	30	10						12	4.6
3 Sep	IB	37	0-5	BY/KY	50	50								6	0.3
3 Sep	IB	37	5-15	BY/KY	90							10		12	1.2
3 Sep	LTB	37	15-25	BY/KY	30	30	30	10						12	2.4
3 Sep	LTB	37	25-35	BY/KY	30	30	20	20						12	2.7
3 Sep	LTB	37	35-45	BY/KY	30	30	20	20						12	3.7
3 Sep	LTB	37	45-55	BY/KY	30	30	20	20						12	4.0
3 Sep	LTB	37	55-65	BY/KY	40	30	30							12	4.6
4 Sep	IB	38	0-5	VV/KY	45	35						20		6	1.5
4 Sep	IB	38	5-15	VV/KY	80	10					10			12	2.4
4 Sep	LTB	38	15-25	VV/KY	40	30	20	10						12	3.0
4 Sep	LTB	38	25-35	VV/KY	40	30	20	10						12	3.7
4 Sep	LTB	38	35-45	VV/KY	40	30	20	10						12	4.0
4 Sep	LTB	38	45-55	VV/KY	40	30	20	10						12	4.6
4 Sep	LTB	38	55-65	VV/KY	40	30	20	10						12	4.9
4 Sep	IB	39	0-5	VV/KY	50	50								6	1.5
4 Sep	IB	39	5-15	VV/KY	60						40			12	2.4
4 Sep	LTB	39	15-25	VV/KY	40	20	40							12	2.7
4 Sep	LTB	39	25-35	VV/KY	40	30	20	10						12	3.7
4 Sep	LTB	39	35-45	VV/KY	40	30	20	10						12	4.0
4 Sep	LTB	39	45-55	VV/KY	40	30	20	10						12	4.6
4 Sep	LTB	39	55-65	VV/KY	40	30	20	10						12	4.9
4 Sep	IB	40	0-5	VV/KY	90	10								6	2.1
4 Sep	IB	40	5-15	VV/KY	60	20	20							12	2.7
4 Sep	LTB	40	15-25	VV/KY	60	20	20							12	3.4
4 Sep	LTB	40	25-35	VV/KY	50	40	10							12	4.0
4 Sep	LTB	40	35-45	VV/KY	40	10	40	10						12	4.6
4 Sep	LTB	40	45-55	VV/KY	40	10	40	10						12	4.6

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
4 Sep	LTB	40	55-65	VV/KY	50	10	30	10						12	4.9
4 Sep	IB	41	0-5	VV/KY	80	20								6	1.2
4 Sep	IB	41	5-15	VV/KY	60	20	20							12	3.0
4 Sep	LTB	41	15-25	VV/KY	60	20	20							12	3.0
4 Sep	LTB	41	25-35	VV/KY	60	20	10				10			12	3.7
4 Sep	LTB	41	35-45	VV/KY	60	20	20							12	4.6
4 Sep	LTB	41	45-55	VV/KY	60	20	20							12	4.9
4 Sep	LTB	41	55-65	VV/KY	60	20	20							12	5.2
4 Sep	IB	42	0-5	KY/VV	40	40					20			6	2.7
4 Sep	IB	42	5-15	KY/VV	90	10								12	2.4
4 Sep	LTB	42	15-25	KY/VV	60	10	30							12	3.0
4 Sep	LTB	42	25-35	KY/VV	60	15	20				5			12	3.7
4 Sep	LTB	42	35-45	KY/VV	40	30	30							12	4.3
4 Sep	LTB	42	45-55	KY/VV	40	30	30							12	4.6
4 Sep	LTB	42	55-65	KY/VV	40	30	30								4.9
4 Sep	ADI	43	0-5	VV/KY	70						10	20		6	1.5
4 Sep	ADI	43	5-15	VV/KY	60	10	30							12	3.0
4 Sep	LTB	43	15-25	VV/KY	45	10	40				5			12	3.4
4 Sep	LTB	43	25-35	VV/KY	30	30	30	10						12	3.7
4 Sep	LTB	43	35-45	VV/KY	30	30	30	10						12	4.6
4 Sep	LTB	43	45-55	VV/KY	30	30	30	10						12	4.9
4 Sep	LTB	43	55-65	VV/KY	30	30	30	10						12	5.2
5 Sep	ADI	44	5-15	BY/VV	55	20					25			5	3.0
5 Sep	LTB	44	15-25	BY/VV	60	20	10				10			10	3.4
5 Sep	ADI	44	0-5	BY/VV	50	50								10	0.3
5 Sep	LTB	44	25-35	BY/VV	50	10	30	10						10	4.0
5 Sep	LTB	44	35-45	BY/VV	50	10	30	10						10	4.3
5 Sep	LTB	44	45-55	BY/VV	50	20	30							10	4.6
5 Sep	LTB	44	55-65	BY/VV	50	10	30	10						11	5.2
5 Sep	ADI	45	0-5	BY/VV	80						20			5	1.8
5 Sep	ADI	45	5-15	BY/VV	60	10	10				20			10	2.7
5 Sep	LTB	45	15-25	BY/VV	50	20	20	5			5			10	3.4
5 Sep	LTB	45	25-35	BY/VV	50	20	20	5			5			10	4.0
5 Sep	LTB	45	35-45	BY/VV	50	10	30	10						10	4.9
5 Sep	LTB	45	45-55	BY/VV	50	10	30	10						10	4.6

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
5 Sep	LTB	45	55-65	BY/VV	50	20	30							12	5.2
5 Sep	IB	46	0-5	BY/VV	90							10		5	1.2
5 Sep	IB	46	5-15	BY/VV	50	10	20	10			10			10	2.7
5 Sep	LTB	46	15-25	BY/VV	40	10	40	10						10	3.4
5 Sep	LTB	46	25-35	BY/VV	40	10	40	10						10	4.0
5 Sep	LTB	46	35-45	BY/VV	40	10	40	10						11	4.9
5 Sep	LTB	46	45-55	BY/VV	20	40	30	10						10	5.2
5 Sep	LTB	46	55-65	BY/VV	20	40	30	10						12	5.2
5 Sep	IB	47	0-5	BY/VV		100								5	1.2
5 Sep	IB	47	5-15	BY/VV	50	10	30	10						10	2.7
5 Sep	LTB	47	15-25	BY/VV	50		50							10	3.7
5 Sep	LTB	47	25-35	BY/VV	50		45	5						10	4.0
5 Sep	LTB	47	35-45	BY/VV	50		45	5						11	4.9
5 Sep	LTB	47	45-55	BY/VV	50		45	5						11	5.2
5 Sep	LTB	47	55-65	BY/VV	50		50							12	5.2
5 Sep	IB	48	0-5	BY/VV	80	20								5	0.0
5 Sep	IB	48	5-15	BY/VV	70		20				10			10	2.7
5 Sep	LTB	48	15-25	BY/VV	40		50	10						10	3.4
5 Sep	LTB	48	25-35	BY/VV	60	10	20	10						11	4.3
5 Sep	LTB	48	35-45	BY/VV	50		40	10						12	4.6
5 Sep	LTB	48	45-55	BY/VV	50		40	10						11	4.9
5 Sep	LTB	48	55-65	BY/VV	50		40	10						12	4.9
5 Sep	IB	49	0-5	BY/VV	90							10		5	0.6
5 Sep	IB	49	5-15	BY/VV	80	10					10			10	2.7
5 Sep	LTB	49	15-25	BY/VV	60		30	10						10	3.7
5 Sep	LTB	49	25-35	BY/VV	50	10	30	10						11	4.3
5 Sep	LTB	49	35-45	BY/VV	50	10	30	10						12	4.9
5 Sep	LTB	49	45-55	BY/VV		40	50	10						10	4.9
5 Sep	LTB	49	55-65	BY/VV		40	50	10						12	4.9
6 Sep	IB	50	0-5	KY/BD	40	40					20			6	0.3
6 Sep	IB	50	5-15	KY/BD	50						50			12	1.5
6 Sep	LTB	50	15-25	KY/BD	60	20	20							12	3.0
6 Sep	LTB	50	25-35	KY/BD	60	20	20							12	4.0
6 Sep	LTB	50	35-45	KY/BD	40	30	30							12	4.6
6 Sep	LTB	50	45-55	KY/BD	40	30	30							12	4.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
6 Sep	LTB	50	55-65	KY/BD	40	30	30							12	5.2
6 Sep	IB	51	0-5	KY/BD	80	20								6	0.3
6 Sep	IB	51	5-15	KY/BD	80	20								12	3.0
6 Sep	LTB	51	15-25	KY/BD	60	20	15				5			12	3.7
6 Sep	LTB	51	25-35	KY/BD	60	20	20							12	4.6
6 Sep	LTB	51	35-45	KY/BD	60	20	20							12	4.9
6 Sep	LTB	51	45-55	KY/BD	60	20	20							12	4.9
6 Sep	LTB	51	55-65	KY/BD	40	30	30							12	4.9
6 Sep	IB	52	0-5	KY/BD	70	30								6	0.0
6 Sep	IB	52	5-15	KY/BD	80	10	10							12	1.5
6 Sep	LTB	52	15-25	KY/BD	70	10	20							12	3.0
6 Sep	LTB	52	25-35	KY/BD	70	10	20							12	4.6
6 Sep	LTB	52	35-45	KY/BD	70	10	20							12	5.2
6 Sep	LTB	52	45-55	KY/BD	30	40	30							12	4.9
6 Sep	LTB	52	55-65	KY/BD	30	40	30							12	4.9
6 Sep	IB	53	0-5	KY/BD	50	50								6	0.3
6 Sep	IB	53	5-15	KY/BD	80	10	10							12	3.0
6 Sep	LTB	53	15-25	KY/BD	40	30	30							12	4.0
6 Sep	LTB	53	25-35	KY/BD	40	30	30							12	4.6
6 Sep	LTB	53	35-45	KY/BD	40	30	30							12	4.9
6 Sep	LTB	53	45-55	KY/BD	50	10	20				20			12	4.9
6 Sep	LTB	53	55-65	KY/BD	40	30	30							12	4.6
6 Sep	ADI	54	0-5	KY/BD	50	50								6	0.3
6 Sep	ADI	54	5-15	KY/BD	50	30	20							12	1.5
6 Sep	LTB	54	15-25	KY/BD	50	30	20							12	3.0
6 Sep	LTB	54	25-35	KY/BD	40	30	20	10						12	3.7
6 Sep	LTB	54	35-45	KY/BD	40	30	30							12	4.9
6 Sep	LTB	54	45-55	KY/BD	40	30	30							12	4.9
6 Sep	LTB	54	55-65	KY/BD	40	30	30							12	5.2
6 Sep	ADI	55	0-5	KY/BD	50	50								6	0.3
6 Sep	ADI	55	5-15	KY/BD	40	30	30							12	1.5
6 Sep	LTB	55	15-25	KY/BD	40	30	30							12	2.4
6 Sep	LTB	55	25-35	KY/BD	40	30	30							12	3.0
6 Sep	LTB	55	35-45	KY/BD	30	30	30	10						12	4.3
6 Sep	LTB	55	45-55	KY/BD	30	30	30	10						12	4.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
6 Sep	LTB	55	55-65	KY/BD	30	30	30	10						12	4.9
7 Sep	ADI	56	0-5	BD/VV	50	50								6	1.2
7 Sep	ADI	56	5-15	BD/VV	75		25							12	4.3
7 Sep	LTB	56	15-25	BD/VV	50	25	25							12	4.3
7 Sep	LTB	56	25-35	BD/VV	50	25	25							12	4.6
7 Sep	LTB	56	35-45	BD/VV	30	30	30				10			12	4.6
7 Sep	LTB	56	45-55	BD/VV	40	30	30							12	4.9
7 Sep	LTB	56	55-65	BD/VV	40	45	15							12	4.9
7 Sep	IB	57	0-5	BD/VV	50	50								6	1.2
7 Sep	IB	57	5-15	BD/VV	75		25							12	3.0
7 Sep	LTB	57	15-25	BD/VV	50	20	30							12	4.3
7 Sep	LTB	57	25-35	BD/VV	60	20	20							12	4.9
7 Sep	LTB	57	35-45	BD/VV	40	30	30							12	4.9
7 Sep	LTB	57	45-55	BD/VV	40	30	30							12	5.2
7 Sep	LTB	57	55-65	BD/VV	40	30	30							12	5.2
7 Sep	IB	58	0-5	BD/VV	50	50								6	1.5
7 Sep	IB	58	5-15	BD/VV	70	20	10							12	2.4
7 Sep	LTB	58	15-25	BD/VV	60	20	20							12	3.7
7 Sep	LTB	58	25-35	BD/VV	40	30	30							12	4.3
7 Sep	LTB	58	35-45	BD/VV	40	30	30							12	4.9
7 Sep	LTB	58	45-55	BD/VV	40	30	30							12	4.9
7 Sep	LTB	58	55-65	BD/VV	40	30	30							12	5.2
7 Sep	IB	59	0-5	BD/VV	50	50								6	1.2
7 Sep	IB	59	5-15	BD/VV	70	30								12	3.0
7 Sep	LTB	59	15-25	BD/VV	70	20	10							12	3.7
7 Sep	LTB	59	25-35	BD/VV	60	30	10							12	4.6
7 Sep	LTB	59	35-45	BD/VV	40	30	30							12	4.9
7 Sep	LTB	59	45-55	BD/VV	40	30	30							12	4.9
7 Sep	LTB	59	55-65	BD/VV	40	30	30							12	4.9
7 Sep	IB	60	0-5	BD/VV	50	50								6	1.2
7 Sep	IB	60	5-15	BD/VV	70	30								12	3.0
7 Sep	LTB	60	15-25	BD/VV	60	20	20							12	4.3
7 Sep	LTB	60	25-35	BD/VV	60	20	20							12	4.3
7 Sep	LTB	60	35-45	BD/VV	40	30	30							12	4.9
7 Sep	LTB	60	45-55	BD/VV	40	30	30							12	4.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
7 Sep	LTB	60	55-65	BD/VV	40	30	30							12	5.2
7 Sep	IB	61	0-5	BD/VV	50	50								6	0.3
7 Sep	IB	61	5-15	BD/VV	70	30								12	1.5
7 Sep	LTB	61	15-25	BD/VV	40	30	30							12	3.0
7 Sep	LTB	61	25-35	BD/VV	40	30	30							12	4.3
7 Sep	LTB	61	35-45	BD/VV	40	20	20	20						12	4.9
7 Sep	LTB	61	45-55	BD/VV	40	20	20	20						12	4.9
7 Sep	LTB	61	55-65	BD/VV	40	30	30							12	5.2
8 Sep	IB	62	0-5	BD/KY	80	20								6	1.2
8 Sep	IB	62	5-15	BD/KY	80	10	10							12	3.0
8 Sep	LTB	62	15-25	BD/KY	40	40	20							12	4.0
8 Sep	LTB	62	25-35	BD/KY	40	40	20							12	4.6
8 Sep	LTB	62	35-45	BD/KY	60	20	20							12	4.9
8 Sep	LTB	62	45-55	BD/KY	40	30	30							12	4.9
8 Sep	LTB	62	55-65	BD/KY	40	30	30							12	4.9
8 Sep	IB	63	0-5	BD/KY	50	50								6	0.6
8 Sep	IB	63	5-15	BD/KY	50	50								12	2.4
8 Sep	LTB	63	15-25	BD/KY	50	20		20				10		12	4.0
8 Sep	LTB	63	25-35	BD/KY	40	20	10	10	15		5			12	4.6
8 Sep	LTB	63	35-45	BD/KY	40	20	40							12	4.9
8 Sep	LTB	63	45-55	BD/KY	40	20	40							12	4.9
8 Sep	LTB	63	55-65	BD/KY	40	20	40							12	4.9
8 Sep	IB	64	0-5	BD/KY	50	50								6	0.3
8 Sep	IB	64	5-15	BD/KY	50	50								12	1.2
8 Sep	LTB	64	15-25	BD/KY	50	15	20		15					12	3.0
8 Sep	LTB	64	25-35	BD/KY	40	30	30							12	4.9
8 Sep	LTB	64	35-45	BD/KY	40	30	30							12	4.9
8 Sep	LTB	64	45-55	BD/KY	40	30	30							12	4.9
8 Sep	LTB	64	55-65	BD/KY	40	20	40							12	4.9
8 Sep	ADI	65	0-5	BD/KY	50	50								6	0.9
8 Sep	ADI	65	5-15	BD/KY	60	30			5		5			12	2.1
8 Sep	LTB	65	15-25	BD/KY	65	30			5					12	4.0
8 Sep	LTB	65	25-35	BD/KY	60	30	10							12	4.6
8 Sep	LTB	65	35-45	BD/KY	60	30	10							12	4.3
8 Sep	LTB	65	45-55	BD/KY	60	30	10							12	4.6

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
8 Sep	LTB	65	55-65	BD/KY	60	30	10							12	5.2
8 Sep	ADI	66	0-5	BD/KY	40	60								6	0.6
8 Sep	ADI	66	5-15	BD/KY	90	10								12	2.4
8 Sep	LTB	66	15-25	BD/KY	70	10	20							12	3.0
8 Sep	LTB	66	25-35	BD/KY	60	20	20							12	4.0
8 Sep	LTB	66	35-45	BD/KY	70	10	10				10			12	4.6
8 Sep	LTB	66	45-55	BD/KY	50	20	30							12	4.9
8 Sep	LTB	66	55-65	BD/KY	50	20	30							12	4.9
8 Sep	ADI	67	0-5	BD/KY	80	20								6	0.6
8 Sep	ADI	67	5-15	BD/KY	80	20								12	3.0
8 Sep	LTB	67	15-25	BD/KY	70	10	20							12	3.7
8 Sep	LTB	67	25-35	BD/KY	50	10	30	10						12	3.7
8 Sep	LTB	67	35-45	BD/KY	50	10	30	10						12	4.6
8 Sep	LTB	67	45-55	BD/KY	50	10	30	10						12	4.9
8 Sep	LTB	67	55-65	BD/KY	50	10	30	10						12	4.9
9 Sep	USB	68	0-5	VV/KY	50	50								6	1.8
9 Sep	USB	68	5-15	VV/KY	30	30	40							12	3.4
9 Sep	USB	68	15-25	VV/KY	30	30	30	10						12	3.4
9 Sep	USB	68	25-35	VV/KY	30		30	30	10					12	3.4
9 Sep	USB	68	35-45	VV/KY	30	30	30	10						12	4.3
9 Sep	USB	68	45-55	VV/KY	30	30	30	10						12	4.3
9 Sep	USB	68	55-65	VV/KY	30	30	30	10						12	4.9
9 Sep	USB	69	0-5	VV/KY	50	50								6	1.8
9 Sep	USB	69	5-15	VV/KY	50	30	20							12	3.7
9 Sep	USB	69	15-25	VV/KY	60	20	20							12	3.7
9 Sep	USB	69	25-35	VV/KY	60	20	20							12	4.0
9 Sep	USB	69	35-45	VV/KY	60	20	20							12	4.3
9 Sep	USB	69	45-55	VV/KY	60	20	20							12	4.3
9 Sep	USB	69	55-65	VV/KY	30	30	30	10						12	4.9
9 Sep	USB	70	0-5	VV/KY	50	50								6	1.5
9 Sep	USB	70	5-15	VV/KY	80	20								12	3.4
9 Sep	USB	70	15-25	VV/KY	50	20	20	10						12	3.7
9 Sep	USB	70	25-35	VV/KY	50	20	30							12	3.7
9 Sep	USB	70	35-45	VV/KY	40	30	30							12	4.3
9 Sep	USB	70	45-55	VV/KY	40	30	30							12	4.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Divers[2]	Percent Substrate Composition									Survey Time (mins)	Depth (m)
					Fines	Sand	Gravel	Cobble	Boulder	Hardpan	Woody Debris	Vegetation	Concrete		
9 Sep	USB	70	55-65	VV/KY	40	30	30							12	4.9
9 Sep	USB	71	0-5	BY/KY	50	50								6	0.9
9 Sep	USB	71	5-15	BY/KY	50	50								12	4.0
9 Sep	USB	71	15-25	BY/KY	40	30	10	10			10			12	3.7
9 Sep	USB	71	25-35	BY/KY	30	30	20	20						12	3.7
9 Sep	USB	71	35-45	BY/KY	30	30	20	20						12	4.0
9 Sep	USB	71	45-55	BY/KY	30	30	20	20						12	4.6
9 Sep	USB	71	55-65	BY/KY	30	30	20	20						12	4.9
9 Sep	USB	72	0-5	BY/KY	50	50								6	0.9
9 Sep	USB	72	5-15	BY/KY	50	30					20			12	3.4
9 Sep	USB	72	15-25	BY/KY	30	30	20	20						12	3.7
9 Sep	USB	72	25-35	BY/KY	30	30	20	20						12	4.0
9 Sep	USB	72	35-45	BY/KY	30	30	20	20						12	4.3
9 Sep	USB	72	45-55	BY/KY	30	30	20	20						12	4.9
9 Sep	USB	72	55-65	BY/KY	30	30	20	20						12	4.9

[1] ADI = Area of direct impact; IB = Intermediate buffer; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer; USS = Upstream spot dive

[2] VV = Vanessa Vest; BD = Brian Dennis; BY = Brandon Yates; KY = Kevin Yount

Table C2. Site 2 mussel survey summary for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
31 Aug	DSB	21	0-5	5	6	1.2	0	0	0
31 Aug	DSB	21	5-15	10	12	1.2	2	12	1.2
31 Aug	DSB	21	15-25	10	12	1.2	4	6	0.6
31 Aug	DSB	21	25-35	10	12	1.2	4	9	0.9
31 Aug	DSB	21	35-45	10	12	1.2	3	7	0.7
31 Aug	DSB	21	45-55	10	12	1.2	3	4	0.4
31 Aug	DSB	21	55-65	10	12	1.2	6	10	1
31 Aug	DSB	22	0-5	5	6	1.2	1	2	0.4
31 Aug	DSB	22	5-15	10	12	1.2	5	9	0.9
31 Aug	DSB	22	15-25	10	12	1.2	4	8	0.8
31 Aug	DSB	22	25-35	10	12	1.2	3	4	0.4
31 Aug	DSB	22	35-45	10	12	1.2	4	5	0.5
31 Aug	DSB	22	45-55	10	12	1.2	10	14	1.4
31 Aug	DSB	22	55-65	10	12	1.2	8	14	1.4
31 Aug	DSB	23	0-5	5	6	1.2	0	0	0
31 Aug	DSB	23	5-15	10	12	1.2	3	4	0.4
31 Aug	DSB	23	15-25	10	12	1.2	3	12	1.2
31 Aug	DSB	23	25-35	10	12	1.2	4	12	1.2
31 Aug	DSB	23	35-45	10	12	1.2	6	10	1
31 Aug	DSB	23	45-55	10	12	1.2	4	9	0.9
31 Aug	DSB	23	55-65	10	12	1.2	8	22	2.2
31 Aug	DSB	24	0-5	5	6	1.2	1	1	0.2
31 Aug	DSB	24	5-15	10	12	1.2	2	4	0.4
31 Aug	DSB	24	15-25	10	12	1.2	3	7	0.7
31 Aug	DSB	24	25-35	10	12	1.2	4	8	0.8
31 Aug	DSB	24	35-45	10	12	1.2	5	9	0.9
31 Aug	DSB	24	45-55	10	12	1.2	4	17	1.7

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
31 Aug	DSB	24	55-65	10	12	1.2	8	18	1.8
1 Sep	DSB	25	0-5	5	6	1.2	0	0	0
1 Sep	DSB	25	5-15	10	12	1.2	3	4	0.4
1 Sep	DSB	25	15-25	10	12	1.2	5	12	1.2
1 Sep	DSB	25	25-35	10	12	1.2	7	16	1.6
1 Sep	DSB	25	35-45	10	12	1.2	10	20	2
1 Sep	DSB	25	45-55	10	12	1.2	6	20	2
1 Sep	DSB	25	55-65	10	12	1.2	6	25	2.5
1 Sep	DSB	26	0-5	5	6	1.2	0	0	0
1 Sep	DSB	26	5-15	10	12	1.2	2	5	0.5
1 Sep	DSB	26	15-25	10	12	1.2	7	30	3
1 Sep	DSB	26	25-35	10	12	1.2	5	11	1.1
1 Sep	DSB	26	35-45	10	12	1.2	6	8	0.8
1 Sep	DSB	26	45-55	10	12	1.2	7	26	2.6
1 Sep	DSB	26	55-65	10	12	1.2	11	34	3.4
1 Sep	DSB	27	0-5	5	6	1.2	0	0	0
1 Sep	DSB	27	5-15	10	12	1.2	0	0	0
1 Sep	DSB	27	15-25	10	12	1.2	0	0	0
1 Sep	DSB	27	25-35	10	12	1.2	7	13	1.3
1 Sep	DSB	27	35-45	10	12	1.2	6	8	0.8
1 Sep	DSB	27	45-55	10	12	1.2	10	25	2.5
1 Sep	DSB	27	55-65	10	12	1.2	10	22	2.2
1 Sep	DSB	28	0-5	5	6	1.2	0	0	0
1 Sep	DSB	28	5-15	10	12	1.2	3	6	0.6
1 Sep	DSB	28	15-25	10	12	1.2	4	14	1.4
1 Sep	DSB	28	25-35	10	12	1.2	6	18	1.8
1 Sep	DSB	28	35-45	10	12	1.2	6	18	1.8
1 Sep	DSB	28	45-55	10	12	1.2	7	15	1.5
1 Sep	DSB	28	55-65	10	12	1.2	5	9	0.9

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
2 Sep	DSB	29	0-5	5	6	1.2	0	0	0
2 Sep	DSB	29	5-15	10	12	1.2	1	1	0.1
2 Sep	DSB	29	15-25	10	12	1.2	4	15	1.5
2 Sep	DSB	29	25-35	10	12	1.2	6	12	1.2
2 Sep	DSB	29	35-45	10	12	1.2	6	16	1.6
2 Sep	DSB	29	45-55	10	12	1.2	9	20	2
2 Sep	DSB	29	55-65	10	12	1.2	11	23	2.3
2 Sep	DSB	30	0-5	5	6	1.2	0	0	0
2 Sep	DSB	30	5-15	10	12	1.2	3	8	0.8
2 Sep	DSB	30	15-25	10	12	1.2	5	17	1.7
2 Sep	DSB	30	25-35	10	12	1.2	6	13	1.3
2 Sep	DSB	30	35-45	10	12	1.2	2	4	0.4
2 Sep	DSB	30	45-55	10	12	1.2	6	16	1.6
2 Sep	DSB	30	55-65	10	12	1.2	7	18	1.8
2 Sep	DSB	31	0-5	5	6	1.2	0	0	0
2 Sep	DSB	31	5-15	10	12	1.2	2	6	0.6
2 Sep	DSB	31	15-25	10	12	1.2	6	9	0.9
2 Sep	DSB	31	25-35	10	12	1.2	4	9	0.9
2 Sep	DSB	31	35-45	10	12	1.2	7	15	1.5
2 Sep	DSB	31	45-55	10	12	1.2	7	17	1.7
2 Sep	DSB	31	55-65	10	12	1.2	8	24	2.4
3 Sep	DSB	32	0-5	5	6	1.2	0	0	0
3 Sep	DSB	32	5-15	10	12	1.2	2	2	0.2
3 Sep	DSB	32	15-25	10	12	1.2	3	6	0.6
3 Sep	DSB	32	25-35	10	12	1.2	7	23	2.3
3 Sep	DSB	32	35-45	10	12	1.2	4	10	1
3 Sep	DSB	32	45-55	10	12	1.2	7	10	1
3 Sep	DSB	32	55-65	10	12	1.2	9	23	2.3
3 Sep	ADI	33	0-5	5	6	1.2	0	0	0

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
3 Sep	ADI	33	5-15	10	12	1.2	2	2	0.2
3 Sep	LTB	33	15-25	10	12	1.2	6	33	3.3
3 Sep	LTB	33	25-35	10	12	1.2	4	14	1.4
3 Sep	LTB	33	35-45	10	12	1.2	4	4	0.4
3 Sep	LTB	33	45-55	10	12	1.2	5	11	1.1
3 Sep	LTB	33	55-65	10	12	1.2	8	18	1.8
3 Sep	ADI	34	0-5	5	6	1.2	0	0	0
3 Sep	ADI	34	5-15	10	12	1.2	2	2	0.2
3 Sep	LTB	34	15-25	10	12	1.2	3	6	0.6
3 Sep	LTB	34	25-35	10	12	1.2	2	11	1.1
3 Sep	LTB	34	35-45	10	12	1.2	2	2	0.2
3 Sep	LTB	34	45-55	10	12	1.2	6	12	1.2
3 Sep	LTB	34	55-65	10	12	1.2	9	20	2
3 Sep	ADI	35	0-5	5	6	1.2	0	0	0
3 Sep	ADI	35	5-15	10	12	1.2	0	0	0
3 Sep	LTB	35	15-25	10	12	1.2	5	11	1.1
3 Sep	LTB	35	25-35	10	12	1.2	5	14	1.4
3 Sep	LTB	35	35-45	10	12	1.2	3	5	0.5
3 Sep	LTB	35	45-55	10	12	1.2	6	8	0.8
3 Sep	LTB	35	55-65	10	12	1.2	7	15	1.5
3 Sep	IB	36	0-5	5	6	1.2	0	0	0
3 Sep	IB	36	5-15	10	12	1.2	1	1	0.1
3 Sep	LTB	36	15-25	10	12	1.2	4	12	1.2
3 Sep	LTB	36	25-35	10	12	1.2	6	10	1
3 Sep	LTB	36	35-45	10	12	1.2	8	18	1.8
3 Sep	LTB	36	45-55	10	12	1.2	7	20	2
3 Sep	LTB	36	55-65	10	12	1.2	5	17	1.7
3 Sep	IB	37	0-5	5	6	1.2	0	0	0
3 Sep	IB	37	5-15	10	12	1.2	2	2	0.2

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
3 Sep	LTB	37	15-25	10	12	1.2	6	15	1.5
3 Sep	LTB	37	25-35	10	12	1.2	5	17	1.7
3 Sep	LTB	37	35-45	10	12	1.2	9	20	2
3 Sep	LTB	37	45-55	10	12	1.2	9	17	1.7
3 Sep	LTB	37	55-65	10	12	1.2	10	34	3.4
4 Sep	IB	38	0-5	5	6	1.2	0	0	0
4 Sep	IB	38	5-15	10	12	1.2	2	3	0.3
4 Sep	LTB	38	15-25	10	12	1.2	6	11	1.1
4 Sep	LTB	38	25-35	10	12	1.2	6	10	1
4 Sep	LTB	38	35-45	10	12	1.2	9	22	2.2
4 Sep	LTB	38	45-55	10	12	1.2	7	19	1.9
4 Sep	LTB	38	55-65	10	12	1.2	9	22	2.2
4 Sep	IB	39	0-5	5	6	1.2	0	0	0
4 Sep	IB	39	5-15	10	12	1.2	1	2	0.2
4 Sep	LTB	39	15-25	10	12	1.2	6	18	1.8
4 Sep	LTB	39	25-35	10	12	1.2	3	15	1.5
4 Sep	LTB	39	35-45	10	12	1.2	6	6	0.6
4 Sep	LTB	39	45-55	10	12	1.2	8	15	1.5
4 Sep	LTB	39	55-65	10	12	1.2	11	20	2
4 Sep	IB	40	0-5	5	6	1.2	0	0	0
4 Sep	IB	40	5-15	10	12	1.2	6	25	2.5
4 Sep	LTB	40	15-25	10	12	1.2	3	13	1.3
4 Sep	LTB	40	25-35	10	12	1.2	7	13	1.3
4 Sep	LTB	40	35-45	10	12	1.2	5	13	1.3
4 Sep	LTB	40	45-55	10	12	1.2	7	10	1
4 Sep	LTB	40	55-65	10	12	1.2	14	25	2.5
4 Sep	IB	41	0-5	5	6	1.2	0	0	0
4 Sep	IB	41	5-15	10	12	1.2	5	8	0.8
4 Sep	LTB	41	15-25	10	12	1.2	3	6	0.6

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
4 Sep	LTB	41	25-35	10	12	1.2	6	16	1.6
4 Sep	LTB	41	35-45	10	12	1.2	3	4	0.4
4 Sep	LTB	41	45-55	10	12	1.2	7	13	1.3
4 Sep	LTB	41	55-65	10	12	1.2	8	24	2.4
4 Sep	IB	42	0-5	5	6	1.2	0	0	0
4 Sep	IB	42	5-15	10	12	1.2	1	2	0.2
4 Sep	LTB	42	15-25	10	12	1.2	5	22	2.2
4 Sep	LTB	42	25-35	10	12	1.2	4	11	1.1
4 Sep	LTB	42	35-45	10	12	1.2	7	13	1.3
4 Sep	LTB	42	45-55	10	12	1.2	10	25	2.5
4 Sep	LTB	42	55-65	10		0	12	20	2
4 Sep	ADI	43	0-5	5	6	1.2	0	0	0
4 Sep	ADI	43	5-15	10	12	1.2	2	2	0.2
4 Sep	LTB	43	15-25	10	12	1.2	2	2	0.2
4 Sep	LTB	43	25-35	10	12	1.2	7	12	1.2
4 Sep	LTB	43	35-45	10	12	1.2	5	16	1.6
4 Sep	LTB	43	45-55	10	12	1.2	10	21	2.1
4 Sep	LTB	43	55-65	10	12	1.2	7	17	1.7
5 Sep	ADI	44	5-15	10	5	0.5	2	5	0.5
5 Sep	LTB	44	15-25	10	10	1	4	7	0.7
5 Sep	ADI	44	0-5	5	10	2	0	0	0
5 Sep	LTB	44	25-35	10	10	1	3	5	0.5
5 Sep	LTB	44	35-45	10	10	1	3	3	0.3
5 Sep	LTB	44	45-55	10	10	1	9	22	2.2
5 Sep	LTB	44	55-65	10	11	1.1	8	19	1.9
5 Sep	ADI	45	0-5	5	5	1	0	0	0
5 Sep	ADI	45	5-15	10	10	1	3	10	1
5 Sep	LTB	45	15-25	10	10	1	4	11	1.1
5 Sep	LTB	45	25-35	10	10	1	7	14	1.4

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
5 Sep	LTB	45	35-45	10	10	1	4	12	1.2
5 Sep	LTB	45	45-55	10	10	1	7	13	1.3
5 Sep	LTB	45	55-65	10	12	1.2	10	24	2.4
5 Sep	IB	46	0-5	5	5	1	0	0	0
5 Sep	IB	46	5-15	10	10	1	4	8	0.8
5 Sep	LTB	46	15-25	10	10	1	3	5	0.5
5 Sep	LTB	46	25-35	10	10	1	6	10	1
5 Sep	LTB	46	35-45	10	11	1.1	5	6	0.6
5 Sep	LTB	46	45-55	10	10	1	10	16	1.6
5 Sep	LTB	46	55-65	10	12	1.2	8	35	3.5
5 Sep	IB	47	0-5	5	5	1	0	0	0
5 Sep	IB	47	5-15	10	10	1	3	3	0.3
5 Sep	LTB	47	15-25	10	10	1	2	7	0.7
5 Sep	LTB	47	25-35	10	10	1	4	6	0.6
5 Sep	LTB	47	35-45	10	11	1.1	5	7	0.7
5 Sep	LTB	47	45-55	10	11	1.1	8	19	1.9
5 Sep	LTB	47	55-65	10	12	1.2	8	20	2
5 Sep	IB	48	0-5	5	5	1	0	0	0
5 Sep	IB	48	5-15	10	10	1	1	2	0.2
5 Sep	LTB	48	15-25	10	10	1	3	4	0.4
5 Sep	LTB	48	25-35	10	11	1.1	2	3	0.3
5 Sep	LTB	48	35-45	10	12	1.2	5	9	0.9
5 Sep	LTB	48	45-55	10	11	1.1	12	25	2.5
5 Sep	LTB	48	55-65	10	12	1.2	9	31	3.1
5 Sep	IB	49	0-5	5	5	1	0	0	0
5 Sep	IB	49	5-15	10	10	1	1	1	0.1
5 Sep	LTB	49	15-25	10	10	1	4	8	0.8
5 Sep	LTB	49	25-35	10	11	1.1	6	9	0.9
5 Sep	LTB	49	35-45	10	12	1.2	8	17	1.7

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
5 Sep	LTB	49	45-55	10	10	1	8	29	2.9
5 Sep	LTB	49	55-65	10	12	1.2	10	37	3.7
6 Sep	IB	50	0-5	5	6	1.2	0	0	0
6 Sep	IB	50	5-15	10	12	1.2	2	2	0.2
6 Sep	LTB	50	15-25	10	12	1.2	2	6	0.6
6 Sep	LTB	50	25-35	10	12	1.2	3	4	0.4
6 Sep	LTB	50	35-45	10	12	1.2	6	12	1.2
6 Sep	LTB	50	45-55	10	12	1.2	9	14	1.4
6 Sep	LTB	50	55-65	10	12	1.2	11	19	1.9
6 Sep	IB	51	0-5	5	6	1.2	0	0	0
6 Sep	IB	51	5-15	10	12	1.2	0	0	0
6 Sep	LTB	51	15-25	10	12	1.2	1	1	0.1
6 Sep	LTB	51	25-35	10	12	1.2	2	2	0.2
6 Sep	LTB	51	35-45	10	12	1.2	3	3	0.3
6 Sep	LTB	51	45-55	10	12	1.2	6	12	1.2
6 Sep	LTB	51	55-65	10	12	1.2	10	31	3.1
6 Sep	IB	52	0-5	5	6	1.2	0	0	0
6 Sep	IB	52	5-15	10	12	1.2	3	8	0.8
6 Sep	LTB	52	15-25	10	12	1.2	3	5	0.5
6 Sep	LTB	52	25-35	10	12	1.2	2	3	0.3
6 Sep	LTB	52	35-45	10	12	1.2	7	11	1.1
6 Sep	LTB	52	45-55	10	12	1.2	8	11	1.1
6 Sep	LTB	52	55-65	10	12	1.2	10	29	2.9
6 Sep	IB	53	0-5	5	6	1.2	0	0	0
6 Sep	IB	53	5-15	10	12	1.2	1	2	0.2
6 Sep	LTB	53	15-25	10	12	1.2	1	1	0.1
6 Sep	LTB	53	25-35	10	12	1.2	1	1	0.1
6 Sep	LTB	53	35-45	10	12	1.2	4	5	0.5
6 Sep	LTB	53	45-55	10	12	1.2	3	3	0.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
6 Sep	LTB	53	55-65	10	12	1.2	8	23	2.3
6 Sep	ADI	54	0-5	5	6	1.2	0	0	0
6 Sep	ADI	54	5-15	10	12	1.2	1	3	0.3
6 Sep	LTB	54	15-25	10	12	1.2	3	6	0.6
6 Sep	LTB	54	25-35	10	12	1.2	1	1	0.1
6 Sep	LTB	54	35-45	10	12	1.2	5	15	1.5
6 Sep	LTB	54	45-55	10	12	1.2	7	11	1.1
6 Sep	LTB	54	55-65	10	12	1.2	10	22	2.2
6 Sep	ADI	55	0-5	5	6	1.2	0	0	0
6 Sep	ADI	55	5-15	10	12	1.2	0	0	0
6 Sep	LTB	55	15-25	10	12	1.2	2	7	0.7
6 Sep	LTB	55	25-35	10	12	1.2	8	12	1.2
6 Sep	LTB	55	35-45	10	12	1.2	8	8	0.8
6 Sep	LTB	55	45-55	10	12	1.2	9	15	1.5
6 Sep	LTB	55	55-65	10	12	1.2	9	23	2.3
7 Sep	ADI	56	0-5	5	6	1.2	0	0	0
7 Sep	ADI	56	5-15	10	12	1.2	3	3	0.3
7 Sep	LTB	56	15-25	10	12	1.2	4	8	0.8
7 Sep	LTB	56	25-35	10	12	1.2	3	5	0.5
7 Sep	LTB	56	35-45	10	12	1.2	7	14	1.4
7 Sep	LTB	56	45-55	10	12	1.2	5	8	0.8
7 Sep	LTB	56	55-65	10	12	1.2	8	20	2
7 Sep	IB	57	0-5	5	6	1.2	0	0	0
7 Sep	IB	57	5-15	10	12	1.2	3	5	0.5
7 Sep	LTB	57	15-25	10	12	1.2	4	8	0.8
7 Sep	LTB	57	25-35	10	12	1.2	5	13	1.3
7 Sep	LTB	57	35-45	10	12	1.2	7	15	1.5
7 Sep	LTB	57	45-55	10	12	1.2	7	14	1.4
7 Sep	LTB	57	55-65	10	12	1.2	9	23	2.3

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
7 Sep	IB	58	0-5	5	6	1.2	0	0	0
7 Sep	IB	58	5-15	10	12	1.2	0	0	0
7 Sep	LTB	58	15-25	10	12	1.2	4	6	0.6
7 Sep	LTB	58	25-35	10	12	1.2	5	14	1.4
7 Sep	LTB	58	35-45	10	12	1.2	6	13	1.3
7 Sep	LTB	58	45-55	10	12	1.2	8	14	1.4
7 Sep	LTB	58	55-65	10	12	1.2	9	18	1.8
7 Sep	IB	59	0-5	5	6	1.2	0	0	0
7 Sep	IB	59	5-15	10	12	1.2	1	2	0.2
7 Sep	LTB	59	15-25	10	12	1.2	4	4	0.4
7 Sep	LTB	59	25-35	10	12	1.2	3	7	0.7
7 Sep	LTB	59	35-45	10	12	1.2	5	10	1
7 Sep	LTB	59	45-55	10	12	1.2	4	9	0.9
7 Sep	LTB	59	55-65	10	12	1.2	7	12	1.2
7 Sep	IB	60	0-5	5	6	1.2	0	0	0
7 Sep	IB	60	5-15	10	12	1.2	1	2	0.2
7 Sep	LTB	60	15-25	10	12	1.2	2	4	0.4
7 Sep	LTB	60	25-35	10	12	1.2	3	7	0.7
7 Sep	LTB	60	35-45	10	12	1.2	3	7	0.7
7 Sep	LTB	60	45-55	10	12	1.2	7	14	1.4
7 Sep	LTB	60	55-65	10	12	1.2	8	24	2.4
7 Sep	IB	61	0-5	5	6	1.2	0	0	0
7 Sep	IB	61	5-15	10	12	1.2	0	0	0
7 Sep	LTB	61	15-25	10	12	1.2	5	6	0.6
7 Sep	LTB	61	25-35	10	12	1.2	4	7	0.7
7 Sep	LTB	61	35-45	10	12	1.2	5	12	1.2
7 Sep	LTB	61	45-55	10	12	1.2	6	10	1
7 Sep	LTB	61	55-65	10	12	1.2	9	30	3
8 Sep	IB	62	0-5	5	6	1.2	0	0	0

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
8 Sep	IB	62	5-15	10	12	1.2	5	8	0.8
8 Sep	LTB	62	15-25	10	12	1.2	5	8	0.8
8 Sep	LTB	62	25-35	10	12	1.2	6	10	1
8 Sep	LTB	62	35-45	10	12	1.2	7	9	0.9
8 Sep	LTB	62	45-55	10	12	1.2	7	12	1.2
8 Sep	LTB	62	55-65	10	12	1.2	10	25	2.5
8 Sep	IB	63	0-5	5	6	1.2	0	0	0
8 Sep	IB	63	5-15	10	12	1.2	0	0	0
8 Sep	LTB	63	15-25	10	12	1.2	7	18	1.8
8 Sep	LTB	63	25-35	10	12	1.2	7	9	0.9
8 Sep	LTB	63	35-45	10	12	1.2	4	9	0.9
8 Sep	LTB	63	45-55	10	12	1.2	9	17	1.7
8 Sep	LTB	63	55-65	10	12	1.2	8	24	2.4
8 Sep	IB	64	0-5	5	6	1.2	0	0	0
8 Sep	IB	64	5-15	10	12	1.2	0	0	0
8 Sep	LTB	64	15-25	10	12	1.2	6	14	1.4
8 Sep	LTB	64	25-35	10	12	1.2	4	12	1.2
8 Sep	LTB	64	35-45	10	12	1.2	4	11	1.1
8 Sep	LTB	64	45-55	10	12	1.2	5	17	1.7
8 Sep	LTB	64	55-65	10	12	1.2	8	21	2.1
8 Sep	ADI	65	0-5	5	6	1.2	0	0	0
8 Sep	ADI	65	5-15	10	12	1.2	4	11	1.1
8 Sep	LTB	65	15-25	10	12	1.2	4	12	1.2
8 Sep	LTB	65	25-35	10	12	1.2	4	11	1.1
8 Sep	LTB	65	35-45	10	12	1.2	3	5	0.5
8 Sep	LTB	65	45-55	10	12	1.2	8	16	1.6
8 Sep	LTB	65	55-65	10	12	1.2	9	20	2
8 Sep	ADI	66	0-5	5	6	1.2	0	0	0
8 Sep	ADI	66	5-15	10	12	1.2	3	4	0.4

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
8 Sep	LTB	66	15-25	10	12	1.2	6	19	1.9
8 Sep	LTB	66	25-35	10	12	1.2	7	10	1
8 Sep	LTB	66	35-45	10	12	1.2	7	16	1.6
8 Sep	LTB	66	45-55	10	12	1.2	10	27	2.7
8 Sep	LTB	66	55-65	10	12	1.2	9	26	2.6
8 Sep	ADI	67	0-5	5	6	1.2	0	0	0
8 Sep	ADI	67	5-15	10	12	1.2	2	2	0.2
8 Sep	LTB	67	15-25	10	12	1.2	6	16	1.6
8 Sep	LTB	67	25-35	10	12	1.2	7	18	1.8
8 Sep	LTB	67	35-45	10	12	1.2	8	20	2
8 Sep	LTB	67	45-55	10	12	1.2	9	21	2.1
8 Sep	LTB	67	55-65	10	12	1.2	9	28	2.8
9 Sep	USB	68	0-5	5	6	1.2	0	0	0
9 Sep	USB	68	5-15	10	12	1.2	3	5	0.5
9 Sep	USB	68	15-25	10	12	1.2	7	14	1.4
9 Sep	USB	68	25-35	10	12	1.2	5	10	1
9 Sep	USB	68	35-45	10	12	1.2	8	19	1.9
9 Sep	USB	68	45-55	10	12	1.2	6	15	1.5
9 Sep	USB	68	55-65	10	12	1.2	6	20	2
9 Sep	USB	69	0-5	5	6	1.2	0	0	0
9 Sep	USB	69	5-15	10	12	1.2	3	9	0.9
9 Sep	USB	69	15-25	10	12	1.2	6	15	1.5
9 Sep	USB	69	25-35	10	12	1.2	7	21	2.1
9 Sep	USB	69	35-45	10	12	1.2	8	13	1.3
9 Sep	USB	69	45-55	10	12	1.2	9	20	2
9 Sep	USB	69	55-65	10	12	1.2	9	27	2.7
9 Sep	USB	70	0-5	5	6	1.2	0	0	0
9 Sep	USB	70	5-15	10	12	1.2	2	2	0.2
9 Sep	USB	70	15-25	10	12	1.2	4	5	0.5

Date (2024)	Survey Area[1]	Transect[1]	Interval	Area (m^2)	Survey Time (mins)	Effort (mins/m^2)	Species Diversity	# of Mussels	Mussel Density (mussel/m^2)
9 Sep	USB	70	25-35	10	12	1.2	8	18	1.8
9 Sep	USB	70	35-45	10	12	1.2	7	17	1.7
9 Sep	USB	70	45-55	10	12	1.2	8	16	1.6
9 Sep	USB	70	55-65	10	12	1.2	8	24	2.4
9 Sep	USB	71	0-5	5	6	1.2	0	0	0
9 Sep	USB	71	5-15	10	12	1.2	1	1	0.1
9 Sep	USB	71	15-25	10	12	1.2	3	5	0.5
9 Sep	USB	71	25-35	10	12	1.2	4	20	2
9 Sep	USB	71	35-45	10	12	1.2	8	17	1.7
9 Sep	USB	71	45-55	10	12	1.2	10	33	3.3
9 Sep	USB	71	55-65	10	12	1.2	7	26	2.6
9 Sep	USB	72	0-5	5	6	1.2	0	0	0
9 Sep	USB	72	5-15	10	12	1.2	3	5	0.5
9 Sep	USB	72	15-25	10	12	1.2	4	5	0.5
9 Sep	USB	72	25-35	10	12	1.2	5	10	1
9 Sep	USB	72	35-45	10	12	1.2	6	13	1.3
9 Sep	USB	72	45-55	10	12	1.2	6	28	2.8
9 Sep	USB	72	55-65	10	12	1.2	11	24	2.4

[1] ADI = Area of direct impact; IB = Intermediate buffer; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

Table C3. Summary of live unionid mussels collected at Site 2 during mussel survey for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Live Mussel Species Scientific Name[1]	ADI[2]	DSB[2]	IB[2]	LTB[2]	USB[2]	USS[2]	Total
Actinonaias ligamentina	0	23	1	96	16	16	152
Amblema plicata	5	283	13	487	94	67	949
Cyclonaias pustulosa	1	63	2	173	35	24	298
*Cyprogenia stegaria**	0	0	0	1	0	0	1
Ellipsaria lineolata	0	76	1	272	39	27	415
Elliptio crassidens	0	0	0	1	0	0	1
Fusconaia flava	0	4	2	1	1	0	8
*Fusconaia subrotunda**	0	0	0	0	0	1	1
Lampsilis cardium	2	24	1	83	16	10	136
Lampsilis siliquoidea	3	3	3	13	5	0	27
Ligumia recta	23	208	42	443	82	32	830
Megalonaias nervosa	0	32	2	44	5	3	86
Obliquaria reflexa	0	15	2	78	15	9	119
*Obovaria subrotunda**	0	0	0	3	1	0	4
*Plethobasus cyphyus**	0	3	0	9	2	3	17
*Pleurobema clava**	0	0	0	0	0	1	1
Pleurobema cordatum	0	31	0	121	19	16	187
Pleurobema sintoxia	0	21	0	92	13	14	140
Potamilus alatus	10	52	16	108	17	8	211
Potamilus fragilis	0	0	0	1	0	0	1
Quadrula quadrula	0	15	1	50	8	2	76
Theliderma metanevra	0	60	0	328	89	113	590
Grand Total	**44**	**913**	**86**	**2404**	**457**	**346**	**4250**

[1] * = Federally listed species

[2] ADI = Area of direct impact; DSB = Downstream buffer; IB = Intermidiate buffer; LTB = Lateral buffer; USB = Upstream buffer; USS = Upstream spot dive

Table C4. Site 2 mussel morphometric and occurance data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	21	0-5	No mussels					0		
31 Aug	DSB	21	5-15	*Ligumia recta*	150+			M	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	135			M	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	129			M	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	131			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	138.1			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	141			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	129			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	132.5			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	137			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	132.6			F	1	Live	
31 Aug	DSB	21	5-15	*Ligumia recta*	129			F	1	Live	
31 Aug	DSB	21	5-15	*Amblema plicata*	74.7				1	Live	
31 Aug	DSB	21	5-15	*Amblema plicata*					1	WD	
31 Aug	DSB	21	5-15	*Potamilus alatus*					1	WD	
31 Aug	DSB	21	15-25	*Obliquaria reflexa*	59.7				1	Live	
31 Aug	DSB	21	15-25	*Ellipsaria lineolata*	88				1	Live	
31 Aug	DSB	21	15-25	*Ligumia recta*	142.5			F	1	Live	
31 Aug	DSB	21	15-25	*Ligumia recta*	135.5			F	1	Live	
31 Aug	DSB	21	15-25	*Ligumia recta*				F	1	WD	
31 Aug	DSB	21	15-25	*Amblema plicata*	71				1	Live	
31 Aug	DSB	21	15-25	*Amblema plicata*	75.3				1	Live	
31 Aug	DSB	21	15-25	*Amblema plicata*					1	WD	
31 Aug	DSB	21	15-25	*Amblema plicata*					1	WD	
31 Aug	DSB	21	25-35	*Ligumia recta*	106.2			F	1	Live	
31 Aug	DSB	21	25-35	*Potamilus alatus*	113.2				1	Live	
31 Aug	DSB	21	25-35	*Potamilus alatus*	117.5				1	Live	
31 Aug	DSB	21	25-35	*Megalonaias nervosa*	150+				1	Live	
31 Aug	DSB	21	25-35	*Ligumia recta*	150+			F	1	Live	
31 Aug	DSB	21	25-35	*Ligumia recta*	131.3			F	1	Live	
31 Aug	DSB	21	25-35	*Ligumia recta*	125			F	1	Live	
31 Aug	DSB	21	25-35	*Ligumia recta*	136			M	1	Live	
31 Aug	DSB	21	25-35	*Amblema plicata*	107.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	21	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	21	35-45	*Lampsilis cardium*	117.2			F	1	Live	
31 Aug	DSB	21	35-45	*Ellipsaria lineolata*	74				1	Live	
31 Aug	DSB	21	35-45	*Lampsilis cardium*	74			M	1	Live	
31 Aug	DSB	21	35-45	*Lampsilis cardium*	123.9			M	1	Live	
31 Aug	DSB	21	35-45	*Amblema plicata*	120				1	Live	
31 Aug	DSB	21	35-45	*Amblema plicata*	121.1				1	Live	
31 Aug	DSB	21	35-45	*Amblema plicata*	115.9				1	Live	
31 Aug	DSB	21	35-45	*Amblema plicata*					3	WD	
31 Aug	DSB	21	45-55	*Cyclonaias pustulosa*	67.5				1	Live	
31 Aug	DSB	21	45-55	*Megalonaias nervosa*	150+				1	Live	
31 Aug	DSB	21	45-55	*Amblema plicata*	97.3				1	Live	
31 Aug	DSB	21	45-55	*Amblema plicata*	85.3				1	Live	
31 Aug	DSB	21	45-55	*Amblema plicata*					1	WD	
31 Aug	DSB	21	55-65	*Ellipsaria lineolata*	76				1	Live	
31 Aug	DSB	21	55-65	*Ellipsaria lineolata*	77				1	Live	
31 Aug	DSB	21	55-65	*Ellipsaria lineolata*	81				1	Live	
31 Aug	DSB	21	55-65	*Ellipsaria lineolata*					1	WD	
31 Aug	DSB	21	55-65	*Actinonaias ligamentina*	108.2				1	Live	
31 Aug	DSB	21	55-65	*Potamilus alatus*	95.1				1	Live	
31 Aug	DSB	21	55-65	*Potamilus alatus*					1	WD	
31 Aug	DSB	21	55-65	*Theliderma metanevra*	75.9				1	Live	
31 Aug	DSB	21	55-65	*Amblema plicata*	107.2				1	Live	
31 Aug	DSB	21	55-65	*Amblema plicata*	103.4				1	Live	
31 Aug	DSB	21	55-65	*Amblema plicata*	103				1	Live	
31 Aug	DSB	21	55-65	*Ligumia recta*	125.5			F	1	Live	
31 Aug	DSB	21	55-65	*Cyclonaias pustulosa*					1	WD	
31 Aug	DSB	22	0-5	*Potamilus alatus*	51.5				1	Live	
31 Aug	DSB	22	0-5	*Potamilus alatus*	73.8				1	Live	
31 Aug	DSB	22	5-15	*Ligumia recta*	137			M	1	Live	
31 Aug	DSB	22	5-15	*Ligumia recta*	142.5			M	1	Live	
31 Aug	DSB	22	5-15	*Ligumia recta*	123.6			F	1	Live	
31 Aug	DSB	22	5-15	*Amblema plicata*	94.2				1	Live	
31 Aug	DSB	22	5-15	*Amblema plicata*	114.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	22	5-15	*Amblema plicata*	121.9				1	Live	
31 Aug	DSB	22	5-15	*Quadrula quadrula*	67				1	Live	
31 Aug	DSB	22	5-15	*Plethobasus cyphyus**	93.2	42.9	71		1	Live	0289 Orange
31 Aug	DSB	22	5-15	*Megalonaias nervosa*	150+				1	Live	
31 Aug	DSB	22	15-25	*Ligumia recta*	150+			M	1	Live	
31 Aug	DSB	22	15-25	*Amblema plicata*	95.5				1	Live	
31 Aug	DSB	22	15-25	*Amblema plicata*	102.3				1	Live	
31 Aug	DSB	22	15-25	*Amblema plicata*					1	WD	
31 Aug	DSB	22	15-25	*Ligumia recta*	139.2			F	1	Live	
31 Aug	DSB	22	15-25	*Ligumia recta*	130			F	1	Live	
31 Aug	DSB	22	15-25	*Ligumia recta*	133			F	1	Live	
31 Aug	DSB	22	15-25	*Cyclonaias pustulosa*	61.3				1	Live	
31 Aug	DSB	22	15-25	*Megalonaias nervosa*	129.5				1	Live	
31 Aug	DSB	22	25-35	*Ligumia recta*	144			F	1	Live	
31 Aug	DSB	22	25-35	*Lampsilis cardium*	116.5			M	1	Live	
31 Aug	DSB	22	25-35	*Amblema plicata*	123				1	Live	
31 Aug	DSB	22	25-35	*Amblema plicata*	86				1	Live	
31 Aug	DSB	22	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	22	35-45	*Potamilus alatus*	102				1	Live	
31 Aug	DSB	22	35-45	*Ligumia recta*	137.7			F	1	Live	
31 Aug	DSB	22	35-45	*Ligumia recta*	136.2			F	1	Live	
31 Aug	DSB	22	35-45	*Ellipsaria lineolata*	73.5				1	Live	
31 Aug	DSB	22	35-45	*Amblema plicata*	103.2				1	Live	
31 Aug	DSB	22	35-45	*Amblema plicata*					5	WD	
31 Aug	DSB	22	45-55	*Ellipsaria lineolata*	89.2				1	Live	
31 Aug	DSB	22	45-55	*Pleurobema cordatum*	84.3				1	Live	
31 Aug	DSB	22	45-55	*Pleurobema cordatum*	93.2				1	Live	
31 Aug	DSB	22	45-55	*Theliderma metanevra*	89.2				1	Live	
31 Aug	DSB	22	45-55	*Theliderma metanevra*	83.3				1	Live	
31 Aug	DSB	22	45-55	*Theliderma metanevra*	84.9				1	Live	
31 Aug	DSB	22	45-55	*Quadrula quadrula*	54.2				1	Live	
31 Aug	DSB	22	45-55	*Obliquaria reflexa*	60				1	Live	
31 Aug	DSB	22	45-55	*Amblema plicata*					1	WD	
31 Aug	DSB	22	45-55	*Lampsilis cardium*	112.2			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	22	45-55	*Lampsilis cardium*				F	1	WD	
31 Aug	DSB	22	45-55	*Cyclonaias pustulosa*	72.5				1	Live	
31 Aug	DSB	22	45-55	*Potamilus alatus*	106.7				1	Live	
31 Aug	DSB	22	45-55	*Ligumia recta*	142.3			F	1	Live	
31 Aug	DSB	22	45-55	*Ellipsaria lineolata*	79				1	Live	
31 Aug	DSB	22	45-55	*Amblema plicata*	112.4				1	Live	
31 Aug	DSB	22	45-55	*Quadrula quadrula*					1	WD	
31 Aug	DSB	22	55-65	*Theliderma metanevra*	70.3				1	Live	
31 Aug	DSB	22	55-65	*Theliderma metanevra*	81.5				1	Live	
31 Aug	DSB	22	55-65	*Pleurobema cordatum*	61.6				1	Live	
31 Aug	DSB	22	55-65	*Cyclonaias pustulosa*	66.3				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*	106.6				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*	81				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*	97.1				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*	79				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*	145				1	Live	
31 Aug	DSB	22	55-65	*Amblema plicata*					1	WD	
31 Aug	DSB	22	55-65	*Amblema plicata*					1	WD	
31 Aug	DSB	22	55-65	*Amblema plicata*					1	WD	
31 Aug	DSB	22	55-65	*Amblema plicata*					1	WD	
31 Aug	DSB	22	55-65	*Actinonaias ligamentina*	120				1	Live	
31 Aug	DSB	22	55-65	*Ellipsaria lineolata*	92.1				1	Live	
31 Aug	DSB	22	55-65	*Ellipsaria lineolata*	80				1	Live	
31 Aug	DSB	22	55-65	*Lampsilis cardium*	122.4			M	1	Live	
31 Aug	DSB	22	55-65	*Ligumia recta*	150+			M	1	Live	
31 Aug	DSB	23	0-5	No mussels							
31 Aug	DSB	23	5-15	*Ligumia recta*	143.4			F	1	Live	
31 Aug	DSB	23	5-15	*Ligumia recta*	136.2			F	1	Live	
31 Aug	DSB	23	5-15	*Amblema plicata*	93.2				1	Live	
31 Aug	DSB	23	5-15	*Potamilus alatus*	127				1	Live	
31 Aug	DSB	23	15-25	*Ligumia recta*	150+			F	1	Live	
31 Aug	DSB	23	15-25	*Ligumia recta*	146.7			F	1	Live	
31 Aug	DSB	23	15-25	*Ligumia recta*	136.4			F	1	Live	
31 Aug	DSB	23	15-25	*Ligumia recta*	142.8			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	23	15-25	*Amblema plicata*	95				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	112.5				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	113				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	108.6				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	101.1				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	112.6				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*	105				1	Live	
31 Aug	DSB	23	15-25	*Amblema plicata*					1	WD	
31 Aug	DSB	23	15-25	*Cyclonaias pustulosa*	60.4				1	Live	
31 Aug	DSB	23	15-25	*Ellipsaria lineolata*					1	WD	
31 Aug	DSB	23	25-35	*Lampsilis cardium*	118			M	1	Live	
31 Aug	DSB	23	25-35	*Lampsilis cardium*	115.2			M	1	Live	
31 Aug	DSB	23	25-35	*Amblema plicata*	97.5				1	Live	
31 Aug	DSB	23	25-35	*Amblema plicata*	110.7				1	Live	
31 Aug	DSB	23	25-35	*Amblema plicata*	100.4				1	Live	
31 Aug	DSB	23	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	23	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	23	25-35	*Lampsilis cardium*	125.2			F	1	Live	
31 Aug	DSB	23	25-35	*Lampsilis cardium*	150+			F	1	Live	
31 Aug	DSB	23	25-35	*Ligumia recta*	137.2			F	1	Live	
31 Aug	DSB	23	25-35	*Ligumia recta*	130			F	1	Live	
31 Aug	DSB	23	25-35	*Ligumia recta*	127.1			F	1	Live	
31 Aug	DSB	23	25-35	*Potamilus alatus*	119				1	Live	
31 Aug	DSB	23	25-35	*Ligumia recta*	120			M	1	Live	
31 Aug	DSB	23	35-45	*Actinonaias ligamentina*	115.4				1	Live	
31 Aug	DSB	23	35-45	*Ellipsaria lineolata*	82.5				1	Live	
31 Aug	DSB	23	35-45	*Ellipsaria lineolata*					1	WD	
31 Aug	DSB	23	35-45	*Theliderma metanevra*	70.4				1	Live	
31 Aug	DSB	23	35-45	*Ligumia recta*	145.5			M	1	Live	
31 Aug	DSB	23	35-45	*Ligumia recta*	140			M	1	Live	
31 Aug	DSB	23	35-45	*Ligumia recta*	142.2			M	1	Live	
31 Aug	DSB	23	35-45	*Ligumia recta*				M	1	WD	
31 Aug	DSB	23	35-45	*Potamilus alatus*	115				1	Live	
31 Aug	DSB	23	35-45	*Amblema plicata*	117.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	23	35-45	*Amblema plicata*	107.1				1	Live	
31 Aug	DSB	23	35-45	*Amblema plicata*	101.5				1	Live	
31 Aug	DSB	23	35-45	*Amblema plicata*					1	WD	
31 Aug	DSB	23	35-45	*Amblema plicata*					1	WD	
31 Aug	DSB	23	45-55	*Actinonaias ligamentina*	126.7				1	Live	
31 Aug	DSB	23	45-55	*Ligumia recta*	133.6			M	1	Live	
31 Aug	DSB	23	45-55	*Ligumia recta*	135.4			F	1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*	113				1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*	112.5				1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*	117.7				1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*	108				1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*	150+				1	Live	
31 Aug	DSB	23	45-55	*Amblema plicata*					4	WD	
31 Aug	DSB	23	45-55	*Ellipsaria lineolata*	98.6				1	Live	
31 Aug	DSB	23	45-55	*Theliderma metanevra*					1	WD	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	81				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	82				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	83				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	79.7				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	82.9				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	84.9				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*					1	WD	
31 Aug	DSB	23	55-65	*Cyclonaias pustulosa*	61.2				1	Live	
31 Aug	DSB	23	55-65	*Cyclonaias pustulosa*	54				1	Live	
31 Aug	DSB	23	55-65	*Pleurobema sintoxia*	91.3				1	Live	
31 Aug	DSB	23	55-65	*Theliderma metanevra*	77				1	Live	
31 Aug	DSB	23	55-65	*Pleurobema cordatum*	93.6				1	Live	
31 Aug	DSB	23	55-65	*Pleurobema cordatum*	85.3				1	Live	
31 Aug	DSB	23	55-65	*Pleurobema cordatum*	84.7				1	Live	
31 Aug	DSB	23	55-65	*Actinonaias ligamentina*	117.7				1	Live	
31 Aug	DSB	23	55-65	*Actinonaias ligamentina*					1	WD	
31 Aug	DSB	23	55-65	*Potamilus alatus*	110.3				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*	101				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*	96.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	23	55-65	*Amblema plicata*	103.3				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*	103.5				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*	117.4				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*	99.9				1	Live	
31 Aug	DSB	23	55-65	*Amblema plicata*					1	WD	
31 Aug	DSB	23	55-65	*Ligumia recta*	144.4			M	1	Live	
31 Aug	DSB	24	0-5	*Lampsilis siliquoidea*	122.2			M	1	Live	
31 Aug	DSB	24	5-15	*Ligumia recta*	142.5			M	1	Live	
31 Aug	DSB	24	5-15	*Ligumia recta*	144.5			F	1	Live	
31 Aug	DSB	24	5-15	*Potamilus alatus*	110				1	Live	
31 Aug	DSB	24	5-15	*Potamilus alatus*	112				1	Live	
31 Aug	DSB	24	5-15	*Potamilus alatus*					1	WD	
31 Aug	DSB	24	5-15	*Theliderma metanevra*					1	WD	
31 Aug	DSB	24	15-25	*Ligumia recta*	146.7			M	1	Live	
31 Aug	DSB	24	15-25	*Ligumia recta*	118.8			F	1	Live	
31 Aug	DSB	24	15-25	*Ligumia recta*	116.4			F	1	Live	
31 Aug	DSB	24	15-25	*Ligumia recta*	135.5			M	1	Live	
31 Aug	DSB	24	15-25	*Megalonaias nervosa*	150+				1	Live	
31 Aug	DSB	24	15-25	*Amblema plicata*	75.9				1	Live	
31 Aug	DSB	24	15-25	*Amblema plicata*	75.2				1	Live	
31 Aug	DSB	24	15-25	*Amblema plicata*					2	WD	
31 Aug	DSB	24	25-35	*Lampsilis cardium*	133.2			M	1	Live	
31 Aug	DSB	24	25-35	*Potamilus alatus*	117				1	Live	
31 Aug	DSB	24	25-35	*Ligumia recta*	140.2			M	1	Live	
31 Aug	DSB	24	25-35	*Ligumia recta*	118.7			M	1	Live	
31 Aug	DSB	24	25-35	*Amblema plicata*	116.4				1	Live	
31 Aug	DSB	24	25-35	*Amblema plicata*	120.9				1	Live	
31 Aug	DSB	24	25-35	*Amblema plicata*	93.1				1	Live	
31 Aug	DSB	24	25-35	*Amblema plicata*	87.7				1	Live	
31 Aug	DSB	24	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	24	25-35	*Amblema plicata*					1	WD	
31 Aug	DSB	24	35-45	*Megalonaias nervosa*	150+				1	Live	
31 Aug	DSB	24	35-45	*Ellipsaria lineolata*	79.9				1	Live	
31 Aug	DSB	24	35-45	*Ellipsaria lineolata*	65.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	24	35-45	*Amblema plicata*	104.2				1	Live	
31 Aug	DSB	24	35-45	*Amblema plicata*	82.4				1	Live	
31 Aug	DSB	24	35-45	*Ligumia recta*	150+			M	1	Live	
31 Aug	DSB	24	35-45	*Ligumia recta*	150+			M	1	Live	
31 Aug	DSB	24	35-45	*Ligumia recta*	150+			F	1	Live	
31 Aug	DSB	24	35-45	*Lampsilis cardium*	121.3			M	1	Live	
31 Aug	DSB	24	35-45	*Amblema plicata*					2	WD	
31 Aug	DSB	24	35-45	*Quadrula quadrula*					2	WD	
31 Aug	DSB	24	45-55	*Amblema plicata*	120				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	105.2				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	120.1				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	101.8				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	89.8				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	115.2				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	79.2				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	99.9				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	106.1				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	93.2				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	107.5				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	103.3				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	90.8				1	Live	
31 Aug	DSB	24	45-55	*Amblema plicata*	105.5				1	Live	
31 Aug	DSB	24	45-55	*Megalonaias nervosa*	140				1	Live	
31 Aug	DSB	24	45-55	*Ligumia recta*	127.4			F	1	Live	
31 Aug	DSB	24	45-55	*Ellipsaria lineolata*	93.2				1	Live	
31 Aug	DSB	24	55-65	*Lampsilis cardium*	118			M	1	Live	
31 Aug	DSB	24	55-65	*Actinonaias ligamentina*	103.2				1	Live	
31 Aug	DSB	24	55-65	*Actinonaias ligamentina*	150+				1	Live	
31 Aug	DSB	24	55-65	*Ellipsaria lineolata*	76.4				1	Live	
31 Aug	DSB	24	55-65	*Ellipsaria lineolata*	92.2				1	Live	
31 Aug	DSB	24	55-65	*Pleurobema sintoxia*	91.6				1	Live	
31 Aug	DSB	24	55-65	*Theliderma metanevra*	75				1	Live	
31 Aug	DSB	24	55-65	*Theliderma metanevra*	85.5				1	Live	
31 Aug	DSB	24	55-65	*Theliderma metanevra*	84				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
31 Aug	DSB	24	55-65	*Theliderma metanevra*	87.2				1	Live	
31 Aug	DSB	24	55-65	*Theliderma metanevra*	55.5				1	Live	
31 Aug	DSB	24	55-65	*Theliderma metanevra*	74				1	Live	
31 Aug	DSB	24	55-65	*Quadrula quadrula*	70.3				1	Live	
31 Aug	DSB	24	55-65	*Potamilus alatus*	92.3				1	Live	
31 Aug	DSB	24	55-65	*Amblema plicata*	100.4				1	Live	
31 Aug	DSB	24	55-65	*Amblema plicata*	102.7				1	Live	
31 Aug	DSB	24	55-65	*Amblema plicata*	94.9				1	Live	
31 Aug	DSB	24	55-65	*Amblema plicata*	105.1				1	Live	
31 Aug	DSB	24	55-65	*Ellipsaria lineolata*					1	WD	
1 Sep	DSB	25	0-5	No mussels							
1 Sep	DSB	25	5-15	*Ligumia recta*	150+			F	1	Live	
1 Sep	DSB	25	5-15	*Potamilus alatus*	128.9				1	Live	
1 Sep	DSB	25	5-15	*Potamilus alatus*	116.6				1	Live	
1 Sep	DSB	25	5-15	*Amblema plicata*	77.4				1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	143.3			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	150+			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	150+			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	142			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	132.4			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	127			F	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	142.4			M	1	Live	
1 Sep	DSB	25	15-25	*Ligumia recta*	80			M	1	Live	
1 Sep	DSB	25	15-25	*Obliquaria reflexa*	42.3				1	Live	
1 Sep	DSB	25	15-25	*Quadrula quadrula*	59.8				1	Live	
1 Sep	DSB	25	15-25	*Ellipsaria lineolata*	74.1				1	Live	
1 Sep	DSB	25	15-25	*Potamilus alatus*	114.7				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	116.8				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	116.2				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	109.5				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	88.3				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	103.3				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	86.4				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	115.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	25	25-35	*Amblema plicata*	85				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	100				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*	102.7				1	Live	
1 Sep	DSB	25	25-35	*Amblema plicata*					2	WD	
1 Sep	DSB	25	25-35	*Ligumia recta*	145			M	1	Live	
1 Sep	DSB	25	25-35	*Lampsilis cardium*	102.3			F	1	Live	
1 Sep	DSB	25	25-35	*Potamilus alatus*	113.4				1	Live	
1 Sep	DSB	25	25-35	*Cyclonaias pustulosa*	68.3				1	Live	
1 Sep	DSB	25	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	25	25-35	*Pleurobema sintoxia*	86.4				1	Live	
1 Sep	DSB	25	35-45	*Quadrula quadrula*	68.5				1	Live	
1 Sep	DSB	25	35-45	*Quadrula quadrula*	75.5				1	Live	
1 Sep	DSB	25	35-45	*Ellipsaria lineolata*	83.2				1	Live	
1 Sep	DSB	25	35-45	*Ellipsaria lineolata*	91.6				1	Live	
1 Sep	DSB	25	35-45	*Ellipsaria lineolata*	77.7				1	Live	
1 Sep	DSB	25	35-45	*Pleurobema cordatum*	66.5				1	Live	
1 Sep	DSB	25	35-45	*Actinonaias ligamentina*	107.3				1	Live	
1 Sep	DSB	25	35-45	*Ligumia recta*	136			M	1	Live	
1 Sep	DSB	25	35-45	*Ligumia recta*	125.6			F	1	Live	
1 Sep	DSB	25	35-45	*Ligumia recta*	134.9			F	1	Live	
1 Sep	DSB	25	35-45	*Potamilus alatus*	110.6				1	Live	
1 Sep	DSB	25	35-45	*Potamilus alatus*	74.7				1	Live	
1 Sep	DSB	25	35-45	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	25	35-45	*Amblema plicata*	94				1	Live	
1 Sep	DSB	25	35-45	*Amblema plicata*	108.6				1	Live	
1 Sep	DSB	25	35-45	*Pleurobema sintoxia*	79.5				1	Live	
1 Sep	DSB	25	35-45	*Fusconaia flava*	77				1	Live	
1 Sep	DSB	25	35-45	*Amblema plicata*	98.4				1	Live	
1 Sep	DSB	25	35-45	*Amblema plicata*	107.3				1	Live	
1 Sep	DSB	25	35-45	*Amblema plicata*	100				1	Live	
1 Sep	DSB	25	45-55	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	25	45-55	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	25	45-55	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*					2	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	25	45-55	*Amblema plicata*	96.7				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	104				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	107.3				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	98				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	107.8				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	104.7				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	105.3				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	101				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	99.1				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	91.4				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	84.6				1	Live	
1 Sep	DSB	25	45-55	*Amblema plicata*	111				1	Live	
1 Sep	DSB	25	45-55	*Obliquaria reflexa*	45.6				1	Live	
1 Sep	DSB	25	45-55	*Potamilus alatus*	113.8				1	Live	
1 Sep	DSB	25	45-55	*Ligumia recta*	150+			M	1	Live	
1 Sep	DSB	25	45-55	*Ligumia recta*	150+			M	1	Live	
1 Sep	DSB	25	45-55	*Fusconaia flava*	84.8				1	Live	
1 Sep	DSB	25	45-55	*Cyclonaias pustulosa*					1	WD	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	90				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	81.4				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	82				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	78.3				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	78.9				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	83.2				1	Live	
1 Sep	DSB	25	55-65	*Theliderma metanevra*	80.8				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	98.1				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	102				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	117.5				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	108.8				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	107.4				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	105.1				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	86.6				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	118.1				1	Live	
1 Sep	DSB	25	55-65	*Amblema plicata*	71				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	25	55-65	*Amblema plicata*	102.3				1	Live	
1 Sep	DSB	25	55-65	*Cyclonaias pustulosa*	46				1	Live	
1 Sep	DSB	25	55-65	*Cyclonaias pustulosa*	49.6				1	Live	
1 Sep	DSB	25	55-65	*Cyclonaias pustulosa*					2	WD	
1 Sep	DSB	25	55-65	*Actinonaias ligamentina*	133.2				1	Live	
1 Sep	DSB	25	55-65	*Actinonaias ligamentina*	113.2				1	Live	
1 Sep	DSB	25	55-65	*Actinonaias ligamentina*	104.3				1	Live	
1 Sep	DSB	25	55-65	*Actinonaias ligamentina*	127.4				1	Live	
1 Sep	DSB	25	55-65	*Quadrula quadrula*	58.3				1	Live	
1 Sep	DSB	25	55-65	*Potamilus alatus*	76.1				1	Live	
1 Sep	DSB	25	55-65	*Ellipsaria lineolata*					1	WD	
1 Sep	DSB	26	0-5	No mussels							
1 Sep	DSB	26	5-15	*Ligumia recta*	131			F	1	Live	
1 Sep	DSB	26	5-15	*Ligumia recta*	133.9			F	1	Live	
1 Sep	DSB	26	5-15	*Ligumia recta*	129.3			F	1	Live	
1 Sep	DSB	26	5-15	*Ligumia recta*	138.4			F	1	Live	
1 Sep	DSB	26	5-15	*Lampsilis siliquoidea*	129.2			F	1	Live	
1 Sep	DSB	26	5-15	*Amblema plicata*					1	WD	
1 Sep	DSB	26	15-25	*Amblema plicata*	111.5				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	136.8				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	95.5				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	107.4				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	96.4				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	80.4				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*					1	WD	
1 Sep	DSB	26	15-25	*Ligumia recta*	132.5			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	150+			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	150+			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	133.7			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	136.5			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	147.8			M	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	124.9			F	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	128			F	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	139.1			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	26	15-25	*Ligumia recta*				F	1	WD	
1 Sep	DSB	26	15-25	*Obliquaria reflexa*	60				1	Live	
1 Sep	DSB	26	15-25	*Lampsilis cardium*	99.8			F	1	Live	
1 Sep	DSB	26	15-25	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	26	15-25	*Potamilus alatus*	75.2				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	106.5				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	112.6				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	125.4				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	85.4				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	75.9				1	Live	
1 Sep	DSB	26	15-25	*Amblema plicata*	111.8				1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	135.8			F	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	144.3			F	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	143.7			F	1	Live	
1 Sep	DSB	26	15-25	*Ligumia recta*	112.3			F	1	Live	
1 Sep	DSB	26	15-25	*Cyclonaias pustulosa*	50				1	Live	
1 Sep	DSB	26	25-35	*Ligumia recta*	135.1			M	1	Live	
1 Sep	DSB	26	25-35	*Ligumia recta*	110.5			M	1	Live	
1 Sep	DSB	26	25-35	*Quadrula quadrula*	60				1	Live	
1 Sep	DSB	26	25-35	*Quadrula quadrula*					1	WD	
1 Sep	DSB	26	25-35	*Potamilus alatus*	107				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	99.9				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	90				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	115.6				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	108.4				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	101.1				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*	96.6				1	Live	
1 Sep	DSB	26	25-35	*Amblema plicata*					3	WD	
1 Sep	DSB	26	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	26	35-45	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	26	35-45	*Amblema plicata*	105				1	Live	
1 Sep	DSB	26	35-45	*Amblema plicata*	104.6				1	Live	
1 Sep	DSB	26	35-45	*Amblema plicata*	103				1	Live	
1 Sep	DSB	26	35-45	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	26	35-45	*Ligumia recta*	126.4			F	1	Live	
1 Sep	DSB	26	35-45	*Cyclonaias pustulosa*	56.2				1	Live	
1 Sep	DSB	26	35-45	*Ellipsaria lineolata*	71.6				1	Live	
1 Sep	DSB	26	35-45	*Potamilus alatus*	105.4				1	Live	
1 Sep	DSB	26	35-45	*Potamilus alatus*					1	WD	
1 Sep	DSB	26	45-55	*Amblema plicata*	98.7				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	96.2				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	103				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	93				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	102				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	105.2				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	79.6				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	112.5				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	90				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	107.5				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	98				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*	95.1				1	Live	
1 Sep	DSB	26	45-55	*Amblema plicata*					3	WD	
1 Sep	DSB	26	45-55	*Cyclonaias pustulosa*	64				1	Live	
1 Sep	DSB	26	45-55	*Cyclonaias pustulosa*	64				1	Live	
1 Sep	DSB	26	45-55	*Cyclonaias pustulosa*	55.4				1	Live	
1 Sep	DSB	26	45-55	*Cyclonaias pustulosa*	46.9				1	Live	
1 Sep	DSB	26	45-55	*Obliquaria reflexa*	60.9				1	Live	
1 Sep	DSB	26	45-55	*Ellipsaria lineolata*	74.3				1	Live	
1 Sep	DSB	26	45-55	*Ellipsaria lineolata*	85.4				1	Live	
1 Sep	DSB	26	45-55	*Ellipsaria lineolata*	82				1	Live	
1 Sep	DSB	26	45-55	*Ellipsaria lineolata*	81				1	Live	
1 Sep	DSB	26	45-55	*Ligumia recta*	120				1	Live	
1 Sep	DSB	26	45-55	*Ligumia recta*	148.9				1	Live	
1 Sep	DSB	26	45-55	*Quadrula quadrula*	55.5				1	Live	
1 Sep	DSB	26	45-55	*Quadrula quadrula*	57.1				1	Live	
1 Sep	DSB	26	45-55	*Actinonaias ligamentina*	110.1				1	Live	
1 Sep	DSB	26	45-55	*Potamilus alatus*					1	WD	
1 Sep	DSB	26	45-55	*Theliderma metanevra*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	26	55-65	*Obliquaria reflexa*	60.1				1	Live	
1 Sep	DSB	26	55-65	*Lampsilis cardium*	92.1			M	1	Live	
1 Sep	DSB	26	55-65	*Pleurobema cordatum*	96.7				1	Live	
1 Sep	DSB	26	55-65	*Pleurobema cordatum*	90.7				1	Live	
1 Sep	DSB	26	55-65	*Pleurobema cordatum*	79.8				1	Live	
1 Sep	DSB	26	55-65	*Pleurobema cordatum*					1	WD	
1 Sep	DSB	26	55-65	*Quadrula quadrula*	51				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	71				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	81.5				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	94.4				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	72.7				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	62				1	Live	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	85.5				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	105.3				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	101.6				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	103.8				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	81.3				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	106.1				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	96.6				1	Live	
1 Sep	DSB	26	55-65	*Amblema plicata*	93.5				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	84				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	84.1				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	86.5				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	86.6				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	101				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	80				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	83.1				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	82.4				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*	84				1	Live	
1 Sep	DSB	26	55-65	*Theliderma metanevra*					1	WD	
1 Sep	DSB	26	55-65	*Ellipsaria lineolata*	82				1	Live	
1 Sep	DSB	26	55-65	*Ligumia recta*	134.8			F	1	Live	
1 Sep	DSB	26	55-65	*Cyclonaias pustulosa*	58.5				1	Live	
1 Sep	DSB	26	55-65	*Cyclonaias pustulosa*	63.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	26	55-65	*Actinonaias ligamentina*	85.7				1	Live	
1 Sep	DSB	26	55-65	*Pleurobema sintoxia*	86.2				1	Live	
1 Sep	DSB	27	0-5	No mussels							
1 Sep	DSB	27	5-15	No mussels							
1 Sep	DSB	27	15- 25	No mussels							
1 Sep	DSB	27	25-35	*Lampsilis cardium*	118.5			F	1	Live	
1 Sep	DSB	27	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	27	25-35	*Amblema plicata*	117.4				1	Live	
1 Sep	DSB	27	25-35	*Amblema plicata*	103.5				1	Live	
1 Sep	DSB	27	25-35	*Amblema plicata*	107.1				1	Live	
1 Sep	DSB	27	25-35	*Amblema plicata*	87.6				1	Live	
1 Sep	DSB	27	25-35	*Amblema plicata*					3	WD	
1 Sep	DSB	27	25-35	*Ligumia recta*	132			F	1	Live	
1 Sep	DSB	27	25-35	*Ligumia recta*	144.4			M	1	Live	
1 Sep	DSB	27	25-35	*Ligumia recta*				M	1	WD	
1 Sep	DSB	27	25-35	*Cyclonaias pustulosa*	52				1	Live	
1 Sep	DSB	27	25-35	*Cyclonaias pustulosa*	59.6				1	Live	
1 Sep	DSB	27	25-35	*Ellipsaria lineolata*	80				1	Live	
1 Sep	DSB	27	25-35	*Ellipsaria lineolata*	67.1				1	Live	
1 Sep	DSB	27	25-35	*Potamilus alatus*	108.8				1	Live	
1 Sep	DSB	27	35-45	*Megalonaias nervosa*	145.6				1	Live	
1 Sep	DSB	27	35-45	*Megalonaias nervosa*	110.2				1	Live	
1 Sep	DSB	27	35-45	*Amblema plicata*	95.3				1	Live	
1 Sep	DSB	27	35-45	*Amblema plicata*					2	WD	
1 Sep	DSB	27	35-45	*Ellipsaria lineolata*	72.1				1	Live	
1 Sep	DSB	27	35-45	*Pleurobema cordatum*	65				1	Live	
1 Sep	DSB	27	35-45	*Cyclonaias pustulosa*	66				1	Live	
1 Sep	DSB	27	35-45	*Cyclonaias pustulosa*	65.3				1	Live	
1 Sep	DSB	27	35-45	*Ligumia recta*	92.3				1	Live	
1 Sep	DSB	27	35-45	*Ligumia recta*					1	WD	
1 Sep	DSB	27	45-55	*Megalonaias nervosa*	142				1	Live	
1 Sep	DSB	27	45-55	*Megalonaias nervosa*	143				1	Live	
1 Sep	DSB	27	45-55	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	27	45-55	*Megalonaias nervosa*	150+				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	27	45-55	*Cyclonaias pustulosa*	57.5				1	Live	
1 Sep	DSB	27	45-55	*Cyclonaias pustulosa*					1	WD	
1 Sep	DSB	27	45-55	*Amblema plicata*	90				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	87.5				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	95.3				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	102.3				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	110				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	118.5				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	83.2				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	108.8				1	Live	
1 Sep	DSB	27	45-55	*Amblema plicata*	107.4				1	Live	
1 Sep	DSB	27	45-55	*Theliderma metanevra*	87.3				1	Live	
1 Sep	DSB	27	45-55	*Pleurobema sintoxia*	96				1	Live	
1 Sep	DSB	27	45-55	*Lampsilis cardium*	102.6			M	1	Live	
1 Sep	DSB	27	45-55	*Lampsilis cardium*	128.5			M	1	Live	
1 Sep	DSB	27	45-55	*Lampsilis cardium*				M	1	WD	
1 Sep	DSB	27	45-55	*Ellipsaria lineolata*	88.3				1	Live	
1 Sep	DSB	27	45-55	*Ellipsaria lineolata*	64				1	Live	
1 Sep	DSB	27	45-55	*Ellipsaria lineolata*	80.4				1	Live	
1 Sep	DSB	27	45-55	*Ligumia recta*	139.5			F	1	Live	
1 Sep	DSB	27	45-55	*Ligumia recta*	121.5			F	1	Live	
1 Sep	DSB	27	45-55	*Pleurobema cordatum*	55.5				1	Live	
1 Sep	DSB	27	45-55	*Potamilus alatus*	114.3				1	Live	
1 Sep	DSB	27	45-55	*Potamilus alatus*					1	WD	
1 Sep	DSB	27	55-65	*Ellipsaria lineolata*	84.2				1	Live	
1 Sep	DSB	27	55-65	*Lampsilis cardium*	113			M	1	Live	
1 Sep	DSB	27	55-65	*Lampsilis cardium*	120.8			M	1	Live	
1 Sep	DSB	27	55-65	*Ligumia recta*	124.5			F	1	Live	
1 Sep	DSB	27	55-65	*Pleurobema cordatum*	95.7				1	Live	
1 Sep	DSB	27	55-65	*Pleurobema sintoxia*	90.9				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*	89				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*	94.3				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*	102.2				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*	114.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	27	55-65	*Amblema plicata*	104.2				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*	87				1	Live	
1 Sep	DSB	27	55-65	*Amblema plicata*					1	WD	
1 Sep	DSB	27	55-65	*Theliderma metanevra*	81.6				1	Live	
1 Sep	DSB	27	55-65	*Theliderma metanevra*	81.6				1	Live	
1 Sep	DSB	27	55-65	*Theliderma metanevra*	79.2				1	Live	
1 Sep	DSB	27	55-65	*Theliderma metanevra*	80				1	Live	
1 Sep	DSB	27	55-65	*Cyclonaias pustulosa*	58.3				1	Live	
1 Sep	DSB	27	55-65	*Cyclonaias pustulosa*	63.5				1	Live	
1 Sep	DSB	27	55-65	*Cyclonaias pustulosa*	54.7				1	Live	
1 Sep	DSB	27	55-65	*Cyclonaias pustulosa*					1	WD	
1 Sep	DSB	27	55-65	*Actinonaias ligamentina*	110.5				1	Live	
1 Sep	DSB	27	55-65	*Potamilus alatus*	107				1	Live	
1 Sep	DSB	27	55-65	*Potamilus alatus*	109				1	Live	
1 Sep	DSB	27	55-65	*Potamilus alatus*					1	WD	
1 Sep	DSB	28	0-5	No mussels							
1 Sep	DSB	28	5-15	*Potamilus alatus*	115.5				1	Live	
1 Sep	DSB	28	5-15	*Ligumia recta*	140			M	1	Live	
1 Sep	DSB	28	5-15	*Fusconaia flava*	63.7				1	Live	
1 Sep	DSB	28	5-15	*Ligumia recta*	150+				1	Live	
1 Sep	DSB	28	5-15	*Ligumia recta*	132.5				1	Live	
1 Sep	DSB	28	5-15	*Ligumia recta*	140				1	Live	
1 Sep	DSB	28	15-25	*Cyclonaias pustulosa*	68				1	Live	
1 Sep	DSB	28	15-25	*Cyclonaias pustulosa*	55.3				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	109.4				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	101.3				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	103.7				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	112.4				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	100				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*	101.4				1	Live	
1 Sep	DSB	28	15-25	*Amblema plicata*					1	WD	
1 Sep	DSB	28	15-25	*Ellipsaria lineolata*	72.3				1	Live	
1 Sep	DSB	28	15-25	*Ellipsaria lineolata*	72.4				1	Live	
1 Sep	DSB	28	15-25	*Ligumia recta*	141.7			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	28	15-25	*Ligumia recta*	119.3			F	1	Live	
1 Sep	DSB	28	15-25	*Ligumia recta*	144.6			F	1	Live	
1 Sep	DSB	28	15-25	*Ligumia recta*	147			M	1	Live	
1 Sep	DSB	28	15-25	*Potamilus alatus*					1	WD	
1 Sep	DSB	28	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	25-35	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	25-35	*Amblema plicata*	80				1	Live	
1 Sep	DSB	28	25-35	*Amblema plicata*	110.4				1	Live	
1 Sep	DSB	28	25-35	*Amblema plicata*	110.3				1	Live	
1 Sep	DSB	28	25-35	*Amblema plicata*					1	WD	
1 Sep	DSB	28	25-35	*Ligumia recta*	96.2			M	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	130.7			M	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	139.1			M	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	135.5			F	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	138.6			F	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	114.1			F	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	131			F	1	Live	
1 Sep	DSB	28	25-35	*Ligumia recta*	133.6			F	1	Live	
1 Sep	DSB	28	25-35	*Pleurobema sintoxia*	92.5				1	Live	
1 Sep	DSB	28	25-35	*Cyclonaias pustulosa*	48				1	Live	
1 Sep	DSB	28	25-35	*Cyclonaias pustulosa*	57				1	Live	
1 Sep	DSB	28	25-35	*Ellipsaria lineolata*	38				1	Live	
1 Sep	DSB	28	35-45	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	35-45	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	35-45	*Megalonaias nervosa*	150+				1	Live	
1 Sep	DSB	28	35-45	*Amblema plicata*	80				1	Live	
1 Sep	DSB	28	35-45	*Amblema plicata*	110.4				1	Live	
1 Sep	DSB	28	35-45	*Amblema plicata*	110.3				1	Live	
1 Sep	DSB	28	35-45	*Amblema plicata*					1	WD	
1 Sep	DSB	28	35-45	*Ligumia recta*	96.2			M	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	130.7			M	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	139.1			M	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	135.5			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	28	35-45	*Ligumia recta*	138.6			F	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	114.1			F	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	131			F	1	Live	
1 Sep	DSB	28	35-45	*Ligumia recta*	133.6			F	1	Live	
1 Sep	DSB	28	35-45	*Pleurobema sintoxia*	92.5				1	Live	
1 Sep	DSB	28	35-45	*Cyclonaias pustulosa*	48				1	Live	
1 Sep	DSB	28	35-45	*Cyclonaias pustulosa*	57				1	Live	
1 Sep	DSB	28	35-45	*Ellipsaria lineolata*	38				1	Live	
1 Sep	DSB	28	45-55	*Potamilus alatus*	101.7				1	Live	
1 Sep	DSB	28	45-55	*Ligumia recta*	131.5			M	1	Live	
1 Sep	DSB	28	45-55	*Ligumia recta*				M	1	WD	
1 Sep	DSB	28	45-55	*Theliderma metanevra*	83				1	Live	
1 Sep	DSB	28	45-55	*Theliderma metanevra*					1	WD	
1 Sep	DSB	28	45-55	*Amblema plicata*	111.3				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	91				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	84.3				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	150+				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	98				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	88.3				1	Live	
1 Sep	DSB	28	45-55	*Amblema plicata*	104.6				1	Live	
1 Sep	DSB	28	45-55	*Actinonaias ligamentina*	123				1	Live	
1 Sep	DSB	28	45-55	*Pleurobema sintoxia*	94.8				1	Live	
1 Sep	DSB	28	45-55	*Ellipsaria lineolata*	65.2				1	Live	
1 Sep	DSB	28	45-55	*Ellipsaria lineolata*	76.5				1	Live	
1 Sep	DSB	28	45-55	*Ellipsaria lineolata*	80.8				1	Live	
1 Sep	DSB	28	45-55	*Megalonaias nervosa*					2	WD	
1 Sep	DSB	28	55-65	*Theliderma metanevra*	75.4				1	Live	
1 Sep	DSB	28	55-65	*Ellipsaria lineolata*	75				1	Live	
1 Sep	DSB	28	55-65	*Ellipsaria lineolata*	75				1	Live	
1 Sep	DSB	28	55-65	*Pleurobema cordatum*	92.1				1	Live	
1 Sep	DSB	28	55-65	*Pleurobema cordatum*	93.6				1	Live	
1 Sep	DSB	28	55-65	*Pleurobema cordatum*					1	WD	
1 Sep	DSB	28	55-65	*Amblema plicata*	96.7				1	Live	
1 Sep	DSB	28	55-65	*Amblema plicata*	106.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
1 Sep	DSB	28	55-65	*Amblema plicata*	94.6				1	Live	
1 Sep	DSB	28	55-65	*Amblema plicata*					12	WD	
1 Sep	DSB	28	55-65	*Pleurobema sintoxia*	100				1	Live	
2 Sep	DSB	29	0-5	No mussels							
2 Sep	DSB	29	5-15	*Amblema plicata*					1	WD	
2 Sep	DSB	29	5-15	*Ligumia recta*	126.5			F	1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	107.3				1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	82.5				1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	87.9				1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	94.2				1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	116.5				1	Live	
2 Sep	DSB	29	15-25	*Amblema plicata*	101.2				1	Live	
2 Sep	DSB	29	15-25	*Cyclonaias pustulosa*	60.2				1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	121.6			M	1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	145.3			M	1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	143.4			F	1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	134.5			F	1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	133.7			F	1	Live	
2 Sep	DSB	29	15-25	*Ligumia recta*	130.2			F	1	Live	
2 Sep	DSB	29	15-25	*Potamilus alatus*	114.7				1	Live	
2 Sep	DSB	29	15-25	*Potamilus alatus*	116.8				1	Live	
2 Sep	DSB	29	25-35	*Amblema plicata*	95.2				1	Live	
2 Sep	DSB	29	25-35	*Amblema plicata*	95.2				1	Live	
2 Sep	DSB	29	25-35	*Amblema plicata*					1	WD	
2 Sep	DSB	29	25-35	*Cyclonaias pustulosa*	60.7				1	Live	
2 Sep	DSB	29	25-35	*Ellipsaria lineolata*	74.3				1	Live	
2 Sep	DSB	29	25-35	*Ellipsaria lineolata*	88.2				1	Live	
2 Sep	DSB	29	25-35	*Ligumia recta*	134.2			M	1	Live	
2 Sep	DSB	29	25-35	*Ligumia recta*	148.4			M	1	Live	
2 Sep	DSB	29	25-35	*Ligumia recta*	150+			M	1	Live	
2 Sep	DSB	29	25-35	*Ligumia recta*	144.8			M	1	Live	
2 Sep	DSB	29	25-35	*Potamilus alatus*	96.6				1	Live	
2 Sep	DSB	29	25-35	*Potamilus alatus*	79.2				1	Live	
2 Sep	DSB	29	25-35	*Theliderma metanevra*	74.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	29	35-45	*Amblema plicata*	101.2				1	Live	
2 Sep	DSB	29	35-45	*Amblema plicata*	116.7				1	Live	
2 Sep	DSB	29	35-45	*Amblema plicata*	118.3				1	Live	
2 Sep	DSB	29	35-45	*Amblema plicata*	97.5				1	Live	
2 Sep	DSB	29	35-45	*Cyclonaias pustulosa*	62.1				1	Live	
2 Sep	DSB	29	35-45	*Cyclonaias pustulosa*	64.3				1	Live	
2 Sep	DSB	29	35-45	*Cyclonaias pustulosa*	60.2				1	Live	
2 Sep	DSB	29	35-45	*Cyclonaias pustulosa*	50.9				1	Live	
2 Sep	DSB	29	35-45	*Cyclonaias pustulosa*	47.6				1	Live	
2 Sep	DSB	29	35-45	*Ellipsaria lineolata*	80.1				1	Live	
2 Sep	DSB	29	35-45	*Ellipsaria lineolata*	92.1				1	Live	
2 Sep	DSB	29	35-45	*Ligumia recta*	150+			M	1	Live	
2 Sep	DSB	29	35-45	*Ligumia recta*	133.4			F	1	Live	
2 Sep	DSB	29	35-45	*Ligumia recta*	139.5			F	1	Live	
2 Sep	DSB	29	35-45	*Pleurobema cordatum*	65.6				1	Live	
2 Sep	DSB	29	35-45	*Quadrula quadrula*	60				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	101.1				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	114.4				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	94				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	103.2				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	93.4				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	106.7				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	109.8				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	107.1				1	Live	
2 Sep	DSB	29	45-55	*Amblema plicata*	122.4				1	Live	
2 Sep	DSB	29	45-55	*Cyclonaias pustulosa*	56.2				1	Live	
2 Sep	DSB	29	45-55	*Cyclonaias pustulosa*	65.4				1	Live	
2 Sep	DSB	29	45-55	*Cyclonaias pustulosa*	49.2				1	Live	
2 Sep	DSB	29	45-55	*Cyclonaias pustulosa*					1	WD	
2 Sep	DSB	29	45-55	*Ellipsaria lineolata*	87.7				1	Live	
2 Sep	DSB	29	45-55	*Lampsilis cardium*	119.7			M	1	Live	
2 Sep	DSB	29	45-55	*Ligumia recta*	110.3			F	1	Live	
2 Sep	DSB	29	45-55	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSB	29	45-55	*Obliquaria reflexa*	50				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	29	45-55	*Obliquaria reflexa*	63.3				1	Live	
2 Sep	DSB	29	45-55	*Pleurobema sintoxia*	104.4				1	Live	
2 Sep	DSB	29	45-55	*Potamilus alatus*	117.9				1	Live	
2 Sep	DSB	29	55-65	*Amblema plicata*	104.5				1	Live	
2 Sep	DSB	29	55-65	*Amblema plicata*	89.7				1	Live	
2 Sep	DSB	29	55-65	*Cyclonaias pustulosa*	65.2				1	Live	
2 Sep	DSB	29	55-65	*Cyclonaias pustulosa*	48.7				1	Live	
2 Sep	DSB	29	55-65	*Cyclonaias pustulosa*	63.4				1	Live	
2 Sep	DSB	29	55-65	*Cyclonaias pustulosa*	55.6				1	Live	
2 Sep	DSB	29	55-65	*Ellipsaria lineolata*	91.5				1	Live	
2 Sep	DSB	29	55-65	*Fusconaia flava*	74				1	Live	
2 Sep	DSB	29	55-65	*Ligumia recta*	103.5			M	1	Live	
2 Sep	DSB	29	55-65	*Ligumia recta*	144.2			M	1	Live	
2 Sep	DSB	29	55-65	*Ligumia recta*	125.7			F	1	Live	
2 Sep	DSB	29	55-65	*Obliquaria reflexa*	49.8				1	Live	
2 Sep	DSB	29	55-65	*Plethobasus cyphyus**	102	44.3	68.5		1	Live	1990 Yellow
2 Sep	DSB	29	55-65	*Pleurobema cordatum*	63.6				1	Live	
2 Sep	DSB	29	55-65	*Pleurobema cordatum*	66.1				1	Live	
2 Sep	DSB	29	55-65	*Pleurobema sintoxia*	89.5				1	Live	
2 Sep	DSB	29	55-65	*Pleurobema sintoxia*	95				1	Live	
2 Sep	DSB	29	55-65	*Pleurobema sintoxia*	90.5				1	Live	
2 Sep	DSB	29	55-65	*Potamilus alatus*	118.2				1	Live	
2 Sep	DSB	29	55-65	*Theliderma metanevra*	85.2				1	Live	
2 Sep	DSB	29	55-65	*Theliderma metanevra*	75.9				1	Live	
2 Sep	DSB	29	55-65	*Theliderma metanevra*	85				1	Live	
2 Sep	DSB	29	55-65	*Theliderma metanevra*	76.2				1	Live	
2 Sep	DSB	29	55-65	*Theliderma metanevra*					2	WD	
2 Sep	DSB	30	0-5	No mussels							
2 Sep	DSB	30	5-15	*Amblema plicata*	103.4				1	Live	
2 Sep	DSB	30	5-15	*Amblema plicata*	136.9				1	Live	
2 Sep	DSB	30	5-15	*Ligumia recta*	150+				1	Live	
2 Sep	DSB	30	5-15	*Ligumia recta*	127.6				1	Live	
2 Sep	DSB	30	5-15	*Ligumia recta*	126.9				1	Live	
2 Sep	DSB	30	5-15	*Ligumia recta*	126.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	30	5-15	*Ligumia recta*	143.2			M	1	Live	
2 Sep	DSB	30	5-15	*Potamilus alatus*	97.8				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	118.5				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	106.4				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	109.6				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	115.7				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	90.9				1	Live	
2 Sep	DSB	30	15-25	*Amblema plicata*	116.3				1	Live	
2 Sep	DSB	30	15-25	*Cyclonaias pustulosa*	59.8				1	Live	
2 Sep	DSB	30	15-25	*Ellipsaria lineolata*	90.1				1	Live	
2 Sep	DSB	30	15-25	*Ellipsaria lineolata*	67.7				1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	114.3			M	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	143			M	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	146.5			M	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	149			F	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	145.6			F	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	131.5			F	1	Live	
2 Sep	DSB	30	15-25	*Ligumia recta*	138.7			F	1	Live	
2 Sep	DSB	30	15-25	*Obliquaria reflexa*	60.5				1	Live	
2 Sep	DSB	30	25-35	*Amblema plicata*	89.1				1	Live	
2 Sep	DSB	30	25-35	*Amblema plicata*	55.7				1	Live	
2 Sep	DSB	30	25-35	*Amblema plicata*	93.9				1	Live	
2 Sep	DSB	30	25-35	*Amblema plicata*					1	WD	
2 Sep	DSB	30	25-35	*Lampsilis cardium*	101				1	Live	
2 Sep	DSB	30	25-35	*Ligumia recta*	143.4			M	1	Live	
2 Sep	DSB	30	25-35	*Ligumia recta*	130.4			M	1	Live	
2 Sep	DSB	30	25-35	*Ligumia recta*	143.4			M	1	Live	
2 Sep	DSB	30	25-35	*Ligumia recta*	139.2			F	1	Live	
2 Sep	DSB	30	25-35	*Ligumia recta*	138.4			F	1	Live	
2 Sep	DSB	30	25-35	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSB	30	25-35	*Pleurobema cordatum*	89.5				1	Live	
2 Sep	DSB	30	25-35	*Pleurobema cordatum*	60.5				1	Live	
2 Sep	DSB	30	25-35	*Quadrula quadrula*	61.2				1	Live	
2 Sep	DSB	30	35-45	*Amblema plicata*	113.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	30	35-45	*Amblema plicata*	101				1	Live	
2 Sep	DSB	30	35-45	*Amblema plicata*	92.5				1	Live	
2 Sep	DSB	30	35-45	*Ligumia recta*	138.2			M	1	Live	
2 Sep	DSB	30	45-55	*Actinonaias ligamentina*	116.6				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	104				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	151.3				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	132.9				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	116.7				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	95.2				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	76				1	Live	
2 Sep	DSB	30	45-55	*Amblema plicata*	77.5				1	Live	
2 Sep	DSB	30	45-55	*Cyclonaias pustulosa*	57.2				1	Live	
2 Sep	DSB	30	45-55	*Cyclonaias pustulosa*	62.3				1	Live	
2 Sep	DSB	30	45-55	*Ellipsaria lineolata*	87				1	Live	
2 Sep	DSB	30	45-55	*Ellipsaria lineolata*	81.5				1	Live	
2 Sep	DSB	30	45-55	*Ellipsaria lineolata*	62.5				1	Live	
2 Sep	DSB	30	45-55	*Ligumia recta*	126.7			F	1	Live	
2 Sep	DSB	30	45-55	*Ligumia recta*	120			F	1	Live	
2 Sep	DSB	30	45-55	*Pleurobema sintoxia*	92.3				1	Live	
2 Sep	DSB	30	55-65	*Actinonaias ligamentina*	119				1	Live	
2 Sep	DSB	30	55-65	*Amblema plicata*	110.5				1	Live	
2 Sep	DSB	30	55-65	*Amblema plicata*	105				1	Live	
2 Sep	DSB	30	55-65	*Amblema plicata*	100.2				1	Live	
2 Sep	DSB	30	55-65	*Amblema plicata*	64.5				1	Live	
2 Sep	DSB	30	55-65	*Amblema plicata*					1	WD	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	55.9				1	Live	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	59.3				1	Live	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	61.3				1	Live	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	43.3				1	Live	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	65.9				1	Live	
2 Sep	DSB	30	55-65	*Cyclonaias pustulosa*	61.4				1	Live	
2 Sep	DSB	30	55-65	*Ellipsaria lineolata*	67.8				1	Live	
2 Sep	DSB	30	55-65	*Ellipsaria lineolata*	52.5				1	Live	
2 Sep	DSB	30	55-65	*Ligumia recta*	150+			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	30	55-65	*Ligumia recta*	128.9			F	1	Live	
2 Sep	DSB	30	55-65	*Pleurobema cordatum*	92.1				1	Live	
2 Sep	DSB	30	55-65	*Pleurobema cordatum*	70.5				1	Live	
2 Sep	DSB	30	55-65	*Theliderma metanevra*	78.7				1	Live	
2 Sep	DSB	31	0-5	No mussels							
2 Sep	DSB	31	5-15	*Amblema plicata*	91.7				1	Live	
2 Sep	DSB	31	5-15	*Ligumia recta*	143.5			M	1	Live	
2 Sep	DSB	31	5-15	*Ligumia recta*	149.2			M	1	Live	
2 Sep	DSB	31	5-15	*Ligumia recta*	131.5			F	1	Live	
2 Sep	DSB	31	5-15	*Ligumia recta*	145			F	1	Live	
2 Sep	DSB	31	5-15	*Ligumia recta*	153.4			F	1	Live	
2 Sep	DSB	31	15-25	*Amblema plicata*	105.2				1	Live	
2 Sep	DSB	31	15-25	*Amblema plicata*					1	WD	
2 Sep	DSB	31	15-25	*Cyclonaias pustulosa*					1	WD	
2 Sep	DSB	31	15-25	*Ligumia recta*	130			F	1	Live	
2 Sep	DSB	31	15-25	*Ligumia recta*	149			F	1	Live	
2 Sep	DSB	31	15-25	*Ligumia recta*	141.3			M	1	Live	
2 Sep	DSB	31	15-25	*Ligumia recta*	135			M	1	Live	
2 Sep	DSB	31	15-25	*Plethobasus cyphyus**	81.4	38	63.8		1	Live	1916 Yellow
2 Sep	DSB	31	15-25	*Pleurobema cordatum*	73.2				1	Live	
2 Sep	DSB	31	15-25	*Potamilus alatus*	119.1				1	Live	
2 Sep	DSB	31	15-25	*Theliderma metanevra*	83.5				1	Live	
2 Sep	DSB	31	25-35	*Amblema plicata*	98.2				1	Live	
2 Sep	DSB	31	25-35	*Amblema plicata*	98.1				1	Live	
2 Sep	DSB	31	25-35	*Ellipsaria lineolata*	81				1	Live	
2 Sep	DSB	31	25-35	*Ligumia recta*	138.2			M	1	Live	
2 Sep	DSB	31	25-35	*Ligumia recta*	140.3			M	1	Live	
2 Sep	DSB	31	25-35	*Ligumia recta*	91.3			M	1	Live	
2 Sep	DSB	31	25-35	*Ligumia recta*	132.2			F	1	Live	
2 Sep	DSB	31	25-35	*Ligumia recta*	130.5			F	1	Live	
2 Sep	DSB	31	25-35	*Plethobasus cyphyus**					1	WD	
2 Sep	DSB	31	25-35	*Potamilus alatus*	115.7				1	Live	
2 Sep	DSB	31	35-45	*Actinonaias ligamentina*	126.1				1	Live	
2 Sep	DSB	31	35-45	*Amblema plicata*	110.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	31	35-45	*Amblema plicata*	97.2				1	Live	
2 Sep	DSB	31	35-45	*Amblema plicata*	101.3				1	Live	
2 Sep	DSB	31	35-45	*Amblema plicata*	86.7				1	Live	
2 Sep	DSB	31	35-45	*Amblema plicata*	113				1	Live	
2 Sep	DSB	31	35-45	*Amblema plicata*	94.6				1	Live	
2 Sep	DSB	31	35-45	*Cyclonaias pustulosa*	56.7				1	Live	
2 Sep	DSB	31	35-45	*Ellipsaria lineolata*	75				1	Live	
2 Sep	DSB	31	35-45	*Ellipsaria lineolata*	61.3				1	Live	
2 Sep	DSB	31	35-45	*Ligumia recta*	83.9			M	1	Live	
2 Sep	DSB	31	35-45	*Ligumia recta*	145.3			M	1	Live	
2 Sep	DSB	31	35-45	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSB	31	35-45	*Megalonaias nervosa*	150+				1	Live	
2 Sep	DSB	31	35-45	*Potamilus alatus*	102				1	Live	
2 Sep	DSB	31	45-55	*Actinonaias ligamentina*	107.1				1	Live	
2 Sep	DSB	31	45-55	*Actinonaias ligamentina*	101				1	Live	
2 Sep	DSB	31	45-55	*Amblema plicata*	69.5				1	Live	
2 Sep	DSB	31	45-55	*Amblema plicata*	103.5				1	Live	
2 Sep	DSB	31	45-55	*Amblema plicata*	132.5				1	Live	
2 Sep	DSB	31	45-55	*Amblema plicata*					1	WD	
2 Sep	DSB	31	45-55	*Cyclonaias pustulosa*	44.4				1	Live	
2 Sep	DSB	31	45-55	*Cyclonaias pustulosa*	72.5				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	84.3				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	87.3				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	85.3				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	76.6				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	74.6				1	Live	
2 Sep	DSB	31	45-55	*Ellipsaria lineolata*	52.4				1	Live	
2 Sep	DSB	31	45-55	*Ligumia recta*	141.3			M	1	Live	
2 Sep	DSB	31	45-55	*Ligumia recta*	150.3			F	1	Live	
2 Sep	DSB	31	45-55	*Potamilus alatus*	109.3				1	Live	
2 Sep	DSB	31	45-55	*Theliderma metanevra*	82.2				1	Live	
2 Sep	DSB	31	55-65	*Actinonaias ligamentina*	116.2				1	Live	
2 Sep	DSB	31	55-65	*Amblema plicata*	94.9				1	Live	
2 Sep	DSB	31	55-65	*Amblema plicata*	119.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
2 Sep	DSB	31	55-65	*Amblema plicata*	105.3				1	Live	
2 Sep	DSB	31	55-65	*Ellipsaria lineolata*	64.5				1	Live	
2 Sep	DSB	31	55-65	*Ellipsaria lineolata*	86.7				1	Live	
2 Sep	DSB	31	55-65	*Ellipsaria lineolata*	82.6				1	Live	
2 Sep	DSB	31	55-65	*Ligumia recta*	138.1			F	1	Live	
2 Sep	DSB	31	55-65	*Ligumia recta*	130.2			F	1	Live	
2 Sep	DSB	31	55-65	*Ligumia recta*	150+			M	1	Live	
2 Sep	DSB	31	55-65	*Pleurobema cordatum*	84.5				1	Live	
2 Sep	DSB	31	55-65	*Pleurobema cordatum*	97.5				1	Live	
2 Sep	DSB	31	55-65	*Pleurobema cordatum*	97.9				1	Live	
2 Sep	DSB	31	55-65	*Pleurobema cordatum*	84.7				1	Live	
2 Sep	DSB	31	55-65	*Pleurobema cordatum*	74.3				1	Live	
2 Sep	DSB	31	55-65	*Potamilus alatus*	114.5				1	Live	
2 Sep	DSB	31	55-65	*Potamilus alatus*	86.7				1	Live	
2 Sep	DSB	31	55-65	*Quadrula quadrula*	60.5				1	Live	
2 Sep	DSB	31	55-65	*Quadrula quadrula*	63.5				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*	78.3				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*	80.5				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*	81.4				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*	78.4				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*	83.4				1	Live	
2 Sep	DSB	31	55-65	*Theliderma metanevra*					1	WD	
3 Sep	DSB	32	0-5	No mussels							
3 Sep	DSB	32	5-15	*Ligumia recta*	129.6			F	1	Live	
3 Sep	DSB	32	5-15	*Cyclonaias pustulosa*	38.2				1	Live	
3 Sep	DSB	32	15-25	*Ligumia recta*	129			F	1	Live	
3 Sep	DSB	32	15-25	*Ligumia recta*	127.9			F	1	Live	
3 Sep	DSB	32	15-25	*Ligumia recta*	137.2			F	1	Live	
3 Sep	DSB	32	15-25	*Ligumia recta*	133.4			F	1	Live	
3 Sep	DSB	32	15-25	*Ligumia recta*					2	WD	
3 Sep	DSB	32	15-25	*Potamilus alatus*	120				1	Live	
3 Sep	DSB	32	15-25	*Potamilus alatus*					1	WD	
3 Sep	DSB	32	15-25	*Amblema plicata*	97.7				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	96.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	DSB	32	25-35	*Amblema plicata*	74.7				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	115				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	101.5				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	115				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	107.8				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	100.6				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	69.6				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	80.7				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	111				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	82				1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*	138.3			F	1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*	144			F	1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*	130.4			M	1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*	132.1			F	1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*	131.5			F	1	Live	
3 Sep	DSB	32	25-35	*Ligumia recta*					2	WD	
3 Sep	DSB	32	25-35	*Potamilus alatus*	96.7				1	Live	
3 Sep	DSB	32	25-35	*Amblema plicata*	95.5				1	Live	
3 Sep	DSB	32	25-35	*Ellipsaria lineolata*	66.5				1	Live	
3 Sep	DSB	32	25-35	*Obliquaria reflexa*	56.4				1	Live	
3 Sep	DSB	32	25-35	*Obliquaria reflexa*	59				1	Live	
3 Sep	DSB	32	25-35	*Pleurobema cordatum*	72.4				1	Live	
3 Sep	DSB	32	25-35	*Lampsilis siliquoidea*	105			F	1	Live	
3 Sep	DSB	32	35-45	*Potamilus alatus*	102				1	Live	
3 Sep	DSB	32	35-45	*Amblema plicata*	67.3				1	Live	
3 Sep	DSB	32	35-45	*Amblema plicata*	112.6				1	Live	
3 Sep	DSB	32	35-45	*Amblema plicata*	98.6				1	Live	
3 Sep	DSB	32	35-45	*Amblema plicata*	100.6				1	Live	
3 Sep	DSB	32	35-45	*Amblema plicata*					2	WD	
3 Sep	DSB	32	35-45	*Pleurobema sintoxia*	87				1	Live	
3 Sep	DSB	32	35-45	*Ligumia recta*	138.5			M	1	Live	
3 Sep	DSB	32	35-45	*Ligumia recta*	146.4			M	1	Live	
3 Sep	DSB	32	35-45	*Ligumia recta*	149.9			M	1	Live	
3 Sep	DSB	32	35-45	*Ligumia recta*	134.5			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	DSB	32	35-45	*Ellipsaria lineolata*					1	WD	
3 Sep	DSB	32	45-55	*Ellipsaria lineolata*	76				1	Live	
3 Sep	DSB	32	45-55	*Amblema plicata*	100.5				1	Live	
3 Sep	DSB	32	45-55	*Amblema plicata*	85				1	Live	
3 Sep	DSB	32	45-55	*Obliquaria reflexa*	65.1				1	Live	
3 Sep	DSB	32	45-55	*Pleurobema cordatum*	92.4				1	Live	
3 Sep	DSB	32	45-55	*Lampsilis cardium*	114			M	1	Live	
3 Sep	DSB	32	45-55	*Ligumia recta*	91.4			M	1	Live	
3 Sep	DSB	32	45-55	*Ligumia recta*	145.8			M	1	Live	
3 Sep	DSB	32	45-55	*Ligumia recta*	135.7			M	1	Live	
3 Sep	DSB	32	45-55	*Potamilus alatus*	101.7				1	Live	
3 Sep	DSB	32	45-55	*Cyclonaias pustulosa*					1	WD	
3 Sep	DSB	32	55-65	*Obliquaria reflexa*	56.2				1	Live	
3 Sep	DSB	32	55-65	*Potamilus alatus*	114.3				1	Live	
3 Sep	DSB	32	55-65	*Potamilus alatus*	113.3				1	Live	
3 Sep	DSB	32	55-65	*Potamilus alatus*	99.7				1	Live	
3 Sep	DSB	32	55-65	*Amblema plicata*	69.3				1	Live	
3 Sep	DSB	32	55-65	*Amblema plicata*	110				1	Live	
3 Sep	DSB	32	55-65	*Amblema plicata*	110.2				1	Live	
3 Sep	DSB	32	55-65	*Amblema plicata*					1	WD	
3 Sep	DSB	32	55-65	*Actinonaias ligamentina*	112.7				1	Live	
3 Sep	DSB	32	55-65	*Cyclonaias pustulosa*	62.7				1	Live	
3 Sep	DSB	32	55-65	*Cyclonaias pustulosa*	65.5				1	Live	
3 Sep	DSB	32	55-65	*Cyclonaias pustulosa*	63.7				1	Live	
3 Sep	DSB	32	55-65	*Cyclonaias pustulosa*	60.8				1	Live	
3 Sep	DSB	32	55-65	*Theliderma metanevra*	87				1	Live	
3 Sep	DSB	32	55-65	*Theliderma metanevra*	90				1	Live	
3 Sep	DSB	32	55-65	*Theliderma metanevra*	71.3				1	Live	
3 Sep	DSB	32	55-65	*Theliderma metanevra*	64.3				1	Live	
3 Sep	DSB	32	55-65	*Theliderma metanevra*					1	WD	
3 Sep	DSB	32	55-65	*Pleurobema sintoxia*	85.9				1	Live	
3 Sep	DSB	32	55-65	*Pleurobema sintoxia*	89.4				1	Live	
3 Sep	DSB	32	55-65	*Pleurobema sintoxia*	89.7				1	Live	
3 Sep	DSB	32	55-65	*Pleurobema sintoxia*	95				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	DSB	32	55-65	*Ligumia recta*	141.3			M	1	Live	
3 Sep	DSB	32	55-65	*Ligumia recta*	150+			M	1	Live	
3 Sep	DSB	32	55-65	*Pleurobema cordatum*	91.4				1	Live	
3 Sep	DSB	32	55-65	*Ellipsaria lineolata*					2	WD	
3 Sep	ADI	33	0-5	No mussels							
3 Sep	ADI	33	5-15	*Ligumia recta*	140.7			F	1	Live	
3 Sep	ADI	33	5-15	*Lampsilis siliquoidea*	107			F	1	Live	
3 Sep	LTB	33	15-25	*Amblema plicata*	75.8				1	Live	
3 Sep	LTB	33	15-25	*Amblema plicata*	111				1	Live	
3 Sep	LTB	33	15-25	*Amblema plicata*					1	WD	
3 Sep	LTB	33	15-25	*Ligumia recta*	132			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	133.1			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	128.7			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	141.6			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	125.1			M	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	130.4			M	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	129.3			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	128.2			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	114			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	123.3			F	1	Live	
3 Sep	LTB	33	15-25	*Megalonaias nervosa*	133.6				1	Live	
3 Sep	LTB	33	15-25	*Obliquaria reflexa*	56.2				1	Live	
3 Sep	LTB	33	15-25	*Obliquaria reflexa*	61.4				1	Live	
3 Sep	LTB	33	15-25	*Potamilus alatus*					2	WD	
3 Sep	LTB	33	15-25	*Amblema plicata*	96.2				1	Live	
3 Sep	LTB	33	15-25	*Amblema plicata*	99.8				1	Live	
3 Sep	LTB	33	15-25	*Amblema plicata*	111				1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	135.6			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	147			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	132.4			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	144.1			M	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	120			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	144.1			M	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	125.9			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	33	15-25	*Ligumia recta*	137.6			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	133.7			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	141.1			M	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	140.2			F	1	Live	
3 Sep	LTB	33	15-25	*Ligumia recta*	138			F	1	Live	
3 Sep	LTB	33	15-25	*Lampsilis cardium*	112.5			M	1	Live	
3 Sep	LTB	33	15-25	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	33	15-25	*Potamilus alatus*	110				1	Live	
3 Sep	LTB	33	15-25	*Potamilus alatus*					2	WD	
3 Sep	LTB	33	25-35	*Ligumia recta*	126.3			F	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	128.9			F	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	130.4			M	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	142.3			F	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	130			M	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	146.3			M	1	Live	
3 Sep	LTB	33	25-35	*Ellipsaria lineolata*	69				1	Live	
3 Sep	LTB	33	25-35	*Amblema plicata*	85.1				1	Live	
3 Sep	LTB	33	25-35	*Amblema plicata*	110.1				1	Live	
3 Sep	LTB	33	25-35	*Amblema plicata*	120.3				1	Live	
3 Sep	LTB	33	25-35	*Amblema plicata*					3	WD	
3 Sep	LTB	33	25-35	*Ligumia recta*	140			F	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*	141.5			F	1	Live	
3 Sep	LTB	33	25-35	*Ligumia recta*					1	WD	
3 Sep	LTB	33	25-35	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	33	25-35	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	33	35-45	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	33	35-45	*Theliderma metanevra*	64.7				1	Live	
3 Sep	LTB	33	35-45	*Ligumia recta*	128.2			F	1	Live	
3 Sep	LTB	33	35-45	*Ligumia recta*					1	WD	
3 Sep	LTB	33	35-45	*Ellipsaria lineolata*	71.5				1	Live	
3 Sep	LTB	33	35-45	*Potamilus alatus*					1	WD	
3 Sep	LTB	33	45-55	*Ellipsaria lineolata*	62.7				1	Live	
3 Sep	LTB	33	45-55	*Ellipsaria lineolata*	71.6				1	Live	
3 Sep	LTB	33	45-55	*Ellipsaria lineolata*	82				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	33	45-55	*Ellipsaria lineolata*	71.6				1	Live	
3 Sep	LTB	33	45-55	*Pleurobema cordatum*	77.6				1	Live	
3 Sep	LTB	33	45-55	*Theliderma metanevra*	80				1	Live	
3 Sep	LTB	33	45-55	*Amblema plicata*	98.9				1	Live	
3 Sep	LTB	33	45-55	*Amblema plicata*	98.7				1	Live	
3 Sep	LTB	33	45-55	*Ligumia recta*	140			F	1	Live	
3 Sep	LTB	33	45-55	*Ligumia recta*	135.5			F	1	Live	
3 Sep	LTB	33	45-55	*Ligumia recta*	105.7			M	1	Live	
3 Sep	LTB	33	45-55	*Potamilus alatus*					1	WD	
3 Sep	LTB	33	55-65	*Pleurobema cordatum*	75.3				1	Live	
3 Sep	LTB	33	55-65	*Pleurobema cordatum*	93.1				1	Live	
3 Sep	LTB	33	55-65	*Pleurobema cordatum*	93.4				1	Live	
3 Sep	LTB	33	55-65	*Pleurobema cordatum*	64.4				1	Live	
3 Sep	LTB	33	55-65	*Ligumia recta*	132.8			F	1	Live	
3 Sep	LTB	33	55-65	*Ligumia recta*	149.5			M	1	Live	
3 Sep	LTB	33	55-65	*Ligumia recta*	126.2			M	1	Live	
3 Sep	LTB	33	55-65	*Ligumia recta*	133.4			M	1	Live	
3 Sep	LTB	33	55-65	*Ligumia recta*	150+			M	1	Live	
3 Sep	LTB	33	55-65	*Theliderma metanevra*	95.2				1	Live	
3 Sep	LTB	33	55-65	*Theliderma metanevra*	85.3				1	Live	
3 Sep	LTB	33	55-65	*Theliderma metanevra*	89.7				1	Live	
3 Sep	LTB	33	55-65	*Actinonaias ligamentina*	127.9				1	Live	
3 Sep	LTB	33	55-65	*Actinonaias ligamentina*					1	WD	
3 Sep	LTB	33	55-65	*Amblema plicata*	114.2				1	Live	
3 Sep	LTB	33	55-65	*Amblema plicata*	88.2				1	Live	
3 Sep	LTB	33	55-65	*Megalonaias nervosa*	140.7				1	Live	
3 Sep	LTB	33	55-65	*Ellipsaria lineolata*	67				1	Live	
3 Sep	LTB	33	55-65	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	33	55-65	*Cyclonaias pustulosa*	51.8				1	Live	
3 Sep	ADI	34	0-5	No mussels							
3 Sep	ADI	34	5-15	*Lampsilis siliquoidea*	94.5				1	Live	
3 Sep	ADI	34	5-15	*Potamilus alatus*	116.2				1	Live	
3 Sep	LTB	34	15-25	*Ligumia recta*	141			M	1	Live	
3 Sep	LTB	34	15-25	*Ligumia recta*	128.2			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	34	15-25	*Ligumia recta*	129.4			F	1	Live	
3 Sep	LTB	34	15-25	*Ligumia recta*	130.5			F	1	Live	
3 Sep	LTB	34	15-25	*Amblema plicata*	104.2				1	Live	
3 Sep	LTB	34	15-25	*Obliquaria reflexa*	52				1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	144.3			F	1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	146.4			M	1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	131.1			F	1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	139			M	1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	132.4			F	1	Live	
3 Sep	LTB	34	25-35	*Ligumia recta*	131.5			F	1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*	104.2				1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*	86.5				1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*	75				1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*	95.4				1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*	106.1				1	Live	
3 Sep	LTB	34	25-35	*Amblema plicata*					1	WD	
3 Sep	LTB	34	35-45	*Ellipsaria lineolata*	73.1				1	Live	
3 Sep	LTB	34	35-45	*Amblema plicata*	100				1	Live	
3 Sep	LTB	34	45-55	*Lampsilis siliquoidea*	112			F	1	Live	
3 Sep	LTB	34	45-55	*Cyclonaias pustulosa*	54.2				1	Live	
3 Sep	LTB	34	45-55	*Obliquaria reflexa*	59				1	Live	
3 Sep	LTB	34	45-55	*Obliquaria reflexa*	45.5				1	Live	
3 Sep	LTB	34	45-55	*Ellipsaria lineolata*	54.2				1	Live	
3 Sep	LTB	34	45-55	*Ligumia recta*	108.1			M	1	Live	
3 Sep	LTB	34	45-55	*Ligumia recta*	128.6			M	1	Live	
3 Sep	LTB	34	45-55	*Ligumia recta*	135			F	1	Live	
3 Sep	LTB	34	45-55	*Ligumia recta*	132			F	1	Live	
3 Sep	LTB	34	45-55	*Amblema plicata*	96.5				1	Live	
3 Sep	LTB	34	45-55	*Amblema plicata*	98.1				1	Live	
3 Sep	LTB	34	45-55	*Amblema plicata*	89				1	Live	
3 Sep	LTB	34	45-55	*Theliderma metanevra*					1	WD	
3 Sep	LTB	34	45-55	*Amblema plicata*					1	WD	
3 Sep	LTB	34	55-65	*Ligumia recta*	138			F	1	Live	
3 Sep	LTB	34	55-65	*Amblema plicata*	106.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	34	55-65	*Amblema plicata*	98.2				1	Live	
3 Sep	LTB	34	55-65	*Amblema plicata*	72.1				1	Live	
3 Sep	LTB	34	55-65	*Amblema plicata*	108.8				1	Live	
3 Sep	LTB	34	55-65	*Amblema plicata*	60.2				1	Live	
3 Sep	LTB	34	55-65	*Ellipsaria lineolata*	68.1				1	Live	
3 Sep	LTB	34	55-65	*Ellipsaria lineolata*	70				1	Live	
3 Sep	LTB	34	55-65	*Ellipsaria lineolata*	83.1				1	Live	
3 Sep	LTB	34	55-65	*Ellipsaria lineolata*	69.4				1	Live	
3 Sep	LTB	34	55-65	*Pleurobema cordatum*	93.5				1	Live	
3 Sep	LTB	34	55-65	*Pleurobema cordatum*	90.7				1	Live	
3 Sep	LTB	34	55-65	*Theliderma metanevra*	74.2				1	Live	
3 Sep	LTB	34	55-65	*Obliquaria reflexa*	40.5				1	Live	
3 Sep	LTB	34	55-65	*Obliquaria reflexa*	59.7				1	Live	
3 Sep	LTB	34	55-65	*Cyclonaias pustulosa*	61.8				1	Live	
3 Sep	LTB	34	55-65	*Cyclonaias pustulosa*	63.1				1	Live	
3 Sep	LTB	34	55-65	*Cyclonaias pustulosa*	54.2				1	Live	
3 Sep	LTB	34	55-65	*Lampsilis cardium*	130			M	1	Live	
3 Sep	LTB	34	55-65	*Potamilus alatus*					1	WD	
3 Sep	LTB	34	55-65	*Amblema plicata*					1	WD	
3 Sep	LTB	34	55-65	*Actinonaias ligamentina*	116.8				1	Live	
3 Sep	ADI	35	0-5	No mussels							
3 Sep	ADI	35	5-15	No mussels							
3 Sep	LTB	35	15-25	*Lampsilis siliquoidea*	83.5			M	1	Live	
3 Sep	LTB	35	15-25	*Ligumia recta*	140.2			F	1	Live	
3 Sep	LTB	35	15-25	*Ligumia recta*	84.5			M	1	Live	
3 Sep	LTB	35	15-25	*Ligumia recta*	140.2			M	1	Live	
3 Sep	LTB	35	15-25	*Ligumia recta*	139			M	1	Live	
3 Sep	LTB	35	15-25	*Megalonaias nervosa*	147				1	Live	
3 Sep	LTB	35	15-25	*Ellipsaria lineolata*	70				1	Live	
3 Sep	LTB	35	15-25	*Ellipsaria lineolata*	53.8				1	Live	
3 Sep	LTB	35	15-25	*Ellipsaria lineolata*	60.2				1	Live	
3 Sep	LTB	35	15-25	*Ellipsaria lineolata*	92.4				1	Live	
3 Sep	LTB	35	15-25	*Lampsilis cardium*	115.3				1	Live	
3 Sep	LTB	35	25-35	*Ellipsaria lineolata*	88.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	35	25-35	*Ellipsaria lineolata*	94				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*	106.8				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*	90.2				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*	100.5				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*	91.5				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*	99				1	Live	
3 Sep	LTB	35	25-35	*Ligumia recta*	118.1			F	1	Live	
3 Sep	LTB	35	25-35	*Ligumia recta*	149.1			M	1	Live	
3 Sep	LTB	35	25-35	*Ligumia recta*	130			M	1	Live	
3 Sep	LTB	35	25-35	*Ligumia recta*	137.2			F	1	Live	
3 Sep	LTB	35	25-35	*Ligumia recta*	129.1			F	1	Live	
3 Sep	LTB	35	25-35	*Potamilus alatus*	103.9				1	Live	
3 Sep	LTB	35	25-35	*Amblema plicata*					5	WD	
3 Sep	LTB	35	25-35	*Plethobasus cyphyus**	105.3	48.5	69.3		1	Live	1861 Yellow
3 Sep	LTB	35	35-45	*Amblema plicata*	108.1				1	Live	
3 Sep	LTB	35	35-45	*Amblema plicata*	107.5				1	Live	
3 Sep	LTB	35	35-45	*Pleurobema cordatum*	86.7				1	Live	
3 Sep	LTB	35	35-45	*Pleurobema cordatum*	67				1	Live	
3 Sep	LTB	35	35-45	*Pleurobema sintoxia*	89.2				1	Live	
3 Sep	LTB	35	35-45	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	35	35-45	*Amblema plicata*					2	WD	
3 Sep	LTB	35	45-55	*Theliderma metanevra*	84.2				1	Live	
3 Sep	LTB	35	45-55	*Actinonaias ligamentina*	107				1	Live	
3 Sep	LTB	35	45-55	*Lampsilis cardium*	104.1			F	1	Live	
3 Sep	LTB	35	45-55	*Quadrula quadrula*	53.8				1	Live	
3 Sep	LTB	35	45-55	*Cyclonaias pustulosa*	60.1				1	Live	
3 Sep	LTB	35	45-55	*Cyclonaias pustulosa*	53.5				1	Live	
3 Sep	LTB	35	45-55	*Cyclonaias pustulosa*	61.8				1	Live	
3 Sep	LTB	35	45-55	*Ligumia recta*	125			M	1	Live	
3 Sep	LTB	35	55-65	*Potamilus alatus*	103.1				1	Live	
3 Sep	LTB	35	55-65	*Potamilus alatus*	82.3				1	Live	
3 Sep	LTB	35	55-65	*Pleurobema cordatum*	93.7				1	Live	
3 Sep	LTB	35	55-65	*Pleurobema cordatum*	90.2				1	Live	
3 Sep	LTB	35	55-65	*Pleurobema cordatum*	83				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	35	55-65	*Pleurobema sintoxia*	91.2				1	Live	
3 Sep	LTB	35	55-65	*Pleurobema sintoxia*	99.5				1	Live	
3 Sep	LTB	35	55-65	*Pleurobema sintoxia*	88.6				1	Live	
3 Sep	LTB	35	55-65	*Ellipsaria lineolata*	87.8				1	Live	
3 Sep	LTB	35	55-65	*Ellipsaria lineolata*	77.1				1	Live	
3 Sep	LTB	35	55-65	*Ligumia recta*	135.1			M	1	Live	
3 Sep	LTB	35	55-65	*Amblema plicata*	113.8				1	Live	
3 Sep	LTB	35	55-65	*Amblema plicata*	97.2				1	Live	
3 Sep	LTB	35	55-65	*Theliderma metanevra*	83.2				1	Live	
3 Sep	LTB	35	55-65	*Theliderma metanevra*	85				1	Live	
3 Sep	LTB	35	55-65	*Cyclonaias pustulosa*					1	WD	
3 Sep	LTB	35	55-65	*Amblema plicata*					1	WD	
3 Sep	IB	36	0-5	No mussels							
3 Sep	IB	36	5-15	*Potamilus alatus*	118.2				1	Live	
3 Sep	LTB	36	15-25	*Amblema plicata*	99.1				1	Live	
3 Sep	LTB	36	15-25	*Amblema plicata*	107				1	Live	
3 Sep	LTB	36	15-25	*Amblema plicata*	99.5				1	Live	
3 Sep	LTB	36	15-25	*Ellipsaria lineolata*	74				1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	130.5			M	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	123.1			F	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	137.7			F	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	122.5			F	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	139			M	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	110			M	1	Live	
3 Sep	LTB	36	15-25	*Ligumia recta*	141.2			M	1	Live	
3 Sep	LTB	36	15-25	*Lampsilis siliquoidea*	99			F	1	Live	
3 Sep	LTB	36	15-25	*Amblema plicata*					2	WD	
3 Sep	LTB	36	25-35	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	36	25-35	*Cyclonaias pustulosa*	64.2				1	Live	
3 Sep	LTB	36	25-35	*Ligumia recta*	149.1			M	1	Live	
3 Sep	LTB	36	25-35	*Ligumia recta*	138			F	1	Live	
3 Sep	LTB	36	25-35	*Ligumia recta*	128.7			F	1	Live	
3 Sep	LTB	36	25-35	*Amblema plicata*	113.8				1	Live	
3 Sep	LTB	36	25-35	*Amblema plicata*	99.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	36	25-35	*Amblema plicata*	83.1				1	Live	
3 Sep	LTB	36	25-35	*Ellipsaria lineolata*	73.8				1	Live	
3 Sep	LTB	36	25-35	*Plethobasus cyphyus**	116.9	44.2	74.8		1	Live	1104 Yellow
3 Sep	LTB	36	25-35	*Amblema plicata*					1	WD	
3 Sep	LTB	36	35-45	*Lampsilis siliquoidea*	103.5				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	87.2				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	103				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	100.5				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	102.1				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	106				1	Live	
3 Sep	LTB	36	35-45	*Amblema plicata*	95.5				1	Live	
3 Sep	LTB	36	35-45	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	36	35-45	*Ellipsaria lineolata*	88				1	Live	
3 Sep	LTB	36	35-45	*Potamilus alatus*	108.2				1	Live	
3 Sep	LTB	36	35-45	*Potamilus alatus*	112.4				1	Live	
3 Sep	LTB	36	35-45	*Ligumia recta*	137			M	1	Live	
3 Sep	LTB	36	35-45	*Ligumia recta*	139			M	1	Live	
3 Sep	LTB	36	35-45	*Ligumia recta*	140.1			M	1	Live	
3 Sep	LTB	36	35-45	*Ligumia recta*	150+			F	1	Live	
3 Sep	LTB	36	35-45	*Ligumia recta*	143.8			M	1	Live	
3 Sep	LTB	36	35-45	*Cyclonaias pustulosa*	55				1	Live	
3 Sep	LTB	36	35-45	*Actinonaias ligamentina*	118.4				1	Live	
3 Sep	LTB	36	35-45	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	36	35-45	*Amblema plicata*					3	WD	
3 Sep	LTB	36	45-55	*Plethobasus cyphyus**	113.8	47.1	79.5		1	Live	1928 Yellow
3 Sep	LTB	36	45-55	*Pleurobema cordatum*	85.5				1	Live	
3 Sep	LTB	36	45-55	*Pleurobema cordatum*	90.2				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	102.1				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	104.3				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	108				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	102.1				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	101.8				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	118.2				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	94.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	36	45-55	*Amblema plicata*	95				1	Live	
3 Sep	LTB	36	45-55	*Amblema plicata*	77				1	Live	
3 Sep	LTB	36	45-55	*Actinonaias ligamentina*	120				1	Live	
3 Sep	LTB	36	45-55	*Pleurobema sintoxia*	88.5				1	Live	
3 Sep	LTB	36	45-55	*Cyclonaias pustulosa*	55.7				1	Live	
3 Sep	LTB	36	45-55	*Cyclonaias pustulosa*	55				1	Live	
3 Sep	LTB	36	45-55	*Cyclonaias pustulosa*	60.2				1	Live	
3 Sep	LTB	36	45-55	*Cyclonaias pustulosa*	58				1	Live	
3 Sep	LTB	36	45-55	*Ligumia recta*	129			M	1	Live	
3 Sep	LTB	36	45-55	*Ligumia recta*	131.2			F	1	Live	
3 Sep	LTB	36	55-65	*Ellipsaria lineolata*	84.1				1	Live	
3 Sep	LTB	36	55-65	*Ellipsaria lineolata*	90.5				1	Live	
3 Sep	LTB	36	55-65	*Ellipsaria lineolata*	77.2				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	110				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	107.4				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	98.2				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	85				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	107.2				1	Live	
3 Sep	LTB	36	55-65	*Amblema plicata*	86				1	Live	
3 Sep	LTB	36	55-65	*Theliderma metanevra*	82				1	Live	
3 Sep	LTB	36	55-65	*Theliderma metanevra*	69.5				1	Live	
3 Sep	LTB	36	55-65	*Theliderma metanevra*	77.1				1	Live	
3 Sep	LTB	36	55-65	*Theliderma metanevra*	79.5				1	Live	
3 Sep	LTB	36	55-65	*Theliderma metanevra*	81.2				1	Live	
3 Sep	LTB	36	55-65	*Lampsilis cardium*	118.5			M	1	Live	
3 Sep	LTB	36	55-65	*Lampsilis cardium*	115			M	1	Live	
3 Sep	LTB	36	55-65	*Pleurobema sintoxia*	95.5				1	Live	
3 Sep	LTB	36	55-65	*Cyclonaias pustulosa*					1	WD	
3 Sep	LTB	36	55-65	*Plethobasus cyphyus**					1	WD	
3 Sep	IB	37	0-5	No mussels							
3 Sep	IB	37	5-15	*Cyclonaias pustulosa*	66.5				1	Live	
3 Sep	IB	37	5-15	*Amblema plicata*	69				1	Live	
3 Sep	IB	37	5-15	*Ligumia recta*					1	WD	
3 Sep	LTB	37	15-25	*Amblema plicata*	96.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	37	15-25	*Amblema plicata*	109.2				1	Live	
3 Sep	LTB	37	15-25	*Amblema plicata*	108				1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	150+			M	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	150+			F	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	140			M	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	129.1			F	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	138			F	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	137.1			F	1	Live	
3 Sep	LTB	37	15-25	*Ligumia recta*	141.1			M	1	Live	
3 Sep	LTB	37	15-25	*Obliquaria reflexa*	53.5				1	Live	
3 Sep	LTB	37	15-25	*Obliquaria reflexa*	60				1	Live	
3 Sep	LTB	37	15-25	*Lampsilis cardium*	113.9			M	1	Live	
3 Sep	LTB	37	15-25	*Actinonaias ligamentina*	119.2				1	Live	
3 Sep	LTB	37	15-25	*Ellipsaria lineolata*	87.5				1	Live	
3 Sep	LTB	37	25-35	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	37	25-35	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	37	25-35	*Megalonaias nervosa*	145.2				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	95.2				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	98.5				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	96.1				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	96				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	98.8				1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*	65				1	Live	
3 Sep	LTB	37	25-35	*Potamilus alatus*	114				1	Live	
3 Sep	LTB	37	25-35	*Ellipsaria lineolata*	95.5				1	Live	
3 Sep	LTB	37	25-35	*Ellipsaria lineolata*	67.2				1	Live	
3 Sep	LTB	37	25-35	*Ellipsaria lineolata*	73				1	Live	
3 Sep	LTB	37	25-35	*Ligumia recta*	138.1			F	1	Live	
3 Sep	LTB	37	25-35	*Ligumia recta*	145.5			F	1	Live	
3 Sep	LTB	37	25-35	*Ligumia recta*	142.5			M	1	Live	
3 Sep	LTB	37	25-35	*Ligumia recta*	128			F	1	Live	
3 Sep	LTB	37	25-35	*Amblema plicata*					2	WD	
3 Sep	LTB	37	25-35	*Obliquaria reflexa*					1	WD	
3 Sep	LTB	37	35-45	*Megalonaias nervosa*	150+				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	37	35-45	*Ligumia recta*	127.3			M	1	Live	
3 Sep	LTB	37	35-45	*Ligumia recta*	140.4			M	1	Live	
3 Sep	LTB	37	35-45	*Ligumia recta*	143.1			M	1	Live	
3 Sep	LTB	37	35-45	*Pleurobema cordatum*	75.3				1	Live	
3 Sep	LTB	37	35-45	*Potamilus alatus*	72.5				1	Live	
3 Sep	LTB	37	35-45	*Potamilus alatus*	85.2				1	Live	
3 Sep	LTB	37	35-45	*Potamilus alatus*	105				1	Live	
3 Sep	LTB	37	35-45	*Potamilus alatus*	106				1	Live	
3 Sep	LTB	37	35-45	*Actinonaias ligamentina*	110				1	Live	
3 Sep	LTB	37	35-45	*Theliderma metanevra*	72.1				1	Live	
3 Sep	LTB	37	35-45	*Ellipsaria lineolata*	75				1	Live	
3 Sep	LTB	37	35-45	*Ellipsaria lineolata*	84.5				1	Live	
3 Sep	LTB	37	35-45	*Ellipsaria lineolata*	73.6				1	Live	
3 Sep	LTB	37	35-45	*Amblema plicata*	95.2				1	Live	
3 Sep	LTB	37	35-45	*Amblema plicata*	79.8				1	Live	
3 Sep	LTB	37	35-45	*Amblema plicata*	68.4				1	Live	
3 Sep	LTB	37	35-45	*Amblema plicata*	113				1	Live	
3 Sep	LTB	37	35-45	*Amblema plicata*	100.5				1	Live	
3 Sep	LTB	37	35-45	*Lampsilis cardium*	109			M	1	Live	
3 Sep	LTB	37	35-45	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	37	35-45	*Megalonaias nervosa*					1	WD	
3 Sep	LTB	37	35-45	*Amblema plicata*					1	WD	
3 Sep	LTB	37	45-55	*Actinonaias ligamentina*	100				1	Live	
3 Sep	LTB	37	45-55	*Ellipsaria lineolata*	84.2				1	Live	
3 Sep	LTB	37	45-55	*Ellipsaria lineolata*	63				1	Live	
3 Sep	LTB	37	45-55	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	37	45-55	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	37	45-55	*Potamilus alatus*	108.4				1	Live	
3 Sep	LTB	37	45-55	*Cyclonaias pustulosa*	49.5				1	Live	
3 Sep	LTB	37	45-55	*Cyclonaias pustulosa*	69.2				1	Live	
3 Sep	LTB	37	45-55	*Cyclonaias pustulosa*	63				1	Live	
3 Sep	LTB	37	45-55	*Cyclonaias pustulosa*	48.1				1	Live	
3 Sep	LTB	37	45-55	*Theliderma metanevra*	75.6				1	Live	
3 Sep	LTB	37	45-55	*Amblema plicata*	88.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	37	45-55	*Amblema plicata*	77.5				1	Live	
3 Sep	LTB	37	45-55	*Amblema plicata*	99.5				1	Live	
3 Sep	LTB	37	45-55	*Pleurobema sintoxia*	93.8				1	Live	
3 Sep	LTB	37	45-55	*Ligumia recta*	142.2			M	1	Live	
3 Sep	LTB	37	45-55	*Ligumia recta*	128.1			F	1	Live	
3 Sep	LTB	37	45-55	*Megalonaias nervosa*					1	WD	
3 Sep	LTB	37	45-55	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	37	45-55	*Amblema plicata*					1	WD	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	89.1				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	80				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	88.2				1	Live	
3 Sep	LTB	37	55-65	*Cyclonaias pustulosa*	53.1				1	Live	
3 Sep	LTB	37	55-65	*Cyclonaias pustulosa*	57.2				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	76				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	77.5				1	Live	
3 Sep	LTB	37	55-65	*Amblema plicata*	87.5				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema sintoxia*	99.8				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema cordatum*	89.2				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema cordatum*	82.5				1	Live	
3 Sep	LTB	37	55-65	*Actinonaias ligamentina*	133.8				1	Live	
3 Sep	LTB	37	55-65	*Actinonaias ligamentina*	122				1	Live	
3 Sep	LTB	37	55-65	*Ligumia recta*	148.1			M	1	Live	
3 Sep	LTB	37	55-65	*Amblema plicata*					1	WD	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*					1	WD	
3 Sep	LTB	37	55-65	*Potamilus alatus*	122				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	88.4				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	94.6				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	89				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	84.2				1	Live	
3 Sep	LTB	37	55-65	*Ellipsaria lineolata*	62				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	77.5				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	78.1				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	80.5				1	Live	
3 Sep	LTB	37	55-65	*Theliderma metanevra*	76.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
3 Sep	LTB	37	55-65	*Actinonaias ligamentina*	129.1				1	Live	
3 Sep	LTB	37	55-65	*Actinonaias ligamentina*	103				1	Live	
3 Sep	LTB	37	55-65	*Actinonaias ligamentina*	118.4				1	Live	
3 Sep	LTB	37	55-65	*Ligumia recta*	132			M	1	Live	
3 Sep	LTB	37	55-65	*Pleurobema cordatum*	96				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema cordatum*	90.2				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema sintoxia*	101.1				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema sintoxia*	94.8				1	Live	
3 Sep	LTB	37	55-65	*Pleurobema sintoxia*	90.6				1	Live	
3 Sep	LTB	37	55-65	*Megalonaias nervosa*	150+				1	Live	
3 Sep	LTB	37	55-65	*Potamilus alatus*					1	WD	
4 Sep	IB	38	0-5	No mussels							
4 Sep	IB	38	5-15	*Ligumia recta*	144.7			M	1	Live	
4 Sep	IB	38	5-15	*Ligumia recta*	148.3			F	1	Live	
4 Sep	IB	38	5-15	*Obliquaria reflexa*	21				1	Live	
4 Sep	LTB	38	15-25	*Ligumia recta*	148.8			F	1	Live	
4 Sep	LTB	38	15-25	*Ligumia recta*	150+			F	1	Live	
4 Sep	LTB	38	15-25	*Ligumia recta*	133.7			F	1	Live	
4 Sep	LTB	38	15-25	*Ligumia recta*	144.5			F	1	Live	
4 Sep	LTB	38	15-25	*Ligumia recta*	119.7			M	1	Live	
4 Sep	LTB	38	15-25	*Ellipsaria lineolata*	95.7				1	Live	
4 Sep	LTB	38	15-25	*Ellipsaria lineolata*	65.4				1	Live	
4 Sep	LTB	38	15-25	*Cyclonaias pustulosa*	60.1				1	Live	
4 Sep	LTB	38	15-25	*Potamilus alatus*	95.8				1	Live	
4 Sep	LTB	38	15-25	*Amblema plicata*	104.7				1	Live	
4 Sep	LTB	38	15-25	*Obliquaria reflexa*	62.3				1	Live	
4 Sep	LTB	38	25-35	*Ellipsaria lineolata*	75.3				1	Live	
4 Sep	LTB	38	25-35	*Ligumia recta*	133.1			F	1	Live	
4 Sep	LTB	38	25-35	*Ligumia recta*	134.2			F	1	Live	
4 Sep	LTB	38	25-35	*Ligumia recta*	139.5			F	1	Live	
4 Sep	LTB	38	25-35	*Ligumia recta*	145.8			M	1	Live	
4 Sep	LTB	38	25-35	*Megalonaias nervosa*	144.8				1	Live	
4 Sep	LTB	38	25-35	*Megalonaias nervosa*					1	WD	
4 Sep	LTB	38	25-35	*Cyclonaias pustulosa*	49.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	38	25-35	*Amblema plicata*	78.6				1	Live	
4 Sep	LTB	38	25-35	*Amblema plicata*	89.4				1	Live	
4 Sep	LTB	38	25-35	*Potamilus alatus*	86.5				1	Live	
4 Sep	LTB	38	35-45	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	38	35-45	*Megalonaias nervosa*	147.4				1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	139.9			M	1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	150			M	1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	144.3			M	1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	135.6			M	1	Live	
4 Sep	LTB	38	35-45	*Ligumia recta*	142.3			F	1	Live	
4 Sep	LTB	38	35-45	*Ellipsaria lineolata*	92.5				1	Live	
4 Sep	LTB	38	35-45	*Ellipsaria lineolata*	68.4				1	Live	
4 Sep	LTB	38	35-45	*Ellipsaria lineolata*	69.7				1	Live	
4 Sep	LTB	38	35-45	*Ellipsaria lineolata*	80.2				1	Live	
4 Sep	LTB	38	35-45	*Actinonaias ligamentina*	104.4				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*	112.7				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*	113.2				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*	94.8				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*	100.2				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*	84.6				1	Live	
4 Sep	LTB	38	35-45	*Amblema plicata*					1	WD	
4 Sep	LTB	38	35-45	*Lampsilis cardium*	101.1			F	1	Live	
4 Sep	LTB	38	35-45	*Pleurobema cordatum*	81.2				1	Live	
4 Sep	LTB	38	35-45	*Theliderma metanevra*	68.2				1	Live	
4 Sep	LTB	38	35-45	*Obliquaria reflexa*	62.9				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	106.5				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	113.9				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	94.7				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	96.4				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	102.5				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	100				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	89.9				1	Live	
4 Sep	LTB	38	45-55	*Amblema plicata*	110.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	38	45-55	*Amblema plicata*					2	WD	
4 Sep	LTB	38	45-55	*Actinonaias ligamentina*	113.7				1	Live	
4 Sep	LTB	38	45-55	*Actinonaias ligamentina*	127.6				1	Live	
4 Sep	LTB	38	45-55	*Ellipsaria lineolata*	77.8				1	Live	
4 Sep	LTB	38	45-55	*Quadrula quadrula*	69.9				1	Live	
4 Sep	LTB	38	45-55	*Quadrula quadrula*	60.4				1	Live	
4 Sep	LTB	38	45-55	*Theliderma metanevra*	75.8				1	Live	
4 Sep	LTB	38	45-55	*Theliderma metanevra*	90.1				1	Live	
4 Sep	LTB	38	45-55	*Ligumia recta*	138.4			M	1	Live	
4 Sep	LTB	38	45-55	*Ligumia recta*	149.5			M	1	Live	
4 Sep	LTB	38	45-55	*Potamilus alatus*	102.4				1	Live	
4 Sep	LTB	38	45-55	*Potamilus alatus*	92.2				1	Live	
4 Sep	LTB	38	45-55	*Potamilus alatus*					1	WD	
4 Sep	LTB	38	55-65	*Amblema plicata*	120.2				1	Live	
4 Sep	LTB	38	55-65	*Amblema plicata*	77.8				1	Live	
4 Sep	LTB	38	55-65	*Amblema plicata*	100.1				1	Live	
4 Sep	LTB	38	55-65	*Amblema plicata*	75.8				1	Live	
4 Sep	LTB	38	55-65	*Amblema plicata*					1	WD	
4 Sep	LTB	38	55-65	*Ellipsaria lineolata*	93.2				1	Live	
4 Sep	LTB	38	55-65	*Ellipsaria lineolata*	53.4				1	Live	
4 Sep	LTB	38	55-65	*Ellipsaria lineolata*	88.4				1	Live	
4 Sep	LTB	38	55-65	*Pleurobema cordatum*	92.6				1	Live	
4 Sep	LTB	38	55-65	*Pleurobema cordatum*	90.7				1	Live	
4 Sep	LTB	38	55-65	*Pleurobema cordatum*	88.8				1	Live	
4 Sep	LTB	38	55-65	*Pleurobema sintoxia*	80.1				1	Live	
4 Sep	LTB	38	55-65	*Lampsilis cardium*	113.3			F	1	Live	
4 Sep	LTB	38	55-65	*Ligumia recta*	135.9			F	1	Live	
4 Sep	LTB	38	55-65	*Obliquaria reflexa*	60.6				1	Live	
4 Sep	LTB	38	55-65	*Theliderma metanevra*	76.9				1	Live	
4 Sep	LTB	38	55-65	*Theliderma metanevra*	82.4				1	Live	
4 Sep	LTB	38	55-65	*Theliderma metanevra*	84.1				1	Live	
4 Sep	LTB	38	55-65	*Theliderma metanevra*	70.1				1	Live	
4 Sep	LTB	38	55-65	*Cyclonaias pustulosa*	63.1				1	Live	
4 Sep	LTB	38	55-65	*Cyclonaias pustulosa*	48.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	38	55-65	*Cyclonaias pustulosa*	66.7				1	Live	
4 Sep	LTB	38	55-65	*Cyclonaias pustulosa*	60				1	Live	
4 Sep	LTB	38	55-65	*Potamilus alatus*					1	WD	
4 Sep	IB	39	0-5	No mussels							
4 Sep	IB	39	5-15	*Ligumia recta*	140.2			M	1	Live	
4 Sep	IB	39	5-15	*Ligumia recta*	129.7			F	1	Live	
4 Sep	IB	39	5-15	*Potamilus alatus*					2	WD	
4 Sep	LTB	39	15-25	*Ligumia recta*	130			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	145.2			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	125.4			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	133.9			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	146.7			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	129.2			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	118.8			F	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	141.1			M	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	140			M	1	Live	
4 Sep	LTB	39	15-25	*Ligumia recta*	113.2			M	1	Live	
4 Sep	LTB	39	15-25	*Amblema plicata*	105.4				1	Live	
4 Sep	LTB	39	15-25	*Amblema plicata*	98.8				1	Live	
4 Sep	LTB	39	15-25	*Ellipsaria lineolata*	72.4				1	Live	
4 Sep	LTB	39	15-25	*Ellipsaria lineolata*	61				1	Live	
4 Sep	LTB	39	15-25	*Cyclonaias pustulosa*	55.7				1	Live	
4 Sep	LTB	39	15-25	*Cyclonaias pustulosa*	54.1				1	Live	
4 Sep	LTB	39	15-25	*Lampsilis cardium*	102.2			M	1	Live	
4 Sep	LTB	39	15-25	*Potamilus alatus*	108.1				1	Live	
4 Sep	LTB	39	15-25	*Potamilus alatus*					1	WD	
4 Sep	LTB	39	25-35	*Ligumia recta*	146.8			M	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	140.1			M	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	145.5			M	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	141.6			M	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	124.5			M	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	144.5			F	1	Live	
4 Sep	LTB	39	25-35	*Ligumia recta*	138.2			F	1	Live	
4 Sep	LTB	39	25-35	*Amblema plicata*	120.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	39	25-35	*Amblema plicata*	115.5				1	Live	
4 Sep	LTB	39	25-35	*Amblema plicata*	92.4				1	Live	
4 Sep	LTB	39	25-35	*Amblema plicata*	82.7				1	Live	
4 Sep	LTB	39	25-35	*Amblema plicata*	105.5				1	Live	
4 Sep	LTB	39	25-35	*Amblema plicata*	81.3				1	Live	
4 Sep	LTB	39	25-35	*Ellipsaria lineolata*	76.6				1	Live	
4 Sep	LTB	39	25-35	*Ellipsaria lineolata*	57.1				1	Live	
4 Sep	LTB	39	35-45	*Actinonaias ligamentina*	104.4				1	Live	
4 Sep	LTB	39	35-45	*Lampsilis cardium*	130.1			M	1	Live	
4 Sep	LTB	39	35-45	*Theliderma metanevra*	85.7				1	Live	
4 Sep	LTB	39	35-45	*Amblema plicata*	95.3				1	Live	
4 Sep	LTB	39	35-45	*Amblema plicata*					1	WD	
4 Sep	LTB	39	35-45	*Ligumia recta*	113.8			F	1	Live	
4 Sep	LTB	39	35-45	*Ellipsaria lineolata*	73.4				1	Live	
4 Sep	LTB	39	35-45	*Potamilus fragilis*					1	WD	
4 Sep	LTB	39	45-55	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	39	45-55	*Amblema plicata*	118.3				1	Live	
4 Sep	LTB	39	45-55	*Theliderma metanevra*	65.3				1	Live	
4 Sep	LTB	39	45-55	*Lampsilis cardium*	103.9			F	1	Live	
4 Sep	LTB	39	45-55	*Ligumia recta*	115.2			F	1	Live	
4 Sep	LTB	39	45-55	*Ligumia recta*	135.7			F	1	Live	
4 Sep	LTB	39	45-55	*Ligumia recta*	120.1			M	1	Live	
4 Sep	LTB	39	45-55	*Ligumia recta*	121.3			M	1	Live	
4 Sep	LTB	39	45-55	*Pleurobema sintoxia*	85.6				1	Live	
4 Sep	LTB	39	45-55	*Pleurobema sintoxia*	98.4				1	Live	
4 Sep	LTB	39	45-55	*Ellipsaria lineolata*	84.8				1	Live	
4 Sep	LTB	39	45-55	*Ellipsaria lineolata*	92.1				1	Live	
4 Sep	LTB	39	45-55	*Actinonaias ligamentina*	106.1				1	Live	
4 Sep	LTB	39	45-55	*Actinonaias ligamentina*	105.7				1	Live	
4 Sep	LTB	39	45-55	*Actinonaias ligamentina*	108.5				1	Live	
4 Sep	LTB	39	55-65	*Ellipsaria lineolata*	92.6				1	Live	
4 Sep	LTB	39	55-65	*Ellipsaria lineolata*	80.1				1	Live	
4 Sep	LTB	39	55-65	*Ellipsaria lineolata*	83.4				1	Live	
4 Sep	LTB	39	55-65	*Ellipsaria lineolata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	39	55-65	*Plethobasus cyphyus**	81.9	36	62.3		1	Live	0737 Yellow
4 Sep	LTB	39	55-65	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	39	55-65	*Lampsilis cardium*	103.8				1	Live	
4 Sep	LTB	39	55-65	*Potamilus fragilis*					1	WD	
4 Sep	LTB	39	55-65	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	39	55-65	*Ligumia recta*	120.7			F	1	Live	
4 Sep	LTB	39	55-65	*Amblema plicata*	95.8				1	Live	
4 Sep	LTB	39	55-65	*Amblema plicata*	102.3				1	Live	
4 Sep	LTB	39	55-65	*Amblema plicata*	109.5				1	Live	
4 Sep	LTB	39	55-65	*Theliderma metanevra*	71.9				1	Live	
4 Sep	LTB	39	55-65	*Theliderma metanevra*	65.1				1	Live	
4 Sep	LTB	39	55-65	*Cyclonaias pustulosa*	58.4				1	Live	
4 Sep	LTB	39	55-65	*Cyclonaias pustulosa*	65.3				1	Live	
4 Sep	LTB	39	55-65	*Pleurobema cordatum*	93.2				1	Live	
4 Sep	LTB	39	55-65	*Pleurobema cordatum*	81.1				1	Live	
4 Sep	LTB	39	55-65	*Pleurobema cordatum*	89.8				1	Live	
4 Sep	LTB	39	55-65	*Pleurobema sintoxia*	67.5				1	Live	
4 Sep	LTB	39	55-65	*Obliquaria reflexa*	49.2				1	Live	
4 Sep	IB	40	0-5	No mussels							
4 Sep	IB	40	5-15	*Actinonaias ligamentina*	114.5				1	Live	
4 Sep	IB	40	5-15	*Amblema plicata*	82.5				1	Live	
4 Sep	IB	40	5-15	*Amblema plicata*	104.7				1	Live	
4 Sep	IB	40	5-15	*Amblema plicata*	70.1				1	Live	
4 Sep	IB	40	5-15	*Amblema plicata*	76.7				1	Live	
4 Sep	IB	40	5-15	*Fusconaia flava*	59.7				1	Live	
4 Sep	IB	40	5-15	*Lampsilis cardium*	100.5				1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	130.1			M	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	145.2			M	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	150+			M	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	122.3			M	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	145			M	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*				M	1	WD	
4 Sep	IB	40	5-15	*Ligumia recta*	124.3			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	138.9			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	IB	40	5-15	*Ligumia recta*	128.2			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	143.9			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	128.7			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	144.3			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	135.9			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	130.6			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	150+			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	131.2			F	1	Live	
4 Sep	IB	40	5-15	*Ligumia recta*	110.3			F	1	Live	
4 Sep	IB	40	5-15	*Potamilus alatus*	124.5				1	Live	
4 Sep	IB	40	5-15	*Potamilus alatus*	110.4				1	Live	
4 Sep	LTB	40	15-25	*Potamilus alatus*	118.5				1	Live	
4 Sep	LTB	40	15-25	*Potamilus alatus*	114.1				1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	115.4			F	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	122.2			F	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	145.4			F	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	140			F	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	135.6			M	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	130.9			M	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	149.1			M	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	133			M	1	Live	
4 Sep	LTB	40	15-25	*Ligumia recta*	131.7			M	1	Live	
4 Sep	LTB	40	15-25	*Ellipsaria lineolata*	67.2				1	Live	
4 Sep	LTB	40	15-25	*Ellipsaria lineolata*	69.3				1	Live	
4 Sep	LTB	40	25-35	*Lampsilis cardium*	133.9			M	1	Live	
4 Sep	LTB	40	25-35	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	40	25-35	*Ligumia recta*	133.4			F	1	Live	
4 Sep	LTB	40	25-35	*Ligumia recta*	131.8			F	1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*	120.2				1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*	104.7				1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*	103.9				1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*	100.1				1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*	91				1	Live	
4 Sep	LTB	40	25-35	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	40	25-35	*Ellipsaria lineolata*	74.5				1	Live	
4 Sep	LTB	40	25-35	*Ellipsaria lineolata*	83.1				1	Live	
4 Sep	LTB	40	25-35	*Pleurobema cordatum*	82.2				1	Live	
4 Sep	LTB	40	25-35	*Quadrula quadrula*	56.1				1	Live	
4 Sep	LTB	40	35-45	*Ligumia recta*	121.1			M	1	Live	
4 Sep	LTB	40	35-45	*Ligumia recta*	125.5			F	1	Live	
4 Sep	LTB	40	35-45	*Potamilus alatus*	109.8				1	Live	
4 Sep	LTB	40	35-45	*Potamilus alatus*	112.3				1	Live	
4 Sep	LTB	40	35-45	*Potamilus alatus*	92.3				1	Live	
4 Sep	LTB	40	35-45	*Amblema plicata*	113.1				1	Live	
4 Sep	LTB	40	35-45	*Amblema plicata*	100				1	Live	
4 Sep	LTB	40	35-45	*Ellipsaria lineolata*	90.1				1	Live	
4 Sep	LTB	40	35-45	*Ellipsaria lineolata*	60.6				1	Live	
4 Sep	LTB	40	35-45	*Ellipsaria lineolata*	88.4				1	Live	
4 Sep	LTB	40	35-45	*Lampsilis cardium*	111.1			M	1	Live	
4 Sep	LTB	40	35-45	*Lampsilis cardium*	123.4			M	1	Live	
4 Sep	LTB	40	35-45	*Lampsilis cardium*	113.4			F	1	Live	
4 Sep	LTB	40	45-55	*Ligumia recta*	141.2			M	1	Live	
4 Sep	LTB	40	45-55	*Amblema plicata*	106.3				1	Live	
4 Sep	LTB	40	45-55	*Amblema plicata*	98.4				1	Live	
4 Sep	LTB	40	45-55	*Amblema plicata*					2	WD	
4 Sep	LTB	40	45-55	*Ligumia recta*	122.4			F	1	Live	
4 Sep	LTB	40	45-55	*Ellipsaria lineolata*	91.7				1	Live	
4 Sep	LTB	40	45-55	*Ellipsaria lineolata*	77.6				1	Live	
4 Sep	LTB	40	45-55	*Obliquaria reflexa*	54.9				1	Live	
4 Sep	LTB	40	45-55	*Quadrula quadrula*	63.6				1	Live	
4 Sep	LTB	40	45-55	*Theliderma metanevra*	78.7				1	Live	
4 Sep	LTB	40	45-55	*Actinonaias ligamentina*	89.2				1	Live	
4 Sep	LTB	40	55-65	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	40	55-65	*Ligumia recta*	140.4			M	1	Live	
4 Sep	LTB	40	55-65	*Ligumia recta*	133.9			F	1	Live	
4 Sep	LTB	40	55-65	*Potamilus alatus*	85.7				1	Live	
4 Sep	LTB	40	55-65	*Theliderma metanevra*	72.5				1	Live	
4 Sep	LTB	40	55-65	*Theliderma metanevra*	82.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	40	55-65	*Theliderma metanevra*	86.2				1	Live	
4 Sep	LTB	40	55-65	*Theliderma metanevra*	82.9				1	Live	
4 Sep	LTB	40	55-65	*Ellipsaria lineolata*	90.3				1	Live	
4 Sep	LTB	40	55-65	*Ellipsaria lineolata*	78.1				1	Live	
4 Sep	LTB	40	55-65	*Ellipsaria lineolata*	93.4				1	Live	
4 Sep	LTB	40	55-65	*Ellipsaria lineolata*	84.6				1	Live	
4 Sep	LTB	40	55-65	*Pleurobema sintoxia*	87.5				1	Live	
4 Sep	LTB	40	55-65	*Pleurobema sintoxia*	89.5				1	Live	
4 Sep	LTB	40	55-65	*Pleurobema sintoxia*	98.5				1	Live	
4 Sep	LTB	40	55-65	*Fusconaia flava*	83.1				1	Live	
4 Sep	LTB	40	55-65	*Lampsilis cardium*	99.9			F	1	Live	
4 Sep	LTB	40	55-65	*Quadrula quadrula*	59.4				1	Live	
4 Sep	LTB	40	55-65	*Obliquaria reflexa*	48.8				1	Live	
4 Sep	LTB	40	55-65	*Cyclonaias pustulosa*	62.5				1	Live	
4 Sep	LTB	40	55-65	*Pleurobema cordatum*	99.9				1	Live	
4 Sep	LTB	40	55-65	*Amblema plicata*	93.6				1	Live	
4 Sep	LTB	40	55-65	*Amblema plicata*					1	WD	
4 Sep	LTB	40	55-65	*Actinonaias ligamentina*	123.8				1	Live	
4 Sep	LTB	40	55-65	*Actinonaias ligamentina*	114.4				1	Live	
4 Sep	LTB	40	55-65	*Actinonaias ligamentina*	113.9				1	Live	
4 Sep	IB	41	0-5	No mussels							
4 Sep	IB	41	5-15	*Amblema plicata*	105.9				1	Live	
4 Sep	IB	41	5-15	*Amblema plicata*	70.4				1	Live	
4 Sep	IB	41	5-15	*Cyclonaias pustulosa*					1	WD	
4 Sep	IB	41	5-15	*Ellipsaria lineolata*	70				1	Live	
4 Sep	IB	41	5-15	*Ligumia recta*	150+			M	1	Live	
4 Sep	IB	41	5-15	*Ligumia recta*	135.1			F	1	Live	
4 Sep	IB	41	5-15	*Ligumia recta*	130.2			F	1	Live	
4 Sep	IB	41	5-15	*Megalonaias nervosa*	135.7				1	Live	
4 Sep	IB	41	5-15	*Obliquaria reflexa*	44.1				1	Live	
4 Sep	LTB	41	15-25	*Ligumia recta*	144.5			M	1	Live	
4 Sep	LTB	41	15-25	*Ligumia recta*	127.5			M	1	Live	
4 Sep	LTB	41	15-25	*Ligumia recta*	132.7			F	1	Live	
4 Sep	LTB	41	15-25	*Ligumia recta*	129.1			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	41	15-25	*Ellipsaria lineolata*	78.6				1	Live	
4 Sep	LTB	41	15-25	*Amblema plicata*	104.9				1	Live	
4 Sep	LTB	41	25-35	*Lampsilis cardium*	113.6			F	1	Live	
4 Sep	LTB	41	25-35	*Lampsilis cardium*	120			M	1	Live	
4 Sep	LTB	41	25-35	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	41	25-35	*Ligumia recta*	148.7			M	1	Live	
4 Sep	LTB	41	25-35	*Ligumia recta*	110.2			M	1	Live	
4 Sep	LTB	41	25-35	*Ligumia recta*	121.3			F	1	Live	
4 Sep	LTB	41	25-35	*Potamilus alatus*	104.9				1	Live	
4 Sep	LTB	41	25-35	*Potamilus alatus*	93.1				1	Live	
4 Sep	LTB	41	25-35	*Potamilus alatus*	110.9				1	Live	
4 Sep	LTB	41	25-35	*Amblema plicata*	88.7				1	Live	
4 Sep	LTB	41	25-35	*Amblema plicata*	99.2				1	Live	
4 Sep	LTB	41	25-35	*Amblema plicata*	98.3				1	Live	
4 Sep	LTB	41	25-35	*Ellipsaria lineolata*	70.2				1	Live	
4 Sep	LTB	41	25-35	*Ellipsaria lineolata*	68.4				1	Live	
4 Sep	LTB	41	25-35	*Ellipsaria lineolata*	79.1				1	Live	
4 Sep	LTB	41	25-35	*Ellipsaria lineolata*	102.5				1	Live	
4 Sep	LTB	41	35-45	*Amblema plicata*	99.9				1	Live	
4 Sep	LTB	41	35-45	*Amblema plicata*	115.4				1	Live	
4 Sep	LTB	41	35-45	*Potamilus alatus*	92.9				1	Live	
4 Sep	LTB	41	35-45	*Potamilus alatus*					1	WD	
4 Sep	LTB	41	35-45	*Lampsilis cardium*	120.6			M	1	Live	
4 Sep	LTB	41	45-55	*Actinonaias ligamentina*	120				1	Live	
4 Sep	LTB	41	45-55	*Ligumia recta*	143.9			M	1	Live	
4 Sep	LTB	41	45-55	*Ligumia recta*	70.5			M	1	Live	
4 Sep	LTB	41	45-55	*Pleurobema sintoxia*	96.4				1	Live	
4 Sep	LTB	41	45-55	*Pleurobema cordatum*	93.7				1	Live	
4 Sep	LTB	41	45-55	*Ellipsaria lineolata*	74.1				1	Live	
4 Sep	LTB	41	45-55	*Amblema plicata*	50.9				1	Live	
4 Sep	LTB	41	45-55	*Amblema plicata*	95.6				1	Live	
4 Sep	LTB	41	45-55	*Amblema plicata*	75.2				1	Live	
4 Sep	LTB	41	45-55	*Amblema plicata*	80.4				1	Live	
4 Sep	LTB	41	45-55	*Amblema plicata*	66.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	41	45-55	*Theliderma metanevra*	78.9				1	Live	
4 Sep	LTB	41	45-55	*Theliderma metanevra*	82.3				1	Live	
4 Sep	LTB	41	55-65	*Ligumia recta*	119.3			F	1	Live	
4 Sep	LTB	41	55-65	*Ligumia recta*	123.8			F	1	Live	
4 Sep	LTB	41	55-65	*Ligumia recta*	138.4			M	1	Live	
4 Sep	LTB	41	55-65	*Pleurobema cordatum*	89.5				1	Live	
4 Sep	LTB	41	55-65	*Pleurobema cordatum*	91.7				1	Live	
4 Sep	LTB	41	55-65	*Pleurobema cordatum*	87.2				1	Live	
4 Sep	LTB	41	55-65	*Pleurobema cordatum*	99.7				1	Live	
4 Sep	LTB	41	55-65	*Amblema plicata*	69				1	Live	
4 Sep	LTB	41	55-65	*Amblema plicata*	79.5				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	84.7				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	63.9				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	65.1				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	74.4				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	85.5				1	Live	
4 Sep	LTB	41	55-65	*Theliderma metanevra*	82				1	Live	
4 Sep	LTB	41	55-65	*Obliquaria reflexa*	51.1				1	Live	
4 Sep	LTB	41	55-65	*Ellipsaria lineolata*	83.1				1	Live	
4 Sep	LTB	41	55-65	*Ellipsaria lineolata*	70.2				1	Live	
4 Sep	LTB	41	55-65	*Lampsilis cardium*	106.8			F	1	Live	
4 Sep	LTB	41	55-65	*Actinonaias ligamentina*	83.4				1	Live	
4 Sep	LTB	41	55-65	*Actinonaias ligamentina*	130.2				1	Live	
4 Sep	LTB	41	55-65	*Actinonaias ligamentina*	118.7				1	Live	
4 Sep	LTB	41	55-65	*Actinonaias ligamentina*	99				1	Live	
4 Sep	LTB	41	55-65	*Actinonaias ligamentina*	122.6				1	Live	
4 Sep	IB	42	0-5	No mussels							
4 Sep	IB	42	5-15	*Potamilus alatus*	110.1				1	Live	
4 Sep	IB	42	5-15	*Potamilus alatus*	108.5				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	110.2				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	109.9				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	115.6				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	116.2				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	104.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	42	15-25	*Amblema plicata*	90.2				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*	77.7				1	Live	
4 Sep	LTB	42	15-25	*Amblema plicata*					1	WD	
4 Sep	LTB	42	15-25	*Potamilus alatus*	118.3				1	Live	
4 Sep	LTB	42	15-25	*Potamilus alatus*	94.6				1	Live	
4 Sep	LTB	42	15-25	*Obliquaria reflexa*	51.5				1	Live	
4 Sep	LTB	42	15-25	*Obliquaria reflexa*	45.6				1	Live	
4 Sep	LTB	42	15-25	*Obliquaria reflexa*	53.4				1	Live	
4 Sep	LTB	42	15-25	*Obliquaria reflexa*	55.7				1	Live	
4 Sep	LTB	42	15-25	*Obliquaria reflexa*	51.4				1	Live	
4 Sep	LTB	42	15-25	*Cyclonaias pustulosa*	44.1				1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	125.1			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	148			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*	128.3			F	1	Live	
4 Sep	LTB	42	15-25	*Ligumia recta*				F	1	WD	
4 Sep	LTB	42	25-35	*Ligumia recta*	138.2			M	1	Live	
4 Sep	LTB	42	25-35	*Ligumia recta*	140			M	1	Live	
4 Sep	LTB	42	25-35	*Ligumia recta*	133.7			M	1	Live	
4 Sep	LTB	42	25-35	*Ligumia recta*	145.3			F	1	Live	
4 Sep	LTB	42	25-35	*Ligumia recta*	142.5			F	1	Live	
4 Sep	LTB	42	25-35	*Amblema plicata*	101.7				1	Live	
4 Sep	LTB	42	25-35	*Amblema plicata*	99.6				1	Live	
4 Sep	LTB	42	25-35	*Amblema plicata*	103.5				1	Live	
4 Sep	LTB	42	25-35	*Amblema plicata*					1	WD	
4 Sep	LTB	42	25-35	*Potamilus alatus*	103.2				1	Live	
4 Sep	LTB	42	25-35	*Potamilus alatus*	128.5				1	Live	
4 Sep	LTB	42	25-35	*Ellipsaria lineolata*	64.7				1	Live	
4 Sep	LTB	42	35-45	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	42	35-45	*Potamilus alatus*	100				1	Live	
4 Sep	LTB	42	35-45	*Potamilus alatus*	99.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	42	35-45	*Potamilus alatus*	84.2				1	Live	
4 Sep	LTB	42	35-45	*Potamilus alatus*	105.5				1	Live	
4 Sep	LTB	42	35-45	*Potamilus alatus*	72.1				1	Live	
4 Sep	LTB	42	35-45	*Ellipsaria lineolata*	95.2				1	Live	
4 Sep	LTB	42	35-45	*Ellipsaria lineolata*	69.5				1	Live	
4 Sep	LTB	42	35-45	*Cyclonaias pustulosa*	47.1				1	Live	
4 Sep	LTB	42	35-45	*Ligumia recta*	138			F	1	Live	
4 Sep	LTB	42	35-45	*Ligumia recta*	128.7			F	1	Live	
4 Sep	LTB	42	35-45	*Lampsilis cardium*	118.5			M	1	Live	
4 Sep	LTB	42	35-45	*Actinonaias ligamentina*	115.4				1	Live	
4 Sep	LTB	42	45-55	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	108.2				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	106.4				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	83.4				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	88.1				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	110.2				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	112.9				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*	70.3				1	Live	
4 Sep	LTB	42	45-55	*Amblema plicata*					1	WD	
4 Sep	LTB	42	45-55	*Potamilus alatus*	107				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	62.5				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	68.7				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	68.1				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	81.2				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	75.5				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	81.4				1	Live	
4 Sep	LTB	42	45-55	*Ellipsaria lineolata*	76.3				1	Live	
4 Sep	LTB	42	45-55	*Pleurobema cordatum*	63.8				1	Live	
4 Sep	LTB	42	45-55	*Theliderma metanevra*	86.5				1	Live	
4 Sep	LTB	42	45-55	*Theliderma metanevra*	78.6				1	Live	
4 Sep	LTB	42	45-55	*Quadrula quadrula*	65.6				1	Live	
4 Sep	LTB	42	45-55	*Cyclonaias pustulosa*	51.3				1	Live	
4 Sep	LTB	42	45-55	*Lampsilis cardium*	120.7			F	1	Live	
4 Sep	LTB	42	45-55	*Lampsilis cardium*	116.6			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	42	45-55	*Actinonaias ligamentina*	89.3				1	Live	
4 Sep	LTB	42	45-55	*Actinonaias ligamentina*	115.4				1	Live	
4 Sep	LTB	42	45-55	*Plethobasus cyphyus**					1	WD	
4 Sep	LTB	42	55-65	*Amblema plicata*	110.1				1	Live	
4 Sep	LTB	42	55-65	*Amblema plicata*					2	WD	
4 Sep	LTB	42	55-65	*Potamilus alatus*	108.4				1	Live	
4 Sep	LTB	42	55-65	*Ligumia recta*	149.3			M	1	Live	
4 Sep	LTB	42	55-65	*Ligumia recta*	94.7			M	1	Live	
4 Sep	LTB	42	55-65	*Ligumia recta*	130.2			M	1	Live	
4 Sep	LTB	42	55-65	*Ellipsaria lineolata*	80.3				1	Live	
4 Sep	LTB	42	55-65	*Ellipsaria lineolata*	84.5				1	Live	
4 Sep	LTB	42	55-65	*Cyclonaias pustulosa*	58.9				1	Live	
4 Sep	LTB	42	55-65	*Cyclonaias pustulosa*	56.7				1	Live	
4 Sep	LTB	42	55-65	*Cyclonaias pustulosa*	63				1	Live	
4 Sep	LTB	42	55-65	*Cyclonaias pustulosa*	60.2				1	Live	
4 Sep	LTB	42	55-65	*Quadrula quadrula*	58.5				1	Live	
4 Sep	LTB	42	55-65	*Obliquaria reflexa*	57.8				1	Live	
4 Sep	LTB	42	55-65	*Pleurobema cordatum*	62.6				1	Live	
4 Sep	LTB	42	55-65	*Pleurobema sintoxia*	91.3				1	Live	
4 Sep	LTB	42	55-65	*Pleurobema sintoxia*	87.5				1	Live	
4 Sep	LTB	42	55-65	*Pleurobema sintoxia*					1	WD	
4 Sep	LTB	42	55-65	*Theliderma metanevra*	78.7				1	Live	
4 Sep	LTB	42	55-65	*Theliderma metanevra*	84.2				1	Live	
4 Sep	LTB	42	55-65	*Lampsilis cardium*	115.2			M	1	Live	
4 Sep	LTB	42	55-65	*Actinonaias ligamentina*	113.3				1	Live	
4 Sep	ADI	43	0-5	No mussels							
4 Sep	ADI	43	5-15	*Amblema plicata*	96.6				1	Live	
4 Sep	ADI	43	5-15	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	43	15-25	*Ligumia recta*	122.7			F	1	Live	
4 Sep	LTB	43	15-25	*Ligumia recta*				F	1	WD	
4 Sep	LTB	43	15-25	*Amblema plicata*	77.8				1	Live	
4 Sep	LTB	43	15-25	*Amblema plicata*					1	WD	
4 Sep	LTB	43	15-25	*Potamilus alatus*					1	WD	
4 Sep	LTB	43	25-35	*Lampsilis cardium*	101.5			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	43	25-35	*Lampsilis cardium*	97.3			F	1	Live	
4 Sep	LTB	43	25-35	*Lampsilis cardium*	107.3			M	1	Live	
4 Sep	LTB	43	25-35	*Potamilus alatus*	111				1	Live	
4 Sep	LTB	43	25-35	*Potamilus alatus*					1	WD	
4 Sep	LTB	43	25-35	*Ellipsaria lineolata*	75				1	Live	
4 Sep	LTB	43	25-35	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	43	25-35	*Ligumia recta*	145			M	1	Live	
4 Sep	LTB	43	25-35	*Ligumia recta*	150.1			M	1	Live	
4 Sep	LTB	43	25-35	*Cyclonaias pustulosa*	62.6				1	Live	
4 Sep	LTB	43	25-35	*Amblema plicata*	92.3				1	Live	
4 Sep	LTB	43	25-35	*Amblema plicata*	109.1				1	Live	
4 Sep	LTB	43	25-35	*Amblema plicata*					1	WD	
4 Sep	LTB	43	25-35	*Potamilus fragilis*	63.2				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	105				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	103.7				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	98.2				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	114				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	101.1				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	100.2				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	86				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	94.8				1	Live	
4 Sep	LTB	43	35-45	*Amblema plicata*	106				1	Live	
4 Sep	LTB	43	35-45	*Megalonaias nervosa*	146.7				1	Live	
4 Sep	LTB	43	35-45	*Megalonaias nervosa*	150+				1	Live	
4 Sep	LTB	43	35-45	*Ligumia recta*	150+			M	1	Live	
4 Sep	LTB	43	35-45	*Ligumia recta*	135			F	1	Live	
4 Sep	LTB	43	35-45	*Ellipsaria lineolata*	80				1	Live	
4 Sep	LTB	43	35-45	*Ellipsaria lineolata*	92.5				1	Live	
4 Sep	LTB	43	35-45	*Potamilus alatus*	108.5				1	Live	
4 Sep	LTB	43	35-45	*Cyclonaias pustulosa*					1	WD	
4 Sep	LTB	43	45-55	*Theliderma metanevra*	82.3				1	Live	
4 Sep	LTB	43	45-55	*Cyclonaias pustulosa*	63.5				1	Live	
4 Sep	LTB	43	45-55	*Obliquaria reflexa*	59.4				1	Live	
4 Sep	LTB	43	45-55	*Actinonaias ligamentina*	122.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	43	45-55	*Amblema plicata*	84.7				1	Live	
4 Sep	LTB	43	45-55	*Amblema plicata*	93.1				1	Live	
4 Sep	LTB	43	45-55	*Amblema plicata*	128.1				1	Live	
4 Sep	LTB	43	45-55	*Amblema plicata*	103.5				1	Live	
4 Sep	LTB	43	45-55	*Lampsilis cardium*	103.7			M	1	Live	
4 Sep	LTB	43	45-55	*Pleurobema sintoxia*	94.7				1	Live	
4 Sep	LTB	43	45-55	*Ellipsaria lineolata*	60.8				1	Live	
4 Sep	LTB	43	45-55	*Ellipsaria lineolata*	75.4				1	Live	
4 Sep	LTB	43	45-55	*Ellipsaria lineolata*	81.9				1	Live	
4 Sep	LTB	43	45-55	*Potamilus alatus*	95.7				1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	148.2			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	143.9			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	96.5			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	138.4			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	121			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	145.8			M	1	Live	
4 Sep	LTB	43	45-55	*Ligumia recta*	150+			F	1	Live	
4 Sep	LTB	43	55-65	*Pleurobema sintoxia*	94.5				1	Live	
4 Sep	LTB	43	55-65	*Ellipsaria lineolata*	87.9				1	Live	
4 Sep	LTB	43	55-65	*Ellipsaria lineolata*	69.7				1	Live	
4 Sep	LTB	43	55-65	*Amblema plicata*	98.5				1	Live	
4 Sep	LTB	43	55-65	*Amblema plicata*	93.6				1	Live	
4 Sep	LTB	43	55-65	*Potamilus alatus*	117.4				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*	76.7				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*	86.5				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*	80.5				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*					1	WD	
4 Sep	LTB	43	55-65	*Plethobasus cyphyus**	104.7	41.5	71.2		1	Live	0711 Yellow
4 Sep	LTB	43	55-65	*Ellipsaria lineolata*	71.4				1	Live	
4 Sep	LTB	43	55-65	*Obliquaria reflexa*	46.5				1	Live	
4 Sep	LTB	43	55-65	*Amblema plicata*	64.3				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*	76.6				1	Live	
4 Sep	LTB	43	55-65	*Theliderma metanevra*	77.8				1	Live	
4 Sep	LTB	43	55-65	*Pleurobema sintoxia*	95.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
4 Sep	LTB	43	55-65	*Pleurobema sintoxia*	72.4				1	Live	
5 Sep	ADI	44	0-5	No mussels							
5 Sep	ADI	44	5-15	*Lampsilis cardium*	100.6			F	1	Live	
5 Sep	ADI	44	5-15	*Lampsilis cardium*	110.7			M	1	Live	
5 Sep	ADI	44	5-15	*Lampsilis siliquoidea*					1	WD	
5 Sep	ADI	44	5-15	*Ligumia recta*	136			M	1	Live	
5 Sep	ADI	44	5-15	*Ligumia recta*	124			F	1	Live	
5 Sep	ADI	44	5-15	*Ligumia recta*	133.3			F	1	Live	
5 Sep	LTB	44	15-25	*Amblema plicata*	64.3				1	Live	
5 Sep	LTB	44	15-25	*Ellipsaria lineolata*	72				1	Live	
5 Sep	LTB	44	15-25	*Ligumia recta*	125.2			M	1	Live	
5 Sep	LTB	44	15-25	*Ligumia recta*	140.2			F	1	Live	
5 Sep	LTB	44	15-25	*Ligumia recta*	128.7			M	1	Live	
5 Sep	LTB	44	15-25	*Ligumia recta*	135.3			M	1	Live	
5 Sep	LTB	44	15-25	*Quadrula quadrula*	58.1				1	Live	
5 Sep	LTB	44	25-35	*Potamilus alatus*	118.6				1	Live	
5 Sep	LTB	44	25-35	*Amblema plicata*	110				1	Live	
5 Sep	LTB	44	25-35	*Amblema plicata*	95.3				1	Live	
5 Sep	LTB	44	25-35	*Ligumia recta*	136.3			F	1	Live	
5 Sep	LTB	44	25-35	*Ligumia recta*	150+			M	1	Live	
5 Sep	LTB	44	35-45	*Ellipsaria lineolata*	87.2				1	Live	
5 Sep	LTB	44	35-45	*Ligumia recta*	128.8			F	1	Live	
5 Sep	LTB	44	35-45	*Amblema plicata*	99				1	Live	
5 Sep	LTB	44	45-55	*Ligumia recta*	134.2			M	1	Live	
5 Sep	LTB	44	45-55	*Ligumia recta*	140.1			M	1	Live	
5 Sep	LTB	44	45-55	*Lampsilis cardium*	107.7			M	1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	100.3				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	103.2				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	74.8				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	71.9				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	100.1				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	102				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	112.7				1	Live	
5 Sep	LTB	44	45-55	*Amblema plicata*	99				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	44	45-55	*Quadrula quadrula*	63.1				1	Live	
5 Sep	LTB	44	45-55	*Cyclonaias pustulosa*	54.6				1	Live	
5 Sep	LTB	44	45-55	*Cyclonaias pustulosa*	58.9				1	Live	
5 Sep	LTB	44	45-55	*Ellipsaria lineolata*	67				1	Live	
5 Sep	LTB	44	45-55	*Ellipsaria lineolata*	82.2				1	Live	
5 Sep	LTB	44	45-55	*Ellipsaria lineolata*	92.1				1	Live	
5 Sep	LTB	44	45-55	*Ellipsaria lineolata*	87				1	Live	
5 Sep	LTB	44	45-55	*Theliderma metanevra*	82.6				1	Live	
5 Sep	LTB	44	45-55	*Theliderma metanevra*	66				1	Live	
5 Sep	LTB	44	45-55	*Pleurobema sintoxia*	98.2				1	Live	
5 Sep	LTB	44	45-55	*Pleurobema cordatum*	86.1				1	Live	
5 Sep	LTB	44	45-55	*Obliquaria reflexa*					2	WD	
5 Sep	LTB	44	55-65	*Amblema plicata*	103.1				1	Live	
5 Sep	LTB	44	55-65	*Amblema plicata*	107.7				1	Live	
5 Sep	LTB	44	55-65	*Amblema plicata*	96.3				1	Live	
5 Sep	LTB	44	55-65	*Amblema plicata*	103.3				1	Live	
5 Sep	LTB	44	55-65	*Amblema plicata*	107.8				1	Live	
5 Sep	LTB	44	55-65	*Amblema plicata*	88.8				1	Live	
5 Sep	LTB	44	55-65	*Theliderma metanevra*	64.1				1	Live	
5 Sep	LTB	44	55-65	*Theliderma metanevra*	74.8				1	Live	
5 Sep	LTB	44	55-65	*Theliderma metanevra*	87.2				1	Live	
5 Sep	LTB	44	55-65	*Theliderma metanevra*	55.5				1	Live	
5 Sep	LTB	44	55-65	*Theliderma metanevra*	73				1	Live	
5 Sep	LTB	44	55-65	*Cyclonaias pustulosa*	58.6				1	Live	
5 Sep	LTB	44	55-65	*Ligumia recta*	120			F	1	Live	
5 Sep	LTB	44	55-65	*Potamilus alatus*	98				1	Live	
5 Sep	LTB	44	55-65	*Potamilus alatus*	102.8				1	Live	
5 Sep	LTB	44	55-65	*Pleurobema cordatum*	93.1				1	Live	
5 Sep	LTB	44	55-65	*Pleurobema sintoxia*	99.3				1	Live	
5 Sep	LTB	44	55-65	*Actinonaias ligamentina*	115				1	Live	
5 Sep	LTB	44	55-65	*Actinonaias ligamentina*	113.7				1	Live	
5 Sep	ADI	45	0-5	No mussels							
5 Sep	ADI	45	5-15	*Amblema plicata*	100.7				1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	130			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	ADI	45	5-15	*Ligumia recta*	150+			M	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	149.7			M	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	135.1			F	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	128.9			F	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	130			F	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	145.1			F	1	Live	
5 Sep	ADI	45	5-15	*Ligumia recta*	140.8			F	1	Live	
5 Sep	ADI	45	5-15	*Potamilus alatus*	127.7				1	Live	
5 Sep	LTB	45	15-25	*Potamilus alatus*	107.8				1	Live	
5 Sep	LTB	45	15-25	*Obliquaria reflexa*	60.9				1	Live	
5 Sep	LTB	45	15-25	*Amblema plicata*	94.1				1	Live	
5 Sep	LTB	45	15-25	*Amblema plicata*	90.3				1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	125.4			M	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	120.3			M	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	134			M	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	121.1			F	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	130.9			F	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	148.7			F	1	Live	
5 Sep	LTB	45	15-25	*Ligumia recta*	132.5			F	1	Live	
5 Sep	LTB	45	25-35	*Megalonaias nervosa*	150+				1	Live	
5 Sep	LTB	45	25-35	*Ligumia recta*	150+			F	1	Live	
5 Sep	LTB	45	25-35	*Ligumia recta*	150+			M	1	Live	
5 Sep	LTB	45	25-35	*Ligumia recta*	140.5			M	1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	108.7				1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	85.5				1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	63.7				1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	77.4				1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	104.5				1	Live	
5 Sep	LTB	45	25-35	*Amblema plicata*	93.3				1	Live	
5 Sep	LTB	45	25-35	*Ellipsaria lineolata*	63.2				1	Live	
5 Sep	LTB	45	25-35	*Quadrula quadrula*	63.4				1	Live	
5 Sep	LTB	45	25-35	*Potamilus alatus*	115.1				1	Live	
5 Sep	LTB	45	25-35	*Lampsilis cardium*	108.1				1	Live	
5 Sep	LTB	45	35-45	*Amblema plicata*	99.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	45	35-45	*Amblema plicata*	107.5				1	Live	
5 Sep	LTB	45	35-45	*Amblema plicata*	104.8				1	Live	
5 Sep	LTB	45	35-45	*Amblema plicata*	96.1				1	Live	
5 Sep	LTB	45	35-45	*Amblema plicata*	87				1	Live	
5 Sep	LTB	45	35-45	*Ellipsaria lineolata*	74.4				1	Live	
5 Sep	LTB	45	35-45	*Cyclonaias pustulosa*	60.1				1	Live	
5 Sep	LTB	45	35-45	*Cyclonaias pustulosa*	58.9				1	Live	
5 Sep	LTB	45	35-45	*Cyclonaias pustulosa*	54.7				1	Live	
5 Sep	LTB	45	35-45	*Cyclonaias pustulosa*	50.2				1	Live	
5 Sep	LTB	45	35-45	*Cyclonaias pustulosa*	51.7				1	Live	
5 Sep	LTB	45	35-45	*Obliquaria reflexa*	48.1				1	Live	
5 Sep	LTB	45	45-55	*Amblema plicata*	93.2				1	Live	
5 Sep	LTB	45	45-55	*Amblema plicata*	97.7				1	Live	
5 Sep	LTB	45	45-55	*Amblema plicata*	96.9				1	Live	
5 Sep	LTB	45	45-55	*Amblema plicata*	88.1				1	Live	
5 Sep	LTB	45	45-55	*Amblema plicata*	79.3				1	Live	
5 Sep	LTB	45	45-55	*Ligumia recta*	149.7			M	1	Live	
5 Sep	LTB	45	45-55	*Ligumia recta*	133.2			M	1	Live	
5 Sep	LTB	45	45-55	*Cyclonaias pustulosa*	56				1	Live	
5 Sep	LTB	45	45-55	*Ellipsaria lineolata*	79.9				1	Live	
5 Sep	LTB	45	45-55	*Ellipsaria lineolata*	88.2				1	Live	
5 Sep	LTB	45	45-55	*Pleurobema sintoxia*	94.1				1	Live	
5 Sep	LTB	45	45-55	*Theliderma metanevra*	80.8				1	Live	
5 Sep	LTB	45	45-55	*Actinonaias ligamentina*	89.1				1	Live	
5 Sep	LTB	45	55-65	*Potamilus alatus*	129.5				1	Live	
5 Sep	LTB	45	55-65	*Lampsilis cardium*	128				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	86.1				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	74.3				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	81				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	80.9				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	83.2				1	Live	
5 Sep	LTB	45	55-65	*Theliderma metanevra*	83.1				1	Live	
5 Sep	LTB	45	55-65	*Amblema plicata*	108.1				1	Live	
5 Sep	LTB	45	55-65	*Amblema plicata*	107.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	45	55-65	*Amblema plicata*	95				1	Live	
5 Sep	LTB	45	55-65	*Ligumia recta*	92.6			M	1	Live	
5 Sep	LTB	45	55-65	*Ligumia recta*	130.1			F	1	Live	
5 Sep	LTB	45	55-65	*Cyclonaias pustulosa*	54.8				1	Live	
5 Sep	LTB	45	55-65	*Cyclonaias pustulosa*	62				1	Live	
5 Sep	LTB	45	55-65	*Cyclonaias pustulosa*	57.7				1	Live	
5 Sep	LTB	45	55-65	*Cyclonaias pustulosa*	61				1	Live	
5 Sep	LTB	45	55-65	*Quadrula quadrula*	53.1				1	Live	
5 Sep	LTB	45	55-65	*Ellipsaria lineolata*	80.8				1	Live	
5 Sep	LTB	45	55-65	*Pleurobema cordatum*	78.6				1	Live	
5 Sep	LTB	45	55-65	*Pleurobema cordatum*	72.7				1	Live	
5 Sep	LTB	45	55-65	*Pleurobema sintoxia*	83.1				1	Live	
5 Sep	LTB	45	55-65	*Pleurobema sintoxia*	92.8				1	Live	
5 Sep	LTB	45	55-65	*Pleurobema sintoxia*	94.7				1	Live	
5 Sep	IB	46	0-5	No mussels							
5 Sep	IB	46	5-15	*Amblema plicata*	81.3				1	Live	
5 Sep	IB	46	5-15	*Fusconaia flava*	75.6				1	Live	
5 Sep	IB	46	5-15	*Ligumia recta*	139			F	1	Live	
5 Sep	IB	46	5-15	*Ligumia recta*	150+			M	1	Live	
5 Sep	IB	46	5-15	*Ligumia recta*	144.8			M	1	Live	
5 Sep	IB	46	5-15	*Ligumia recta*	130.3			F	1	Live	
5 Sep	IB	46	5-15	*Potamilus alatus*	120.3				1	Live	
5 Sep	IB	46	5-15	*Potamilus alatus*	88.3				1	Live	
5 Sep	LTB	46	15-25	*Ligumia recta*	144.8			M	1	Live	
5 Sep	LTB	46	15-25	*Ligumia recta*	133.6			F	1	Live	
5 Sep	LTB	46	15-25	*Ligumia recta*	135			M	1	Live	
5 Sep	LTB	46	15-25	*Ellipsaria lineolata*	78.5				1	Live	
5 Sep	LTB	46	15-25	*Cyclonaias pustulosa*	55.5				1	Live	
5 Sep	LTB	46	25-35	*Ligumia recta*	129.9			F	1	Live	
5 Sep	LTB	46	25-35	*Ligumia recta*	130.1			M	1	Live	
5 Sep	LTB	46	25-35	*Ligumia recta*	130.3			M	1	Live	
5 Sep	LTB	46	25-35	*Ligumia recta*	142.8			M	1	Live	
5 Sep	LTB	46	25-35	*Lampsilis cardium*	106			F	1	Live	
5 Sep	LTB	46	25-35	*Potamilus alatus*	144.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	46	25-35	*Amblema plicata*	115				1	Live	
5 Sep	LTB	46	25-35	*Amblema plicata*	75.6				1	Live	
5 Sep	LTB	46	25-35	*Ellipsaria lineolata*	66.2				1	Live	
5 Sep	LTB	46	25-35	*Megalonaias nervosa*	150+				1	Live	
5 Sep	LTB	46	35-45	*Lampsilis cardium*	127.8			M	1	Live	
5 Sep	LTB	46	35-45	*Lampsilis cardium*	112.6			F	1	Live	
5 Sep	LTB	46	35-45	*Actinonaias ligamentina*	112.7				1	Live	
5 Sep	LTB	46	35-45	*Ligumia recta*	138			M	1	Live	
5 Sep	LTB	46	35-45	*Potamilus alatus*	37.7				1	Live	
5 Sep	LTB	46	35-45	*Ellipsaria lineolata*	73				1	Live	
5 Sep	LTB	46	45-55	*Lampsilis cardium*	86.1			M	1	Live	
5 Sep	LTB	46	45-55	*Actinonaias ligamentina*	123.4				1	Live	
5 Sep	LTB	46	45-55	*Actinonaias ligamentina*	134.6				1	Live	
5 Sep	LTB	46	45-55	*Pleurobema sintoxia*	100				1	Live	
5 Sep	LTB	46	45-55	*Pleurobema sintoxia*					1	WD	
5 Sep	LTB	46	45-55	*Pleurobema cordatum*	84.3				1	Live	
5 Sep	LTB	46	45-55	*Pleurobema cordatum*	64.1				1	Live	
5 Sep	LTB	46	45-55	*Theliderma metanevra*	73.1				1	Live	
5 Sep	LTB	46	45-55	*Theliderma metanevra*	74.6				1	Live	
5 Sep	LTB	46	45-55	*Theliderma metanevra*	82.1				1	Live	
5 Sep	LTB	46	45-55	*Theliderma metanevra*	73				1	Live	
5 Sep	LTB	46	45-55	*Amblema plicata*	81.2				1	Live	
5 Sep	LTB	46	45-55	*Amblema plicata*					2	WD	
5 Sep	LTB	46	45-55	*Quadrula quadrula*	58.8				1	Live	
5 Sep	LTB	46	45-55	*Ellipsaria lineolata*	63.7				1	Live	
5 Sep	LTB	46	45-55	*Ellipsaria lineolata*	75.5				1	Live	
5 Sep	LTB	46	45-55	*Ellipsaria lineolata*					2	WD	
5 Sep	LTB	46	45-55	*Obliquaria reflexa*	57.9				1	Live	
5 Sep	LTB	46	45-55	*Ligumia recta*	133.9			F	1	Live	
5 Sep	LTB	46	55-65	*Theliderma metanevra*	73.3				1	Live	
5 Sep	LTB	46	55-65	*Theliderma metanevra*	78.1				1	Live	
5 Sep	LTB	46	55-65	*Theliderma metanevra*	80.9				1	Live	
5 Sep	LTB	46	55-65	*Theliderma metanevra*	58.6				1	Live	
5 Sep	LTB	46	55-65	*Theliderma metanevra*	80.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	52.1				1	Live	
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	56.6				1	Live	
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	60.1				1	Live	
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	50.3				1	Live	
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	53				1	Live	
5 Sep	LTB	46	55-65	*Ligumia recta*	141			M	1	Live	
5 Sep	LTB	46	55-65	*Ligumia recta*	140.9			M	1	Live	
5 Sep	LTB	46	55-65	*Ligumia recta*	134.8			F	1	Live	
5 Sep	LTB	46	55-65	*Ligumia recta*	101.4			F	1	Live	
5 Sep	LTB	46	55-65	*Amblema plicata*	105.6				1	Live	
5 Sep	LTB	46	55-65	*Amblema plicata*	106.8				1	Live	
5 Sep	LTB	46	55-65	*Amblema plicata*	94.1				1	Live	
5 Sep	LTB	46	55-65	*Amblema plicata*	101.2				1	Live	
5 Sep	LTB	46	55-65	*Amblema plicata*	87.3				1	Live	
5 Sep	LTB	46	55-65	*Quadrula quadrula*	69.9				1	Live	
5 Sep	LTB	46	55-65	*Cyclonaias pustulosa*	59.8				1	Live	
5 Sep	LTB	46	55-65	*Actinonaias ligamentina*	112.6				1	Live	
5 Sep	LTB	46	55-65	*Actinonaias ligamentina*	120				1	Live	
5 Sep	LTB	46	55-65	*Actinonaias ligamentina*	121.2				1	Live	
5 Sep	LTB	46	55-65	*Actinonaias ligamentina*	129.3				1	Live	
5 Sep	LTB	46	55-65	*Actinonaias ligamentina*	105.8				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	74.4				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	90.1				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	88.3				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	87.2				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	73.3				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema cordatum*	85.1				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema sintoxia*	99				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema sintoxia*	88.7				1	Live	
5 Sep	LTB	46	55-65	*Pleurobema sintoxia*	92.2				1	Live	
5 Sep	IB	47	0-5	No mussels							
5 Sep	IB	47	5-15	*Amblema plicata*	64.5				1	Live	
5 Sep	IB	47	5-15	*Amblema plicata*					1	WD	
5 Sep	IB	47	5-15	*Ligumia recta*	133			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	IB	47	5-15	*Megalonaias nervosa*	142				1	Live	
5 Sep	LTB	47	15-25	*Potamilus alatus*	94.6				1	Live	
5 Sep	LTB	47	15-25	*Potamilus alatus*	75.3				1	Live	
5 Sep	LTB	47	15-25	*Potamilus alatus*	110.3				1	Live	
5 Sep	LTB	47	15-25	*Potamilus alatus*	112.8				1	Live	
5 Sep	LTB	47	15-25	*Potamilus alatus*					1	WD	
5 Sep	LTB	47	15-25	*Ligumia recta*	140			F	1	Live	
5 Sep	LTB	47	15-25	*Ligumia recta*	128.7			F	1	Live	
5 Sep	LTB	47	15-25	*Ligumia recta*	143.3			M	1	Live	
5 Sep	LTB	47	25-35	*Potamilus alatus*	121.6				1	Live	
5 Sep	LTB	47	25-35	*Ellipsaria lineolata*	74.5				1	Live	
5 Sep	LTB	47	25-35	*Quadrula quadrula*	60				1	Live	
5 Sep	LTB	47	25-35	*Ligumia recta*	131			M	1	Live	
5 Sep	LTB	47	25-35	*Ligumia recta*	131.1			F	1	Live	
5 Sep	LTB	47	25-35	*Ligumia recta*	130.9			F	1	Live	
5 Sep	LTB	47	35-45	*Amblema plicata*	88.7				1	Live	
5 Sep	LTB	47	35-45	*Ellipsaria lineolata*	88.8				1	Live	
5 Sep	LTB	47	35-45	*Ellipsaria lineolata*	76.4				1	Live	
5 Sep	LTB	47	35-45	*Ligumia recta*	129.8			F	1	Live	
5 Sep	LTB	47	35-45	*Ligumia recta*	125.6				1	Live	
5 Sep	LTB	47	35-45	*Potamilus alatus*	114.7				1	Live	
5 Sep	LTB	47	35-45	*Obovaria subrotunda**	43.2	28.8	38.9		1	Live	1989 Yellow
5 Sep	LTB	47	45-55	*Amblema plicata*	105.6				1	Live	
5 Sep	LTB	47	45-55	*Amblema plicata*	85.3				1	Live	
5 Sep	LTB	47	45-55	*Amblema plicata*	101.3				1	Live	
5 Sep	LTB	47	45-55	*Amblema plicata*	94.5				1	Live	
5 Sep	LTB	47	45-55	*Amblema plicata*	66.6				1	Live	
5 Sep	LTB	47	45-55	*Amblema plicata*	72.3				1	Live	
5 Sep	LTB	47	45-55	*Cyclonaias pustulosa*	58.1				1	Live	
5 Sep	LTB	47	45-55	*Cyclonaias pustulosa*	63.3				1	Live	
5 Sep	LTB	47	45-55	*Cyclonaias pustulosa*					1	WD	
5 Sep	LTB	47	45-55	*Ellipsaria lineolata*	80.6				1	Live	
5 Sep	LTB	47	45-55	*Ellipsaria lineolata*	98.7				1	Live	
5 Sep	LTB	47	45-55	*Potamilus alatus*	107.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	47	45-55	*Potamilus alatus*	92.5				1	Live	
5 Sep	LTB	47	45-55	*Pleurobema cordatum*	81.2				1	Live	
5 Sep	LTB	47	45-55	*Pleurobema sintoxia*	86.8				1	Live	
5 Sep	LTB	47	45-55	*Pleurobema sintoxia*	88.4				1	Live	
5 Sep	LTB	47	45-55	*Pleurobema sintoxia*	100.1				1	Live	
5 Sep	LTB	47	45-55	*Theliderma metanevra*	89.2				1	Live	
5 Sep	LTB	47	45-55	*Ligumia recta*	133.3			M	1	Live	
5 Sep	LTB	47	45-55	*Ligumia recta*	130			F	1	Live	
5 Sep	LTB	47	55-65	*Ellipsaria lineolata*	91.3				1	Live	
5 Sep	LTB	47	55-65	*Ellipsaria lineolata*	69.3				1	Live	
5 Sep	LTB	47	55-65	*Ligumia recta*	120			F	1	Live	
5 Sep	LTB	47	55-65	*Theliderma metanevra*	69.1				1	Live	
5 Sep	LTB	47	55-65	*Theliderma metanevra*	84.4				1	Live	
5 Sep	LTB	47	55-65	*Cyclonaias pustulosa*	71.1				1	Live	
5 Sep	LTB	47	55-65	*Cyclonaias pustulosa*	50				1	Live	
5 Sep	LTB	47	55-65	*Amblema plicata*	99.8				1	Live	
5 Sep	LTB	47	55-65	*Amblema plicata*	79.6				1	Live	
5 Sep	LTB	47	55-65	*Amblema plicata*	91				1	Live	
5 Sep	LTB	47	55-65	*Amblema plicata*	62				1	Live	
5 Sep	LTB	47	55-65	*Ellipsaria lineolata*	46.5				1	Live	
5 Sep	LTB	47	55-65	*Ellipsaria lineolata*	85.6				1	Live	
5 Sep	LTB	47	55-65	*Theliderma metanevra*	77.3				1	Live	
5 Sep	LTB	47	55-65	*Pleurobema cordatum*	65.5				1	Live	
5 Sep	LTB	47	55-65	*Pleurobema cordatum*	88.9				1	Live	
5 Sep	LTB	47	55-65	*Pleurobema sintoxia*	93.7				1	Live	
5 Sep	LTB	47	55-65	*Pleurobema sintoxia*	96.2				1	Live	
5 Sep	LTB	47	55-65	*Lampsilis cardium*	123.4			M	1	Live	
5 Sep	LTB	47	55-65	*Lampsilis cardium*	113.3			M	1	Live	
5 Sep	IB	48	0-5	No mussels							
5 Sep	IB	48	5-15	*Ligumia recta*	133.3			F	1	Live	
5 Sep	IB	48	5-15	*Ligumia recta*	130.6			M	1	Live	
5 Sep	IB	48	5-15	*Potamilus alatus*					1	WD	
5 Sep	LTB	48	15-25	*Potamilus alatus*	90.8				1	Live	
5 Sep	LTB	48	15-25	*Ellipsaria lineolata*	75.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	48	15-25	*Ligumia recta*	115.8			F	1	Live	
5 Sep	LTB	48	15-25	*Ligumia recta*	130.6			F	1	Live	
5 Sep	LTB	48	25-35	*Ligumia recta*	125.6			F	1	Live	
5 Sep	LTB	48	25-35	*Ligumia recta*	145.7			F	1	Live	
5 Sep	LTB	48	25-35	*Obliquaria reflexa*	50.1				1	Live	
5 Sep	LTB	48	35-45	*Ellipsaria lineolata*	82.8				1	Live	
5 Sep	LTB	48	35-45	*Ellipsaria lineolata*	92.6				1	Live	
5 Sep	LTB	48	35-45	*Ellipsaria lineolata*	80.1				1	Live	
5 Sep	LTB	48	35-45	*Amblema plicata*	95				1	Live	
5 Sep	LTB	48	35-45	*Amblema plicata*	95				1	Live	
5 Sep	LTB	48	35-45	*Theliderma metanevra*	89.3				1	Live	
5 Sep	LTB	48	35-45	*Ligumia recta*	131			M	1	Live	
5 Sep	LTB	48	35-45	*Ligumia recta*	150+			M	1	Live	
5 Sep	LTB	48	35-45	*Pleurobema sintoxia*	84				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	90.1				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	92.8				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	84.3				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	56.2				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	72				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	85.3				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	96.1				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	118.5				1	Live	
5 Sep	LTB	48	45-55	*Amblema plicata*	105.4				1	Live	
5 Sep	LTB	48	45-55	*Theliderma metanevra*	66.5				1	Live	
5 Sep	LTB	48	45-55	*Theliderma metanevra*	76.1				1	Live	
5 Sep	LTB	48	45-55	*Potamilus alatus*	90.3				1	Live	
5 Sep	LTB	48	45-55	*Lampsilis cardium*	99.9			M	1	Live	
5 Sep	LTB	48	45-55	*Ligumia recta*	139.1			F	1	Live	
5 Sep	LTB	48	45-55	*Pleurobema cordatum*	95.7				1	Live	
5 Sep	LTB	48	45-55	*Pleurobema sintoxia*	89.1				1	Live	
5 Sep	LTB	48	45-55	*Pleurobema sintoxia*	93.2				1	Live	
5 Sep	LTB	48	45-55	*Ellipsaria lineolata*	93.2				1	Live	
5 Sep	LTB	48	45-55	*Ellipsaria lineolata*	88.9				1	Live	
5 Sep	LTB	48	45-55	*Ellipsaria lineolata*	64.6				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	48	45-55	*Cyclonaias pustulosa*	55.4				1	Live	
5 Sep	LTB	48	45-55	*Cyclonaias pustulosa*	45.5				1	Live	
5 Sep	LTB	48	45-55	*Cyclonaias pustulosa*					1	WD	
5 Sep	LTB	48	45-55	*Quadrula quadrula*	62.2				1	Live	
5 Sep	LTB	48	45-55	*Obliquaria reflexa*	53.1				1	Live	
5 Sep	LTB	48	45-55	*Actinonaias ligamentina*	92.8				1	Live	
5 Sep	LTB	48	55-65	*Amblema plicata*	100.1				1	Live	
5 Sep	LTB	48	55-65	*Amblema plicata*	99.5				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	78.6				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	72.2				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	83.1				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	88.8				1	Live	
5 Sep	LTB	48	55-65	*Obliquaria reflexa*	49.2				1	Live	
5 Sep	LTB	48	55-65	*Obliquaria reflexa*	51				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	92				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	84.5				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	74.1				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	84.2				1	Live	
5 Sep	LTB	48	55-65	*Actinonaias ligamentina*	103.3				1	Live	
5 Sep	LTB	48	55-65	*Pleurobema cordatum*	92				1	Live	
5 Sep	LTB	48	55-65	*Pleurobema cordatum*	67.7				1	Live	
5 Sep	LTB	48	55-65	*Ligumia recta*	150.1			M	1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	95.7				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	83.8				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	74.3				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	92.4				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	65.1				1	Live	
5 Sep	LTB	48	55-65	*Ellipsaria lineolata*	62.6				1	Live	
5 Sep	LTB	48	55-65	*Pleurobema cordatum*	94.3				1	Live	
5 Sep	LTB	48	55-65	*Pleurobema cordatum*	80.3				1	Live	
5 Sep	LTB	48	55-65	*Amblema plicata*	75.1				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	76				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	72.7				1	Live	
5 Sep	LTB	48	55-65	*Theliderma metanevra*	75.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	48	55-65	*Cyclonaias pustulosa*	47.2				1	Live	
5 Sep	LTB	48	55-65	*Cyclonaias pustulosa*	60				1	Live	
5 Sep	LTB	48	55-65	*Pleurobema sintoxia*	87.1				1	Live	
5 Sep	IB	49	0-5	No mussels							
5 Sep	IB	49	5-15	*Ligumia recta*	128.1			F	1	Live	
5 Sep	IB	49	5-15	*Potamilus alatus*					2	WD	
5 Sep	LTB	49	15-25	*Megalonaias nervosa*	150+				1	Live	
5 Sep	LTB	49	15-25	*Ligumia recta*	134.5			F	1	Live	
5 Sep	LTB	49	15-25	*Ligumia recta*	125.6			F	1	Live	
5 Sep	LTB	49	15-25	*Ligumia recta*	135.2			F	1	Live	
5 Sep	LTB	49	15-25	*Ligumia recta*	146			M	1	Live	
5 Sep	LTB	49	15-25	*Obliquaria reflexa*	52.2				1	Live	
5 Sep	LTB	49	15-25	*Potamilus alatus*	121.4				1	Live	
5 Sep	LTB	49	15-25	*Potamilus alatus*	69.3				1	Live	
5 Sep	LTB	49	25-35	*Obliquaria reflexa*	54.5				1	Live	
5 Sep	LTB	49	25-35	*Ellipsaria lineolata*	72.8				1	Live	
5 Sep	LTB	49	25-35	*Ellipsaria lineolata*	77.2				1	Live	
5 Sep	LTB	49	25-35	*Lampsilis cardium*	126.1			M	1	Live	
5 Sep	LTB	49	25-35	*Ligumia recta*	132.2			F	1	Live	
5 Sep	LTB	49	25-35	*Ligumia recta*	145			F	1	Live	
5 Sep	LTB	49	25-35	*Ligumia recta*	148.7			M	1	Live	
5 Sep	LTB	49	25-35	*Amblema plicata*	104.5				1	Live	
5 Sep	LTB	49	25-35	*Potamilus alatus*	112.2				1	Live	
5 Sep	LTB	49	25-35	*Potamilus alatus*					1	WD	
5 Sep	LTB	49	35-45	*Megalonaias nervosa*	150+				1	Live	
5 Sep	LTB	49	35-45	*Ligumia recta*	146.5			M	1	Live	
5 Sep	LTB	49	35-45	*Ligumia recta*	145.6			M	1	Live	
5 Sep	LTB	49	35-45	*Ligumia recta*	145.3			F	1	Live	
5 Sep	LTB	49	35-45	*Ligumia recta*	116.8			F	1	Live	
5 Sep	LTB	49	35-45	*Amblema plicata*	92.1				1	Live	
5 Sep	LTB	49	35-45	*Amblema plicata*	112.6				1	Live	
5 Sep	LTB	49	35-45	*Amblema plicata*	107.9				1	Live	
5 Sep	LTB	49	35-45	*Amblema plicata*	85.5				1	Live	
5 Sep	LTB	49	35-45	*Amblema plicata*	94.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	49	35-45	*Ellipsaria lineolata*	57.2				1	Live	
5 Sep	LTB	49	35-45	*Ellipsaria lineolata*	80.5				1	Live	
5 Sep	LTB	49	35-45	*Cyclonaias pustulosa*	62.2				1	Live	
5 Sep	LTB	49	35-45	*Cyclonaias pustulosa*	48				1	Live	
5 Sep	LTB	49	35-45	*Obliquaria reflexa*	51.5				1	Live	
5 Sep	LTB	49	35-45	*Pleurobema sintoxia*	95.6				1	Live	
5 Sep	LTB	49	35-45	*Actinonaias ligamentina*	134.1				1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	142.6			M	1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	143.6			M	1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	137.8			M	1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	102.4			M	1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	126.3			F	1	Live	
5 Sep	LTB	49	45-55	*Ligumia recta*	142.1			F	1	Live	
5 Sep	LTB	49	45-55	*Quadrula quadrula*	59.5				1	Live	
5 Sep	LTB	49	45-55	*Quadrula quadrula*	65.6				1	Live	
5 Sep	LTB	49	45-55	*Quadrula quadrula*	64				1	Live	
5 Sep	LTB	49	45-55	*Potamilus alatus*	114.2				1	Live	
5 Sep	LTB	49	45-55	*Potamilus alatus*	114.1				1	Live	
5 Sep	LTB	49	45-55	*Ellipsaria lineolata*	82.6				1	Live	
5 Sep	LTB	49	45-55	*Ellipsaria lineolata*	72				1	Live	
5 Sep	LTB	49	45-55	*Ellipsaria lineolata*	78.1				1	Live	
5 Sep	LTB	49	45-55	*Ellipsaria lineolata*	88.8				1	Live	
5 Sep	LTB	49	45-55	*Ellipsaria lineolata*	98.2				1	Live	
5 Sep	LTB	49	45-55	*Theliderma metanevra*	67.9				1	Live	
5 Sep	LTB	49	45-55	*Theliderma metanevra*	82.2				1	Live	
5 Sep	LTB	49	45-55	*Theliderma metanevra*	79.2				1	Live	
5 Sep	LTB	49	45-55	*Theliderma metanevra*	77				1	Live	
5 Sep	LTB	49	45-55	*Cyclonaias pustulosa*	59.2				1	Live	
5 Sep	LTB	49	45-55	*Cyclonaias pustulosa*	60.2				1	Live	
5 Sep	LTB	49	45-55	*Amblema plicata*	97.1				1	Live	
5 Sep	LTB	49	45-55	*Amblema plicata*	95				1	Live	
5 Sep	LTB	49	45-55	*Amblema plicata*	104.1				1	Live	
5 Sep	LTB	49	45-55	*Amblema plicata*	102.8				1	Live	
5 Sep	LTB	49	45-55	*Amblema plicata*	81.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	49	45-55	*Amblema plicata*	108.7				1	Live	
5 Sep	LTB	49	45-55	*Lampsilis siliquoidea*	70				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	80				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	86.2				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	86.9				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	83.2				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	76				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	77.8				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	96				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	81.7				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	83.4				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	104				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	119				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	95.5				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	81.2				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	74				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	75.5				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	73.7				1	Live	
5 Sep	LTB	49	55-65	*Theliderma metanevra*	82.1				1	Live	
5 Sep	LTB	49	55-65	*Ellipsaria lineolata*	74.1				1	Live	
5 Sep	LTB	49	55-65	*Ellipsaria lineolata*	50.5				1	Live	
5 Sep	LTB	49	55-65	*Ellipsaria lineolata*	94.1				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	65.1				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	57.1				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	60.5				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	59				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	60.2				1	Live	
5 Sep	LTB	49	55-65	*Cyclonaias pustulosa*	59.1				1	Live	
5 Sep	LTB	49	55-65	*Pleurobema cordatum*	72				1	Live	
5 Sep	LTB	49	55-65	*Pleurobema cordatum*	60				1	Live	
5 Sep	LTB	49	55-65	*Pleurobema cordatum*	80.6				1	Live	
5 Sep	LTB	49	55-65	*Pleurobema cordatum*	94.1				1	Live	
5 Sep	LTB	49	55-65	*Quadrula quadrula*	61.4				1	Live	
5 Sep	LTB	49	55-65	*Obliquaria reflexa*	53.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
5 Sep	LTB	49	55-65	*Obliquaria reflexa*	50.4				1	Live	
5 Sep	LTB	49	55-65	*Amblema plicata*	107				1	Live	
5 Sep	LTB	49	55-65	*Ligumia recta*	145.1			M	1	Live	
5 Sep	LTB	49	55-65	*Potamilus alatus*	118.7				1	Live	
5 Sep	LTB	49	55-65	*Actinonaias ligamentina*	97				1	Live	
6 Sep	IB	50	0-5	No mussels							
6 Sep	IB	50	5-15	*Ligumia recta*	128.1			F	1	Live	
6 Sep	IB	50	5-15	*Quadrula quadrula*	63				1	Live	
6 Sep	IB	50	5-15	*Potamilus alatus*					1	WD	
6 Sep	LTB	50	15-25	*Amblema plicata*	74				1	Live	
6 Sep	LTB	50	15-25	*Amblema plicata*	77.5				1	Live	
6 Sep	LTB	50	15-25	*Amblema plicata*	106.7				1	Live	
6 Sep	LTB	50	15-25	*Ligumia recta*	133.1			F	1	Live	
6 Sep	LTB	50	15-25	*Ligumia recta*	144.5			M	1	Live	
6 Sep	LTB	50	15-25	*Ligumia recta*	143.1			M	1	Live	
6 Sep	LTB	50	15-25	*Amblema plicata*					1	WD	
6 Sep	LTB	50	25-35	*Quadrula quadrula*	60.7				1	Live	
6 Sep	LTB	50	25-35	*Ligumia recta*	150+			M	1	Live	
6 Sep	LTB	50	25-35	*Amblema plicata*	95.2				1	Live	
6 Sep	LTB	50	25-35	*Amblema plicata*	110.5				1	Live	
6 Sep	LTB	50	25-35	*Amblema plicata*					1	WD	
6 Sep	LTB	50	25-35	*Potamilus alatus*					1	WD	
6 Sep	LTB	50	35-45	*Lasmigona complanata*					1	WD	
6 Sep	LTB	50	35-45	*Amblema plicata*	107.7				1	Live	
6 Sep	LTB	50	35-45	*Amblema plicata*	105.2				1	Live	
6 Sep	LTB	50	35-45	*Ligumia recta*	128.6			F	1	Live	
6 Sep	LTB	50	35-45	*Ligumia recta*	150+			F	1	Live	
6 Sep	LTB	50	35-45	*Theliderma metanevra*	82				1	Live	
6 Sep	LTB	50	35-45	*Theliderma metanevra*	74.5				1	Live	
6 Sep	LTB	50	35-45	*Theliderma metanevra*	87.2				1	Live	
6 Sep	LTB	50	35-45	*Theliderma metanevra*	75.8				1	Live	
6 Sep	LTB	50	35-45	*Cyclonaias pustulosa*	64.1				1	Live	
6 Sep	LTB	50	35-45	*Ellipsaria lineolata*	73.4				1	Live	
6 Sep	LTB	50	35-45	*Pleurobema cordatum*	75.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	50	35-45	*Pleurobema cordatum*	82				1	Live	
6 Sep	LTB	50	35-45	*Cyclonaias pustulosa*					1	WD	
6 Sep	LTB	50	35-45	*Ligumia recta*					1	WD	
6 Sep	LTB	50	35-45	*Lampsilis cardium*					1	WD	
6 Sep	LTB	50	45-55	*Ligumia recta*	139.5			M	1	Live	
6 Sep	LTB	50	45-55	*Ligumia recta*	132.2			M	1	Live	
6 Sep	LTB	50	45-55	*Lampsilis cardium*	84			M	1	Live	
6 Sep	LTB	50	45-55	*Actinonaias ligamentina*	108.1				1	Live	
6 Sep	LTB	50	45-55	*Ellipsaria lineolata*	91.5				1	Live	
6 Sep	LTB	50	45-55	*Ellipsaria lineolata*	65.1				1	Live	
6 Sep	LTB	50	45-55	*Theliderma metanevra*	77				1	Live	
6 Sep	LTB	50	45-55	*Theliderma metanevra*	78.5				1	Live	
6 Sep	LTB	50	45-55	*Amblema plicata*	100.7				1	Live	
6 Sep	LTB	50	45-55	*Pleurobema cordatum*	69.2				1	Live	
6 Sep	LTB	50	45-55	*Pleurobema cordatum*	70.8				1	Live	
6 Sep	LTB	50	45-55	*Cyclonaias pustulosa*	50.5				1	Live	
6 Sep	LTB	50	45-55	*Cyclonaias pustulosa*	44.1				1	Live	
6 Sep	LTB	50	45-55	*Quadrula quadrula*	59.4				1	Live	
6 Sep	LTB	50	45-55	*Amblema plicata*					3	WD	
6 Sep	LTB	50	45-55	*Obliquaria reflexa*					1	WD	
6 Sep	LTB	50	55-65	*Ligumia recta*	140.1			F	1	Live	
6 Sep	LTB	50	55-65	*Ligumia recta*	125			F	1	Live	
6 Sep	LTB	50	55-65	*Potamilus alatus*	118.9				1	Live	
6 Sep	LTB	50	55-65	*Megalonaias nervosa*	130				1	Live	
6 Sep	LTB	50	55-65	*Lampsilis cardium*	103.1			F	1	Live	
6 Sep	LTB	50	55-65	*Quadrula quadrula*	56.5				1	Live	
6 Sep	LTB	50	55-65	*Theliderma metanevra*	78.2				1	Live	
6 Sep	LTB	50	55-65	*Theliderma metanevra*	71				1	Live	
6 Sep	LTB	50	55-65	*Theliderma metanevra*	77.4				1	Live	
6 Sep	LTB	50	55-65	*Theliderma metanevra*	82				1	Live	
6 Sep	LTB	50	55-65	*Theliderma metanevra*	62.5				1	Live	
6 Sep	LTB	50	55-65	*Amblema plicata*	84				1	Live	
6 Sep	LTB	50	55-65	*Amblema plicata*	94.6				1	Live	
6 Sep	LTB	50	55-65	*Pleurobema cordatum*	85.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	50	55-65	*Pleurobema cordatum*	92.4				1	Live	
6 Sep	LTB	50	55-65	*Obliquaria reflexa*	52.1				1	Live	
6 Sep	LTB	50	55-65	*Obliquaria reflexa*	51.8				1	Live	
6 Sep	LTB	50	55-65	*Cyclonaias pustulosa*	49.5				1	Live	
6 Sep	LTB	50	55-65	*Ellipsaria lineolata*	84.2				1	Live	
6 Sep	LTB	50	55-65	*Amblema plicata*					1	WD	
6 Sep	LTB	51	0-5	No mussels							
6 Sep	LTB	51	5-15	No mussels							
6 Sep	LTB	51	15-25	*Ligumia recta*	147			M	1	Live	
6 Sep	LTB	51	25-35	*Megalonaias nervosa*					1	WD	
6 Sep	LTB	51	25-35	*Amblema plicata*	92.5				1	Live	
6 Sep	LTB	51	25-35	*Cyclonaias pustulosa*	59.2				1	Live	
6 Sep	LTB	51	25-35	*Ligumia recta*					1	WD	
6 Sep	LTB	51	35-45	*Amblema plicata*	103				1	Live	
6 Sep	LTB	51	35-45	*Megalonaias nervosa*	150+				1	Live	
6 Sep	LTB	51	35-45	*Megalonaias nervosa*					1	WD	
6 Sep	LTB	51	35-45	*Quadrula quadrula*	63.5				1	Live	
6 Sep	LTB	51	35-45	*Amblema plicata*					1	WD	
6 Sep	LTB	51	45-55	*Ellipsaria lineolata*	94.5				1	Live	
6 Sep	LTB	51	45-55	*Ellipsaria lineolata*	84.1				1	Live	
6 Sep	LTB	51	45-55	*Ellipsaria lineolata*	81				1	Live	
6 Sep	LTB	51	45-55	*Ligumia recta*	138.1			M	1	Live	
6 Sep	LTB	51	45-55	*Ligumia recta*	144			F	1	Live	
6 Sep	LTB	51	45-55	*Amblema plicata*	100				1	Live	
6 Sep	LTB	51	45-55	*Amblema plicata*	98.6				1	Live	
6 Sep	LTB	51	45-55	*Cyclonaias pustulosa*	53.7				1	Live	
6 Sep	LTB	51	45-55	*Cyclonaias pustulosa*	60				1	Live	
6 Sep	LTB	51	45-55	*Cyclonaias pustulosa*	67.1				1	Live	
6 Sep	LTB	51	45-55	*Theliderma metanevra*	90.2				1	Live	
6 Sep	LTB	51	45-55	*Actinonaias ligamentina*	115.5				1	Live	
6 Sep	LTB	51	55-65	*Actinonaias ligamentina*	123				1	Live	
6 Sep	LTB	51	55-65	*Actinonaias ligamentina*	110.2				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	76.5				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	72.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	51	55-65	*Theliderma metanevra*	84.8				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	78.2				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	72				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	83.5				1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*	80.1				1	Live	
6 Sep	LTB	51	55-65	*Plethobasus cyphyus**	110.2	47.7	80		1	Live	1935 Yellow
6 Sep	LTB	51	55-65	*Amblema plicata*	101.2				1	Live	
6 Sep	LTB	51	55-65	*Amblema plicata*	95.8				1	Live	
6 Sep	LTB	51	55-65	*Amblema plicata*	99.4				1	Live	
6 Sep	LTB	51	55-65	*Ellipsaria lineolata*	74				1	Live	
6 Sep	LTB	51	55-65	*Ellipsaria lineolata*	70.5				1	Live	
6 Sep	LTB	51	55-65	*Ellipsaria lineolata*	71.2				1	Live	
6 Sep	LTB	51	55-65	*Ellipsaria lineolata*	75.5				1	Live	
6 Sep	LTB	51	55-65	*Ellipsaria lineolata*	54.1				1	Live	
6 Sep	LTB	51	55-65	*Ligumia recta*	147.4			M	1	Live	
6 Sep	LTB	51	55-65	*Ligumia recta*	144			M	1	Live	
6 Sep	LTB	51	55-65	*Theliderma metanevra*					1	WD	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	61.2				1	Live	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	59.1				1	Live	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	62.5				1	Live	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	58.5				1	Live	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	68.1				1	Live	
6 Sep	LTB	51	55-65	*Cyclonaias pustulosa*	53				1	Live	
6 Sep	LTB	51	55-65	*Obliquaria reflexa*	45.1				1	Live	
6 Sep	LTB	51	55-65	*Obliquaria reflexa*	53				1	Live	
6 Sep	LTB	51	55-65	*Pleurobema cordatum*	79				1	Live	
6 Sep	LTB	51	55-65	*Pleurobema sintoxia*	76.5				1	Live	
6 Sep	LTB	51	55-65	*Pleurobema sintoxia*	99				1	Live	
6 Sep	IB	52	0-5	No mussels							
7 Sep	IB	53	5-15	*Potamilus alatus*	117.4				1	Live	
6 Sep	IB	52	5-15	*Potamilus alatus*	97.5				1	Live	
6 Sep	IB	52	5-15	*Potamilus alatus*	138				1	Live	
6 Sep	IB	52	5-15	*Amblema plicata*	96.7				1	Live	
6 Sep	IB	52	5-15	*Amblema plicata*	74.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	IB	52	5-15	*Ligumia recta*	148.7			M	1	Live	
6 Sep	IB	52	5-15	*Ligumia recta*	138.4			M	1	Live	
6 Sep	IB	52	5-15	*Ligumia recta*	124			F	1	Live	
6 Sep	IB	52	5-15	*Ligumia recta*	139.8			F	1	Live	
6 Sep	LTB	52	15-25	*Ligumia recta*	140.1			M	1	Live	
6 Sep	LTB	52	15-25	*Ligumia recta*	141.5			M	1	Live	
6 Sep	LTB	52	15-25	*Ligumia recta*	150+			M	1	Live	
6 Sep	LTB	52	15-25	*Obliquaria reflexa*	45.2				1	Live	
6 Sep	LTB	52	15-25	*Amblema plicata*	88.7				1	Live	
6 Sep	LTB	52	25-35	*Amblema plicata*	118.1				1	Live	
6 Sep	LTB	52	25-35	*Amblema plicata*	100				1	Live	
6 Sep	LTB	52	25-35	*Ligumia recta*	118.3			F	1	Live	
6 Sep	LTB	52	35-45	*Ligumia recta*	129.5			F	1	Live	
6 Sep	LTB	52	35-45	*Amblema plicata*	88.3				1	Live	
6 Sep	LTB	52	35-45	*Amblema plicata*	106.5				1	Live	
6 Sep	LTB	52	35-45	*Amblema plicata*	107.1				1	Live	
6 Sep	LTB	52	35-45	*Amblema plicata*	96				1	Live	
6 Sep	LTB	52	35-45	*Actinonaias ligamentina*	108.4				1	Live	
6 Sep	LTB	52	35-45	*Actinonaias ligamentina*	121				1	Live	
6 Sep	LTB	52	35-45	*Obliquaria reflexa*	48.5				1	Live	
6 Sep	LTB	52	35-45	*Cyclonaias pustulosa*	57				1	Live	
6 Sep	LTB	52	35-45	*Pleurobema sintoxia*	94.2				1	Live	
6 Sep	LTB	52	35-45	*Obovaria subrotunda**	42.5	26.1	38.8		1	Live	1945 Yellow
6 Sep	LTB	52	45-55	*Potamilus alatus*	110.5				1	Live	
6 Sep	LTB	52	45-55	*Amblema plicata*	64.2				1	Live	
6 Sep	LTB	52	45-55	*Amblema plicata*	107.7				1	Live	
6 Sep	LTB	52	45-55	*Ellipsaria lineolata*	80.5				1	Live	
6 Sep	LTB	52	45-55	*Ellipsaria lineolata*	73.1				1	Live	
6 Sep	LTB	52	45-55	*Theliderma metanevra*	63.7				1	Live	
6 Sep	LTB	52	45-55	*Theliderma metanevra*	82.4				1	Live	
6 Sep	LTB	52	45-55	*Pleurobema sintoxia*	88.1				1	Live	
6 Sep	LTB	52	45-55	*Actinonaias ligamentina*	108				1	Live	
6 Sep	LTB	52	45-55	*Obliquaria reflexa*	51.1				1	Live	
6 Sep	LTB	52	45-55	*Cyclonaias pustulosa*	63.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	52	55-65	*Ligumia recta*	145.2			M	1	Live	
6 Sep	LTB	52	55-65	*Ligumia recta*	132.1			M	1	Live	
6 Sep	LTB	52	55-65	*Ellipsaria lineolata*	85.2				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	83				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	79.2				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	81.5				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	73.2				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	85.5				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	79.3				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	83.2				1	Live	
6 Sep	LTB	52	55-65	*Theliderma metanevra*	71.2				1	Live	
6 Sep	LTB	52	55-65	*Lampsilis cardium*	114			F	1	Live	
6 Sep	LTB	52	55-65	*Lampsilis cardium*	123.1			M	1	Live	
6 Sep	LTB	52	55-65	*Lampsilis cardium*	118.5			F	1	Live	
6 Sep	LTB	52	55-65	*Amblema plicata*	109.1				1	Live	
6 Sep	LTB	52	55-65	*Amblema plicata*	96.5				1	Live	
6 Sep	LTB	52	55-65	*Plethobasus cyphyus**	107	49.7	72.9		1	Live	0739 Yellow
6 Sep	LTB	52	55-65	*Cyclonaias pustulosa*	59.5				1	Live	
6 Sep	LTB	52	55-65	*Cyclonaias pustulosa*	51.2				1	Live	
6 Sep	LTB	52	55-65	*Cyclonaias pustulosa*	57.1				1	Live	
6 Sep	LTB	52	55-65	*Obliquaria reflexa*	50				1	Live	
6 Sep	LTB	52	55-65	*Obliquaria reflexa*	49.5				1	Live	
6 Sep	LTB	52	55-65	*Obliquaria reflexa*					1	WD	
6 Sep	LTB	52	55-65	*Pleurobema cordatum*	64				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema cordatum*	81.5				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema cordatum*	62.1				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema sintoxia*	86.2				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema sintoxia*	87.1				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema sintoxia*	92.5				1	Live	
6 Sep	LTB	52	55-65	*Pleurobema sintoxia*	85.1				1	Live	
6 Sep	IB	53	0-5	No mussels							
6 Sep	IB	53	5-15	*Potamilus alatus*	104.5				1	Live	
6 Sep	LTB	53	15-25	*Ligumia recta*	133.1				1	Live	
6 Sep	LTB	53	25-35	*Megalonaias nervosa*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	53	25-35	*Amblema plicata*	105.3				1	Live	
6 Sep	LTB	53	35-45	*Amblema plicata*	72.1				1	Live	
6 Sep	LTB	53	35-45	*Amblema plicata*	94.5				1	Live	
6 Sep	LTB	53	35-45	*Lampsilis cardium*	118.5			F	1	Live	
6 Sep	LTB	53	35-45	*Ligumia recta*	147.1			M	1	Live	
6 Sep	LTB	53	35-45	*Pleurobema cordatum*	67.1				1	Live	
6 Sep	LTB	53	35-45	*Amblema plicata*					2	WD	
6 Sep	LTB	53	45-55	*Ellipsaria lineolata*	85				1	Live	
6 Sep	LTB	53	45-55	*Theliderma metanevra*	80				1	Live	
6 Sep	LTB	53	45-55	*Actinonaias ligamentina*	90.5				1	Live	
6 Sep	LTB	53	45-55	*Theliderma metanevra*					1	WD	
6 Sep	LTB	53	55-65	*Ellipsaria lineolata*	91.4				1	Live	
6 Sep	LTB	53	55-65	*Ellipsaria lineolata*	67.2				1	Live	
6 Sep	LTB	53	55-65	*Ellipsaria lineolata*	78				1	Live	
6 Sep	LTB	53	55-65	*Ellipsaria lineolata*	83.4				1	Live	
6 Sep	LTB	53	55-65	*Actinonaias ligamentina*	120.7				1	Live	
6 Sep	LTB	53	55-65	*Actinonaias ligamentina*	121.2				1	Live	
6 Sep	LTB	53	55-65	*Obliquaria reflexa*	45.2				1	Live	
6 Sep	LTB	53	55-65	*Obliquaria reflexa*	55.8				1	Live	
6 Sep	LTB	53	55-65	*Quadrula quadrula*	49.5				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	86.1				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	78.7				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	77.4				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	76				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	68				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	83.5				1	Live	
6 Sep	LTB	53	55-65	*Theliderma metanevra*	78.1				1	Live	
6 Sep	LTB	53	55-65	*Cyclonaias pustulosa*	56.5				1	Live	
6 Sep	LTB	53	55-65	*Cyclonaias pustulosa*	59.4				1	Live	
6 Sep	LTB	53	55-65	*Ligumia recta*	147.7			M	1	Live	
6 Sep	LTB	53	55-65	*Ligumia recta*	140.1			M	1	Live	
6 Sep	LTB	53	55-65	*Pleurobema cordatum*	88.6			M	1	Live	
6 Sep	LTB	53	55-65	*Pleurobema cordatum*	85.1				1	Live	
6 Sep	LTB	53	55-65	*Pleurobema cordatum*	57				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	53	55-65	*Obliquaria reflexa*					1	WD	
6 Sep	ADI	54	0-5	No mussels							
6 Sep	ADI	54	5-15	*Potamilus alatus*	110.8				1	Live	
6 Sep	ADI	54	5-15	*Potamilus alatus*	109				1	Live	
6 Sep	ADI	54	5-15	*Potamilus alatus*	70.5				1	Live	
6 Sep	ADI	54	5-15	*Ligumia recta*					1	WD	
6 Sep	LTB	54	15-25	*Ligumia recta*	123.4			M	1	Live	
6 Sep	LTB	54	15-25	*Ligumia recta*	150+			M	1	Live	
6 Sep	LTB	54	15-25	*Ligumia recta*	135.5			F	1	Live	
6 Sep	LTB	54	15-25	*Amblema plicata*	104				1	Live	
6 Sep	LTB	54	15-25	*Amblema plicata*	99.4				1	Live	
6 Sep	LTB	54	15-25	*Amblema plicata*					2	WD	
6 Sep	LTB	54	15-25	*Plethobasus cyphyus**	99.8	47.9	74.7		1	Live	1714 Yellow
6 Sep	LTB	54	25-35	*Obliquaria reflexa*	43				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	103.1				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	108.4				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	107.2				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	109				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	98				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	93.2				1	Live	
6 Sep	LTB	54	35-45	*Amblema plicata*	83.5				1	Live	
6 Sep	LTB	54	35-45	*Ligumia recta*	139			M	1	Live	
6 Sep	LTB	54	35-45	*Megalonaias nervosa*	150+				1	Live	
6 Sep	LTB	54	35-45	*Theliderma metanevra*	66.8				1	Live	
6 Sep	LTB	54	35-45	*Theliderma metanevra*	76.1				1	Live	
6 Sep	LTB	54	35-45	*Theliderma metanevra*	74				1	Live	
6 Sep	LTB	54	35-45	*Cyclonaias pustulosa*	51.5				1	Live	
6 Sep	LTB	54	35-45	*Cyclonaias pustulosa*	58.4				1	Live	
6 Sep	LTB	54	35-45	*Cyclonaias pustulosa*	54				1	Live	
6 Sep	LTB	54	35-45	*Ellipsaria lineolata*					2	WD	
6 Sep	LTB	54	45-55	*Lampsilis cardium*	101.1			F	1	Live	
6 Sep	LTB	54	45-55	*Ligumia recta*	132.1			M	1	Live	
6 Sep	LTB	54	45-55	*Ligumia recta*	144.8			M	1	Live	
6 Sep	LTB	54	45-55	*Ligumia recta*	125			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	54	45-55	*Ligumia recta*	131.4			F	1	Live	
6 Sep	LTB	54	45-55	*Ellipsaria lineolata*	80				1	Live	
6 Sep	LTB	54	45-55	*Ellipsaria lineolata*	93.5				1	Live	
6 Sep	LTB	54	45-55	*Pleurobema cordatum*	61.4				1	Live	
6 Sep	LTB	54	45-55	*Theliderma metanevra*	77.5				1	Live	
6 Sep	LTB	54	45-55	*Potamilus alatus*	113				1	Live	
6 Sep	LTB	54	45-55	*Quadrula quadrula*	60				1	Live	
6 Sep	LTB	54	45-55	*Amblema plicata*					1	WD	
6 Sep	LTB	54	45-55	*Theliderma metanevra*					1	WD	
6 Sep	LTB	54	55-65	*Actinonaias ligamentina*	118				1	Live	
6 Sep	LTB	54	55-65	*Lampsilis cardium*	124.2			M	1	Live	
6 Sep	LTB	54	55-65	*Amblema plicata*	99.4				1	Live	
6 Sep	LTB	54	55-65	*Amblema plicata*	102.8				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	74.1				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	78.5				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	88.4				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	76.1				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	64				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	82				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	67.1				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	75.5				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	82.7				1	Live	
6 Sep	LTB	54	55-65	*Theliderma metanevra*	75				1	Live	
6 Sep	LTB	54	55-65	*Pleurobema cordatum*	92.4				1	Live	
6 Sep	LTB	54	55-65	*Potamilus alatus*	102				1	Live	
6 Sep	LTB	54	55-65	*Potamilus alatus*	104.1				1	Live	
6 Sep	LTB	54	55-65	*Ellipsaria lineolata*	78.2				1	Live	
6 Sep	LTB	54	55-65	*Ellipsaria lineolata*	61				1	Live	
6 Sep	LTB	54	55-65	*Quadrula quadrula*	70				1	Live	
6 Sep	LTB	54	55-65	*Ligumia recta*	131.8			F	1	Live	
6 Sep	LTB	54	55-65	*Obliquaria reflexa*	43.7				1	Live	
6 Sep	LTB	54	55-65	*Cyclonaias pustulosa*					1	WD	
6 Sep	LTB	54	55-65	*Amblema plicata*					1	WD	
6 Sep	ADI	55	0-5	No mussels							

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	ADI	55	5-15	No mussels							
6 Sep	LTB	55	15-25	*Ligumia recta*	131.5			F	1	Live	
6 Sep	LTB	55	15-25	*Ligumia recta*	139			F	1	Live	
6 Sep	LTB	55	15-25	*Ligumia recta*	150+			F	1	Live	
6 Sep	LTB	55	15-25	*Ligumia recta*	135			F	1	Live	
6 Sep	LTB	55	15-25	*Ligumia recta*	131			F	1	Live	
6 Sep	LTB	55	15-25	*Obliquaria reflexa*	58.1				1	Live	
6 Sep	LTB	55	15-25	*Obliquaria reflexa*	44				1	Live	
6 Sep	LTB	55	15-25	*Amblema plicata*					1	WD	
6 Sep	LTB	55	25-35	*Quadrula quadrula*	65.4				1	Live	
6 Sep	LTB	55	25-35	*Amblema plicata*	96				1	Live	
6 Sep	LTB	55	25-35	*Amblema plicata*	80.5				1	Live	
6 Sep	LTB	55	25-35	*Amblema plicata*	93.1				1	Live	
6 Sep	LTB	55	25-35	*Amblema plicata*	98.6				1	Live	
6 Sep	LTB	55	25-35	*Quadrula quadrula*	60.5				1	Live	
6 Sep	LTB	55	25-35	*Megalonaias nervosa*	150+				1	Live	
6 Sep	LTB	55	25-35	*Ellipsaria lineolata*	64.4				1	Live	
6 Sep	LTB	55	25-35	*Cyclonaias pustulosa*	53				1	Live	
6 Sep	LTB	55	25-35	*Lampsilis cardium*	98.5			F	1	Live	
6 Sep	LTB	55	25-35	*Ligumia recta*	135			M	1	Live	
6 Sep	LTB	55	25-35	*Actinonaias ligamentina*	130.5				1	Live	
6 Sep	LTB	55	35-45	*Theliderma metanevra*	73				1	Live	
6 Sep	LTB	55	35-45	*Quadrula quadrula*	55.7				1	Live	
6 Sep	LTB	55	35-45	*Cyclonaias pustulosa*	70.5				1	Live	
6 Sep	LTB	55	35-45	*Lampsilis siliquoidea*	94			F	1	Live	
6 Sep	LTB	55	35-45	*Amblema plicata*	106.5				1	Live	
6 Sep	LTB	55	35-45	*Obliquaria reflexa*	45.7				1	Live	
6 Sep	LTB	55	35-45	*Actinonaias ligamentina*	100				1	Live	
6 Sep	LTB	55	35-45	*Pleurobema sintoxia*	75.5				1	Live	
6 Sep	LTB	55	45-55	*Amblema plicata*	104.4				1	Live	
6 Sep	LTB	55	45-55	*Amblema plicata*	110				1	Live	
6 Sep	LTB	55	45-55	*Amblema plicata*	113.5				1	Live	
6 Sep	LTB	55	45-55	*Amblema plicata*	102.3				1	Live	
6 Sep	LTB	55	45-55	*Megalonaias nervosa*	150+				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
6 Sep	LTB	55	45-55	*Ligumia recta*	147.1			M	1	Live	
6 Sep	LTB	55	45-55	*Ligumia recta*	126			F	1	Live	
6 Sep	LTB	55	45-55	*Ligumia recta*	134.2			F	1	Live	
6 Sep	LTB	55	45-55	*Ligumia recta*	126.5			F	1	Live	
6 Sep	LTB	55	45-55	*Potamilus alatus*	128.5				1	Live	
6 Sep	LTB	55	45-55	*Ellipsaria lineolata*	95				1	Live	
6 Sep	LTB	55	45-55	*Quadrula quadrula*	68.2				1	Live	
6 Sep	LTB	55	45-55	*Obliquaria reflexa*	55				1	Live	
6 Sep	LTB	55	45-55	*Lampsilis cardium*	114.5			M	1	Live	
6 Sep	LTB	55	45-55	*Pleurobema cordatum*	83.2				1	Live	
6 Sep	LTB	55	45-55	*Cyclonaias pustulosa*					1	WD	
6 Sep	LTB	55	55-65	*Potamilus alatus*	118				1	Live	
6 Sep	LTB	55	55-65	*Potamilus alatus*	99.5				1	Live	
6 Sep	LTB	55	55-65	*Lampsilis cardium*	104			F	1	Live	
6 Sep	LTB	55	55-65	*Pleurobema cordatum*	98.2				1	Live	
6 Sep	LTB	55	55-65	*Pleurobema cordatum*	80				1	Live	
6 Sep	LTB	55	55-65	*Pleurobema cordatum*	81.2				1	Live	
6 Sep	LTB	55	55-65	*Pleurobema sintoxia*	98				1	Live	
6 Sep	LTB	55	55-65	*Ellipsaria lineolata*	86.1				1	Live	
6 Sep	LTB	55	55-65	*Ellipsaria lineolata*	85.4				1	Live	
6 Sep	LTB	55	55-65	*Ellipsaria lineolata*	63.5				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	72				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	74.5				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	84.2				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	64				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	76				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	79.5				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	64.5				1	Live	
6 Sep	LTB	55	55-65	*Theliderma metanevra*	73.1				1	Live	
6 Sep	LTB	55	55-65	*Amblema plicata*	89.2				1	Live	
6 Sep	LTB	55	55-65	*Amblema plicata*	80				1	Live	
6 Sep	LTB	55	55-65	*Cyclonaias pustulosa*	66.4				1	Live	
6 Sep	LTB	55	55-65	*Cyclonaias pustulosa*	55				1	Live	
6 Sep	LTB	55	55-65	*Ligumia recta*	70			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	ADI	56	0-5	No mussels							
7 Sep	ADI	56	5-15	*Ligumia recta*	146.2			F	1	Live	
7 Sep	ADI	56	5-15	*Potamilus alatus*	63				1	Live	
7 Sep	ADI	56	5-15	*Amblema plicata*	77.4				1	Live	
7 Sep	LTB	56	15-25	*Ligumia recta*	131.4			F	1	Live	
7 Sep	LTB	56	15-25	*Ligumia recta*	132.1			F	1	Live	
7 Sep	LTB	56	15-25	*Ligumia recta*	134.6			F	1	Live	
7 Sep	LTB	56	15-25	*Potamilus alatus*	113.1				1	Live	
7 Sep	LTB	56	15-25	*Potamilus alatus*	112.2				1	Live	
7 Sep	LTB	56	15-25	*Cyclonaias pustulosa*	49.4				1	Live	
7 Sep	LTB	56	15-25	*Cyclonaias pustulosa*	61.3				1	Live	
7 Sep	LTB	56	15-25	*Obliquaria reflexa*	56.1				1	Live	
7 Sep	LTB	56	25-35	*Lampsilis cardium*	117.8			M	1	Live	
7 Sep	LTB	56	25-35	*Amblema plicata*	107				1	Live	
7 Sep	LTB	56	25-35	*Amblema plicata*	105.6				1	Live	
7 Sep	LTB	56	25-35	*Amblema plicata*	104.8				1	Live	
7 Sep	LTB	56	25-35	*Potamilus alatus*	115.2				1	Live	
7 Sep	LTB	56	35-45	*Ligumia recta*	142.5			M	1	Live	
7 Sep	LTB	56	35-45	*Theliderma metanevra*	86.3				1	Live	
7 Sep	LTB	56	35-45	*Theliderma metanevra*	75.2				1	Live	
7 Sep	LTB	56	35-45	*Amblema plicata*	84.1				1	Live	
7 Sep	LTB	56	35-45	*Amblema plicata*	86.2				1	Live	
7 Sep	LTB	56	35-45	*Amblema plicata*	105.6				1	Live	
7 Sep	LTB	56	35-45	*Ellipsaria lineolata*	75.1				1	Live	
7 Sep	LTB	56	35-45	*Ellipsaria lineolata*	81.3				1	Live	
7 Sep	LTB	56	35-45	*Ellipsaria lineolata*	88.8				1	Live	
7 Sep	LTB	56	35-45	*Quadrula quadrula*	61.3				1	Live	
7 Sep	LTB	56	35-45	*Cyclonaias pustulosa*	62				1	Live	
7 Sep	LTB	56	35-45	*Cyclonaias pustulosa*	67.9				1	Live	
7 Sep	LTB	56	35-45	*Cyclonaias pustulosa*	57.7				1	Live	
7 Sep	LTB	56	35-45	*Lampsilis cardium*	128.3			F	1	Live	
7 Sep	LTB	56	45-55	*Amblema plicata*	120				1	Live	
7 Sep	LTB	56	45-55	*Amblema plicata*	113.9				1	Live	
7 Sep	LTB	56	45-55	*Amblema plicata*	73.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	56	45-55	*Theliderma metanevra*	85.4				1	Live	
7 Sep	LTB	56	45-55	*Theliderma metanevra*	80.2				1	Live	
7 Sep	LTB	56	45-55	*Ellipsaria lineolata*	74.6				1	Live	
7 Sep	LTB	56	45-55	*Cyclonaias pustulosa*	52.9				1	Live	
7 Sep	LTB	56	45-55	*Lampsilis cardium*	109.3			F	1	Live	
7 Sep	LTB	56	55-65	*Actinonaias ligamentina*	135.6				1	Live	
7 Sep	LTB	56	55-65	*Actinonaias ligamentina*	113.4				1	Live	
7 Sep	LTB	56	55-65	*Ellipsaria lineolata*	90.5				1	Live	
7 Sep	LTB	56	55-65	*Ellipsaria lineolata*	79.6				1	Live	
7 Sep	LTB	56	55-65	*Ellipsaria lineolata*	98.1				1	Live	
7 Sep	LTB	56	55-65	*Ellipsaria lineolata*	84.4				1	Live	
7 Sep	LTB	56	55-65	*Ligumia recta*	132			F	1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	85.1				1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	87.5				1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	83.2				1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	85.6				1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	83.9				1	Live	
7 Sep	LTB	56	55-65	*Theliderma metanevra*	84.1				1	Live	
7 Sep	LTB	56	55-65	*Quadrula quadrula*	65.9				1	Live	
7 Sep	LTB	56	55-65	*Cyclonaias pustulosa*	66.6				1	Live	
7 Sep	LTB	56	55-65	*Cyclonaias pustulosa*	56.2				1	Live	
7 Sep	LTB	56	55-65	*Pleurobema sintoxia*	63				1	Live	
7 Sep	LTB	56	55-65	*Pleurobema sintoxia*	71				1	Live	
7 Sep	LTB	56	55-65	*Pleurobema sintoxia*	99.1				1	Live	
7 Sep	LTB	56	55-65	*Pleurobema cordatum*	88.3				1	Live	
7 Sep	IB	57	0-5	No mussels							
7 Sep	IB	57	5-15	*Amblema plicata*	101.3				1	Live	
7 Sep	IB	57	5-15	*Potamilus alatus*	120.2				1	Live	
7 Sep	IB	57	5-15	*Potamilus alatus*	133				1	Live	
7 Sep	IB	57	5-15	*Lampsilis siliquoidea*	87.6			F	1	Live	
7 Sep	IB	57	5-15	*Lampsilis siliquoidea*	101.2			F	1	Live	
7 Sep	LTB	57	15-25	*Amblema plicata*	111.9				1	Live	
7 Sep	LTB	57	15-25	*Amblema plicata*	103				1	Live	
7 Sep	LTB	57	15-25	*Amblema plicata*	123				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	57	15-25	*Amblema plicata*	106.8				1	Live	
7 Sep	LTB	57	15-25	*Amblema plicata*	69.1				1	Live	
7 Sep	LTB	57	15-25	*Ellipsaria lineolata*	85.7				1	Live	
7 Sep	LTB	57	15-25	*Quadrula quadrula*	67.7				1	Live	
7 Sep	LTB	57	15-25	*Ligumia recta*	142.6			M	1	Live	
7 Sep	LTB	57	25-35	*Ligumia recta*	145.2			F	1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	112.3				1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	99.5				1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	89.7				1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	84.2				1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	79				1	Live	
7 Sep	LTB	57	25-35	*Amblema plicata*	82.9				1	Live	
7 Sep	LTB	57	25-35	*Actinonaias ligamentina*	115.6				1	Live	
7 Sep	LTB	57	25-35	*Ellipsaria lineolata*	85.5				1	Live	
7 Sep	LTB	57	25-35	*Ellipsaria lineolata*	81.2				1	Live	
7 Sep	LTB	57	25-35	*Cyclonaias pustulosa*	64.6				1	Live	
7 Sep	LTB	57	25-35	*Cyclonaias pustulosa*	57.3				1	Live	
7 Sep	LTB	57	25-35	*Cyclonaias pustulosa*	63.8				1	Live	
7 Sep	LTB	57	35-45	*Potamilus alatus*	61.7				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	101				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	105.4				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	102.3				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	102.5				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	96.5				1	Live	
7 Sep	LTB	57	35-45	*Amblema plicata*	91.6				1	Live	
7 Sep	LTB	57	35-45	*cyclonaias pustulosa*	66				1	Live	
7 Sep	LTB	57	35-45	*Cyclonaias pustulosa*	55.1				1	Live	
7 Sep	LTB	57	35-45	*Cyclonaias pustulosa*	69.5				1	Live	
7 Sep	LTB	57	35-45	*Ellipsaria lineolata*	79.1				1	Live	
7 Sep	LTB	57	35-45	*Ligumia recta*	138.8			M	1	Live	
7 Sep	LTB	57	35-45	*Actinonaias ligamentina*	111.9				1	Live	
7 Sep	LTB	57	35-45	*Actinonaias ligamentina*	112.6				1	Live	
7 Sep	LTB	57	35-45	*Pleurobema sintoxia*	93.2				1	Live	
7 Sep	LTB	57	45-55	*Ligumia recta*	84.1			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	57	45-55	*Ligumia recta*	144.6			M	1	Live	
7 Sep	LTB	57	45-55	*Ligumia recta*	126.9			F	1	Live	
7 Sep	LTB	57	45-55	*Ellipsaria lineolata*	56.2				1	Live	
7 Sep	LTB	57	45-55	*Ellipsaria lineolata*	67.4				1	Live	
7 Sep	LTB	57	45-55	*Ellipsaria lineolata*	87.9				1	Live	
7 Sep	LTB	57	45-55	*Ellipsaria lineolata*					1	WD	
7 Sep	LTB	57	45-55	*Cyclonaias pustulosa*	56.2				1	Live	
7 Sep	LTB	57	45-55	*Cyclonaias pustulosa*	60.3				1	Live	
7 Sep	LTB	57	45-55	*Cyclonaias pustulosa*	52.6				1	Live	
7 Sep	LTB	57	45-55	*Cyclonaias pustulosa*					1	WD	
7 Sep	LTB	57	45-55	*Lampsilis cardium*	105			F	1	Live	
7 Sep	LTB	57	45-55	*Lampsilis cardium*	109.6			M	1	Live	
7 Sep	LTB	57	45-55	*Actinonaias ligamentina*	102.4				1	Live	
7 Sep	LTB	57	45-55	*Pleurobema sintoxia*	77.8				1	Live	
7 Sep	LTB	57	45-55	*Pleurobema cordatum*	66				1	Live	
7 Sep	LTB	57	55-65	*Lampsilis cardium*	105			F	1	Live	
7 Sep	LTB	57	55-65	*Pleurobema sintoxia*	78.7				1	Live	
7 Sep	LTB	57	55-65	*Pleurobema sintoxia*	92.3				1	Live	
7 Sep	LTB	57	55-65	*Pleurobema cordatum*	67.7				1	Live	
7 Sep	LTB	57	55-65	*Pleurobema cordatum*	79.3				1	Live	
7 Sep	LTB	57	55-65	*Ligumia recta*	150+			M	1	Live	
7 Sep	LTB	57	55-65	*Amblema plicata*	114.9				1	Live	
7 Sep	LTB	57	55-65	*Amblema plicata*	95				1	Live	
7 Sep	LTB	57	55-65	*Cyclonaias pustulosa*	75.2				1	Live	
7 Sep	LTB	57	55-65	*Cyclonaias pustulosa*	59				1	Live	
7 Sep	LTB	57	55-65	*Cyclonaias pustulosa*	59.5				1	Live	
7 Sep	LTB	57	55-65	*Cyclonaias pustulosa*	54.5				1	Live	
7 Sep	LTB	57	55-65	*Cyclonaias pustulosa*					1	WD	
7 Sep	LTB	57	55-65	*Theliderma metanevra*	77.7				1	Live	
7 Sep	LTB	57	55-65	*Theliderma metanevra*	82.6				1	Live	
7 Sep	LTB	57	55-65	*Theliderma metanevra*	83				1	Live	
7 Sep	LTB	57	55-65	*Theliderma metanevra*	80.3				1	Live	
7 Sep	LTB	57	55-65	*Theliderma metanevra*	62				1	Live	
7 Sep	LTB	57	55-65	*Ellipsaria lineolata*	65				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	57	55-65	*Ellipsaria lineolata*	89.2				1	Live	
7 Sep	LTB	57	55-65	*Ellipsaria lineolata*	79.9				1	Live	
7 Sep	LTB	57	55-65	*Potamilus alatus*	115.4				1	Live	
7 Sep	LTB	57	55-65	*Pleurobema cordatum*	61.7				1	Live	
7 Sep	LTB	57	55-65	*Lampsilis cardium*	103.6			F	1	Live	
7 Sep	LTB	58	0-5	No mussels							
7 Sep	LTB	58	5-15	No mussels							
7 Sep	LTB	58	15-25	*Ligumia recta*	138.1			F	1	Live	
7 Sep	LTB	58	15-25	*Ligumia recta*	133.6			M	1	Live	
7 Sep	LTB	58	15-25	*Potamilus alatus*	114.7				1	Live	
7 Sep	LTB	58	15-25	*Amblema plicata*	97.4				1	Live	
7 Sep	LTB	58	15-25	*Quadrula quadrula*	68.2				1	Live	
7 Sep	LTB	58	15-25	*Quadrula quadrula*	73.1				1	Live	
7 Sep	LTB	58	25-35	*Megalonaias nervosa*	142				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	120.6				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	99.5				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	105.4				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	105.3				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	114.6				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	87.9				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	101.3				1	Live	
7 Sep	LTB	58	25-35	*Amblema plicata*	72				1	Live	
7 Sep	LTB	58	25-35	*Ligumia recta*	148			M	1	Live	
7 Sep	LTB	58	25-35	*Ligumia recta*	133.9			F	1	Live	
7 Sep	LTB	58	25-35	*Ellipsaria lineolata*	96.1				1	Live	
7 Sep	LTB	58	25-35	*Ellipsaria lineolata*	86.3				1	Live	
7 Sep	LTB	58	25-35	*Obliquaria reflexa*	30.4				1	Live	
7 Sep	LTB	58	35-45	*Amblema plicata*	120				1	Live	
7 Sep	LTB	58	35-45	*Amblema plicata*	98				1	Live	
7 Sep	LTB	58	35-45	*Amblema plicata*	104.4				1	Live	
7 Sep	LTB	58	35-45	*Amblema plicata*	105.2				1	Live	
7 Sep	LTB	58	35-45	*Amblema plicata*	105				1	Live	
7 Sep	LTB	58	35-45	*Ellipsaria lineolata*	97				1	Live	
7 Sep	LTB	58	35-45	*Ellipsaria lineolata*	71				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	58	35-45	*Cyclonaias pustulosa*	61.8				1	Live	
7 Sep	LTB	58	35-45	*Ligumia recta*	146.1			M	1	Live	
7 Sep	LTB	58	35-45	*Potamilus alatus*	72.2				1	Live	
7 Sep	LTB	58	35-45	*Pleurobema sintoxia*	101				1	Live	
7 Sep	LTB	58	35-45	*Pleurobema sintoxia*	100.4				1	Live	
7 Sep	LTB	58	35-45	*Pleurobema sintoxia*	94.9				1	Live	
7 Sep	LTB	58	45-55	*cyclonaias pustulosa*	92.3				1	Live	
7 Sep	LTB	58	45-55	*Lampsilis cardium*	114			F	1	Live	
7 Sep	LTB	58	45-55	*Theliderma metanevra*	87.4				1	Live	
7 Sep	LTB	58	45-55	*Theliderma metanevra*	72.5				1	Live	
7 Sep	LTB	58	45-55	*Pleurobema cordatum*	69.5				1	Live	
7 Sep	LTB	58	45-55	*Pleurobema cordatum*	69.1				1	Live	
7 Sep	LTB	58	45-55	*Ellipsaria lineolata*	80				1	Live	
7 Sep	LTB	58	45-55	*Obliquaria reflexa*	66.9				1	Live	
7 Sep	LTB	58	45-55	*Cyclonaias pustulosa*	61				1	Live	
7 Sep	LTB	58	45-55	*Cyclonaias pustulosa*	60.9				1	Live	
7 Sep	LTB	58	45-55	*Amblema plicata*	106.2				1	Live	
7 Sep	LTB	58	45-55	*Amblema plicata*	99.2				1	Live	
7 Sep	LTB	58	45-55	*Ligumia recta*	107.2			M	1	Live	
7 Sep	LTB	58	45-55	*Ligumia recta*	137.5			M	1	Live	
7 Sep	LTB	58	55-65	*Theliderma metanevra*	83.5				1	Live	
7 Sep	LTB	58	55-65	*Theliderma metanevra*	87.7				1	Live	
7 Sep	LTB	58	55-65	*Theliderma metanevra*	61.4				1	Live	
7 Sep	LTB	58	55-65	*Theliderma metanevra*	75				1	Live	
7 Sep	LTB	58	55-65	*Theliderma metanevra*	81.1				1	Live	
7 Sep	LTB	58	55-65	*Pleurobema sintoxia*	94				1	Live	
7 Sep	LTB	58	55-65	*Pleurobema sintoxia*	90.5				1	Live	
7 Sep	LTB	58	55-65	*Pleurobema sintoxia*	81.2				1	Live	
7 Sep	LTB	58	55-65	*Ellipsaria lineolata*	88.5				1	Live	
7 Sep	LTB	58	55-65	*Ellipsaria lineolata*	64.1				1	Live	
7 Sep	LTB	58	55-65	*Potamilus alatus*	98.9				1	Live	
7 Sep	LTB	58	55-65	*Potamilus alatus*	107.1				1	Live	
7 Sep	LTB	58	55-65	*Potamilus alatus*	106.3				1	Live	
7 Sep	LTB	58	55-65	*Actinonaias ligamentina*	120.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	58	55-65	*Ligumia recta*	135.1			F	1	Live	
7 Sep	LTB	58	55-65	*Lampsilis cardium*	104.3			M	1	Live	
7 Sep	LTB	58	55-65	*Pleurobema cordatum*	90.5				1	Live	
7 Sep	LTB	58	55-65	*Cyclonaias pustulosa*	56.1				1	Live	
7 Sep	LTB	58	55-65	*Cyclonaias pustulosa*					1	WD	
7 Sep	IB	59	0-5	No mussels							
7 Sep	IB	59	5-15	*Potamilus alatus*	117.3				1	Live	
7 Sep	IB	59	5-15	*Potamilus alatus*	108.2				1	Live	
7 Sep	LTB	59	15-25	*Potamilus alatus*	99.3				1	Live	
7 Sep	LTB	59	15-25	*Ligumia recta*	150+			F	1	Live	
7 Sep	LTB	59	15-25	*Amblema plicata*	91.6				1	Live	
7 Sep	LTB	59	15-25	*Pleurobema sintoxia*	93.7				1	Live	
7 Sep	LTB	59	25-35	*Lampsilis cardium*	121.1			F	1	Live	
7 Sep	LTB	59	25-35	*Theliderma metanevra*	75.5				1	Live	
7 Sep	LTB	59	25-35	*Theliderma metanevra*	77.7				1	Live	
7 Sep	LTB	59	25-35	*Theliderma metanevra*	70.1				1	Live	
7 Sep	LTB	59	25-35	*Pleurobema cordatum*	91.9				1	Live	
7 Sep	LTB	59	25-35	*Pleurobema cordatum*	66.6				1	Live	
7 Sep	LTB	59	25-35	*Pleurobema cordatum*	74.9				1	Live	
7 Sep	LTB	59	35-45	*Ligumia recta*	138.5			F	1	Live	
7 Sep	LTB	59	35-45	*Theliderma metanevra*	77.3				1	Live	
7 Sep	LTB	59	35-45	*Theliderma metanevra*	72.5				1	Live	
7 Sep	LTB	59	35-45	*Theliderma metanevra*	86.1				1	Live	
7 Sep	LTB	59	35-45	*Actinonaias ligamentina*	113.3				1	Live	
7 Sep	LTB	59	35-45	*Ligumia recta*	138			M	1	Live	
7 Sep	LTB	59	35-45	*Ligumia recta*	149.1			M	1	Live	
7 Sep	LTB	59	35-45	*Potamilus alatus*	104.2				1	Live	
7 Sep	LTB	59	35-45	*Obliquaria reflexa*	58.6				1	Live	
7 Sep	LTB	59	35-45	*Obliquaria reflexa*	60.6				1	Live	
7 Sep	LTB	59	45-55	*Potamilus alatus*	113.5				1	Live	
7 Sep	LTB	59	45-55	*Amblema plicata*	104.2				1	Live	
7 Sep	LTB	59	45-55	*Amblema plicata*	109.7				1	Live	
7 Sep	LTB	59	45-55	*Amblema plicata*	100.7				1	Live	
7 Sep	LTB	59	45-55	*Amblema plicata*	103.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	59	45-55	*Amblema plicata*					1	WD	
7 Sep	LTB	59	45-55	*Ligumia recta*	129.4			F	1	Live	
7 Sep	LTB	59	45-55	*Ligumia recta*	139.2			F	1	Live	
7 Sep	LTB	59	45-55	*Ligumia recta*	138.6			F	1	Live	
7 Sep	LTB	59	45-55	*Ligumia recta*					1	WD	
7 Sep	LTB	59	45-55	*Obliquaria reflexa*	53				1	Live	
7 Sep	LTB	59	55-65	*Theliderma metanevra*	95.5				1	Live	
7 Sep	LTB	59	55-65	*Theliderma metanevra*	71.6				1	Live	
7 Sep	LTB	59	55-65	*Actinonaias ligamentina*	115.5				1	Live	
7 Sep	LTB	59	55-65	*Pleurobema cordatum*	100.1				1	Live	
7 Sep	LTB	59	55-65	*Pleurobema cordatum*	89				1	Live	
7 Sep	LTB	59	55-65	*Ligumia recta*	121			F	1	Live	
7 Sep	LTB	59	55-65	*Ligumia recta*	120.6			F	1	Live	
7 Sep	LTB	59	55-65	*Amblema plicata*	105.5				1	Live	
7 Sep	LTB	59	55-65	*Amblema plicata*	89.2				1	Live	
7 Sep	LTB	59	55-65	*Plethobasus cyphyus**	107.2	75.7	46.4		1	Live	1860 Yellow
7 Sep	LTB	59	55-65	*Cyclonaias pustulosa*	65.1				1	Live	
7 Sep	LTB	59	55-65	*Cyclonaias pustulosa*	64.4				1	Live	
7 Sep	IB	60	0-5	No mussels							
7 Sep	IB	60	5-15	*Ligumia recta*	150+			M	1	Live	
7 Sep	IB	60	5-15	*Ligumia recta*	150+			M	1	Live	
7 Sep	LTB	60	15-25	*Ligumia recta*	128			M	1	Live	
7 Sep	LTB	60	15-25	*Ligumia recta*	133.2			F	1	Live	
7 Sep	LTB	60	15-25	*Ligumia recta*	130			F	1	Live	
7 Sep	LTB	60	15-25	*Lampsilis cardium*	124			M	1	Live	
7 Sep	LTB	60	25-35	*Amblema plicata*	89.1				1	Live	
7 Sep	LTB	60	25-35	*Amblema plicata*	109.5				1	Live	
7 Sep	LTB	60	25-35	*Amblema plicata*	94.3				1	Live	
7 Sep	LTB	60	25-35	*Amblema plicata*	99.5				1	Live	
7 Sep	LTB	60	25-35	*Ellipsaria lineolata*	75.5				1	Live	
7 Sep	LTB	60	25-35	*Ligumia recta*	110.2			F	1	Live	
7 Sep	LTB	60	25-35	*Ligumia recta*	143.8			F	1	Live	
7 Sep	LTB	60	35-45	*Ligumia recta*	150+			M	1	Live	
7 Sep	LTB	60	35-45	*Ligumia recta*	121.2			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	60	35-45	*Ellipsaria lineolata*	57.5				1	Live	
7 Sep	LTB	60	35-45	*Ellipsaria lineolata*	82				1	Live	
7 Sep	LTB	60	35-45	*Amblema plicata*	70.1				1	Live	
7 Sep	LTB	60	35-45	*Amblema plicata*	94.5				1	Live	
7 Sep	LTB	60	35-45	*Amblema plicata*	68.2				1	Live	
7 Sep	LTB	60	45-55	*Megalonaias nervosa*	150+				1	Live	
7 Sep	LTB	60	45-55	*Ligumia recta*	141			F	1	Live	
7 Sep	LTB	60	45-55	*Ligumia recta*	104.1			F	1	Live	
7 Sep	LTB	60	45-55	*Amblema plicata*	105.5				1	Live	
7 Sep	LTB	60	45-55	*Amblema plicata*	88.1				1	Live	
7 Sep	LTB	60	45-55	*Amblema plicata*	92				1	Live	
7 Sep	LTB	60	45-55	*Amblema plicata*	88.7				1	Live	
7 Sep	LTB	60	45-55	*Amblema plicata*	72				1	Live	
7 Sep	LTB	60	45-55	*Pleurobema cordatum*					1	WD	
7 Sep	LTB	60	45-55	*Theliderma metanevra*	78.1				1	Live	
7 Sep	LTB	60	45-55	*Cyclonaias pustulosa*	52.4				1	Live	
7 Sep	LTB	60	45-55	*Cyclonaias pustulosa*	53.1				1	Live	
7 Sep	LTB	60	45-55	*Obliquaria reflexa*	45				1	Live	
7 Sep	LTB	60	45-55	*Ligumia recta*	133.1			F	1	Live	
7 Sep	LTB	60	45-55	*Ellipsaria lineolata*	62				1	Live	
7 Sep	LTB	60	55-65	*Actinonaias ligamentina*	130				1	Live	
7 Sep	LTB	60	55-65	*Ligumia recta*	150+			M	1	Live	
7 Sep	LTB	60	55-65	*Ligumia recta*	133.4			M	1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	81.7				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	83.5				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	72				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	77.4				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	82				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	77.5				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	77.1				1	Live	
7 Sep	LTB	60	55-65	*Theliderma metanevra*	78.4				1	Live	
7 Sep	LTB	60	55-65	*Amblema plicata*	83.1				1	Live	
7 Sep	LTB	60	55-65	*Amblema plicata*	96.5				1	Live	
7 Sep	LTB	60	55-65	*Amblema plicata*	93.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	60	55-65	*Cyclonaias pustulosa*	54.4				1	Live	
7 Sep	LTB	60	55-65	*Cyclonaias pustulosa*	64.1				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	71				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	83.2				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	85.5				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	72.1				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	78				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema cordatum*	90.5				1	Live	
7 Sep	LTB	60	55-65	*Ellipsaria lineolata*	83.6				1	Live	
7 Sep	LTB	60	55-65	*Pleurobema sintoxia*	83.1				1	Live	
7 Sep	LTB	61	0-5	No mussels							
7 Sep	LTB	61	5-15	No mussels							
7 Sep	LTB	61	15-25	*Lampsilis cardium*	130			M	1	Live	
7 Sep	LTB	61	15-25	*Ligumia recta*	150+			M	1	Live	
7 Sep	LTB	61	15-25	*Ligumia recta*	140			M	1	Live	
7 Sep	LTB	61	15-25	*Potamilus alatus*	107.2				1	Live	
7 Sep	LTB	61	15-25	*Amblema plicata*	98				1	Live	
7 Sep	LTB	61	15-25	*Ellipsaria lineolata*	72.5				1	Live	
7 Sep	LTB	61	25-35	*Amblema plicata*	122.4				1	Live	
7 Sep	LTB	61	25-35	*Amblema plicata*	116				1	Live	
7 Sep	LTB	61	25-35	*Amblema plicata*	95.5				1	Live	
7 Sep	LTB	61	25-35	*Ligumia recta*	132			M	1	Live	
7 Sep	LTB	61	25-35	*Ligumia recta*	127.5			F	1	Live	
7 Sep	LTB	61	25-35	*Cyclonaias pustulosa*	55				1	Live	
7 Sep	LTB	61	25-35	*Obliquaria reflexa*	48.2				1	Live	
7 Sep	LTB	61	35-45	*Theliderma metanevra*	83.2				1	Live	
7 Sep	LTB	61	35-45	*Theliderma metanevra*	65.1				1	Live	
7 Sep	LTB	61	35-45	*Theliderma metanevra*	82.7				1	Live	
7 Sep	LTB	61	35-45	*Amblema plicata*	97.5				1	Live	
7 Sep	LTB	61	35-45	*Amblema plicata*	100				1	Live	
7 Sep	LTB	61	35-45	*Amblema plicata*	95.4				1	Live	
7 Sep	LTB	61	35-45	*Amblema plicata*	98.6				1	Live	
7 Sep	LTB	61	35-45	*Amblema plicata*	82				1	Live	
7 Sep	LTB	61	35-45	*Ellipsaria lineolata*	95				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	61	35-45	*Quadrula quadrula*	55.3				1	Live	
7 Sep	LTB	61	35-45	*Pleurobema cordatum*	71.1				1	Live	
7 Sep	LTB	61	35-45	*Pleurobema cordatum*	82.5				1	Live	
7 Sep	LTB	61	35-45	*Ligumia recta*					1	WD	
7 Sep	LTB	61	45-55	*Lampsilis cardium*	121			M	1	Live	
7 Sep	LTB	61	45-55	*Ellipsaria lineolata*	96.5				1	Live	
7 Sep	LTB	61	45-55	*Theliderma metanevra*	84.2				1	Live	
7 Sep	LTB	61	45-55	*Theliderma metanevra*	75				1	Live	
7 Sep	LTB	61	45-55	*Theliderma metanevra*	77.4				1	Live	
7 Sep	LTB	61	45-55	*Theliderma metanevra*	78.1				1	Live	
7 Sep	LTB	61	45-55	*Theliderma metanevra*	65				1	Live	
7 Sep	LTB	61	45-55	*Pleurobema sintoxia*	63				1	Live	
7 Sep	LTB	61	45-55	*Pleurobema cordatum*	70.5				1	Live	
7 Sep	LTB	61	45-55	*Ligumia recta*	140			M	1	Live	
7 Sep	LTB	61	55-65	*Pleurobema sintoxia*	88				1	Live	
7 Sep	LTB	61	55-65	*Lampsilis cardium*	130			M	1	Live	
7 Sep	LTB	61	55-65	*Actinonaias ligamentina*	130.5				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	80.2				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	85				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	86.5				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	84				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	76.1				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	77.4				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	88.5				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	84				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	75				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	81.5				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	76				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	80				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	76.5				1	Live	
7 Sep	LTB	61	55-65	*Theliderma metanevra*	62.1				1	Live	
7 Sep	LTB	61	55-65	*Cyclonaias pustulosa*	45				1	Live	
7 Sep	LTB	61	55-65	*Cyclonaias pustulosa*	50.4				1	Live	
7 Sep	LTB	61	55-65	*Cyclonaias pustulosa*	63.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
7 Sep	LTB	61	55-65	*Cyclonaias pustulosa*	58				1	Live	
7 Sep	LTB	61	55-65	*Amblema plicata*	94.4				1	Live	
7 Sep	LTB	61	55-65	*Ellipsaria lineolata*	77				1	Live	
7 Sep	LTB	61	55-65	*Pleurobema cordatum*	77.4				1	Live	
7 Sep	LTB	61	55-65	*Pleurobema cordatum*	52.1				1	Live	
7 Sep	LTB	61	55-65	*Pleurobema cordatum*	58.7				1	Live	
7 Sep	LTB	61	55-65	*Obliquaria reflexa*	45.1				1	Live	
7 Sep	LTB	61	55-65	*Obliquaria reflexa*	47				1	Live	
7 Sep	LTB	61	55-65	*Obliquaria reflexa*	55.4				1	Live	
7 Sep	LTB	61	55-65	*Lampsilis cardium*	93			F	1	Live	
7 Sep	LTB	61	55-65	*Cyclonaias pustulosa*					1	WD	
8 Sep	IB	62	0-5	No mussels							
8 Sep	IB	62	5-15	*Potamilus alatus*	110				1	Live	
8 Sep	IB	62	5-15	*Ligumia recta*	145.2			M	1	Live	
8 Sep	IB	62	5-15	*Ligumia recta*	150+			M	1	Live	
8 Sep	IB	62	5-15	*Ligumia recta*	125			F	1	Live	
8 Sep	IB	62	5-15	*Ligumia recta*	150+			F	1	Live	
8 Sep	IB	62	5-15	*Lampsilis siliquoidea*	99			F	1	Live	
8 Sep	IB	62	5-15	*Cyclonaias pustulosa*	57.1				1	Live	
8 Sep	IB	62	5-15	*Amblema plicata*	95				1	Live	
8 Sep	LTB	62	15-25	*Ligumia recta*	130.1			F	1	Live	
8 Sep	LTB	62	15-25	*Ligumia recta*	140.5			F	1	Live	
8 Sep	LTB	62	15-25	*Ligumia recta*	145.5			F	1	Live	
8 Sep	LTB	62	15-25	*Amblema plicata*	100				1	Live	
8 Sep	LTB	62	15-25	*Amblema plicata*					2	WD	
8 Sep	LTB	62	15-25	*Ellipsaria lineolata*	75				1	Live	
8 Sep	LTB	62	15-25	*Ellipsaria lineolata*	82.1				1	Live	
8 Sep	LTB	62	15-25	*Quadrula quadrula*	53				1	Live	
8 Sep	LTB	62	15-25	*Lampsilis siliquoidea*	110.1			F	1	Live	
8 Sep	LTB	62	25-35	*Amblema plicata*	99				1	Live	
8 Sep	LTB	62	25-35	*Amblema plicata*	107.4				1	Live	
8 Sep	LTB	62	25-35	*Amblema plicata*	98.1				1	Live	
8 Sep	LTB	62	25-35	*Lampsilis cardium*	104			M	1	Live	
8 Sep	LTB	62	25-35	*Lampsilis cardium*	95			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	62	25-35	*Theliderma metanevra*	83				1	Live	
8 Sep	LTB	62	25-35	*Potamilus alatus*	120.1				1	Live	
8 Sep	LTB	62	25-35	*Ligumia recta*	122			F	1	Live	
8 Sep	LTB	62	25-35	*Cyclonaias pustulosa*	58.5				1	Live	
8 Sep	LTB	62	25-35	*Cyclonaias pustulosa*	48.1				1	Live	
8 Sep	LTB	62	35-45	*Potamilus alatus*	97.5				1	Live	
8 Sep	LTB	62	35-45	*Theliderma metanevra*	65.2				1	Live	
8 Sep	LTB	62	35-45	*Ellipsaria lineolata*	69.5				1	Live	
8 Sep	LTB	62	35-45	*Ellipsaria lineolata*	73.1				1	Live	
8 Sep	LTB	62	35-45	*Ellipsaria lineolata*	70.5				1	Live	
8 Sep	LTB	62	35-45	*Pleurobema sintoxia*	93.4				1	Live	
8 Sep	LTB	62	35-45	*Obliquaria reflexa*	45.1				1	Live	
8 Sep	LTB	62	35-45	*Quadrula quadrula*	62				1	Live	
8 Sep	LTB	62	35-45	*Cyclonaias pustulosa*	47				1	Live	
8 Sep	LTB	62	35-45	*Amblema plicata*					3	WD	
8 Sep	LTB	62	45-55	*Lampsilis cardium*	125			M	1	Live	
8 Sep	LTB	62	45-55	*Lampsilis cardium*	106.1			F	1	Live	
8 Sep	LTB	62	45-55	*Amblema plicata*	85.4				1	Live	
8 Sep	LTB	62	45-55	*Amblema plicata*	82				1	Live	
8 Sep	LTB	62	45-55	*Amblema plicata*	77.1				1	Live	
8 Sep	LTB	62	45-55	*Ligumia recta*	150+			F	1	Live	
8 Sep	LTB	62	45-55	*Ellipsaria lineolata*	77.1				1	Live	
8 Sep	LTB	62	45-55	*Theliderma metanevra*	80.4				1	Live	
8 Sep	LTB	62	45-55	*Theliderma metanevra*	73.5				1	Live	
8 Sep	LTB	62	45-55	*Quadrula quadrula*	55				1	Live	
8 Sep	LTB	62	45-55	*Pleurobema cordatum*	85.7				1	Live	
8 Sep	LTB	62	45-55	*Pleurobema cordatum*	82.1				1	Live	
8 Sep	LTB	62	45-55	*Ellipsaria lineolata*					1	WD	
8 Sep	LTB	62	45-55	*Amblema plicata*					2	WD	
8 Sep	LTB	62	45-55	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	62	55-65	*Amblema plicata*	99				1	Live	
8 Sep	LTB	62	55-65	*Amblema plicata*	113.7				1	Live	
8 Sep	LTB	62	55-65	*Amblema plicata*	83.3				1	Live	
8 Sep	LTB	62	55-65	*Actinonaias ligamentina*	114.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	62	55-65	*Actinonaias ligamentina*	140.6				1	Live	
8 Sep	LTB	62	55-65	*Ellipsaria lineolata*	95.7				1	Live	
8 Sep	LTB	62	55-65	*Ellipsaria lineolata*	81.3				1	Live	
8 Sep	LTB	62	55-65	*Ellipsaria lineolata*	70				1	Live	
8 Sep	LTB	62	55-65	*Lampsilis cardium*	114			F	1	Live	
8 Sep	LTB	62	55-65	*Ligumia recta*	145.5			F	1	Live	
8 Sep	LTB	62	55-65	*Ligumia recta*	134.2			M	1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	83.1				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	71				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	84.5				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	75				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	82				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	75.3				1	Live	
8 Sep	LTB	62	55-65	*Theliderma metanevra*	73				1	Live	
8 Sep	LTB	62	55-65	*Obliquaria reflexa*	53				1	Live	
8 Sep	LTB	62	55-65	*Cyclonaias pustulosa*	54.1				1	Live	
8 Sep	LTB	62	55-65	*Cyclonaias pustulosa*	63.5				1	Live	
8 Sep	LTB	62	55-65	*Pleurobema cordatum*	72				1	Live	
8 Sep	LTB	62	55-65	*Pleurobema sintoxia*	86.5				1	Live	
8 Sep	LTB	62	55-65	*Pleurobema sintoxia*	83				1	Live	
8 Sep	LTB	62	55-65	*Pleurobema sintoxia*	87.1				1	Live	
8 Sep	LTB	62	55-65	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	62	55-65	*Ellipsaria lineolata*					1	WD	
8 Sep	LTB	63	0-5	No mussels							
8 Sep	LTB	63	5-15	No mussels							
8 Sep	LTB	63	15-25	*Ligumia recta*	139.1			F	1	Live	
8 Sep	LTB	63	15-25	*Ligumia recta*	137.6			F	1	Live	
8 Sep	LTB	63	15-25	*Ligumia recta*	142			F	1	Live	
8 Sep	LTB	63	15-25	*Ligumia recta*	145			F	1	Live	
8 Sep	LTB	63	15-25	*Ligumia recta*	123.5			F	1	Live	
8 Sep	LTB	63	15-25	*Ligumia recta*	130			F	1	Live	
8 Sep	LTB	63	15-25	*Potamilus alatus*	120.4				1	Live	
8 Sep	LTB	63	15-25	*Potamilus alatus*	98.1				1	Live	
8 Sep	LTB	63	15-25	*Potamilus alatus*	99				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	63	15-25	*Megalonaias nervosa*	108.6				1	Live	
8 Sep	LTB	63	15-25	*Amblema plicata*	77.8				1	Live	
8 Sep	LTB	63	15-25	*Amblema plicata*	90.5				1	Live	
8 Sep	LTB	63	15-25	*Amblema plicata*	100.1				1	Live	
8 Sep	LTB	63	15-25	*Amblema plicata*	92.4				1	Live	
8 Sep	LTB	63	15-25	*Amblema plicata*	86				1	Live	
8 Sep	LTB	63	15-25	*Ellipsaria lineolata*	67				1	Live	
8 Sep	LTB	63	15-25	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	63	15-25	*Obliquaria reflexa*	49				1	Live	
8 Sep	LTB	63	15-25	*Elliptio crassidens*	77				1	Live	
8 Sep	LTB	63	25-35	*Ellipsaria lineolata*	66				1	Live	
8 Sep	LTB	63	25-35	*Ellipsaria lineolata*	72.5				1	Live	
8 Sep	LTB	63	25-35	*Amblema plicata*	99.4				1	Live	
8 Sep	LTB	63	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	63	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	63	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	63	25-35	*Cyclonaias pustulosa*	44				1	Live	
8 Sep	LTB	63	25-35	*Quadrula quadrula*	60.5				1	Live	
8 Sep	LTB	63	25-35	*Obliquaria reflexa*	48.2				1	Live	
8 Sep	LTB	63	25-35	*Potamilus alatus*	104				1	Live	
8 Sep	LTB	63	25-35	*Ligumia recta*	123			F	1	Live	
8 Sep	LTB	63	25-35	*Ligumia recta*	144			M	1	Live	
8 Sep	LTB	63	35-45	*Ligumia recta*	127.2			F	1	Live	
8 Sep	LTB	63	35-45	*Ligumia recta*	124			F	1	Live	
8 Sep	LTB	63	35-45	*Ellipsaria lineolata*	97				1	Live	
8 Sep	LTB	63	35-45	*Ellipsaria lineolata*	88.2				1	Live	
8 Sep	LTB	63	35-45	*Theliderma metanevra*	80.4				1	Live	
8 Sep	LTB	63	35-45	*Theliderma metanevra*	77.1				1	Live	
8 Sep	LTB	63	35-45	*Amblema plicata*	95.5				1	Live	
8 Sep	LTB	63	35-45	*Amblema plicata*	104				1	Live	
8 Sep	LTB	63	35-45	*Amblema plicata*	118.3				1	Live	
8 Sep	LTB	63	45-55	*Actinonaias ligamentina*	94.5				1	Live	
8 Sep	LTB	63	45-55	*Ligumia recta*	133.1			M	1	Live	
8 Sep	LTB	63	45-55	*Ligumia recta*	137.2			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	63	45-55	*Ligumia recta*	115			M	1	Live	
8 Sep	LTB	63	45-55	*Theliderma metanevra*	72				1	Live	
8 Sep	LTB	63	45-55	*Theliderma metanevra*	77.4				1	Live	
8 Sep	LTB	63	45-55	*Theliderma metanevra*	75.1				1	Live	
8 Sep	LTB	63	45-55	*Theliderma metanevra*	83				1	Live	
8 Sep	LTB	63	45-55	*Ellipsaria lineolata*	87.1				1	Live	
8 Sep	LTB	63	45-55	*Ellipsaria lineolata*	85				1	Live	
8 Sep	LTB	63	45-55	*Ellipsaria lineolata*					1	WD	
8 Sep	LTB	63	45-55	*Ellipsaria lineolata*					1	WD	
8 Sep	LTB	63	45-55	*Ellipsaria lineolata*					1	WD	
8 Sep	LTB	63	45-55	*Cyclonaias pustulosa*	60				1	Live	
8 Sep	LTB	63	45-55	*Cyclonaias pustulosa*	61.5				1	Live	
8 Sep	LTB	63	45-55	*Amblema plicata*	92.8				1	Live	
8 Sep	LTB	63	45-55	*Pleurobema cordatum*	71.2				1	Live	
8 Sep	LTB	63	45-55	*Pleurobema sintoxia*	86.4				1	Live	
8 Sep	LTB	63	45-55	*Pleurobema sintoxia*	74.5				1	Live	
8 Sep	LTB	63	45-55	*Obliquaria reflexa*	50.5				1	Live	
8 Sep	LTB	63	55-65	*Actinonaias ligamentina*	115.5				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	73				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	45				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	72.4				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	75				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	72.5				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	74.2				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	77.5				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	85				1	Live	
8 Sep	LTB	63	55-65	*Amblema plicata*	85.2				1	Live	
8 Sep	LTB	63	55-65	*Pleurobema cordatum*	90.5				1	Live	
8 Sep	LTB	63	55-65	*Pleurobema sintoxia*	90.2				1	Live	
8 Sep	LTB	63	55-65	*Ligumia recta*	128			M	1	Live	
8 Sep	LTB	63	55-65	*Obliquaria reflexa*	42.5				1	Live	
8 Sep	LTB	63	55-65	*Amblema plicata*					1	WD	
8 Sep	LTB	63	55-65	*Amblema plicata*	110				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	91.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	63	55-65	*Theliderma metanevra*	81.2				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	78.1				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*	79.7				1	Live	
8 Sep	LTB	63	55-65	*Ligumia recta*	133.1			F	1	Live	
8 Sep	LTB	63	55-65	*Ligumia recta*	129.5			F	1	Live	
8 Sep	LTB	63	55-65	*Ligumia recta*	126			M	1	Live	
8 Sep	LTB	63	55-65	*Cyclonaias pustulosa*	48.4				1	Live	
8 Sep	LTB	63	55-65	*Pleurobema cordatum*	85				1	Live	
8 Sep	LTB	63	55-65	*Theliderma metanevra*					1	WD	
8 Sep	LTB	64	0-5	No mussels							
8 Sep	LTB	64	5-15	No mussels							
8 Sep	LTB	64	15-25	*Potamilus alatus*					1	WD	
8 Sep	LTB	64	15-25	*Lampsilis siliquoidea*	84			F	1	Live	
8 Sep	LTB	64	15-25	*Lampsilis siliquoidea*	99.5			F	1	Live	
8 Sep	LTB	64	15-25	*Lampsilis siliquoidea*	93			F	1	Live	
8 Sep	LTB	64	15-25	*Ligumia recta*	134.2			F	1	Live	
8 Sep	LTB	64	15-25	*Ligumia recta*	135			F	1	Live	
8 Sep	LTB	64	15-25	*Ligumia recta*	142.5			F	1	Live	
8 Sep	LTB	64	15-25	*Ligumia recta*	133.1			F	1	Live	
8 Sep	LTB	64	15-25	*Potamilus alatus*	105.6				1	Live	
8 Sep	LTB	64	15-25	*Potamilus alatus*	118.4				1	Live	
8 Sep	LTB	64	15-25	*Amblema plicata*	98				1	Live	
8 Sep	LTB	64	15-25	*Amblema plicata*	75.2				1	Live	
8 Sep	LTB	64	15-25	*Quadrula quadrula*	54.1				1	Live	
8 Sep	LTB	64	15-25	*Quadrula quadrula*	70.5				1	Live	
8 Sep	LTB	64	15-25	*Ellipsaria lineolata*	68				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	95				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	103.4				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	90.2				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	98.1				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	99.5				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	102.4				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	104.1				1	Live	
8 Sep	LTB	64	25-35	*Amblema plicata*	55.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	64	25-35	*Ellipsaria lineolata*	77.4				1	Live	
8 Sep	LTB	64	25-35	*Ellipsaria lineolata*	67.2				1	Live	
8 Sep	LTB	64	25-35	*Cyclonaias pustulosa*	60.1				1	Live	
8 Sep	LTB	64	25-35	*Ligumia recta*	140			F	1	Live	
8 Sep	LTB	64	35-45	*Ligumia recta*	150+			M	1	Live	
8 Sep	LTB	64	35-45	*Ligumia recta*	148			M	1	Live	
8 Sep	LTB	64	35-45	*Ligumia recta*	125.5			M	1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	83.5				1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	79.2				1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	78.7				1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	80				1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	82.3				1	Live	
8 Sep	LTB	64	35-45	*Theliderma metanevra*	82				1	Live	
8 Sep	LTB	64	35-45	*Actinonaias ligamentina*	123				1	Live	
8 Sep	LTB	64	35-45	*Amblema plicata*	100.4				1	Live	
8 Sep	LTB	64	35-45	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	64	45-55	*Actinonaias ligamentina*	68.2				1	Live	
8 Sep	LTB	64	45-55	*Actinonaias ligamentina*	104				1	Live	
8 Sep	LTB	64	45-55	*Ellipsaria lineolata*	88				1	Live	
8 Sep	LTB	64	45-55	*Ellipsaria lineolata*	89.4				1	Live	
8 Sep	LTB	64	45-55	*Ellipsaria lineolata*	63.2				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	75.5				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	88				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	82.1				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	85.4				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	89				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	79.1				1	Live	
8 Sep	LTB	64	45-55	*Theliderma metanevra*	76.5				1	Live	
8 Sep	LTB	64	45-55	*Potamilus alatus*	113.4				1	Live	
8 Sep	LTB	64	45-55	*Ligumia recta*	121			M	1	Live	
8 Sep	LTB	64	45-55	*Ligumia recta*	131.5			M	1	Live	
8 Sep	LTB	64	45-55	*Ligumia recta*	140.5			M	1	Live	
8 Sep	LTB	64	45-55	*Ligumia recta*	133.1			F	1	Live	
8 Sep	LTB	64	45-55	*Cyclonaias pustulosa*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	64	55-65	*Actinonaias ligamentina*	129.4				1	Live	
8 Sep	LTB	64	55-65	*Actinonaias ligamentina*	70				1	Live	
8 Sep	LTB	64	55-65	*Lampsilis cardium*	109			M	1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*	75.4				1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*	75				1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*	74.1				1	Live	
8 Sep	LTB	64	55-65	*Ligumia recta*	128.1			F	1	Live	
8 Sep	LTB	64	55-65	*Ligumia recta*	133.4			F	1	Live	
8 Sep	LTB	64	55-65	*Ligumia recta*	120			F	1	Live	
8 Sep	LTB	64	55-65	*Amblema plicata*	104.7				1	Live	
8 Sep	LTB	64	55-65	*Ellipsaria lineolata*	81.5				1	Live	
8 Sep	LTB	64	55-65	*Cyclonaias pustulosa*	58				1	Live	
8 Sep	LTB	64	55-65	*Pleurobema sintoxia*	94.2				1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*					1	WD	
8 Sep	LTB	64	55-65	*Amblema plicata*					1	WD	
8 Sep	LTB	64	55-65	*Ligumia recta*					1	WD	
8 Sep	LTB	64	55-65	*Ligumia recta*	128			F	1	Live	
8 Sep	LTB	64	55-65	*Amblema plicata*	100.4				1	Live	
8 Sep	LTB	64	55-65	*Amblema plicata*	98.4				1	Live	
8 Sep	LTB	64	55-65	*Amblema plicata*	94				1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*	72.4				1	Live	
8 Sep	LTB	64	55-65	*Theliderma metanevra*	72.4				1	Live	
8 Sep	LTB	64	55-65	*Cyclonaias pustulosa*	42				1	Live	
8 Sep	LTB	64	55-65	*Cyclonaias pustulosa*	50.5				1	Live	
8 Sep	LTB	64	55-65	*Amblema plicata*					4	WD	
8 Sep	ADI	65	0-5	No mussels							
8 Sep	ADI	65	5-15	*Ligumia recta*	150+			M	1	Live	
8 Sep	ADI	65	5-15	*Ligumia recta*	134.2			M	1	Live	
8 Sep	ADI	65	5-15	*Cyclonaias pustulosa*	62				1	Live	
8 Sep	ADI	65	5-15	*Potamilus alatus*	102				1	Live	
8 Sep	ADI	65	5-15	*Potamilus alatus*	110				1	Live	
8 Sep	ADI	65	5-15	*Lampsilis siliquoidea*	96.4			F	1	Live	
8 Sep	ADI	65	5-15	*Ligumia recta*	138.1			F	1	Live	
8 Sep	ADI	65	5-15	*Ligumia recta*	132			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	ADI	65	5-15	*Ligumia recta*	118.5			F	1	Live	
8 Sep	ADI	65	5-15	*Ligumia recta*	129			F	1	Live	
8 Sep	ADI	65	5-15	*Ligumia recta*	130.1			F	1	Live	
8 Sep	LTB	65	15-25	*Ligumia recta*	133.1			F	1	Live	
8 Sep	LTB	65	15-25	*Ligumia recta*	122			F	1	Live	
8 Sep	LTB	65	15-25	*Ligumia recta*	150+			F	1	Live	
8 Sep	LTB	65	15-25	*Potamilus alatus*	122.5				1	Live	
8 Sep	LTB	65	15-25	*Potamilus alatus*	99.4				1	Live	
8 Sep	LTB	65	15-25	*Potamilus alatus*	98				1	Live	
8 Sep	LTB	65	15-25	*Potamilus alatus*	118.4				1	Live	
8 Sep	LTB	65	15-25	*Amblema plicata*	77.4				1	Live	
8 Sep	LTB	65	15-25	*Amblema plicata*	92				1	Live	
8 Sep	LTB	65	15-25	*Amblema plicata*	69				1	Live	
8 Sep	LTB	65	15-25	*Obliquaria reflexa*	50.6				1	Live	
8 Sep	LTB	65	15-25	*Obliquaria reflexa*	49.2				1	Live	
8 Sep	LTB	65	15-25	*Ligumia recta*					3	WD	
8 Sep	LTB	65	15-25	*Potamilus alatus*					1	WD	
8 Sep	LTB	65	15-25	*Amblema plicata*					1	WD	
8 Sep	LTB	65	25-35	*Lampsilis cardium*	121.4			M	1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	95				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	88.2				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	90				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	84.1				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	100.5				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	99				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*	77.2				1	Live	
8 Sep	LTB	65	25-35	*Ligumia recta*	120.5			M	1	Live	
8 Sep	LTB	65	25-35	*Ligumia recta*	150+			M	1	Live	
8 Sep	LTB	65	25-35	*Quadrula quadrula*	57.4				1	Live	
8 Sep	LTB	65	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	65	35-45	*Amblema plicata*	100				1	Live	
8 Sep	LTB	65	35-45	*Amblema plicata*	94.2				1	Live	
8 Sep	LTB	65	35-45	*Ligumia recta*	150+			M	1	Live	
8 Sep	LTB	65	35-45	*Ellipsaria lineolata*	72.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	65	35-45	*Ellipsaria lineolata*	82.1				1	Live	
8 Sep	LTB	65	35-45	*Amblema plicata*					5	WD	
8 Sep	LTB	65	35-45	*Potamilus alatus*					1	WD	
8 Sep	LTB	65	35-45	*Theliderma metanevra*					1	WD	
8 Sep	LTB	65	45-55	*Actinonaias ligamentina*	115.5				1	Live	
8 Sep	LTB	65	45-55	*Megalonaias nervosa*	150+				1	Live	
8 Sep	LTB	65	45-55	*Amblema plicata*	95				1	Live	
8 Sep	LTB	65	45-55	*Amblema plicata*	108.1				1	Live	
8 Sep	LTB	65	45-55	*Amblema plicata*	88.7				1	Live	
8 Sep	LTB	65	45-55	*Pleurobema cordatum*	74.8				1	Live	
8 Sep	LTB	65	45-55	*Pleurobema cordatum*	79.1				1	Live	
8 Sep	LTB	65	45-55	*Theliderma metanevra*	82				1	Live	
8 Sep	LTB	65	45-55	*Theliderma metanevra*	81.5				1	Live	
8 Sep	LTB	65	45-55	*Theliderma metanevra*	82.6				1	Live	
8 Sep	LTB	65	45-55	*Theliderma metanevra*	85.1				1	Live	
8 Sep	LTB	65	45-55	*Quadrula quadrula*	57.4				1	Live	
8 Sep	LTB	65	45-55	*Quadrula quadrula*	58.1				1	Live	
8 Sep	LTB	65	45-55	*Cyclonaias pustulosa*	45.5				1	Live	
8 Sep	LTB	65	45-55	*Cyclonaias pustulosa*	59				1	Live	
8 Sep	LTB	65	45-55	*Ellipsaria lineolata*	70				1	Live	
8 Sep	LTB	65	45-55	*Potamilus alatus*					1	WD	
8 Sep	LTB	65	55-65	*Ligumia recta*	148.1			M	1	Live	
8 Sep	LTB	65	55-65	*Ligumia recta*	150+			M	1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	85.8				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	82				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	75.4				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	75				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	63				1	Live	
8 Sep	LTB	65	55-65	*Pleurobema sintoxia*	83				1	Live	
8 Sep	LTB	65	55-65	*Cyclonaias pustulosa*	52.1				1	Live	
8 Sep	LTB	65	55-65	*Obliquaria reflexa*	43				1	Live	
8 Sep	LTB	65	55-65	*Obliquaria reflexa*	62.5				1	Live	
8 Sep	LTB	65	55-65	*Lampsilis cardium*	121.4			F	1	Live	
8 Sep	LTB	65	55-65	*Ligumia recta*	142			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	65	55-65	*Pleurobema cordatum*	88.4				1	Live	
8 Sep	LTB	65	55-65	*Pleurobema cordatum*	92.5				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	72				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	77.4				1	Live	
8 Sep	LTB	65	55-65	*Theliderma metanevra*	64.5				1	Live	
8 Sep	LTB	65	55-65	*Amblema plicata*	95.1				1	Live	
8 Sep	LTB	65	55-65	*Cyprogenia stegaria**	69.9	43	62.6		1	Live	1902 Yellow
8 Sep	ADI	66	0-5	No mussels							
8 Sep	ADI	66	5-15	*Potamilus alatus*	104.1				1	Live	
8 Sep	ADI	66	5-15	*Amblema plicata*	95.8				1	Live	
8 Sep	ADI	66	5-15	*Amblema plicata*	89.1				1	Live	
8 Sep	ADI	66	5-15	*Ligumia recta*	133.1			F	1	Live	
8 Sep	LTB	66	15-25	*Ellipsaria lineolata*	74.8				1	Live	
8 Sep	LTB	66	15-25	*Ellipsaria lineolata*	71.2				1	Live	
8 Sep	LTB	66	15-25	*Ellipsaria lineolata*	93.1				1	Live	
8 Sep	LTB	66	15-25	*Quadrula quadrula*	59.1				1	Live	
8 Sep	LTB	66	15-25	*Quadrula quadrula*	55				1	Live	
8 Sep	LTB	66	15-25	*Quadrula quadrula*	60.8				1	Live	
8 Sep	LTB	66	15-25	*Ligumia recta*	145			M	1	Live	
8 Sep	LTB	66	15-25	*Ligumia recta*	132.7			M	1	Live	
8 Sep	LTB	66	15-25	*Ligumia recta*	123.7			F	1	Live	
8 Sep	LTB	66	15-25	*Ligumia recta*	127.1			F	1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	88.6				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	108				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	91				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	110.1				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	104.8				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	75.5				1	Live	
8 Sep	LTB	66	15-25	*Amblema plicata*	62.8				1	Live	
8 Sep	LTB	66	15-25	*Obliquaria reflexa*	44				1	Live	
8 Sep	LTB	66	15-25	*Obovaria subrotunda**	55.8	31.1	51.5		1	Live	0757 Yellow
8 Sep	LTB	66	25-35	*Ligumia recta*	144.6			M	1	Live	
8 Sep	LTB	66	25-35	*Actinonaias ligamentina*	124				1	Live	
8 Sep	LTB	66	25-35	*Lampsilis siliquoidea*	108.8			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	66	25-35	*Ellipsaria lineolata*	73.4				1	Live	
8 Sep	LTB	66	25-35	*Ellipsaria lineolata*	88.1				1	Live	
8 Sep	LTB	66	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	66	25-35	*Amblema plicata*	77.2				1	Live	
8 Sep	LTB	66	25-35	*Megalonaias nervosa*	150+				1	Live	
8 Sep	LTB	66	25-35	*Theliderma metanevra*	81				1	Live	
8 Sep	LTB	66	25-35	*Theliderma metanevra*	81.5				1	Live	
8 Sep	LTB	66	25-35	*Theliderma metanevra*	89.2				1	Live	
8 Sep	LTB	66	35-45	*Ligumia recta*					1	WD	
8 Sep	LTB	66	35-45	*Ligumia recta*	137.4			F	1	Live	
8 Sep	LTB	66	35-45	*Ligumia recta*	123.8			F	1	Live	
8 Sep	LTB	66	35-45	*Ligumia recta*	125.8			M	1	Live	
8 Sep	LTB	66	35-45	*Ligumia recta*	125.5			M	1	Live	
8 Sep	LTB	66	35-45	*Cyclonaias pustulosa*	51.6				1	Live	
8 Sep	LTB	66	35-45	*Potamilus alatus*	109.3				1	Live	
8 Sep	LTB	66	35-45	*Potamilus alatus*	111.2				1	Live	
8 Sep	LTB	66	35-45	*Pleurobema sintoxia*	99.8				1	Live	
8 Sep	LTB	66	35-45	*Amblema plicata*	110				1	Live	
8 Sep	LTB	66	35-45	*Amblema plicata*	103.5				1	Live	
8 Sep	LTB	66	35-45	*Theliderma metanevra*	86.2				1	Live	
8 Sep	LTB	66	35-45	*Theliderma metanevra*	84.5				1	Live	
8 Sep	LTB	66	35-45	*Ellipsaria lineolata*	100				1	Live	
8 Sep	LTB	66	35-45	*Ellipsaria lineolata*	71.8				1	Live	
8 Sep	LTB	66	35-45	*Ellipsaria lineolata*	82.5				1	Live	
8 Sep	LTB	66	35-45	*Ellipsaria lineolata*	68.6				1	Live	
8 Sep	LTB	66	45-55	*Actinonaias ligamentina*	112				1	Live	
8 Sep	LTB	66	45-55	*Actinonaias ligamentina*	105.2				1	Live	
8 Sep	LTB	66	45-55	*Actinonaias ligamentina*	114.5				1	Live	
8 Sep	LTB	66	45-55	*Megalonaias nervosa*	150+				1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*	88				1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*	70.5				1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*	72.8				1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*	76.5				1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*	69				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	66	45-55	*Theliderma metanevra*	82				1	Live	
8 Sep	LTB	66	45-55	*Amblema plicata*	95				1	Live	
8 Sep	LTB	66	45-55	*Amblema plicata*	98.8				1	Live	
8 Sep	LTB	66	45-55	*Amblema plicata*	90.1				1	Live	
8 Sep	LTB	66	45-55	*Amblema plicata*	100.2				1	Live	
8 Sep	LTB	66	45-55	*Ellipsaria lineolata*	66.8				1	Live	
8 Sep	LTB	66	45-55	*Ellipsaria lineolata*	88.2				1	Live	
8 Sep	LTB	66	45-55	*Ellipsaria lineolata*	84.1				1	Live	
8 Sep	LTB	66	45-55	*Pleurobema sintoxia*	88				1	Live	
8 Sep	LTB	66	45-55	*Pleurobema sintoxia*	94.1				1	Live	
8 Sep	LTB	66	45-55	*Lampsilis cardium*	102.1			M	1	Live	
8 Sep	LTB	66	45-55	*Lampsilis cardium*	111			M	1	Live	
8 Sep	LTB	66	45-55	*Potamilus alatus*	118.8				1	Live	
8 Sep	LTB	66	45-55	*Potamilus alatus*	93				1	Live	
8 Sep	LTB	66	45-55	*Cyclonaias pustulosa*	67				1	Live	
8 Sep	LTB	66	45-55	*Cyclonaias pustulosa*	63.1				1	Live	
8 Sep	LTB	66	45-55	*Ligumia recta*	120.5			F	1	Live	
8 Sep	LTB	66	45-55	*Ligumia recta*	118.7			F	1	Live	
8 Sep	LTB	66	45-55	*Theliderma metanevra*					1	WD	
8 Sep	LTB	66	45-55	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	66	55-65	*Potamilus alatus*	118.7				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*					1	WD	
8 Sep	LTB	66	55-65	*Amblema plicata*	113.5				1	Live	
8 Sep	LTB	66	55-65	*Amblema plicata*	118.4				1	Live	
8 Sep	LTB	66	55-65	*Amblema plicata*	87.8				1	Live	
8 Sep	LTB	66	55-65	*Amblema plicata*	83.5				1	Live	
8 Sep	LTB	66	55-65	*Pleurobema cordatum*	72.9				1	Live	
8 Sep	LTB	66	55-65	*Pleurobema cordatum*	92.4				1	Live	
8 Sep	LTB	66	55-65	*Pleurobema cordatum*	93.3				1	Live	
8 Sep	LTB	66	55-65	*Ligumia recta*	128.3			M	1	Live	
8 Sep	LTB	66	55-65	*Actinonaias ligamentina*	146.6				1	Live	
8 Sep	LTB	66	55-65	*Actinonaias ligamentina*	117.4				1	Live	
8 Sep	LTB	66	55-65	*Lampsilis cardium*	130.2				1	Live	
8 Sep	LTB	66	55-65	*Ellipsaria lineolata*	72.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	66	55-65	*Ellipsaria lineolata*	85.2				1	Live	
8 Sep	LTB	66	55-65	*Cyclonaias pustulosa*	57.8				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	76.3				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	87.8				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	78.4				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	79.5				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	76.4				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	86.6				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	82.5				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	68.1				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	78.1				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	78.4				1	Live	
8 Sep	LTB	66	55-65	*Theliderma metanevra*	85.3				1	Live	
8 Sep	ADI	67	0-5	No mussels							
8 Sep	ADI	67	5-15	*Potamilus alatus*	85				1	Live	
8 Sep	ADI	67	5-15	*Ligumia recta*	134			F	1	Live	
8 Sep	LTB	67	15-25	*Lampsilis siliquoidea*	64.5				1	Live	
8 Sep	LTB	67	15-25	*Obliquaria reflexa*	39.1				1	Live	
8 Sep	LTB	67	15-25	*Obliquaria reflexa*	50				1	Live	
8 Sep	LTB	67	15-25	*Obliquaria reflexa*	48.2				1	Live	
8 Sep	LTB	67	15-25	*Ligumia recta*	131			F	1	Live	
8 Sep	LTB	67	15-25	*Ligumia recta*	125.5			F	1	Live	
8 Sep	LTB	67	15-25	*Cyclonaias pustulosa*	52.5				1	Live	
8 Sep	LTB	67	15-25	*Quadrula quadrula*	59.4				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	96.2				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	101.5				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	101.2				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	95				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	66				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	113.2				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	108.7				1	Live	
8 Sep	LTB	67	15-25	*Amblema plicata*	110.5				1	Live	
8 Sep	LTB	67	25-35	*Ellipsaria lineolata*	78				1	Live	
8 Sep	LTB	67	25-35	*Ellipsaria lineolata*	86.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	67	25-35	*Actinonaias ligamentina*	115.4				1	Live	
8 Sep	LTB	67	25-35	*Actinonaias ligamentina*	112				1	Live	
8 Sep	LTB	67	25-35	*Cyclonaias pustulosa*	53				1	Live	
8 Sep	LTB	67	25-35	*Pleurobema sintoxia*	91.5				1	Live	
8 Sep	LTB	67	25-35	*Pleurobema sintoxia*	102				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	106				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	104.2				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	104				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	118				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	112.2				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*	109.1				1	Live	
8 Sep	LTB	67	25-35	*Ligumia recta*	130.5			F	1	Live	
8 Sep	LTB	67	25-35	*Ligumia recta*	142.2			M	1	Live	
8 Sep	LTB	67	25-35	*Ligumia recta*	133.1			M	1	Live	
8 Sep	LTB	67	25-35	*Ligumia recta*	140.2			M	1	Live	
8 Sep	LTB	67	25-35	*Potamilus alatus*	112.1				1	Live	
8 Sep	LTB	67	25-35	*Amblema plicata*					1	WD	
8 Sep	LTB	67	35-45	*Cyclonaias pustulosa*	61.1				1	Live	
8 Sep	LTB	67	35-45	*Cyclonaias pustulosa*	65.8				1	Live	
8 Sep	LTB	67	35-45	*Lampsilis cardium*	118.8			F	1	Live	
8 Sep	LTB	67	35-45	*Actinonaias ligamentina*	110.5				1	Live	
8 Sep	LTB	67	35-45	*Ellipsaria lineolata*	59				1	Live	
8 Sep	LTB	67	35-45	*Theliderma metanevra*	83.5				1	Live	
8 Sep	LTB	67	35-45	*Megalonaias nervosa*	150+				1	Live	
8 Sep	LTB	67	35-45	*Amblema plicata*	94.4				1	Live	
8 Sep	LTB	67	35-45	*Amblema plicata*	103.4				1	Live	
8 Sep	LTB	67	35-45	*Amblema plicata*	96				1	Live	
8 Sep	LTB	67	35-45	*Amblema plicata*	94.5				1	Live	
8 Sep	LTB	67	35-45	*Amblema plicata*	103.1				1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	128.1			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	145			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	126.5			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	141			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	121.3			F	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	67	35-45	*Ligumia recta*	134.3			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	139.5			F	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*	127.5			M	1	Live	
8 Sep	LTB	67	35-45	*Ligumia recta*					1	WD	
8 Sep	LTB	67	35-45	*Amblema plicata*					1	WD	
8 Sep	LTB	67	35-45	*Theliderma metanevra*					1	WD	
8 Sep	LTB	67	45-55	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	67	45-55	*Ligumia recta*					1	WD	
8 Sep	LTB	67	45-55	*Ligumia recta*	131.2			M	1	Live	
8 Sep	LTB	67	45-55	*Cyclonaias pustulosa*	58				1	Live	
8 Sep	LTB	67	45-55	*Cyclonaias pustulosa*	58.5				1	Live	
8 Sep	LTB	67	45-55	*Cyclonaias pustulosa*	60.1				1	Live	
8 Sep	LTB	67	45-55	*Lampsilis cardium*	106.4			F	1	Live	
8 Sep	LTB	67	45-55	*Actinonaias ligamentina*	135.5				1	Live	
8 Sep	LTB	67	45-55	*Actinonaias ligamentina*	102.1				1	Live	
8 Sep	LTB	67	45-55	*Theliderma metanevra*	76.1				1	Live	
8 Sep	LTB	67	45-55	*Theliderma metanevra*	81.5				1	Live	
8 Sep	LTB	67	45-55	*Theliderma metanevra*	87.1				1	Live	
8 Sep	LTB	67	45-55	*Theliderma metanevra*	74.5				1	Live	
8 Sep	LTB	67	45-55	*Theliderma metanevra*	81.2				1	Live	
8 Sep	LTB	67	45-55	*Ellipsaria lineolata*	88.9				1	Live	
8 Sep	LTB	67	45-55	*Ellipsaria lineolata*	89.1				1	Live	
8 Sep	LTB	67	45-55	*Ellipsaria lineolata*	86				1	Live	
8 Sep	LTB	67	45-55	*Pleurobema sintoxia*	89.8				1	Live	
8 Sep	LTB	67	45-55	*Pleurobema sintoxia*	87.2				1	Live	
8 Sep	LTB	67	45-55	*Pleurobema cordatum*	93.5				1	Live	
8 Sep	LTB	67	45-55	*Pleurobema cordatum*	76.1				1	Live	
8 Sep	LTB	67	45-55	*Amblema plicata*	109.1				1	Live	
8 Sep	LTB	67	45-55	*Amblema plicata*	102.5				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	82.5				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	83.1				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	86.1				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	77				1	Live	
8 Sep	LTB	67	55-65	*Cyclonaias pustulosa*					1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
8 Sep	LTB	67	55-65	*Cyclonaias pustulosa*	66.1				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema cordatum*	98.8				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema sintoxia*	93.7				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema sintoxia*	92.5				1	Live	
8 Sep	LTB	67	55-65	*Amblema plicata*	94				1	Live	
8 Sep	LTB	67	55-65	*Lampsilis cardium*	126.6			M	1	Live	
8 Sep	LTB	67	55-65	*Actinonaias ligamentina*	113.5				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	81				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	87.2				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	71				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	83.5				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	80				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	75.5				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	94				1	Live	
8 Sep	LTB	67	55-65	*Theliderma metanevra*	73.4				1	Live	
8 Sep	LTB	67	55-65	*Cyclonaias pustulosa*	64.5				1	Live	
8 Sep	LTB	67	55-65	*Cyclonaias pustulosa*	60.1				1	Live	
8 Sep	LTB	67	55-65	*Cyclonaias pustulosa*					1	WD	
8 Sep	LTB	67	55-65	*Ellipsaria lineolata*	91.2				1	Live	
8 Sep	LTB	67	55-65	*Ellipsaria lineolata*	86				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema cordatum*	70.9				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema sintoxia*	99.8				1	Live	
8 Sep	LTB	67	55-65	*Pleurobema sintoxia*	83.2				1	Live	
8 Sep	LTB	67	55-65	*Lampsilis cardium*	102			F	1	Live	
8 Sep	LTB	67	55-65	*Lampsilis siliquoidea*	82.1			F	1	Live	
9 Sep	USB	68	0-5	No mussels							
9 Sep	USB	68	5-15	*Potamilus alatus*	111.9				1	Live	
9 Sep	USB	68	5-15	*Potamilus alatus*	111.2				1	Live	
9 Sep	USB	68	5-15	*Ligumia recta*	128.3			F	1	Live	
9 Sep	USB	68	5-15	*Ligumia recta*	131.5			F	1	Live	
9 Sep	USB	68	5-15	*Ellipsaria lineolata*	77.1				1	Live	
9 Sep	USB	68	15-25	*Quadrula quadrula*					1	Live	
9 Sep	USB	68	15-25	*Ligumia recta*	135.1			M	1	Live	
9 Sep	USB	68	15-25	*Ligumia recta*	144.5			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	68	15-25	*Ligumia recta*	138.9			M	1	Live	
9 Sep	USB	68	15-25	*Ligumia recta*	124.2			F	1	Live	
9 Sep	USB	68	15-25	*Amblema plicata*	83.9				1	Live	
9 Sep	USB	68	15-25	*Amblema plicata*	70.9				1	Live	
9 Sep	USB	68	15-25	*Amblema plicata*	106.4				1	Live	
9 Sep	USB	68	15-25	*Ellipsaria lineolata*	70.2				1	Live	
9 Sep	USB	68	15-25	*Quadrula quadrula*	66.7				1	Live	
9 Sep	USB	68	15-25	*Cyclonaias pustulosa*	44.7				1	Live	
9 Sep	USB	68	15-25	*Obliquaria reflexa*	46.8				1	Live	
9 Sep	USB	68	15-25	*Obliquaria reflexa*	51.5				1	Live	
9 Sep	USB	68	15-25	*Obovaria subrotunda**	61.5	38	56.7		1	Live	1722 Yellow
9 Sep	USB	68	25-35	*Lampsilis siliquoidea*	108.2			M	1	Live	
9 Sep	USB	68	25-35	*Amblema plicata*	106.9				1	Live	
9 Sep	USB	68	25-35	*Amblema plicata*					1	WD	
9 Sep	USB	68	25-35	*Ligumia recta*	105.8			M	1	Live	
9 Sep	USB	68	25-35	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	68	25-35	*Ligumia recta*	144.4			M	1	Live	
9 Sep	USB	68	25-35	*Ligumia recta*				M	1	WD	
9 Sep	USB	68	25-35	*Ligumia recta*	150+			F	1	Live	
9 Sep	USB	68	25-35	*Ligumia recta*	131.8			F	1	Live	
9 Sep	USB	68	25-35	*Lampsilis cardium*	111.2			F	1	Live	
9 Sep	USB	68	25-35	*Lampsilis cardium*	114.7			F	1	Live	
9 Sep	USB	68	25-35	*Potamilus alatus*	113.8				1	Live	
9 Sep	USB	68	35-45	*Ligumia recta*	133			F	1	Live	
9 Sep	USB	68	35-45	*Ligumia recta*	136.5			F	1	Live	
9 Sep	USB	68	35-45	*Ligumia recta*	135.8			F	1	Live	
9 Sep	USB	68	35-45	*Ligumia recta*	140.9			F	1	Live	
9 Sep	USB	68	35-45	*Ligumia recta*	138.2			F	1	Live	
9 Sep	USB	68	35-45	*Amblema plicata*	93.2				1	Live	
9 Sep	USB	68	35-45	*Amblema plicata*	107.4				1	Live	
9 Sep	USB	68	35-45	*Amblema plicata*	110				1	Live	
9 Sep	USB	68	35-45	*Amblema plicata*	104.2				1	Live	
9 Sep	USB	68	35-45	*Amblema plicata*					1	WD	
9 Sep	USB	68	35-45	*Potamilus alatus*	108.4				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	68	35-45	*Potamilus alatus*	84.1				1	Live	
9 Sep	USB	68	35-45	*Theliderma metanevra*	77.3				1	Live	
9 Sep	USB	68	35-45	*Theliderma metanevra*	85.4				1	Live	
9 Sep	USB	68	35-45	*Quadrula quadrula*	58				1	Live	
9 Sep	USB	68	35-45	*Cyclonaias pustulosa*	59.6				1	Live	
9 Sep	USB	68	35-45	*Obliquaria reflexa*	47.3				1	Live	
9 Sep	USB	68	35-45	*Obliquaria reflexa*	49.5				1	Live	
9 Sep	USB	68	35-45	*Obliquaria reflexa*	49.9				1	Live	
9 Sep	USB	68	35-45	*Pleurobema sintoxia*	92.6				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	81.9				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	93.3				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	106.5				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	116.2				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	108				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	94.7				1	Live	
9 Sep	USB	68	45-55	*Amblema plicata*	100.2				1	Live	
9 Sep	USB	68	45-55	*Theliderma metanevra*	80.1				1	Live	
9 Sep	USB	68	45-55	*Theliderma metanevra*	77.7				1	Live	
9 Sep	USB	68	45-55	*Theliderma metanevra*	74				1	Live	
9 Sep	USB	68	45-55	*Theliderma metanevra*	82.6				1	Live	
9 Sep	USB	68	45-55	*Ellipsaria lineolata*	85.3				1	Live	
9 Sep	USB	68	45-55	*Ligumia recta*	132.4			M	1	Live	
9 Sep	USB	68	45-55	*Cyclonaias pustulosa*	59.2				1	Live	
9 Sep	USB	68	45-55	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	68	45-55	*Pleurobema cordatum*	77				1	Live	
9 Sep	USB	68	55-65	*Ligumia recta*	137.2			M	1	Live	
9 Sep	USB	68	55-65	*Ligumia recta*	135.5			F	1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	79.9				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*					1	WD	
9 Sep	USB	68	55-65	*Theliderma metanevra*					1	WD	
9 Sep	USB	68	55-65	*Theliderma metanevra*	80.8				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	74				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	74				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	77.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	68	55-65	*Theliderma metanevra*	89.7				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	79.1				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	73.6				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	80.5				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	74				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	89.4				1	Live	
9 Sep	USB	68	55-65	*Theliderma metanevra*	60.8				1	Live	
9 Sep	USB	68	55-65	*Cyclonaias pustulosa*	50.1				1	Live	
9 Sep	USB	68	55-65	*Cyclonaias pustulosa*	65.1				1	Live	
9 Sep	USB	68	55-65	*Ellipsaria lineolata*	67				1	Live	
9 Sep	USB	68	55-65	*Lampsilis cardium*	111			F	1	Live	
9 Sep	USB	68	55-65	*Lampsilis cardium*	112.2			F	1	Live	
9 Sep	USB	68	55-65	*Actinonaias ligamentina*	125.2				1	Live	
9 Sep	USB	69	0-5	No mussels							
9 Sep	USB	69	5-15	*Ligumia recta*	142.2			F	1	Live	
9 Sep	USB	69	5-15	*Ligumia recta*	145.9			F	1	Live	
9 Sep	USB	69	5-15	*Ligumia recta*	128.6			F	1	Live	
9 Sep	USB	69	5-15	*Ligumia recta*	126.2			M	1	Live	
9 Sep	USB	69	5-15	*Amblema plicata*	90.7				1	Live	
9 Sep	USB	69	5-15	*Amblema plicata*	115				1	Live	
9 Sep	USB	69	5-15	*Amblema plicata*	122.1				1	Live	
9 Sep	USB	69	5-15	*Megalonaias nervosa*	150+				1	Live	
9 Sep	USB	69	5-15	*Megalonaias nervosa*	150+				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	99.9				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	101.4				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	96.3				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	98.7				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	117.1				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	68.9				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	74.8				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*	79.9				1	Live	
9 Sep	USB	69	15-25	*Amblema plicata*					1	WD	
9 Sep	USB	69	15-25	*Ellipsaria lineolata*	79.2				1	Live	
9 Sep	USB	69	15-25	*Quadrula quadrula*	71.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	69	15-25	*Cyclonaias pustulosa*	58				1	Live	
9 Sep	USB	69	15-25	*Obliquaria reflexa*	48.7				1	Live	
9 Sep	USB	69	15-25	*Obliquaria reflexa*	45.1				1	Live	
9 Sep	USB	69	15-25	*Ligumia recta*	131.6			F	1	Live	
9 Sep	USB	69	15-25	*Ligumia recta*	143.5			F	1	Live	
9 Sep	USB	69	25-35	*Ligumia recta*	147.1			M	1	Live	
9 Sep	USB	69	25-35	*Ligumia recta*	134.6			M	1	Live	
9 Sep	USB	69	25-35	*Ligumia recta*	140			M	1	Live	
9 Sep	USB	69	25-35	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	69	25-35	*Ligumia recta*	129.3			F	1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	114.7				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	112.1				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	84.9				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	78.7				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	96.7				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	90.3				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	96.2				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*	93.5				1	Live	
9 Sep	USB	69	25-35	*Amblema plicata*					1	WD	
9 Sep	USB	69	25-35	*Theliderma metanevra*	82.8				1	Live	
9 Sep	USB	69	25-35	*Ellipsaria lineolata*	80				1	Live	
9 Sep	USB	69	25-35	*Ellipsaria lineolata*	67.7				1	Live	
9 Sep	USB	69	25-35	*Ellipsaria lineolata*	95.3				1	Live	
9 Sep	USB	69	25-35	*Ellipsaria lineolata*	87.9				1	Live	
9 Sep	USB	69	25-35	*Cyclonaias pustulosa*	58				1	Live	
9 Sep	USB	69	25-35	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	69	25-35	*Potamilus alatus*	96.2				1	Live	
9 Sep	USB	69	25-35	*Lampsilis cardium*	103.3			F	1	Live	
9 Sep	USB	69	35-45	*Amblema plicata*	109.1				1	Live	
9 Sep	USB	69	35-45	*Amblema plicata*	108.7				1	Live	
9 Sep	USB	69	35-45	*Amblema plicata*	106.2				1	Live	
9 Sep	USB	69	35-45	*Amblema plicata*					1	WD	
9 Sep	USB	69	35-45	*Ellipsaria lineolata*	90.3				1	Live	
9 Sep	USB	69	35-45	*Quadrula quadrula*	59.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	69	35-45	*Theliderma metanevra*	78.6				1	Live	
9 Sep	USB	69	35-45	*Theliderma metanevra*	77.1				1	Live	
9 Sep	USB	69	35-45	*Cyclonaias pustulosa*	50				1	Live	
9 Sep	USB	69	35-45	*Potamilus alatus*	109.2				1	Live	
9 Sep	USB	69	35-45	*Potamilus alatus*	110.5				1	Live	
9 Sep	USB	69	35-45	*Theliderma metanevra*	86.3				1	Live	
9 Sep	USB	69	35-45	*Pleurobema cordatum*	93.3				1	Live	
9 Sep	USB	69	35-45	*Pleurobema cordatum*					1	WD	
9 Sep	USB	69	35-45	*Lampsilis cardium*	123.2			F	1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	78.3				1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	77.3				1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	76.2				1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	82				1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	68.5				1	Live	
9 Sep	USB	69	45-55	*Theliderma metanevra*	71.3				1	Live	
9 Sep	USB	69	45-55	*Ellipsaria lineolata*	84.8				1	Live	
9 Sep	USB	69	45-55	*Ellipsaria lineolata*	74.3				1	Live	
9 Sep	USB	69	45-55	*Ellipsaria lineolata*	87.2				1	Live	
9 Sep	USB	69	45-55	*Ellipsaria lineolata*	78.3				1	Live	
9 Sep	USB	69	45-55	*Amblema plicata*	91.5				1	Live	
9 Sep	USB	69	45-55	*Amblema plicata*	97.7				1	Live	
9 Sep	USB	69	45-55	*Amblema plicata*	109				1	Live	
9 Sep	USB	69	45-55	*Amblema plicata*					2	WD	
9 Sep	USB	69	45-55	*Lampsilis cardium*	115.4			F	1	Live	
9 Sep	USB	69	45-55	*Lampsilis cardium*	125.6			M	1	Live	
9 Sep	USB	69	45-55	*Ligumia recta*	136.9			M	1	Live	
9 Sep	USB	69	45-55	*Pleurobema cordatum*	84				1	Live	
9 Sep	USB	69	45-55	*Pleurobema sintoxia*	87.7				1	Live	
9 Sep	USB	69	45-55	*Obliquaria reflexa*	44.4				1	Live	
9 Sep	USB	69	45-55	*Actinonaias ligamentina*	73				1	Live	
9 Sep	USB	69	45-55	*Potamilus alatus*					1	WD	
9 Sep	USB	69	55-65	*Actinonaias ligamentina*	101				1	Live	
9 Sep	USB	69	55-65	*Ligumia recta*	138.5			M	1	Live	
9 Sep	USB	69	55-65	*Ligumia recta*	129.2			M	1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	69	55-65	*Ligumia recta*	133.2			M	1	Live	
9 Sep	USB	69	55-65	*Ligumia recta*	126.1			F	1	Live	
9 Sep	USB	69	55-65	*Ligumia recta*	139.4			F	1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	72.1				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	82				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	91.3				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	81.4				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	79.9				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	69.4				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	73.4				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	76				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	81				1	Live	
9 Sep	USB	69	55-65	*Theliderma metanevra*	82.5				1	Live	
9 Sep	USB	69	55-65	*Cyclonaias pustulosa*	68.5				1	Live	
9 Sep	USB	69	55-65	*Ellipsaria lineolata*	95.6				1	Live	
9 Sep	USB	69	55-65	*Obliquaria reflexa*	57.2				1	Live	
9 Sep	USB	69	55-65	*Plethobasus cyphyus**	101.9	46.4	76.3		1	Live	1793 Yellow
9 Sep	USB	69	55-65	*Pleurobema cordatum*	103.2				1	Live	
9 Sep	USB	69	55-65	*Pleurobema cordatum*	101.2				1	Live	
9 Sep	USB	69	55-65	*Pleurobema cordatum*	108				1	Live	
9 Sep	USB	69	55-65	*Pleurobema cordatum*	98.9				1	Live	
9 Sep	USB	69	55-65	*Pleurobema cordatum*	89				1	Live	
9 Sep	USB	69	55-65	*Pleurobema cordatum*					1	WD	
9 Sep	USB	69	55-65	*Pleurobema sintoxia*	93.4				1	Live	
9 Sep	USB	69	55-65	*Pleurobema sintoxia*	103.5				1	Live	
9 Sep	USB	70	0-5	No mussels							
9 Sep	USB	70	5-15	*Lampsilis siliquoidea*	97.5			F	1	Live	
9 Sep	USB	70	5-15	*Potamilus alatus*	114.1				1	Live	
9 Sep	USB	70	15-25	*Megalonaias nervosa*	150+				1	Live	
9 Sep	USB	70	15-25	*Potamilus alatus*	88.6				1	Live	
9 Sep	USB	70	15-25	*Amblema plicata*	105.7				1	Live	
9 Sep	USB	70	15-25	*Ligumia recta*	148.2			F	1	Live	
9 Sep	USB	70	15-25	*Ligumia recta*	127			F	1	Live	
9 Sep	USB	70	15-25	*Ligumia recta*				F	1	WD	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	70	25-35	*Amblema plicata*	99				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	109.3				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	106.5				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	92.4				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	101.1				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	97.6				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	106.9				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	105.5				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*	94.8				1	Live	
9 Sep	USB	70	25-35	*Amblema plicata*					1	WD	
9 Sep	USB	70	25-35	*Lampsilis cardium*	130.5			M	1	Live	
9 Sep	USB	70	25-35	*Ligumia recta*	148			F	1	Live	
9 Sep	USB	70	25-35	*Ligumia recta*	138.6			F	1	Live	
9 Sep	USB	70	25-35	*Ligumia recta*	104.7			M	1	Live	
9 Sep	USB	70	25-35	*Obliquaria reflexa*	57.2				1	Live	
9 Sep	USB	70	25-35	*Quadrula quadrula*	70.5				1	Live	
9 Sep	USB	70	25-35	*Theliderma metanevra*	83.7				1	Live	
9 Sep	USB	70	25-35	*Cyclonaias pustulosa*	58.6				1	Live	
9 Sep	USB	70	25-35	*Megalonaias nervosa*	150+				1	Live	
9 Sep	USB	70	35-45	*Ligumia recta*	140.1			F	1	Live	
9 Sep	USB	70	35-45	*Ligumia recta*	141.4			F	1	Live	
9 Sep	USB	70	35-45	*Ligumia recta*	149.6			F	1	Live	
9 Sep	USB	70	35-45	*Ligumia recta*				F	1	WD	
9 Sep	USB	70	35-45	*Ligumia recta*	143			M	1	Live	
9 Sep	USB	70	35-45	*Amblema plicata*	123.5				1	Live	
9 Sep	USB	70	35-45	*Amblema plicata*	106.7				1	Live	
9 Sep	USB	70	35-45	*Amblema plicata*	105				1	Live	
9 Sep	USB	70	35-45	*Amblema plicata*	103.7				1	Live	
9 Sep	USB	70	35-45	*Amblema plicata*	98.4				1	Live	
9 Sep	USB	70	35-45	*Ellipsaria lineolata*	88.5				1	Live	
9 Sep	USB	70	35-45	*Ellipsaria lineolata*	70.6				1	Live	
9 Sep	USB	70	35-45	*Ellipsaria lineolata*	77				1	Live	
9 Sep	USB	70	35-45	*Cyclonaias pustulosa*	57				1	Live	
9 Sep	USB	70	35-45	*Cyclonaias pustulosa*	66.5				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	70	35-45	*Theliderma metanevra*	81				1	Live	
9 Sep	USB	70	35-45	*Potamilus alatus*	111.5				1	Live	
9 Sep	USB	70	35-45	*Plethobasus cyphyus**					1	WD	
9 Sep	USB	70	35-45	*Pleurobema sintoxia*	91.4				1	Live	
9 Sep	USB	70	45-55	*Theliderma metanevra*	73.7				1	Live	
9 Sep	USB	70	45-55	*Theliderma metanevra*	75				1	Live	
9 Sep	USB	70	45-55	*Theliderma metanevra*	80				1	Live	
9 Sep	USB	70	45-55	*Theliderma metanevra*	81.6				1	Live	
9 Sep	USB	70	45-55	*Theliderma metanevra*	80.2				1	Live	
9 Sep	USB	70	45-55	*Lampsilis cardium*	109.2			F	1	Live	
9 Sep	USB	70	45-55	*Actinonaias ligamentina*	106.7				1	Live	
9 Sep	USB	70	45-55	*Ellipsaria lineolata*	94.6				1	Live	
9 Sep	USB	70	45-55	*Ellipsaria lineolata*	77.8				1	Live	
9 Sep	USB	70	45-55	*Cyclonaias pustulosa*	60.7				1	Live	
9 Sep	USB	70	45-55	*Cyclonaias pustulosa*	62.6				1	Live	
9 Sep	USB	70	45-55	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	70	45-55	*Obliquaria reflexa*	60.5				1	Live	
9 Sep	USB	70	45-55	*Obliquaria reflexa*	43.6				1	Live	
9 Sep	USB	70	45-55	*Megalonaias nervosa*	137.7				1	Live	
9 Sep	USB	70	45-55	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	70	45-55	*Theliderma metanevra*					1	WD	
9 Sep	USB	70	45-55	*Pleurobema sintoxia*	95.6				1	Live	
9 Sep	USB	70	45-55	*Pleurobema sintoxia*	81.4				1	Live	
9 Sep	USB	70	55-65	*Ligumia recta*	142.8			M	1	Live	
9 Sep	USB	70	55-65	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	70	55-65	*Ligumia recta*	113.6			M	1	Live	
9 Sep	USB	70	55-65	*Ligumia recta*	132.7			M	1	Live	
9 Sep	USB	70	55-65	*Cyclonaias pustulosa*	55.4				1	Live	
9 Sep	USB	70	55-65	*Cyclonaias pustulosa*	51.6				1	Live	
9 Sep	USB	70	55-65	*Potamilus alatus*	89.7				1	Live	
9 Sep	USB	70	55-65	*Amblema plicata*	100.5				1	Live	
9 Sep	USB	70	55-65	*Amblema plicata*	99.4				1	Live	
9 Sep	USB	70	55-65	*Amblema plicata*	80.8				1	Live	
9 Sep	USB	70	55-65	*Amblema plicata*	73.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	70	55-65	*Theliderma metanevra*	79.5				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	85				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	82.4				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	90.5				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	87.4				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	78.1				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	84				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	67.3				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*	88				1	Live	
9 Sep	USB	70	55-65	*Theliderma metanevra*					1	WD	
9 Sep	USB	70	55-65	*Ellipsaria lineolata*	66.4				1	Live	
9 Sep	USB	70	55-65	*Actinonaias ligamentina*	107.1				1	Live	
9 Sep	USB	70	55-65	*Pleurobema cordatum*	71				1	Live	
9 Sep	USB	70	55-65	*Pleurobema cordatum*	85.4				1	Live	
9 Sep	USB	71	0-5	No mussels							
9 Sep	USB	71	5-15	*Amblema plicata*	86				1	Live	
9 Sep	USB	71	15-25	*Lampsilis siliquoidea*	150.4			F	1	Live	
9 Sep	USB	71	15-25	*Ligumia recta*	137.4			M	1	Live	
9 Sep	USB	71	15-25	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	71	15-25	*Lampsilis siliquoidea*	62.5			M	1	Live	
9 Sep	USB	71	15-25	*Cyclonaias pustulosa*	53.1				1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	138.1			F	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	149			F	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	139.3			F	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	137			F	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	144.2			M	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	131.4			M	1	Live	
9 Sep	USB	71	25-35	*Ligumia recta*	101			M	1	Live	
9 Sep	USB	71	25-35	*Ellipsaria lineolata*	88.6				1	Live	
9 Sep	USB	71	25-35	*Ellipsaria lineolata*	86.7				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	107.6				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	99				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	102.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	71	25-35	*Amblema plicata*	99.6				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	113				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	98.5				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	103.4				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*	87				1	Live	
9 Sep	USB	71	25-35	*Amblema plicata*					1	WD	
9 Sep	USB	71	25-35	*Cyclonaias pustulosa*	58.5				1	Live	
9 Sep	USB	71	25-35	*Cyclonaias pustulosa*	52.3				1	Live	
9 Sep	USB	71	35-45	*Ligumia recta*	131			F	1	Live	
9 Sep	USB	71	35-45	*Ligumia recta*	145			F	1	Live	
9 Sep	USB	71	35-45	*Ligumia recta*	136			M	1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*	110.3				1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*	101.7				1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*	95				1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*	107.8				1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*	85.5				1	Live	
9 Sep	USB	71	35-45	*Amblema plicata*					1	WD	
9 Sep	USB	71	35-45	*Theliderma metanevra*	83				1	Live	
9 Sep	USB	71	35-45	*Theliderma metanevra*	71				1	Live	
9 Sep	USB	71	35-45	*Quadrula quadrula*	59.4				1	Live	
9 Sep	USB	71	35-45	*Cyclonaias pustulosa*	60.5				1	Live	
9 Sep	USB	71	35-45	*Cyclonaias pustulosa*	55				1	Live	
9 Sep	USB	71	35-45	*Ellipsaria lineolata*	86.7				1	Live	
9 Sep	USB	71	35-45	*Obliquaria reflexa*	50				1	Live	
9 Sep	USB	71	35-45	*Obliquaria reflexa*	53.6				1	Live	
9 Sep	USB	71	35-45	*Pleurobema cordatum*	81				1	Live	
9 Sep	USB	71	45-55	*Plethobasus cyphyus**					1	WD	
9 Sep	USB	71	45-55	*Ligumia recta*	147.4			M	1	Live	
9 Sep	USB	71	45-55	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	71	45-55	*Lampsilis cardium*	114.4			M	1	Live	
9 Sep	USB	71	45-55	*Amblema plicata*	57.7				1	Live	
9 Sep	USB	71	45-55	*Amblema plicata*	71.3				1	Live	
9 Sep	USB	71	45-55	*Amblema plicata*	72.4				1	Live	
9 Sep	USB	71	45-55	*Amblema plicata*	116.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	71	45-55	*Amblema plicata*					1	WD	
9 Sep	USB	71	45-55	*Theliderma metanevra*	81.3				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	75.4				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	80				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	85.6				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	78.7				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	80.6				1	Live	
9 Sep	USB	71	45-55	*Theliderma metanevra*	91				1	Live	
9 Sep	USB	71	45-55	*Cyclonaias pustulosa*	63				1	Live	
9 Sep	USB	71	45-55	*Cyclonaias pustulosa*	52				1	Live	
9 Sep	USB	71	45-55	*Ellipsaria lineolata*	88.5				1	Live	
9 Sep	USB	71	45-55	*Ellipsaria lineolata*	91.7				1	Live	
9 Sep	USB	71	45-55	*Ellipsaria lineolata*	83				1	Live	
9 Sep	USB	71	45-55	*Ligumia recta*	139			F	1	Live	
9 Sep	USB	71	45-55	*Ligumia recta*	150+			F	1	Live	
9 Sep	USB	71	45-55	*Ligumia recta*	150+			F	1	Live	
9 Sep	USB	71	45-55	*Potamilus alatus*	106.6				1	Live	
9 Sep	USB	71	45-55	*Potamilus alatus*	104.3				1	Live	
9 Sep	USB	71	45-55	*Actinonaias ligamentina*	116.4				1	Live	
9 Sep	USB	71	45-55	*Actinonaias ligamentina*	115				1	Live	
9 Sep	USB	71	45-55	*Actinonaias ligamentina*	109.2				1	Live	
9 Sep	USB	71	45-55	*Lampsilis cardium*	106.2			F	1	Live	
9 Sep	USB	71	45-55	*Lampsilis cardium*	98.4			F	1	Live	
9 Sep	USB	71	45-55	*Pleurobema cordatum*	66.4				1	Live	
9 Sep	USB	71	45-55	*Pleurobema cordatum*	95.5				1	Live	
9 Sep	USB	71	45-55	*Pleurobema sintoxia*	83.3				1	Live	
9 Sep	USB	71	45-55	*Pleurobema sintoxia*	96.7				1	Live	
9 Sep	USB	71	55-65	*Ligumia recta*	142.5			F	1	Live	
9 Sep	USB	71	55-65	*Ligumia recta*	140			M	1	Live	
9 Sep	USB	71	55-65	*Amblema plicata*	117.6				1	Live	
9 Sep	USB	71	55-65	*Amblema plicata*	107.3				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	87				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	81.4				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	90				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	71	55-65	*Theliderma metanevra*	80				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	74.6				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	82.5				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	82				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	79.1				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	82.6				1	Live	
9 Sep	USB	71	55-65	*Theliderma metanevra*	62.1				1	Live	
9 Sep	USB	71	55-65	*Ellipsaria lineolata*	96.7				1	Live	
9 Sep	USB	71	55-65	*Ellipsaria lineolata*	48.6				1	Live	
9 Sep	USB	71	55-65	*Ellipsaria lineolata*	88.4				1	Live	
9 Sep	USB	71	55-65	*Cyclonaias pustulosa*	63.2				1	Live	
9 Sep	USB	71	55-65	*Cyclonaias pustulosa*	62				1	Live	
9 Sep	USB	71	55-65	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	71	55-65	*Pleurobema sintoxia*	80.6				1	Live	
9 Sep	USB	71	55-65	*Pleurobema sintoxia*	71				1	Live	
9 Sep	USB	71	55-65	*Pleurobema sintoxia*	90.5				1	Live	
9 Sep	USB	71	55-65	*Pleurobema cordatum*	89				1	Live	
9 Sep	USB	71	55-65	*Pleurobema cordatum*	81.7				1	Live	
9 Sep	USB	71	55-65	*Pleurobema cordatum*	87				1	Live	
9 Sep	USB	71	55-65	*Pleurobema cordatum*	88				1	Live	
9 Sep	USB	72	0-5	No mussels							
9 Sep	USB	72	5-15	*Ligumia recta*	136			F	1	Live	
9 Sep	USB	72	5-15	*Ligumia recta*	135.4			F	1	Live	
9 Sep	USB	72	5-15	*Ligumia recta*	140.5			F	1	Live	
9 Sep	USB	72	5-15	*Fusconaia flava*	72.4				1	Live	
9 Sep	USB	72	5-15	*Potamilus alatus*	96.2				1	Live	
9 Sep	USB	72	15-25	*Ligumia recta*	125.2			M	1	Live	
9 Sep	USB	72	15-25	*Ligumia recta*	132.5			F	1	Live	
9 Sep	USB	72	15-25	*Amblema plicata*	98.6				1	Live	
9 Sep	USB	72	15-25	*Potamilus alatus*	91.8				1	Live	
9 Sep	USB	72	15-25	*Lampsilis siliquoidea*	105.5			F	1	Live	
9 Sep	USB	72	25-35	*Ellipsaria lineolata*	82.3				1	Live	
9 Sep	USB	72	25-35	*Ellipsaria lineolata*	62.1				1	Live	
9 Sep	USB	72	25-35	*Ellipsaria lineolata*	82.9				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	72	25-35	*Ligumia recta*	62.1			M	1	Live	
9 Sep	USB	72	25-35	*Ligumia recta*	147.2			M	1	Live	
9 Sep	USB	72	25-35	*Ligumia recta*	145.8			M	1	Live	
9 Sep	USB	72	25-35	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	72	25-35	*Cyclonaias pustulosa*	52				1	Live	
9 Sep	USB	72	25-35	*Potamilus alatus*	131.5				1	Live	
9 Sep	USB	72	25-35	*Amblema plicata*	108.5				1	Live	
9 Sep	USB	72	25-35	*Ellipsaria lineolata*					1	WD	
9 Sep	USB	72	35-45	*Actinonaias ligamentina*	119				1	Live	
9 Sep	USB	72	35-45	*Ellipsaria lineolata*	93.2				1	Live	
9 Sep	USB	72	35-45	*Cyclonaias pustulosa*	61.8				1	Live	
9 Sep	USB	72	35-45	*Amblema plicata*	104.9				1	Live	
9 Sep	USB	72	35-45	*Amblema plicata*	100				1	Live	
9 Sep	USB	72	35-45	*Amblema plicata*	101				1	Live	
9 Sep	USB	72	35-45	*Amblema plicata*	90.8				1	Live	
9 Sep	USB	72	35-45	*Amblema plicata*	101.9				1	Live	
9 Sep	USB	72	35-45	*Theliderma metanevra*	79.1				1	Live	
9 Sep	USB	72	35-45	*Theliderma metanevra*	74.8				1	Live	
9 Sep	USB	72	35-45	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	72	35-45	*Ligumia recta*	140.7			M	1	Live	
9 Sep	USB	72	35-45	*Ligumia recta*	135			M	1	Live	
9 Sep	USB	72	45-55	*Lampsilis cardium*	124.2			M	1	Live	
9 Sep	USB	72	45-55	*Lampsilis cardium*	116.9			M	1	Live	
9 Sep	USB	72	45-55	*Actinonaias ligamentina*	115.5				1	Live	
9 Sep	USB	72	45-55	*Actinonaias ligamentina*	117.2				1	Live	
9 Sep	USB	72	45-55	*Actinonaias ligamentina*	101.7				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	58.9				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	59.5				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	59.8				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	55.2				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	62				1	Live	
9 Sep	USB	72	45-55	*Cyclonaias pustulosa*	62.5				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	82				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	87.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	72	45-55	*Theliderma metanevra*	82.7				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	58.1				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	82				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	87				1	Live	
9 Sep	USB	72	45-55	*Theliderma metanevra*	75.2				1	Live	
9 Sep	USB	72	45-55	*Amblema plicata*	118.2				1	Live	
9 Sep	USB	72	45-55	*Amblema plicata*	117				1	Live	
9 Sep	USB	72	45-55	*Amblema plicata*	95				1	Live	
9 Sep	USB	72	45-55	*Amblema plicata*	105.2				1	Live	
9 Sep	USB	72	45-55	*Amblema plicata*	92.5				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*	88.3				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*	72.2				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*	49.9				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*	93.1				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*	86.3				1	Live	
9 Sep	USB	72	45-55	*Ellipsaria lineolata*					1	WD	
9 Sep	USB	72	55-65	*Amblema plicata*	100				1	Live	
9 Sep	USB	72	55-65	*Amblema plicata*	96.6				1	Live	
9 Sep	USB	72	55-65	*Amblema plicata*	105.5				1	Live	
9 Sep	USB	72	55-65	*Lampsilis cardium*	104.3			F	1	Live	
9 Sep	USB	72	55-65	*Pleurobema sintoxia*	91.6				1	Live	
9 Sep	USB	72	55-65	*Pleurobema cordatum*	88.1				1	Live	
9 Sep	USB	72	55-65	*Pleurobema cordatum*	91.9				1	Live	
9 Sep	USB	72	55-65	*Cyclonaias pustulosa*	66.6				1	Live	
9 Sep	USB	72	55-65	*Cyclonaias pustulosa*	67.3				1	Live	
9 Sep	USB	72	55-65	*Quadrula quadrula*	67				1	Live	
9 Sep	USB	72	55-65	*Obliquaria reflexa*	56.1				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	86.2				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	80				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	75.5				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	77.1				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	77.2				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	79.4				1	Live	
9 Sep	USB	72	55-65	*Theliderma metanevra*	75				1	Live	

Date (2024)	Area[1]	Transect[1]	Interval	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
9 Sep	USB	72	55-65	*Ligumia recta*	150+			M	1	Live	
9 Sep	USB	72	55-65	*Plethobasus cyphyus**	107	48.4	75.2		1	Live	1965 Yellow
9 Sep	USB	72	55-65	*Theliderma metanevra*					1	WD	
9 Sep	USB	72	55-65	*Cyclonaias pustulosa*					1	WD	
9 Sep	USB	72	55-65	*Ligumia recta*					1	WD	
9 Sep	USB	72	55-65	*Actinonaias ligamentina*	118.8				1	Live	
9 Sep	USB	72	55-65	*Actinonaias ligamentina*	112.2				1	Live	
9 Sep	USB	72	55-65	*Actinonaias ligamentina*	118.6				1	Live	
9 Sep	USB	72	55-65	*Actinonaias ligamentina*	122.7				1	Live	

[1] ADI = Area of direct impact; DSB = Downstream buffer; LTB = Lateral buffer; USB = Upstream buffer

[2] * = Federally listed species

[3] F = Female; M = Male

[4] WD = Weathered deadshell; SF = Subfossil

Table C5. Site 2 spot dive mussel morphometric and occurance data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 1	*Amblema plicata*					4	WD	
10 Sep	USS	Spot 1	*Amblema plicata*	93				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	111.1				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	106				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	106				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	123.4				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	109.7				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	118				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	120.5				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	107.4				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	101.1				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	103				1	Live	
10 Sep	USS	Spot 1	*Amblema plicata*	106.9				1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	125			F	1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	114.2			F	1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	136.4			M	1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	150+			F	1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	150+			M	1	Live	
10 Sep	USS	Spot 1	*Ligumia recta*	144.5			F	1	Live	
10 Sep	USS	Spot 1	*Cyclonaias pustulosa*					1	WD	
10 Sep	USS	Spot 1	*Actinonaias ligamentina*	116.5				1	Live	
10 Sep	USS	Spot 2	*Megalonaias nervosa*	150+				1	Live	
10 Sep	USS	Spot 2	*Megalonaias nervosa*	150+				1	Live	
10 Sep	USS	Spot 2	*Megalonaias nervosa*					1	WD	
10 Sep	USS	Spot 2	*Amblema plicata*	102.2				1	Live	
10 Sep	USS	Spot 2	*Amblema plicata*	17.3				1	Live	
10 Sep	USS	Spot 2	*Amblema plicata*	102.4				1	Live	
10 Sep	USS	Spot 2	*Amblema plicata*	105.7				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 2	*Amblema plicata*	92.8				1	Live	
10 Sep	USS	Spot 2	*Amblema plicata*					7	WD	
10 Sep	USS	Spot 2	*Amblema plicata*	103.9				1	Live	
10 Sep	USS	Spot 2	*Amblema plicata*	115.3				1	Live	
10 Sep	USS	Spot 2	*Theliderma metanevra*					1	WD	
10 Sep	USS	Spot 2	*Theliderma metanevra*	73.6				1	Live	
10 Sep	USS	Spot 2	*Theliderma metanevra*	75.4				1	Live	
10 Sep	USS	Spot 2	*Ellipsaria lineolata*	64.5				1	Live	
10 Sep	USS	Spot 2	*Ellipsaria lineolata*	92.7				1	Live	
10 Sep	USS	Spot 2	*Ellipsaria lineolata*	77.7				1	Live	
10 Sep	USS	Spot 2	*Ellipsaria lineolata*	66				1	Live	
10 Sep	USS	Spot 2	*Ellipsaria lineolata*	92.4				1	Live	
10 Sep	USS	Spot 2	*Potamilus alatus*					1	WD	
10 Sep	USS	Spot 2	*Ligumia recta*	137.2			M	1	Live	
10 Sep	USS	Spot 2	*Pleurobema sintoxia*	95				1	Live	
10 Sep	USS	Spot 2	*Lampsilis cardium*	118.6			M	1	Live	
10 Sep	USS	Spot 3	*Cyclonaias pustulosa*					1	WD	
10 Sep	USS	Spot 3	*Cyclonaias pustulosa*	65				1	Live	
10 Sep	USS	Spot 3	*Cyclonaias pustulosa*	62				1	Live	
10 Sep	USS	Spot 3	*Ellipsaria lineolata*					1	WD	
10 Sep	USS	Spot 3	*Ellipsaria lineolata*	86				1	Live	
10 Sep	USS	Spot 3	*Plethobasus cyphyus**	103.8	49.2	73		1	Live	1778 Yellow
10 Sep	USS	Spot 3	*Obliquaria reflexa*	50				1	Live	
10 Sep	USS	Spot 3	*Obliquaria reflexa*	48.6				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*	111.4				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*	88.3				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*	101.4				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*	140.3				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*	107				1	Live	
10 Sep	USS	Spot 3	*Amblema plicata*					1	WD	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 3	*Ligumia recta*	142.3			F	1	Live	
10 Sep	USS	Spot 3	*Ligumia recta*	137.5			F	1	Live	
10 Sep	USS	Spot 3	*Lampsilis cardium*	114.5			F	1	Live	
10 Sep	USS	Spot 3	*Actinonaias ligamentina*	127.2				1	Live	
10 Sep	USS	Spot 3	*Actinonaias ligamentina*	113.4				1	Live	
10 Sep	USS	Spot 3	*Actinonaias ligamentina*	111.6				1	Live	
10 Sep	USS	Spot 3	*Pleurobema cordatum*	82.5				1	Live	
10 Sep	USS	Spot 3	*Pleurobema cordatum*	88.4				1	Live	
10 Sep	USS	Spot 3	*Pleurobema sintoxia*	95.5				1	Live	
10 Sep	USS	Spot 4	*Ligumia recta*	134.2			M	1	Live	
10 Sep	USS	Spot 4	*Ligumia recta*	138.2			F	1	Live	
10 Sep	USS	Spot 4	*Ligumia recta*	147.5			F	1	Live	
10 Sep	USS	Spot 4	*Ligumia recta*	132.3			F	1	Live	
10 Sep	USS	Spot 4	*Ligumia recta*	145			F	1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*	69.6				1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*	101.4				1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*	95.7				1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*	80.3				1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*	94				1	Live	
10 Sep	USS	Spot 4	*Amblema plicata*					2	WD	
10 Sep	USS	Spot 4	*Cyclonaias pustulosa*	59.3				1	Live	
10 Sep	USS	Spot 4	*Cyclonaias pustulosa*	61.5				1	Live	
10 Sep	USS	Spot 4	*Cyclonaias pustulosa*	63				1	Live	
10 Sep	USS	Spot 4	*Cyclonaias pustulosa*	60				1	Live	
10 Sep	USS	Spot 4	*Cyclonaias pustulosa*					1	WD	
10 Sep	USS	Spot 4	*Theliderma metanevra*	81.4				1	Live	
10 Sep	USS	Spot 4	*Theliderma metanevra*	75				1	Live	
10 Sep	USS	Spot 4	*Theliderma metanevra*	79.4				1	Live	
10 Sep	USS	Spot 4	*Theliderma metanevra*	80.2				1	Live	
10 Sep	USS	Spot 4	*Theliderma metanevra*	76.8				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 4	*Theliderma metanevra*	86.7				1	Live	
10 Sep	USS	Spot 4	*Theliderma metanevra*					1	WD	
10 Sep	USS	Spot 4	*Ellipsaria lineolata*	52				1	Live	
10 Sep	USS	Spot 4	*Ellipsaria lineolata*	52.6				1	Live	
10 Sep	USS	Spot 4	*Ellipsaria lineolata*	70.6				1	Live	
10 Sep	USS	Spot 4	*Ellipsaria lineolata*	107.2				1	Live	
10 Sep	USS	Spot 4	*Ellipsaria lineolata*					1	WD	
10 Sep	USS	Spot 4	*Actinonaias ligamentina*	116.5				1	Live	
10 Sep	USS	Spot 4	*Actinonaias ligamentina*	108				1	Live	
10 Sep	USS	Spot 4	*Actinonaias ligamentina*	127				1	Live	
10 Sep	USS	Spot 4	*Fusconaia subrotunda**	77.5	40.6	63.1		1	Live	1752 Yellow
10 Sep	USS	Spot 4	*Pleurobema sintoxia*	86				1	Live	
10 Sep	USS	Spot 4	*Pleurobema cordatum*	78.2				1	Live	
10 Sep	USS	Spot 4	*Potamilus alatus*					2	WD	
10 Sep	USS	Spot 4	*Potamilus alatus*	112.1				1	Live	
10 Sep	USS	Spot 4	*Potamilus alatus*	94.5				1	Live	
10 Sep	USS	Spot 4	*Quadrula quadrula*	6.5				1	Live	
10 Sep	USS	Spot 5	*Cyclonaias pustulosa*	60				1	Live	
10 Sep	USS	Spot 5	*Cyclonaias pustulosa*	63.6				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	91				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	100.5				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	115.3				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	93.1				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	85.4				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*	89.3				1	Live	
10 Sep	USS	Spot 5	*Amblema plicata*					1	WD	
10 Sep	USS	Spot 5	*Lampsilis cardium*	115			F	1	Live	
10 Sep	USS	Spot 5	*Theliderma metanevra*	73				1	Live	
10 Sep	USS	Spot 5	*Theliderma metanevra*	79				1	Live	
10 Sep	USS	Spot 5	*Theliderma metanevra*	78.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 5	*Theliderma metanevra*	67.3				1	Live	
10 Sep	USS	Spot 5	*Theliderma metanevra*	90				1	Live	
10 Sep	USS	Spot 5	*Theliderma metanevra*	76.3				1	Live	
10 Sep	USS	Spot 5	*Ligumia recta*	140.7			M	1	Live	
10 Sep	USS	Spot 5	*Ligumia recta*	115.4			M	1	Live	
10 Sep	USS	Spot 5	*Ligumia recta*	140.4			F	1	Live	
10 Sep	USS	Spot 5	*Ligumia recta*	147.3			F	1	Live	
10 Sep	USS	Spot 5	*Ligumia recta*	140.1			F	1	Live	
10 Sep	USS	Spot 5	*Pleurobema sintoxia*	82.7				1	Live	
10 Sep	USS	Spot 5	*Pleurobema sintoxia*	70.2				1	Live	
10 Sep	USS	Spot 5	*Plethobasus cyphyus**					1	WD	
10 Sep	USS	Spot 5	*Potamilus alatus*					1	WD	
10 Sep	USS	Spot 5	*Pleurobema clava**	84.4	32.3	49.4		1	Live	T007 Gray
10 Sep	USS	Spot 6	*Theliderma metanevra*	75				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	77.8				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	61.2				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	76				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	76				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	79.8				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	82.8				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	84				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	89.6				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	80				1	Live	
10 Sep	USS	Spot 6	*Theliderma metanevra*	68.4				1	Live	
10 Sep	USS	Spot 6	*Amblema plicata*	95.2				1	Live	
10 Sep	USS	Spot 6	*Amblema plicata*	83				1	Live	
10 Sep	USS	Spot 6	*Amblema plicata*	150+				1	Live	
10 Sep	USS	Spot 6	*Ligumia recta*	137.7			F	1	Live	
10 Sep	USS	Spot 6	*Lampsilis cardium*	97.6			F	1	Live	
10 Sep	USS	Spot 6	*Actinonaias ligamentina*	107.2				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 6	*Ellipsaria lineolata*	87.5				1	Live	
10 Sep	USS	Spot 6	*Ellipsaria lineolata*	67				1	Live	
10 Sep	USS	Spot 6	*Ellipsaria lineolata*	74.2				1	Live	
10 Sep	USS	Spot 6	*Ellipsaria lineolata*	72.7				1	Live	
10 Sep	USS	Spot 6	*Cyclonaias pustulosa*	52.6				1	Live	
10 Sep	USS	Spot 6	*Cyclonaias pustulosa*					1	WD	
10 Sep	USS	Spot 6	*Obliquaria reflexa*	40				1	Live	
10 Sep	USS	Spot 6	*Pleurobema cordatum*	93.6				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	94.3				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	96.3				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	82.3				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	105.4				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	109.3				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	108				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*	108				1	Live	
10 Sep	USS	Spot 7	*Amblema plicata*					1	WD	
10 Sep	USS	Spot 7	*Theliderma metanevra*	89				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	89.4				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	83.2				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	87.3				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	88.9				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	81.4				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	83				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	84				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	82.4				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	84.5				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	91.7				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	86.5				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	80				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	80.1				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 7	*Theliderma metanevra*	81.7				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	81.4				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	81.7				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	82.5				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	79.8				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	73.1				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	82.3				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	83.2				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	88				1	Live	
10 Sep	USS	Spot 7	*Theliderma metanevra*	92.7				1	Live	
10 Sep	USS	Spot 7	*Quadrula quadrula*	59.6				2	WD	
10 Sep	USS	Spot 7	*Cyclonaias pustulosa*	69				1	Live	
10 Sep	USS	Spot 7	*Ellipsaria lineolata*	82.4				1	Live	
10 Sep	USS	Spot 7	*Ellipsaria lineolata*					1	WD	
10 Sep	USS	Spot 7	*Ligumia recta*	148.2				1	Live	
10 Sep	USS	Spot 7	*Ligumia recta*	150+				1	Live	
10 Sep	USS	Spot 7	*Ligumia recta*					1	WD	
10 Sep	USS	Spot 7	*Actinonaias ligamentina*	125.3				1	Live	
10 Sep	USS	Spot 7	*Lampsilis cardium*	127.2			M	1	Live	
10 Sep	USS	Spot 7	*Obliquaria reflexa*					1	WD	
10 Sep	USS	Spot 8	*Amblema plicata*	110.5				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	102.3				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	107.3				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	84				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	110.3				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	76.3				1	Live	
10 Sep	USS	Spot 8	*Amblema plicata*	112.4				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	82.4				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	82.5				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	81.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 8	*Theliderma metanevra*	86.7				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	78.3				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	75				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	73.4				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	83.8				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	86				1	Live	
10 Sep	USS	Spot 8	*Theliderma metanevra*	60.3				1	Live	
10 Sep	USS	Spot 8	*Ellipsaria lineolata*	95				1	Live	
10 Sep	USS	Spot 8	*Ellipsaria lineolata*	80				1	Live	
10 Sep	USS	Spot 8	*Ellipsaria lineolata*	81.7				1	Live	
10 Sep	USS	Spot 8	*Ellipsaria lineolata*	92.8				1	Live	
10 Sep	USS	Spot 8	*Ellipsaria lineolata*	79.1				1	Live	
10 Sep	USS	Spot 8	*Obliquaria reflexa*	60.4				1	Live	
10 Sep	USS	Spot 8	*Cyclonaias pustulosa*	63.5				1	Live	
10 Sep	USS	Spot 8	*Cyclonaias pustulosa*	60.8				1	Live	
10 Sep	USS	Spot 8	*Cyclonaias pustulosa*	50.5				1	Live	
10 Sep	USS	Spot 8	*Lampsilis cardium*	105			F	1	Live	
10 Sep	USS	Spot 8	*Actinonaias ligamentina*	112				1	Live	
10 Sep	USS	Spot 8	*Ligumia recta*	142.3			F	1	Live	
10 Sep	USS	Spot 8	*Ligumia recta*	141			M	1	Live	
10 Sep	USS	Spot 8	*Pleurobema cordatum*	82.5				1	Live	
10 Sep	USS	Spot 8	*Pleurobema cordatum*	84.1				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	82				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	97.2				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	83.8				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	93.8				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	107.4				1	Live	
10 Sep	USS	Spot 9	*Amblema plicata*	109.3				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	92				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	72.3				1	Live	

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 9	*Theliderma metanevra*	79.8				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	77.3				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	75.4				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	79				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	86.8				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	84.5				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	87				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	72.4				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	72.5				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	83.2				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	75.5				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	83.7				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	78.7				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	83				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	89.7				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	74				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	80				1	Live	
10 Sep	USS	Spot 9	*Theliderma metanevra*	80				1	Live	
10 Sep	USS	Spot 9	*Ellipsaria lineolata*	66.4				1	Live	
10 Sep	USS	Spot 9	*Ellipsaria lineolata*	76.7				1	Live	
10 Sep	USS	Spot 9	*Ellipsaria lineolata*					2	WD	
10 Sep	USS	Spot 9	*Cyclonaias pustulosa*	68.5				1	Live	
10 Sep	USS	Spot 9	*Cyclonaias pustulosa*	65.7				1	Live	
10 Sep	USS	Spot 9	*Cyclonaias pustulosa*					1	WD	
10 Sep	USS	Spot 9	*Ligumia recta*	131.5			M	1	Live	
10 Sep	USS	Spot 9	*Lampsilis cardium*	105.5			M	1	Live	
10 Sep	USS	Spot 9	*Actinonaias ligamentina*	108.7				1	Live	
10 Sep	USS	Spot 9	*Potamilus alatus*	103.5				1	Live	
10 Sep	USS	Spot 9	*Potamilus alatus*					2	WD	
10 Sep	USS	Spot 9	*Plethobasus cyphyus**	110.7	50.6	77.8		1	Live	1049 Yellow

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 9	*Pleurobema sintoxia*	91.1				1	Live	
10 Sep	USS	Spot 9	*Pleurobema sintoxia*	90.4				1	Live	
10 Sep	USS	Spot 9	*Pleurobema cordatum*	86.4				1	Live	
10 Sep	USS	Spot 9	*Pleurobema cordatum*	85.2				1	Live	
10 Sep	USS	Spot 10	*Lampsilis cardium*	120.8			F	1	Live	l
10 Sep	USS	Spot 10	*Lampsilis cardium*	100.7			F	1	Live	l
10 Sep	USS	Spot 10	*Megalonaias nervosa*	150+				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	72				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	90.8				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	89.7				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	83.4				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	82				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	83.1				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	81.8				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	70.1				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	80				1	Live	l
10 Sep	USS	Spot 10	*Theliderma metanevra*	75.7				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*	50.5				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*	68.5				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*	54.3				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*	57.8				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*	55.5				1	Live	l
10 Sep	USS	Spot 10	*Cyclonaias pustulosa*					3	WD	l
10 Sep	USS	Spot 10	*Quadrula quadrula*	64				1	Live	l
10 Sep	USS	Spot 10	*Obliquaria reflexa*	56.4				1	Live	l
10 Sep	USS	Spot 10	*Potamilus alatus*	94.5				1	Live	l
10 Sep	USS	Spot 10	*Potamilus alatus*	106.5				1	Live	l
10 Sep	USS	Spot 10	*Potamilus alatus*	101.4				1	Live	l
10 Sep	USS	Spot 10	*Actinonaias ligamentina*	114.7				1	Live	l
10 Sep	USS	Spot 10	*Actinonaias ligamentina*	112.5				1	Live	l

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number	
10 Sep	USS	Spot 10	*Amblema plicata*	121.4				1	Live		U
10 Sep	USS	Spot 10	*Ellipsaria lineolata*	96				1	Live		U
10 Sep	USS	Spot 10	*Ellipsaria lineolata*	86				1	Live		U
10 Sep	USS	Spot 10	*Ligumia recta*	150+			M	1	Live		U
10 Sep	USS	Spot 10	*Ligumia recta*	150+			M	1	Live		U
10 Sep	USS	Spot 10	*Ligumia recta*	122.5			F	1	Live		U
10 Sep	USS	Spot 10	*Ligumia recta*	101.2			M	1	Live		U
10 Sep	USS	Spot 10	*Plethobasus cyphyus**	10.5	55	75.7		1	Live	1704 Yellow	
10 Sep	USS	Spot 10	*Pleurobema sintoxia*	85.3				1	Live		U
10 Sep	USS	Spot 10	*Pleurobema cordatum*	93.4				1	Live		U
10 Sep	USS	Spot 10	*Pleurobema cordatum*	64.5				1	Live		U
10 Sep	USS	Spot 10	*Pleurobema cordatum*	57.3				1	Live		U
10 Sep	USS	Spot 10	*Potamilus fragilis*					1	WD		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	76.4				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	82.5				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	71.7				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	83.4				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	70.2				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	74				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	78.3				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	83				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	73.4				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	76				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	78.4				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	81				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	67.5				1	Live		U
10 Sep	USS	Spot 11	*Theliderma metanevra*	61.4				1	Live		U
10 Sep	USS	Spot 11	*Cyclonaias pustulosa*	65				1	Live		U
10 Sep	USS	Spot 11	*Cyclonaias pustulosa*	74.8				1	Live		U
10 Sep	USS	Spot 11	*Cyclonaias pustulosa*	61.8				1	Live		U

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 11	*Cyclonaias pustulosa*	45.5				1	Live	U
10 Sep	USS	Spot 11	*Ellipsaria lineolata*	60.6				1	Live	U
10 Sep	USS	Spot 11	*Ellipsaria lineolata*	71.6				1	Live	U
10 Sep	USS	Spot 11	*Ellipsaria lineolata*	65				1	Live	U
10 Sep	USS	Spot 11	*Obliquaria reflexa*	46.8				1	Live	U
10 Sep	USS	Spot 11	*Obliquaria reflexa*	50.6				1	Live	U
10 Sep	USS	Spot 11	*Actinonaias ligamentina*	111.7				1	Live	U
10 Sep	USS	Spot 11	*Actinonaias ligamentina*	127.7				1	Live	U
10 Sep	USS	Spot 11	*Amblema plicata*	114.5				1	Live	U
10 Sep	USS	Spot 11	*Amblema plicata*	91.4				1	Live	U
10 Sep	USS	Spot 11	*Amblema plicata*	110.4				1	Live	U
10 Sep	USS	Spot 11	*Amblema plicata*	101.6				1	Live	U
10 Sep	USS	Spot 11	*Amblema plicata*	73				1	Live	U
10 Sep	USS	Spot 11	*Ligumia recta*	128.7			F	1	Live	U
10 Sep	USS	Spot 11	*Ligumia recta*	126			F	1	Live	U
10 Sep	USS	Spot 11	*Potamilus alatus*	100.7				1	Live	U
10 Sep	USS	Spot 11	*Potamilus alatus*	98.6				1	Live	U
10 Sep	USS	Spot 11	*Potamilus alatus*					1	WD	U
10 Sep	USS	Spot 11	*Pleurobema sintoxia*	93.2				1	Live	U
10 Sep	USS	Spot 11	*Pleurobema sintoxia*	93.5				1	Live	U
10 Sep	USS	Spot 11	*Pleurobema sintoxia*					1	WD	U
10 Sep	USS	Spot 11	*Pleurobema cordatum*	85				1	Live	U
10 Sep	USS	Spot 11	*Pleurobema cordatum*	86				1	Live	U
10 Sep	USS	Spot 11	*Plethobasus cyphyus**					1	WD	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	80				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	82.3				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	69.5				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	78.2				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	83.5				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	83.7				1	Live	U

Date (2024)	Area[1]	Transect[1]	Species[2]	Length (mm)	Width (mm)	Height (mm)	Sex[3]	Count	Condition[4]	Tag Number
10 Sep	USS	Spot 12	*Theliderma metanevra*	64				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	78.3				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	74.5				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*	79.2				1	Live	U
10 Sep	USS	Spot 12	*Theliderma metanevra*					3	WD	U
10 Sep	USS	Spot 12	*Actinonaias ligamentina*	114				1	Live	U
10 Sep	USS	Spot 12	*Obliquaria reflexa*	48.2				1	Live	U
10 Sep	USS	Spot 12	*Obliquaria reflexa*	42.8				1	Live	U
10 Sep	USS	Spot 12	*Obliquaria reflexa*					2	WD	U
10 Sep	USS	Spot 12	*Ligumia recta*	144.5			F	1	Live	U
10 Sep	USS	Spot 12	*Lampsilis cardium*	100.6			F	1	Live	U
10 Sep	USS	Spot 12	*Amblema plicata*	110.5				1	Live	U
10 Sep	USS	Spot 12	*Amblema plicata*	86.4				1	Live	U
10 Sep	USS	Spot 12	*Amblema plicata*	100.4				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema sintoxia*	92				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema sintoxia*	92				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema sintoxia*	84				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema sintoxia*	79.1				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema cordatum*	85.5				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema cordatum*	83				1	Live	U
10 Sep	USS	Spot 12	*Pleurobema cordatum*	87.1				1	Live	U

[1] USS = Upstream spot dive

[2] * = Federally listed species

[3] F = Female; M = Male

[4] WD = Weathered deadshell; SF = Subfossil

Table C6. Site 2 spot dive habitat data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Survey Area[1]	Transect[1]	Divers[2]	Percent Substrate Composition				Time (mins)	Depth (m)
				Fines	Sand	Gravel	Cobble		
10 Sep	USS	Spot 1	BD	40	40	20		10	4.9
10 Sep	USS	Spot 2	BD	40	30	20	10	10	4.9
10 Sep	USS	Spot 3	BD	30	40	20	10	10	4.9
10 Sep	USS	Spot 4	BD	30	40	30		10	4.9
10 Sep	USS	Spot 5	BD	30	40	30	10	10	4.9
10 Sep	USS	Spot 6	BD	10	50	40		10	4.9
10 Sep	USS	Spot 7	BD	10	50	40		10	4.9
10 Sep	USS	Spot 8	BD	10	50	40		10	4.9
10 Sep	USS	Spot 9	BD	10	50	40		10	4.9
10 Sep	USS	Spot 10	BD	10	50	40		10	4.9
10 Sep	USS	Spot 11	BD	10	50	40		10	4.9
10 Sep	USS	Spot 12	BD	20	40	40		10	4.9

[1] USS = Upstream spot dive

[2] BD = Brian Dennis

C-3
WVDNR SCOPE OF WORK FORM

Mussel Survey Scope of Work Summary Sheet

Form Date **3/16/2020**

Project Title: Site 2 USFWS-NWR Muskingum Island Well Plugging Project

Project Company: USFWS - National Wildlife Refuge
Date Submitted: 29-Jul-24
Mussel Contractor: Environmental Solutions & Innovations
Date Revised: 28-Oct-24
Lead Malacologist: Brandon L. Yates
Project Contractor: Environmental Solutions & Innovations
Collectors: if applicable Brandon L. Yates, Paul Robert, Vanessa Vest, Kevin Yount, Brian Dennis
County: Wood
Group (Circle One): 1 2 3 (4)
Stream: Ohio River
Location Description: Along right descending bank of Muskingum Island
Navigational Pool if Applicable: Belleville Pool
If Group 1 or 2, Receiving Stream:

Project Type: Dredging Area < 1,000 m^2 (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Lengths:	15 m*	ADI Widths:	15 m*	Salvage area (m^2):	
US Buffer Length:	50 m	US Buffer Width:	65 m	USS Buffer Length:	
DS Buffer Length:	150 m	DS Buffer Width:	65 m	DSS Buffer Length:	
Lateral Buffer Length:	313 m*	Lateral Buffer Width:	50 m	Lateral S Buffer Width:	

*4 well ADIs within 300 meters, thus 1 long contiguous survey area; see Figure 3

Phase 1 Survey Method Transect [X] Cells [ ] Other [ ]

# Transects/Length (m):		Cell Size (mxm):	Cell Search Effort (Min/m^2)
12 transects @ 65 m	ADIs:		
5 transects @ 65 m	USB:		
12 transects @ 65 m	DSB:		

An additional **23 transects** are within "intermediary" buffers created by the overlap of US & DS buffers from each well

Spacing Between Transects (M)

≤10 m in ADI, USB, and first 100m of DSB; 25m in 100 to 150m portion of DSB

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long.	-81.505287	Lat.	39.369455
Upstream End ADI:	Long.	-81.505734	Lat.	39.369169
ADI Centers:	(39.369121, -81.505794) 2. (39.368513, -81.506699) 3. (39.367888, -81.507538) 4. (39.367306, -81.508341)			
Downstream End ADI:	Long.	-81.508407	Lat.	39.367257
Downstream End DS Buffer:	Long.	-81.509293	Lat.	39.366516
RELOCATION AREA:	Long.		Lat.	

Map: Show ADI, USB, DSB and survey layout with outine of proposed impact.

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods	[X] Yes	Provide Description in Scope	
Addressed Alternative Sites	[X] Yes	Provide Description in Scope	

Phase 2 requested?: [X] Yes [ ] No

Request for Relocation: [ ] Yes [X] No

Method:
(check one) [ ] Cell Size (mxm):
[ ] Moving Transect:
[ ] Other:_____

Multiple passes are to be made through the area until less than 5 % of the number collected on the first two passes combined are recovered on the

C-4
WVDNR MUSSEL SUMMARY FORM

Mussel Survey Summary Datasheet

Event Information

Project title: USFWS-NWR Muskingum Island Well Plugging Project

Location (Stream name, Site name): Ohio River, Site 2

Date (mm / dd / yyyy): 08 / 27 / 2024 - 09/10/2024

Section A – Survey Method			Section B – Surveys Conducted	
Primary (select one)	☐ Waterscope	☐ Snorkel	(select all that apply)	
	☒ SCUBA/SSA	☐ Other	☐ Quantitative (cells)	
Secondary (select one)	☐ Waterscope	☐ Snorkel	☐ Quantitative with excavation	
	☐ SCUBA/SSA	☐ Bank search	☒ Semi-quantitative (transects)	
	☒ Hand picking	☐ Midden	☐ Qualitative	
	Other/Additional		Other	

Collector Names

Brandon Yates	Vanessa Vest	
Kevin Yount	Brian Denis	
Paul Robert		

Section C – Species Counts (additional lines on back)

Species	ADI	DSB	IB	LTB	USB	USS	Total live	Fresh dead	Weathered dead	Notes
1.) *Actinonaias ligamentina*	0	23	1	96	16	16	152	0	2	
2.) *Amblema plicata*	5	283	13	487	94	67	949	0	192	
3.) *Cyclonaias pustulosa*	1	63	2	173	35	24	298	0	45	
4.) *Cyclonaias stegaria*	0	0	0	1	0	0	1	0	0	FLS
5.) *Ellipsaria lineolata*	0	76	1	272	39	27	415	0	32	
6.) *Elliptio crassidens*	0	0	0	1	0	0	1	0	0	
7.) *Fusconaia flava*	0	4	2	1	1	0	8	0	0	
8.) *Fusconaia subrotunda*	0	0	0	0	0	1	1	0	0	FLS
9.) *Lampsilis cardium*	2	24	1	83	16	10	136	0	3	
10.) *Lampsilis siliquodiea*	3	3	3	13	5	0	27	0	1	

Section D – Survey Time and Area

Search effort (min)	210	936	402	2,049	390	120	Total effort	4,107	min
Search area (m^2)	840	9,750	6,910	15,650	3,250		Total area	36,400	m^2

Section E – Notes

Mussel Survey Summary Datasheet

Event Information

Project title – Enter the project title, corresponding with that on the Mussel Survey Scope of Work Summary Sheet Protocol Form.

Stream name – Enter name of stream.

Site name – Enter the name of the site.

Date – Enter date in mm/dd/yyyy format.

Section A – Survey Method

Primary – Select one option indicating the primary survey method.

Secondary – If applicable, select or write in one option indicating the secondary survey method. If "Other" was selected as the primary survey method, select or write in the primary survey method.

Section B – Surveys Conducted

Select or write-in all surveys conducted.

Section C – Species Counts

Species – Enter the species name.

Area/Collector – Enter species count by area or collector, if applicable.

Total live – Sum the total number of live mussels of each species.

Fresh dead – Sum the total number of fresh dead mussels of each species.

Weathered dead – Sum the total number of weathered dead mussels of each species.

Notes – Enter any notes about the species.

Section D – Survey Time and Area

Search effort, Total effort – Enter time (in minutes) spent searching per area/collector and overall.

Search area, Total area – Enter the area (in m^2) searched per area/collector and sum overall.

Section E – [redacted]

Include any important notes about the survey methods.

Section [redacted] – Species Counts (continued)

Species	Area/Collector						Total live	Fresh dead	Weath. dead	Notes
	ADI	DSB	IB	LTB	USB	USS				
11.) *Lasmigona complanata*	0	0	0	0	0	0	0	0	1	
12.) *Ligumia recta*	23	208	42	443	82	32	830	0	33	
13.) *Megalonaias nervosa*	0	32	2	44	5	3	86	0	9	
14.) *Obliquaria reflexa*	0	15	2	78	15	9	119	0	9	
15.) *Obovaria subrotunda*	0	0	0	3	1	0	4	0	0	FLS
16.) *Plethobasus cyphyus*	0	3	0	9	2	3	17	0	7	FLS
17.) *Pleurobema clava*	0	0	0	0	0	1	1	0	0	FLS
18.) *Pleurobema cordatum*	0	31	0	121	19	16	187	0	5	

Mussel Survey Summary Datasheet

Species	Area/Collector						Total live	Fresh dead	Weathered dead	Notes
	ADI	DSB	IB	LTB	USB	USS				
19.) *Pleurobema sintoxia*	0	21	0	92	13	14	140	0	3	
20.) *Potamilus alatus*	10	52	16	108	17	8	211	0	44	
21.) *Potamilus fragilis*	0	0	0	1	0	0	1	0	3	
22.) *Quadrula quadrula*	0	15	1	50	8	2	76	0	6	
23.) *Theliderma metanevra*	0	60	0	328	89	113	590	0	31	

C-5
DATASHEETS

Current Stream and Weather Conditions

Event Information

Project title: USFWS-NWR Muskingum Island Well Plugging Project

Location (Stream name, Site name): Ohio River, site 2

Date (mm / dd / yyyy): ____ / ____ / _____ 08/31 - 09/01/2024

Section A – Weather Conditions

Precipitation (select one)
- ☐ Intermittent rain
- ☐ Light rain
- ☒ Moderate rain
- ☐ Heavy rain
- ☐ None

Cloud cover (select one)
- ☐ 0 %
- ☒ 25 %
- ☐ 50 %
- ☐ 75 %
- ☐ 100 %

Heavy rain

Has there been a heavy rain in the last 7 days?

☐ Yes ☒ No

Air temp

[illegible] °C

Section B – Sediment/Substrate

Sediment odor (select one)
- ☒ Normal
- ☐ None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic (methane)
- ☐ Other

Sediment deposits (select one)
- ☐ Sludge
- ☐ Leaf litter
- ☒ Sand
- ☐ Relict shells
- ☐ Paper/Fiber
- ☐ Other

Substrate type (rank top three, no "ties")
- ☐ Bedrock
- ☐ Boulder
- ☐ Cobble
- 3 Gravel
- 2 Sand
- 1 Silt
- ☐ Clay

Section C – Streambank and Riparian Zone Characterization

Canopy cover (select one)
- ☒ None
- ☐ Mostly open
- ☐ Mostly shaded
- ☐ Shaded

Riparian zone fully intact? (select one; within 10 meters)
- ☐ Left descending bank
- ☒ Right descending bank of island
- ☐ Both banks
- ☐ Neither bank

Stream bank failure? (select one; within survey reach)
- ☐ Left descending bank
- ☒ Right descending bank of island
- ☐ Both banks
- ☐ Neither bank

Section D – Aquatic Vegetation

Dominant vegetation type (select all applicable)
- ☐ Rooted floating
- ☐ Rooted emergent
- ☒ Rooted submergent
- ☐ Free floating
- ☐ Floating algae
- ☐ Attached algae
- ☐ Moss
- ☐ None

Dominant species

Other significant species

Percent of reach with aquatic vegetation (in terms of area)

1 %

Current Stream and Weather Conditions

Section E – Water Quality

Water surface oil (select one)
- ☐ Slick
- ☐ Globs
- ☐ Sheen
- ☐ Flecks
- ☒ None
- ☐ Other

Water odor (select one)
- ☒ Normal/None
- ☐ Petroleum
- ☐ Fishy
- ☐ Sewage
- ☐ Chemical
- ☐ Other

Turbidity (visual)
- 96: 243.5 cm
- ☒ Clear
- ☐ Opaque
- ☐ Slightly turbid
- ☐ Stained
- ☐ Turbid

Water temp	26.0-27.2 °C	**Turbidity**	mg/L	**Water sample collected** (for lab tests)	☐Yes ☒No
Conductivity	uS/cm	**Flow**	cfs		
Dissolved O_2	mg/L	**Gage height**	ft		
pH		**Secchi depth**	1.2-1.5 m	**Hach kit used**	☐Yes ☒No

Section F – Stream Characterization

Human influence (select all applicable)
- ☐ Engineered dam
- ☐ Channelized
- ☐ Ford
- ☐ Riprap
- ☒ Island
- ☒ Trash
- ☒ Other: 4 wells
- ☐ Bridge (pillars in stream)
- ☐ Bridge (no pillars in stream)
- ☐ Pipeline (parallel to stream)
- ☐ Pipeline crossing
- ☒ Pipes (inlet/outlet)
- ☐ Wall/Dike/Revetment

In stream cover (select all applicable)
- ☐ Beaver dam
- ☐ Blow down
- ☐ Debris dam
- ☒ Woody debris
- ☐ Other

Section G – Watershed Features

Human influence/Watershed features (within survey reach)

Proximity: Mark each applicable feature. **P** (Present) >10m from shore, **C** (Close) <10m from shore, **B** (On bank/stream).
Dominant land use: Mark up to two features. Use **R** or **L** for right or left bank; use **X** for both banks.

Feature	Prox.	Dom.	Feature	Prox.	Dom.	Feature	Prox.	Dom.
Residential building			Mining activity			Row crops		
Non-residential building			Forest	P,R		Hay field		
Commercial/Industrial			Logging			Pasture		
Railroad (active)			Park/Lawn			Feed lot		
Railroad (inactive)			Pavement			Old field		
Railroad (rails to trails)			Road			Landfill		

Local watershed erosion (select one; pertains to land use, not failing stream banks)

☐None ☒Light ☐Moderate ☐Heavy

Section H – Notes

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DATASHEET# 1.F1
DATE 8-31-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1	DSB	21	90-100	BY/KY	60		40					12	17	Y. 1/3	2500 KY 1800 BY
2		|	80-90		50		40	10				12	16	Y.D10	
3		|	70-80		50		40	10				12	13	G/B	
4		|	60-70		50		20	30				12	9	B.90	
5		|	50-60		20	10		50			20WD	12	5	Y.D16	
6		|	40-50		30	10		40			20WD	12	5	Y.005	
7		⊥	35-40		50	30				Concrete	30	6	1	ND	850 KY 1100 BY
8		22	35-40	BY/KY	50	40	10					6	1	Y.01	3350 KY 3300 BY
9		|	40-50		80	20						12	5	Y.018	
10		|	50-60		50	20	30					12	6	Y.017	
11		|	60-70		20	20	60					12	9	Y.020	2900 KY 3000 BY
12		|	70-80		20	20	60					12	11	Y.011	
13		|	80-90		20	20	60					12	12	Y.019	
14		+	90-100		80	20	50				10ND	12	17	B.136	2500 KY 2600 BY
15		23	35-40	BY/KY	60	40						60	1	ND	1700 KY 2000 BY
16		|	40-50		60	30	10					12	5	Y.009	
17		|	50-60		10		80	10				12	6	Y.009	
18		|	60-70		10		80	10				12	9	B.26	
19		|	70-80		60	10		30				12	11	B.83	
20		|	80-90		60	10		30				12	13	Y.007	
21		⊥	90-100		50	50						12	17	Y.003	2500 KY 2600 BY
22		24	35-40	BY/KY	50	40	10					6	1	Blue 70	1700 KY 2000 BY
23		|	40-50		50	50						12	6	Yellow 008	
24		|	50-60		100							12	10	Orange 128	
25		|	60-70		100							12	12	Yellow 009	
26		|	70-80		100							12	14	Yellow C1	1330 KY 1700 BY
27		|	80-90		100							12	16	Y.014	
28		⊥	90-100		100							12	17	Yellow L	1000 KY 1400 BY
29															
30															
31															
32															
33															
34															
35															

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DATASHEET# 1 of 5
DATE 8 31 21

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		24	35-40		L	sil.	122.2♂						
2			60-70		L	cardium	133.2♂						
3					P	alatus	117.0						
4					L	recta	140.2♂	118.7♂					
5					A	plic	116.4, 120.9, 93.1, 87.7						
6					A	plic	2 WD						
7			90-100		L	cardium	118.0♂						
8					A	lig	103.2, >150						
9					E	lin	76.4, 92.2						
10					P	sin	91.6						
11					T	met	75.0, 85.5, 84.0, 87.2, 55.5, 74.0,						
12					Q	Q	70.3						
13					P	alatus	92.3						
14					A	plic	100.4, 102.7, 94.9, 105.1						
15					E	lin	1 WD						
16			70-80		M	nerv	>150						
17					E	lin	79.9, 65.1						
18					A	plic	104.2, 2.4						
19					L	recta 2	>150♂, 1 >150♀						
20					L	cardium	121.3♂						
21					A	plic	2 WD						
22					Q	Q	2 WD						
23			50-60		L	recta	146.7♂,	118.8♀,	116.4♀,	135.5♂			
24					M	nerv	>150						
25					A	plic	75.9, 75.2						
26					A	plic	2 WD						
27			80-90		A	plic	120.0, 105.2, 120.1, 101.8, 89.8, 115.2, 79.2, 89.9, 106.1, 93.2, 107.5, 103.3, 90.8, 105.5						
28					M	nerv	140.0						
29					L	recta	127.4♀						
30					E	Lin	93.2						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 2 of 5
DATE 8-31-24

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1			80-90		E	lin	89.2						
2					P	cord	84.3, 93.2,						
3					T	Met	89.2, 83.3, 84.9						
4					Q	Q	54.2						
5					O	ref	60.0						
6					A	plic	1 WP						
7		22	35-40		P	alatus	57.5, 73.8						
8		22	70-80		P	alatus	102.0,						
9					L	recta ♀	137.7, 136.2						
10					E	lin	73.5						
11					A	plicata	103.2	5-WD					
12		22	40-50		L	recta ♂	~~137~~ 137.0, 142.5						
13					L	recta ♀	123.6						
14					A	plic	94.2, 114.9, 121.9,						
15					Q	quad	67.0						
16					P	cyphyus	93.2	42.9	71.0				
17					M	Nervosa	150+						
18		22	90-100		T	met	70.3, 81.5,						
19					P	cord	61.6						
20					C	pust	66.3						
21					A	plic	106.6, 81.0, 93.1, 77.0, 145.3					4-WD	
22					A	lig	120.0						
23					E	lin	92.1, 80.0						
24					L	cared ♂	122.4						
25					L	recta ♂	150+						
26		22	80-90		L	cared ♀	112.2	1-WD					
27					C	pust	72.5						
28					O	alatus	106.7						
29					L	recta ♀	142.3						
30					E	lin	79.0						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 3 of 5
DATE 31-Aug

Project/Task: 2312.05 Stream Ohio River State WV County Boone

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1					A	plic	112.4						
2					Q	Q	1-WD						
3		22	50-60		L	recta ♂	150+						
4					A	~~recta~~ plic	95.5,	102.3	1-WD				
5					L	recta ♀	139.2,	130.0,	133.0				
6					L	post	61.3						
7					M	new	129.5						
8			⊥		~~A~~								
9		22	60-70		L	recta ♀	144.0						
10					L	cord ♂	116.5						
11			⊥		A	plic	123.0,	96.0	1-WD				
12		23	40-50		L	recta ♀	143.4,	136.2					
13					A	plic	93.2						
14			⊥		P	alatus	127.0						
15		23	90-100		T	met	81.0,	82.0,	83.0,	73.7,	82.7,	84.9	1-WD
16					L	post	61.2,	54.0,					
17					P	sin	91.3,						
18					T	met	77.0,						
19					P	cord	93.6,	85.3,	84.7				
20					A	lig	117.7	1-WD					
21					P	alatus	110.3						
22					A	plic	101.0,	96.9,	100.3,	103.5,	117.4,	99.9	1-WD
23					L	recta ♂	144.4						
24		23	70-80		A	lig	115.1						
25					E	lin	82.5	1-WD					
26					T	met	70.4						
27					L	recta ♂	145.5,	140.0,	142.2	1-WD			
28					P	alatus	115.0,						
29					A	plic	117.5,	107.1,	101.5,	2-WD			
30		24	40-50		L	recta ♂	142.5						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 4 of 5
DATE 31 Aug

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		24	40-50		L	recta ♀	144.5						
2					P	alatus	1100,	12.0,	1-WD				
3					T	met	1-WD						
4		23	50-60		L	recta ♀	150+,	146.7,	136.4				
5					L	recta ♂	142.8,						
6					A	plic	95.0,	112.5,	113.0,	105.6,	101.1,	112	
7					L	rust	60.4						
8					E	lin	1-WD						
9		23	80-90		A	lig	126.7						
10					L	recta ♂	133.6						
11					L	recta ♀	135.4						
12					A	plic	113.0,	112.5,	117.7,	105.0,	150+,	4-WD	
13					E	lin	98.6						
14					T	met	1-WD						
15		23	100-70		L	card ♂	118.0,	15.2					
16					A	plic	97.5,	107,	100.4	2-WD			
17					L	card ♀	125.2,	150+					
18					L	recta ♀	137.2,	130.0,	127.1,				
19					P	alatus	119.0						
20					L	recta ♂	120.0						
21		21	40-50		L	recta ♂	150+,	135.0,	129.0				
22					L	recta ♀	131.0,	138.1,	141.0,	129.0,	122.5,	127.3, 126.6,	129.0
23					A	plic	74.7	1-WD					
24					P	alatus	1-WD						
25		21	90-100		E	lin	76.0,	77.0,	81.0	1-WD			
26					A	lig	108.2,						
27					P	alatus	~~95.1~~			1-WD			
28					T	met	75.9						
29					A	plic	107.2,	103.4,	103.0				
30					L	recta ♀	125.5						

* Male / Juvenile / Female

rust 1-WD

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 5
DATE 31 Aug 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		21	50-60		O	ret	59.7						
2			↓		E	lin	88.0						
3					L	recta ♀	142.5,	135.5	1-WD				
4			⊥		A	plic	71.0,	75.3,	2-WD				
5		21	60-70		L	recta ♀	106.2						
6			↓		P	alatus	113.2,	117.5					
7					M	nerv	150+						
8					L	recta ♀	150+,	131.3,	125.0				
9					L	recta ♂	136.0						
10			⊥		A	plic	107.2	1-WD					
11		21	70-80		L	card ♀	117.2						
12			↓		E	lin	74.0,						
13					L	card ♂	74.0,	123.9,					
14			⊥		A	plic	120.0,	121.1,	115.9	3-WD			
15		21	80-90		C	past	67.5						
16			↓		M	nerv	150+						
17			⊥		A	plic	97.3,	85.3,	1-WD				
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE 1-Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

Total time w/ QC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth	Live/ Dead_Mussel	Notes
1		25	35-40	VV/KY	40	60						6	5	NO	KY: 2750 WV: 1500
2			40-50		40	50	10					12	8	Y.003	
3			50-60		40	10	50					12	10	Y009	
4			60-70		40	10	50					12	12	B90	KY 2300 WV: 1200
5			70-80		40	10	50					12	15	B, 26	
6			80-90		40		50	10				12	17	Y.002	
7		⊥	90-100	↓	40	10	50					12	17	Yellow 007	KY: 1900 WV: 1000
8		26	35-40	WV/KY	60	40					10LWD	6	4	NO	KY: 700 WV: 3000
9			40-50		30	30	30				10LWD	12	8	Y.018	
10			50-60		40	30	30					12	10	Y.01	
11			60-70		40	30	30					12	12	Y.001	KY: 1500 WV 2500
12			70-80		30	20	40	10				12	14	Y.017	
13			80-90		30	20	40	10				12	16	B.26	
14		⊥	90-100	↓	30	20	40	10				12	17	Y.020	KY: 900 WV: 2100
15		27	35-40	VV/KY	50	50						6	5	NO	KY: 3100 WV 2000
16			40-50		80	20						12	10	NO	
17			50-60		30	30	30	10				12	10	B.83	
18			60-70		30	30	30	10				12	11	Y.010	
19			70-80		30	30	30	10				12	13	Y.001	
20			80-90		30	30	30	10				12	15	Y.005	KY: 2400 WV: 1500
21		⊥	90-100		30	30	30	10				12	16	Y.016	
22		28	35-40		50	50						6	4	NO	
23			40-50		60	10	30					12	9	C.128	
24			50-60		60	10	30					12	10	B.70	
25			60-70		60	10	30					12	11	Y.013	KY: 1800 VV: 900
26			70-80		60	10	30					12	13	G/B	
27			80-90		60	10	30					12	15	Y.7	KY: 1600 WV: 700
28		⊥	90-100		50		50					12	17	Y.C1	KY: 1500 VV 500
29															
30															
31															
32															
33															
34															
35															

vis- ~6ft @ bottom
Weather: overcast + cloudy to Sunny and calm winds

Temp
Air: 65 → 85°F
H_2O: 79.2°F @ surface

Secchi: 1.5 meters

SEE BACK

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 6
DATE 1 sept

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		25	60-70		A	plic	116.8, 116.2, 109.5	88.3, 103.3	86.4		115.4			85.0, 100.0, 102.7	2-WD
2		↓	↓		L	recta ♂	145.0,								
3					L	cardium ♀	102.3								
4					P	alatus	113.4								
5					C	gust	68.3								
6					M	nerv	150+								
7		⊥	⊥		P	sin	86.4								
8		25	50-60		L	recta ♀	143.3, 150+, 150+, 142.0, 132.4, 127.0								
9		↓	↓		L	recta ♂	142.4, 80.0,								
10					O	ref	42.3								
11					Q	sp.	59.8								
12					E	fin	74.1								
13		⊥	⊥		P	alatus	114.7								
14		25	70-80		Q	grand	68.5, 75.5								
15		↓	↓		E	fin	83.2, 91.6, 77.7,								
16					P	cord	66.5								
17					A	lig	107.3								
18					L	recta ♂	136.0,								
19					L	recta ♀	125.6, 134.9								
20					P	alatus	110.6, 74.7								
21					M	nerv	150+								
22					A	plic	94.0, 108.6,								
23					P	sin	79.5								
24					E	flava	77.0								
25		⊥	⊥		A	plic	98.4, 107.3, 100.0								
26		25	80-90		M	nerv	150+, 150+, 150+								
27		↓	↓		A	plic	96.7, 104.0, 107.3, 98.0, 107.8, 104.7, 105.3								2-WD
28						⊥	101.0, 99.1, 91.4, 84.6, 111.0,								
29		⊥	⊥		O	ref	45.6								

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 6
DATE 1 Sept 2024

Project/Task: 2312.005 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		25	80-90		P	alatus	113.8						
2		↓	↓		L	recta ♂	150+, 150+						
3		↓	↓		F	flava	84.8						
4		↓	↓		C	past	1-WD						
5		25	40-50		L	recta ♀	150+,						
6		↓	↓		P	alatus	128.9, 116.6,						
7		↓	↓		A	plic	77.4						
8		25	90-100		T	met	90.0, 81.4, 82.0, 78.3, 78.9, 83.2, 80.8						
9		↓	↓		A	plic	98.1, 102.0, 117.5, 108.8, 107.4, 105.1, 86.6, 118.1, 71.0, 102.3						
10		↓	↓		C	past	46.0, 49.6		2-WD				
11		↓	↓		A	lig	133.2, 113.2, 104.3, 127.4						
12		↓	↓		Q	quad	58.3						
13		↓	↓		P	alatus	76.1						
14		↓	↓		E	lin	1-WD						
15		26	50-60		A	plic	111.5, 130.8, 95.5, 107.4, 96.4, 80.4			1-WD			
16		↓	↓		L	recta ♂	132.5, 150+, 150+, 133.7, 136.5, 147.8						
17		↓	↓		L	recta ♀	124.9, 128.0, 129.1			1-WD			
18		↓	↓		O	ref	60.0						
19		↓	↓		L	cord ♀	99.8						
20		↓	↓		M	nerv	150+						
21		↓	↓		P	alatus	75.2						
22		26	80-90		A	plic	98.7, 96.2, 103.0, 93.0			102.0, 105.2, 79.6, 112.5, 90.0, 107.5, 98.0, 95.1			3-WD
23		↓	↓		C	past	64.0, 64.0, 55.4, 46.9,						
24		↓	↓		O	ref	60.9						
25		↓	↓		E	lin	74.3, 85.4, 82.0, 81.0						
26		↓	↓		L	recta ♂	120.0, 148.9,						
27		↓	↓		Q	quad	55.5, 57.1,						
28		↓	↓		A	lig	110.1						
29		↓	↓		P	alatus	1 WD						
30		↓	↓		T	met	1 WD						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 6
DATE 15 Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		26	90-100		O	ref	(60.1						
2		″	″		L	card ♂	92.1						
3		″	″		P	cord	96.7	90.7, 79.8,		1-WO			
4		″	″		Q	quad	51.0						
5		″	″		E	lin	71.0, 81.5, 94.4		72.7	62.0, 85.5			
6		″	″		A	plic	105.3, 101.6, 103.8, 81.3,		106.1, 96.6, 93.5,			3-WO	
7		″	″		T	mcl	84.0, 84.1, 86.5, 86.6			101.0, 80.1, 83.1,		82.4, 81.0	1-WO
8		″	″		E	lin	82.0						
9		″	″		L	recta ♀	134.8						
10		″	″		C	pust	58.5, 63.1,						
11		″	″		A	lig	85.7						
12		″	″		P	sin	86.2						
13		26	40-50		L	recta ♀	131.0, 133.9, 129.3, 138.4						
14		″	″		L	sili ♀	129.2						
15		″	″		A	plic	1-WO						
16		26	70-80		M	nerv	150+						
17		″	″		A	plic	105.0, 104.6, 103.0			1-WO			
18		″	″		L	recta ♀	126.4,						
19		″	″		C	pust	56.2,						
20		″	″		E	lin	71.6						
21		″	″		P	alatus	105.4	1-WO					
22		26	60-70		L	recta ♂	135.1, 1105,						
23		″	″		Q	quad	60.0,	1-WO					
24		″	″		P	alatus	107.0,						
25		″	″		A	plic	99.9, 90.0, 115.6		108.4, 101.1, 96.6,			3-WO	
26		″	″		M	nerv	150+						
27		27	50-60		A	plic	1065,	112.6, 125.4, 85.4, 75.9,				111.8	
28		″	″		L	recta ♀	135.8, 144.3, 143.7, 112.3						
29		″	″		C	pust	50.0						

Property of Environmental Solutions & Innovations, Inc
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 6
DATE 1 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		27	60-70		L	cord ♀	118.5						
2					M	nerv	150+						
3					A	plic	117.4, 103.5, 107.1, 87.6,			3-WD			
4					L	recta ♀	132.0						
5					L	recta ♂	144.4	1-WD					
6					C	pust	52.0, 59.6,						
7					E	lin	80.0, 67.1,						
8					P	alatus	108.8						
9		27	70-80		M	nerv	145.6,	110.2					
10					A	plic	95.3,	2-WD					
11					E	lin	72.1						
12					P	cord	65.0						
13					C	pust	66.0, 65.3,						
14					L	recta ♂	92.3,	1-WD					
15		27	80-90		M	nerv	142.0,	143.0,	150+ 150+,				
16					C	pust	57.5,	1-WD					
17					A	plic	90.0, 87.5, 95.3, 102.3, 110.0, 118.5, 83.2, 108.8 107.4						
18					T	mut	87.3						
19					P	sin	96.0						
20					L	cord ♂	102.6,	128.5	1-WD				
21					E	lin	88.3, 64.0, 80.4						
22					L	recta ♀	139.5,	121.5					
23					P	cord	55.5						
24					P	alatus	114.3	1-WD					
25		27	90-100		E	lin	84.2	1-WD					
26					L	cardium ♂	113.0,	120.8					
27					L	recta ♀	124.5						
28					P	cord	95.7						
29					P	sin	90.9						
30					A	plic	89.0, 94.3, 102.2, 114.6,	104.2,	87.0	1-WD			

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 6
DATE 1 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		27	90-100		T	met	81.6, 81.6, 79.2		80.0						
2					C	pust	52.3, 63.5, 54.7			1-WD					
3					A	lig	110.5,								
4					P	alatus	107.0, 109.0			1-WD					
5		28	90-100		T	met	75.4								
6					E	lin	75.0, 75.0,								
7					P	cord	92.1, 93.6		1-WD						
8					A	plic	96.7, 96.3, 94.6			12-WD					
9					P	sin	1000.0								
10		28	40-50		P	alatus	115.5								
11					L	recta ♂	140.0								
12					F	flava	63.7								
13					L	recta ♀	150+, 132.5, 140.0,								
14		28	70-80		M	nervosa	150+, 150+, 150+								
15					A	plic	80.0, 110.4, 110.3,			1-WD					
16					L	recta ♂	96.2, 130.7, 139.1,								
17					L	recta ♀	135.5, 138.6, 114.1, 131.0, 133.6,								
18					P	sin	92.5								
19					C	pust	48.0, 57.0								
20					E	lin	38.0								
21		28	60-70		M	nerv	150+		1-WD						
22					L	recta ♂	146.5, 135.9, 127.9								
23					P	alatus	128.0								
24					L	recta ♀	112.6								
25					A	plic	97.0, 110.5, 107.7, 117.3, 89.4,			113-5,				103.8, 93.0	6-WD
26					E	lin	82.4, 85.4,								
27					L	cord ♂	135.8								
28		28	50-60		L	pust	68.0, 55.3								
29					A	plic	109.4, 101.3, 103.7, 112.4, 100.0, 101.4			1-WD					
30					E	lin	72.3, 72.4								

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 6
DATE 1 sept 2024

Project/Task: 23120S

Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		28	50-60		L	recta ♀	141.7	119.3, 144.6							
2		″	″		L	recta ♂	147.0								
3		″	″		P	alatus	1-WD								
4		28	80-90		P	alatus	101.7								
5		″	″		L	recta ♂	131.5	1-WD							
6		″	″		O	ref	~~44.5~~								
7		″	″		L	recta ♀	145.0	136.5, 136.9, 104.3, 142.0						1-WD	
8		″	″		T	mut	83.0	1-WD							
9		″	″		A	plic	111.3, 91.0, 84.3, 150+, 98.0, 88.3, 104.6								2-WD
10		″	″		A	lig	123.0								
11		″	″		P	sin	94.8								
12		″	″		E	lin	65.2	76.5, 80.8,							
13		—	—		M	new	2-WD								
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth 57	Live/ Dead_Mussel	Notes
1		29	35-40		60	40							8		3000 BY/1500 W
2			40-50		60	10	80				10 wood		7	Orange	
3			50-60		40	20	30	10					9	Yellow 003	
4			60-70		40	20	30	10					11	Blue 136	
5			70-80		40	20	30	10					12	Yellow 009	2300 BY / 1100 W
6			80-90		40	10	40	10					14	Yellow 017	
7			90-100		40	10	40	10					16	Yellow 001	2100 BY / 900 W
8		30	35-40		70	20					10 wood		5	NO	800 BY / 2800 W
9			40-50		60	5	30	5					9	Blue 70	
10			50-60		50		40	10					10	Yellow 011	
11			60-70		50		40	10					12	Blue 26	
12			70-80		80	10	30	10					14	Yellow 007	
13			80-90		50	10	30	10					14	Yellow 005	
14			90-100		50	10	30	10					15	Blue 83	1500 BY/2100 W
15		31	35-40		80						20 VEG		8	NO	1500 BY/2100 W
16			40-50		50		50						8	Yellow 7	
17			50-60		90		50						11	Yellow 018	1100 BY/2000 W
18			60-70		50	45		5					11	Yellow C	
19			70-80		50	45		5					13	Black	
20			80-90		50	45		5					13	Yellow 002	
21			90-100		50	45		5					15	Yellow 008	700 BY / [illegible]
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 4
DATE 9-2-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height ~~Depth~~ (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		29	90-100		★P	cyphyus	102.0	44.3	68.5						Tag #: Yellow 1990
2					P	alatus	118.2								
3					E	lin	91.5								
4					L	recta ♂	103.5	144.2							
5					F	flava	74.0								
6					L	recta ♀	125.7								
7					A	plic	104.5, 89.1								
8					T	met	85.2, 75.9, 85.0, 76.2			2-WD					
9					P	cord	63.6, 66.1								
10					P	sin	89.5, 95.0, 90.5								
11					C	pust	65.2, 48.7, 63.4, 55.6								
12					O	ret	49.8								
13		29	80-90		A	plic	101.1, 114.4, 94.0, 103.2, 93.4, 106.7, 109.8, 107.1, 122.4								
14					L	card ♂	119.7								
15					E	lin	87.7								
16					P	~~cord~~ sin	104.4								
17					C	pust	56.2, 65.4, 49.2			1-WD					
18					L	recta ♀	110.3								
19					P	alatus	117.9								
20					M	nervosa	150+								
21					O	ret	50.0, 63.3								
22		29	70-80		A	plic	101.2, 116.7, 118.3, 97.5								
23					L	recta ♂	150+								
24					E	lin	80.1, 92.1,								
25					P	cord	65.6								
26					C	pust	62.1, 64.3, 60.2, 50.9, 47.6								
27					Q	?	60.0								
28					L	recta ♀	133.4, 139.5								
29															

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 4
DATE 2 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		29	40-50		L	recta ♀	126.5						
2			⊥		A	plic	1-WD						
3		29	60-70		A	plic	95.2, 95.2, 1-WD						
4			|		P	alatus	96.6, 79.2						
5			|		L	recta ♂	134.2, 148.4, 150+, 144.8						
6			|		E	lin	74.3, 88.2						
7			|		T	met	74.5						
8			—		C	rust	60.7						
9		29	50-60		A	plic	107.3, 82.5, 87.9, 94.2, 116.5						
10			|		P	alatus	114.7, 116.8						
11			|		L	recta ♂	121.6, 145.3						
12			|		C	rust	60.2						
13			|		L	recta ♀	143.4, 134.5, 133.7, 130.2						
14			⊥		A	plic	101.2						
15		30	90-100		L	recta ♀	150+, 128.9,						
16			|		C	rust	55.9, 59.3, 61.3, 43.3, 65.9, 61.4,						
17			|		P	coral	92.1						
18			|		A	plic	110.5, 105.0, 100.2, 64.5, 1-WD						
19			|		T	met	78.7						
20			|		A	lig	119.0						
21			|		E	lin	67.8, 52.5						
22			⊥		P	coral	70.5						
23		30	40-50		L	recta ♀	150+, 127.6, 126.9, 126.3						
24			|		P	alatus	97.8,						
25			|		A	plic	103.4, 36.9						
26			/		L	recta ♂	143.2						
27		30	50-60		A	plic	118.5, 106.4, 109.6, 115.7, 90.9, 116.3,						
28			|		L	recta ♂	114.3, 143.0, 146.5						
29			|		E	lin	90.1, 67.7						
30			|		L	recta ♀	149.0, 145.6, 131.5, 138.7						
			|		L	rust	59.8						
			⊥		O	pet	60.5						

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 4
DATE 2 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M	J	F	Photo #s	Comments
1		30	60-70		A	plic	89.1, 55.7, 93.9,			1-WD					
2					P	cord	89.5, 60.5								
3					L	recta ♂	143.4, 130.4, 143.4								
4					Q	quad	61.2,								
5					L	recta ♀	139.2, 138.4								
6					L	cordium	101.0								
7					M	nerv	150+								
8		30	70-80		A	plic	113.4, 101.0, 92.5								
9					L	recta ♂	138.2								
10		30	80-90		A	plic	104.0, 151.3, 132.9, 116.7, 95.2, 76.0, 77.5								
11					P	sin	92.3								
12					A	lig	116.6								
13					L	recta ♀	126.7, 120.0,								
14					E	lin	87.0, 81.5, 62.5,								
15					C	gast	67.2, 62.3								
16		31	60-70		E	lin	81.0								
17					L	recta ♂	138.2, 140.3, 91.3,								
18					L	recta ♀	132.2, 130.5								
19					P	alatus	115.7								
20					A	plic	98.2, 98.1								
21					P	cyphyus	1-WD								
22		31	80-90		E	lin	84.3, 87.3, 85.3, 76.6, 74.6, 52.4								
23					C	gast	44.4, 72.5								
24					A	plic	69.5, 103.5, 132.5			1-WD					
25					A	lig	107.1, 101.0								
26					P	alatus	109.3								
27					T	met	82.2								
28					L	recta ♂	141.3								
29					L	recta ♀	150.3								

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 4
DATE 25 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		31	70-80		A	plic	110.4,	97.2,	101.3,	86.7,	113.0, 94.6		
2					M	neos	150+,	150+,					
3					L	recta ♂	83.9,	145.3,					
4					L	pust	56.7						
5					A	lig	126.1						
6					E	lin	75.0,	61.3					
7			↓		P	alatus	102.0						
8		31	90-100		P	cord	84.5,	97.5,	97.9,	84.7,	74.3		
9					L	recta ♀	138.1,	130.2					
10					L	recta ♂	150+						
11					A	plic	94.9,	119.4,	105.3				
12					P	alatus	114.5,	86.7,					
13					Q	quad	60.5,	63.5,					
14					T	met	78.3,	80.5,	81.4,	78.4,	83.4,	1-WD	
15					E	lin	64.5,	86.7,	82.6				
16			↓		A	lig	116.2						
17		31	40-50		L	recta ♂	143.5,	149.2					
18			↓		A	plic	91.7						
19					L	recta ♀	131.5,	145.0,	153.4				
20		31	50-60		L	recta ♀	130.0,	149.0					
21					L	recta ♂	141.3,	135.0					
22					T	Met	83.5						
23					A	plic	105.2	1-WD					
24					P	alatus	119.1						
25					P	cord	73.2						
26					P	cyphyus	81.4	38.0	63.8				Tag #:
27			↓		L	pust	1-WD						
28													
29													
30													

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

Total WQC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth FT	Live/ Dead_Mussel	Notes
1		32	35-40	BY/KY	50	50						6	2		2900 BY 2900 KY
2			40-50	|	70	10	10				10veg	12	8	Y/KW 007 ✓	
3			50-60	|	70		20				DWD	12	10	Y 016 ✓	
4			60-70	|	60	10	30					12	13	Y 018 ✓	
5			70-80	|	60	10	30					12	13	Y 017 ✓	
6			80-90	|	30	30				40		12	16	Y 009 ✓	
7		⊥	90-100	⊥	30	30	30	10				12	17	Y 005 ✓	2000 BY 2000 KY
8		33	35-40	BY/KY	40	40				40	10veg	6	2	No mussels	
9			40-50	|	30	30	20				20WD	12	8	Y 001 ✓	
10			50-60	|	30	30	30		10			12	14	Y 004-Y 003 ✓	
11			60-70	|	30	30	30		10			12	15	B 83 ✓	
12			70-80	|	40	30	10	10	10			12	15	B 26 ✓	
13			80-90	|	30	30	30	10				12	17	Orange ✓	
14		⊥	90-100	⊥	30	30	30	10				12	17	Y 002 ✓	1600 BY 1000 KY
15		34	35-40	BY/KY	80					20WD	20WD	6	2	No mussels	1600 BY 3000 KY
16			40-50	|	50		10	30		20HP		12	5	Y017 ✓	
17			50-60	|	50		10	30		20HP		12	6	Y002 ✓	
18			60-70	|	50		20			20HP		12	8	B83 ✓	1100 BY 2300 KY
19			70-80	|	40		20			40HP		12	10	Y001 ✓	
20			80-90	|	20		20	20		40HP		12	15	B26 ✓	
21		⊥	90-100	⊥	40		40	20				12	15	Y018 ✓	900 BY 2100 KY
22		35	35-40	BY/KY	20	60				10veg	10veg	6	2	No mussels	3000 BY 2100 KY
23			40-50	|	90	10						12	7	"	
24			50-60	|	80	10	10					12	11	Y005 ✓	
25			60-70	|	40			20		40		12	11	Y004 ✓	
26			70-80	|	30	30	10	30				12	13	B70 ✓	
27			80-90	|	30	30	10	30				12	14	Orange ✓	2000 BY 1500 KY
28		⊥	90-100	⊥	40	30	20	10				12	16	Y007 ✓	
29		36	35-40	BY/KY	90	10						6		No mussels	2200 BY 1100 KY
30			40-50	|	90						10veg	12	4	Y011 ✓	2100 BY 3000 KY
31			50-60	|	40	30	30					12	10	B90 ✓	
32			60-70	|	40	30	30					12	10	B136 ✓	
33			70-80	|	30	30	30	10				12	15	Y002 ✓	
34			80-90	|	30	30	30	10				12	15	Black ✓	
35		⊥	90-100	⊥	30	30	30	10				12	15	Y018 ✓	1400 BY 2100 KY

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DATASHEET# 2 of 2
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth FT	Live/ Dead_Mussel	Notes
1		37	35-40	BY, MY	50	50						6	1	No mussels	1400 2100
2			40-50		90						10 veg	12	4	Black/Green	
3			50-60		30	30	30	10				12	8	Y7 ✓	
4			60-70		30	30	20					12	9	Y008 ✓	800 1350
5			70-80		30	30	20	20				12	12	Y001 ✓	
6			80-90		30	30	20	20				12	13	Y003 ✓	
7		↓	90-100	↓	40	30	30					12	15	Y009/Y013"	600 100
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 8

DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		32	90-100		O.	ref	56.2,						Yellow 006
2			↓		P.	elatus	114.3, 113.3, 99.7						
3					A.	plic	109.3, 110.0, 110.2, 1 WD						
4					A.	lig	112.7						
5					C.	pust	62.7, 65.9, 63.7, 60.8,						
6					T.	mut	87.0, 90.0, 71.3, 64.3,	1 WD					
7					P.	suntoxia	85.9, 89.4, 89.7, 95.0,						
8					L.	recta	141.3♂	150+♂					
9					P.	coral	91.4, ♀						
10			—		E.	lin	2 WD						
11		32	80-90		E.	lin	76.0,						Yellow 009
12			↓		A.	plic	100.5, 95.0,						
13					O.	ref	69.1,						
14					P.	cord	92.4,						
15					L.	card	114♂						
16					L.	recta	91.4♀, 143.8♂, 133.7♂,						
17					P.	elatus	101.7						
18			↓		C.	pust	1 WD						
19		32	40-50		L.	recta	129.0♀						Yellow 007
20			↓		C.	pust	38.2,						
21		32	50-60		L.	recta	129.0♀,	127.9♀	137.2♀	133.4♀	2 WD		Yellow 010
22			↓		P.	elatus	120.0	1 WD					
23			↓		A.	plic	97.7,						
24		32	70-80		P.	elatus	102.0,						Yellow 017
25			↓		A.	plic	107.3,	112.6, 98	4, 101.6,	2 WD			
26						suntoxia	87.0,						
27					L.	recta	138.9♂	141.04♂	149.9♂	134.5♀			
28			↓		E.	lin	1 WD						~~Yellow 018~~
29													

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DATASHEET# 2 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		32	60-70		A.	plic 96.4,	74.7, 115.0, 101.5,	116.0, 107.8, 100.6,		109.6, 80.7, 111.0, 82.0			Yellow 018
2					L.	recta	138.3♀	144.0♀	130.4♂	132.1♀	131.5♀	2 WD	
3					P.	elatus	96.7,						
4					A.	plic	95.5						
5					E.	lin	60.5						
6					O.	ref	86.4,	89.0					
7					P.	cord	72.4						
8					L.	sili	105.0♀						
9		33	50-60		A.	plic	79.8, 111.0, 1WD						Yellow 003
10					L.	recta	132.0♀	133.1♀	128.7♀	141.6♀	125.1♂	130.4♂	
11							129.3♀	128.2♀	114.0♀	123.3♀			
12					M.	nerv	133.6,						
13					O.	ref	86.2, 61.4,						
14					P.	elatus	2 WD						
15		33	50-60		A.	plic	96.2,	99.8, 111.0,					Yellow 004
16					L.	recta	139.6♀	147.0♀	132.4♀	144.1♂	120.0♀	144.1♂	
17							125.0♀	137.6♀	133.7♀	141.1♂, 140.2♀, 138.0♀			
18					L.	card	112.9♂						
19					M.	nerv	150+						
20					P.	elatus	110.0, 2 WD						
21		33	90-100		P.	cord	79.3, 93.1, 93.4, 64.4						Yellow 002
22					L.	recta	132.8♀	149.5♂	126.2♂	133.4♂, 150+♂,			
23					T.	mot	95.2, 86.3, 89.7,						
24					A.	lig	127.9	1 WD					
25					A.	plic	114.2, 88.2						
26					M.	nerv	140.7						
27					E.	lin	67.0, 1 WD						
28					C.	rost	51.8						
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		33	70-80		M.	nerv	150+						Blue 26
2			|		T	met	64.7						
3			|		L	recta	128.2♀	1WD					
4			|		E	lin	71.5						
5			⊥		P	elatus	1 WD						
6		33	30-40		L	recta	148.7♀						Yellow 001
7			⊥		L	sili	107.0♀						
8		33	60-70		L	recta	126.3♀	128.9♀	130.4♂	142.3♀	130.0♂	146.3♂	Blue 83
9			|		E	lin	69.0,						
10			|		A	plic	85.1, 110.1, 120.3, 3WD						
11			|		L	recta	140.♀	141.5♀	1WD				
12			⊥		M	nerv	150+, 150+						
13		33	80-90		E	lin	62.7, 71.4, 82.0, 71.6						Orange
14			|		R	cord	77.6,						
15			|		T	met	80.0,						
16			|		A.	plic	98.9, 98.7						
17			|		L	recta	140.0♀	139.5♀	109.7♂				
18			⊥		P	elatus	1WD						
19		34	40-50		L	sili ♀	94.5						
20			⊥		P	alatus	116.2						
21			60-70		L	recta	144.3♀,	146.4♂,	131.1♀,	139.0♂,	132.4♀,	131.5♀	
22			|		A	plic	104.2, 86.5, 75.0, 95.4, 106.1,						
23			⊥		A	plic	1WD						
24			70-80		E	lin	73.1,						
25			⊥		A	plic	100.0						
26			50-60		L	recta	141.0♂,	138.2♀,	129.4♀,	130.5♀			
27			|		A	plic	104.2						
28			⊥		O	ref	52.0						
29		⊥											

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		34	90-100		L	recta	138.0♀						
2					A	plic	106.5,	98.2,	72.1,	108.8, 60.2,			
3					E	lin	68.1,	70.0,	83.1,	69.4,			
4					P	cord	93.5,	90.7					
5					T	met	74.2,						
6					O	ref	40.5,	59.7,					
7					C	pus	61.8,	63.1,	54.2,				
8					L	cardium	130.0♂						
9					P	alatus	1WD						
10					A	plic	1WD						
11		⊥	⊥		A	lig	116.8						
12		34	80-90		L	sil	112.0♀						
13					C	pus	54.2						
14					O	ref	59.0,	45.5					
15					E	lin	54.2						
16					L	recta	108.1♀	128.0♂,	135.0♀,	132.0♀			
17					A	plic	96.5,	93.1,	89.0				
18					T	met	1WD						
19		⊥	⊥		A	plic	1WD						
20		35	50-60		L	sil	83.5♂						
21					L	recta	140.2♀,	84.5♂,	140.2♂,	139.0♂,			
22					M	nerv	147.0						
23					E	lin	70.0,	53.8,	60.2,	92.4			
24			⊥		L	cardium	115.3,						
25			70-80		A	plic	108.1,	107.5					
26					P	cord	86.7,	67.0					
27					P	sin	89.2						
28					E	lin	1WD						
29			—		A	plic	2WD						
30		⊥											

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DATASHEET# 5 of 8
DATE 9-3-24

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		35	90-100		P	alatus	103.1,	82.3,					
2					P	cord	93.7,	90.2,	83.0,				
3					P	sin	91.2,	99.5,	88.6,				
4					E	lin	87.8,	77.1,					
5					L	recta	135.1♀						
6					A	plic	113.8,	97.2					
7					T	met	83.2,	85.0,					
8					C	pus	1 WD						
9			↓		A	plic	1 WD						
10			60-70		E	lin	88.2,	94.0					
11					A	plic	106.8,	90.2,	100.5,	91.5,	99.0		
12					L	recta	118.1♀,	149.1♂,	130.0♂,	137.2♀,	129.1♀,		
13					P	alatus	103.9,						
14					A	plic	5 WD						
15			80-90	★	P	cuphys	105.3	48.5	69.3			tag	Yellow 1861 tag
16			80-90		T	met	84.2,						
17					A	lig	107.0,						
18					L	cardium	104.1♀,						
19					Q	Q	53.8						
20					C	pus	60.1,	53.5,	61.8				
21		↓	↓		L	recta	125.0♂						
22		36	40-50		P	alatus	118.2						
23		36	60-70		M	nerv	>150						
24					C	pus	64.2,						
25					L	recta	149.1♂,	138.0♀,	128.7♀				
26					A	plic	113.8,	99.1,	83.1				
27					E	lin	73.8,						
28				★	P	cuphys	116.9	44.2	74.8			tag	Yellow 1104
29					A	plic	1 WD						
30		↓	↓										

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		3C	80-90	★	P	cuphyus	113.8	47.1	79.5			tag	Yellow 1928
2					P	cord	85.5,	90.2					
3					A	plic	102.1,	104.3,	68.0,	102.1,	101.8,	18.2, 94.7,	95.0, 77.0
4					A	lig	120.0,						
5					P	sin	88.5						
6					C	pus	57.7,	55.0,	60.2,	58.0,			
7					L	recta	129.0♂	131.2♀					
8			90-100		E	lin	84.1,	90.5,	77.2				
9					A	plic	110.0,	107.4,	98.2,	85.0,	107.2,	86.0	
10					T	met	82.0,	69.5,	77.1,	79.5,	81.2		
11					L	cardium	118.5♂,	115.0♂					
12					P	sin	95.5,						
13					C	pus	1WD						
14					P	cuphyus	1WD						
15			70-80		L	sil.	103.5						
16					A	plic	87.2,	103.0,	100.5,	102.1,	106.0,	95.5	
17					M	nerv	>150						
18					E	lin	88.0,						
19					P	alatus	108.2,	112.4					
20					L	recta	137.0♂	139.0♂	140.1♂,	>150♀,	143.8♂		
21					C	pus	55.0						
22					A	lig	118.4						
23					E	lin	1WD						
24					A	plic	3WD						
25			50-60		A	plic	99.1,	107.0,	99.5,				
26					E	lin	74.0						
27					L	recta	130.5♂,	123.1♀,	137.7♀,	122.5♀,	139.0♂	110.0♂,	141.2♂
28					L	sil.	99.0♀						
29					A	plic	2WD						
30													

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s		Comments
1		37	90-100		E	lin	89.1,	80.0,	88.2					
2			|		C	pus	53.1,	57.2,						
3			|		T	met	76.0,	77.5						
4			|		A	plic	87.5,							
5			|		P	sin	99.8							
6			|		P	cord	89.2,	82.5,						
7			|		A	lig	133.8,	122.0						
8			|		L	recta	148.1♂							
9			|		A	plic	1WD							
10			↓		E	lin	1WD							
11		37	50-60		A	plic	96.3,	109.2,	108.0					
12			|		L	recta	>150♂	>150♀	140.0♂	129.1♀,	138.0♀,	137.1♀,	141.1♂	
13			|		O	ref	53.5,	60.0,						
14			|		L	cardium	113.9♂							
15			|		A	lig	119.2							
16			↓		E	lin	87.5							
17		37	70-80		M	nervosa	>150							
18			|		L	recta	127.3♀,	140.4♂,	143.1♂					
19			|		P	cord	75.3,							
20			|		P	alatus	72.5,	85.2,	105.0,	106.0				
21			|		A	lig	110.0							
22			|		T	met	72.1							
23			|		E	lin	75.0,	84.5,	73.6,					
24			|		A	plic	95.2,	79.8,	68.4,	113.0,	100.5			
25			|		L	cardium	109.0♂							
26			|		E	lin	1WD							
27			|		M	nerv	1WD							
28			↓		A	plic	1WD							
29														
30														

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 8 of 8
DATE 9-3-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		37	80-90		A	lig	100.0						
2			↓		E	lin	84.2	63.0,					
3					M	nerv	>150,	>150					
4					P	alatus	108.4,						
5					C	pus	49.5,	69.2,	63.0,	48.1			
6					T	met	75.6,						
7					A	plic	88.1,	77.5,	99.5				
8					P	sin	93.8						
9					L	recta	142.2♂	128.1♀					
10					M	nerv	1WD						
11					E	lin	1WD						
12			↓		A	plic	1WD						
13		37	60-70		M	nerv	>150,	>150,	145.2,				
14			↓		A	plic	95.2,	98.5,	96.1,	96.0,	98.8,	65.0	
15					P	alatus	114.0						
16					E	lin	95.5,	67.2,	73.0,				
17					L	recta	138.1♀	145.5♀,	142.5♂,	128.0♀			
18					A	plic	2WD						
19			↓		O	ref	1WD						
20		37	40-50		C	pus	66.5						
21			↓		A	plic	69.0						
22					L	recta	1WD						
23		37	90-100		P	alatus	122.0						
24			↓		E	lin	88.4,	94.6,	89.0,	84.2,	62.0		
25					T	met	77.5,	78.1,	80.5,	76.4,			
26					A	lig	129.1,	103.0,	118.4				
27					L	recta	132.0♂,						
28					P	cord	96.0,	90.2,					
29					P	sin	101.1,	94.8,	90.6				
30					M	nerv	>150						

* Male / Juvenile / Female

*Diver (initials only)

P alatus 1WD

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 4 Sept 2024

Project/Task: 2312.005 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominate — Total time w/QC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1		38	35-40	WV/KY	45	45					20 veg	6	5	NO	KY: 2750 WV: 3060
2		|	40-50	|	80	10					10 WD	12	8	Y. 001	
3			50-60		40	30	20	10				12	10	Y. 003	
4			60-70		40	30	20	10				12	12	Y. 007	
5			70-80		40	30	20	10				12	13	Y. 004	
6			80-90		40	30	20	10				12	15	Y. 005	
7		⊥	90-100	—	40	30	20	10				12	16	B. 70	KY: 1900 WV: 2500
8		39	35-40	WV/KY	50	50						6	5		
9		|	40-50	|	60						40 LWD	12	8	Y. 017	
10			50-60		40	20	40					12	9	B. 90	
11			60-70		40	30	20	10				12	12	Y. 014	
12			70-80		40	30	20	10				12	13	Y. 010	KY: 1250 WV: 2100
13			80-90		40	30	20	10				12	15	Yellow C1	
14		⊥	90-100	—	40	30	20	10				12	16	Yellow 7	KY: 3500 WV: 1800
15		40	35-40	WV/KY	90	10						6	7	NO	KY: WV: 1800
16		|	40-50	|	60	20	20					12	9	Y001	
17			50-60		60	20	20					12	11	Y003	
18			60-70		50		40	10				12	13	Y008	
19			70-80		40	10	40	10				12	15	Y005	KY: 2300 WV: 1400
20			80-90		40	10	40	10				12	15	BG	
21		⊥	90-100	⊥	50	10	30	10				12	16	Y. 004	KY: 1750 WV: 1100
22		41	35-40	W/KY	80	20						6	4		KY: 1750 WV: 1100
23		|	40-50	|	60	20	20					12	10	Y008	
24			50-60		60	20	20					12	10	Y009	
25			60-70		60	20	~~20~~ 10				10 LWD	12	12	Y. 013	
26			70-80		60	20	20					12	15	Y. 018	KY: 1300 WV: 800
27			80-90		60	20	20					12	16	B. 26	
28		⊥	90-100	⊥	60	20	20					12	17	Black carabiner	KY: 800 W: 500
29		42	35-40	KY/WV	40	40					20 LWD	6	4	NO	
30		|	40-50	|	90	10						12	8	Y. 011	
31			50-60		60	10	30					12	10	B. 136	
32			60-70		60	15	20				5 LWD	12	12	B. 70	
33			70-80		40	30	30					12	14	Orange carabiner	
34			80-90		40	30	30					12	15	Yellow 7	
35		⊥	90-100	⊥	40	30	30						16	Y. 017	KY: 1600 WV: 2000

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 2
DATE 4 sept

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

Substrate Composition (Rank top 3) 1=Dominate

Time total w/QC

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1		43	35-40	WV/KY	70					20 Veg	10 LWD	6	5	NO	
2			40-50		60	10	30					12	10	Y 003	
3			50-60		45	10	40				5 LWD	12	11	Y 004	
4			60-70		30	30	30	10				12	12	Y. 008	
5			70-80		30	30	30	10				12	15	Y. 001	WV: 1600 KY: 10000
6			80-90		30	30	30	10				12	16	BG	KY: 800
7			90-100		30	30	30	10				12	17	Y. 002 & 010	KY: 6000
8															WV: 1200 KY: 600
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															.
32															
33															
34															
35															

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 9
DATE 4 Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		38	40-50		O	ref	21.0						
2			|		L	recta ♂	144.7						
3			|		L	recta ♀	148.3						
4			60-70		E	lin	75.3						
5			|		L	recta ♀	133.1, 134.2, 139.5						
6			|		L	recta ♂	145.8						
7			|		M	nerv	144.8	1-WD					
8			|		L	rost	49.3						
9			|		A	plic	78.6, 89.4						
10			|		P	alatus	86.5						
11		38	80-90		A	plic	106.5, 113.9, 94.7, 96.9, 102.5, 100.0, 89.9, 110.3						2-WD
12			|		A	lig	113.7, 127.6						
13			|		E	lin	77.8						
14			|		O	g	69.9, 60.4						
15			|		T	met	75.8, 90.1						
16			|		L	recta ♂	138.4, 149.5						
17			|		P	alatus	102.4, 92.2 1-WD						
18		38	70-80		M	nerv	150+, 147.4						
19			|		L	recta ♂	139.9, 150.0, 144.3, 150+, 135.6						
20			|		L	recta ♀	142.3						
21			|		E	lin	92.5, 68.4, 69.7, 80.2						
22			|		A	lig	104.4						
23			|		A	plic	112.7, 113.2, 94.8, 100.2, 84.6,					1-WD	
24			|		L	hard ♀	101.1						
25			|		P	cord	81.2						
26			|		T	met	68.2						
27			|		O	ref	62.9						
28		38	50-60		L	recta ♀	148.8	150+, 133.7,	144.5				
29					L	recta ♂	119.7,						

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DATASHEET# 2 of 9
DATE 4 Sept 2024

Project/Task: 2312.005 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		38	50-60		E	lin	95.7,	65.4,					
2			|		L	pust	100.1						
3			|		P	alatus	95.8						
4			|		A	plic	104.7						
5			⊥		O	ret	62.3						
6		90-38	90-100		A	plic	120.2,	77.8,	100.1,	75.8,	1-WD		
7			|		E	lin	93.2,	53.4,	88.4				
8			|		P	rosa	92.6,	90.7,	88.8,				
9			|		P	sin	80.1						
10			|		L	curd ♂♀	113.3						
11			|		L	recta ♀	135.9						
12			|		O	ret	60.6						
13			|		T	met	76.9,	82.4,	84.1,	70.1			
14			|		L	pust	63.1,	48.6,	66.7,	60.0			
15			⊥		P	alatus	1-WD						
16		39	90-100		E	lin	92.6,	80.1,	83.4	1-WD			
17			T		P	cyphyus	81.9	36.6	62.3				Tag #: 0737 Yellow
18			|		M	nervos	150+						
19			|		L	cardium	103.6						
20			|		P	fragilis	1-WD						
21			|		L	recta ♂	150+						
22			|		L	recta ♀	120.7						
23			|		A	plic	95.8,	102.3,	109.5				
24			|		T	met	71.9,	65.1,					
25			|		L	pust	58.4,	65.3,					
26			|		P	rosa	93.2,	81.1,	89.8				
27			|		P	sin	67.5						
28			⊥		O	ret	49.2						
29		39	70-80		A	lig	104.4						
30					L	cardium ♂	130.1						

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DATASHEET# 3 of 9
DATE 4 Sept

Project/Task: 2312.05 Stream Ohio River State WV County Lead

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		39	70-80		T. Met	85.7						
2					A plic	95.3	1-WD					
3					L.recta ♀	113.8						
4					E. lin	73.4						
5					P. fragilis	1-WD						
6		39	80-90		M nerv	150+						
7					A. plic	118.3						
8					T. met	65.3						
9					L. cord ♀	103.9						
10					L. recta ♀	115.2, 135.7						
11					L. recta ♂	120.1, 121.3						
12					P. sin	85.6, 98.4						
13					E. lin	84.8, 92.1						
14					A. lig	106.1, 105.7, 108.5						
15		39	40-50		L. recta ♂	140.2						
16					L. recta ♀	129.7						
17					P. alatus	2-WD						
18		39	60-70		L recta ♂	146.8, 140.1, 145.5, 141.6, 124.5						
19					L. recta ♀	144.5, 138.2						
20					A. plic	120.3, 115.5, 92.4, 82.7, 105.5, 81.3						
21					E lin	76.6, 57.1						
22		39	50-60		L. recta ♀	130.0, 145.2, 125.4, 133.9, 146.7, 129.2, 118.8						
23					L recta ♂	141.1, 140.0, 113.2						
24					A plic	105.4, 98.8						
25					E lin	72.4, 65.0						
26					C gust	55.7, 54.1						
27					L cord ♂	102.2						
28					P alatus	108.1	1-WD					
29		40	80-90		L recta ♂	141.2						
30					A plic	106.3, 98.4,			2-WD			

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 4 of 9
DATE 4 Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		40	80-90		L. recta ♀	122.4						
2					E. lin	91.7, 77.6,						
3					O ret	54.9						
4					O quad	63.6						
5					T met	78.7						
6					A lig	89.2						
7		40	60-70		L. card ♂	183.9						
8					M. nerv	150+						
9					L. recta ♀	133.4, 131.8						
10					A pliz	120.2, 104.7,	103.9,	100.1, 91.0			1-wD	
11					E lin	74.5, 83.1,						
12					P cord	82.2						
13					O quad	56.1						
14		40	90-100		M nerv	150+						
15					L recta ♂	140.4						
16					L recta ♀	133.9						
17					P. alatus	85.7						
18					T met	72.5, 82.8,	80.2,	82.9				
19					E lin	90.3, 78.1,	93.4,	84.6				
20					P sin	87.5, 89.5,	98.5					
21					F flava	83.1						
22					L cardium ♀	99.9						
23					Q quad	59.4						
24					O ret	48.8						
25					L just	62.5						
26					P cord	99.9						
27					A plic	93.6	1-wD					
28					A lig	123.8,	114.4,	113.9				
29		40	50-60		P alatus	118.5,	114.1,					
30			↓		L recta ♀	115.4,	122.2,	145.4,	140.0			

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 5 of 9
DATE 4 Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		40	50-60		L.recta ♂	135.6,	130.9,	149.1,	133.0,	131.7		
2			↓		E.lin	67.2,	69.3					
3		40	70-80		L.recta ♂	121.1						
4			↓		L.recta ♀	125.5						
5					P alatus	109.8,	112.3,	92.3,				
6					A plic	113.1,	100.0,					
7					E lin	90.1,	60.6,	88.4				
8					L cordium ♂	111.1,	123.4					
9			↓		L cordium ♀	113.4						
10		40	40-50		L recta ♂	130.1,	145.2,	150+,	122.3,	145.0	1-WD	
11			↓		L recta ♀	124.3,	138.9,	128.2,	143.9,	128.7,	144.3,	135.9, 130.6, 150+, 131.2, 110.3
12					P alatus	124.5,	110.4,					
13					L cordium	100.5						
14					A plic	82,5,	104.7,	70.1,	76.7,			
15					F flava	54.7						
16			↓		A lig	114.5						
17		41	60-70		L card ♀	113.6						
18			↓		L card ♂	120.0						
19					M nerv	150.+						
20					L recta ♂	148.7,	110.2					
21					L recta ♀	121.3						
22					P alatus	104.9,	93.1,	110.9				
23					A. plic	88.7,	99.2,	98.3				
24			↓		E.lin	70.2,	63.4,	79.1,	102.5			
25		41	90-100		L recta ♀	119.3,	123.8					
26			↓		L recta ♂	138.4						
27					P card	89.5,	91.7,	87.2,	99.7			
28					A plic	69.0,	79.5					
29					T met	84.7,	63.9,	65.1,	74.4,	85.5,	82.0	
30					O ret	51.1,						

* Male / Juvenile / Female

*Diver (initials only)

E lin 83.1, 70.2,
L card ♀ 106.8
A lig 83.4, 130.2, 118.7, 99.0, 122.6

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DATASHEET# 6 of 9
DATE 4 Sept

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		41	80-90		A.lig	120.0						
2			↓		L.recta ♂	143.9, 70.5						
3					P.sin	96.4						
4					P.cost	93.7						
5					E.lin	74.1						
6					A.plic	50.9, 95.6, 75.2, 80.4, 66.8						
7			⊥		T.Met	78.9, 82.3						
8		41	50-60		L.recta ♂	144.5, 127.5						
9			↓		L.recta ♀	132.7, 129.1						
10					E.lin	78.6						
11			⊥		A.plic	104.9						
12		41	40-50		L.recta ♂	150.+						
13			↓		A.plic	105.9, 70.4						
14					O.ret	44.1						
15					E.lin	70.0						
16					M.nevs	135.7						
17					L.recta ♀	135.1, 130.2						
18			⊥		C.pust	1-WD						
19		41	70-80		A.plic	99.9, 115.4						
20		↓	↓		P.alatus	92.9	1-WD					
21		⊥	⊥		L.recta ♂	120.6						
22		42	40-50		P.alatus	110.1, 108.5						
23		42	50-60		A.plic	110.2, 109.9, 115.6, 116.2, 104.3, 90.2, 77.7						1-WD
24			↓		P.alatus	118.3, 94.6,						
25					O.ret	51.5, 45.6, 53.4, 55.7, 57.4						
26					C.pust	44.1						
27					L.recta ♂	125.1, 150+, 150+, 150+, 148.0, 150+						
28			⊥		L.recta ♀	128.3		1-WD				
29		42	60-70		L.recta ♂	138.2, 140.0, 133.7						
30					L.recta ♀	145.3, 142.5						

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 9
DATE 4 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		42	60-70		A plic	101.7, 99.6, 103.5			1-WD			
2			|		Palatus	103.2, 128.5						
3			|		E lin	64.7						
4		42	90-100		A plic	110.1		2-WD				
5			|		Palatus	108.4						
6			|		L recta ♂	149.3, 94.7, 130.2						
7			|		E lin	80.3, 84.5						
8			|		C gut	58.9, 56.7, 63.0, 60.2						
9			|		Q guad	58.5						
10			|		O ref	57.8						
11			|		P cood	62.6						
12			|		P sin	91.3, 87.5		1-WD				
13			|		T met	78.7, 84.2						
14	1		|		L cord ♂	115.2						
15			|		A lig	113.3						
16		42	70-80		M nerv	150+						
17			|		Palatus	100.0, 99.7, 84.2, 105.5, 72.1						
18			|		E lin	95.2, 69.5						
19			|		C gust	47.1						
20			|		L recta ♂ ♀	138.0, 128.7						
21			|		L cord ♂	118.5						
22			|		A lig	115.4						
23		42	80-90		M nerv	150+						
24					A plic	108.2, 106.4, 83.4, 88.1, 110.2, 112.9, 70.3			1-WD			
25					Palatus	107.0						
26					E lin	62.5, 68.7, 68.1, 81.2, 75.5, 81.4, 76.3						
27					P cord	63.8						
28					T met	86.5, 78.6,						
29					Q guad	65.6						
30					C gust	51.3						

* Male / Juvenile / Female

*Diver (initials only)

L cordium ♀ 120.7
L cordium ♂ 116.6

A lig 89.3, 115.4

P. cyphyus 1- WD

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DATASHEET# 8 of 9
DATE 4 Sept

Project/Task: 2312.005 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		43	70-80		Aplic	105.0, 103.7, 98.2, 114.0, 101.1, 100.2, 86.0, 94.8, 106.0						
2			↓		Mnesv	146.7, 150+						
3					Lrecta ♂	150+						
4					Lrecta ♀	135.0						
5					Elin	80.0, 92.5,						
6					Palatus	108.5						
7			↓		Cpust	1-WD						
8		43	80-90		Tmeta	82.3						
9					Cpust	63.5						
10					Orcf	59.4						
11					Alig	122.4						
12					Aplic	84.7, 93.1, 128.1, 103.5						
13					Lcard ♂	103.7,						
14					Psin	94.7						
15					Elin	100.8, 75.4, 81.9						
16					Palatus	95.7						
17					Lrecta ♂	148.2, 143.9, 96.5, 138.4, 121.0, 145.8						
18			↓		Lrecta ♀	150+						
19		43	60-70		Lcard ♀	101.5, 97.3						
20			↓		Lcard ♂	107.3						
21					Palatus	111.0	1-WD					
22					Elin	75.0						
23					Lrecta ♂	150+, 145.0, 150+						
24					Cpust	62.6						
25					Aplic	92.3, 109.1		1-WD				
26			↓		Pfrag	63.2						
27		43	90-100		Psin	94.5						
28					Elin	87.9, 69.7						
29					Aplic	98.5, 93.6						
30					Palatus	117.4						

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 9 of 9
DATE 4 sept

Project/Task: 2312.03 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		43	90-100		T met	76.7, 8	0.5, 0.5		1-WD			
2				☆	P cyphyus	104.7	41.5	71.2				Tag# 0711 Yellow
3					Elin	71.4						
4					~~Actin~~ Oret	46.5						
5					Aplic	64.3						
6					T. met	76.6, 7	7.8					
7			1		P sin	95.3, 7	2.4					
8		43	50-60		L recta ♀	122.7	1-WD					
9			1		Aplic	77.8	1-WD					
10			1		Palatus	1-WD						
11		43	40-50		L. recta ♂	150+						
12		1	1		Aplic	96.6						
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 5 Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Percentages)

No.	Area	Transect	Interval	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth	Notes
1	44	90-80		BY/VV	60	20									25 WD	5	10	2800 BY/2600 VV/G/B
2	"	80-60		"	100	20	10								10 WD	10	11	Y.002
3		35-40		"	50	50										10	1	No
4		60-70		"	50	10	30	10								10	13	Y.008
5		70-80		"	50	10	30	10								10	14	Y.003
6		80-90		"	50	20	30									10	15	Y.001
7		90-100		"	50	10	30	10								11	17	Y.004
8	45	35-40		BY/VV	80										20WD	5	6	2200BY/2200VV
9		40-50		"	60	10	10								20WD	10	9	B.70
10		50-60		"	50	20	20	5							5 WD	10	10	B.70
11		60-70		"	50	20	20	5							5 WD	10	13	Y.017
12		70-80		"	50	10	30	10								10	16	Y.005
13		80-90		"	50	10	30	10								10	15	Y.018
14		90-100		"	90	20	30									12	17	500BY/W/Y.007
15	46	35-40		BY/VV	90										10 veg.	5	4	No
16		40-50		"	50	10	20	10							10 WD	10	9	Y.004
17		50-60		"	40	10	40	10								10	11	B.136
18		60-70		"	40	10	40	10								10	13	Y.003
19		70-80		"	40	10	40	10								11	16	Y.005
20		80-90		"	20	40	30	10								10	17	Y.002
21		90-100		"	20	40	30	10								12	17	700BY/800VV/Y.001-Y.001
22	47	35-40		BY/W		100										5	4	3000BY/1000VV/No
23		40-50		"	50	10	30	10								10	9	Y.018
24		50-60		"	50		50									10	12	Y.007
25		60-70		"	50		45	5								10	13	B.70
26		70-80		"	50		45	5								11	16	700VV/Y.005
27		80-90		"	50		45	5								11	17	Y.017
28		90-100		"	50		50									12	17	500W/2800BY/B.20-G/B
29	48	35-40		BY/VV	80	20										5		2200BY/1300VV/~~[illegible]~~
30		40-50		"	70		20								10WD	10	9	~~[illegible]~~ Y.002
31		50-60		"	40		50	10								10	11	~~[illegible]~~ Y.007
32		60-70		"	60	10	20	10								11	14	~~Y.013~~ D. Carahamer
33		70-80		"	50		40	10								12	19	~~[illegible]~~ Y.013
34		80-90		"	50		40	10								11	16	Y.004
35		90-100		"	50		40	10								12	16	700VV/1500BY/B.90-Y.011

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4525 Este Ave Road. Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 2
DATE 9 Sept. 2024

Project/Task: 2312.05 **Stream** Ohio stream **State** WV **County** Wood

Substrate Composition (Percentages)

No.	Area	Transect	Interval	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth	Notes
1		49	30-40	BJ/VV	90										10 veg	5	2	1300 W/1500 BY
2			40-50		80	10									10 WD	10	9	Y. 009
3			50-60		60		30	10								10	12	B 1316
4			60-70		50	10	30	10								11	14	Y. 014
5			70-80		50	10	30	10								12	Y0	Black
6			80-90			40	50	10								10	16	Y. 001
7			90-100			40	50	10								12	16	Y. 003/Y. 008 (750 BY/1000 BY) 44mm Prog.
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		
31																		
32																		
33																		
34																		
35																		

ESI

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 8
DATE 8 sept 2004

Project/Task: 2312.05 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	44	44	40-50		L. recta	136.0♂,	124♀,	133.5♀				G/B
2			↓		P. card	100.6♀,	110.7♂,					
3			↓		L. sili	1 WD ♂						
4		44	50-60		L. recta	125.2♂,	140.2♀,	128.7♂,	139.3♂			Y.002
5			↓		Q. q	58.1						
6			↓		A. plic	104.3						
7			↓		E. lin	72.0						
8		44	60-70		P. dlatus	118.6						Y.008
9			↓		A. plic	110.0, 95.3,						
10			↓		L. recta	134.3♀,	150+ ♂,					
11		44	70-80		E. lin	87.2						Y.003
12			↓		L. recta	128.8♀						
13			↓		A. plic	99.0						
14		44	80-90		L. recta	134.2♂	140.1♂					Y. 001
15			↓		L. cardium	107.7♂						
16			↓		A. plic	100.5, 103.2, 74.8, 71.9, 100.1, 102.0, 112.7, 99.0,						
17			↓		Q. q	103.1,						
18			↓		C. pust	54.6, 58.9						
19			↓		E. lin	107.0, 82.2, 92.1, 87.0,						
20			↓		T. mut	82.0, 106.0,						
21			↓		Syntoxia	98.2.						
22			↓		P. cordatum	86.1,						
23			↓		Q. ref	2 WD						
24		44	90-100		A. plic	103.1, 107.7, 96.3, 103.3, 107.8, 88.3						Y. 004
25			↓		T. mut	64.1, 71.8, 87.2, 56.9, 73.0,						
26			↓		C. pust	58.6,						
27			↓		L. recta	120.0♀						
28			↓		P. dlatus	98.0, 102.8,						
29			↓		P. cordatum	93.1,						
30			↓		syntoxia	99.3,						

* Male / Juvenile / Female

A. lig

*Diver (initials only)
115.0, 113.7,

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DATASHEET# 2 of 8
DATE 5 Sept 2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		45	90-100		P. alatus	129.5,						Y. 007
2					L. cardium	♂128.0						
3					T. met	86.1, 74.3, 81.0, 80.9, 83.2, 83.1,						
4					A. plic	108.1, 107.6, 95.						
5					L. recta	♂92.6, ♀130.1,						
6					C. pust	64.8, 62.0, 57.7, 61.0						
7					Q. q	53.1						
8					E. lin	80.8						
9					P. cordatum	78.6, 72.7						
10					Syntoxia	83.1, 92.8, 94.7,						
11		45	70-80		A. plic	99.1, 107.5, 104.8, 96.1, 87.0						Y. 005
12					E. lin	74.4						
13					C. pust	60.1, 58.9, 54.7, 50.2, 51.7						
14					O. ref	48.1						
15		45	80-90		A. plic	93.2, 97.7, 96.9, 88.1, 79.3,						Y. 018
16					L. recta	♂149.7	♂133.2					100 BY WV
17					C. pust	96.0,						
18					E. lin	79.9, 78.7						
19					Syntoxia	94.1						
20					T. met	80.8						
21					A. lig	89.1						
22		45	60-70		M. nerv	150+						Y. 017
23					L. recta	150+♀, 150+♂, 140 ♂						
24					A. plic	108.7, 85.6, 103.7, 77.4, 101.3, 93.3,						
25					E. lin	63.2,						
26					Q. q	63.4						
27					P. alatus	115.1						
28					L. cardium	108.1 ♂						
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 8
DATE 5 sept 2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		45	40-50		L. recta ♂	130.0, 154, 149.7,						Blue 70
2			|		L. recta ♀	139.1, 128.9, 130.0, 145.1,			140.8			
3			|		P. alatus	127.7						
4			|		A. plic	100.7						
5		45	50-60		P. alatus	107.8,						B. 70
6			|		O. ref	100.9,						
7			|		A. plic	94.1, 90.3,						
8			|		L. recta ♂	125.4, 120.3, 134.0						
9			|		L. recta ♀	121.1, 130.7, 148.7, 132.5						
10		46	90-100		T. met	72.3, 78.1, 80.9, 58.6, 80.7,						Y. 009/001
11			|		C. pust	52.1, 56.6, 60.1, 50.3, 53.0,						
12			|		L. recta ♂	141.0, 140.9,						
13			|		L. recta ♀	134.8, 101.4,						
14			|		A. plic	105.6, 101.8, 94.1, 101.2, 87.3,						
15			|		O. o	109.9, 8.						
16			|		C. pust	99.8						
17			|		E. lin	72.3, 74.1, 65.7, 62.8, 80.1, 88.1						
18			|		O. ref	91.8,						
19			|		A. lig	112.6, 120.0, 121.2, 129.3, 109.8						
20			|		P. cordatum	74.4, 90.1, 88.3, 87.2, 73.3, 85.1,						
21			|		syntoxia	99.0, 88.7, 92.2,						
22		46	80-90		L. cardium	86.1,						Y. 002
23			|		A. lig	123.4, 134.6,						
24			|		syntoxia	100.0, 1 WD						
25			|		P. cordatum	84.3, 84.1,						
26			|		T. met	73.1, 74.6, 82.1, 73.0,						
27			|		A. plic	81.2, 2 WD						
28			|		O. o	58.8,						
29			|		E. lin	63.7, 75.5, 2 WD						
30			|		O. ref	57.9,						

* Male / Juvenile / Female

L. recta

*Diver (initials only)

133.9 ♀

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 8
DATE 3 sept. 2024

Project/Task: 2312.09 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		46	70-80		L. cardium	127.8♂	112.6♀					Y.008
2			|		A. lig	112.7						
3			|		L. recta ♂	138.0						
4			|		P. alatus	37.7						
5			⊥		E. lin	73.0,						
6		46	60-70		L. recta ♀	129.9,						Y.003
7			|		L. recta ♂	130.1, 130.3, 142.8						
8			|		L. cardium	106.0♀						
9			|		P. alatus	144.1,						
10			|		A. plic	115.0, 75.6,						
11			|		E. lin	66.2						
12			⊥		M. nerv	150+,						Y.004
13		46	40-50		P. alatus	120.3, 88.3,						
14			|		L. recta	139.0♀	150+♂	141.8♂	130.3♀			
15			|		flava	75.6						
16			⊥		A. plic	81.3						
17		46	80-100		L. recta	144.8♂	133.6♀	139.0♂				B.136
18			|		E. lin	78.5						
19			⊥		C. rust	55.5						
20		47	60-70		P. alatus	121.6,						B.70
21			|		E. lin	74.5,						
22			|		Q.q	60.0,						
23			|		L. recta ♂	131.0						
24			⊥		L. recta ♀	131.1, 130.9,						
25		47	70-80		A. plic	88.7,						Y.005
26			|		E. lin	88.8, 76.4						
27			|		L. recta ♀	129.8						
28			|		L. recta ♂	125.6						
29			|		P. alatus	114.7						
30			⊥	☆	O. sub	43.2L.	28.8W.	38.9H.				Yellow 1989

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road. Cincinnati. OH 45232 (513) 451 - 1777

DATASHEET# 5 of 8
DATE 5 sept. 2024

Project/Task: 23/2.09 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		47	90-100		E. lin	91.3, 69.3,						R/G
2			↓		C. recta ♀	120.0,						
3					T. met	69.1, 84.1,						
4					C. post	71.1, 50.0,						
5			↓		A. plic	99.8,						
6		47	90-100		A. plic	79.6, 91.0, 62.0,						B.26
7			↓		E. lin	46.5, 89.6						
8					T. met	77.3						
9					P. cordatum	65.5, 88.9,						
10					syntoxia	93.7, 96.2,						
11			↓		L. cardium	123.48	113.36					
12		47	80-90		A. plic	109.6, 85.3, 101.3, 94.5,			66.6, 72.3,			Y.017
13			↓		C. post	98.1, 63.3, 1 WD						
14					E. lin	80.6, 98.7,						
15					P. alatus	107.7, 92.5,						
16					P. cordatum	81.2,						
17					syntoxia	86.8, 88.4, 100.1,						
18					T. met	89.2,						
19					L. recta ♂	133.3						
20					L. recta ♀	130.0						
21			↓		A. lig	124.4						
22		47	40-80		M. nerv	142.0,						Y.018
23			↓		A. plic	64.5, 1 WD						
24					L. recta ♀	135.0						
25		47	50-60		P. alatus	94.6, 76.3, 110.3, 112.8, 1 WD						Y.007
26			↓		L. recta ♀	140.0, 128.7						
27			↓		L. recta ♂	143.3						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 6 of 8
DATE 5 Sept 2024

Project/Task: 23205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		48	90-100		A. plic	100.1, 99.5,						B.90
2			|		T. met	78.6, 72.2, 83.1, 88.8,						
3			|		O. ref	49.2, 51.0,						
4			|		E. lin	92.0, 84.5, 71.1, 84.2						
5			|		A. lig	103.3,						
6			⊥		P. cordatum	92.0, 77.						
7		48	90-100		L. recta ♂	150.1,						Y. 011
8			|		E. lin	95.7, 83.8, 74.3, 92.4, 68.1, 62.6,						
9			|		P. cordatum	94.3, 80.3,						
10			|		A. plic	79.1,						
11			|		T. met	76.0, 72.7, 75.8,						
12			|		C. pust	47.2, 60.0,						
13			⊥		syntoxia	87.1,						
14		48	80-90		A. plic	90.1, 92.8, 84.3, 56.2, 78.0, 85.3, 96.1, 118.5, 105.4						Y. 004
15			|		T. met	60.5, 76.1,						
16			|		P. alatus	90.3,						
17			|		L. Cardium	99.9,						
18			|		L. recta ♀	139.1,						
19			|		L. recta ♂	133.4,						
20			|		P. cordatum	95.7,						
21			|		syntoxia	89.1, 93.2,						
22			|		E. lin	93.2, 85.9, 64.4						
23			|		C. pust	55.4, 46.5, 1 WD						
24			|		D. d.	62.2						
25			|		O. ref	53.1						
26			⊥		A. lig	92.8						
27		48	70-80		E. lin	82.8, 93.4, 80.1,						Y. 013
28			|		A. plic	95.0, 95.0,						
29			|		T. met	89.3,						
30			⊥		L. recta ♂	131.0	ISDH					

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road. Cincinnati. OH 45232 (513) 451 - 1777

DATASHEET# 7 of 8
DATE 5 sept. 2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		48	70-80		syntoxia	84.0						Y.013
2		48	60-70		L. recta ♀	125.6,	145.7,					Orange
3			↓		O. ref	50.1,						
4		48	60-50		P. alatus	90.8						Y.007
5			↓		E. lin	79.1						
6			↓		L. recta ♀	115.8, 130.6						
7		48	40-50		L. recta ♀	133.3,						Y.002
8			↓		L. recta ♂	130.6						
9			↓		P. alatus	1WD						
10		49	90-100		+ . met	80.0	86.7	86.9	93.2	76.0	77.8	Y008 Y003
11			↓		A plic	96.0	81.7	83.4	104.0	119.0	95.5	
12			↓		+ . met	81.2	74.0	75.5	73.7	82.1		
13			↓		E. Lin	74.1	50.5	94.1				
14			↓		C. pust	65.1	57.1	60.5	59.0	60.2	59.1	
15			↓		P. Cordatum	72.0	60.0	80.6	94.1			
16			↓		QQ	61.4						
17			↓		O. ref	53.3	50.4					
18			↓		A. plic	107.0						
19			↓		L recta ♂	145.1						
20			↓		P. alatus	118.7						
21			↓		A Lig	97.0						
22		49	60-70		O. ref	54.5						Y 014
23			↓		E. Lin	72.8	77.2					
24			↓		L. cardium ♂	126.1						
25			↓		L. cardium ♀	116.4						
26			↓		L. recta ♀	132.2	145.0					
27			↓		L. recta ♂	148.7						
28			↓		A plic	104.5						
29			↓		P. alatus	112.2	1WD					
30												

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 8 of 8
DATE 5 sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		49	50-60		M. nerv	150+						B136
2					L. recta ♀	134.5	125.6	135.2				
3					L. recta ♂	146.0						
4					O. ref	52.2						
5					P alatus	121.4	69.3					
6		49	40-50		L. recta ♀	128.1						Y009
7					P. alatus	2 WT						
8		49	70-80		M nerv	150+						Black
9					L recta ♂	146.5	145.6					
10					L recta ♀	145.3	116.8					
11					A. plic	92.1	112.6	107.9	85.5	94.1		
12					E. Lin	57.2	80.5					
13					C. post	62.2	48.0					
14					O. ref	51.5						
15					P. alatus	109.2						
16					P. sintoxia	95.6						
17					A. lig	134.1						
18		49	80-90		L. recta ♂	142.6	143.6	137.8	102.4			Y001
19					L. recta ♀	126.3	142.1					
20					QQ	59.5	65.6	64.0				
21					P. alatus	114.2	114.1					
22					E. Lin	82.6	72.0	78.1	88.8	98.2		
23					T. met	67.9	82.2	79.2	77.0			
24					G. post	59.2	60.2					
25					A. plic	97.1	95.0	104.1	102.8	81.5	108.7	
26					A. plic	116.0	93.6					
27					L. sili ♀	70.0						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road. Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Percentages)

No.	Area	Transect	Interval	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min) (Total)	Depth	Notes	
1		50	35-40	KY/BD	40	40									20WD	6	1	2700 KY 2900 BD	
2			40-50		50										50WD	12	5	✓	Y007
3			50-60		60	20	20									12	10	✓	B70
4			60-70		60	20	20									12	13	✓	Y002
5			70-80		40	30	30									12	15	✓	Y005
6			80-90		40	30	30									12	16	✓	Y017
7		⊥	90-100	⊥	40	30	30									12	17	1700 KY 2000 BD ✓	B26
8		51	35-40	KY/BD	80	20										6	1	No mussels	No
9			40-50		80	20										12	10	No mussels	No
10			50-60		60	20	15								5WD	12	12	✓	YC1
11			60-70		60	20	20									12	15	1450 KY 1800 BD ✓	YCH
12			70-80		60	20	20									12	16	✓	B/G
13			80-90		60	20	20									12	16	✓	Orange
14		⊥	90-100	⊥	60	30	30									12	16	850 KY 1250 BD ✓	Y003
15		52	35-40	KY/BD	70	30										6		3000 KY 1250 BD	NO
16			40-50		80	10	10									12	5	✓	Y009
17			50-60		70	10	20									12	10	✓	B. 90
18			60-70		70	10	20									12	15	2000 KY 6000 BD ✓	Y. 014
19			70-80		70	10	20									12	17	✓	B. 136
20			80-90		30	40	30									12	16	✓	Y. 008
21		⊥	90-100	⊥	30	40	30									12	16	1800 KY 450 BD	Orange
22		53	35-40	KY/BD	50	50										6	1	1800 KY 3200 BD	NO
23			40-50		80	10	10									12	10	✓	Y. 001
24			50-60		40	30	30									12	13	✓	Black
25			60-70		40	30	30									12	15	✓	Y. 013
26			70-80		40	30	30									12	16		Y. 011
27			80-90		50	10	20								20WD	12	16	1300 KY ✓	Y. L
28		⊥	90-100	⊥	40	30	30									12	15	1100 KY 2300 BD ✓	Orang
29																		3000 2300 BD	
30																			
31																			
32																			
33																			
34																			
35																			

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 2
DATE 9-6-24

Project/Task: 23205 Stream Ohio River State WV County Wood

Substrate Composition (Percentages)

No.	Area	Transect	Interval	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth	Notes
1		54	35-40	KY/BD	50	50										6	1	No mussels
2			40-50		50	30	20									12	5	Y009 ✓
3			50-60		50	30	20									12	10	Orange
4			60-70		40	30	20	10								12	12	Y010
5			70-80		40	30	30									12	16	Y001 ✓
6			80-90		40	30	30									12	16	Y004 ✓
7		⊥	90-100	⊥	40	30	30									12	17	Base ✓
8		55	35-40	KY/BD	50	50										6	1	1500 BD 2250 KY
9			40-50		40	30	30									12	5	No mussels
10			50-60		40	30	30									12	8	Y017 ✓
11			60-70		40	30	30									12	10	Y003
12			70-80		30	30	30	10								12	14	Y009
13			80-90		30	30	30	10								12	16	Y013
14		⊥	90-100	⊥	30	30	30	10								12	16	600 BD 1300 KY Y010 ✓
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		
31																		
32																		
33																		
34																		
35																		

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 7
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		51	90-100		A. lig	123.0, 110.2,						
2			↓		T. met	76.5, 72.1, 84.8,		78.2, 72.0, 83.5, 80.1,				
3				☆	P. cuphys	110.2	47.7	80.0				tag Y1935 *
4					A. plic	101.2, 95.8, 99.4,						
5					E. lin	74.0, 70.5, 71.2, 75.5, 54.1,						
6					L. recta	147.4♂, 144.0♂,						
7					T. met	1WD						
8					C. dus	61.2, 59.1, 62.5,		58.5, 67.1, 53.0				
9					O. ref	45.1, 53.0,						
10					P. cord	79.0,						
11			↓		P. sin	76.5,	99.0					
12		51	80-90		E. lin	94.5, 84.1, 81.0,						
13			↓		L. recta	138.1♂,	144.0♀,					
14					A. plic	100.0, 98.6,						
15					C. dus	53.7, 60.0, 67.1,						
16					T. met	90.2,						
17			↓		A. lig	115.5						
18		51	50-60		L. recta	147.0♂						
19		51	60-70		M. nerv	1WD						
20			↓		A. plic	92.5,						
21					C. dus	59.2,						
22			↓		L. recta	1WD						
23		51	70-80		A. plic	103.0						
24			↓		M. nerv	>150,						
25					M. nerv	1WD						
26					Q. Q	63.5						
27			↓		A. plic	1WD						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 7
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		50	80-90		L. recta	139.5♂	132.2♂					
2					L. cardium	84.0♂						
3					A. lig	108.1,						
4					E. lin	91.5, 65.1,						
5					T. met	77.0, 73.5,						
6					A. plic	100.7,						
7					P. card	69.8,	70.8,					
8					C. pus	50.5, 4	4.1,					
9					Q. Q	59.4						
10					A. plic	3 WD						
11					O. ref	1 WD						
12		50	60-70		Q. Q	60.7,						
13					L. recta	>150♂						
14					A. plic	95.2, 110.5						
15					A. plic	1 WD						
16					P. alatus	1 WD						
17		50	40-50		L. recta	128.1♀						
18					Q. Q	63.0						
19					P. alatus	1 WD						
20		50	50-60		A. plic	74.0,	77.5,	106.7				
21					L. recta	133.1♀,	144.5♂,	143.1♂				
22					A. plic	1 WD						
23		50	70-80		L. complinata	1 WD						
24					A. plic	107.7,	105.2,					
25					L. recta	128.6♀,	>150♀,					
26					T. met	82.0, 74.5,	81.2,	75.9,				
27					C. pus	64.1,						
28					E. lin	73.4,						
29					P. card	75.2, 82.0						
30					C. pus	1 WD						
					L. recta	1 WD						
					L. cardium	1 WD						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 7
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		50	90-100		L. recta	140.1♀,	125.0♀					
2			"		P. alatus	118.9,						
3					M. nerv	130.0,						
4					L. cardium	103.1♀						
5					Q. Q	56.5,						
6					T. met	78.2, 7	1.0, 7	7.4, 82.0,	62.5			
7					A. plic	84.0,	94.6					
8					P. cord	85.1,	92.4					
9					O. ref	52.1,	51.8,					
10					C. pus	49.5,						
11					E. lin	84.2						
12		50	—		A. plic	1 WD						
13		52	90-100		L. recta ♂	145.2	132.1					Orange
14					L. recta ♀							
15					E. lin	85.2,						
16					T. met	83.0, 7	9.2, 81.	5, 73.2,	85.5, 79.3,	83.2, 71.2,		
17					L. cardium	114.0♀	123.1♂	118.5♀				
18					A. plic	109.1, 9	6.5,					
19					P. cuphyus	107.0	49.7	72.9				tag Y0739
20					C. pus	59.5, 5	1.2, 5	7.1,				
21					O. ref	50.0,	49.5,					
22					O. ref	1 WD						
23					P. cord	64.0,	81.5	62.1				
24			"		P. sin	86.2,	87.1,	92.5,	85.1,			
25		52	80-90		P. alatus	110.5,						
26					A. plic	64.2,	107.7					
27					E. lin	80.5,	73.1,					
28					T. met	63.7,	62.4,					
29					P. sin	88.1,						
30					A. lig	108.0						
					O. ref	51.1,						
					C. pus	63.5						

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 7
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		52	50-60		L. recta ♂	140.1	141.5	>150				
2			↓		O. ref	45.2						
3			↓		A. plic	88.7						
4		52	70-80		L. recta ♀	129.5						
5			↓		A. plic	88.3, 100.5,	107.1, 96.0,					
6			↓		A. lig	108.4, 121.0,						
7			↓		O. ref	48.5						
8			↓		C. pus	57.0						
9			↓		P. sin	94.2						
10			↓		O. sub	42.5	126.1	38.8				tag Y1945
11		52	60-70		A. plic	118.1, 100.0						
12			↓		L. recta ♀	118.3						
13		52	40-50		P. alatus	117.4, 97.5, 138.0						
14		↓	↓		A. plic	96.7, 74.1,						
15		↓	↓		L. recta ♂	148.7, 138.4						
16		↓	↓		L. recta ♀	124.0, 139.8						
17		53	60-70		M. nerv	1WD						
18			↓		A. plic	105.3						
19		53	70-80		A. plic	72.1, 94.5						
20			↓		L. cardium	118.5♀						
21			↓		L. recta	147.1♂						
22			↓		P. cord	67.1						
23			↓		A. plic	2WD						
24		53	90-100		E. lin	91.4, 97.2,	78.0, 83.4,					
25			↓		A. lig	120.7, 121.2,						
26			↓		O. ref	45.2, 55.8,						
27			↓		Q. Q.	49.5,						
28			↓		T. met	86.1, 78.7, 77.4, 76.0, 68.0, 83.5, 78.1,						
29			↓		C. pus	56.5, 59.4,						
30			↓		L. recta ♂	147.7, 140.1						
			↓		P. cord	88.6, 85.1, 57.0,						
			↓		O. ref	1WD						

* Male / Juvenile / Female

*Diver (initials only)

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 7
DATE 9-6-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		53	50-60			L. recta	133.1♂						
2			40-50			P. alatus	104.5						
3			80-90			E. lin	85.0						
4						T. met	80.0						
5						A. lig	90.5						
6						T. met	1WD						
7		54	90-100			A. lig	118.0						
8						L. cardium	124.2♂						
9						A. plic	99.4,	102.8					
10						T. met	74.1,	78.5, 88.4, 76.1, 64.0,	82.0,	67.1, 75.5, 82.7, 75.0			
11						P. cord	92.4						
12						P. alatus	102.0, 104.1						
13						E. lin	78.2, 61.0						
14						Q. Q	70.6						
15						L. recta ♀	131.8						
16						O. ref	43.7						
17						C. pus	1WD						
18						A. plic	1WD						
19		54	80-90			L. cardium	101.1♀						
20						L. recta♂	132.1,	144.8, 125.0,					
21						L. recta ♀	131.4						
22						E. lin	80.0,	93.5,					
23						P. cord	61.4						
24						T. met	77.5,						
25						P. alatus	113.0						
26						Q. Q	60.0						
27						A. plic	1WD						
28						T. met	1WD						
29													

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 7
DATE 9-6-24

Project/Task: 231205 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		54	70-80		A.	plic	103.1,	108.4	107.2,	109.0,	98.0,	93.2, 83.5,	
2					L.	recta ♂	139.0						
3					m	nerv	>150						
4					T.	met	66.8,	76.1,	74.0,				
5					C.	pus	51.5,	58.4,	54.0				
6					E.	lin	2WD						
7		54	40-50		P	alatus	110.8,	109.0,	70.5,				
8					L	recta	1WD						
9		54	50-60		L	recta ♂	123.4,	>150,					
10					L	recta ♀	135.5						
11					A	plic	104.0	99.4,					
12					A	plic	2WD						
13					P	cuphyus	99.8	47.9	74.7				tag Y1714 *
14		54	60-70		O	ref	43.0						
15		55	80-90		A	plic	104.4,	110.0,	113.5,	102.3,			
16					m	nerv	>150						
17					L	recta ♂	147.1						
18					L	recta ♀	126.0	134.2,	126.5				
19					P	alatus	128.5						
20					E	lin	95.0,						
21					Q	Q	68.2,						
22					O	ref	55.0,						
23					L	cardium	114.5♂						
24					P	cord	83.2						
25					C	pus	1WD						
26		55	90-100		P	alatus	118.0,	99.5,					
27					L	cardium	104.0♀						
28					P	cord	98.2,	80.0,	81.2,				
29					P	sin	98.0,						
30					E	lin	86.1,	85.4,	63.5,				

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 7
DATE 9-6-24

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		55	90-100		T.	met	72.0,	74.5,	84.2,	64.0,	76.0,	79.5, 64.5,	73.1
2			|		A.	plic	89.2,	80.0,					
3			|		C.	pus	(c)60.4,	55.0					
4			|		L.	recta ♂	70.0						
5		55	50-60		L.	recta ♀	131.5,	139.0,	>150,	135.0,	131.0,		
6			|		O.	ref	58.1,	44.0					
7			|		A.	plic	IWD						
8		55	60-70		Q	Q	(c)5.4,						
9			|		A	plic	96.0,	80.5,	93.1,	98.6,			
10			|		Q	Q	60.5,						
11			|		M	nerv	>150						
12			|		E	lin	64.4,						
13			|		C	pus	53.0						
14			|		L	cardium	98.5♀						
15			|		L	recta ♂	135.0						
16			|		A	lig	130.5						
17		55	70-80		T	met	73.0,						
18			|		Q	Q	55.7,						
19			|		C	pus	70.5						
20			|		L	sili	94.0♀						
21			|		A	plic	100.5						
22			|		O	ref	45.7,						
23			|		A	lig	100.0						
24			|		P	sin	75.5						
25													
26													
27													
28													
29													

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 7 Sept

Project/Task: 2312.05 Stream Ohio river State WV County Wood

Substrate Composition (Rank top 3) 1=Dominant

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1		56	35-40	BD/VV	50	50						6	4		300 BD/VV
2			40-50	|	75		25					12	14	Y010	
3			50-60	|	50	25	25					12	14	Y002	
4			60-70	|	50	25	25					12	18	Y007	
5			70-80	|	30	30	30				10 WD	12	18	Black	
6			80-90	|	40	30	30					12	16	Orange / Ring	
7			90-100	|	40	45	15					12	16	Orange	
8		57	35 40	BD/VV	50	50						6	4		500 BD/2600 VV
9			40 50	|	75		25					12	10	B 7 0	
10			50 60	|	50	20	30					12	14	Orange	
11			60 70	|	60	20	20					12	16	Y003	
12			70 80	|	40	30	30					12	16	Y017	
13			80 90	|	40	30	30					12	17	Y013	
14			90 100	|	40	30	30					12	17	Y004	
15		58	35 40	BD/VV	50	50						6	5		1500 BD 2200 VV
16			40 50	|	70	20	10					12	8	Orange	
17			50 60	|	60	20	20					12	12	Black	
18			60 70	|	40	30	30					12	14	Y002	
19			70 80	|	40	30	30					12	16	Orange / Ring	
20			80 90	|	40	30	30					12	16	Y010	
21			90 100	|	40	30	30					12	17	Y005	500 BV 1500 VV
22		59	35-40	BD/VV	50	50						6	4	No mussels	300 BP 1500 VV
23			40 50	|	70	30						12	10	B 7 0	
24			50 60	|	70	20	10					12	12	Y017	
25			60 70	|	60	30	10					12	15	Orange	
26			70 80	|	40	30	30					12	16	Orange	
27			80 90	|	40	30	30					12	16	Y004	
28			90 100	|	40	30	30					12	16	Y013	2200 BV 500 VV
29		60	35-40	BD/VV	50	50						6	4	No mussels	3000 VV
30			40-50	|	70	30						12	10	Y014	✓
31			50-60	|	60	20	20					12	14	Y011	✓
32			60-70	|	60	20	20					12	14	Y009	✓
33			70-80	|	40	30	30					12	16	B/G	✓
34			80-90	|	40	30	30					12	16	Y001	✓
35			90-100	|	40	30	30					12	17	Y003	✓1300 BP 2100 VV

500 BP 1200

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 2
DATE 9-7-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominant

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ____	Live/ Dead_Mussel	Notes
1		C1	35-40	VV/BC	50	50						6	1	No mussels	
2		↓	40-50	↓	70	30						12	5	No mussels	
3			50-60		40	30	30					12	10	Orange	✓
4			60-70		40	30	30					12	14	Y010	✓
5			70-80		40	20	20	20				12	16	B26	✓
6			80-90		40	20	20	20				12	16	Y005	✓
7		↓	90-100	↓	40	30	30					12	17	Y008 / Black	✓
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 7

DATE 7 sept 2024

Project/Task: 2312.05 **Stream** Ohio river **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		56	40-50			L. recta ♀	146.2						Yolo
2						P. alatus	63.0						
3						A. plic	77.4						
4		56	50-60			L. recta ♀	131.4	132.1	134.6				Yoo2
5						P. alatus	113.1	112.2					
6						C. pust	49.4	61.3					
7						O. ref	56.1						
8		56	60-70			Cardium?	117.8						Yoo3
9						A. plic	107.0	105.6	104.8				
10						P. alatus	115.2						
11		56	70-80			L recta ♂	142.5						Black
12						T. met	86.3	75.2					
13						A. plic	84.1	86.2	105.6				
14						E. Lin	75.1	81.3	88.8				
15						QQ	61.3						
16						C. pust	62.6	67.9	57.7				
17						Cardium ♀	128.3						
18		56	80-90			A. plic	120.0	113.9	73.8				Orange 1 Ring
19						T. met	85.4	80.2					
20						E. lin	74.6						
21						C. pust	52.9						
22						Cardium ♀	109.3						
23		56	90-100			A lig	135.6	113.4					Olange
24						E. Lin	90.5	79.6	98.1	84.4			
25						L. recta ♀	132.0						
26						T. met	85.1	87.5	83.2	85.6	83.9	84.1	74.0
27						QQ	65.9						
28						C pust	66.6	56.2					
29						Sintoxia	63.0	71.0	99.1				
						Cordatum	88.3						

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 7
DATE 7 Sept.

Project/Task: _____ **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		57	40-50			A. plic	101.3						B70
2		57	50-60			A. plic	111.9	103.0	123.0	106.8	69.1		Orange
3			↓			E. lin	85.7						
4						Q Q	67.7						
5			—			L. recta ♂	142.6						
6		57	60-70			L recta ♀	145.2						Y003
7			↓			A plic	112.3	99.5	89.7	84.2	79.0	82.9	
8						A lig	115.6						
9						E. Tin	85.5	81.2					
10			+			C pust	64.6	57.3	63.8				
11		57	70-80			P. alatus	61.7						Y017
12			↓			A. plic	101.0	105.4	102.3	102.5	96.5	91.6	
13						C. pust	66.0	55.1	69.5				
14						E lin	79.1						
15						L recta ♂	138.8						
16						A. lig	111.9	112.6					
17			—			Sintoxia	93.2						
18		57	80-90			L recta ♂	84.1	144.6					Y013
19			↓			L recta ♀	126.9						
20						E. lin	56.2	67.4	87.9	1WD			
21						C. pust	56.2	60.3	52.6	1WD			
22						Cardium ♀	105.0						
23						Cardium ♂	109.6						
24						A lig	102.4						
25						Sintoxia	77.8						
26			↓			Cordatum	66.0						
27		57	90-100			Cardium ♀	105.0						Y004
28			↓			Sintoxia	78.7	92.3					
29						Cordatum	67.7	79.3					
30			↓			L recta ♂	150+						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 7
DATE 7 Sept

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		57	90-100			A plic	114.9	95.0					
2						C pust	75.2	59.0	59.5	54.5	IWD		
3						T. met	77.7	82.6	83.0	80.3	62.0		
4						E. lin	65.0	89.2	79.9				
5						P. alatus	115.4						
6						P. Cordatum	61.7						
7						Cardium ♀	103.6						
8		58	40-50			P alatus	120.2	133.0					Orange
9						L. sili ♀	87.6	101.2					
10		58	50-60			L recta ♀	138.1						Black
11						L. recta ♂	133.6						
12						P. alatus	114.7						
13						A. plic	97.4						
14						QQ	68.2	73.1					
15		58	60-70			M. nervosa	142.0						Yoo2
16						A. plic	120.6	99.5	105.4	105.3	114.6	87.9	
17						A. plic	101.3	72.0					
18						L. recta ♂	148.0						
19						L. recta ♀	133.9						
20						E. lin	96.1	86.3					
21						O. ref	30.4						
22		58	70-80			A plic	120.0	98.0	104.4	105.2	105.0	IWD	Orange Ring
23						E. Lin	97.0	71.0					
24						C. pust	61.8						
25						L. recta ♂	146.1						
26						P. alatus	72.2						
27						Sintoxia	101.0	100.4	94.9				
28													
29													

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 7
DATE 9-9-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		58	80-90			Sintoxia	92.3						Y010
2						Cardium ♀	114.0						
3						T. met	87.4	72.5					
4						Cordatum	69.5	69.1					
5						E. lin	80.0						
6						O. ref	66.9						
7						C. pust	61.0	60.9					
8						A. plic	106.2	99.2					
9						L. recta ♂	107.2	137.5					
10		58	90-100			T met	83.5	87.7	61.4	75.0	81.1		Y005
11						sintoxia	94.0	90.5	81.2				
12						E. lin	88.5	64.1					
13						P alatus	98.9	107.1	106.3				
14						A lig	120.4						
15						L recta ♀	135.1						
16						Cardium ♂	104.3						
17						Cordatum	90.5						
18						C pust	56.1	IWD					
19		59	40-50			P alatus	117.3	108.2					B70
20		59	50-60			P. alatus	99.3						017 Y
21						L. recta ♀	150+						
22						A. plic	91.6						
23						sintoxia	93.7						
24		59	60-70			Cardium ♀	121.1						Orange
25						T met	75.5	77.7	70.1				
26						P. cordatum	91.9	66.6	74.9				
27		59	70-80			L. recta ♀	138.5						Orange
28						T met	77.3	72.5	86.1				
29						A. lig	113.3						
30						L recta ♂	138.0	149.1					

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 7
DATE 9-7-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		59	70-80			P. alatus	104.2						Orange
2			"			O. rex	58.6	60.6					
3		59	80-90			P. alatus	113.5						Y004
4			|			A plic	104.2	109.7	100.7	103.1	1WD		
5			|			L recta ♀	129.4	139.2	138.6	1WD			
6			|			Cardium ♀	115.9						
7			|			C. pust	64.9	64.4	63.6				
8			|			E lin	88.3	91.2	1WD				
9			|			T met	76.0						
10			|			L. recta ♂	150+						
11			"			O ref	53.0						
12		59	90-100			T. Met	95.5	71.6					Y013
13			|			A. lig	115.5						
14			|			P. Cordatum	100.1	89.0					
15			|			L. recta ♀	121.0	120.6					
16			|			A. plic	105.5	89.2					
17			|			Cyphyus	107.2 L	75.7 H	46.4 W				Yellow Tag 1860 *
18			"			C. pust	65.1	64.4					
19		61	50-60			L. cardium	131.0♂						
20			|			L. recta♂	>150.	140.0.					
21			|			P. alatus	107.2						
22			|			A. plic	98.0						
23			"			E. lin	72.5						
24		61	60-70			A. plic	122.4,	116.0,	95.5,				
25			|			L. recta♂	132.0,						
26			|			L. recta♀	127.5						
27			|			C. pus	55.0						
28			"			O. ref	48.2						
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 7
DATE 9-7-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		G1	70-80		T	met	83.2,	65.1,	82.7,				
2			|		A	plic	97.5,	100.0,	95.4,	98.6,	82.0,		
3			|		E	lin	95.0						
4			|		C	Q	55.3						
5			|		P	cord	71.1,	82.5					
6			⊥		L	recta	LWD						
7		G1	80-90		L	cardium	121.0♂						
8			|		E	lin	96.5						
9			|		T	met	84.2,	75.0,	77.4,	78.1,	65.0,		
10			|		P	sin	63.0,						
11			|		P	cord	70.5,						
12			⊥		L	recta ♂	140.0						
13		G1	90-100		P	sin	88.0,						
14			|		L	cardium ♂	130.0						
15			|		A	lig	130.5						
16			|		T	met	80.2,	85.0,	86.5,	84.0,	76.1,	77.4, 88.5,	84.0, 75.0, 81.5, 76.0
17			|			"	80.0,	76.5,	62.1,				
18			|		C	pus	45.0,	50.4,	63.1,	58.0,			
19			|		A	plic	94.4,						
20			|		E	lin	77.0,						
21			|		P	cord	77.4,	52.1,	58.7,				
22			|		O	ref	45.1,	47.0,	55.4,				
23			|		L	cardium ♀	93.0,						
24			⊥		C	pus	LWD						
25													
26													
27													
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 7
DATE 9-7-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Mass (g)	M J F	Photo #s	Comments
1		60	40-50		L	recta ♂	>150, >	150,					
2		60	50-60		L	recta ♂	128.0,						
3			↓		L	recta ♀	133.2,	130.1,					
4			↓		L	cardium ♂	124.0						
5		60	60-70		A	plic	89.1,	109.5,	94.3,	99.5,			
6			↓		E	lin	75.5						
7			↓		L	recta ♀	110.2,	143.8					
8		60	70-80		L	recta ♂	>150,	121.2,					
9			↓		E	lin	57.5,	82.0					
10			↓		A	plic	70.1,	94.5,	68.2,				
11		60	80-90		m	nerv	>150						
12			↓		L	recta ♀	141.0,	104.1,					
13			↓		A	plic	105.5,	88.1,	92.0,	88.7,	72.0,		
14			↓		P	cord	68.0,	64.1,					
15			↓		T	met	78.1,						
16			↓		C	pus	52.4,	53.1,					
17			↓		O	fef	45.0						
18			↓		L	recta ♀	133.1						
19			↓		E	lin	62.0,						
20		60	90-100		A	lig	130.0,						
21			↓		L	recta ♂	>150,	133.4,					
22			↓		T	met	81.7,	83.5,	72.0,	77.4,	82.0,	77.5, 77.1,	78.4
23			↓		A	plic	83.1,	96.5,	93.7,				
24			↓		C	pus	54.5,	64.1,					
25			↓		P	cord	71.0,	83.2,	85.5,	72.1,	78.0,	90.5	
26			↓		E	lin	83.6,						
27			↓		P	sin	83.1,						
28													
29													
30													

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 2
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominant

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth Ft	Live/ Dead_Mussel	Notes
1		G2	35-40	BD/KY	80	20						6	4	No mussels	2600BD 2900KY
2			40-50		80	10	10					12	10	Orange ✓	
3			50-60		40	40	20					12	13	Y018 ✓	
4			60-70		40	40	20					12	15	Black ✓	
5			70-80		60	20	20					12	16	Y005 ✓	
6			80-90		40	30	30					12	16	Y008 ✓	
7			90-100		40	30	30					12	16	Y001 ✓	1900BD 2000KY
8		G3	35-40	BD/KY	50	50						6	2	No mussels	
9			40-50		50	50						12	8	No mussels	
10			50-60		50	20		20			10 veg	12	13	Y002 ✓	
11			60-70		40	20	10	10	15		5WD	12	15	Y003 ✓	
12			70-80		40	20	40					12	16	B/G ✓	1600BD 1600KY
13			80-90		40	20	40					12	16	Y011 ✓	
14			90-100		40	20	40					12	16	Y009V/Y010V	1000BD 1000KY
15		G4	35-40	BD/KY	50	50						6	1	No mussels	1100BD 2700KY
16			40-50		50	50						12	4	No mussels	
17			50-60		50	15	20		15			12	10	Y7 ✓	
18			60-70		40	30	30					12	16	Y005 ✓	
19			70-80		40	30	30					12	16	Y018 ✓	
20			80-90		40	30	30					12	16	Y001 ✓	
21			90-100		40	20	40					12	16	Y008/Black ✓	2000BD 1700KY
22		G5	35-40	BD/KY								6	3	No mussels	2900BD 1700KY
23			40-50		60	30			5		5WD	12	7	Orange ✓	
24			50-60		65	30			5			12	13	Y014 ✓	
25			60-70		60	30	10					12	15	Y009 ✓	
26			70-80		60	30	10					12	14	Y010 ✓	
27			80-90		60	30	10					12	15	Y011 ✓	
28			90-100		60	30	10					12	17	Orange/Y002V	2000 900KY
29		G6	35-40	BD/KY								6	2	No mussels	2000BD 2700KY
30			40-50		90	10						12	8	B26 ✓	
31			50-60		70	10	20					12	10	B70 ✓	
32			60-70		60	20	20					12	13	Y004	
33			70-80		70	10	10				10WD	12	15	Y014 ✓	
34			80-90		50	20	30					12	16	Orange ✓	
35			90-100		50	20	30					12	16	Y018/Y009V	1200 1750

Air: 70°F
Water: 80.0°F

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 2
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Rank top 3) 1=Dominant

No.	Area	Transect	Interval	Diver	Fines	Sand	Gravel	Cobble	Boulder	Bedrock/ Hardpan	Other	Time (min)	Depth ft	Live/ Dead_Mussel	Notes
1		67	35-40	BD/KY	80	20						6	2	No mussels	
2			40-50		80	20						12	10	ROG ✓	
3			50-60	|	70	10	20				12	12	Orange ✓	
4			60-70	|	50	10	30	10			12	12	R/GS ✓	
5			70-80	|	50	10	30	10			12	15	YG17 ✓	
6			80-90	|	50	10	30	10			12	16	YO13 ✓	
7		⊥	90-100	⊥	50	10	30	10				12	16	Y003 ✓	
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
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31															
32															
33															
34															
35															

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 10
DATE 9-8-24

Project/Task: 231205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		C02	90-100		A. plic	99.0, 113.7, 83.3,						
2					A. lig	114.2,	140.6,					
3					E. lin	95.7, 81.3, 70.0,						
4					L. card	114.0♀						
5					L. recta ♀	145.5						
6					L. recta ♂	134.2,						
7					T. met	83.1, 71.0, 84.5, 75.0, 82.0, 75.3, 73.0,						
8					O. ref	53.0,						
9					C. pus	54.1, 63.5,						
10					P. cord	72.0						
11					P sin	86.5, 83.0, 87.1,						
12					C. pus	1WD						
13			⊥		E. lin	1WD						
14		C02	80-90		L. cardium	125.0♂	106.1♀					
15					A. plic	85.4, 82.0, 77.1,						
16					L. recta ♀	>50,						
17					E. lin	77.1,						
18					T. met	80.4,	73.5					
19					Q. Q	55.0,						
20					P. cord	85.7,	82.1,					
21					E. lin	1WD						
22					A. plic	2WD						
23			⊥		C. pus	1WD						
24		C02	60-70		A. plic	99.0, 107.4, 93.1,						
25					L. cardium	104.0♂, 95.0♀						
26					T. met	83.0,						
27					P. alatus	120.1,						
28					L. recta ♀	122.0						
29			⊥		C. pus	58.5,	48.1,					
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		G2	50-60		L. recta ♀	130.1,	140.5,	145.5				
2					A. plic	100.0,						
3					A. plic	2 WD						
4					E. lin	75.0,	82.1,					
5					Q. Q	53.0						
6					L. sili ♀	110.1,						
7		G2	70-80		P. alatus	97.5,						
8					T. met	65.2,						
9					E. lin	69.5,	73.1,	70.5,				
10					P. sin	93.4,						
11					O. ref	45.1,						
12					Q. Q	62.0,						
13					C. pus	47.0,						
14					A. plic	3 WD						
15		G2	40-50		P. alatus	110.0						
16					L. recta ♂	145.2,	>150,					
17					L. recta ♀	125.0,	>150,					
18					L. sili ♀	99.0,						
19					C. pus	57.1,						
20					A. plic	95.0						
21		G3	90-100		A. lig	115.5						
22					T. met	73.0,	45.0,	72.4,	75.0,	72.5,	74.2, 77.5,	85.0,
23					A. plic	85.2						
24					P. cord	90.5						
25					P. sin	90.2						
26					L. recta ♂	128.0						
27					O. ref	42.5						
28					A. plic	1 WD						
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road. Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		G3	70-80		L. recta ♀	127.2,	124.0,					
2			|		E. lin	97.0,	88.2					
3			|		T. met	80.4,	77.1,					
4			⊥		A. plic	95.5,	104.0	118.3				
5		G3	90-100		A. plic	110.0,						
6			|		T. met	91.5,	81.2,	78.1,	79.7,			
7			|		L. recta ♀	133.1,	129.5,					
8			|		L. recta ♂	126.0,						
9			|		C. pus	48.4						
10			|		P. ford	85.0						
11			⊥		T. met	1WD						
12		G3	50-60		L. recta ♀	139.1,	137.6,	142.0,	145.0,	123.5,	130.0,	
13			|		P. alatus	120.4,	98.1,	99.0,				
14			|		M. nerv	108.6						
15			|		A. plic	77.8,	90.5,	100.1,	92.4,	86.0,		
16			|		E. lin	67.0,						
17			|		C. pus	1WD						
18			|		O. ref	49.0						
19			⊥		E. crass	77.0						
20		G3	80-90		A. lig	94.5,						
21			|		L. recta ♂	133.1,	137.2,	115.0				
22			|		T. met	72.0,	77.4,	75.1,	83.0,			
23			|		E. lin	87.1,	85.0,					
24			|		E. lin	3WD						
25			|		C. pus	60.0,	61.5,					
26			|		A. plic	92.8,						
27			|		P. ford	71.2,						
28			|		P. sin	86.4,	74.5					
29			⊥		O. ref	50.5,						
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 10
DATE 9-8-24

Project/Task: 23205 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		G3	60-70		E. lin	66.0,	72.5,					
2			|		A. plic	99.4,						
3			|		A. plic	3WD						
4			|		C. pus	44.0,						
5			|		Q. Q	60.5						
6			|		O. ref	48.2						
7			|		P. alatus	104.0,						
8			|		L. recta ♀	123.0						
9			⊥		L. recta ♂	144.0						
10		G4	90-100		A. lig	129.4,	70.0					
11			|		L. cari ♂	109.0 ♂						
12			|		T. met	75.4,	75.0,	74.1,				
13			|		L. recta ♀	128.1,	133.4,	120.0,				
14			|		A. plic	104.7,						
15			|		E. lin	81.5,						
16			|		C. pus	58.0,						
17			|		P. sin	94.2						
18			|		T. met	1WD						
19			|		A. plic	1WD						
20			⊥		L. recta	1WD						
21		G4	50-60		P. alatus	1WD						
22			|		L. sili ♀	84.0,	99.5,	93.0,				
23			|		L. recta ♀	134.2,	135.0,	142.5,	133.1,			
24			|		P. alatus	105.6,	118.4,					
25			|		A. plic	98.0,	75.2,					
26			|		Q. Q	54.1,	70.5					
27			⊥		E. lin	68.0						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 10
DATE 7-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		G 4	80-90		A. lig	68.2,	104.0,					
2			|		E. lin	88.0,	89.4,	63.2,				
3			|		T. met	75.5,	88.0,	82.1,	85.4,	89.0,	79.1, 76.5,	
4			|		P. alatus	113.4,						
5			|		L. recta ♂	121.0,	131.5,	140.5				
6			|		L. recta ♀	133.1,						
7			⊥		C. pus	1WD						
8		G4	60-70		A. plic	95.0,	103.4,	90.2,	98.1,	99.5,	102.4, 104.1, 55.4	
9			|		E. lin	77.4,	67.2,					
10			|		C. pus	60.1						
11			⊥		L. recta ♀	140.0						
12		G 4	70-80		L. recta ♂	>150,	148.0,	125.5				
13			|		T. met	83.5,	79.2,	78.7,	80.0,	82.3,	82.0	
14	1		|		A. lig	123.0,						
15			|		A. plic	100.4,						
16			⊥		C. pus	1WD						
17		G 4	90-100		L. recta ♀	128.0,						
18			|		A. plic	100.4,	98.4,	94.0,				
19			|		T. met	72.4,	72.4,					
20			|		C. pus	42.0,	50.5					
21			⊥		A. plic	4 WD						
22		G5	50-60		L. recta ♀	133.1,	122.0,	150,				
23			|		P. alatus	122.5,	99.4,	98.0,	118.4,			
24			|		A. plic	77.4,	92.0,	69.0,				
25			|		O. ref	50.6,	49.2,					
26			|		L recta	2 WD						
27			|		P. alatus	1 WD						
28			⊥		A. plic	1 WD						
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		.65	90-100		L. recta ♂	148.1,	>150,					
2			|		T. met	85.8,	82.0,	75.4,	75.0,	63.0,		
3			|		P. sin	83.0						
4			|		C. pus	52.1,						
5			⊥		O. def	43.0,	62.5					
6		65	60-70		L. card ♂	121.4						
7			|		A. plic	95.0,	88.2,	90.0,	84.1,	100.5,	99.0, 77.2,	
8			|		L. recta ♂	120.5,	>150					
9			|		Q. Q	57.4,						
10			⊥		A. plic	1WD						
11		65	90-100		L. cardium ♀	121.4						
12			|		L. recta ♀	142.0,						
13			|		P. card	88.4,	92.5,					
14			|		T. met	72.0,	77.4,	64.5,				
15			|		A. plic	95.1						
16			80-90		C. stig	69.9	43.0	62.6				tag Y1902
17		65	80-90		A. lig	115.5						
18			|		M. nerv	>150						
19			|		A. plic	95.0	98.1,	88.7,				
20			|		P. card	74.8,	79.1,					
21			|		T. met	82.0,	81.5,	82.6,	85.1,			
22			|		Q. Q	57.4,	58.1					
23			|		C. pus	45.5,	59.0,					
24			|		E. lin	70.0						
25			⊥		P. alatus	1WD						
26		65	40-50		L. recta ♂	>150,	134.2,					
27			|		C. pus	62.0						
28			|		P. alatus	102.0	110.					
29			|		L. sili ♀	96.4						
30			⊥		L. recta ♀	138.1,	132.0,	118.5,	129.0,	130.1		

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		65	70-80		A. plic	100.0,	94.2					
2					L. recta ♂	>150						
3					E. lin	72.5,	82.1					
4					A. plic	SWD						
5					P. alatus	1WD						
6			⊥		T. met	1WD						
7		66	90-100		P. alatus	118.7						
8					T. met	1WD						
9					A. plic	113.5,	118.4,	87.8,	83.5,			
10					P. cord	72.9,	92.4,	93.3				
11					L. recta ♂	128.3						
12					A. lig	146.6,	117.4					
13					L. cardium	130.2,						
14					E. lin	72.2,	85.2,					
15					C. pus	57.8						
16					T. met	76.3,	87.8,	78.4,	79.5,	76.4,	86.6, 82.5, 68.1, 78.1,	
17			⊥		"	78.4,	85.3					
18		66	80-90		A. lig	112.0,	105.2,	114.5,				
19					M. nerv	>150,						
20					T. met	88.0,	70.5,	72.8,	76.5,	69.0,	82.0,	
21					A. plic	95.0,	98.8,	90.1,	100.2,			
22					E. lin	66.8,	88.2,	84.1,				
23					P. sin	88.0,	94.1,					
24					L. cardium ♂	102.1	111.0					
25					P. alatus	118.8,	93.0,					
26					C. pus	67.0,	63.1,					
27					L. recta ♀	120.5,	118.7					
28					T. met	1WD						
29			⊥		C. pus	1WD						
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 8 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio Rive State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		66	70-80		L. recta	1WD						
2			|		L. recta ♀	137.4,	123.8					
3			|		L. recta ♂	125.8,	125.5					
4			|		C. pus	51.6,	109.3					
5			|		P. alatus	109.3	111.2					
6			|		P. sin	99.8,						
7			|		A. plic	110.0,	103.5					
8			|		T. met	86.2,	84.5					
9			⊥		E. lin	100.0,	71.8,	82.5,	68.6			
10		66	50-60		E. lin	74.8,	71.2,	93.1,				
11			|		Q.Q	59.1,	55.0	60.8				
12			|		L. recta ♂	145.0,	132.7,					
13			|		L. recta ♀	123.7,	127.1					
14			|		A. plic	88.6,	108.0,	91.0,	110.1,	104.8,	75.5, 6	2.8,
15			|		O. ref	44.0,						
16			⊥		O. sub	55.8	31.1	51.5				Y0757
17		66	60-70		L. recta ♂	144.6						
18			|		A. lig	124.0,						
19			|		L. sil ♀	108.8						
20			|		E. lin	73.4,	88.1,					
21			|		A. plic	1WD						
22			|		A. plic	77.2,						
23			|		M. herv	>150						
24			⊥		T. met	81.0,	81.5,	89.2,				
25		66	40-50		P. alatus	104.1						
26			|		A. plic	95.8,	89.1					
27			⊥		L. recta ♀	133.1						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 9 of 10
DATE 9-8-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		67	70-80		C. pus	61.1,	65.8,					
2			|		L. cardium ♀	118.8						
3			|		A. lig	110.5,						
4			|		E. lin	59.0,						
5			|		T. met	83.5,						
6			|		M. nerv	>150						
7			|		A. plic	94.4,	103.4,	96.0,	94.5,	103.1		
8			|		L. recta ♀	128.1,	145.0,	126.5,	111.0,	121.3,	134.3,	139.5,
9			|		L. recta ♂	127.5,						
10			|		L. recta	IWD						
11			|		A. plic	IWD						
12			|		T. met	IWD						
13		67	90-100		T. met	82.5,	83.1,	86.1,	77.0,			
14			|		C. pus	IWD						
15			|		C. bus	(6.1,						
16			|		P. chrd	98.8,						
17			|		P. sin	93.7,	92.5,					
18			|		A. plic	94.0						
19			|		L. cardium ♂	126.6						
20		67	50-60		L. sili	64.5						
21			|		O. ref	39.1,	50.0,	48.2				
22			|		L. recta ♀	131.0,	125.5,					
23			|		C. pus	52.5,						
24			|		O. O	59.4						
25			|		A. plic	96.2,	101.5,	101.2,	95.0,	96.0,	113.2, 108.7,	110.5
26		67	40-50		P. dilatus	85.0						
27			|		L. recta ♀	134.0						
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 10 of 10
DATE 9-8-24

Project/Task: 23120S Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		G7	80-90		C. pus	1WD						
2					L. recta ♀	1WD						
3					L. recta ♂	131.2						
4					C. pus	58.0,	58.5,	60.1,				
5					L. cardium?	106.4,						
6					A. lig	135.5,	102.1					
7					T. met	76.1,	81.5,	87.1,	74.5,	81.2,		
8					E. lin	88.9,	89.1,	86.0,				
9					P. sin	89.8,	87.2					
10					P. cord	93.5,	76.1,					
11			⊥		A. plic	109.1,	102.5,					
12		G7	60-70		E. lin	78.0,	86.5,					
13					A. lig	115.4,	112.0,					
14					C. pus	53.0,						
15					P. sin	91.5,	102.0,					
16					A. plic	106.0,	104.2,	104.0,	118.0,	112.2,	109.1,	
17					L. recta ♀	130.5						
18					L. recta ♂	142.2,	133.1,	140.2,				
19					P. alatus	112.1,						
20			⊥		A. plic	1WD						
21		G7	90-100		A. lig	113.5,						
22					T. met	81.0,	87.2	71.0,	83.5,	80.0	75.5, 94.0, 73.4	
23					C. pus	64.5,	60.1,					
24					C. pus	1WD						
25					E. lin	91.2,	86.0					
26					P. cord	70.9						
27					P. sin	99.8,	83.2					
28					L. cardium?	102.0						
29			⊥		L. sili ♀	82.1						
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 1
DATE 9-9-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Substrate Composition (Percentages)

Total time w/QC ~ ft

No.	Area	Transect	Interval	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth	Notes
1		68	35-40	VV/KY	50	50										6	6	VV: 2700 KY: 2850
2			40-50		20	30	40									12	11	
3			50-60		30	30	30	10								12	11	
4			60-70		30		30	30	10							12	11	
5			70-80		30	30	30	10								12	14	
6			80-90		30	30	30	10								12	14	
7			90-100		30	30	30	10								12	16	VV: 2100 KY: 1900
8		69	35-40	VV/KY	50	50										6	6	
9			40-50		50	30	20									12	12	
10			50-60		60	20	20									12	12	
11			60-70		60	20	20									12	13	
12			70-80		60	20	20									12	14	
13			80-90		60	20	20									12	14	KY: 1100 VV: 1600
14			90-100		30	30	30	10								12	16	KY: 1000 VV: 1400
15		70	35-40	VV/KY	50	50										6	5	KY: 3000
16			40-50		80	20										12	11	
17			50-60		50	20	20	10								12	12	
18			60-70		50	20	30									12	12	
19			70-80		40	30	30									12	14	
20			80-90		40	30	30									12	16	
21			90-100		40	30	30									12	16	KY: 2100 VV: 7000
22		71	35-40	BY/KY	50	50										6	3	KY: 2100 BY: 3000
23			40-50		50	50										12	13	
24			50-60		40	30	10	10							10 WD	12	12	
25			60-70		30	30	20	20								12	12	
26			70-80		30	30	20	20								12	13	
27			80-90		30	30	20	20								12	15	
28			90-100		30	30	20	20								12	16	1000 KY 2000 BY
29		72	35-40	BY/KY	50	50										6	3	2900 KY
30			40-50		50	30									20 LWD	12	11	
31			50-60		30	30	20	20								12	12	
32			60-70		30	30	20	20								12	13	
33			70-80		30	30	20	20								12	14	
34			80-90		30	30	20	20								12	16	
35			90-100		30	30	20	20								12	16	1700 1300

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 1 of 8
DATE 9-Sept 2024

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		68	90-100		L. Recta	137.2				M		
2			↓		↓	135.5				F		
3					T. Met	79.9	2-WD					
4					↓	80.8						
5						74.0						
6						74.0						
7						77.2						
8						89.7						
9						79.1						
10						73.6						
11						80.5						
12						74.0						
13						89.4						
14					↓	60.8						
15					C. Rust	50.1						
16					↓	65.1						
17					E. Lin	67.0						
18					L. Card	111.0				F		
19					↓	112.2				F		
20			↓		A. Lig	125.2						
21		68	80-90		A. Plic	81.9, 93.3, 106.5, 116.2, 109.0, 94.7,					100.2	
22			↓		T. met	80.1, 77.7, 74.0, 82.6						
23					E. Lin	85.3						
24					L. recta ♂	132.4				M		
25					C. Rust	59.2	1-WD					
26			↓		P. Cord	77.0						
27		68	70-80		L. recta ♀	133.0, 136.5, 135.8, 140.9, 138.2						
28			↓		A. Plic	93.2, 107.4, 110.0, 104.2				1-WD		
29					P. Solidus	108.4, 84.1						
30			↓		T. Met	77.3, 85.4						

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 2 of 8
DATE 9 Sept

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		68	70-80		QQ	58.0						
2		↓	↓		C. Pust	59.6						
3					O. ref	47.3,	49.5,	49.9				
4		⊥	⊥		P. Sin	92.6						
5		68	60-70		L. Sili ♂	108.2						
6			↓		A. Plic	106.9	HWD					
7					L. recta ♂	105.8,	+150,	144.4	1-WD			
8					L. recta ♀	150+,	131.8					
9					L. Card ♀	111.2,	114.7					
10			⊥		P alatus	113.8,						
11		68	40-50		P alatus	111.9,	111.2					
12			↓		L recta ♀	128.3,	131.5					
13			⊥		E lin	77.1						
14		68	50-60		Qq							
15			↓		L recta ♂	135.1	144.5	138.9				
16					L recta ♀	124.2						
17					A plic	83.9,	70.9,	106.4				
18					E lin	70.2						
19					Qq	66.7						
20					C Pust	44.7						
21					O ref	46.8,	51.5					
22			⊥	☆	O. sub	61.5	38.0	56.7				Tag # 1722 Yellow
23		69	40-50		L. recta ♀	142.2,	145.9,	128.6				
24			↓		⊥ ♂	126.2						
25					A. Plic	90.7,	115.0,	122.1,				
26			⊥		M. Nerv	150+,	150+					
27		69	50-60		A. Plic	99.9,	101.4,	96.3	99.7, 117.1, 68.9, 74.8, 79.9		1-WD	
28			↓		E. lin	79.2,						
29					QQ	71.3						
30			⊥		C. Pust	58.0						

* Male / Juvenile / Female

*Diver (initials only)

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 8
DATE 8 9 Sept

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		69	50-60			O. ref	48.7, 45.1						
2			⊥			L. recta ♀	131.6	143.5					
3		69	60-70			L. recta ♂	147.1,	134.6,	140.0, 150+				
4			↓			⊥ ♀	129.3						
5						A. plicata	114.7,	112.1,	84.9, 78.7,	96.7, 90.3, 96.2, 93.5		1-WD	
6						T. met	82.8						
7						E. lin	80.0, 67.7, 95.3, 87.9						
8						C. rust	58.0	1-WD					
9						P. alatus	96.2						
10			⊥			L. card ♀	103.3						
11		69	70-80			A. plic	109.1,	108.7,	106.2,	1-WD			
12			↓			E. lin	90.3,						
13						QQ	59.3						
14						T. met	78.6,	77.1					
15						C. rust	50.0						
16						P. alatus	109.2,	110.5					
17						T. met	86.3						
18						P. card	93.3	WD					
19			⊥			L. card ♀	123.2						
20		69	80-90			T. met	78.3,	77.3,	82.0,	68.5, 71.3			
21			↓			E. lin	84.8,	71.3,	87.2, 78.3				
22						A. plic	91.5,	97.7,	109.0	2-WD			
23						L. card ♀	115.4						
24						♂	125.6						
25						L. recta ♂	136.9		P. alatus	1-WD			
26						P. card	84.0						
27						P. sin	87.7						
28						O. ref	44.4						
29			⊥			A. lig	73.0						

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 8
DATE 9 Sept

Project/Task: 2312.005 **Stream** Ohio River **State** WV **County** Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Height Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		69	90-100			A lig	101.0						
2						L recta ♂	138.5,	129.2,	133.2				
3						L recta ♀	126.1,	139.4					
4						T met	72.1,	82.0,	91.3, 81.4,	79.9, 69.4	73.4,	76.0, 81.0, 82.5	
5						C pust	68.5						
6						E. lin	95.6						
7						O ref	57.2						
8					☆	P cyphyus	101.9	46.4	76.3				Tag # 1793
9						P rord	103.2,	101.2,	108.0, 98.9, 89.0		1-WD		
10						P sin	93.4,	103.5					
11		70	60-70			A. plic	111.0,	109.3,	106.5, 92.4,	101.1, 97.6,	106.9, 105.5, 94.8,		Tan D
12						L. Card ♂	130.5,						
13						L. recta ♀	148.0,	138.6					
14						♂	104.7						
15						O. ref	51.2						
16						QQ	70.5						
17						T. met	83.7,						
18						C. Pust	58.6						
19						M. nervosa	150+						
20		70	50-60			M. nervosa	150+						
21						P. glatus	88.6						
22						A. plic	105.7				1WD	Cplus	
23						L. recta ♀	148.2	127.0	1-WD		1WD	T. met	
24			80-90			T. met	73.7,	75.0,	80.2, 81.6,	80.2			
25						Lrecta ♀	109.2						
26						A. lig	106.7						
27						E. lin	94.6,	77.8					
28						C. pust	60.7,	62.6,	1-WD				
29						O. ref	60.5,	43.6					
30						M. nervosa	137.7						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 5 of 8
DATE 9 Sept

Project/Task: 2312.005 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		70	80-90			P. Sin	95.6, 81.4						
2			↓										
3		70	40-50			L. Sili ♀	97.5						
4			↓			P. alatus	114.1						
5		70	90-100			L. Recta ♂	142.8, 150+, 113.6, 132.7						
6						C. Pust	55.4, 51.6,						
7						P. alatus	89.7						
8						A. Plic	100.5,	99.4, 80.8, 73.7					
9						T. met	79.5,	85.0, 82.4, 90.5, 87.4, 78.1, 84.0, 67.3, 88.0					1-WD
10						E. lin	66.4						
11						A. lig	107.1						
12			↓			P. Cord	71.0,	85.4					
13		70	70-80			L. Recta ♀	140.1,	141.4,	149.6,	1-WD			
14			↓			↓ ♂	143.0						
15						A. Plic	123.5, 106.7, 105.0, 103.7, 98.4,						
16						E. Lin	88.5, 70.6, 7.0						
17						C. Pust	57.0, 56.5						
18						T. Met	81.0						
19						P. alatus	111.5						
20						P. Cypheus	1-WD						
21			↓			P. Sin	91.4						
22		71	70-80			L. Recta ♀	131.0, 145.0,						
23						♂	136.0,						
24						A. Plic	110.3, 101.7, 95.0, 107.8, 85.5, 1-WD						
25						T. Met	83.0, 71.0,						
26						QQ	59.4,						
27						C. Pust	60.5, 55.0						
28						E. lin	86.7						
29						O. ref	50.0, 53.6						
			↓			P. cord	81.0						

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 8
DATE 9 sept

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Genus	Species	Length (mm)	Width (mm)	Depth (mm)	Age <5 (A), 5-15(B), >15(C)	M J F	Photo #s	Comments
1		71	60-70			L. recta ♀	135.1,	149.0,	139.3,	137.0			
2			|			⊥ ♂	150+	144.2,	131.4,	101.0			
3			|			E. lin	88.6,	86.7,					
4			|			A. plic	107.6,	95.0,	100.3,	99.6, 163.0,	98.5, 103.4, 81.0,		1-WD
5			⊥			C. rust	56.5,	52.3,					
6			50-60			L. sili ♀	150.4						
7			|			L. recta ♂	127.4,	150+					
8			|			L. sili ♂	52.5						
9			⊥			C. rust	53.1						
10		71	80-90			P. cyphens	1-WD						
11			|			L. recta ♂	147.4,	150+					
12			|			L. cardium ♂	114.4						
13			|			A. plic	57.7,	71.3,	72.4,	116.9 1-WD			
14			|			T. met	81.3,	75.4,	80.0,	85.6, 78.7, 80.6, 91.0			
15			|			C. rust	63.0,	62.0					
16			|			E. lin	88.5,	91.7,	83.0				
17			|			L. recta ♀	139.0,	150+,	150+				
18			|			P. alatus	106.6,	104.3					
19			|			A. lig	116.4,	115.0,	109.2				
20			|			L. card ♀	106.2,	98.4					
21			|			P. cord	66.4,	95.5					
22			|			P. sin	83.3,	96.7,					
23			70-80										
24		71	40-50			A. plic	86.0						
25		71	90-100			L. recta ♀	142.5						
26			|			♂	140.0						
27			|			A. plic	117.6,	107.3					
28			|			T. met	87.0,	81.4,	90.0,	80.0, 74.6, 82.5, 82.0, 79.1, 82.6, 62.1			
29			|			E. lin	96.7,	91.6,	89.4,				
30			|			C. rust	63.2,	62.0	1-WD				
			|			P. sin	80.6,	71.0,	90.5				
			⊥			P. cord	89.0,	81.7,	87.0,	88.0			

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 8
DATE 9-9-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		72	80-90		L. cardium ♂	124.2,	116.9					
2			↓		A. lig	115.5,	117.2,	101.7,				
3					C. pus	58.9,	59.5,	59.8,	55.2,	62.0,	62.5,	
4					T. met	82.0,	87.1,	82.7,	58.1,	82.0,	87.0, 75.2,	
5					A. plic	118.2,	117.0,	95.0,	105.2,	92.5,		
6					E. lin	88.3,	72.2,	49.9,	93.1,	86.3,		
7			↓		E. lin	1WD						
8		72	90-100		A. plic	100.0,	96.6,	105.5,				
9			↓		L. cardium ♀	104.3						
10					P. sin	91.6,						
11					P. cord	88.1,	91.9,					
12					C. pus	66.6,	67.3					
13					Q. Q	67.0,						
14					O. ref	56.1,						
15					T. met	86.2,	80.0,	78.5,	77.1,	77.2,	79.4, 75.0,	
16					L. recta ♂	>150,						
17					A. lig							
18					P. cuphyus	107.0	48.4	75.2				tag Y1965
19					T. met ♀	1WD						
20					C. pus	1WD						
21					L. recta	1WD						
22			↓		A. lig	118.8,	112.2,	118.6,	122.7,			
23		72	70-80		A. lig ♀	119.0,						
24			↓		E. lin ♀	93.2,						
25					C. pus	61.8,						
26					A. plic	104.9,	100.0,	101.0,	90.8,	101.9,		
27					T. met	79.1,	74.8,					
28			↓		L. recta ♂	>150,	140.7,	135.0				
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 8 of 8
DATE 9-9-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		72	40-50		L. recta ♀	136.0,	135.4,	146.5				
2			↓		F. Flava	72.4						
3			↓		P. alatus	96.2,						
4		72	60-70		E. [illegible] ♂	82.3,	62.1,	82.9				
5			↓		E. recta ♂	62.1,	147.2,	145.8, >150,				
6			↓		C. pus	52.0						
7			↓		P. alatus	131.5						
8			↓		A. plic	108.5						
9			↓		E. lin	IWD						
10		72	50-60		L. recta ♂	125.2,						
11			↓		L. recta ♀	132.5						
12			↓		A. plic	98.6,						
13			↓		P. alatus	91.8						
14			↓		L. sili ♀	105.5						
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 1 of 2
DATE 10 Sept 2024

Project/Task: 2312.05 **Stream** Ohio River **State** WV **County** Wood

Spot Dives Upstream Area

Substrate Composition (Percentages)

No.	Area	~~Transect~~	~~Interval~~	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth ft	Notes
1		Spot1		BD	40	40	20									10	16	BD: 2900
2		Spot2			40	30	20	10								10	16	
3		Spot3			30	40	20	10								10	16	
4		Spot4			30	40	30									10	15	BD: 1400
5		Spot5			30	40	30	10								10	16	BD: 1000
6		Spot6			10	50	40									10	16	3100
7		Spot7			10	50	40									10	15	
8		Spot8			10	50	40									10	16	
9		Spot9			10	50	40									10	16	1700
10		Spot10			10	50	40									10	16	
11		Spot11			10	50	40									10	15	
12		Spot12			20	40	40									10	16	900
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
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33																		
34																		
35																		

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 202
DATE 9-10-24

Project/Task: 231205 Stream Ohio River State WV County Wood

Relocation Spot Dives

Substrate Composition (Percentages)

No.	Area	~~Transect~~	~~Interval~~	Diver	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Artificial	Detritus	Muck	Other	Time (min)	Depth	Notes
1			Reb1	BD	10	40	50									10	16	3100: BD
2			Reb2	|	10	40	40	10								10	16	2100: BD
3			Reb3	|		50	40	10								10	16	1600: BD
4			Reb4	|		50	40	10								10	16	
5			Reb5	|	20	20	30	20								10	16	
6			Reb6	|	20	30	30	20								10	16	
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
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32																		
33																		
34																		
35																		

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4525 Este Ave Road. Cincinnati. OH 45232 (513) 451 - 1777

DATASHEET# 1 of 7
DATE 10 Sept 2024

Project/Task: 2312 05 Stream Ohio River State WV County Wood

spot Dive

ESI - Mussel Datasheet

Spot Dives Upstream Area

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	USS	Spot 1			A. plic	4 WD, 93.0, 111.1, 101.0,			110.0, 123.4,	120.5,	109.7, 118.8	
2					"	107.4, 101.1,	103.0,	106.9				
3					L. recta	129.0 ♀	114.2 ♀	136.4 ♂	150+ ♀	150+ ♂	144.5 ♀	
4					C. rust	1 WD						
5					A. lig	116.5						
6	USS	Spot 2			M. nervosa	150+	1 WD	150+				
7					A. plic	102.2, 107.3,	102.4,	105.7, 92.8,	7 WD,	103.9, 115.3,		
8					T. mut	1 WD, 73.6, 79.4						
9					E. lin	64.5, 92.7, 77.7,	106.0, 92.4					
10					P. elatus	1 WD						
11					L. recta	137.2 ♂						
12					P. sin	95.0						
13					L. cardium	118.6 ♂						
14	USS	Spot 3			C. rust	1 WD	65.0,	62.0,				
15					E. lin	1 WD	86.0,					
16					T. mut	75.3, 73.5,	81.6,	65.0, 72.8,	104.4, 81.0,	70.6,	81.6, 74.0,	82.0, 79.5, 85.7, 83.4, 1 WD
17				✱	Cyphius	103.8 L.	49.2 W.	73.0 H.				TAG 1778 Yellow
18					O. ret	50.0, 48.6						
19					A. plic	111.4, 88.3,	104.1,	103.0, 107.0,	1 WD			
20					L. recta	142.3 ♀	137.5 ♀					
21					L. cardium	114.5 ♀						
22					A. lig	127.2, 113.4,	111.6,					
23					P. cordi	82.5, 88.4						
24					P sin	95.5						
25												
26												
27												
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 2 of 7
DATE 10 sept 2024

Project/Task: 2312105 Stream Ohio River State WV County Wood

SpotDVC

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	USS	4			L. recta	134.2♂	138.2♀	147.5♀	132.3♀	149.0♀		
2		1			A. plic	109.1, 101.4	95.7	80.3	9	4.0, 2 WD		
3					C. rust	93.1, 61.9	63.0, 60.0	1 WD				
4					T. met	81.4, 79.0	79.4	80.2, 76.8	8, 86.7	1 WD		
5					E. lin	52.0, 52.6	70.1	107.2	1 WD			
6					A. lia	116.5, 108.0	127.0					
7				✗	F. sub	77.5 L.	40.6 W.	63.1 H.				Tag # 1752
8					P. sin	86.0						
9					P. cord	78.2						
10					P. alatus	2 WD	112.1	94.5				
11					O. q.	60.5						
12												
13												
14	USS	Spot 5			C. rust	60.0, 63.6						
15		1			A. plic	91.0, 100.6	115.3	93.1, 89.4	89.3	1 WD		
16					L. cardium	111.5♀						
17					T. met	73.0, 79.0	78.1	67.3, 90.0	76.3			
18					L. recta	140.7♂	114.0♂	140.4♀	147.3♀	140.1♀		
19					P. sin	82.7, 70.2						
20					P. cyphius	1 WD						
21					P. alatus	1 WD						
22		1		✗	P. clava	84.4	32.3	49.4				Previously tag Grac. T007
23	USS	Spot 6			T. met	75.0, 77.8, 1	2, 76.0	76.0, 79.8, 82	8, 84.0, 89.6	80.9, 68.4		
24		1			A. plic	95.2, 83.0, 100						
25					L. recta	137.7♀						
26					L. cardium	97.6♀						
27					A. lia	107.2						
28					E. lin	87.5, 67.0, 74.2, 72.7						
29					C. rust	52.6	1 WD					
30					O. rof	40.0						

* Male / Juvenile / Female

P. cord 93.6

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 3 of 7
DATE 9-10-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Spot Dive

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	USS	7			A. plic	94.3, 91.6	3, 82.3	109.4	109.3, 108.0	108.0, 1 WD		
2					T. met	89.0, 89.4	85.2, 87.3,	88.9, 81.4	83.0, 84.0	82.4, 84.5, 91.7		
3					"	86.5, 89.0	80.1	81.7, 81.4	81.7, 82.5,	79.8, 73.1, 82.3, 83.2		
4					"	88.0, 2 WD		92.7				
5					Q. q.	89.6						
6					C. pust	69.0						
7					E. lin	82.4	1 WD					
8					L. recta	148.2 ♂	150+ ♀	1 WD				
9					A. lig	125.3						
10					L. cardium	127.2 ♂						
11					O. ref	1 WD						
12		8										
13	USS				A. plic	110.5, 107	2.3, 107.3,	84.0	110.3, 110.3,	112.4,		
14					T. met	82.4, 82.5,	81.3, 81.7,	78.3, 75.0,	73.4, 83.8,	86.0, 60.3		
15					E. lin	93.0, 80.0	81.7,	92.8, 79.1,				
16					O. ref	100.4,						
17					C. pust	103.5, 101.8,	90.5,					
18					L. cardium	105.0 ♀						
19					A. lig	112.0,						
20					L. recta	142.3 ♀	141.0 ♂					
21		9			P. cord	82.5, 84.1						
22	USS				A. plic	82.0, 97.2,	83.8,	93.8, 108.4,	109.3,			
23					T. met	92.0, 72.3,	79.8, 77.3,	73.4, 79.0,	80.8, 84.5,	87.0, 72.4		
24					"	72.5, 83.2,	79.9, 83.7,	78.7, 87.0,	83.0, 89.7,	74.0		
25					"	80.0, 80.0						
26					E. lin	106.4, 71.6,	7. 2 WD					
27					C. pust	108.5, 105.7,	1 WD					
28					L. recta	131.5 ♂						
29					L. cardium	105.5 ♂						
30					A. lig	108.7						

* Male / Juvenile / Female

*Diver (initials only)

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4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 4 of 7
DATE 9-10-24

Project/Task: 2312.05 Stream Ohio River State WV County Wood

Spot Dive

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	USS	9			P. alatus	103.5	2 WD					
2				☆	P. cyphius	110.7 L.	50.6 W.	77.8 H.				TAG 1049 Yellow
3					P. sin	91.1, 90.4						
4					P. cord	86.4, 89.2.						
5												
6	USS	10			L. cardium	120.3 ♀	100.7 ♀					
7					M. nerv	150+						
8					T. met	78.0, 90.8, 89.7,	83.4, 82.0, 83.1,	81.8, 70.1, 80.0,	79.7			
9					C. pust	60.5, 68.5, 54.3,	57.8, 58.5,	3 WD				
10					O. q.	64.0,						
11					O. ref	86.4						
12					P. alatus	94.5, 106.5, 101.4						
13					A. lig	114.7, 112.5,						
14					A. plic	121.4						
15					E. lin	96.0, 81.0						
16					L. recta	150+ ♂	150+ ♂	62.5 ♀	101.2 ♂			
17				☆	P. cyphius	10.5 L.	55.0 W.	79.7 H.				TAG 1704 Yellow
18					P. sin	85.3						
19					P. cord	93.4, 64.5, 57.3						
20					P. fraq	1 WD						
21	USS	11			T. met	76.4, 82.5, 71.7,	83.4, 70.2,	74.0, 78.3,	83.0, 73.4,	76.0		
22						~~78.4~~, 81.0, 67.5,	64.9					
23					C. pust	65.0, 74.8, 61.8,	45.5					
24					E. lin	100.6, 71.6, 65.0,						
25					O. ref	46.8, 60.10						
26					A. lig	111.7, 127.7,						
27					A. plic	114.5, 91.4, 110.4,	101.6, 73.0					
28					L. recta	128.7 ♀	126.0 ♀					
29					P. alatus	100.7, 98.10,	1 WD					
30					P. sin	93.2	93.5	1 WD				

* Male / Juvenile / Female

*Diver (initials only)

P. cord 85.0, 86.0

P. cyphius 1 WD

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DATASHEET# 5 of 7
DATE 10 sept. 2021

Project/Task: 2312.05 Stream Ohio river State WV County Wood

Spot Dive

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	USS	12			T. met	80.0, 82.3, 69.5, 78.2, 83.5, 83.7, 69.0, 78.3						
2		|			74.5, 79.2,		3 WD				
3					A. lig	114.0						
4					O. ref)	48.2, 42.8		2 WD				
5					E. lin	52.7,						
6					L. recta	144.5 ♀						
7					L. cardium	100.6 ♀						
8					A. plic	110.5, 86.4, 100.4,						
9					P. sin	92.0, 92.0, 84.0, 79.1,						
10		⊥			P. cord	85.5, 85.0, 87.1, 92.1						
11		Relocation Dive										
12	Relo	1			L. recta	137.0 ♀	148.2 ♂	133.0 ♀	129.0 ♂	130.0 ♀	146.5 ♀	
13		|			A. plic	134.1, 105, 109.7, 101.5, 113.6, 5 WD						
14	1				A. lig	118.0, 106.8, 107.2, 111.7,						
15					P. alatus	110.8, 114.4						
16					C. rust	104.8, 62.5,						
17					P. cord	70.0						
18					E. lin	89.0, 92.8, (67.7, 51.1, 80.9, 1 WD						
19					P. sin	90.6,						
20					L. sili	80.6 ♀						
21		⊥			T. met	84.4, 87.0, 85.4, 79.0, 84.7, 76.3, 77.4, 71.0, 81.5						
22	Relo	2.			T. mut	85.5, 82.1, 81.0, 85.8, 90.2, 80.5, 74.0, 80.4, 87.0, 80.0, 86.0						
23						84.6, 83.3, 74.5, 86.9, 74.5, 73.0, 82.1, 71.4, 80.6, 96.1, 1 WD						
24					C. rust	70.4, 56.0, 64.0, 52.6, 2 WD						
25					E. lin	87.0, 84.0, 74.4, 78.7, 67.2, 1 WD						
26					L. sili	95.3 ♀						
27					P. alatus	106.5, 117.3, 2 WD						
28					L. cardium	105.0 ♀	95.4 ♀	101.6 ♀	1 WD			
29					A. plic	111.4, 105, 3 WD						
30		⊥			L. recta	138.4 ♀	1 WD					

* Male / Juvenile / Female

*Diver (initials only)

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DATASHEET# 6 of 7
DATE 10 Sept 2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

Relocation Dives

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	Relo	2			P. cord	93.3, 68.4						
2		1			P. sin	67.0, 96.5, 90.0						
3		1			P. cyphus	1 WD						
4	Relo	3			T. met	83.0, 93.4, 72.5, 85.4, 82.1, 88.9, 84.1, 86.4, 73.2, 79.5		1-WD				
5		|			Cpust	68.5						
6		|			E lin	76.4, 81.2, 85.5,			2-WD			
7		|			L cord ♀	102.5						
8		|			L cord ♂	118.7						
9		|			A lig	113.4, 113.6		1-WD				
10		|			L recta ♀	133.0						
11		|			P cord	89.1	1-WD					
12		|			A plic	7-WD						
13		1			Palatus	1-WD						
14	Relo	4			T met	85.0, 82.0, 82.3, 82.2, 82.3, 83.0, 74.4, 80.7, 89.5						
15		1			A plic	89.3, 98.5, 119.0, 107.0, 108.7, 95.1, 110.2						5-WD
16		|			E lin	56.5						
17		|			Cpust	65.5	1-WD					
18		|			Palatus	121.1						
19		|			L recta ♀	132.0, 136.4, 134.2						
20		|			L recta ♂	130.6						
21		|			L cardium ♂	122.7						
22		|			P cord	92.2, 88.4, 102.7						
23		|			P sin	98.7						
24		|			P cyphyus	1-WD						
25		1		☆	F sub	96.7	50.4	79.3				Tag #1961 Yellow
26	Relo	5			A plic	94.5, 102.8, 105.0, 106.0, 89.0, 107.5						
27		|			T met	86.1,						
28		|			E lin	95.5						
29		|			O ref	53.4						
30		1			L sili ♀	80.0						

* Male / Juvenile / Female

*Diver (initials only)

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Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road. Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 7
DATE 10 sept

Project/Task: 7312.005 Stream Ohio River State WV County Wood

Relocation Spot Dives

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		Relo	5		Alig	120.4						
2			1		L recta ♂	144.5, 138.6, 141						
3					L recta ♀	111.5						
4					P rord	79.7	1-WD					
5					P alatus	115.3, 106.4		3-WD				
6					C pust	2-WD						
7			1		M nervosa	1-WD						
8		Relo	6		T rect	89.4, 85.4, 81.2, 90.0, 80.0				74.7		
9			1		A lig	127.0	1-WD					
10					P alatus	120.3	111.5					
11					E lin	88.0, 90.5, 93.5, 100.7, 61.6,						
12					A plic	111.5, 112.6			2-WD			
13					L recta ♀	145.0, 142.3, 145.0						
14					L recta ♂	150+, 150+						
15			1		P rord	63.5						
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

Current Stream and Weather Conditions

Event Information

Project title: USFWS-NWR Muskingum Island Well Plugging Project

Location (Stream name, Site name): Ohio River, Site 2

Date (mm / dd / yyyy): ____ / ____ / _____ 08/31/2024-09/10/2024

Section A – Weather Conditions

Precipitation (select one)

- ☐ Intermittent rain
- ☐ Light rain
- ☒ Moderate rain
- ☐ Heavy rain
- ☐ None

Cloud cover (select one)

- ☐ 0 %
- ☒ 25 %
- ☐ 50 %
- ☐ 75 %
- ☐ 100 %

Heavy rain

Has there been a heavy rain in the last 7 days?

☐ Yes ☒ No

Air temp

11.5-30.8 °C

Section B – Sediment/Substrate

Sediment odor (select one)

- ☒ Normal
- ☐ None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic (methane)
- ☐ Other

Sediment deposits (select one)

- ☐ Sludge
- ☐ Leaf litter
- ☒ Sand
- ☐ Relict shells
- ☐ Paper/Fiber
- ☐ Other

Substrate type

(rank top three, no "ties")

- ☐ Bedrock
- ☐ Boulder
- ☐ Cobble
- x Gravel
- x Sand
- x Silt
- ☐ Clay

Section C – Streambank and Riparian Zone Characterization

Canopy cover

(select one)

- ☒ None
- ☐ Mostly open
- ☐ Mostly shaded
- ☐ Shaded

Riparian zone fully intact?

(select one; within 10 meters)

- ☐ Left descending bank
- ☐ Right descending bank
- ☐ Both banks
- ☐ Neither bank

Stream bank failure?

(select one; within survey reach)

- ☐ Left descending bank
- ☒ Right descending bank
- ☐ Both banks
- ☐ Neither bank

Section D – Aquatic Vegetation

Dominant vegetation type (select all applicable)

- ☐ Rooted floating
- ☐ Rooted emergent
- ☒ Rooted submergent
- ☐ Free floating
- ☐ Floating algae
- ☐ Attached algae
- ☐ Moss
- ☐ None

Dominant species

Other significant species

Percent of reach with aquatic vegetation

(in terms of area)

1 %

Current Stream and Weather Conditions

Section E – Water Quality

Water surface oil (select one)

- ☐ Slick
- ☐ Globs
- ☐ Sheen
- ☐ Flecks
- ☒ None
- ☐ Other

Water odor (select one)

- ☒ Normal/None
- ☐ Petroleum
- ☐ Fishy
- ☐ Sewage
- ☐ Chemical
- ☐ Other

Turbidity (visual)

cm

- ☒ Clear
- ☐ Opaque
- ☐ Slightly turbid
- ☐ Stained
- ☐ Turbid

Water temp	26.0-27.2 °C	**Turbidity**	mg/L
Conductivity	uS/cm	**Flow**	cfs
Dissolved O_2	mg/L	**Gage height**	ft
pH		**Secchi depth**	1.2-1.6 m

Water sample collected (for lab tests)

☐Yes ☒No

Hach kit used

☐Yes ☒No

Section F – Stream Characterization

Human influence (select all applicable)

- ☐ Engineered dam
- ☐ Channelized
- ☐ Ford
- ☐ Riprap
- ☐ Island
- ☐ Trash
- ☒ Other **Well**
- ☐ Bridge (pillars in stream)
- ☐ Bridge (no pillars in stream)
- ☐ Pipeline (parallel to stream)
- ☐ Pipeline crossing
- ☐ Pipes (inlet/outlet)
- ☐ Wall/Dike/Revetment

In stream cover (select all applicable)

- ☐ Beaver dam
- ☐ Blow down
- ☐ Debris dam
- ☐ Woody debris
- ☐ Other

Section G – Watershed Features

Human influence/Watershed features (within survey reach)

Proximity: Mark each applicable feature. **P** (Present) >10m from shore, **C** (Close) <10m from shore, **B** (On bank/stream).
Dominant land use: Mark up to two features. Use **R** or **L** for right or left bank; use **X** for both banks.

Feature	Prox.	Dom.	Feature	Prox.	Dom.	Feature	Prox.	Dom.
Residential building			Mining activity			Row crops		
Non-residential building			Forest			Hay field		
Commercial/Industrial			Logging			Pasture		
Railroad (active)			Park/Lawn			Feed lot		
Railroad (inactive)			Pavement			Old field		
Railroad (rails to trails)			Road			Landfill		

Local watershed erosion (select one; pertains to land use, not failing stream banks)

☐None ☐Light ☐Moderate ☐Heavy

Section H – Notes

_____

_____

_____

Current Stream and Weather Conditions

Event Information

Project title – Enter the project title, corresponding with that on the Mussel Survey Scope of Work Summary Sheet Protocol Form.

Stream name – Enter name of stream.

Site name – Enter the name of the site.

Date – Enter date in mm/dd/yyyy format.

Section A – Weather Conditions

Precipitation – Select one option that reflects current precipitation conditions.

Cloud cover – Select one option that reflects current cloud cover.

Heavy rain – Select whether precipitation in the past week was sufficiently heavy to create runoff.

Air temp – Enter current air temperature in °C.

Section B – Sediment/Substrate

Sediment odor, Sediment deposit – Select one option that best reflects the presence of odors and deposits using criteria established in the EPA manual, Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers, Sections 5.1.11.

Substrate type – Rank the top three most common substrate components, with 1 being dominant. Pebble sizes are based on Wentworth categories.

Section C – Streambank and Riparian Zone Characterization

Canopy cover – Select one option that best reflects the proportion of open to shaded area.

Riparian zone fully intact – Select whether the riparian zone within 10 meters of your survey reach or station is fully intact.

Stream bank failure – Select whether there is stream bank failure in your survey reach or station.

Section D – Aquatic Vegetation

Dominant vegetation type – Select all options that reflect the general type(s) of estimated dominant vegetation.

- **Rooted emergent –** plants that are rooted in the substrate and rise above the water surface (e.g., cattails)
- **Rooted submergent –** plants that are rooted in the substrate and only grow beneath the water's surface (e.g., curly pondweed)
- **Rooted floating –** plants that are rooted in the substrate with tops floating on the surface (e.g., water lilies)
- **Free floating –** plants that are not rooted and float on the water's surface (e.g., duckweed)
- **Floating algae –** algae that are not attached to the substrate and float on or near the water's surface
- **Attached algae –** algae that are attached to the substrate (e.g., green rocks)
- **Moss –** moss or bryophytes covering rocks (e.g., carpeted stream bottom)
- **None –** there is no dominant vegetation

Dominant species – Record the dominant species.

Other significant species – Record any other significant species.

Percent of reach with aquatic vegetation – Estimate the percent of the reach that contains the dominant species.

Current Stream and Weather Conditions

Section E – Water Quality

Water surface oil, Water odor – Select one option that best reflects the presence of oils and odors using criteria established in the EPA manual, Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers, Sections 5.1.10.

Turbidity (visual) – Record estimated visual depth in cm. Select one option that best reflects water turbidity.

Water temp (°C), Conductivity (uS/cm), Dissolved O_2 (mg/L), pH, Turbidity (mg/L), Flow (cfs), Gage height (ft) – Record values in the units listed. Take readings according to manufacturer instructions for the meter used.

Secchi depth – Lower the Secchi disc in the water until black and white cannot be distinguished. Raise the disc to the point at which you can again distinguish black and white. Record this depth to the nearest 0.01 m.

Water sample collected – Select whether a water sample was collected for analysis.

Hach kit used – Select whether a Hach kit was used.

Section F – Stream Characterization

Human influence – Select all options that are present at the site. These refer to any man-made structure, object, equipment, or activity that occurs or has occurred within the stream channel.

In stream cover – Select all options that are present at the site. These refer to "natural" in stream occurrences that may affect stream morphology and provide cover for aquatic organisms.

- **Debris dam –** complete obstruction of the stream channel created primarily by natural materials
- **Blow down –** recent fallen tree or large limb that can potentially affect stream morphology and provide cover for aquatic organisms
- **Beaver dam –** debris dam engineered by beavers
- **Woody debris –** wood pieces that can influence aquatic organism cover and stream morphology

Section G – Watershed Features

Human influence/Watershed features – Mark each influence/feature that is within your survey reach or can be seen directly from your survey area. Indicate up to two dominant land uses.

- **Proximity –** Mark each influence/feature at the site with "P", "C", or "B"; leave absent influences/features blank
  - **P –** Present in the riparian zone, but >10 m from shore
  - **C –** Close to the riparian zone (<10 m from shore), but not in stream or on bank
  - **B –** On the bank (located in the stream or on the stream bank)
- **Dominant land use –** Mark up to two influences/features that are dominant
  - **R –** Dominant feature is on the right descending bank
  - **L –** Dominant feature is on the left descending bank

  X – Dominant feature is on both banks

Local watershed erosion – Select one option that indicates the erosion extent resulting from the above human influence(s). This does not refer to failing banks (e.g., cattle feedlot – high erosion).

Section H – Notes

Include any important notes about the current stream and weather conditions.

C-6
REPRESENTATIVE SITE PHOTOS



Site 2 looking downstream



Site 2 looking at the shore



Site 2 looking upstream



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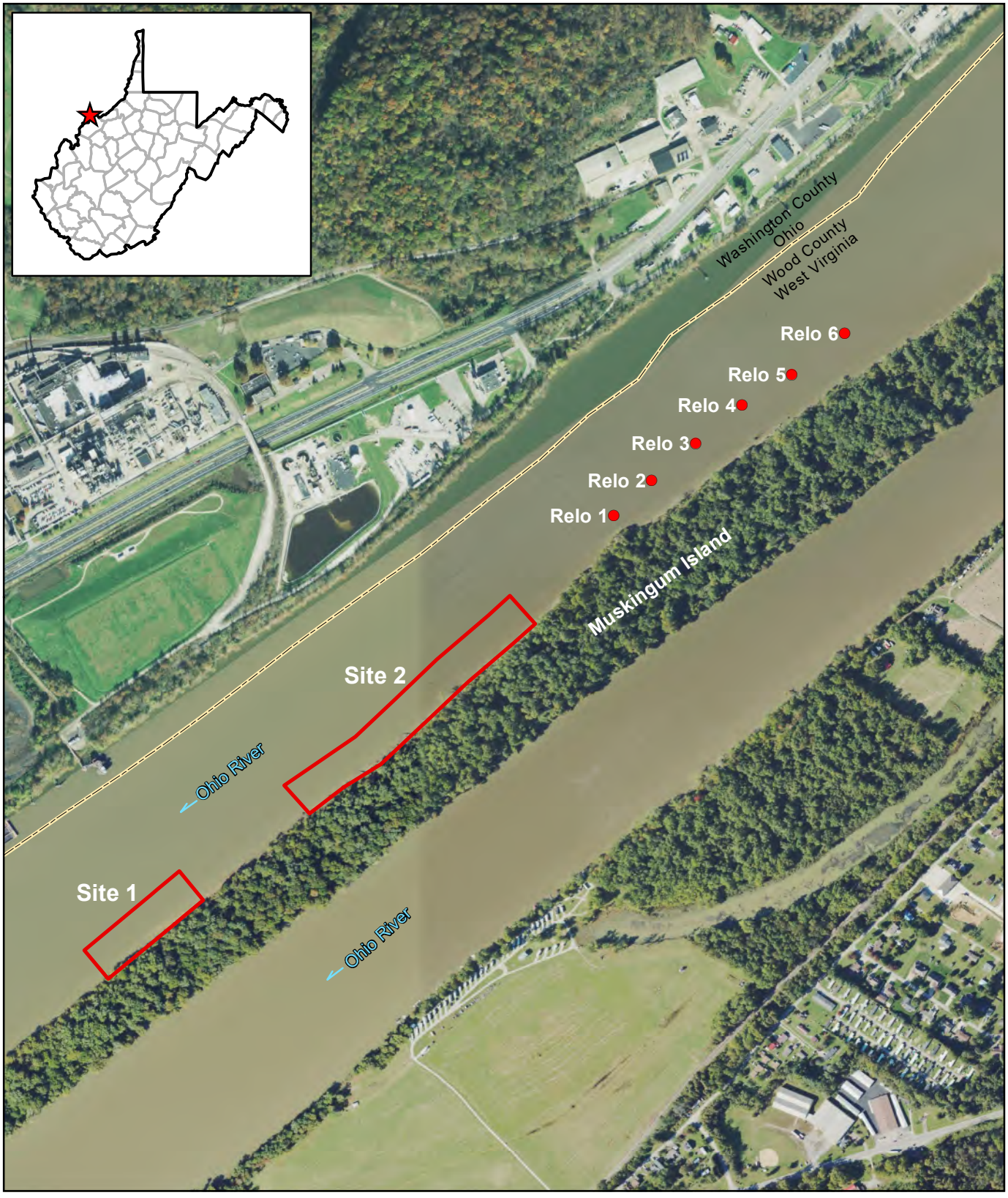


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APPENDIX D
RELOCATION SCOPING SUPPORTING DOCUMENTATION

- D-1: Figures D1 and D2
- D-2: Data Tables D1 through D3
- D-3: Datasheets
- D-4: Representative Site Photos

D-1
FIGURES D1 AND D2



Relocation Site | Survey Area | State Boundary

N
W E
S

Figure D1. Relocation scoping sites for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

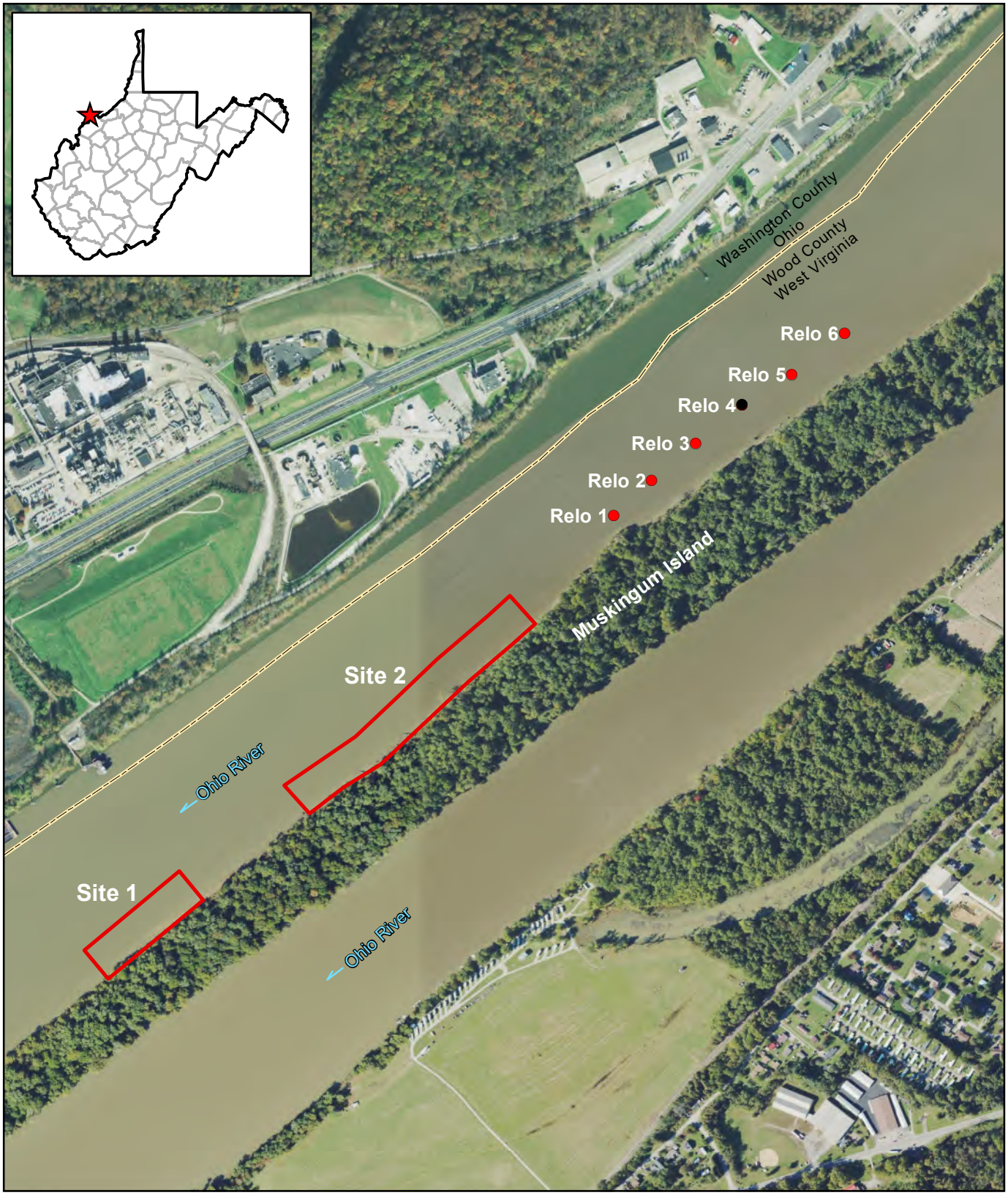
Project No. 2312

0 200 400 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

G:\Current\2312_USFWS_Ohio_River_NWR_Mussels_WVMaps\Aquatic\Report_Figures\FigureD1_2312_Relo_Area_20241029.mxd; creator: CKemmerer



Longsolid Relocation Site Survey Area State Boundary

N
W E
S

Figure D2. Relocation scoping federally listed species occurrence for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Project No. 2312

0 200 400 Meters

Base Map: NAIP Natural Color Imagery

ESI ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

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D-2
DATA TABLES D1 THROUGH D3

Table D1. Relocation scoping habitat data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Survey Area	Site	Divers[1]	Percent Substrate Composition				Time (mins)	Depth (m)
				Fines	Sand	Gravel	Cobble		
10 Sep	Relocation	Relo 1	BD	10	40	50		10	4.9
10 Sep	Relocation	Relo 2	BD	10	40	40	10	10	4.9
10 Sep	Relocation	Relo 3	BD		50	40	10	10	4.9
10 Sep	Relocation	Relo 4	BD		50	40	10	10	4.9
10 Sep	Relocation	Relo 5	BD	20	30	30	20	10	4.9
10 Sep	Relocation	Relo 6	BD	20	30	30	20	10	4.9

[1] BD = Brian Dennis

Table D2. Summary of live unionid mussels collected at relocation scoping sites for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Live Mussel Species								
Scientific Name[1]	**Common Name**	**Relo 1[2]**	**Relo 2[2]**	**Relo 3[2]**	**Relo 4[2]**	**Relo 5[2]**	**Relo 6[2]**	**Total**
Actinonaias ligamentina	mucket	4	0	2	0	1	2	9
Amblema plicata	threeridge	4	2	0	8	6	2	22
Cyclonaias pustulosa	pimpleback	2	4	1	1	0	0	8
Ellipsaria lineolata	butterfly	5	5	3	1	1	5	20
*Fusconaia subrotunda**	longsolid	0	0	0	1	0	0	1
Lampsilis cardium	plain pocketbook	0	3	1	1	0	0	5
Lampsilis siliquoidea	fatmucket	1	1	0	0	1	0	3
Ligumia recta	black sandshell	6	1	1	4	4	5	21
Obliquaria reflexa	threehorn wartyback	0	0	0	0	1	0	1
Pleurobema cordatum	Ohio pigtoe	1	2	1	3	1	1	9
Pleurobema sintoxia	round pigtoe	1	3	0	1	0	0	5
Potamilus alatus	pink heelsplitter	2	2	0	1	2	2	9
Theliderma metanevra	monkeyface	9	21	10	9	1	6	56
	Total	**35**	**44**	**19**	**30**	**18**	**23**	**169**

[1] * = Federally listed species

[2] Relocation scoping sites

Table D3. Relocation scoping mussel morphometric and occurance data for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 1	*Ligumia recta*	137			F	1	Live	
10 Sep	Relocation	Relo 1	*Ligumia recta*	148.2			M	1	Live	
10 Sep	Relocation	Relo 1	*Ligumia recta*	133			F	1	Live	
10 Sep	Relocation	Relo 1	*Ligumia recta*	129			M	1	Live	
10 Sep	Relocation	Relo 1	*Ligumia recta*	130			F	1	Live	
10 Sep	Relocation	Relo 1	*Ligumia recta*	146.5			F	1	Live	
10 Sep	Relocation	Relo 1	*Amblema plicata*	113.4				1	Live	
10 Sep	Relocation	Relo 1	*Amblema plicata*	109.7				1	Live	
10 Sep	Relocation	Relo 1	*Amblema plicata*	101.5				1	Live	
10 Sep	Relocation	Relo 1	*Amblema plicata*	113.6				1	Live	
10 Sep	Relocation	Relo 1	*Amblema plicata*					5	WD	
10 Sep	Relocation	Relo 1	*Actinonaias ligamentina*	118				1	Live	
10 Sep	Relocation	Relo 1	*Actinonaias ligamentina*	106.8				1	Live	
10 Sep	Relocation	Relo 1	*Actinonaias ligamentina*	107.2				1	Live	
10 Sep	Relocation	Relo 1	*Actinonaias ligamentina*	111.7				1	Live	
10 Sep	Relocation	Relo 1	*Potamilus alatus*	16.8				1	Live	
10 Sep	Relocation	Relo 1	*Potamilus alatus*	114.4				1	Live	
10 Sep	Relocation	Relo 1	*Cyclonaias pustulosa*	64.8				1	Live	
10 Sep	Relocation	Relo 1	*Cyclonaias pustulosa*	62.5				1	Live	
10 Sep	Relocation	Relo 1	*Pleurobema cordatum*	70				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*	89				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*	92.3				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*	67.7				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*	51.1				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*	80.9				1	Live	
10 Sep	Relocation	Relo 1	*Ellipsaria lineolata*					1	WD	
10 Sep	Relocation	Relo 1	*Pleurobema sintoxia*	90.6				1	Live	
10 Sep	Relocation	Relo 1	*Lampsilis siliquoidea*	80.6			F	1	Live	

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	84.4				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	87				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	85.4				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	79				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	84.7				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	76.3				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	77.4				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	74.6				1	Live	
10 Sep	Relocation	Relo 1	*Theliderma metanevra*	81.5				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	85.5				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	82.1				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	81				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	85.8				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	90.2				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	80.5				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	74				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	80.4				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	87				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	80				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	86				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	84.6				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	83.3				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	74.5				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	82.9				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	74.5				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	73				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	82.1				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	71.4				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	80.4				1	Live	
10 Sep	Relocation	Relo 2	*Theliderma metanevra*	96.1				1	Live	

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 2	*Theliderma metanevra*					1	WD	
10 Sep	Relocation	Relo 2	*Cyclonaias pustulosa*	70.4				1	Live	
10 Sep	Relocation	Relo 2	*Cyclonaias pustulosa*	55				1	Live	
10 Sep	Relocation	Relo 2	*Cyclonaias pustulosa*	64				1	Live	
10 Sep	Relocation	Relo 2	*Cyclonaias pustulosa*	52.5				1	Live	
10 Sep	Relocation	Relo 2	*Cyclonaias pustulosa*					2	WD	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*	87				1	Live	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*	84				1	Live	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*	74.4				1	Live	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*	78.7				1	Live	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*	67.2				1	Live	
10 Sep	Relocation	Relo 2	*Ellipsaria lineolata*					1	WD	
10 Sep	Relocation	Relo 2	*Lampsilis siliquoidea*	95.3			F	1	Live	
10 Sep	Relocation	Relo 2	*Potamilus alatus*	106.5				1	Live	
10 Sep	Relocation	Relo 2	*Potamilus alatus*	117.3				1	Live	
10 Sep	Relocation	Relo 2	*Potamilus alatus*					2	WD	
10 Sep	Relocation	Relo 2	*Lampsilis cardium*	105				1	Live	
10 Sep	Relocation	Relo 2	*Lampsilis cardium*	95.4				1	Live	
10 Sep	Relocation	Relo 2	*Lampsilis cardium*	101.5				1	Live	
10 Sep	Relocation	Relo 2	*Lampsilis cardium*					1	WD	
10 Sep	Relocation	Relo 2	*Amblema plicata*	114.4				1	Live	
10 Sep	Relocation	Relo 2	*Amblema plicata*	104.5				1	Live	
10 Sep	Relocation	Relo 2	*Amblema plicata*					3	WD	
10 Sep	Relocation	Relo 2	*Ligumia recta*	138.4			F	1	Live	
10 Sep	Relocation	Relo 2	*Ligumia recta*					1	WD	
10 Sep	Relocation	Relo 2	*Pleurobema cordatum*	93.3				1	Live	
10 Sep	Relocation	Relo 2	*Pleurobema cordatum*	68.4				1	Live	
10 Sep	Relocation	Relo 2	*Pleurobema sintoxia*	67				1	Live	
10 Sep	Relocation	Relo 2	*Pleurobema sintoxia*	95.5				1	Live	
10 Sep	Relocation	Relo 2	*Pleurobema sintoxia*	90				1	Live	

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 2	*Plethobasus cyphyus**					1	WD	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	83				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	93.4				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	72.5				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	85.4				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	82.1				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	88.9				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	84.1				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	86.4				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	73.2				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*	79.5				1	Live	
10 Sep	Relocation	Relo 3	*Theliderma metanevra*					1	WD	
10 Sep	Relocation	Relo 3	*Cyclonaias pustulosa*					1	WD	
10 Sep	Relocation	Relo 3	*Cyclonaias pustulosa*	68.5				1	Live	
10 Sep	Relocation	Relo 3	*Ellipsaria lineolata*	76.4				1	Live	
10 Sep	Relocation	Relo 3	*Ellipsaria lineolata*	81.2				1	Live	
10 Sep	Relocation	Relo 3	*Ellipsaria lineolata*	85.5				1	Live	
10 Sep	Relocation	Relo 3	*Ellipsaria lineolata*					2	WD	
10 Sep	Relocation	Relo 3	*Lampsilis cardium*	102.5			F	1	Live	
10 Sep	Relocation	Relo 3	*Actinonaias ligamentina*	113				1	Live	
10 Sep	Relocation	Relo 3	*Actinonaias ligamentina*	113.6				1	Live	
10 Sep	Relocation	Relo 3	*Actinonaias ligamentina*					1	WD	
10 Sep	Relocation	Relo 3	*Ligumia recta*	133			F	1	Live	
10 Sep	Relocation	Relo 3	*Pleurobema cordatum*	89.1				1	Live	
10 Sep	Relocation	Relo 3	*Pleurobema cordatum*					1	WD	
10 Sep	Relocation	Relo 3	*Amblema plicata*					7	WD	
10 Sep	Relocation	Relo 3	*Potamilus alatus*					1	WD	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	85				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	82				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	82.3				1	Live	

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	82.2				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	82.3				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	83				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	74.4				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	80.7				1	Live	
10 Sep	Relocation	Relo 4	*Theliderma metanevra*	89.5				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	89.3				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	98.5				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	119				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	107				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	108				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	108.7				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	95.1				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*	110.2				1	Live	
10 Sep	Relocation	Relo 4	*Amblema plicata*					5	WD	
10 Sep	Relocation	Relo 4	*Ellipsaria lineolata*	56.5				1	Live	
10 Sep	Relocation	Relo 4	*Cyclonaias pustulosa*	65.5				1	Live	
10 Sep	Relocation	Relo 4	*Cyclonaias pustulosa*					1	WD	
10 Sep	Relocation	Relo 4	*Potamilus alatus*	121.1				1	Live	
10 Sep	Relocation	Relo 4	*Ligumia recta*	132			F	1	Live	
10 Sep	Relocation	Relo 4	*Ligumia recta*	136.4			F	1	Live	
10 Sep	Relocation	Relo 4	*Ligumia recta*	134.2			F	1	Live	
10 Sep	Relocation	Relo 4	*Ligumia recta*	130.6			M	1	Live	
10 Sep	Relocation	Relo 4	*Lampsilis cardium*	122.7			M	1	Live	
10 Sep	Relocation	Relo 4	*Pleurobema cordatum*	92.2				1	Live	
10 Sep	Relocation	Relo 4	*Pleurobema cordatum*	88.4				1	Live	
10 Sep	Relocation	Relo 4	*Pleurobema cordatum*	107.7				1	Live	
10 Sep	Relocation	Relo 4	*Pleurobema sintoxia*	98.7				1	Live	
10 Sep	Relocation	Relo 4	*Plethobasus cyphyus**					1	WD	
10 Sep	Relocation	Relo 4	*Fusconaia subrotunda**	96.7	50.4	79.3		1	Live	1961 Yellow

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 5	*Amblema plicata*	94.5				1	Live	
10 Sep	Relocation	Relo 5	*Amblema plicata*	102.8				1	Live	
10 Sep	Relocation	Relo 5	*Amblema plicata*	105				1	Live	
10 Sep	Relocation	Relo 5	*Amblema plicata*	106				1	Live	
10 Sep	Relocation	Relo 5	*Amblema plicata*	89				1	Live	
10 Sep	Relocation	Relo 5	*Amblema plicata*	107.5				1	Live	
10 Sep	Relocation	Relo 5	*Theliderma metanevra*	86.1				1	Live	
10 Sep	Relocation	Relo 5	*Ellipsaria lineolata*	95.5				1	Live	
10 Sep	Relocation	Relo 5	*Obliquaria reflexa*	53.5				1	Live	
10 Sep	Relocation	Relo 5	*Lampsilis siliquoidea*	80				1	Live	
10 Sep	Relocation	Relo 5	*Actinonaias ligamentina*	120.4				1	Live	
10 Sep	Relocation	Relo 5	*Ligumia recta*	144.5			M	1	Live	
10 Sep	Relocation	Relo 5	*Ligumia recta*	133.6			M	1	Live	
10 Sep	Relocation	Relo 5	*Ligumia recta*	141.1			M	1	Live	
10 Sep	Relocation	Relo 5	*Ligumia recta*	111.5			F	1	Live	
10 Sep	Relocation	Relo 5	*Pleurobema cordatum*	79.7				1	Live	
10 Sep	Relocation	Relo 5	*Pleurobema cordatum*					1	WD	
10 Sep	Relocation	Relo 5	*Potamilus alatus*	115.3				1	Live	
10 Sep	Relocation	Relo 5	*Potamilus alatus*	106.4				1	Live	
10 Sep	Relocation	Relo 5	*Potamilus alatus*					3	WD	
10 Sep	Relocation	Relo 5	*Cyclonaias pustulosa*					2	WD	
10 Sep	Relocation	Relo 5	*Megalonaias nervosa*					1	WD	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	89.4				1	Live	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	85.4				1	Live	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	81.2				1	Live	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	90				1	Live	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	80				1	Live	
10 Sep	Relocation	Relo 6	*Theliderma metanevra*	74.7				1	Live	
10 Sep	Relocation	Relo 6	*Actinonaias ligamentina*	127				1	Live	
10 Sep	Relocation	Relo 6	*Actinonaias ligamentina*					1	Live	

Date (2024)	Area	Site	Species[1]	Length (mm)	Width (mm)	Height (mm)	Sex[2]	Count	Condition[3]	Tag Number
10 Sep	Relocation	Relo 6	*Potamilus alatus*	120.3				1	Live	
10 Sep	Relocation	Relo 6	*Potamilus alatus*	111.5				1	Live	
10 Sep	Relocation	Relo 6	*Ellipsaria lineolata*	88				1	Live	
10 Sep	Relocation	Relo 6	*Ellipsaria lineolata*	90.5				1	Live	
10 Sep	Relocation	Relo 6	*Ellipsaria lineolata*	93.5				1	Live	
10 Sep	Relocation	Relo 6	*Ellipsaria lineolata*	60.7				1	Live	
10 Sep	Relocation	Relo 6	*Ellipsaria lineolata*	61.6				1	Live	
10 Sep	Relocation	Relo 6	*Amblema plicata*	111.5				1	Live	
10 Sep	Relocation	Relo 6	*Amblema plicata*	112.6				1	Live	
10 Sep	Relocation	Relo 6	*Amblema plicata*					2	WD	
10 Sep	Relocation	Relo 6	*Ligumia recta*	145			F	1	Live	
10 Sep	Relocation	Relo 6	*Ligumia recta*	142.3			F	1	Live	
10 Sep	Relocation	Relo 6	*Ligumia recta*	145			F	1	Live	
10 Sep	Relocation	Relo 6	*Ligumia recta*	150+			M	1	Live	
10 Sep	Relocation	Relo 6	*Ligumia recta*	150+			M	1	Live	
10 Sep	Relocation	Relo 6	*Pleurobema cordatum*	63.5				1	Live	

[1] * = Federally listed species

[2] F = Female; M = Male

[3] WD = Weathered deadshell

D-3
DATASHEETS

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road, Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 6 of 7
DATE 10 Sept 2024

Project/Task: 2312.05 Stream Ohio river State WV County Wood

Relocation Dives

ESI - Mussel Datasheet

No.	Area	~~Transect~~	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1	Relo	2			P. cord	93.3, 68.4						
2		1			P. sin	67.0, 96.5, 90.0						
3		1			P. cyphus	1 WD						
4	Relo	3			T. met	83.0, 93.4, 72.5, 85.4, 82.1, 88.9, 84.1, 86.4, 73.2, 79.5		1-WD				
5		|			Cpust	68.5						
6		|			E lin	76.4, 81.2, 85.5,			2-WD			
7		|			L cord ♀	102.5						
8		|			L cord ♂	118.7						
9		|			A lig	113.4, 113.6		1-WD				
10		|			L recta ♀	133.0						
11		|			P cord	89.1	1-WD					
12		|			A plic	7-WD						
13		1			Palatus	1-WD						
14	Relo	4			T met	85.0, 82.0, 82.3, 82.2, 82.3, 83.0, 74.4, 80.7, 89.5						
15		1			A plic	89.3, 98.5, 119.0, 107.0, 108.7, 95.1, 110.2						5-WD
16		|			E lin	56.5						
17		|			Cpust	65.5	1-WD					
18		|			Palatus	121.1						
19		|			L recta ♀	132.0, 136.4, 134.2						
20		|			L recta ♂	130.6						
21		|			L cardium ♂	122.7						
22		|			P cord	92.2, 88.4, 102.7						
23		|			P sin	98.7						
24		|			P cyphyus	1-WD						
25		1		☆	F sub	96.7	50.4	79.3				Tag #1961 Yellow
26	Relo	5			A plic	94.5, 102.8, 105.0, 106.0, 89.0, 107.5						
27		|			T met	86.1,						
28		|			E lin	95.5						
29		|			O ref	53.4						
30		1			L sili ♀	80.0						

* Male / Juvenile / Female

*Diver (initials only)

ESI

Property of Environmental Solutions & Innovations, Inc.
4525 Este Ave Road. Cincinnati, OH 45232 (513) 451 - 1777

DATASHEET# 7 of 7
DATE 10 sept

Project/Task: 7312.005 Stream Ohio River State WV County Wood

Relocation Spot Dives

ESI - Mussel Datasheet

No.	Area	Transect	Interval	Diver	Species	Length (mm)	Width (mm)	Height (mm)	Age	M J F	Photo #s	Comments
1		Relo	5		Alig	120.4						
2			1		L recta ♂	144.5, 138.6, 141						
3					L recta ♀	111.5						
4					P rord	79.7	1-WD					
5					P alatus	115.3, 106.4		3-WD				
6					C pust	2-WD						
7			1		M nervosa	1-WD						
8		Relo	6		T rect	89.4, 85.4, 81.2, 90.0, 80.0				74.7		
9			1		A lig	127.0	1-WD					
10					P alatus	120.3	111.5					
11					E lin	88.0, 90.5, 93.5, 100.7, 61.6,						
12					A plic	111.5, 112.6			2-WD			
13					L recta ♀	145.0, 142.3, 145.0						
14					L recta ♂	150+, 150+						
15			1		P rord	63.5						
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

* Male / Juvenile / Female

*Diver (initials only)

D-4
REPRESENTATIVE SITE PHOTOS



Relo 1



Relo 2



Relo 3



Relo 4



Relo 5



Relo 6

APPENDIX E
PROJECT-WIDE MUSSEL PHOTO VOUCHERS



Live mucket (*Actinonaias ligamentina*)



Live threeridge (*Amblema plicata*)



Live pimpleback (*Cyclonaias pustulosa*)



Live fanshell (*Cyprogenia stegaria*) – Yellow 0504



Live butterfly (*Ellipsaria lineolata*)



Live elephant-ear (*Elliptio crassidens*)



Live Wabash pigtoe (*Fusconaia flava*)



Live longsolid (*Fusconaia subrotunda*) – Yellow 1752



Live male pink mucket (*Lampsilis abrupta*) – Yellow 0276



Live male plain pocketbook (*Lampsilis cardium*)



Live female fatmucket (*Lampsilis siliquoidea*)



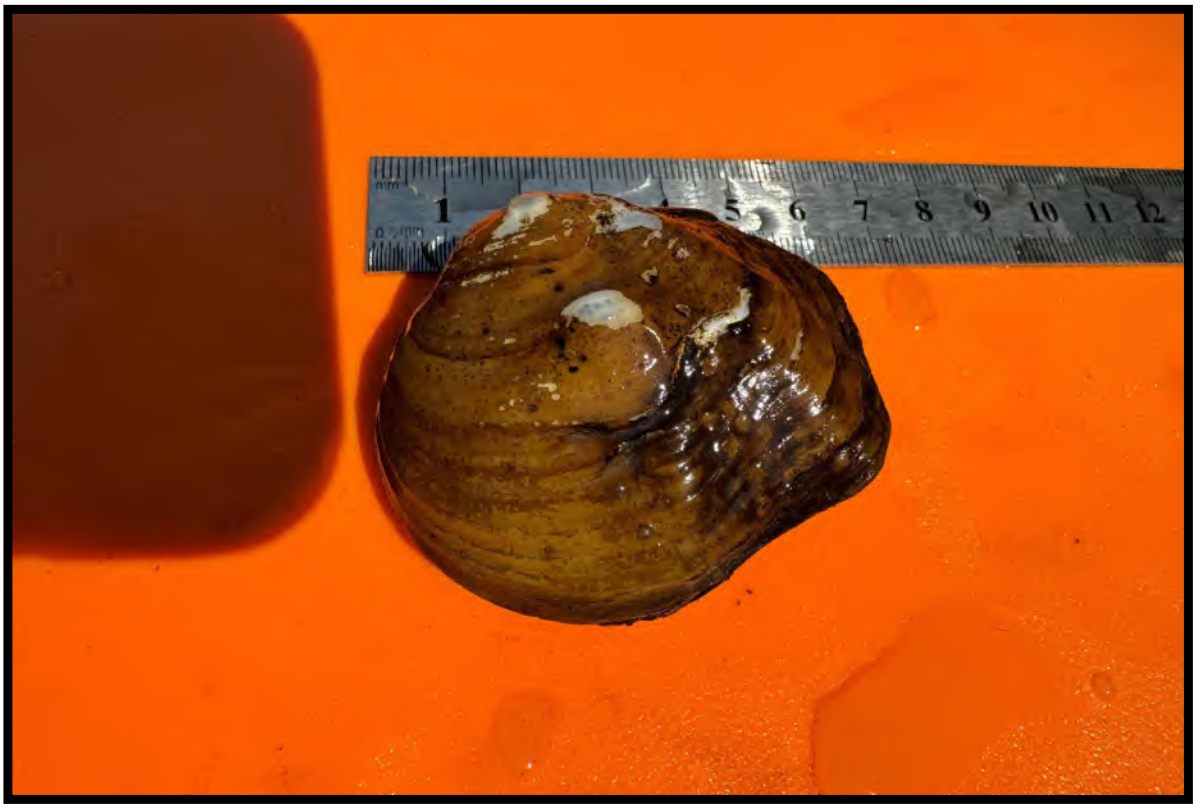
Live white heelsplitter (*Lasmigona complanata*)



Live male black sandshell (*Ligumia recta*)



Live washboard (*Megalonaias nervosa*)



Live threehorn wartyback (*Obliquaria reflexa*)



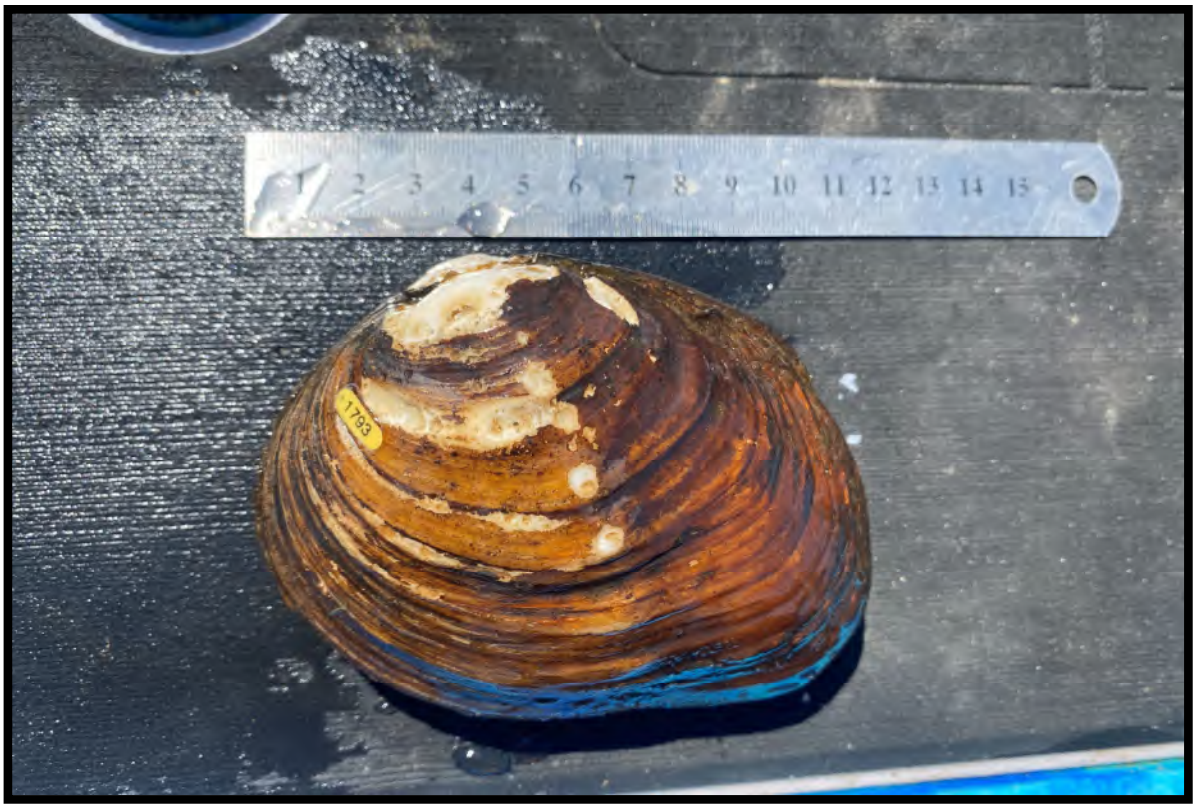
Live round hickorynut (*Obovaria subrotunda*) – Yellow 1606



Live round hickorynut (*Obovaria subrotunda*) – Yellow 1945



Live sheepnose (*Plethobasus cyphyus*) – Yellow 1418



Live sheepnose (*Plethobasus cyphyus*) – Yellow 1793



Live clubshell (*Pleurobema clava*) – Gray T007



Live Ohio pigtoe (*Pleurobema cordatum*)



Live pink heelsplitter (*Potamilus alatus*)



Live fragile papershell (*Potamilus fragilis*)



Live kidneyshell (*Ptychobranchus fasciolaris*)



Live maple leaf (*Quadrula quadrula*)



Live monkeyface (*Theliderma metanevra*)

APPENDIX F
COMPREHENSIVE FLS-SPECIFIC DATA

Table F1. Federally listed species occurances for the Muskingum Island Well Plugging Project on the Ohio River, Wood County, West Virginia.

Date (2024)	Site	Species	Common Name	Latitude	Longitude	Tag Status	Tag Number
28 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.364923	-81.513171	new	020 Yellow
29 Aug	Site 1	*Cyprogenia stegaria*	fanshell	39.365148	-81.512741	new	0504 Yellow
29 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.365016	-81.512972	new	1760 Yellow
30 Aug	Site 1	*Lampsilis abrupta*	pink mucket	39.365375	-81.512525	new	0276 Orange
30 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.365375	-81.512525	new	1310 Blue
30 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.365267	-81.512707	new	1976 Yellow
30 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.365267	-81.512716	new	1418 Yellow
30 Aug	Site 1	*Plethobasus cyphyus*	sheepnose	39.365267	-81.512716	new	0774 Yellow
30 Aug	Site 1	*Obovaria subrotunda*	round hickorynut	39.365493	-81.512355	new	1606 Yellow
31 Aug	Site 2	*Plethobasus cyphyus*	sheepnose	39.366689	-81.509677	new	0289 Orange
2 Sep	Site 1	*Plethobasus cyphyus*	sheepnose	39.36436	-81.513713	new	1765 Yellow
2 Sep	Site 1	*Cyprogenia stegaria*	fanshell	39.36436	-81.513713	new	1725 Yellow
2 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367232	-81.508680	new	1990 Yellow
2 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367416	-81.509196	new	1916 Yellow
3 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367583	-81.508545	new	1861 Yellow
3 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367563	-81.508364	new	1104 Yellow
3 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367823	-81.508506	new	1928 Yellow
4 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.367944	-81.508342	new	0737 Yellow
4 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368199	-81.508019	new	0711 Yellow
5 Sep	Site 2	*Obovaria subrotunda*	round hickorynut	39.368385	-81.507570	new	1989 Yellow
6 Sep	Site 2	*Obovaria subrotunda*	round hickorynut	39.368608	-81.507204	new	1945 Yellow
6 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368655	-81.507419	new	1935 Yellow
6 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368724	-81.507341	new	0739 Yellow
6 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368652	81.506980	new	1714 Yellow
7 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368793	-81.507267	new	1860 Yellow
8 Sep	Site 2	*Cyrogenia stegaria*	fanshell	39.369432	-81.506277	new	1902 Yellow
8 Sep	Site 2	*Obovaria subrotunda*	round hickorynut	39.369215	-81.505899	new	0757 Yellow
9 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.369822	-81.505711	new	1793 Yellow
9 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.369638	-81.505971	new	1965 Yellow
9 Sep	Site 2	*Obovaria subrotunda*	round hickorynut	39.369324	-81.505748	new	1722 Yellow
10 Sep	Site 2	*Pleurobema clava*	clubshell	39.368813	-81.507097	existing	T007 Gray
10 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368055	-81.508064	new	1778 Yellow
10 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.369565	-81.505947	new	1049 Yellow
10 Sep	Site 2	*Plethobasus cyphyus*	sheepnose	39.368984	-81.506805	new	1704 Yellow
10 Sep	Site 2	*Fusconaia subrotunda*	longsolid	39.368451	-81.507582	new	1752 Yellow
10 Sep	Relo 4	*Fusconaia subrotunda*	longsolid	39.368451	-81.507582	new	1961 Yellow

APPENDIX B
USFWS RHPO CLEARANCE

REQUEST FOR NHPA (SECTION 106) REVIEW – NORTHEAST REGION

Submit to RHPO in Advance of Undertakings

Project Background:

Project Name: Orphaned Oil and Gas well plugging Project Type: Infrastructure

Station: Ohio River Islands NWR County: Wood State: WV On USFWS land? Yes ☑ No ☐

USFWS Program: Refuges If Other, please name: _____

Project Location: Township(s) T.3N, R.9W USGS Quad: Parkersburg

Total Project Area Size (in Acres): 88 acres If road/trail, (linear ft, L and W): _____

USFWS Project Leader: Vic Elam Phone #: 620-203-8514

If there is a Governmental/NGO partner(s), please name: _____

Mandatory Attachments (on separate sheets):

1. USGS topographical map and aerial photo, ensuring that the proposed project boundaries are exact.
2. Details of anticipated project activities, i.e. ground/building disturbance (add maps as necessary)
3. Only the relevant sections of design drawings showing soil disturbance boundaries (e.g. planviews)
4. Land use history and environmental setting of the project area (add maps as necessary)

☐ **Check here if you have done any informal consultation(s) outside the USFWS** (if not, check here ☑)
If so, did you talk with SHPO? Tribes? Did you consult any database with known surveys or sites?
Please attach any information you have regarding your outside informal consultation(s).

☑ **Check here if there has been a CR survey done in the project area already** (if not, check here ☐).
If so, who conducted it and when? Did they find any buildings/sites? Please see the next section.
Please attach any information/report(s) you have regarding any previous field survey(s).

☐ **Check here if there are buildings/known sites* in the project area.** (if not, check here ☑)
*Sites may include archaeological sites or features, artifact scatters, mounds or earthworks, cemeteries, privy pits, old foundations, ruins, bridges, dams, water control structures, historic roads/trails/fences, and trash pits/piles.

Information for RHPO if there are known buildings/sites in the project area:

1. Age of building(s)/site(s) or date(s) built: _____RPI # or State(s)_____
2. Attach ground level photographs of both inside and outside of buildings/sites.
3. Attach close-up aerial photo or a sketch map illustrating the placement of the buildings/sites in the project area, key the ground photos to the aerial photo/sketch map.
4. Attach detailed descriptions of the buildings/sites with emphasis on their size, floor plans and architectural elements. Individually, what kind of physical shape are they in (good, fair or poor)?

Submitted by: _____ Date: 12/1/21 Phone #: 620-203-8514

If applicable, submit this form with the Environmental Action Statement (EAS) or NEPA Checklist

RHPO Only ******* *Final Finding by Regional Director via RHPO

☐ Investigation
☐ No Field Survey Needed
☐ Field Survey Done
☐ Phase I (ARPA# _____)
☐ Phase II (ARPA# _____)
☐ Phase III (ARPA# _____)
☐ No Potential Effect. ☐ No site/building(s) in APE. No Effect.
☐ Site/Building(s) present, but none are Historic Properties. No Effect.
☐ Historic Property(ies) present, but No Effect/No Adverse Effect.
☐ Historic Property(ies) present, Adverse Effect, Resolved with MOA.
Justify Finding: No ground disturbance proposed
☐ Stipulations Limit tree clearing to flush with ground (no grubbing) Limit ground disturbance associated with equipment

_____ 2/11/2022 2022.WV.ORI.001

Amy Wood, USFWS Northeast RHPO Date RHPO Project #

*Although the project has been cleared, inadvertent discoveries are still possible. If so, please stop and contact the RHPO at 413-253-8297.