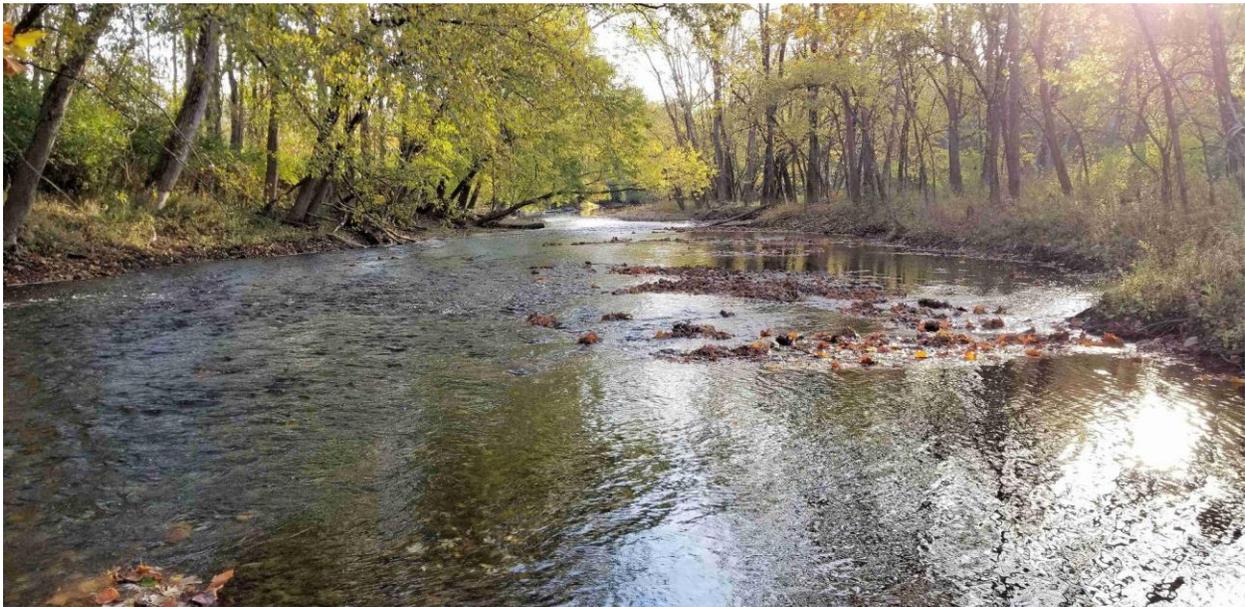


TRIENNIAL REVIEW COMMENTS
BIG AND LITTLE DARBY CREEKS
OUTSTANDING NATIONAL RESOURCE WATERS (ONRW)



Request to the Ohio Environmental Protection Agency to Designate Big and Little Darby Creeks, or portions thereof, as an Outstanding National Resource Water Under OAC § 3475-1-05(E)(2).

Submitted By: The Ohio Environmental Council, Darby Creek Association, Center for Biological Diversity, American Rivers, Forest Keeper, Ohio Scenic Rivers Association, Sierra Club Ohio, and the Nature Conservancy.



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To Ohio EPA Director Anne M. Vogel, Tiffani Kavalec, Chief of the Division of Surface Water, and the Rules Coordinator for the Division of Surface Water:

The comments contained herein comprehensively explain why both Big and Little Darby Creeks must be designated as Outstanding National Resource Waters during the upcoming Triennial Review conducted under OAC § 3475-1-05(E)(2). The signatory organizations look forward to engaging in productive discussions with the Ohio EPA to provide these two creeks with the protections they deserve moving forward. These technical comments support the thousands of Americans who submitted public comments over the past few weeks in support of the designation for the Big and Little Darby Creeks.

The Big and Little Darby Creeks form one of the most important ecological and recreational watersheds in Ohio, the Midwest, and the United States as a whole. Because of their outstanding aquatic biodiversity, the state has classified both creeks as State Scenic Rivers, Exceptional Warm-water Habitats, and Outstanding State Resource Waters. Despite these protections and designations, the creeks are currently facing an uncertain future. With increasing urban and suburban development in the area, many of the watershed's protected mussel species are in decline, and in some cases species are in imminent danger of disappearing.

Without stronger protections, including appropriate antidegradation tier categorization as ONRWs, we will lose one of the most biologically significant stream systems in the Midwest and

the nation. The Big and Little Darby Creeks' current Outstanding State Water antidegradation categorization does not appropriately reflect or protect their national significance. Both creeks are textbook examples of the Clean Water Act's most protective designation—they are Outstanding National Resource Waters. It is long past time for the Ohio EPA to provide them both with the protection due such waters, making them the first in Ohio to receive the designation.

If your team has any additional questions regarding the need to designate the Big and Little Darby Creeks as Outstanding National Resource Waters, our team would welcome the opportunity to meet with them.

Respectfully submitted,

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INTRODUCTION

The Big Darby and Little Darby Creek watershed is one of the most biologically diverse in Ohio, the Midwest, and the Nation. The watershed shelters more than 100 species of fish and 45 mussel species, including five federally endangered aquatic species. It is one of the most ecologically significant watersheds in the Midwest—with unique geology, high stream gradients, intact landscapes, and minimal industrial development. Both creeks are textbook examples of the Clean Water Act’s most protective designation—they are Outstanding National Resource Waters. It is long past time for the Ohio EPA to provide them both with the protection due such waters, making them the first in Ohio to receive the designation.

And without further and appropriate protection, existing trends suggest that the water quality of the Big and Little Darby Creeks is at great risk for further degradation. If appropriate protections are not put in place, we will likely lose key components of one of the most biodiverse stream systems in the Midwest and the nation. Categorizing the Big and Little Darby Creeks as Outstanding National Resource Waters (ONRW) is necessary if we wish to maintain them as the rare, nationally significant gems they are. Therefore, we respectfully request that the Ohio EPA Director categorize the Big and Little Darby Creeks (the main stems, from headwaters to their confluence with the Scioto River) as Outstanding National Resource Waters.

The Big and Little Darby Creeks form one of the most important ecological and recreational watersheds in Ohio, the Midwest, and the United States as a whole. Located west of Columbus, Ohio, 45 mussel species and over 100 species of fish have been recorded in the watershed,

many of which are state and federally threatened and endangered species as well as declining species.¹ This highly diverse aquatic fauna is present due to the fortuitous combination of limited dense development and wastewater, few dams, favorable geology, good connectivity to the historically diverse Scioto River and Ohio River systems, and diverse surrounding upland ecosystems with protected riparian land. In addition, the streams, which flow through mostly agricultural land, have thus far largely been spared extensive industrial and residential development. Despite these advantages, the watershed is showing signs of stress, and massive proposals for new development threaten to forever alter the landscape and instream habitat that supports the Big and Little Darby Creeks' nationally significant biodiversity and recreational values.

Because of their outstanding aquatic biodiversity, the state has classified both creeks as State Scenic Rivers, Exceptional Warmwater Habitats, and Outstanding State Waters.² In addition, the National Park Service has designated the Big and Little Darby Creeks National Scenic Rivers.³ Despite these protections and designations, the creeks are currently facing an uncertain future. With increasing urban and suburban development in the area, many of the watershed's protected mussel species are in decline, and in some cases species are in imminent danger of disappearing. Citing these declines, and the imminent expansion of residential development into the watershed,

¹ At least 45 mussel species and over 100 fish species have been recorded, though there may be unrecorded species in the watershed. Mussel sources include historical records and specimens from the Ohio Museum of Biological Diversity (OSUM), Ohio EPA, Ohio Department of Natural Resources, and Metro Park staff (Mac Albin and others). Fish sources include OSUM, Ohio EPA, and ODNR. *See also* Table 5 in the Appendix; twenty-two fish species recorded in the Big Darby Creek watershed are found on OAC § 3745-1-05's Table 5-2 (Declining Fish Species).

² Table 5-5, OAC § 3745-1-05. *See also* OAC § 3745-1-09. *See also* *List of Ohio's Scenic Rivers*, Ohio Department of Natural Resources, available at: <https://ohiodnr.gov/discover-and-learn/safety-conservation/about-odnr/nature-preserves/scenic-rivers/list-ohio-scenic-rivers>.

³ *See Big and Little Darby Creeks, Ohio*, National Wild and Scenic Rivers System, available at: <https://www.rivers.gov/rivers/big-darby.php>.

the non-profit conservation group American Rivers has twice named Big Darby Creek one of the nation's 10 "Most Endangered Rivers," most recently in 2019.⁴

To borrow a phrase from the Ohio EPA, the Darby is at a crossroads.⁵ Without stronger protections, including appropriate antidegradation tier categorization as ONRWs, we will lose one of the most biologically significant stream systems in the Midwest and the nation. The Big and Little Darby Creeks' current Outstanding State Water antidegradation categorization does not appropriately reflect or protect their national significance. Time is of the essence if we wish to preserve this nationally significant resource that flows through our proverbial and literal backyard. Ohio EPA's current triennial review is a timely opportunity to correct the Creeks' existing antidegradation categorization.

I. LEGAL BACKGROUND

A. ONRWs are Surface Waters with National Ecological *or* Recreational Significance, or Waters with Biological Characteristics that Exceed those Required of Superior High Quality Waters.

Ohio's Antidegradation Rule is found at Ohio Administrative Code § 3745-1-05. That rule, at OAC § 3745-1-05(A)(10)(d), defines "Outstanding national resource waters" as "surface waters that have a national ecological *or* recreational significance[.]" (emphasis added). This same section of the Antidegradation Rule elaborates that national ecological significance:

may include providing habitat for populations of federal endangered or threatened species or displaying some unique combination of biological characteristics in addition to those factors listed in [the definition of 'superior high quality waters' found at OAC § 3745-1-05(A)(10)(b)].⁶

⁴ *America's Most Endangered Rivers of 2019 spotlights climate change threats*, American Rivers, (April 16, 2019), available at: <https://www.americanrivers.org/2019/04/americas-most-endangered-rivers-of-2019-spotlights-climate-change-threats/>

⁵ See *Darby at the Crossroads: A Summary of Ohio EPA's Work and Collaboration to Protect and Restore an Important Water Resource*, The Ohio EPA, (June 30, 2004), available at: https://epa.ohio.gov/static/Portals/35/documents/Darby%20Crossroads_june04.pdf.

⁶ OAC § 3745-1-05(A)(10)(b) defines "superior high quality waters" as "surface waters that possess exceptional ecological values[.]" The same section further provides that the following factors shall be considered in determining exceptional ecological value:

The OAC definition of ONRW further provides that national recreational significance “may include designation in the national wild and scenic river system.” OAC § 3745-1-05(A)(10)(d). And, the same definition provides that ONRWs are to be categorized pursuant to paragraph (E) of Ohio’s Antidegradation Rule.

B. Triennial Review Is a Formal Opportunity for Ohio EPA to Determine Appropriate ONRW Categorizations.

Paragraph (E)(2) of Ohio’s Antidegradation Rule delineates the *triennial review* process for determining high quality water categorizations, including ONRW categorizations:

At least once every three years, the director, in consultation with the director of the department of natural resources, shall consider available information on water bodies in Ohio and determine appropriate high quality water categorizations. Each determination shall consider attributes of exceptional recreational or ecological value, ***the national significance of the water body,*** and other existing and planned uses of the water body. **If the director identifies any waters not properly categorized, the director shall public notice the director's intent to categorize them to the appropriate category upon consideration of public comment.** The director shall categorize outstanding national resource waters, outstanding state waters and superior high quality waters in tables 5-4 to 5-7 of this rule.

OAC § 3745-1-05(E)(2) (emphasis added). As is provided in the rule language above and pursuant to the triennial review process, if the Ohio EPA director identifies any waters not properly categorized, “the director shall public notice the director’s intent to categorize them to the appropriate category upon consideration of public comment.” *Id.*

providing habitat for Ohio or federal endangered species; providing habitat for Ohio threatened species; harboring stable populations of a declining fish species that coincide with the presence of suitable habitat for that species, or that coincide with an essential migration path between areas of suitable habitat for that species; and displaying a level of biological integrity equivalent to the exceptional warmwater habitat index of biotic integrity or invertebrate community index criteria values listed in rule 3745-1-07 of the Administrative Code.

Additionally, this code section further provides that:

Water bodies that exhibit a pattern of biological integrity equivalent to index of biotic integrity and, where applicable, invertebrate community index scores of fifty-six or greater at most sites are characteristic of a near-pristine aquatic habitat. Such waters, as well as other ecologically unique water bodies that have essentially undisturbed native faunas, but for which the biological criteria in rule 3745-1-07 of the Administrative Code do not apply, may be considered as possessing exceptional ecological values without the presence of threatened or endangered species.

II. BIG AND LITTLE DARBY CREEKS SATISFY THE REQUIREMENTS TO BE DESIGNATED AS OUTSTANDING NATIONAL RESOURCE WATERS.

A. The Darby Creeks Are Improperly Categorized as Outstanding State Waters.

The Big and Little Darby Creeks are currently categorized as Outstanding *State Waters*.

Ohio Administrative Code § 3745-1-05(A)(10)(c) defines “Outstanding state waters” as:

Waters that have special significance for the state because of their exceptional ecological values or exceptional recreational values, and that have been so categorized pursuant to paragraph (E) of this rule. To qualify on the basis of exceptional ecological values they must meet the qualifications for superior high quality waters and be further distinguished as being demonstratively among the best waters of the state from an ecological perspective. To qualify on the basis of exceptional recreational values they must provide outstanding or unique opportunities for recreational boating, fishing or other personal enjoyment.

Certainly, both the Big and Little Darby Creeks satisfy the requirements of the Outstanding State Waters categorization. Both water bodies are among the best waters in Ohio from an ecological perspective. And both water bodies provide outstanding and unique recreational opportunities. In short, Big and Little Darby Creeks are waters of special significance for Ohio. If that were all to be said of the Big and Little Darby’s significance, then their current Outstanding State Waters categorizations might well be appropriate. But, of course, that characterization stops well short of their full and true significance. The significance of the Big and Little Darby Creeks extends well beyond Ohio’s boundaries. These are demonstrably two of the most significant waters in the Midwest. And they are two of the most significant waters in the Nation. The Darby Creeks’ current antidegradation categorization as Outstanding State Waters does not reflect their *national* significance. These waters are therefore not properly categorized under Ohio’s Antidegradation Policy. *See* OAC § 3745-1-05(E)(2).

B. The Darby Creeks Have National Ecological Significance.

1. The national ecological significance of the Darby Creeks is well established.

According to the Ohio EPA, “natural resource professionals from private, public and academic institutions are unanimous in citing these streams as among the most biologically diverse streams of their size in the Midwest.”⁷ G. Thomas Watters, well-known malacologist, wrote that the Darby, “for its size, has the greatest diversity of freshwater mussels in North America, perhaps on Earth.”⁸ The Nature Conservancy has declared the Big and Little Darby Creeks as one of the “Last Great Places” worth saving.⁹ Big Darby Creek has twice been named one of the nation’s “Most Endangered Rivers” by American Rivers.¹⁰

In addition, the National Park Service has recognized both Big Darby Creek and Little Darby Creek as National Scenic Rivers, based on their remarkable aquatic diversity and their importance as refugia for rare and endangered species, specifically the watershed’s remarkable and federally endangered mussel fauna.¹¹ On March 10, 1994, both Big and Little Darby Creeks were designated National Scenic Rivers, following the Governor of Ohio’s initial request on October 1, 1990.¹² The National Park Service found that the creeks met the requirements of the Wild and Scenic Rivers Act (WSRA),¹³ a law which describes Scenic Rivers as “certain selected rivers of

⁷ *Darby at the Crossroads: A Summary of Ohio EPA’s Work and Collaboration to Protect and Restore an Important Water Resource*, The Ohio EPA, (June 2004), available at: https://epa.ohio.gov/static/Portals/35/documents/Darby%20Crossroads_june04.pdf.

⁸ G.T. Watters, *Freshwater Mussel Survey of Big Darby Creek*, The Ohio State University, at 1 (1996).

⁹ See *Big Darby and Little Darby Creeks, Ohio*, The National Wild and Scenic Rivers System, available at: <https://www.rivers.gov/rivers/big-darby.php>

¹⁰ *Supra* FN 4.

¹¹ *National Wild and Scenic Rivers System: Big and Little Darby Creeks, OH*, Department of Interior, Federal Register Volume 59, Number 66 (Wednesday, April 6, 1994).

¹² *Id.*

¹³ *Id.*

the Nation” with “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.”¹⁴ This requirement of “outstandingly remarkable” values closely resembles and reinforces the ONRW designation criteria of “national ecological or recreational significance” in OAC § 3745-1-05(A)(10)(d). The National Scenic Rivers program references the Big Darby’s biodiversity, especially its biological quality, in its listing on the registry for the category.¹⁵

2. The Darby Creeks provide habitat for populations of federal endangered and threatened species.

The watershed of the Big and Little Darby Creeks provides critical habitat for multiple federally threatened and endangered species,¹⁶ including at least four federally endangered and one federally threatened native freshwater mussel species.¹⁷ This fact alone qualifies the creeks as an Outstanding National Resource Waters, according to OAC § 3475-1-05(A)(10)(d), satisfying the definition of “national ecological significance.” Currently, Big Darby Creek is home to at least eight species that are on federal lists, including the four endangered mussels (northern riffleshell,

¹⁴ 16 USC § 1271.

¹⁵ See *Big & Little Darby Creeks, Ohio*, The National Wild and Scenic Rivers System, available at: <https://www.rivers.gov/rivers/big-darby.php>.

¹⁶ This section relies in part on the G. Thomas Watters surveys, The Ohio State University Museum of Biological Diversity data, Ohio EPA, ODOT and other data from mussel surveys of the Big Darby Creek watershed. See Milton B. Trautman, *The Fishes of Ohio*, Ohio State University Press 782 pp. (1981); G.T. Watters, *The Distribution and Relative Abundance of the Unionid Mollusks of the Big Darby Creek System in Ohio*, The Ohio State University 158 (1986); G.T. Watters, *1990 Survey of the Unionids of the Big Darby Creek System*, The Ohio State University 36 pp. (1990); G.T. Watters, *Unionidae of the Big Darby Creek System in Central Ohio, U.S.A.*, Malacological Review 99-107 (1996); G.T. Watters, *Freshwater Mussel Survey of Big Darby Creek*, The Ohio State University (1996); G.T. Watters, *Freshwater Mussel Survey of the Big Darby Creek System in Central Ohio*, Ohio Biological Survey 19-24 (1998), available at: http://www.ohiobiologicalsurvey.org/wp-content/themes/ohio/images/Watters_1_1998.pdf; Ohio EPA Fish Surveys (1979-Present); Tetzloff, *2000 Survey of the Freshwater Mussels of the Lower Big Darby Creek*, Ohio Department of Natural Resources 32 (2000); Communications with Dr. David H. Stansbery; Communications with Dr. Ted Cavender; Ohio Listed Species, Ohio Dept. of Natural Resources Div. of Wildlife (July 2020) <https://ohiodnr.gov/static/documents/wildlife/state-listed-species/Ohio's%20Listed%20Species%20pub356.pdf>.

¹⁷ See Table 2.

clubshell, snuffbox, and rayed bean), one endangered fish (Scioto madtom), two endangered mammals that rely on its riparian corridors for reproductive colonies (Indiana bat, northern long-eared bat), and one threatened mussel (rabbitsfoot). In addition, one Big Darby fish species is listed as federally monitored (paddlefish), and two freshwater mussels are currently under consideration for federal listing (round hickorynut and longsolid).¹⁸

Each federally listed mussel species has declined in recent decades within the watershed. Current protections, including designation of the creeks as Outstanding State Resource Waters, have not proven to be sufficient to meet the state’s antidegradation responsibilities. The assessments of species in the watershed and associated ecosystem expand on the watershed’s role in protecting nationally significant natural resources, and highlight the need for the both Big and Little Darby Creeks to be designated Outstanding National Resource Waters. All species assessments are available in the Appendix.

3. The Darby Creeks display a “unique combination of biological characteristics” in addition to those listed under OAC § 3475-1-05(A)(10)(b).

Ohio Administrative Code OAC § 3745-1-05(A)(10)(d) provides that national ecological significance may include “displaying some unique combination of biological characteristics” *in addition to* those listed OAC § 3475-1-05(A)(10)(b).¹⁹ In this section we will discuss how the Big Darby Creek watershed displays a unique combination of biological characteristics in addition to those listed in the State’s Superior High Quality Waters definition.

¹⁸ *Listed Animals*, U.S. Fish and Wildlife Service, available at: <https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report?kingdom=V&kingdom=I&status=E&status=T&status=EmE&status=EmT&status=EXPE&status=EXPN&status=SAE&status=SAT&mapstatus=3&fcrithab=on&fstatus=on&fspecrule=on&finvpop=on&fgroup=on&header=Listed+Animals>.

¹⁹ Supra FN 6.

First and foremost, Big and Little Darby Creeks are *unique* in that they provide critical habitat for an unprecedented number of Ohio endangered, threatened, and species of concern, as well as declining species. In fact, the Big and Little Darby Creeks repeatedly demonstrate the highest level of biotic integrity in the state according to Ohio EPA monitoring data.²⁰ IBI Fish Community Scores are a “multi-metric” classification system that ranks the ecological condition of streams. The Midwest Biodiversity Institute (MBI)’s October 2022 review of Ohio stream quality scores indicated the “endangered and threatened unionid mussel species” populations and “high quality fish assemblage data” distinguish Big and Little Darby Creeks “from other high quality streams in Ohio.”²¹ The mainstem of Little Darby Creek, followed by that of Big Darby Creek, has had the highest recorded mean IBI (Index of Biotic Integrity) scores among *all* Ohio streams. A refinement of the IBI, the CIBI,²² helps separate index scores at the highest levels of biological condition. Using this measure, data from the most recent Big and Little Darby Creek Ohio EPA survey *have the highest CIBI scores and the only mean scores > 90*. The October MBI document says it best: “It is clear that Big and Little Darby Creeks possess the most consistent high quality fish assemblages in Ohio in relation to the CIBI and intolerant species.”²³ The report also speaks to the dangers that the continued central Ohio urbanization might have if protections are not adequate.

²⁰ *Evidence Towards an Outstanding National Resource Water Antidegradation Tier for Big and Little Darby Creeks in Ohio: Avoiding Ecological Mediocrity in Ohio’s Best Streams and Rivers, Midwest Biodiversity Fact Sheet*, Midwest Biodiversity Institute, (October 10, 2022)

²¹ *Id.*

²² Rankin, E. T., *The calibration of the Ohio IBI and ICI using continuous scoring methods*, ILGARD, Voinovich School, Bldg 21, The Ridges, Ohio University, Athens, Ohio 45701 (2010).

²³ *Id.* at 2.

The Big and Little Darby Creeks exemplify “biological significance” in Ohio. Besides achieving the top IBI scores in Ohio, the watershed is home to thirty-nine species protected in the State of Ohio, including thirteen fish species, twenty-five mussel species, and one amphibian species, many of which are also on Ohio endangered and threatened lists.²⁴ The Ohio-listed species found in Big and Little Darby Creeks are cataloged in Tables 1-3 in the Appendix.

The largest group of state and federal listed species are freshwater mussels. According to Wendell R. Haag, a research fishery biologist for the U.S. Forest Service, “North America is home to the most diverse freshwater mussel fauna on Earth.”²⁵ But this community is in decline and at considerable risk: “finding a stream with a significant mussel fauna is an event to be remembered.”²⁶ Freshwater mussels are also the most imperiled group of animals in the country, with over 70% of species listed on various watch lists.²⁷ The Big Darby system is a critical refuge for numerous species. According to the late G. Thomas Watters, one of the foremost malacologists in Ohio, “**For its size, no other North American system has more reported species.**”²⁸ Of the eleven species of mussels listed as federally endangered or threatened in Ohio, five have been recorded in the Big and Little Darby Creeks.²⁹ Two of these, northern riffleshell and clubshell,

²⁴ *Ohio's Listed Species*, Ohio Dept. of Natural Resources, Div. of Wildlife, (July 2022), available at: https://ohiodnr.gov/static/documents/wildlife/state-listed-species/Pub+5356+Ohio+Listed+Species_R0722.pdf. See also OAC § 1501:31-23-02; OAC § 1501:31-23.

²⁵ Wendell R. Haag, *North American Freshwater Mussels: Natural History, Ecology, and Conservation*, U.S. Forest Service, Cambridge University Press, (2012), at 60, available at: https://www.srs.fs.usda.gov/pubs/books/2012/books_2012_haag_001.pdf

²⁶ *Id.* at 318.

²⁷ J.D. Williams, M.L. Warren Jr., K.S. Cummings, J. Harris and R.J. Neves. 1993. Conservation Status of Freshwater Mussels of The United States and Canada. September 1993. Fisheries 18(9):6-22. DOI: 10.1577/1548-8446(1993)018<0006:CSOFMO>2.0.CO;2

²⁸ Watters, G.T. 1994, *Unionidae of the Big Darby Creek system in central Ohio, USA*, Malacological Review 27: 99-107 (emphasis added).

²⁹ *Listed species believed to or known to occur in Ohio*, ECOS Environmental Conservation Online System, available at: <https://ecos.fws.gov/ecp/report/species-listings-by-state?stateAbbrev=OH&stateName=Ohio&statusCategory=Listed>. Accessed 12/5/2022.

were recorded as widely distributed and sometimes abundant in these streams' mainstems in the recent past.³⁰ Both these species likely have their last Ohio populations in the Big Darby system.

The following tables detail the biodiversity of Big and Little Darby Creeks. Importantly, Tables 1 - 4 (located in the Appendix) do not include every species recorded within the watershed, instead only specifically highlighting all species included on various state and federal lists.

To note an example of Big Darby's high quality habitat the Ohio EPA has emphasized how the Big Darby Creek watershed provides key habitat to the endangered spotted darter in a way few ecosystems can:

The state listed spotted darter (endangered) is highly intolerant to a wide range of disturbances and its presence is indicative of very high stream quality. Of the 48 instances statewide where the spotted darter has been collected by Ohio EPA since 1979, 40 (83%) have occurred in the Big Darby Creek basin. Historically, this species has been limited to only the very lowest reaches of Big Darby Creek, having been regularly recorded at State Route 104 (RM 3.2) since 1979. The 2001 survey recorded the spotted darter as far up Big Darby Creek as RM 25.7; however, occurrences still appeared relatively sporadic on a site-by-site basis (Figure 15). During the 2014 survey, the abundance of the spotted darter throughout the Big Darby Creek basin increased dramatically. They are now found as far upstream in Big Darby Creek as RM 34.2 and have even expanded their range as far as RM 8.2 into Little Darby Creek (Figure 15). These were the first spotted darter records by Ohio EPA in Little Darby Creek. In addition to the large adult individuals collected (above picture), other year classes were also recorded, with specimens as small as 3 cm collected.³¹

Moreover, Honick et al (2017) documented the expansion of the ranges of three darter species in the middle Scioto system, with Big Darby Creek serving as a historical refuge. In fact, the expansion of the spotted darter into new populations (nine new populations have been discovered since 1990, and several of these were in central Scioto streams and the Scioto River itself) was cited as the primary reason the USWFS declined to list spotted darter as federally threatened. At least two other uncommon fishes—the bluebreast darter and Tippecanoe darter—have seen similar expansions from Darby into the central Scioto system. Darby's role as refuge and source of

³⁰ Watters, G.T., M.A. Hoggarth & D.H. Stansbery, *The Freshwater Mussels of Ohio*, (2009).

³¹ *Id.* at 61.

expansions of the ranges of sensitive species is one “in addition to” that drives the need to designate the watershed Outstanding National Resource Water.

In addition to Ohio’s official listed species, the Ohio EPA maintains a list (included here as Table 5, located in the Appendix) of declining fish species consisting of “native species that have declined in distribution across Ohio based on collection records since 1978 compared to historical distributions of fish species.”³² Of the thirty-one species currently considered “declining” and listed in OAC § 3745-1-05, twenty have been recorded in the Darby Watershed, and many have substantial, thriving populations in the watershed. The number of sensitive and declining fish species residing in Big and Little Darby Creeks is outstanding, making the Darby Watershed a critical resource in protecting multiple species from ending up on watch lists in the state.³³

Table 5 (located in the Appendix) compares Ohio’s list of thirty-one declining fish species compared to the twenty species found in the Big Darby Creek Watershed (which occupies about 1.2% of the State of Ohio’s land area). The creeks’ role as a stronghold of declining fish is a leading reason why the Ohio EPA must classify them as Outstanding National Resource Waters.³⁴ Declining fish species “have similar properties to the threatened and endangered species, and will likely follow suit if conditions continue to decline in Ohio’s high quality waters.”³⁵ Figure 2 (located in the Appendix) shows how Big Darby Creek harbors a higher number of sensitive fish species than some other outstanding Midwestern streams in other states.³⁶

³² OAC § 3745-1-05 (A)(5).

³³ Table 5-2, OAC § 3745-1-05.

³⁴ *Id.*

³⁵ *Methods and Documentation used to Propose State resource water (SRW) and Superior High Quality Water (SHQW) Classifications for Ohio Water Quality Standards*, The Ohio EPA, (2002), available at: https://epa.ohio.gov/static/Portals/35/rules/SRW_SHQW_methods.pdf

³⁶ *Assessment of the Biological Assemblage Condition of Small Headwater Streams in Ohio Subject to the Proposed General Use Provisions of Ohio’s Water Quality Standards*, Midwest Biodiversity Institute, (2020), available at:

Figure 2: Ohio EPA Survey Data Plot for QHEI and Sensitive Fish in HUC-11 Watersheds³⁷

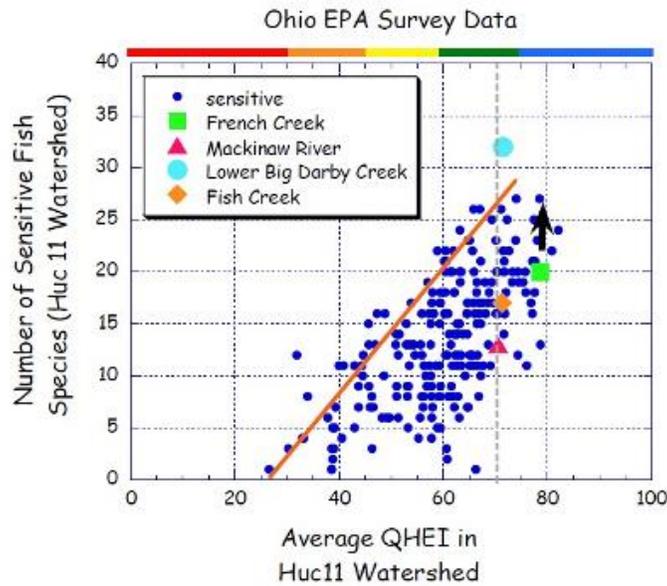


Figure 1 displays a plot of mean QHEI in Huc-11 watersheds and the cumulative number of sensitive fish species in each Huc-11 watershed. The orange line is a threshold “ceiling” drawn by eye. This graphic compares Big Darby Creek to outstanding streams in other states, including French Creek (NY), Mackinaw River (IL), and Fish Creek (IN/MI/OH).

But in addition to these metrics, Big Darby’s ecological importance is underscored by its unique mussel fauna, which is not explicitly measured by or factored into any state water quality standard. Big Darby’s nationally significant mussel fauna, by definition, exceeds the criteria in

<https://midwestbiodiversityinst.org/reports/assessment-of-the-biological-assemblage-condition-of-small-headwater-streams-in-ohio/MBI%20Assessment%20of%20Ohio%20Headwater%20Streams%20WQS%20FINAL%20FINAL%2020141009.pdf>

³⁷ *Assessment of the Biological Assemblage Condition of Small Headwater Streams in Ohio Subject to the Proposed General Use Provisions of Ohio’s Water Quality Standards*, MBI Technical Report. MBI/2011-6-6. Available at: <https://midwestbiodiversityinst.org/reports/assessment-of-the-biological-assemblage-condition-of-small-headwater-streams-in-ohio/MBI%20Assessment%20of%20Ohio%20Headwater%20Streams%20WQS%20FINAL%20FINAL%2020141009.pdf>

OAC § 3475-1-05(A)(10)(b), and qualifies the watershed for ONRW designation. Freshwater mussels are the most endangered fauna in the country, with an estimated 70 percent of species currently imperiled to various degrees.³⁸ Mussels are frequently described as the “canaries in the coal mine” in our freshwater streams, meaning they are the most sensitive animals and the first animals to show problems with water quality. This role as the most sensitive bioindicator in Big Darby Creek is evident in the fact that most fish and bug species are doing well, as demonstrated by IBI and ICI scores, but freshwater mussels continue to decline. This role qualifies as the “in addition to” required in OAC § 3745-1-05(A)(10)(d) to be designated as an Outstanding National Resource Water. Moreover, the OEPA does not factor mussels into its assessment of water quality in any meaningful or systematic way, so this decline in Darby’s mussel fauna has not been specifically monitored, assessed, or diagnosed by the agency.

Given the above factors, the Darby Watershed clearly displays “some unique combination of biological characteristics” *in addition to* characteristics described under OAC § 3475-1-05(A)(10)(b).

4. The Darby Creeks possess unique geological features that contribute to their national ecological significance (including to their unique combination of biological characteristics, above).

The high level of aquatic biodiversity in Big Darby Creek is due to many factors, but a leading factor is that Big Darby and its tributaries straddle several geobiological regions, resulting in an unusually rich cumulative aquatic biodiversity in the watershed. Overall, the watershed is in glaciated land in Central Ohio, but the watershed is not uniformly flat. In its headwaters the Darby streams flow out of the Bellefontaine Escarpment, a region of high elevation (the highest elevation

³⁸ *Freshwater Mollusks*, The Freshwater Mollusk Society, available at: <https://molluskconservation.org/MUSSELS/Conservation.html>

in the state) described as “an erosional remnant of Devonian limestone, dolomite, and shale.”³⁹ Downstream, Little Darby and portions of Big Darby flow through the Darby Plains, an extremely flat area dominated by prairie and oak savanna that is rare in Ohio (see below). Big Darby in its upper third nestles along the Powell end moraine, another geologic zone that influences aquatic communities. The lower Big Darby is characterized by steeper valleys and floodplains filled with deep deposits of glacial outwash. Finally, at its mouth Big Darby is fortuitously situated only 15 miles from the end of glaciation in Ohio, providing a connection to additional aquatic influences from the Appalachian foothills that will be described below.

As mentioned, in its headwaters both Big and Little Darby and some of their tributaries originate in the Bellefontaine Escarpment. These areas are home to cold water faunas, characterized by cold tolerant or cold dependent fishes. Most notably, an isolated colony of least brook lampreys, which are more typically found in colder streams in the Appalachian foothills, are present in this area. Other fish in this category include the brook stickleback and northern mottled sculpin.

Portions of the watershed (especially the Big Darby Creek upper and middle mainstem and Little Darby Creek and its tributaries) are situated in the largest easternmost extension of the Prairie Peninsula (see Figure 2).⁴⁰ This unusually flat landscape was characterized by extensive wetlands and unique fish communities not found in many Ohio streams (examples include blacknose shiner, lake and creek chubsuckers, least darter, golden shiner, hornyhead chub, central mudminnow, tadpole madtom).⁴¹ The prairie areas were characterized by deep grass and forb-derived soils that

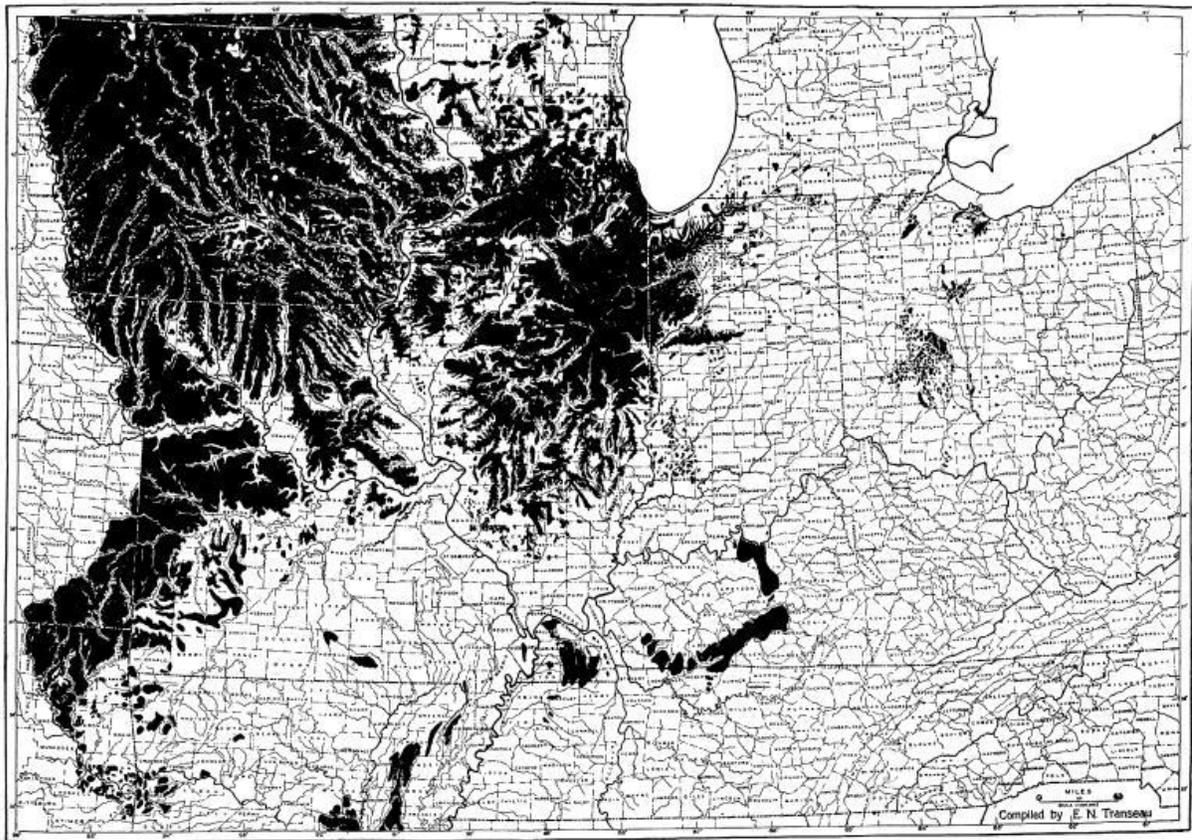
³⁹*Shaded Elevation Map of Ohio*, Ohio Department of Natural Resources, Division of Geological Survey, at 2.

⁴⁰ Roger C. Anderson, USDA Forest Service, GTR-SRS-161, available at: https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs161/gtr_srs161_175.pdf

⁴¹ Applegate, et al, *Conservation and Restoration Plan for Ohio's Native Glacial Lake and Wetland Fishes*, 2019.

promote infiltration and retention of stormwater. The prairies themselves are largely gone, but remnants have been preserved and groups like ODNR and Metro Parks have been working to restore many of the rare or unusual plant assemblages that were once common in the area but rare in Ohio.

Figure 1: Map of the Prairie Peninsula ⁴²



In the mid and lower sections of Big Darby relatively high gradient and favorable stream substrate quality are defining factors. The Big Darby Creek headwaters are near the Bellefontaine

⁴² *Map of the Prairie Peninsula showing eastern extension of tallgrass prairie in the Big Darby Creek watershed, created by Edward Transeau, 1935.*

outlier at a relatively high elevation for Ohio, and enters the Scioto River several hundred feet lower in elevation, creating a relatively high gradient for an Ohio stream of this size. Groundwater-fed reaches related to glacial gravel deposits are found throughout this section of the stream, especially in areas like the Powell end moraine and in large gravel deposits in many of the valley, resulting in the creeks' cobbly and fine-grained substrates. Water percolating through the glacial deposits provide the Darby streams a plentiful supply of groundwater, which filtered of pollutants, regulated in temperature, and consistently flows even in times of drought. The glacial till is also rich in minerals and is quite alkaline, providing aquatic organisms with foundational materials for their life cycles, especially mussels which are known to thrive in mineral-rich, alkaline waters.

The gravel substrate itself helps determine stream habitat quality. The glacial deposits are suitable for lithophilic fish species such as sensitive darters and suckers, some species of which contribute to higher IBI scores. Ohio EPA's 2014 survey documented that habitat quality was "excellent throughout the middle and lower mainstem. The mean mainstem QHEI score (80.1) indicated generally excellent habitat quality throughout."⁴³ Gradient and substrate habitat factors, and others, are significantly positively correlated with IBI scores in the Big Darby Creek watershed and are related to the Big Darby Creek watershed geographic location:

The overwhelming presence of natural stream features (i.e., good riffle quality, floodplain and riparian quality, good amounts and types of instream cover) throughout Big Darby Creek are necessary to support high quality aquatic communities found in this system. A majority of streams in the Big Darby Creek study area have substantial ground water input because of the glacial history and setting of the watershed. Substantial groundwater connectivity can ameliorate effects from negative habitat attributes that may be present, especially in smaller headwater streams."⁴⁴

As mentioned, Big Darby's proximity to unglaciated Ohio has added to the availability of a number of fish species characteristic of Ohio's hilly southern portion. Examples include least

⁴³ *Biological and Water Quality Study of the Big Darby Creek Watershed 2014*, Ohio EPA, (2018), at 202.

⁴⁴ *Id.*

brook lamprey, northern brook lamprey, gravel chub, northern madtom, trout-perch, and sand darter. Many of these fish species are not present in other Central Ohio streams or in Ohio's glaciated streams in general.

Finally, the fact that Big Darby is situated in the middle section of the Scioto River drainage—as opposed to being further upstream—has made the watershed an important spawning location for a number of large river fish. Examples include many of the buffalo, carpsucker, and redhorse suckers, as well as spotted bass, sauger, freshwater drum, and slenderhead and dusky darters. Many of these species are rarely or never recorded for streams that are situated farther from the Ohio River or lower Scioto River.

To summarize, the Darby Creeks are nationally significant due to their uniquely rich and rare biodiversity. First, the national ecological significance of the Darby Creeks is well established. Second, the Darby Creeks provide habitat for populations of several federally endangered and threatened species. Third, the Darby Creeks display a unique combination of biological characteristics. And, fourth, the Darby Creeks possess unique geological features that influence their unique biological values. These Creeks have more than “a national significance,” which is the operative language in the Antidegradation Policy. Indeed, these Creeks are nationally ecologically significant, and deeply so. Because the Darby Creeks are nationally ecologically significant, ONRW is their only appropriate antidegradation tier category. *See* OAC § 3745-1-05(A)(10)(d).

C. Big and Little Darby Creeks Have National Recreational Significance.

The Ohio Administrative Code definition of ONRW provides that national recreational significance “may include designation in the national wild and scenic river system.” OAC § 3745-1-05(A)(10)(d). The National Park Service has recognized both Big Darby Creek and Little Darby Creek as National Scenic Rivers, based on their remarkable aquatic diversity and their importance

as refuges for rare and endangered species.⁴⁵ Through its designation as a State Scenic River, Ohio has recognized how Big Darby Creek is “highly valued for [its] aesthetic and recreational enjoyment, as well as the many ecological attributes [it] possess[es].”⁴⁶ In fact, in the same report in 2002, the Ohio EPA remarked that “this water is clearly a SRW at a minimum and should be considered for Outstanding National Resource Water.”⁴⁷

In 1993, the creeks’ classification as a National Scenic River occurred based primarily on its ecological significance and its recreational significance. The Rivers, Trails, and Conservation Programs office of the National Park Service conducted a Wild and Scenic River Evaluation and Environmental Assessment for the Big and Little Darby Creeks, finding that the creeks met the criteria for such designation.⁴⁸ In its assessment, the National Parks Service analyzed Upper Big Darby Creek (River Mile 71.8 to 39.7), Lower Big Darby Creek (River Mile 34.1 to the Scioto River), and Little Darby Creek (River Mile 20.5 to 0.8).⁴⁹ All three creek segments considered met both the “free-flowing” and “outstanding resources” criteria needed to be designated as a Scenic River. But in addition, the National Parks Service proposed the Upper Big Darby Creek segment receive the “recreational” designation, one of three possible classifications National Scenic Rivers can receive (recreational, scenic, or wild).⁵⁰ Because roads parallel this section of the creek 82% of the time, the creek is readily accessible to visitors.⁵¹ Thus, through its designation as a National

⁴⁵ *National Wild and Scenic Rivers System: Big and Little Darby Creeks, OH*, Department of Interior, Federal Register Volume 59, Number 66 (Wednesday, April 6, 1994).

⁴⁶ *Appendix 1: Ohio Streams and Rivers Antidegradation Tier Justification, SRW & SHQW*, The Ohio EPA, (2002), at 18, available at: https://epa.ohio.gov/static/Portals/35/rules/antideg_justif_appendix1.pdf

⁴⁷ *Id.*

⁴⁸ *Big and Little Darby Creeks, Ohio: Wild and Scenic River Evaluation and Environmental Assessment*, The National Parks Service, (May 1993).

⁴⁹ *Id.* at 3.

⁵⁰ *Id.* at 13.

⁵¹ *Id.*

Scenic River, Big Darby Creek received special recognition for its particular recreational capabilities.

Importantly, Big and Little Darby Creeks have national recreational significance that goes beyond their National Scenic River designation. Multiple parks, nature preserves, and beyond run along the two creeks, most prominently Battelle Darby Creek Metro Park and Prairie Oaks Metro Park, part of the Franklin County Metro Parks system. Battelle Darby Creek Metro Park features over 7,000 acres of forests, wetlands, and prairies, including 1,600 acres of restored wetlands and prairies, and a pasture for bison reintroduced into the region.⁵² Nearly three dozen miles of trails traverse Battelle Darby Creek Metro Park, and visitors can participate in many different activities, from canoeing and kayaking to hunting and fishing.

In 2021 and 2022, over 1.8 and 1.6 million visits, respectively, were made to Battelle Darby Creek and Prairie Oaks Metro Parks.⁵³ Prairie Oaks Metro Park, also borders Big Darby Creek further upstream from Battelle Darby Creek Metro Park, with over 2200 acres of forest and prairie habitat. The Ohio Department of Natural Resources maintains nearly 1600 acres of fee simple ownership and conservation easement acres in the watershed. The Nature Conservancy maintains 1200 acres of Big Darby watershed conservation land, mainly with the Big Darby Creek Headwaters Nature Preserve, encompassing 1000 acres of streams, wetlands and forests northwest of Marysville, Ohio.⁵⁴ The Appalachian Ohio Alliance owns over 1100 acres along Big Darby Creek, mostly in Pickaway County. Other organizations, such as the City of Columbus, Franklin County Soil and Water Conservation District and Prairie Township in Franklin County own conservation

⁵² See *Battelle Darby Creek*, available at: <https://www.metroparks.net/parks-and-trails/battelle-darby-creek/>

⁵³ Steve Studenmund, Metro Parks, personal communication, January 25, 2023

⁵⁴ *Big Darby Creek Headwaters Nature Preserve*, The Nature Conservancy, available at: <https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/big-darby-headwaters-nature-preserve/>

land along Hellbranch Run and tributaries. In total, at least 13,000 acres of conservation land are held by conservation organizations and state and local governments.

Big Darby Creek in Battelle Darby Metro Park is a popular area for canoeing and kayaking, including a busy canoe livery at Darbydale. Prairie Oaks Metro Park further upstream on Big Darby also provides paddling access and is popular with paddlers. Boating access is available near Plain City. These are considered among the most scenic and high natural quality paddling experiences in central Ohio.⁵⁵

III. THE BIG AND LITTLE DARBY CREEKS ARE NOT ADEQUATELY PROTECTED BY THEIR CURRENT ANTIDegradation CATEGORY, EXISTING STORM-WATER CONTROL STANDARDS, OR BENEFICIAL USE DESIGNATIONS.

A. Ohio's Beneficial Use Definitions Are Insufficient to Protect the Darby's National Ecological Significance.

At present, the Big and Little Darby Creeks are not adequately protected by the beneficial use classification system. Big Darby Creek and Little Darby Creek and many of their tributaries are currently classified by the state of Ohio as Exceptional Warmwater Habitat and as an Outstanding State Resource Water. Nevertheless, long-term declines in some critical species, particularly federally listed freshwater mussels, show evidence of a long-term problem. These declines have been well documented, and evidence shows both a persistent gradual pattern of decline and at least one swift die-off of freshwater mussels.

Ohio has one of the most advanced water quality assessment systems of any state in the country. The state uses a system of biocriteria to categorize, assess, and set protections for most of its streams. The purpose of the system is to provide a check on regulations governing stresses from

⁵⁵ *A float down Big Darby Creek is the perfect pick-me-up*, Metro Parks, (2017), available at: <https://www.metro-parks.net/blog/float-big-darby-creek-perfect-pick/> Accessed January 25, 2023.

pollutant loading and improve stream quality to the point of achievement of use designations or better, and to protect a stream antidegradation status. If the aquatic life in a stream thrives under a given loading regime, then limits are judged adequate, i.e., in attainment, whereas if the aquatic life declines, or expected species are absent, pollutant loading limits are inadequate. Unfortunately, while this system has been very effective at achieving significant improvement in many streams across the state, evidence shows that it is not protective of a high quality streams like those in the Big Darby system. This is why the initial recommendation of Ohio EPA aquatic biologists in 2002 (see earlier reference) was to consider the ONRW tier for Big Darby Creek: the baseline biocriteria were not sufficient to protect Big Darby by themselves.

While the biocriteria set the baseline for aquatic life uses, the antidegradation tiers are designed to help protect quality above this baseline. The reasons are threefold. First, Ohio's biocriteria system does not specifically address or monitor specific sensitive species, such as state or federally listed species. For example, if a listed species declines or disappears from a stream, that stream can still meet its prescribed biocriteria scores and be determined to be in attainment of its use designation. Second, the state's biocriteria system uses three assessment tools: the Index of Biotic integrity (IBI), the Modified Index of wellbeing (MIwb) and the Invertebrate Community Index (ICI). These tools do not factor in a water body's use or assess native freshwater mussels. Third, this approach might not comprehensively and adequately address the combinations of multiple point and nonpoint sources—a likely cause of species losses, degradation, and nonattainment.

As a result of these shortcomings, Ohio's water quality standards have allowed many of the Big and Little Darby Creeks' rare and endangered species to decline, even as the mainstems of the creeks meet and exceed their water quality standards. Deficiencies in Ohio's Designated Use definitions and in the Darby stormwater permit—compounded by imminent substantial proposed

urban/suburban development in and adjacent to the Darby Watershed—only highlight the importance and the urgency of properly categorizing the Big and Little Darby Creeks’ antidegradation tier.

As early as the 1980s and 1990s, mussel surveys by G. Thomas Watters indicated declines over time in some of Darby’s freshwater mussel species.⁵⁶ In 2000, a survey of the lower portions of Big Darby Creek demonstrated significant mussel declines in that section of the river, and also showed shifts in the fauna toward more tolerant big river species.⁵⁷ The 2000 survey also found evidence that stormwater was a likely cause of mussel declines.⁵⁸ In 2014, as part of the Ohio EPA’s water quality assessment for an updated TMDL, the Department of Natural Resources commissioned a mussel survey, in recognition of the importance of this fauna to Darby’s overall health. The survey showed clear and widespread declines in mussel populations, as well as shifts in fauna makeup toward more common species.⁵⁹ Although the Ohio EPA declined to include the survey results in its technical document for an upcoming TMDL, the Nature Conservancy produced a report comparing results to the earlier Watters’ surveys.⁶⁰ The report included statements and quotes by Watters: “The decline seems to be ‘overall; it looks like diversity has declined.’ It’s ‘almost a system-wide thing;’ high water or techniques can’t explain all (of the decline).”⁶¹ Finally,

⁵⁶Watters, G. Thomas, *Freshwater Mussel Survey of Big Darby Creek*, The Ohio State University (1996).

⁵⁷Tetzloff, John, *2000 Survey of the Freshwater Mussels of the Lower Big Darby Creek*, Final Report to the Division of Wildlife, the Ohio Department of Natural Resources, at 18-19.

⁵⁸*Id.* at 10-19.

⁵⁹ EnviroScience, *Freshwater Mussel Survey Darby System in Logan, Champaign, Madison, Fr Pickaway Counties to Monitor 40 Sites Previously Surveyed by Watters*, 2015.

⁶⁰Sasson, Anthony, *Comparison of EnviroScience 2014-15 Freshwater Mussel Surveys on the Big Darby System ...* to Watters’ 1986-1996 Surveys, prepared for The Nature Conservancy, 2015, unpublished.

⁶¹*Id.* at 1.

in 2016 an unexplained die-off of mussels resulted in the death of thousands of mussels and individuals of at least two federally endangered species “perish[ing] without warning or explanation.”⁶² Under present conditions, Big Darby’s most sensitive and endangered species are clearly heading in the wrong direction.

Present conditions are not expected to continue, as current and predicted central Ohio development pressure is rising. The Mid-Ohio Regional Planning Commission (MORPC) has projected the population in the Central Ohio region will grow rapidly between 2018 and 2050, with overall population increasing by at least 634,000 resulting in a need for at least 270,000 additional residential units.⁶³ Much of this new development is already occurring, and the Building Industry Association (BIA) projects that much of the growth will occur in the first decade of MORPC’s projection, at an average of 14,000 new residential units per year over that period.⁶⁴

Even with the present protections provided by Darby’s Outstanding State Water Resource designation and conditions in the Ohio EPA stormwater permit, the Big Darby watershed has not been and will not be immune to development pressure. In fact, the area is already a target for new development due to the relatively low land prices in the watershed. In recognition of this threat, in 2002 the OEPA put a moratorium on new development in the Franklin County portion of the watershed until a stakeholder group (the External Advisory Group) could reach consensus on protective measures, including comprehensive stormwater planning.⁶⁵

⁶² Marion Renault, *Freshwater Mussels are Dying-Which is the Likeliest Culprit?*, Wired, (April 2020) <https://www.wired.com/story/freshwater-mussels-are-dying-which-is-the-likeliest-culprit/>.

⁶³ Mid-Ohio Regional Planning Commission, 2018–2050 Population Growth Projections (nd), <https://www.morpc.org/wp-content/uploads/2020/09/MORPC-POPULATION-PROJECTIONS.pdf>

⁶⁴ *Id.*

⁶⁵ *Water Quality Management Plan Scioto River Basin and Blacklick Creek*, Ohio Environmental Protection Agency, at 43, (2002).

In 2006, the Franklin County jurisdictions signed on to the historic Big Darby Accord, a land use plan that caps development in that portion of the watershed.⁶⁶ However, outside the Franklin County area, development in places such as West Jefferson, Plain City, and in the area along the US 33 and State Route 161 corridors in Union and Logan Counties, is proposed or progressing without adequate environmental planning demonstrating that rare and sensitive species would be protected.⁶⁷ In Logan, Madison and Union Counties, about \$170 million in sewer extensions and wastewater treatment plant loans are included in Ohio EPA's Program Management Plan for 2023.⁶⁸ This proposed development will potentially add thousands of acres of impervious surface and stormwater runoff in the near future. This pattern of rapid, unplanned and under-planned development puts the rare species and water quality of the Big and Little Darby Creeks at significant risk, and makes proper categorization of the Creeks all the more important and timely.

Residential and other development bring impervious surfaces and increased stormwater runoff, which add pollutants, and fundamentally alter thermal and flow regimes and in-stream habitat of waterways. This "hardening" of a watershed has well-researched impacts on water quality and biological performance at relatively low levels. The impacts extend to freshwater mussel faunas.⁶⁹ These impacts are described by the U.S. EPA:

Watershed modifications that increase the volume and change the timing of stormwater runoff may initiate substrate instability, increase bank erosion, and promote the siltation of downstream habitats. Strayer (1999) found mussels to be correlated closely with areas of hydraulic stability, moreso than other habitat features such as depth and substrate size. While American cities and suburbs continue

⁶⁶ *Big Darby Accord Master Plan*, 2006; available at: <https://bigdarbyaccord.org/EDP-big-darby-website/media/BDA-documents/Big%20Darby%20Accord%20Master%20Plan/High%20Resolution/Big-Darby-Accord-complete-hires.pdf>

⁶⁷ *Id.*

⁶⁸ *2023 Program Management Plan*, Ohio EPA, available at: <https://epa.ohio.gov/static/Portals/29/documents/ofa/WPCLF-PMP-DRAFT.pdf>

⁶⁹ Stepenuck, K.F., Crunkilton, R.L., and L. Wang. (2002). *Impacts of urban land use on macroinvertebrate communities in southeastern Wisconsin streams*. *Journal of the American Water Resources Association* 38(4):1041-1051.

to expand, stable habitat will likely become increasingly rare to the detriment of freshwater mussel communities.⁷⁰

In addition, greater imperviousness can interrupt natural patterns of stormwater flow and infiltration, leading to flashier and more erosive flooding and lower groundwater recharge of streams. Typical stormwater management can unintentionally raise temperatures in a stream, lead to lower baseflow during drought, and reduce the natural filtering of stream contaminants, all of which can adversely affect mussels. Finally, stormwater runoff is a vector for the delivery of a host of pollutants, according to the US EPA, including⁷¹:

- Sediment
- Oil, grease and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria and nutrients from pet waste and failing septic systems
- Road salts⁷²
- Heavy metals from roof shingles, motor vehicles and other sources
- Thermal pollution from impervious surfaces such as streets, rooftops and stormwater units

All of the listed pollutants negatively impact aquatic life, particularly mussels. Gillis et al (2017)⁷³ and others have cited urban stresses as key reasons for declines of mussels in streams.

Changes in flow regimes related to increases in stormwater runoff from both residential, commercial and agricultural land uses are already evident in the Big Darby watershed, and are

⁷⁰Grabarkiewicz, Jeffrey D. and Wayne S. Davis, *An Introduction to Freshwater Mussels as Biological Indicators*, U.S. Environmental Protection Agency, 2008, p. 18

⁷¹<https://www.epa.gov/nps/nonpoint-source-urban-areas>

⁷² Gillis found that chloride concentrations measured at mussel beds in Canada periodically reached acutely toxic levels for the mussel species tested. Gillis, P.L., *Assessing the toxicity of sodium chloride to the glochidia of freshwater mussels: Implications for salinization of surface waters*, *Environ. Pollut.* 159: 1702–1708. Available at: https://www.researchgate.net/publication/50831030_Assessing_the_Toxicity_of_Sodium_Chloride_to_the_Glochidia_of_Freshwater_Mussels_Implications_for_Salinization_of_Surface_Waters

⁷³Gillis, P.L., R. McInnis, J. Salerno, S.R. de Solla, M.R. Servos and, E.M. Leonard, *Freshwater mussels in an urban watershed: Impacts of anthropogenic inputs and habitat alterations on populations*, *Science of the Total Environment* 574: 671-619, (2017), available at: <https://www.sciencedirect.com/science/article/abs/pii/S0048969716320381>

already leading shifts in the mussel fauna, including declines in rare and federally endangered species.⁷⁴ These declines are clear evidence that current protections are not adequate.

While work needs to be done to determine the exact cause of ongoing declines in the mussel fauna in the Big Darby watershed, it is clear that current protections offered by its designation as Exceptional Warmwater Habitat and Outstanding State Resource Water has not been sufficient to avoid degradation of the watershed.

B. The Ohio EPA's Stormwater Permit for the Big Darby Watershed Is Inadequate to Protect the Creeks' Nationally Significant Character.

The statewide general permit includes two specific conditions in Appendix A Big Darby Creek Watershed (A.4 Riparian Setback Requirements, and A.6 Groundwater Recharge Requirement). While, generally speaking, these are appropriate types of conditions to include, their effectiveness has not been shown through comparison of biological data from stormwater-affected areas. Their adequacy for protection of rare and sensitive species has not been proven, such as through data analysis from Ohio EPA's extensive stream database. These permit requirements also can be avoided through mitigation that can be inappropriate and limited in effectiveness. The permit allows development at high levels of imperviousness that are well known to show lower biotic index scores based on Ohio EPA data. See the two following graphs, based on Ohio EPA stream data, that show rapid declines in stream fish biodiversity even at relatively low to modest levels of development.

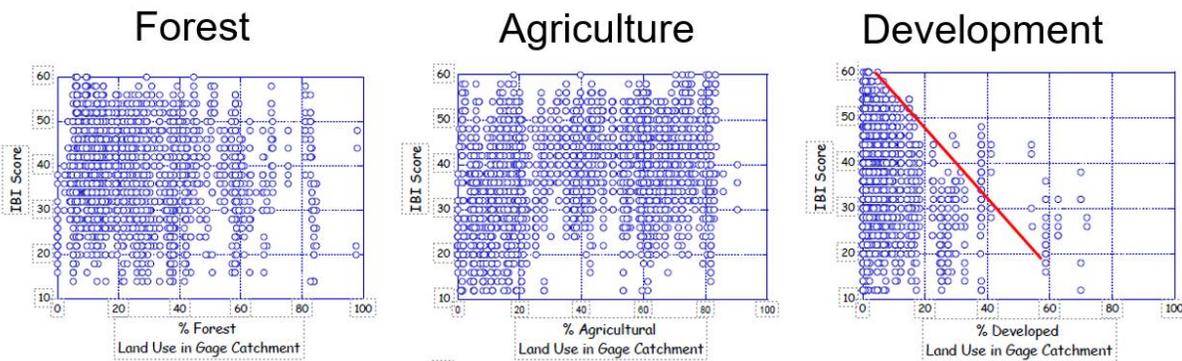
Concerns remain high that this permit for the Big Darby Creek watershed, while well-meaning, has not been shown to be sufficient to protect rare and sensitive species, including the

⁷⁴Tetzloff, John, *2000 Survey of the Freshwater Mussels of the Lower Big Darby Creek*, Final Report to the Division of Wildlife, the Ohio Department of Natural Resources, at 19.

species that help establish Big and Little Darby Creeks as Outstanding.⁷⁵ Data from developed sub-watershed areas affected predominantly by urban/developed land use must be compared to areas of lower levels of urban/developed land use to determine how much development/impervious surface and stormwater that species can tolerate and survive.

Figure 3⁷⁶

Comparison of agricultural and forested land use stream quality to that in developed (“urban”) areas

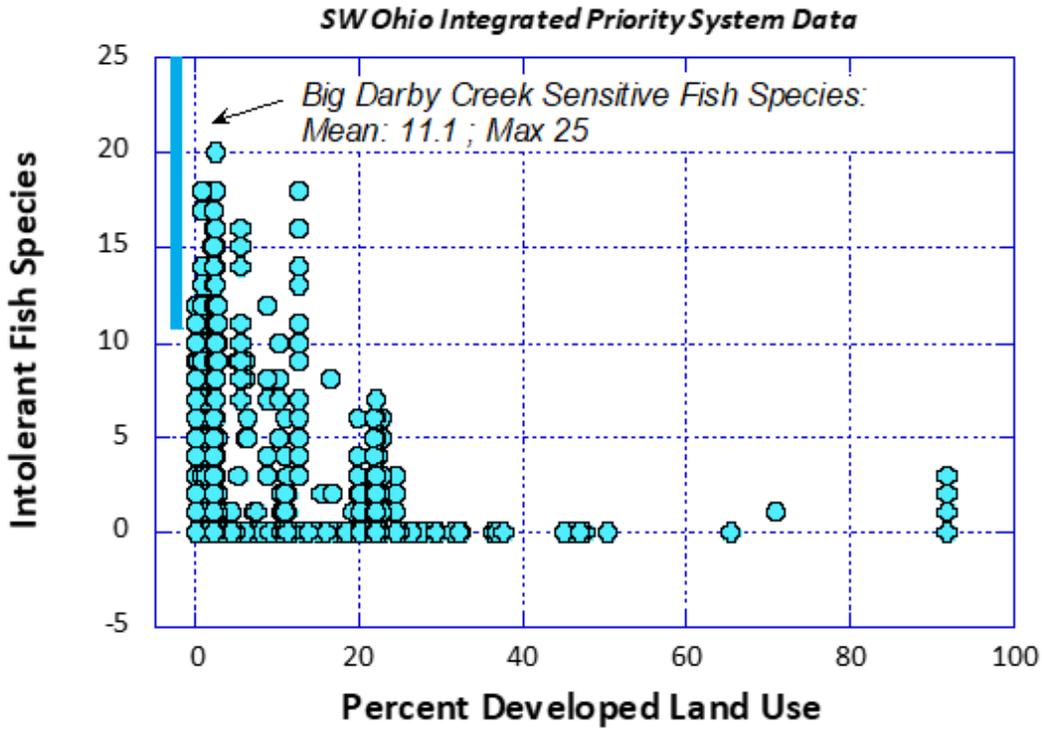


Additional points: Urban impact is cumulative/additive (not mitigated or “cancelled out” by natural area); decline is very likely after a few percent “development”; above graphs do not measure sensitive or “high quality” species.

⁷⁵ Appendix 1: Ohio Streams and Rivers Antidegradation Tier Justification, SRW & SHQW, Ohio EPA, (2002): available at: https://epa.ohio.gov/static/Portals/35/rules/antideg_justif_appendix1.pdf

⁷⁶ Graphs using Ohio EPA data comparing forest agricultural and development land uses and resultant stream fish scores, based on Ohio’s Index of Biotic Integrity (IBI) scores for fish. Note the failure of streams to reach the Exceptional Warmwater Habitat attainment level in the “Development” graph after a relatively low level of development. Plots of IBI vs forested land covers (left), agricultural land covers (middle) and developed land covers (right). Land cover represents percent in upstream catchments at gage locations; biological data represents any data on the same river within 10 miles of the gage. Line on developed land plot approximates a threshold line drawn by eye. Rare and sensitive species are not specifically addressed in this graph. *The Development of a Framework for Managing Flows under the Great Lakes Compact: Issues, Concepts, and Tool Development*, MBI 2009 Technical Report MBI/2009-1.

Figure 4⁷⁷



⁷⁷ Graph showing MBI-collected “Intolerant Fish Species” data collected by MBI in southwest Ohio (Cincinnati area) (green circles) compared to the number of Intolerant Fish Species known in the Big Darby Creek watershed. This compares the range of Big Darby Creek numbers of Intolerant Fish Species to the number of individual sites in southwest Ohio (site land use ranged from urban to exurban/rural). *Integrated Prioritization System (IPS) Documentation and Atlas of Biological Stressor Relationships for Southwest Ohio*, Midwest Biodiversity Institute (MBI), (2015), Technical Report MBI/2015-12-15, available at: http://www.msdcg.org/initiatives/water_quality/index.html.

CONCLUSION

The Ohio EPA has an obligation, under the Clean Water Act, “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” 33 USC § 1251(a). The Big and Little Darby Creeks have national ecological significance and national recreational significance. If the agency fails to designate Big and Little Darby Creeks as Outstanding National Resource Waters, it fundamentally misses the mark in its core mission under federal law. The Outstanding National Resource Water designation was designed precisely for waters like these two creeks. Neighboring states have taken the necessary steps to protect their best streams and rivers; it is well past time that Ohio took similar action, and Big and Little Darby Creek represent the best of what Ohio, the Midwest, and the United States has to offer.

By classifying these two creeks as Outstanding National Resource Waters, Ohio EPA will play a role in facilitating how Central Ohio should develop in its western regions. Development will happen, but it must happen sustainably in relationship with the surrounding environment and ecosystems. The ONRW designation will provide additional protections necessary to help facilitate that goal.

The organizations signing this technical comment look forward to the Ohio EPA’s response. Specifically, we hope the Ohio EPA director will understand the weight of evidence backing up the necessity for categorizing Big and Little Darby Creeks as Outstanding National Resource Waters by issuing “public notice [of] the director's intent to categorize them to the appropriate category upon consideration of public comment.” OAC § 3745-1-05(E)(2). The agency must take action now to protect Big and Little Darby Creeks, before it is too late. If appropriate protections are not put in place, we will likely lose one of the most biodiverse stream systems in Ohio, the Midwest, the United States, and the world.

Respectfully submitted,

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APPENDIX

Northern Riffleshell.

The northern riffleshell (*Epioblasma rangiana*) was once widespread throughout the Ohio River and Lake Erie basins. Today, it is limited to perhaps half a dozen scattered and small populations globally, with the exception of one sizable population in the Allegheny system in Pennsylvania.⁷⁸ It was added to the federal endangered species list in 1993. In Ohio, it is now likely limited to Big Darby Creek. Within Big Darby, the species was once widespread and locally abundant as recently as the 1970s, but thereafter it began disappearing throughout the stream.⁷⁹ The last living individual was observed in 2000.⁸⁰ However, an opportunity arose to augment this dwindling population in 2008 when a bridge project in the Allegheny River in Pennsylvania required the relocation of thousands of northern riffleshells. The U.S. Fish and Wildlife Service, the Ohio Department of Natural Resources, the Ohio State University, and the Columbus and Franklin County Metro Parks cooperated on a project to relocate thousands of individuals in the middle sections of Big Darby Creek on park property.⁸¹ These have shown good survival, and many were located in the 2017 survey efforts by the late Dr. Watters of the Ohio State University. However, reproduction has not yet been observed, suggesting that mussel reproduction may be a special water quality

⁷⁸Northern Riffleshell 5-year Review, U.S. Fish and Wildlife Service, 2008.

⁷⁹ G.T. Watters, *Freshwater Mussel Survey of Big Darby Creek*, The Ohio State University (1996). See also Watters, G.T., M.A. Hoggarth and D.H. Stansbery, *The Freshwater Mussels of Ohio*. The Ohio State University Press, Columbus (2009).

⁸⁰ Tetzloff, John, *2000 Survey of the Freshwater Mussels of the Lower Big Darby Creek*, Final Report to the Division of Wildlife, the Ohio Department of Natural Resources, p. 1.

⁸¹Watters et al. 2009. *Recovering the Riffleshell: The propagation and translocation of a federally endangered freshwater mussel to Ohio*, The NABS 57th Annual Meeting (16-23 May, 2009). Available at: <https://nabs.confex.com/nabs/2009/techprogram/P4354.HTM>

issue in the creek. This augmented population is critical for the global continuance of this extremely imperiled species. Three northern riffleshell individuals were recorded in the 2014-15 EnviroScience survey.⁸²



This photo shows part of the over 800 northern riffleshell mussels that Dr. David Stansbery of the Ohio State University collected at River Mile 19 of Big Darby Creek in August 1962. This illustrates the abundance of the species in Big Darby during that period of time.

Clubshell.

Like the northern riffleshell, the clubshell (*Pleurobema clava*) was once widely spread throughout the Ohio River and Lake Erie drainage systems. And like the northern riffleshell, the clubshell has seen dramatic declines throughout its range, resulting in federal listing in 1993. In a

⁸² *Freshwater Mussel Survey Darby System in Logan, Champaign, Madison, Fr Pickaway Counties to Monitor 40 Sites Previously Surveyed by Watters*, EnviroScience, at 49 (2015).

2008 US Fish and Wildlife reassessment, it was determined that there were about eight populations showing recent recruitment nationwide, which included both Big and Little Darby Creek.⁸³ It is likely that the Darby populations are the last in Ohio. The Little Darby population is sizable, extending over 20 miles and into at least one tributary, Treacle Creek. Recruitment is ongoing and the clubshell is relatively common in this stream. The Big Darby population is far more precarious. Watters did not find it in any of his surveys in the 1980s and 90s and it was feared that the species had been extirpated. A single aged specimen was finally located in 2000 in Prairie Oaks Metro Park,⁸⁴ and in 2006 Hoggarth made the surprising discovery of a juvenile specimen in Plain City.⁸⁵ Along with the northern riffleshell, in 2008 through 2015 thousands of individuals were translocated from the Allegheny River into Metro Parks sections of Big Darby to augment the population.⁸⁶ Many of these transplants have survived and it is hoped that recruitment will occur. Given the small number of viable populations across its range, the Big and Little Darby populations are critical to the global survival of this imperiled species. Seven clubshell were recorded in the 2014-15 EnviroScience report.⁸⁷

Snuffbox.

⁸³ *Clubshell (Pleurobema clava) 5-Year Review: Summary and Evaluation*, U.S. Fish and Wildlife Service, 2008.

⁸⁴ John Tetzloff and David Stansbery, personal observation.

⁸⁵ Hoggarth, M.A. *Report on a mussel survey and relocation for UNI 42-1.49 (PID 13500)*, Big Darby Creek. For TransSystems Corporation, Cleveland, Ohio, (2006).

⁸⁶ “They will be placed in the creek at Battelle Darby Creek Metro Park in clusters to give them a better chance to reproduce, said John Navarro, a program administrator with the Ohio Division of Wildlife.” *See Darby’s mussel population to grow*, The Columbus Dispatch, (2008) available at: <https://www.dispatch.com/story/news/2008/06/24/darby-s-mussel-population-to/24131148007/>

⁸⁷ Supra FN 82.

Like the northern riffleshell, the snuffbox mussel (*Epioblasma triquetra*) is a member of a highly sensitive genus of mollusks in which all species are either federally endangered or extinct. The entire genus is dependent on high quality water and undisturbed habitat. The snuffbox has a wider range than the northern riffleshell and clubshell, extending into the upper Mississippi and Tennessee and Cumberland systems. Nevertheless, it has declined precipitously and its current range is a shadow of its former area, and in 2012 it became the final member of its genus to garner federal endangered species status. In Ohio, it is still present in 10 or fewer streams, and in every case it exists in low numbers.⁸⁸ In the Big Darby system, the snuffbox was fairly common and widespread until about the 1970s. As recently as Watters's first systemwide survey in 1986 he did not include the species in a list of endangered, threatened or special interest species, and he found the species at over half of his 46 Big Darby survey sites. A decade later, in his last survey, he found the species at only five locations. Since 2000, the species continues to show up in very low numbers, mostly from Metro Parks areas of the stream (i.e. below Plain City to Harrisburg).⁸⁹ The snuffbox has become extremely scarce in Little Darby. It is clear that this species is slowly but surely declining throughout the watershed and it is critically important that water quality be improved to save the species. This species was only recorded once in the 2014-15 EnviroScience survey.⁹⁰

Rayed bean.

The rayed bean (*Villosa fabalis*) was formerly widespread but sporadically distributed in the Lake Erie, Ohio, and Tennessee River systems. In 2012 it was placed on the federal endangered

⁸⁸Watters, G.T., M.A. Hoggarth & D.H. Stansbery, *The Freshwater Mussels of Ohio*, (2009), p. 224-26.

⁸⁹ John Tetzloff, Jeff Gordon, Mac Albin, Charles Staudt, personal observations.

⁹⁰ Supra FN 82.

species list due to drastic declines in range and numbers. Within Ohio, the species has also declined precipitously and it is now on the state endangered species list. Recent data suggest it has seven or eight small to moderate-sized isolated populations in Ohio.⁹¹ In Central Ohio, the rayed bean was once widespread in small to medium sized creeks in the central Scioto River basin. Within the Darby system, the rayed bean was widespread throughout the Big Darby mainstem and a few weathered shells indicate it was also present in Little Darby Creek). By the mid-1980s, a complete survey of the watershed by G. Thomas Watters found only a few fresh dead shells in Big Darby (at Plain City and in Battelle-Darby Metro Park) and none in Little Darby. In two subsequent surveys by Watters in 1990 and 1996, the species was not found at all. Fortunately, in a 2006 report to the Ohio Department of Transportation, Hoggarth reported living specimens at Watters' upstream site at Plain City near US Route 42.⁹² This species was not recorded in the 2014-15 EnviroScience survey.⁹³

Rabbitsfoot.

Historically, the rabbitsfoot mussel (*Theliderma cylindrica*) was widespread in the Mississippi, Ohio, and Tennessee/Cumberland systems. Declines across its range led to it being added to the federal threatened species list in 2013. Declines in Ohio have been even more pronounced, and today it is present in perhaps five or six locations.⁹⁴ In Big Darby, it appears to be limited to a very small range between Battelle-Darby and Prairie Oaks Metro parks, where it has been observed in

⁹¹Watters, G.T., M.A. Hoggarth & D.H. Stansbery, *The Freshwater Mussels of Ohio*, (2009), p. 328-29.

⁹² Hoggarth, M.A. *Report on a mussel survey and relocation for UNI 42-1.49 (PID 13500)*, Big Darby Creek. For TransSystems Corporation, Cleveland, Ohio, (2006).

⁹³ Supra FN 82.

⁹⁴Watters, G.T., M.A. Hoggarth & D.H. Stansbery, *The Freshwater Mussels of Ohio*, (2009), p. 268-9.

the last decade.⁹⁵ A larger population exists in the same 20-mile stretch of Little Darby as the clubshell, although it is far less common than that species, and evidence suggests that it is in decline there.⁹⁶ This range has been identified as critical habitat for the species by the USFWS.⁹⁷ This species, like so many endangered mussels, has declined to a precarious state in the Big Darby system, and immediate action is needed to reverse this trend. Seven individuals of this species were recorded in the critical habitat area of the upper Little Darby in the 2015 EnviroScience survey.⁹⁸

Round hickorynut.

The round hickorynut mussel (*Obovaria subrotunda*) was approved for federal listing as a threatened species in 2020.⁹⁹ According to a recent assessment by the USFWS, “precipitous declines and extirpations of Round Hickorynut populations have been documented in the Great Lakes, Ohio, Cumberland, Tennessee, and Lower Mississippi basins.”¹⁰⁰ The assessment identifies 65 extant populations remaining nationwide, only 20 of which are in moderately stable condition. For comparison, the assessment estimates that in Ohio alone an estimated 59 populations have disappeared in recent decades.¹⁰¹ Within the two creeks, the round hickorynut was once a common element of the fauna from its mouth to the confluence with Little Darby Creek, judging by OSUM

⁹⁵ John Tetzloff, personal observation.

⁹⁶ EnviroScience, *Freshwater Mussel Survey Darby System in Logan, Champaign, Madison, Fr Pickaway Counties to Monitor 40 Sites Previously Surveyed by Watters*, 2015, p.49

⁹⁷ Federal Register Vol. 80, No. 83, April 30, 2015, p. 24693.

⁹⁸ Supra FN 82.

⁹⁹ Federal Register / Vol. 85, No. 189 / Tuesday, September 29, 2020 / Proposed Rules, p. 1.

¹⁰⁰ *Species Status Assessment Report for the Round Hickorynut Mussel (Obovaria subrotunda)*, Version 1.0, U.S. Fish and Wildlife Service, Asheville Ecological Services Field Office, Asheville, North Carolina, at 120, (2009).

¹⁰¹ *Id.*

records and the first surveys by Watters. In the last two decades it has become rare, with little evidence of recruitment.¹⁰² The 2015 EnviroScience survey found only one individual.¹⁰³ Like other globally rare mussels, the survival of the Big Darby population is critical for the long-term future of this species.

Longsolid.

Like the round hickorynut, the longsolid (*Fusconaia subrotunda*) was proposed for listing as a federally threatened species in 2020.¹⁰⁴ The longsolid was once widespread throughout the Ohio, Tennessee, and Cumberland systems, but has lost an estimated 98 out of 162 populations.¹⁰⁵ In the state of Ohio the mussel has fared even worse, losing 22 populations, and it currently does not have a sizable, stable population. In Big Darby, the species is known from a subfossil specimen in the lower reaches of the stream, and it might no longer occur in the system. However, the longsolid was once one of the more common species in the Scioto River, and given that stream's recent improvement it is not unreasonable to think that the longsolid could one day repopulate Big Darby Creek.

Scioto madtom.

¹⁰²Tetzloff, John, *Survey of the Freshwater Mussels of the Lower Big Darby Creek, Final Report to the Division of Wildlife, the Ohio Department of Natural Resources*, at 28 (2000). See also Supra FN 82.

¹⁰³ Supra FN 82.

¹⁰⁴ Federal Register Vol. 85, No. 189, September 29, 2020. Proposed Rules, p. 61384. Available at: <https://www.fws.gov/project/decision-listing-longsolid-fusconaia-subrotunda-freshwater-mussel>

¹⁰⁵ *Draft Species Status Assessment Report for the Longsolid Mussel (Fusconaia subrotunda), Version 1.X3.*, U.S. Fish and Wildlife Service (Service). Asheville Ecological Services Field Office, Asheville, North Carolina, at 35 (2018).

The federally endangered Scioto madtom (*Noturus trautmani*) is Big Darby's most enigmatic species. First detected in 1943 at a single location in the lower mainstem, this small fish in the catfish family was last seen in 1957. It was added to the federal endangered species list in 1975, and it is currently under review and has been proposed for removal as an endangered species and possibly be declared extinct by the U.S. Fish and Wildlife Service.¹⁰⁶ The Scioto madtom is unusual, if not unique, in that it is the only endemic species with a range limited to the glaciated region of North America.

Indiana bat.

The Indiana bat (*Myotis sodalis*) is an eastern U.S. tree roosting species that is federally listed as endangered by the U.S. Fish and Wildlife Service. Since the 2019 winter census:

The current population has declined by half compared to when the species was listed as endangered. Threats to the species include human disturbance of hibernating bats, commercialization of caves where the bats hibernate, loss of summer habitat, pesticides and other contaminants, and most recently, the disease white-nose syndrome. The range-wide population has declined by 19% since 2007, when white-nose syndrome first arrived in North America.¹⁰⁷

The Indiana bat has been recorded since the late 2000s along Big Darby Creek in Pickaway County, with roosts largely clustered in riparian woodland habitat along the Big Darby.¹⁰⁸ It also has been recorded in Battelle-Darby Creek Metro Park along Big Darby.¹⁰⁹ The Indiana bat is

¹⁰⁶ Proposed rule: *Endangered and Threatened Wildlife and Plants; Removal of 23 Extinct Species From the Lists of Endangered and Threatened Wildlife and Plants*, 50 CFR Part 17, Fish and Wildlife Service, Department of Interior, available at: <https://www.govinfo.gov/content/pkg/FR-2021-09-30/pdf/2021-21219.pdf#page=1>.

¹⁰⁷ *Indiana Bat*, U.S. Fish & Wildlife Service, available at: <https://www.fws.gov/species/indiana-bat-myotis-sodalis>.

¹⁰⁸ Kniowski, A.B. and S.D. Gehrt, *Summer Ecology of Indiana Bats in Ohio*, Ohio DOT Research Executive Summary, (2011), available at: <https://rosap.nrl.bts.gov/view/dot/21038>.

¹⁰⁹ Morrow, C., *Endangered bat found lurking in Metro Park*, Columbus Dispatch, (August 29, 2009), available at: <https://www.dispatch.com/story/news/2007/07/28/endangered-bat-found-lurking-in/24220812007/>. See also *Finding new species*, MetroParks Parkscope, Winter 2008.

strictly insectivorous, and in some populations it depends heavily on aquatic insects, especially adult caddisflies.¹¹⁰ For this reason, the survival of the Indiana bat is greatly advanced by the persistence of healthy, fecund aquatic ecosystems, particularly systems with high ICI scores such as Big Darby Creek.

Northern long-eared bat.

Northern long-eared bat (*Myotis septentrionalis*) also inhabits wooded areas along and near Big Darby Creek at Battelle-Darby Metro Park¹¹¹. The species is listed as endangered by the State of Ohio¹¹² and US Fish and Wildlife Service. “During the summer and portions of the fall and spring, northern long-eared bats may be found roosting singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags, or dead trees.”¹¹³ Like the Indiana bat, the northern long-eared bat preys on aquatic insects, especially caddisflies.¹¹⁴

Little brown bat.

The little brown bat (*Myotis lucifugus*) has a widespread range in North America and was once very abundant, but has experienced severe declines particularly in eastern North America due to white-nose syndrome, a novel fungal disease. It has been recorded along Big Darby Creek in Battelle Darby Metro Park.¹¹⁵ Foraging habitat requirements are generalized, occurring primarily

¹¹⁰ Supra FN 107.

¹¹¹ Columbus and Franklin County Metro Parks. 2020 BDC Species List.

¹¹² OAC § 1501:31-23-01.

¹¹³ *Northern long-eared bat*, U.S. Fish & Wildlife Service, available at: <https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>. Accessed January 25, 2023.

¹¹⁴ *Id.*

¹¹⁵ 2020 BDC Species List, Columbus and Franklin County Metro Parks.

over streams and other bodies of water. Like the Indiana bat, the little brown bat utilizes aquatic insects in its diet, especially caddisflies and midges.¹¹⁶ Listed as endangered by the State of Ohio,¹¹⁷ the U.S. Fish and Wildlife Service is currently reviewing the status of the little brown bat.¹¹⁸

TABLE 1: Listed fish recorded in the Big Darby Creek Watershed¹¹⁹

Fish - 13 Species		
Common Name	Scientific Name	Status
American eel	<i>Anguilla rostrata</i>	OT
Blacknose shiner	<i>Notropis heterolepis</i>	OE
Goldeye	<i>Hiodon alosoides</i>	OE
Lake chubsucker	<i>Erimyzon sucetta</i>	OT
Least darter	<i>Etheostoma microperca</i>	OSC
Muskellunge	<i>Esox masquinongy</i>	OSC
Northern brook lamprey	<i>Ichthyomyzon fossor</i>	OE
Northern madtom	<i>Noturus stigmosus</i>	OE
Paddlefish	<i>Polyodon spathula</i>	OT, M
Scioto madtom	<i>Noturus trautmani</i>	OE, FE, EX*
Spotted darter	<i>Etheostoma maculatum</i>	OE, M

¹¹⁶ *Little brown bat*, U.S. Fish & Wildlife Service, available at: <https://www.fws.gov/species/little-brown-bat-myotis-lucifugus>. Accessed January 25, 2023.

¹¹⁷ OAC §1501:31-23-01.

¹¹⁸ Supra FN 116.

¹¹⁹ OE—Ohio endangered; OT—Ohio threatened; OSC—Ohio Species of Concern; FE—Federal endangered; FT—Federal threatened; M—federally monitored; EX—proposed extinct

Tippecanoe darter	<i>Etheostoma tippecanoe</i>	OSC
Western creek chubsucker	<i>Erimyzon clariformis</i>	OSC

TABLE 2: Listed mussels recorded in the Big Darby Creek Watershed

Mussels - 25 Species		
Common Name	Scientific Name	Status
Black sandshell	<i>Ligumia recta</i>	OSC
Clubshell	<i>Pleurobema clava</i>	OE, FE
Creek heelsplitter	<i>Lasmigona compressa</i>	OSC
Deertoe	<i>Truncilla truncata</i>	OSC
Elephant-ear	<i>Elliptio crassidens crassidens</i>	OE
Elktoe	<i>Alasmidonta marginata</i>	OSC
Fawnsfoot	<i>Truncilla donaciformis</i>	OSC
Kidneyshell	<i>Ptychobranhus fasciolaris</i>	OSC
Longsolid	<i>Fusconaia maculata</i>	OE
Northern riffleshell	<i>Epioblasma rangiana</i>	OE, FE
Ohio pigtoe	<i>Pleurobema cordatum</i>	OE
Pocketbook	<i>Lampsilis ovata</i>	OE
Pondhorn	<i>Unimerus tetralasmus</i>	OT
Purple wartyback	<i>Cyclonaias tuberculata</i>	OSC
Rabbitsfoot	<i>Theliderma cylindrica</i>	OE, FT
Rainbow	<i>Villosa iris</i>	OSC
Rayed bean	<i>Villosa fabalis</i>	OE, FE

Round hickorynut	<i>Obovaria subrotunda</i>	OT
Round pigtoe	<i>Pleurobema sintoxia</i>	OSC
Salamander mussel	<i>Simpsonaias ambigua</i>	OT
Slippershell mussel	<i>Alasmidonta viridis</i>	OT
Snuffbox	<i>Epioblasma triquetra</i>	OE, FE
Threehorn wartyback	<i>Obliquaria reflexa</i>	OSC
Washboard	<i>Megaloniais nervosa</i>	OE
Wavy-rayed lampmussel	<i>Lampsilis fasciola</i>	OSC

TABLE 3: Listed amphibians recorded in the Big Darby Creek Watershed

Amphibians - 1 Species		
Common Name	Scientific Name	Status
Eastern hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	OE

TABLE 4: Formerly listed species recorded in the Big Darby Creek Watershed

Common name	Scientific name	Former status
Bluebreast darter	<i>Etheostoma camurum</i>	OT; ODNR removed this species from list as of August 2012.
Eastern sand darter	<i>Ammocrypta pellucida</i>	OSC; ODNR removed this species from list as of July 1, 2022.
River redhorse	<i>Moxostoma carinatum</i>	OSC; ODNR removed this species from list as of July 1,

		2022.
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TABLE 5: OAC § 3745-1-05 Antidegradation, Table 5-2. Declining fish species.

Common name	Latin name	Comment	Recorded in Big Darby Creek Watershed
Bigeye chub	<i>Hybopsis amblops</i>		X
Bigeye shiner	<i>Notropis boops</i>		
Blacknose shiner	<i>Notropis heterolepis</i>		X
Bluebreast darter	<i>Etheostoma camurum</i>		X
Brindled madtom	<i>Noturus miurus</i>		X
Brook trout	<i>Salvelinus fontinalis</i>	Natives only	
Creek chubsucker	<i>Erimyzon oblongus</i>		X
Eastern sand darter	<i>Ammocrypta pellucida</i>		X
Goldeye	<i>Hiodon alosoides</i>		X
Hornyhead chub	<i>Nocomis biguttatus</i>		X
Lake chubsucker	<i>Erimyzon sucetta</i>		X
Least brook lamprey	<i>Lampetra aepyptera</i>		X
Least darter	<i>Etheostoma microperca</i>		X
Mimic shiner	<i>Notropis volucellus</i>		
Mooneye	<i>Hiodon tergisus</i>	Lake Erie drainage basin	
Mountain madtom	<i>Noturus eleutherus</i>		
Muskellunge	<i>Esox masquinongy</i>	Natives only	X
Northern brook lamprey	<i>Ichthyomyzon fossor</i>		X
Northern madtom	<i>Noturus stigmosus</i>		X
Popeye shiner	<i>Notropis ariommus</i>		

Pugnose minnow	<i>Opsopoeodus emiliae</i>		
Redside dace	<i>Clinostomus elongatus</i>		
River chub	<i>Nocomis micropogon</i>		X
River darter	<i>Percina schumardi</i>	Lake Erie drainage basin	
Rosyface shiner	<i>Notropis rubellus</i>		X
Silver lamprey	<i>Ichthyomyzon unicuspis</i>		X
Southern redbelly dace	<i>Phoxinus erythrogaster</i>		X
Streamline chub	<i>Erimystax dissimilis</i>		X
Tonguetied minnow	<i>Exoglossum laurae</i>		
Variegate darter	<i>Etheostoma variatum</i>		X
Western banded killifish	<i>Fundulus diaphanous menona</i>		