



United States Department of the Interior
FISH AND WILDLIFE SERVICE

2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6360



September 27, 2022

MEMORANDUM

To: Industrial Economics, Incorporated (IEc)

From: Field Supervisor, Michigan Ecological Services Field Office

Subject: Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Salamander Mussel

The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis of the proposed designation of critical habitat for the Salamander Mussel (*Simpsonaias ambigua*). For this memorandum, the primary source of species information is the Species Status Assessment (SSA) for the Salamander Mussel (Service 2021). Additional citations are indicated within the text of this memorandum.

Section 4(b)(2) of the Endangered Species Act (Act) requires the Secretary of Interior (Secretary), and therefore by delegation the U.S. Fish and Wildlife Service (Service), to consider the economic, national security, and other impacts of designating a particular area as critical habitat. We may exclude an area from critical habitat if we determine the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. In part to comply with section 4(b)(2) of the Act and consider the economic impacts of a proposed critical habitat designation, we prepare an economic analysis that describes and monetizes, where possible, the probable economic impacts (costs and benefits) of the proposed regulation. The data in the economic analysis may be used in the discretionary balancing evaluation under section 4(b)(2) of the Act to consider any particular area for exclusion from the final designation.

Determining the economic impacts of critical habitat designation involves evaluating the “without critical habitat” baseline versus the “with critical habitat” scenario to identify those effects expected to occur solely due to the designation of critical habitat and not from the protections that are in place due to the species being listed under the Act. Effects due solely to the critical habitat designation equal the difference, or increment, between these two scenarios and include both (1) the effects of changes in the action to avoid destruction or adverse modification of critical habitat and (2) the costs of increased administrative efforts that result from the designation. These changes can be thought of as “changes in behavior” or the “incremental effect” that would most likely result from the designation if finalized. Measured differences between the baseline (the world without critical habitat) and the designated critical habitat (world with critical habitat) may include, but are not limited to, the economic effects

stemming from changes in land or resource use or extraction, changes in environmental quality, or time and effort expended on administrative and other activities by Federal landowners, Federal action agencies, and in some instances, State and local governments, or private third parties. These are the “incremental effects” serving as the basis for the economic analysis.

There are a number of ways that designation of critical habitat could influence activities, but one of the important functions of this memorandum is to explain any differences between actions required to avoid jeopardy to the species versus actions that may be required to avoid destruction or adverse modification of critical habitat. The Service is analyzing whether destruction or adverse modification would occur based on whether the Federal agency’s action is likely “to result in the destruction or adverse modification of habitat which is determined by the Secretary... to be critical.” To perform this analysis, the Service considers how the proposed action is likely to affect the function of the critical habitat unit in serving its intended conservation role relative to the entire designation. The information provided below is intended to identify the possible differences for this species under the two different section 7 standards (i.e., jeopardy to the species and adverse modification of critical habitat). Ultimately, however, a determination of whether an activity may result in the destruction or adverse modification of critical habitat is based on the effects of the action to the designated critical habitat in its entirety.

The Service recognizes that the “geographical area occupied by the species” at the time of listing as Stated under section 3(5)(A)(i) of the Act as the geographical area which may generally be delineated around the species’ occurrences, as determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species’ life cycle, even if not used on a regular basis (e.g., migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals). The species may or may not be present within all areas of the geographical area occupied by the species. Thus, the “geographical area occupied by the species” can, depending on the species at issue and the relevant data available, be defined on a relatively coarse scale.

Section 7 consultation is required whenever there is a discretionary Federal action that may affect listed species or designated critical habitat. Section 7(a)(3) also States that a Federal agency shall consult with the Secretary on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species. The initiation of section 7 consultation under the jeopardy standard takes place if the species may be present and the action is likely to affect the species.

Because of the relatively coarse scale of analysis allowed by the definition of “critical habitat,” the species may or may not be present within all portions of the “geographical area occupied by the species” or may be present only periodically. Therefore, at the time of any consultation under section 7 of the Act, the species of interest may not be present within the action area for the purposes of the section 7 consultation, even if that action area is within the “geographical area occupied by the species.” This possibility, however, does not change the “geographical area occupied by the species” as Stated under section 3(5)(A)(i) for the species. It must, however, be reflected in our analysis of the economic impacts of a critical habitat designation. How we implement each critical habitat designation under section 7 is important because even when an area is determined to be within the general geographical area occupied by the species at the time of listing, the specific area where a consultation may occur is based on the presence of the

species within the action area and the effects to that species. If a species is not present and the action is not likely to adversely affect the species within a particular area designated as critical habitat at the time of consultation, the economic effects of the consultation would likely be considered an incremental effect of the critical habitat because in almost all cases, the consultation would not have occurred absent the critical habitat designation¹. These incremental economic effects would derive both from changes in management, such as costs resulting from restrictions on development and other activities due solely to critical habitat, and changes in the scope of administrative review, i.e., the added costs of considering effects to critical habitat during consultation. (Additional administrative costs would also occur in *occupied* areas due to the need to analyze destruction or adverse modification of critical habitat along with jeopardy to the species.) In this memorandum, when we describe occupancy for purposes of estimating the probable incremental impacts and therefore, potential economic costs of critical habitat designation, we are referring to the occupancy status within the action area of a particular Federal action at the time of a consultation under section 7 of the Act. In this context the “geographical area occupied by the species” under section 3(5)(A)(i) and the area where a species may be present or may be affected by a particular Federal action under a section 7 consultation may differ. The difference lies in the implementation of the critical habitat designation for purposes of the section 7 consultation, although within the geographical range occupied by the species under 3(5)(A)(i), the species may or may not be present at the time of consultation. The purpose of this memorandum is to describe how the Service will implement the critical habitat designation; however, it is only on a case-by-case basis that we are able to evaluate whether or not a Federal action may affect the listed species or its critical habitat while considering the species’ presence within the action area.

To identify the incremental effects of critical habitat designation, we start by recognizing the conservation efforts and other protections currently afforded the Salamander Mussel and their habitat, pre-dating proposed listing. We then consider the protections likely to accrue to this species from listing that are independent of critical habitat designation. These include additional consideration for threatened and endangered species under other Federal and State laws, as well as protections provided under the Act. Many of these laws recognize that the persistence of imperiled species is fundamentally dependent on the conservation of their habitat, whether or not it is formally designated as “critical habitat”. The protections pre-dating the listing, combined with the protections of the Act, constitute the baseline for identifying the incremental effects of critical habitat designation.

Finally, we identify the regulatory requirements, conservation measures, and other considerations that may be triggered by critical habitat designation. Even when critical habitat prompts additional consideration, the result may be limited to protections or changes in management that duplicate those provided by listing. Administrative costs of considering critical habitat requirements are noted, along with efficiencies stemming from consideration of overlapping critical habitat designations for other federally listed species. The information below is intended to identify all likely differences without and with critical habitat designation for the Salamander Mussel.

¹ (If the area is not currently occupied and there is no critical habitat designated, it is unlikely that a Federal agency would consult under section 7 in the first instance unless it is clear that activities in the unoccupied areas “may affect” nearby occupied areas.)

I. Background

The Salamander Mussel is a small, thin-shelled mussel and is the only unionid (family of freshwater mussels) with a non-fish host, the mudpuppy (*Necturus maculosus*). The Salamander Mussel is found in rivers, streams, creeks, or lakes, under flat rocks in areas of moderate flow, with varying substrate including bedrock, sand, gravel, or mud. Currently, the Salamander Mussel occurs in 14 States (Arkansas, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, West Virginia, Wisconsin), as well as the Canadian province of Ontario. It has been extirpated within Iowa and can be found within the Mississippi River only along the eastern border of the State.

II. Analysis Summary

Our analysis of the past, current, and future influences on what the Salamander Mussel needs for long-term viability revealed contaminants, hydrological regime, landscape alteration, lack of connectivity, invasive species, and host vulnerability as the primary risk factors influencing the resources upon which the Salamander Mussel relies, either directly or indirectly. We also considered direct threats to the mussel, including the influence of mussel disease and the effect of catastrophic events due to oil and gas exploration and development on the Salamander Mussel. The occupied draft critical habitat units include some or all of the physical or biological features (PBFs) essential to the species conservation:

- (1) Adequate flows, or a hydrologic flow regime (i.e., magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time), necessary to maintain benthic habitats where the species and host are found and stream connectivity. Salamander Mussel and mudpuppy require adequate flows to provide for the exchange of nutrients and sediment, availability of habitat and food, and the ability for newly transformed Salamander Mussel juveniles and young mudpuppies to disperse, settle and become established. Further, adequate flows maintain mudpuppy shelter habitat for reproduction. Adequate flows ensure delivery of oxygen, enable reproduction, deliver food to filter-feeding mussels, and reduce contaminants and fine sediments from interstitial spaces. Stream velocity is not static over time, and variations may be attributed to seasonal changes (with higher flows in winter/spring and lower flows in summer/fall), extreme weather events (e.g., drought or floods), or anthropogenic influence (e.g., flow regulation via impoundments).
- (2) Suitable substrates and connected instream habitats, characterized by geomorphically stable stream channels and banks (i.e., channels that maintain lateral dimensions, longitudinal profiles, and sinuosity patterns overtime without an aggrading or degrading bed elevation) with habitats that support Salamander Mussel and mudpuppy (e.g., large rock shelters, woody debris, and bedrock crevices within stable zones of swift current consisting of low amounts of fine sediment silt).
- (3) Water and sediment quality necessary to sustain natural physiological processes for normal behavior, growth, and viability of all life stages, including (but not limited to): dissolved oxygen (generally above 2 to 3 parts per million (ppm)), salinity (generally below 2 to 4 ppm), and temperature (generally below 86 °Fahrenheit (°F) (30 °Celsius (°C))). Additionally, water quality concentrations below acute toxicity levels

to mussels for contaminants including but not limited to ammonia, nitrate, copper, and chloride.

- (4) The presence and abundance of the host, mudpuppy (*Necturus maculosus*), necessary for recruitment of the Salamander Mussel.

III. Proposed Critical Habitat

We have identified and delineated 37 proposed critical habitat units comprised of approximately 2,011 river miles (rm) that are currently occupied (i.e., at the time of listing) by the Salamander Mussel. The proposed designation for the Salamander Mussel includes 5 units in West Virginia, 7 units in Kentucky, 3 units in Pennsylvania, 7 units in Indiana, 2 units in Michigan, 1 unit in New York, 1 unit in Ohio, 1 unit in Ohio and Indiana, 2 units in Tennessee, and 8 units in Wisconsin. Approximately 84.7 percent of the proposed critical habitat is under private ownership, but 11.1 percent of the proposed critical habitat is designated critical habitat for Rabbitsfoot (see Table 1).

Table 1. Summary of proposed critical habitat units for the Salamander Mussel showing unit names, unit length, riparian ownership, and additionally federally endangered or threatened species with designated critical habitat or proposed designated critical habitat that overlaps with the unit.²

Proposed Critical Habitat Unit	Length of Unit River Miles	Riparian Ownership	Protected Adjacent Lands River Miles	Private Adjacent Lands River Miles	DCH for other Species	River Miles of Unit overlap with DCH	pDCH for other Species	River Miles of Unit overlap with pDCH for other species
Blanchard River	25.02	County/City; Private	0.94	24.08				
Clinton River	7.02	County/City; Private	0.28	6.74				
Conneaut Creek	62.00	State; County/City; Private	2.31	59.69				
Fish Creek (IN)	37.37	State; Private	1.02	36.34	Rabbitsfoot	5.53		
Mill Creek	23.65	State; Private	1.54	22.11				
North Branch Pensaukee River	19.93	State; County/City; Private	1.24	18.69				
Tonawanda Creek	113.21	State; County/City; Tribal; Private	8.69	104.52				
Allegheny River	39.44	State; County/City; Private	4.60	34.85				
Beech Fork River	50.39	State; Private	1.99	48.40				
Big Pine Creek	51.23	State; Private	1.30	49.93				

² River miles may not sum due to rounding.

Drennon Creek	22.36	Private	0	22.36				
East Fork White River	78.58	Federal; State; Private	6.12	72.45				
Fish Creek (WV)	26.58	Private	0	26.58				
Fishing Creek	23.32	County/City; Private	0.13	23.19				
French Creek	74.37	Federal; State; County/City; Private	5.83	68.54	Rabbitsfoot	74.37	Longsolid	74.37
Graham Creek	41.50	Private	0	41.50				
Harpeth River	43.32	Federal; Private	6.07	37.25				
Kinniconick Creek	51.01	Private	0	51.01				
Laughery Creek	44.52	State; Private	3.01	41.51				
Licking River	179.56	Federal; State; County/City; Private	20.82	158.74			Longsolid	179.56
Little Kanawha River	49.82	Private	0	49.82			Longsolid and Round Hickorynut	49.82
Middle Fork Wildcat Creek	35.70	Private	0	35.70				
Middle Island Creek	62.25	State; Private	0.15	62.10			Round Hickorynut	62.25
North Fork Licking River	20.67	Federal; Private	13.13	7.54				
Otter Creek	17.96	Private	0	17.96				
Rolling Fork River	87.90	Private	0	87.90				

South Fork Hughes River	57.44	Private	0	57.44				
South Fork Licking River	18.26	Private	0	18.26				
Tippecanoe River	124.25	State; Private	7.43	116.83	Rabbitsfoot	28.14	Round Hickorynut	74.38
Duck River	116.42	Federal; Private	0.52	115.90	Rabbitsfoot	116.42		
Black River	75.38	Federal; State; County/City; Private	35.71	39.67				
Chippewa River	59.24	Federal; State; County/City; Private	34.04	25.20				
Eau Claire River	7.40	County/City; Private	4.23	3.17				
Lemonweir River	37.50	County/City; Private	2.11	35.39				
St. Croix River	52.93	Federal; State; Private	27.07	25.86				
Wisconsin River North	21.19	State; County/City; Private	4.11	17.08				
Wisconsin River South	152.88	Federal; State; County/City; Private	102.78	50.10				
Total Miles	2,011.61		307.79	1703.82		224.46		440.39

A. Proposed Critical Habitat Unit Description

Black River

Description

The Black River Unit consists of 75.38 miles in Jackson, La Crosse, Monroe, and Trempealeau counties, Wisconsin from the bottom of Lake Arbutus dam southeast of Hatfield, Jackson County, Wisconsin extending downstream to the confluence with the Mississippi River west of Brice Prairie, La Crosse, Wisconsin.

Ownership

Approximately 47% (35.7 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 53% are in private ownership. Approximately 0.15 mile of the public ownership in this unit is in county lands associated with Jackson County Parks' Jackson County Forest. Approximately 0.86 mile of the public ownership in this unit is in Federal lands associated with the Bureau of Land Management land stewardship of islands within the river channel. Approximately 6.6 miles of the public ownership in this unit are in Federal lands on one bank associated with the USFWS Upper Mississippi River National Wildlife and Fish Refuge and State lands on the opposite bank associated with the Wisconsin Department of Natural Resources' Van Loon Wildlife Area. Approximately 28 miles of the public ownership in this unit are in State lands associated with the Wisconsin Department of Natural Resources' North Bend Bottoms Wildlife Area, Statewide Habitat Areas, Half Moon Lake Fishery Area, and Black River State Forest.

General land use

General land use within the Black River Unit includes agriculture and forest as well as several county parks and state-managed fish, wildlife, and forest areas, along with the city of Black River Falls. The public land ownership in this unit is a component of the USFWS Upper Mississippi River National Wildlife and Fish Refuge and the Bureau of Land Management land steward of islands within the river.

Occupancy

The Black River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Black River Unit include degradation of water quality due to contaminants, host vulnerability from the lack of regulation of collection of mudpuppies, and lack of connectivity due to barriers. Several threats pose a moderate risk within the unit, including invasive species, impacts to the hydrologic regime, and habitat degradation and loss due to agriculture and the lack of tree canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address change in the hydrologic regime, habitat degradation and loss due to agriculture and lack of tree canopy cover in the riparian buffer, water quality degradation from contaminants, host

vulnerability due to lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Chippewa River

Description

The Chippewa River Unit consists of 59.24 miles in Buffalo, Dunn, Eau Claire, and Pepin counties, Wisconsin from the mouth of the Eau Claire River at Eau Claire, Eau Claire County, Wisconsin extending downstream to the confluence with the Mississippi River south of Trevino, Buffalo and Pepin counties, Wisconsin.

Ownership

Approximately 57% (34.0 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 43% are in private ownership. Approximately 1.3 miles of the public ownership in this unit are in city or county lands associated with city of Eau Claire's Owen Park and Jefferson County's Public Hunting Ground. Approximately 4.2 miles of the public ownership in this unit are in Federal lands associated with the Bureau of Land Management land stewardship of islands within the river channel. Approximately 1.6 miles of the public ownership in this unit are in Federal lands on one bank associated with the USFWS Upper Mississippi River National Wildlife and Fish Refuge and State lands on the opposite bank associated with the Wisconsin Department of Natural Resources' Tiffany Wildlife Area. Approximately 27 miles of the public ownership in this unit are in State lands associated with the Wisconsin Department of Natural Resources' Lower Chippewa River State Natural Area, Dunnville Wildlife Area, Nine Mile Island State Natural Area.

General land use

General land use within Chippewa River Unit includes agriculture and urban areas as well as several county parks and hunting land, along with the Cities of Eau Claire, Shawtown, and Durand. There are also state-managed wildlife and natural areas. The public land ownership in this unit is a component of the USFWS Upper Mississippi River National Wildlife and Fish Refuge and the Bureau of Land Management land steward of islands within the river.

Occupancy

Chippewa River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Chippewa River Unit include degradation of water quality due to contaminants and host vulnerability from the lack of regulation of collection of mudpuppies. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, impacts to the hydrologic regime, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address change in the hydrologic regime, habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host

species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Eau Claire River

Description

The Eau Claire River Unit consists of 47.37 miles in Eau Claire County, Wisconsin from the confluence of the North Fork and South Fork Eau Claire River, Eau Claire County, Wisconsin extending downstream to Lake Eau Claire, Eau Claire County, Wisconsin.

Ownership

Approximately 57.2% (4.2 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 42.8% are in private ownership. Approximately 4.2 miles of the public ownership in this unit are in city or county lands associated with the Eau Claire County Forest.

General land use

General land use within Eau Claire River Unit includes agriculture and urban areas as well as several county parks associated with the Eau Claire County Forest.

Occupancy

The Eau Claire River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Eau Claire River Unit include degradation of water quality resulting from contaminants and host species vulnerability from the lack of regulation of collection of mudpuppies. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, impacts to the hydrologic regime, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address the change in the hydrologic regime, habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer; water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Lemonweir River

Description

The Lemonweir River unit consists of 37.5 miles in Juneau County, Wisconsin from approximately a quarter mile north of Kennedy County Park north of New Lisbon, Juneau, Wisconsin extending downstream to the confluence with the Wisconsin River northeast of Lyndon Station, Juneau County, Wisconsin.

Ownership

Approximately 5.6% (2.11 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 94.4% are in private ownership. Approximately 2.11 miles of the public ownership in this unit are in city or county lands associated with the Juneau County Forest owned by Juneau County, Riverside Park owned by the city of Mauston, and an unnamed natural area owned by the county.

General land use

General land use within Lemonweir River Unit includes agriculture and urban areas as well as county forest and natural area, along with the Cities of New Lisbon and Mauston.

Occupancy

The Lemonweir River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk in the Lemonweir River Unit include degradation of water quality resulting from contaminants and host species vulnerability from the lack of regulation of collection of mudpuppies. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

St. Croix River

Description

The St. Croix River Unit consists of 52.93 miles in Polk, St. Croix, and Pierce counties, Wisconsin and Chisago and Washington counties, Minnesota from the base of the dam at St. Croix Falls at St. Croix Falls, Polk County, Wisconsin and Taylors Falls, Chisago County, Minnesota extending downstream to the confluences with the Mississippi River at Prescott, Pierce County, Wisconsin and Point Douglas, Washington County, Minnesota.

Ownership

Approximately 51.1% (27.07 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 48.9% are in private ownership. Approximately 17.63 miles of the public ownership in this unit are in Federal lands associated with the National Park Services' Lower St. Croix National Scenic Riverway. Approximately 4.25 miles of the public ownership in this unit are in Federal lands associated with the National Park Services' Lower St. Croix National Scenic Riverway on one side of the bank and on the other side are in State lands associated with the Wisconsin Department of Natural Resources' St. Croix Islands Wildlife Area. Approximately 5.2 miles of the public ownership in this unit are in State lands associated with the Wisconsin Department of Natural Resources' Kinnickinnic State Park and Interstate Park.

General land use

General land use within St. Croix River Unit includes agriculture and urban areas, including the Cities of St. Croix Falls, Osceola, Marine on St. Croix, Stillwater, Houlton, Bayport, Hudson, Lakeland, Lake St. Croix Beach, and Prescott. There are also state-managed wildlife and parks. The public land ownership in this unit is a component of the National Park Services' Lower St. Croix National Scenic Riverway.

Occupancy

The St. Croix River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk to the St. Croix River Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, invasive species, and barriers to dispersal and movement.

Wisconsin River North

Description

The North Wisconsin River Unit consists of 21.19 miles in Lincoln and Marathon counties, Wisconsin from the base of the dam at Merrill, Marathon County, Wisconsin extending downstream to the top of the dam at Wausau, Lincoln County, Wisconsin.

Ownership

Approximately 19.4% (4.11 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 80.6% are in private ownership. Approximately 3.78 miles of the public ownership in this unit are in city or county lands associated with the city of Merrill's Riverside Park, Marathon County's Marathon County Forest, city of Wausau's Gilbert Park, Scholfield Park, Baker Stewart Island Park, Big Bull Falls Park, White Water Park, and Woodson Park. Approximately 0.34 mile of the public ownership in this unit is in State lands associated with the Wisconsin Department of Natural Resources' State-Owned Islands.

General land use

General land use within Wisconsin River North Unit includes agriculture and urban areas, such as the Cities of Merrill, Granite Heights, and Wausau as well as several county parks and forests. There is also state-managed wildlife and natural areas.

Occupancy

The Wisconsin River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk in the Wisconsin River Unit include degradation of water quality resulting from contaminants and host species vulnerability from the lack of regulation of collection of mudpuppies. Lack of connectivity also poses a high risk within the portion of the unit that is within the Lake Dubay watershed.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Wisconsin River South

Description

The South Wisconsin River Unit consists of 152.89 miles in Iowa, Grant, Dane, Crawford, Richland, Sauk, Columbia, Juneau, and Adams counties, Wisconsin from the confluence with the Lemonweir River south of White Creek, Adams County, Wisconsin extending downstream to the confluence with the Mississippi River south of Prairie du Chien, Crawford County, Wisconsin.

Ownership

Approximately 67.2% (102.78 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 32.8% are in private ownership. Approximately 0.09 mile of the public ownership in this unit is in city or county lands associated with the Village of Lake Delton's Newport Park. Approximately 9 miles of the public ownership in this unit are in Federal lands associated with the Bureau of Land Management land stewardship of islands within the river channel and the USFWS Upper Mississippi River National Wildlife and Fish Refuge. Approximately 93.7 miles of the public ownership in this unit are in State lands associated with the Wisconsin Department of Natural Resources' Pine Island Wildlife Area, Sauk Prairie Recreation Area, and Lower Wisconsin State Riverway.

General land use

General land use within the Wisconsin River Unit includes agriculture and urban areas, including numerous cities and municipalities, as well as several county parks and forests. There are also state-managed wildlife and natural areas. The Federal land ownership in this unit is a component of the USFWS Upper Mississippi River National Wildlife and Fish Refuge and the Bureau of Land Management land steward of islands within the river.

Occupancy

The Wisconsin River South Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk in the Wisconsin River South Unit include degradation of water quality resulting from contaminants and host species vulnerability from the lack of regulation of collection of mudpuppies. Several threats pose a moderate risk within the unit, including lack of

connectivity due to barriers in the Castle Rock and Lower Wisconsin watershed, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Allegheny River

Description

The Allegheny River Unit consists of 39.44 miles in Armstrong County, Pennsylvania from the Pennsylvania Route 68 bridge at East Brady, Armstrong County, Pennsylvania extending downstream to the confluence of Kiskiminetas River northeast of Freeport, Armstrong County, Pennsylvania.

Ownership

Approximately 11.65% (4.6 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 88.34% are in private ownership. Approximately 1.86 miles of the public ownership in this unit are in city or county lands associated with the Armstrong County's West Ford City Park and Riverfront Park. Approximately 2.74 miles of the public ownership in this unit are in State lands associated with the Pennsylvania Game Commission's State Game Land #287 and State Game Land #105.

General land use

General land use within Allegheny River Unit includes urban areas, including the Cities of East Brady and Kittanning as well as several county parks. There are also State game areas within this Unit.

Occupancy

The Allegheny River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a moderate risk in the Allegheny River Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

Beech Fork River

Description

The Beech Fork River Unit consists of 50.39 miles in Washington and Nelson counties, Kentucky from the confluence of Beech Fork and Chaplin River north of Mooresville, Springfield County, Kentucky extending downstream to the confluence of Beech Fork River and the Rolling Fork River northeast of Elizabethtown, Elizabethtown and Boston counties, Kentucky.

Ownership

Approximately 4% (2 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 96% are in private ownership. Approximately 2 miles of the public ownership in this unit are in State lands associated with the Kentucky Department of Fish and Wildlife Resources' John C. Williams Wildlife Management Area.

General land use

General land use within Beech Fork River Unit includes agriculture and numerous cities and municipalities. There is also a state-managed wildlife area.

Occupancy

The Beech Fork River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk in the Beech Fork River Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, host species vulnerability from the lack of regulation of collection of mudpuppies, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss from urbanization, agriculture and lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Big Pine Creek

Description

The Big Pine Creek Unit consists of 51.23 miles in White, Benton, and Warren counties, Indiana from the headwater of Big Pine Creek northeast of Round Grove, White County, Indiana extending downstream to the confluence with the Wabash River at Attica, Fountain County, Indiana.

Ownership

Approximately 2.5% (1.3 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 97.5% are in private ownership. Approximately 1.3 miles of the public ownership in this unit are in State lands associated with the Indiana Department of Natural Resources Fish and Wildlife Division's Pine Creek Bottoms Gamebird Habitat Area.

General land use

General land use within Big Pine Creek Unit includes agriculture and urban areas, including the city of Rainsville and town of Pine Village. There is also a state-managed gamebird habitat area.

Occupancy

The Big Pine River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk in the Big Pine Creek Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, host species vulnerability from the lack of regulation of collection of mudpuppies, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Drennon Creek

Description

The Drennon Creek Unit consists of 22.36 miles in Henry County, Kentucky from the headwater of Drennon Creek south of Bethlehem, Henry County, Kentucky extending downstream to the confluence with the Kentucky River southeast of Drennon Springs, Henry County, Kentucky.

Ownership

Approximately 100% (22.36 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Drennon Creek Unit is urban, including the cities of Drennon Springs and Delville, and agriculture.

Occupancy

The Drennon Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a moderate risk to the Drennon Creek Unit include degradation of water quality resulting from contaminants, lack of connectivity due to barriers, host species vulnerability from the lack of regulation of collection of mudpuppies, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

East Fork White River

Description

The East Fork White River Unit consists of 78.58 miles in Dubois, Daviess, Pike, Martin, and Lawrence counties, Indiana from below the Williams dam south of Williams, Lawrence County, Indiana extending downstream to approximately a quarter mile west of North State Road 57 at Rogers, Pike County, Indiana.

Ownership

Approximately 7.8% (6.12 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 92.2% are in private ownership. Approximately 0.12 mile of the public ownership in this unit is in Federal lands associated with the U.S. Forest Service's Hoosier National Forest. Approximately 6 miles of the public ownership in this unit are in State lands associated with the Indiana Department of Natural Resources Fish and Wildlife Division's Williams Dam Public Fishing Area, Hindostan Falls Public Fishing Area, Glendale Fish and Wildlife Area, and the Indiana Department of Natural Resources Forestry Division's Henshaw Bend Nature Preserve, and the Indiana Department of Natural Resources Nature Preserve Division's Bluffs on Beaver Pond.

General land use

General land use within the East Fork of the White River Unit includes forest, agriculture, dams, and urban areas, including the city of Shoals. There are also state-managed wildlife, fishing, and nature preserves. The Federal land ownership in this unit is a component of the U.S. Forest Service's Hoosier National Forest.

Occupancy

The East Fork White River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk to the East Fork of the White River Unit include water quality degradation due to contaminants. Several impacts pose a moderate risk, including host species vulnerability from lack of regulation of collection of mudpuppies, invasive species, changes in the hydrologic regime, and habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address changes in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, host species vulnerability due to lack of regulation controlling mudpuppy collection, and invasive species.

Fish Creek (West Virginia)

Description

The Fish Creek (West Virginia) unit consists of 26.58 miles in Marshall County, West Virginia from the confluence of Pennsylvania Fork Fish Creek and West Virginia Fork Fish Creek at Kausooth, Marshall County, West Virginia extending downstream to the confluence with the Ohio River southwest of Graysville, Marshall County, West Virginia.

Ownership

Approximately 100% (26.58 miles) are in private ownership.

General land use

General land use within the Fish Creek Unit is urban, including numerous towns and municipalities.

Occupancy

The Fish Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Fish Creek Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, and habitat degradation and loss due to urbanization, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, and barriers to dispersal and movement.

Fishing Creek

Description

The Fishing Creek Unit consists of 23.19 miles in Wetzel County, West Virginia from the confluence of the North Fork Fishing Creek and South Fork Fishing Creek at Pine Grove, Wetzel County, West Virginia extending downstream to the confluence with the Ohio River at Brooklyn, Wetzel County, West Virginia.

Ownership

Approximately 0.5% (0.13 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 99.5% are in private ownership. Approximately 0.13 mile of the public ownership in this unit is in city or county lands associated with the city of New Martinsville.

General land use

General land use within Fishing Creek Unit is urban, including numerous cities and municipalities, as well as several city or county parks.

Occupancy

The Fishing Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a moderate risk within the Fishing Creek Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

French Creek

Description

The French Creek Unit consists of 74.37 miles in Mercer, Erie, Crawford, and Venango counties, Pennsylvania from downstream of Union City Dam northwest of Union City, Erie County, Pennsylvania extending downstream to the confluence of the Allegheny River at Franklin, Venango County, Pennsylvania.

Ownership

Approximately 7.8% (5.83 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 92.2% are in private ownership. Approximately 1.1 miles of the public ownership in this unit are in city or county lands associated with the Borough of Cambridge Springs' Cambridge Springs Recreation Area, the Township of Hayfield's Bertram Park, the Township of Vernon's Vernon Township Ball Fields and Vernon Township Recreation Association, and the city of Meadville's Kenneth A Beers Jr. Bicentennial Park. Approximately 1.1 miles of the public ownership in this unit are in Federal lands associated with the U.S. Fish and Wildlife Service's Erie National Wildlife Refuge. Approximately 3.6 miles of the public ownership in this unit are in State lands associated with the Pennsylvania Game Commission's State Game Land #85 and State Game Land #277 and the Pennsylvania Fish and Boat Commission's Meadville Access and Shaw's Landing.

General land use

General land use within French Creek Unit includes agriculture and urban areas, including numerous cities and municipalities, as well as several county parks and recreation areas. There are also state-managed game and access areas. The Federal land ownership in this unit is a component of the U.S. Fish and Wildlife Service's Erie National Wildlife Refuge.

Occupancy

The French Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 74.37 miles of this unit with designated critical habitat for Rabbitsfoot (80 FR 24692). There is overlap of 74.37 miles of this unit with proposed critical habitat for Longsolid (85 FR 61384).

Threats

Threats that pose a moderate risk within the French Creek Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization, agriculture, and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization, agriculture, and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

Graham Creek

Description

The Graham Creek Unit consists of 41.5 miles in Jefferson, Jennings, and Ripley counties, Indiana from west of South Old Michigan Road at New Marion, Ripley County, Indiana extending downstream to the confluence with the Muscatatuck River north of Deputy, Jefferson County, Indiana.

Ownership

Approximately 100% (41.5 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Graham Creek Unit includes agriculture and numerous municipalities.

Occupancy

The Graham Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Graham Creek Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, host species vulnerability from the lack of regulation of collection of mudpuppies, and habitat degradation and loss due to

urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, and barriers to dispersal and movement.

Harpeth River

Description

The Harpeth River Unit consists of 43.3 miles in Cheatham and Dickson counties, Tennessee from the confluence of the South Harpeth River southeast of Kingston Springs, Cheatham County, Tennessee extending downstream to the confluence with the Cumberland River northeast of Bellsburg, Dickson County, Tennessee.

Ownership

Approximately 14% (6.07 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 86% are in private ownership. Approximately 6.07 miles of the public ownership in this unit are in Federal lands associated with the U.S. Army Corps of Engineers' Cheatham Lake Reservoir.

General land use

General land use within Harpeth River Unit includes agriculture and urban areas, including the town of Kingston Springs. The Federal land ownership in this unit is a component of the U.S. Army Corps of Engineers' Cheatham Lake Reservoir.

Occupancy

The Harpeth River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Harpeth River Unit include degradation of water quality resulting from contaminants, lack of connectivity due to barriers, presence of invasive species, host species vulnerability from the lack of regulation of collection of mudpuppies, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer. Impacts to the hydrological regime pose a moderate risk within the unit.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, changes in the hydrologic regime, and barriers to dispersal and movement.

Kinniconick Creek

Description

The Kinniconick Creek Unit consists of 51 miles in Lewis County, Kentucky from the headwaters of Kinniconick Creek southwest of Petersville, Lewis County, Kentucky extending downstream to the confluence with the Ohio River at Rexton, Lewis County, Kentucky.

Ownership

Approximately 100% (51 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Kinniconick Creek Unit includes agriculture and urban areas, including the town of Garrison.

Occupancy

The Kinniconick Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Kinniconick Creek Unit includes degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, host species vulnerability from the lack of regulation of collection of mudpuppies, presence of invasive species, impacts to the hydrologic regime, and habitat degradation and loss due to urbanization, agriculture, percent remaining within the riparian buffer, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address the hydrologic regime, habitat degradation from urbanization, agriculture, percent vegetative cover remaining within the riparian buffer and lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Laughery Creek

Description

The Laughery Creek Unit consists of 44.52 miles in Ripley, Dearborn, and Ohio counties, Indiana from below the dam at Versailles Lake at Versailles, Ripley County, Indiana extending downstream to the confluence with the Ohio River at Buffalo, Ohio County, Indiana.

Ownership

Approximately 6.76% (3.01 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 93.23% are in private ownership. Approximately 3.01 miles of the public ownership in this unit are in State lands associated with the Indiana Department of Natural Resources State Parks and Reservoirs Division's Versailles State Park.

General land use

General land use within the Laughery Creek Unit includes agriculture and urban areas, including the cities of Friendship and Versailles. There are also State parks.

Occupancy

The Laughery Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Laughery Creek Unit include degradation of water quality resulting from contaminants and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer. Several threats pose a moderate risk within the watershed that have led to lack of connectivity due to barriers, presence of invasive species, host species vulnerability from the lack of regulation of collection of mudpuppies and impacts to the hydrologic regime.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, changes in the hydrologic regime, and barriers to dispersal and movement.

Licking River

Description

The Licking River Unit consists of 179.56 miles in Harrison, Robertson, Kenton, Bracken, Campbell, Rowan, Pendleton, Fleming, Bath, and Nicholas counties, Kentucky from below the dam at Cave Rune Lake south of Farmers, Rowan County, Kentucky extending downstream to the confluence with the Ohio River at Newport, Campbell County, Kentucky.

Ownership

Approximately 11.6% (20.82 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 88.4% are in private ownership. Approximately 3.58 miles of the public ownership in this unit are in city or county lands associated with the city of Newport's General James Taylor Park, the city of Covington's 19th St. Hollow Park, Meinken Park, and Eva G. Farris Complex and the Kenton County's Locust Pike Park, and the Campbell County Conservation District's Hawthorne Crossing Conservation Area, and the Kenton County Conservation District's Morning View Natural Area. Approximately 0.4 mile of the public ownership in this unit is in Federal lands associated with the U.S. Army Corps of Engineer's Cave Run Recreation Area. Approximately 0.5 mile of the public ownership in this unit is in Federal lands on one bank associated with the U.S. Army Corps of Engineer's Cave Run Recreation Area or U.S. Forest Service's Daniel Boone National Forest and State lands on the opposite bank associated with the Kentucky Department of Fish and Wildlife Resources' Minor Clark Fish Hatchery. Approximately 16.36 miles of the public ownership in this unit are in State lands associated with the Kentucky State Nature Preserves Commission's Quiet Trails State Nature Preserve, Kentucky Department of Parks' Blue Licks Battlefield State Recreational Park,

and Kentucky Department of Fish and Wildlife Resources' Clay Wildlife Management Area and Minor Clark Fish Hatchery.

General land use

General land use within Licking River Unit includes agriculture, forest, and urban areas, including numerous cities and municipalities, as well as several county parks and natural areas. There are also a state-managed hatchery and state-managed recreation and wildlife areas as well as nature preserves. The Federal land ownership in this unit is a component of the U.S. Army Corps of Engineer's Cave Run Recreation Area or U.S. Forest Service's Daniel Boone National Forest.

Occupancy

The Licking River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 179.56 miles of this unit with proposed designated critical habitat for Longsolid (85 FR 61384).

Threats

Threats that pose a high risk within the Licking River Unit include degradation due to contaminants. Several impacts pose a moderate risk, including host species vulnerability from lack of regulation of collection of mudpuppies, invasive species, changes in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address change in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, host species vulnerability due to lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Little Kanawha River

Description

The Little Kanawha River Unit consists of 49.82 miles in Wood and Wirt counties, West Virginia from the confluence with the West Fork Little Kanawha River west of Creston, Wirt County, West Virginia extending downstream to the confluence with the Ohio River at Parkersburg, Wood County, West Virginia.

Ownership

Approximately 100% (49.82 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Little Kanawha River Unit is urban, including numerous cities and municipalities.

Occupancy

The Little Kanawha River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 49.82 miles of this unit with proposed designated critical habitat for Longsolid and Round Hickorynut (85 FR 61384).

Threats

Threats that pose a moderate risk within the Little Kanawha River Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

Middle Fork Wildcat Creek

Description

The Middle Fork Wildcat Creek Unit consists of 35.7 miles in Carroll, Clinton, and Tippecanoe counties, Indiana from the headwaters of Middle Fork Wildcat Creek northwest of Forest, Clinton County, Indiana extending downstream to the confluence with South Fork Wildcat Creek northwest of Monitor, Tippecanoe County, Indiana.

Ownership

Approximately 100% (35.7 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Middle Fork Wildcat Creek Unit includes agriculture and numerous cities and municipalities.

Occupancy

The Middle Fork Wildcat Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Licking River Unit include water quality degradation due to contaminants and habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer. Two impacts pose a moderate risk, including host species vulnerability from lack of regulation of collection of mudpuppies, and changes in the hydrologic regime.

Special management

Special management considerations or protection measures may be required in this unit to address change in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, water

quality degradation from contaminants, and host species vulnerability due to lack of regulation controlling mudpuppy collection.

Middle Island Creek

Description

The Middle Island Creek Unit consists of 62.25 miles in these Doddridge, Tyler, and Pleasants counties, West Virginia from downstream of Keys Bend south of Camp, Doddridge County, West Virginia extending downstream to the confluence with the Ohio River at Delong, Pleasants County, West Virginia.

Ownership

Approximately 0.25% (0.15 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 99.75% are in private ownership. Approximately 0.15 mile of the public ownership in this unit is in State lands associated with the West Virginia Division of Natural Resources' Buffalo Run Wildlife Management Area.

General land use

General land use within Middle Island Creek Unit is urban, including numerous cities and municipalities. There is also a state-managed wildlife management area.

Occupancy

The Middle Island Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 74.38 miles of this unit with proposed critical habitat for Round Hickorynut (85 FR 61384).

Threats

Threats that pose a moderate risk within the Middle Island Creek Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

North Fork Licking River

Description

The North Fork Licking River Unit consists of 20.67 miles in Morgan and Rowan counties, Kentucky from the headwaters of North Fork Licking River at Redwine, Morgan County, Kentucky extending downstream to the confluence of the Licking River at Bangor, Rowan County, Kentucky.

Ownership

Approximately 63.5% (13.13 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 36.5% are in private ownership. Approximately 13.13 miles of the public ownership in this unit are in Federal lands associated with the U.S. Army Corps of Engineers' Cave Run Recreation Area and U.S. Forest Service's Daniel Boone National Forest.

General land use

General land use within North Fork Licking River Unit includes agriculture, forest, and urban areas, including the cities of Wrigley, Leisure, Craney, and Paragon. The Federal land ownership in this unit is a component of the U.S. Army Corps of Engineer's Cave Run Recreation Area or U.S. Forest Service's Daniel Boone National Forest.

Occupancy

The North Fork Licking River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the North Fork Licking River Unit include water quality degradation due to contaminants. Several impacts pose a moderate risk, including host species vulnerability from lack of regulation of collection of mudpuppies, invasive species, changes in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address change in the hydrologic regime, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, host species vulnerability due to lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Otter Creek

Description

The Otter Creek Unit consists of 18 miles in Jennings and Ripley counties, Indiana from the U.S. Highway 50 bridge west of Holton, Ripley County, Indiana extending downstream to the confluence with the Vernon Fork Muscatatuck River at Vernon, Jennings County, Indiana.

Ownership

Approximately 100% (18 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Otter Creek Unit includes agriculture and urban areas, including the city of Vernon.

Occupancy

The Otter Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that post a high risk within the Otter Creek Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, host species vulnerability from the lack of regulation of collection of mudpuppies, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, and barriers to dispersal and movement.

Rolling Fork River

Description

The Rolling Fork River Unit consists of 87.9 miles in Larue, Hardin, Marion, and Nelson counties, Kentucky from the confluence of the North Rolling Fork River and Big South Fork River west of Bradfordsville, Marion County, Kentucky extending downstream to the confluence with Beech Fork River east of Younger Creek, Hardin County, Kentucky.

Ownership

Approximately 100% (87.9 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within Rolling Fork River Unit includes agriculture and numerous cities and municipalities.

Occupancy

The Rolling Fork River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Rolling Fork River Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, host species vulnerability from the lack of regulation of collection of mudpuppies, presence of invasive species, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture and lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, host

species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

South Fork Hughes River

Description

The South Fork Hughes River Unit consists of 57.44 miles in Doddridge, Wirt, and Ritchie counties, West Virginia from the headwaters of the South Fork Hughes River at Porto Rico, Doddridge County, West Virginia extending downstream to the confluence with the Hughes River south of Cisco, Ritchie County, West Virginia.

Ownership

Approximately 100% (57.44 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within South Fork Hughes River Unit is urban, including numerous cities and municipalities.

Occupancy

The South Fork Hughes River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a moderate risk within the South Fork of the Hughes River Unit include degradation of water quality due to contaminants, invasive species, habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, and lack of connectivity due to barriers.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization and the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, invasive species, and barriers to dispersal and movement.

South Fork Licking River

Description

The South Fork Licking River Unit consists of 18.26 miles in Pendleton and Harrison counties, Kentucky from a mile upstream from the confluence with Crooked Creek north of Boyd, Harrison County, Kentucky extending downstream to the confluence with the Licking River at Falmouth, Pendleton County, Kentucky.

Ownership

Approximately 100% (18.26 miles) of the riparian lands adjacent to, but not included in, this unit are in private ownership.

General land use

General land use within South Fork Licking River Unit is urban, including the cities of Falmouth and Morgan.

Occupancy

The South Fork Licking River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the South Fork of the Licking River Unit include water quality degradation due to contaminants and habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer. Several impacts pose a moderate risk, including host species vulnerability from lack of regulation of collection of mudpuppies, changes in the hydrologic regime, and invasive species.

Special management

Special management considerations or protection measures may be required in this unit to address changes in the hydrologic regime, invasive species, habitat degradation and loss due to urbanization, agriculture, the lack of tree canopy cover and vegetative cover in the riparian buffer, water quality degradation from contaminants, and host species vulnerability due to lack of regulation controlling mudpuppy collection.

Tippecanoe River

Description

The Tippecanoe River Unit consists of 124.25 miles in Marshall, Fulton, Pulaski, Starke, Kosciusko, and White counties, Indiana from below Oswego Lake at Oswego, Kosciusko County, Indiana extending downstream to the top of Lake Shaffer west of Sitka, White County, Indiana.

Ownership

Approximately 6% (7.4 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 94% are in private ownership. Approximately 7.4 miles of the public ownership in this unit are in State lands associated with the Indiana Department of Natural Resources State Parks and Reservoirs Division's Tippecanoe River State Park and Indiana Department of Natural Resources Fish and Wildlife Division's Menominee Public Fishing Area, Talma Public Access, and Old Tip Town Public Access Site.

General land use

General land use within Tippecanoe River Unit includes agriculture and urban areas, including numerous cities and municipalities, as well as several county parks and natural areas. There are also state-managed parks, access areas, and fishing areas.

Occupancy

The Tippecanoe River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 28.14 miles of this unit with designated critical habitat for Rabbitsfoot (80 FR 24692).

Threats

Threats that pose a high risk within the Tippecanoe River Unit include degradation of water quality resulting from contaminants and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer. Several threats pose a moderate risk within the unit, including lack of connectivity due to barriers, presence of invasive species, host species vulnerability from the lack of regulation of collection of mudpuppies, and impacts to the hydrologic regime.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, changes in the hydrologic regime, and barriers to dispersal and movement.

Duck River

Description

The Duck River Unit consists of 116.8 miles in Hickman, Humphreys, Perry, and Maury counties, Tennessee from the confluence of the Little Bigby Creek northwest of Columbia, Maury County, Tennessee extending downstream to the confluence of the Duck River and the Tennessee River which creates a backwater affect at Elysian Grove, Humphreys County, Tennessee.

Ownership

Approximately 0.4% (0.5 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 99.6% are in private ownership. Approximately 0.5 mile of the public ownership in this unit is in Federal lands associated with the National Park Service's Natchez Trace Parkway.

General land use

General land use within Duck River Unit includes agriculture and numerous cities and municipalities. The Federal land ownership in this unit is a component of the National Park Service Natchez Trace Parkway.

Occupancy

The Duck River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 116.42 miles of this unit with designated critical habitat for Rabbitsfoot (80 FR 24692).

Threats

Threats that pose a high risk within the Duck River Unit include habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer, lack of connectivity due to barriers, and host species vulnerability from the lack of regulation of collection of mudpuppies. Several threats pose a moderate risk within the unit, including degradation of water quality resulting from contaminants, presence of invasive species, and impacts to the hydrologic regime.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, host species vulnerability from the lack of regulation controlling mudpuppy collection, changes in the hydrologic regime, and barriers to dispersal and movement.

Blanchard River

Description

The Blanchard River Unit consists of 25.02 miles in Putnam and Hancock counties, Ohio from the west side of Findley, Hancock County, Ohio extending downstream to the confluence with Riley Creek east of Ottawa, Putnam County, Ohio.

Ownership

Approximately 3.75% (0.9 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 96.25% are in private ownership. Approximately 0.9 mile of the public ownership in this unit is in city or county lands associated with the Hancock Park District's Indian Green Preserve.

General land use

General land use within Blanchard River Unit includes agriculture, forest, and urban areas as well as several county parks and natural areas. There are also a state-managed hatchery and state-managed recreation and wildlife areas as well as nature preserves. The Federal land ownership in this unit is a component of the U.S. Army Corps of Engineer's Cave Run Recreation Area or U.S. Forest Service's Daniel Boone National Forest.

Occupancy

The Blanchard River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Blanchard River Unit include degradation of water quality resulting from contaminants and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover and vegetative cover in the riparian buffer. Several threats pose a moderate risk within the unit, including the presence of invasive species and host species vulnerability from the lack of regulation of collection of mudpuppies.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation from urbanization, agriculture, lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, invasive species, and host species vulnerability from the lack of regulation controlling mudpuppy collection.

Clinton River

Description

The Clinton River Unit consists of 7.02 miles in Oakland County, Michigan from downstream of the fish hatchery at Waterford Township, Oakland County, Michigan extending downstream to Cass Lake east of Four Towns, Oakland County, Michigan.

Ownership

Approximately 3.75% (0.94 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 96.25% are in private ownership. Approximately 0.94 mile of the public ownership in this unit is in city or county lands associated with the Waterford Township's Clinton River Canoe Site.

General land use

General land use within the Clinton River Unit includes agriculture, forest, and urban areas. It is located within urban areas near the city of Pontiac. There are county lands associated with a canoe launch.

Occupancy

The Clinton River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Clinton River Unit include degradation of water quality resulting from contaminants and habitat degradation and loss due to the amount of impervious surface, urbanization, and the lack of canopy cover and vegetative cover in the riparian buffer. Several threats pose a moderate risk within the unit, including host species vulnerability from the lack of regulation of collection of mudpuppies, lack of connectivity due to barriers, and invasive species.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss from impervious surfaces, urbanization, and lack of canopy cover and vegetative cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Conneaut Creek

Description

The Conneaut Creek Unit consists of 62 miles in Erie, Crawford, and Ashtabula counties, Pennsylvania from the start of Conneaut Creek at Dicksonburg, Crawford County, Pennsylvania extending downstream to the mouth with Lake Erie at Conneaut, Ashtabula County, Pennsylvania.

Ownership

Approximately 3.7% (2.3 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 96.3% are in private ownership. Approximately 0.34 mile of the public ownership in this unit is in city or county lands associated with Conneaut's Conneaut Local Youth Organization Park. Approximately 1.97 miles of the public ownership in this unit

are in State lands associated with the Ohio Department of Natural Resources' Conneaut Creek Scenic River.

General land use

General land use within the Conneaut Creek Unit includes agriculture, forest, and urban areas, including numerous cities and municipalities, as well as local county and State natural areas.

Occupancy

The Conneaut Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Conneaut Creek Unit include degradation of water quality resulting from contaminants, host species vulnerability from the lack of regulation of collection of mudpuppies, and habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer. Several threats pose a moderate risk within the unit, including connectivity due to barriers and invasive species.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to urbanization, agriculture, and the lack of canopy cover in the riparian buffer, water quality degradation due to contaminants, host species vulnerability from the lack of regulation controlling mudpuppy collection, invasive species, and barriers to dispersal and movement.

Fish Creek (Indiana)

Description

The Fish Creek (Indiana) Unit consists of 37.37 miles in Williams County, Ohio and DeKalb and Steuben counties, Indiana from the headwaters of Fish Creek at Billingstown, Williams County, Ohio extending downstream to the confluence with the St. Joseph River at Edgerton, Williams County, Ohio.

Ownership

Approximately 2.7% (1 mile) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 97.3% are in private ownership. Approximately 1 mile of the public ownership in this unit is in State lands associated with the Ohio Department of Natural Resources' Fish Creek Wildlife Area.

General land use

General land use within the Fish Creek Unit is urban as well as a State wildlife area.

Occupancy

The Fish Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation. There is overlap of 5.53 miles of this unit with designated critical habitat for Rabbitsfoot (80 FR 24692).

Threats

Threats that pose a high risk within the Fish Creek Unit include degradation of water quality resulting from contaminants. Several threats pose a moderate risk within the unit, including connectivity due to barriers, invasive species, and habitat degradation and loss due to the amount of urbanization and the lack of vegetative cover and canopy cover in the riparian buffer.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to the amount of urbanization, the lack of vegetative cover and canopy cover in the riparian buffer, water quality degradation due to contaminants, invasive species, and barriers to dispersal and movement.

Mill Creek

Description

The Mill Creek Unit consists of 23.65 miles in St. Clair County, Michigan from the confluence with Thompson Drain northwest of Brockway Township, St. Clair County, Michigan extending downstream to the confluence with the Black River at Ruby, St. Clair County, Michigan.

Ownership

Approximately 6.5% (1.54 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 93.5% are in private ownership. Approximately 1.54 miles of the public ownership in this unit are in State lands associated with the Michigan Department of Natural Resources Wildlife Division's Port Huron State Game Area.

General land use

General land use within the Mill Creek Unit includes agriculture and urban areas, including numerous cities and municipalities, as well as the state-managed Port Huron State Game Area.

Occupancy

The Mill Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the Mill Creek Unit include degradation of water quality resulting from contaminants and habitat degradation and loss due to the amount of impervious surface, urbanization, agriculture, and the lack of vegetative cover and canopy cover in the riparian buffer. Two threats pose a moderate risk within the unit, including invasive species and host species vulnerability from the lack of regulation controlling mudpuppy collection.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to the amount of impervious surface, urbanization, agriculture, the lack of vegetative cover and canopy cover in the riparian buffer, water quality degradation due to contaminants, invasive species, and host species vulnerability from the lack of regulation controlling mudpuppy collection.

North Branch Pensaukee River

Description

The North Branch Pensaukee River Unit consists of 19.93 miles in Shawano and Oconto counties, Wisconsin from the Pensaukee Lakes at Cecil, Shawano County, Wisconsin extending downstream to the confluence with the Pensaukee River at Abrams, Oconto County, Wisconsin.

Ownership

Approximately 6.2% (1.24 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 93.8% are in private ownership. Approximately 1.22 miles of the public ownership in this unit are in city or county lands associated with the Oconto County's Oconto County Forest. Approximately 0.02 mile of the public ownership in this unit is in State lands associated with the Wisconsin Department of Natural Resources' Wiouwash State Trail.

General land use

General land use within the North Branch of the Pensaukee River Unit includes agriculture, forest, and urban areas as well as local county and State forest areas.

Occupancy

The North Branch Pensaukee River Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats

Threats that pose a high risk within the North Branch Pensaukee River Unit include host species vulnerability from the lack of regulation controlling mudpuppy collection. Two threats that pose a moderate risk include habitat degradation and loss due to the amount of urbanization, agriculture, and the lack of canopy cover in the riparian buffer, and invasive species.

Special management

Special management considerations or protection measures may be required in this unit to address habitat degradation and loss due to the amount of urbanization, agriculture, and the lack of canopy cover in the riparian buffer, invasive species, and host species vulnerability from the lack of regulation controlling mudpuppy collection.

Tonawanda Creek

Description

The Tonawanda Creek Unit consists of 113.21 miles in Erie, Genesee, Niagara, and Wyoming counties, New York from the headwaters of Tonawanda Creek at Java Center, Wyoming County, New York extending downstream to the confluence with the Niagara River at Tonawanda, Erie County, New York.

Ownership

Approximately 7% (8.69 miles) of the riparian lands adjacent to, but not included in, this unit are in public ownership and 93% are in private ownership. Approximately 2.08 miles of the public ownership in this unit are in city or county lands associated with the town of Sheldon's Vincent Almeter Memorial Park Lands, city of Attica's city lands, city of Batavia's local parks and Kiwanis mini park, and Erie County's Erie County Lands. Approximately 6.62 miles of the public ownership in this unit are in State lands associated with New York's Erie Canal Waterway Trail. Approximately 10.6 miles of the ownership in this unit are in tribal lands associated with the Tonawanda Reservation.

General land use

General land use within the Tonawanda Creek Unit includes tribal lands, urban areas including numerous cities and municipalities, as well as local city and county parks and the state-managed Erie Canal Waterway Trail.

Occupancy

The Tonawanda Creek Unit is occupied by the species and contains one or more of the physical or biological features essential to the species' conservation.

Threats and Special management

The Niagara population is in New York and Canada. This population is represented by one fresh shell found incidentally in 2018 at one location in Tonawanda Creek, New York. The assessment completed for the Canada populations did not include the Niagara population as the incidental fresh shell was found in New York. Because of differences in data availability from the U.S. and Canada, it was difficult to evaluate the risk metrics in a comparable way for the current condition analysis. As such, we do not have information on the threats and special management considerations for the Tonawanda Creek Unit.

B. Baseline Analysis

1. Identify other co-occurring listed species or designated critical habitat that overlap with the Salamander Mussel's proposed critical habitat

Approximately 29 species listed under the Act as endangered or threatened species also occur within the riverine habitats (in some portions of the ranges³) used by the Salamander Mussel (Table 2). As a result, the Salamander Mussel may receive some collateral benefits in areas of habitat overlap. For example, because free-flowing and stable river and stream habitats which contain good water quality are also essential for these aquatic species, their habitat requirements can help protect similar Salamander Mussel habitat needs.

Table 2. Federally listed species that overlap with steam systems used by Salamander Mussel.

Common Name	Scientific Name	Federal Status
Copperbelly Water Snake	<i>Nerodia erythrogaster neglecta</i>	Threatened
Pygmy Madtom	<i>Noturus stanauli</i>	Endangered
Birdwing Pearlymussel	<i>Lemiox rimosus</i>	Experimental Population, Non- Essential
Clubshell	<i>Pleurobema clava</i>	Endangered
Cracking Pearlymussel	<i>Hemistena lata</i>	Endangered
Cumberland Monkeyface (pearlymussel)	<i>Quadrula intermedia</i>	Experimental Population, Non- Essential
Cumberlandian Combshell	<i>Epioblasma brevidens</i>	Endangered
Fanshell	<i>Cyprogenia stegaria</i>	Endangered
Fat Pocketbook	<i>Potamilus capax</i>	Endangered

³Information on the ranges of the listed species identified in Table 2 are available on the Internet at fws.gov/endangered/.

Higgins Eye (pearlymussel)	<i>Lampsilis higginsii</i>	Endangered
Northern Riffleshell	<i>Epioblasma torulosa rangiana</i>	Endangered
Orangefoot Pimpleback (pearlymussel)	<i>Plethobasus cooperianus</i>	Endangered
Oyster Mussel	<i>Epioblasma capsaeformis</i>	Endangered
Pale Lilliput (pearlymussel)	<i>Toxolasma cylindrellus</i>	Endangered
Pink Mucket (pearlymussel)	<i>Lampsilis abrupta</i>	Endangered
Purple Cat's Paw (pearlymussel)	<i>Epioblasma obliquata obliquata</i>	Endangered
Rabbitsfoot*	<i>Quadrula cylindrica cylindrica</i>	Threatened
Rayed Bean	<i>Villosa fabalis</i>	Endangered
Ring Pink (mussel)	<i>Obovaria retusa</i>	Endangered
Rough Pigtoe	<i>Pleurobema plenum</i>	Endangered
Round Hickorynut	<i>Obovaria subrotunda</i>	Proposed Threatened
Sheepnose Mussel	<i>Plethobasus cyphus</i>	Endangered
Slabside Pearlymussel	<i>Pleuonaia dolabelloides</i>	Endangered
Snuffbox Mussel	<i>Epioblasma triquetra</i>	Endangered
Spectaclecase (mussel)	<i>Cumberlandia monodonta</i>	Endangered
Tan Riffleshell	<i>Epioblasma florentina walkeri</i>	Endangered
Turgid Blossom (pearlymussel)	<i>Epioblasma turgidula</i>	Endangered
White Catpaw (pearlymussel)	<i>Epioblasma obliquata perobliqua</i>	Endangered
Winged Mapleleaf	<i>Quadrula fragosa</i>	Endangered

*Designated critical habitat for denoted species present.

2. Conservation plans and regulatory mechanisms that may provide protection to the species and its habitat without critical habitat.

a. Conservation Plans/Efforts

We are not aware of any conservation plans in place for the Salamander Mussel.

b. Federal Regulatory Mechanisms

Endangered Species Act (ESA)

We are proposing to list the Salamander Mussel as an endangered species. Listing provides opportunity for conservation and protection under sections 6, 7, 9, and 10 of the Act. These include cooperative actions with States (section 6), consultation with Federal agencies for actions that may affect the species (section 7), protection against take⁴ of the species (section 9), and

⁴ "Take" is defined in the Act as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

cooperative actions with other entities and landowners for the purpose of scientific or enhancement of survival activities involving take (section 10(a)(1)(A) permit), and habitat conservation planning (section 10(a)(1)(B)).

Clean Water Act (CWA)

Congress passed the Federal Water Pollution Control Act Amendments of 1972 and the Clean Water Act (CWA) of 1977 to provide for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's lakes, streams, and coastal waters. Primary authority for the implementation and enforcement of the CWA now rests with the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE). In addition to the measures authorized before 1972, the USACE implements a variety of programs in compliance with the CWA, including Federal effluent limitations and State water quality standards, permits for the discharge of pollutants and dredged and fill materials into navigable waters, and enforcement mechanisms.

Section 404 of the CWA is the principal Federal program that regulates activities affecting the integrity of wetlands. Section 404 prohibits the discharge of dredged or fill material in jurisdictional waters of the United States, unless permitted by USACE under section 404(a) (individual permits), 404(e) (general permits), or unless the discharge is exempt from regulation as designated in section 404(f).

The limits of jurisdictional waters of the United States (the area covered under section 404) are determined by: (1) in the absence of adjacent wetlands, jurisdiction extends to the ordinary high water mark; (2) when adjacent wetlands are present, jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands; or (3) when the water of the United States consists only of wetlands, jurisdiction extends to the limit of the wetland.

Section 402 of the CWA is the principal Federal program that regulates activities affecting water quality. One of the most significant features of the 1972 CWA is the creation of a National Pollutant Discharge Elimination System (NPDES). Except as otherwise provided in the CWA, industrial sources and treatment works may not discharge pollutants into navigable waters without a permit. The EPA or a state-authorized program may issue a permit for discharge upon condition that the discharge meets applicable requirements, which are outlined extensively in the CWA and which reflect, among other things, the need to meet Federal effluent limitations and State water quality standards.

The EPA's Water Protection Division (WPD) oversees the CWA triennial review (Section 303(c)(1)), water quality standards (section 303(c)(3)), impaired waters (section 303(d), and the National Pollution Discharge Elimination System (NPDES) programs (section 402). The EPA's responsibility under the triennial review is to encourage the States to hold public hearings for the purpose of reviewing applicable water quality standards, and, as appropriate, modifying or adopting the State water quality standards (i.e., water body uses, numeric criteria, narrative criteria, and anti-degradation policy). The EPA's responsibility under the water quality standards program is to determine if any water quality standards submitted by the State as a new or revised standard meets the requirements of the CWA.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

The EPA regulates pesticide uses to prevent unreasonable adverse effects upon human health or the environment. As part of the registration process for a new pesticide use or during the

reassessment of ecological risks from a currently registered pesticide, the EPA evaluates extensive environmental fate and toxicity data to determine how a pesticide will move through and break down in the environment and whether potential exposure to the pesticide will result in adverse effects to wildlife and vegetation. The EPA routinely assesses risks to birds, fish, invertebrates, mammals, and plants to determine whether a pesticide may be licensed for use in the United States.

c. Federal Land Management

The following Federal agencies own and manage lands within some of the areas proposed as critical habitat. Ongoing land management activities are considered part of the baseline because they will provide some benefits to the Salamander Mussel with or without critical habitat designation. For those future activities that may affect the Salamander Mussel or its critical habitat, section 7 consultation will occur and may be considered as part of the incremental effects of critical habitat designation.

U.S. Forest Service

The National Forest Management Act of 1976 is the primary statute governing the administration of national forests. This law requires National Forests to evaluate their lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each forest (unit). The 2012 Planning Rule (77 FR 21162; April 9, 2012), as amended, revises land management planning regulations for national forests. The planning rule provides new regulations to guide the development, amendment, and revision of management plans for all Forest System lands. These revised regulations, which became effective on May 9, 2012, require that the U.S. Forest Service (USFS) maintain viable populations of species of conservation concern at the discretion of regional foresters. Additionally, sec. 219.9 stipulates that “the responsible official shall determine whether or not the plan components” provide the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area. Within the range of the Salamander Mussel, the USFS manages land in the Daniel Boone and Hoosier National Forests.

National Park Service

The Organic Act of 1916, as amended (54 U.S.C. 100101), addresses lands owned and managed by the National Park Service, including Natchez Trace National Parkway within the range of the Salamander Mussel. Land management plans for the National Park lands within Tennessee do not contain specific measures to protect Salamander Mussel.

U.S. Army Corps of Engineers

Both Cave Run Recreation Area in Kentucky and Cheatham Lake Recreation Area in Tennessee are managed by the USACE. Cheatham Lock and Dam Project was authorized by Congress in 1946 for development of the Cumberland River Basin for navigation. The Cheatham Lock and Dam project replaced three other aging lock and dam structures. Eventually Congress authorized hydropower at this project and currently the facility is operated at “run of river” flow. The lock and dam and hydropower project are all managed by the USACE. This Lake also provides significant recreation opportunities for the public.

Construction of the Cave Run Recreation Area began in 1965 and was authorized by the Flood Control Act of June 22, 1936. The purpose of Cave Run Lake is to help with flood control within the Ohio River Basin. The Dam is operated by the USACE. Cave Run Lake provides significant recreation for the public and is a public water supply.

Federal Energy Regulatory Commission (FERC)

The Union City Dam is present on French Creek in Erie County, Pennsylvania. It currently is under the jurisdiction of FERC and has a preliminary permit that was issued for 1/13/2020–12/31/2023. Allegheny Lock and Dam #5 and #6 are also located in Pennsylvania on the Allegheny River in Armstrong County. Both lock and dam structures are under jurisdiction of FERC. Lock and Dam # 5 has an active license that will expire on 9/30/2034, and lock and dam #6 also has an active license that expires 6/30/2034.

Six structures in Wisconsin within the proposed critical habitat units for Salamander Mussel are under the jurisdiction of FERC. The Black River Falls Municipal Utilities Hydroelectric Project and the Hatfield Dam are both on the Black River in Jackson County, Wisconsin. These facilities both have active licenses. The Black River Falls Municipal Utilities Hydroelectric Project license expires on 2/28/2042, the Hatfield Dam license expires 4/30/2037.

The Dells Hydro generating Station on the Chippewa River in Eau Claire County currently has an active license that expires on 9/30/2033. There are three additional projects on the Wisconsin River, the Merrill Hydroplant in Lincoln County, the Wausau facility in Marathon County, and the Prairie Du Sac facility in Sauk County. The Merrill Hydroplant is operating under a license exemption, while the other two facilities have active licenses. The Wausau license expires on 6/30/2035 and the Prairie Du Sac on 6/30/2041.

Tribal Regulations

A portion of the Tonawanda Creek unit occurs within the Tonawanda Reservation. The Tonawanda Seneca Nation has a conservation department that was established in 1977 by the Seneca Nation of Indians Council resolution. The department is responsible for the enforcement of Seneca Nation of Indian laws, ordinances and codes addressing hunting, fishing, conservation, environmental, sand and gravel and solid waste ordinances.

d. State Regulatory Mechanisms

In the 14 States where the Salamander Mussel is known to historically or currently occur, it is state-listed as threatened (T) or endangered (E) only in Michigan (E), Illinois (T), Wisconsin (T), Minnesota (E), Pennsylvania (E), and Ohio (currently being uplisted to E from special concern (SC)). Canada also lists Salamander Mussel as E under the Species At Risk Act (see Table 3). In Kentucky, it is listed as endangered and in Indiana it is listed as special concern, though there are not protections associated with either of these designations.

Table 3. Salamander Mussel state status and protections.

Salamander Mussel Protections by State		
State	Status	Protections
Arkansas	None	
Illinois	Endangered	"Endangered Species" means any species of plant or animal classified as endangered under the

		<p>Federal Endangered Species Act of 1973, P.L. 93-205, and amendments thereto, plus such other species which the Board may list as in danger of extinction in the wild in Illinois due to one or more causes including but not limited to, the destruction, diminution or disturbance of habitat, overexploitation, predation, pollution, disease, or other natural or manmade factors affecting its prospects of survival.</p> <p>"Illinois List" means a list of species of animals and plants listed by the Board as endangered or threatened.</p> <p>Sec. 3. It is unlawful for any person:</p> <p>(1) to possess, take, transport, sell, offer for sale, give or otherwise dispose of any animal or the product thereof of any animal species which occurs on the Illinois List;</p> <p>(2) to deliver, receive, carry, transport or ship in interstate or foreign commerce plants listed as endangered by the federal government without a permit therefor issued by the Department as provided in Section 4 of this Act;</p> <p>(3) to take plants on the Illinois List without the express written permission of the landowner; or</p> <p>(4) to sell or offer for sale plants or plant products of endangered species on the Illinois List.</p>
Indiana	Special concern	<p>Special concern species are those that require monitoring because of known/suspected limited abundance or distribution; have had a recent change in legal listing status; or have had a change to the required habitat needed for survival. Special concern species do not receive legal protection under the Nongame and Endangered Species Conservation Act.</p>
Iowa	Extirpated	
Kentucky	Threatened	No protections provided to threatened species.
Michigan	Endangered	<p>324.36505 Prohibitions; exceptions. Sec. 36505.</p> <p>(1) Except as otherwise provided in this part, a person shall not take, possess, transport, import, export, process, sell, offer for sale, buy, or offer to buy, and a common or contract carrier shall not transport or receive for shipment, any species of fish, plants, or wildlife appearing on the following lists: (a) The list of fish, plants, and wildlife indigenous to the state determined to be endangered or threatened within the state pursuant to section 36503 or subsection (3). (b) The United States list of endangered or threatened native fish</p>

		<p>and wildlife. (c) The United States list of endangered or threatened plants. (d) The United States list of endangered or threatened foreign fish and wildlife. (2) A species of fish, plant, or wildlife appearing on any of the lists delineated in subsection (1) which enters the state from another state or from a point outside the territorial limits of the United States may enter, be transported, possessed, and sold in accordance with the terms of a federal permit issued pursuant to section 10 of the endangered species act of 1973, 16 USC 1539, or an applicable permit issued under the laws of another state.</p> <p>Fisheries Order Regulation on Freshwater Mollusks 228.18.</p> <p>By authority conferred on the Natural Resources Commission and the Department of Natural Resources by Part 487 of 1994 PA 451, MCL 324.48701 to 324.48740, it is ordered on November 9, 2017, the following section(s) of the Fisheries Order shall read as follows:</p> <p>This Order does not apply to those species listed in MCL 324.41301(1)(o)(iii) or the Michigan Invasive Species Order. It shall be unlawful to take or attempt to take freshwater mussels or parts of any freshwater mussels, whether living or dead, including the shell or parts thereof, from any waters of this state, except under the provisions of a cultural or scientific investigation permit issued by the Director of the Department of Natural Resources.</p> <p>This Order shall be assigned number FO-228.18, and is entitled "Regulations on Freshwater Mollusks."</p> <p>This Order supersedes the Order entitled "Regulations on the Take of Freshwater Mollusks," which became effective October 8, 2015, and is assigned number FO-228.15.</p> <p>This Order shall take effect on April 1, 2018 and shall remain in effect until amended/rescinded. Issued on this 9th day of November.</p> <p>Approved as to matters over which the Natural Resources Commission has authority.</p>
Minnesota	Endangered	<p>Notwithstanding any other law, a person may not take, import, transport, or sell any portion of an endangered species of wild animal or plant, or sell or possess with intent to sell an article made with any part of the skin, hide, or parts of an endangered species of wild animal or plant, except as provided in subdivisions 2 (regarding plant</p>

		species) and 7 (The commissioner may issue permits and prescribe conditions if for the purpose of zoological, educational, or scientific study; enhances the propagation or survival of the species; prevents injury to persons or property; and/or the social and economic benefits of the act outweigh the harm caused by it). A member of an endangered species may not be destroyed until all alternatives, including live trapping and transplantation, have been evaluated and rejected. A person may capture or destroy a member of an endangered species, without permit, to avoid an immediate and demonstrable threat to human life or property.
Missouri	None	
New York	None	
Ohio	Special Concern	The chief of the division of wildlife, with the approval of the wildlife council, shall adopt and may modify and repeal rules, in accordance with Chapter 119. of the Revised Code, restricting the taking or possession of native wildlife, or any eggs or offspring thereof, that he finds to be threatened with statewide extinction. The rules shall provide for the taking of species threatened with statewide extinction, for zoological, educational, and scientific purposes, and for propagation in captivity to preserve the species, under written permits from the chief. The rules shall in no way restrict the taking or possession of species listed on such United States list for zoological, educational, or scientific purposes, or for propagation in captivity to preserve the species, under a permit or license from the United States or any instrumentality thereof.
Pennsylvania	Endangered	It is unlawful for any person to import, export, transport, sell, resell, exchange, take or possess or conspire, aid, abet, assist or attempt to import, export, transport, sell, resell, buy, exchange, take or possess any birds or animals of any endangered or threatened species, living or dead, or any parts thereof, including eggs, or to violate any regulations pertaining to such wildlife or this section (Citation: 34 Pa.C.S.A. § 2924) “Take.” To harass, pursue, hunt for, shoot, wound, kill, trap, capture, possess or collect any game or wildlife, including shooting at a facsimile of game or wildlife, or attempt to harass, pursue, hunt for, shoot, wound, kill, trap, capture or collect any game or wildlife or aiding, abetting or conspiring

		with another person in that purpose (Citation: 34 Pa.C.S.A. § 102).
Tennessee	None	
West Virginia	None	
Wisconsin	Threatened	<p>It is illegal to take, transport, possess, process or sell any wild animal that is included on the Wisconsin Endangered and Threatened Species List [PDF] without a valid E/T species permit.</p> <p>Mussels — It is illegal to remove threatened or endangered clams, live or dead, from any Wisconsin water. In addition, it is no longer legal to harvest live clams from any state waters. See the Wisconsin clamming regulations for details.</p> <p>Conservation — The Department of Natural Resources is required by law to implement conservation programs on state-listed species. This involves conducting research and developing programs directed at conserving, protecting, managing for and restoring and propagating selected endangered and threatened species to the maximum extent practicable.</p>
Canada	Endangered	<p>The Salamander Mussel is protected under the federal Species at Risk Act (SARA). This mussel is also protected under the federal Fisheries Act, which prohibits destruction of fish habitat.</p> <p>When a wildlife species is listed as an endangered species in Schedule 1 of SARA, the prohibitions in sections 32 and 33 of SARA automatically apply: prohibition against killing, harming, harassing, capturing or taking an individual of that species; prohibition against possessing, collecting, buying, selling, or trading an individual of that species, or any part or derivative of such an individual; and prohibition against damaging or destroying the residence of one or more individuals of that species.</p> <p>The critical habitats of the Northern Riffleshell, Snuffbox, Round Pigtoe, Salamander Mussel, and Rayed Bean were identified in the final amended Recovery Strategy for the Northern Riffleshell, Snuffbox, Round Pigtoe, Salamander Mussel, and Rayed Bean in Canada (2019) [the Amended Recovery Strategy]. As the competent minister under SARA, the Minister of Fisheries and Oceans (MFO) is required to ensure that the critical habitats of the Northern Riffleshell, Snuffbox, Round Pigtoe, Salamander Mussel, and Rayed Bean are protected by provisions in, or measures under, SARA or any other Act of Parliament, or by the application of subsection</p>

	<p>58(1) of SARA. This is accomplished through the making of the Critical Habitat of the Northern Riffleshell (<i>Epioblasma torulosa rangiana</i>) Order, the Critical Habitat of the Snuffbox (<i>Epioblasma triquetra</i>) Order, the Critical Habitat of the Round Pigtoe (<i>Pleurobema sintoxia</i>) Order, the Critical Habitat of the Salamander Mussel (<i>Simpsonaias ambigua</i>) Order, and the Critical Habitat of the Rayed Bean (<i>Villosa fabalis</i>) Order (the orders), under subsections 58(4) and (5) of SARA. These orders trigger the prohibition against the destruction of any part of the species' critical habitat in subsection 58(1) of SARA. The orders afford the MFO the tool needed to ensure that the critical habitats of the Northern Riffleshell, Snuffbox, Round Pigtoe, Salamander Mussel, and Rayed Bean are legally protected, and enhance the protection already afforded to the Northern Riffleshell, Snuffbox, Round Pigtoe, Salamander Mussel, and Rayed Bean habitats under existing legislation to support efforts towards the recovery of these species.</p>
--	---

3. Federal agencies and other project proponents that are likely to consult with the Service under section 7 absent the critical habitat designation

If a Federal agency's action may affect listed species, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not jeopardize the continued existence of the species. These consultations are baseline activities.

Below is a summary of the Federal agencies and types of projects that could affect the Salamander Mussel and therefore may trigger section 7 consultation:

Activities that may result in adverse effects to critical habitat for the species could include actions that would: (1) alter the geomorphology of their stream and river habitats (e.g., instream excavation or dredging, impoundment, channelization, sand and gravel mining, clearing riparian vegetation, and discharge of fill materials); (2) significantly alter the existing flow regime where these species occur (e.g., impoundment, urban development, water diversion, water withdrawal, water draw-down, and hydropower generation); (3) significantly alter water chemistry or water quality (e.g., hydropower discharges, or the release of chemicals, biological pollutants, or heated effluents into surface water or connected groundwater at a point source or by dispersed release (nonpoint source)); (4) significantly alter stream bed material composition and quality by increasing sediment deposition or filamentous algal growth (e.g., construction projects, gravel and sand mining, oil and gas development, coal mining, livestock grazing, timber harvest, and other watershed and floodplain disturbances that release sediments or nutrients into the water); and major habitat alterations that impact mudpuppy persistence.

These types of activities would require section 7 consultation only in cases where there is Federal involvement (e.g., a project is proposed, funded, or authorized by a Federal agency).

Examples of such activities include, but are not limited to, those conducted, funded, or authorized by:

1. USACE (channel dredging and maintenance, dam projects including flood control, navigation, hydropower, bridge projects, stream restoration, and Clean Water Act permitting).
2. U.S. Department of Agriculture, including the Natural Resources Conservation Service and Farm Service Agency (technical and financial assistance for projects) and the USFS (aquatic habitat restoration, fire management plans, fire suppression, fuel reduction treatments, forest plans, and mining permits).
3. U.S. Department of Energy (renewable and alternative energy projects). Federal Energy Regulatory Commission (interstate pipeline construction and maintenance, dam relicensing, and hydrokinetics).
4. U.S. Department of Transportation (highway and bridge construction and maintenance).
5. U.S. Fish and Wildlife Service (issuance of section 10 permits for enhancement of survival, habitat conservation plans, and safe harbor agreements; National Wildlife Refuge planning and refuge activities; Partners for Fish and Wildlife program projects benefiting these species or other listed species, Wildlife and Sportfish Restoration program sportfish stocking).
6. Environmental Protection Agency (water quality criteria, permitting).
7. Office of Surface Mining (land resource management plans, mining permits, oil and natural gas permits, and renewable energy development).

4. What Types of Project Modifications Are Currently Recommended Or Will Likely Be Recommended By The Service To Avoid Jeopardy (i.e., The Continued Existence Of The Species)?

Various Federal and State regulatory mechanisms are in place and provide varying degrees of conservation oversight that may address the threats of ongoing habitat loss and degradation resulting from various activities. However, because Salamander Mussel is not yet listed, we have not conducted any section 7 conference activities or consultations for this species. As a result of the lack of specific consultation actions for the Salamander Mussel, we look to the existing consultation history on other federally listed species in the range of the Salamander Mussel (i.e., Rabbitsfoot (*Theliderma cylindrica*), Snuffbox (*Epioblasma triquetra*), Sheepnose (*Plethobasus cyphus*), Winged Mapleleaf (*Quadrula fragosa*), and Higgins eye (*Lampsilis higginsii*) for Salamander Mussel.

Based on information from the Service's Tracking and Integrated Logging System (TAILS) database from 2016 through 2021 (5 years), 3 formal consultations, 32 informal consultations, 19 technical assistance, and 106 requests for species lists have occurred within the Salamander Mussel stream reaches for Rabbitsfoot, Sheepnose, Winged Mapleleaf, Higgins Eye, and Snuffbox.

Below is a breakdown of these consultations by State:

- Kentucky – No formal consultations, 2 informal consultations, 7 technical assistance, and 23 requests for species lists within Bath, Campbell, Larue, Lewis, Marion, Morgan, Nelson, Nicholas, and Rowan counties. The informal consultations were associated with road infrastructure and pipeline.
- Minnesota – no formal consultations, no information consultations, 8 technical assistance, and 27 requests for species lists within Chisago, Pierce, Polk, St. Croix, and Washington counties.
- Pennsylvania – One formal consultation, 8 informal consultations, 1 technical assistance, and 6 requests for species lists within Armstrong, Crawford and Venango counties. The formal consultation was for a Department of Transportation project to replace a bridge over French Creek, but a non-jeopardy determination was made for mussels. The informal consultations were associated with road infrastructure, water control structures, chemical manufacturers, and development projects.
- Tennessee – One formal consultation, 2 informal consultations, and 3 species lists within Hickman and Humphreys counties. The formal consultation was for a bridge over the Duck River and a no adverse modification determination was concluded. The two informal consultations were association with bridge repairs projects.
- West Virginia – No formal consultations, 20 information consultations, and 36 requests for species lists within Doddridge, Marshall, Ritchie, Tyler, Wetzel, Wirt, and Wood counties. The information consultations were association with pipelines, intakes, stream restoration, road infrastructure, bank stabilization, and development projects
- Wisconsin – One formal consultation, no informal consultations, 3 technical assistance, and 11 requests for species lists within Buffalo, Columbia, Crawford, Dane, Dunn, Eau Claire, La Crosse, Pierce, and Richland counties. The formal consultation was for a transmission line project and a no effect conclusion was made.

These mussels occupy areas within the range of the Salamander Mussel, while the habitat and host (mudpuppy) differ from these species, the other resource needs are similar in terms of water quality, hydrologic regime, and connectivity and the activities occurring within their range are similar in nature. As a result, the majority of resource needs for these mussels are very similar to those for the Salamander Mussel, and measures to conserve habitats for these mussels would in large part likely benefit the Salamander Mussel. Below we outline potential conservation measures that may be included in actions potentially impacting the Salamander Mussel.

What types of project modifications will likely be recommended by the Service to avoid jeopardy (i.e., the continued existence of the species)?

Alterations of habitat that diminish the quality (e.g., actions that degrade water quality, impact the number of mudpuppies within a unit, cause changes in the hydrologic flow regime, or result in physical disturbance to the unique habitat of Salamander Mussel) and the amount of available habitat for the Salamander Mussel are likely to affect the population size and distribution, as well as cause further range declines, and could appreciably reduce the likelihood of survival in the wild and constitute jeopardy. These alterations can be direct (i.e., occur within the stream habitat that is or could be used by the Salamander Mussel) or indirect (i.e., occur within watersheds that

have stream habitat that is or could be used by the Salamander Mussel). The results of consultation under the adverse modification and jeopardy standards are likely to be similar because the PBFs that define critical habitat are also essential for the survival of the Salamander Mussel.

Examples Representing Typical Recommendations To Avoid Jeopardy.

Recommendations for avoiding jeopardy include avoiding activities that cause physical habitat disturbance (i.e., removal or destruction of mudpuppy shelter habitat or excess sedimentation in the areas inhabited by Salamander Mussel), degradation of water quality in streams occupied by the species, significant changes in the hydrologic flow regime within areas occupied by Salamander Mussel. Activities to be avoided include any disturbance to mudpuppy shelter habitat (e.g., destruction or removal of large flat rocks, bedrock, or large wood debris); significant sedimentation, either through bank erosion or as runoff from roads, agricultural areas, or other disturbed sites; inputs of dissolved solids or contaminants; and change to the flow regime including significant changes in velocity, flow, and water availability.

What Types Of Project Modifications Might The Service Recommend During A Section 7 Consultation To Avoid Jeopardy?

Project modifications may include relocating project activities outside of occupied habitat or so that a project is no longer in close proximity to occupied areas to avoid stream disturbance. Other modifications may include: reducing the amount of area impacted (e.g., for road projects the Service might require spanning the stream with a bridge or bottomless/arch culvert or for pipeline projects the Service might request drilling/boring under streams), or requiring strict pollution control methods (e.g., for wastewater discharge permits, the Service might request tertiary treatment, as well as increased monitoring, particularly to detect constituents of concern), or requiring flow alteration (e.g., for dam operations, the Service might require flows and temperatures that closely mimic natural regimes to maintain habitat for the species).

The Service will likely request project modifications to reduce secondary and cumulative impacts, including protective buffers (e.g., native vegetated riparian buffers), reduce impervious surfaces and stormwater runoff, and erosion and sedimentation control planning – all of these modifications would ultimately be protective of habitat and water quality needed to sustain the species.

IV. Incremental Impacts Analysis

Adverse Modification Analysis

Section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. An adverse modification analysis would focus on a project's impacts to the physical or biological features, or other habitat characteristics in areas determined to be essential to the conservation of the species. From section 3(3) of the Act: the terms "conserve," "conserving," and "conservation" mean to use, and the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which the measures provided under the Act are no longer necessary.

Thus, designation of critical habitat helps ensure that a proposed project action will not result in the loss or modification of habitat to the point that the species cannot achieve recovery. The key factor that we assess when determining if adverse modification of habitat will occur is whether, with implementation of the proposed Federal action, the entire critical habitat designation will continue to have the capability to serve its intended function and conservation role for the species.

Similar to the baseline situation, section 7 consultation is required for Federal actions that “may affect or are likely to adversely affect” designated critical habitat. Therefore, under the “with critical habitat” scenario, Federal action agencies will have to consider both the proposed action’s effects to the species, as well as to the designated critical habitat. If adverse effects to either the species or its designated critical habitat are anticipated, formal consultation is required and we would conduct a jeopardy analysis (species) or adverse modification analysis (critical habitat), or both.

The Federal agencies listed above under the baseline analysis are also anticipated to be the primary agencies that would consult with us on the Salamander Mussel critical habitat under section 7. Each formal consultation that results in a “may affect” determination for critical habitat has to include an evaluation determining whether that project would result in adverse modification. The types of activities that could result in an adverse modification determination for the Salamander Mussel would generally involve construction of new impoundments; large-scale projects that alter large rock shelters, large woody debris and bedrock structures; negative changes in water quality and the hydrologic flow regime within the river; and any project that has a major negative impact on the persistence of mudpuppies. These would cause an increase in administrative efforts to develop reasonable and prudent alternatives to the project in order to avoid adverse modification.

What kinds of additional activities are likely to undergo consultation with critical habitat?

As a result of the Salamander Mussel critical habitat designations, Federal agencies may need to reinitiate previously completed section 7 consultations for actions that have already been consulted on for other listed species. The administrative efforts required to reinitiate consultation so that an already completed consultation on a pending project could be evaluated for potential adverse modification of habitat are considered an incremental effect of the critical habitat designation.

In addition, Federal agencies may need to re-initiate consultation of already approved projects. There could be some incremental effect of the designation causing Federal agencies to become more aware of the importance of these areas to the Salamander Mussel for recovery. Therefore, the proposed activities within the proposed areas being designated as critical habitat might receive more agency scrutiny; therefore, the agencies may consult with the Service on actions they may have previously not considered as needing consultation. In the case of the Salamander Mussel, these may be appropriate mudpuppy habitat or other areas between known populations.

We expect that the areas we propose to designate as critical habitat will require some level of management or protection, or both, to address current and future threats to the Salamander Mussel and to maintain the PBFs essential to the conservation of the species. Salamander Mussel may also be dependent upon factors beyond the critical habitat boundaries that are important in maintaining ecological processes.

Activities affecting the PBFs essential to the conservation of Salamander Mussel which may require special management considerations or protection may include but are not limited to: (1) hydropower facilities and water control structures that significantly change the hydrologic flow regime including magnitude, timing, frequency, duration, rate of change, and overall seasonality of discharge over time as well as temperature fluctuation; (2) resource extraction (oil and gas, gravel, metal mining) activities and related permitting (3) industrial or municipal wastewater discharges directly to critical habitat; (4) road construction activities by the Federal Highway Administration and Departments of Transportation; (5) channel modifications for navigation and recreation, and (6) large-scale instream habitat restoration activities.

How much administrative effort does or will the Service expend to address adverse modification in its section 7 consultations with critical habitat? Estimate the difference compared to baseline.

Based on the potential increase in consultations resulting from areas being proposed as critical habitat, we anticipate some increase in overall consultation workload and administrative efforts for Federal agencies and the Service. However, we would consider the vast majority of the increase to be associated with the listing of the species and not solely on the designation of critical habitat. The amount of increased administrative effort due to proposed critical habitat is difficult to foresee and quantify due to a lack of consultation history. Nevertheless, when we complete a consultation for the Salamander Mussel with critical habitat, each consultation will evaluate whether that project would result in adverse modification. As a result, each formal consultation that “may adversely affect” critical habitat has to consider adverse modification. This effort will depend on the nature and complexity of any future consultation. Overall, we do not anticipate a substantial number of consultations that would result in adverse modification; therefore, we do not anticipate a substantial increase in administrative effort to work on measures to avoid adverse modification.

What types of project modifications might the Service make during a section 7 consultation to avoid destruction or adverse modification of critical habitat that are different than those for avoiding jeopardy?

We anticipate limited instances (particularly where there are few critical habitat segments in a given area) where a proposed Federal action could result in adverse modification. We anticipate that the measures to remove jeopardy and adverse modification would likely have some overlap because the impacts in either case will most likely be affecting the persistence and development of habitat. In a scenario where a section 7 consultation may result in both jeopardy and adverse modification findings under each standard, it is difficult to predict what different conservation measures might be required of the Federal agency to avoid both jeopardy and adverse modification, and in most cases, these would be the same. The required consultation measures would depend on the specific circumstances of the situation and are beyond our ability to predict with any certainty with the available information and consultation history; however, in most instances, they would be similar to those identified above.

Conclusion

Because all of the units being proposed for designation as critical habitat are occupied, we do not expect that the critical habitat designation will result in any additional consultations. The conservation recommendations provided to address impacts to the occupied critical habitat will

be the same as those recommended to address impacts to the species because the habitat tolerances of the Salamander Mussel are inextricably linked to the health, growth, and reproduction of the mussels, which are present year-round in their occupied streams. Furthermore, because the critical habitat and known species' range are identical, any proposed action that would result in a finding of adverse modification of occupied habitat would also result in a finding of jeopardy to the species. In the event of an adverse modification determination, we expect that reasonable and prudent alternatives to avoid jeopardy to the species would also avoid adverse modification of the critical habitat. The only incremental impact of critical habitat designation that we anticipate is the small administrative effort required during section 7 consultation to document effects on the physical and biological features of the critical habitat.

V. Literature Cited

- Frierson, L. S. (1914b). Observations on the Genus *Symphynota* Lea. *The Nautilus*. 28 (1): p.40.
- Say, T. (1825). Descriptions of some new species of fresh water and land shells of the United States. *Journal of the Academy of Natural Sciences*, 5(3-4), 119-131.
- U.S. Fish and Wildlife Service. 2021. Species status assessment report for the Salamander Mussel (*Simpsonaias ambigua*). September 2021 (Version 1.0). Michigan Ecological Services Field Office, East Lansing, Michigan.
- Watson, E.T., Metcalfe-Smith, J.L., & Di Maio, J. (2001). COSEWIC status report on the Mudpuppy Mussel *Simpsonaias ambigua* in COSEWIC assessment and status report on the Mudpuppy Mussel *Simpsonaias ambigua* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottaa. 1-45 pp.