MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

ENERGY AND ENVIRONMENT CABINET
OFFICE OF KENTUCKY NATURE PRESERVES
300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
(502) 573-2886

ZEB WEESE
EXECUTIVE DIRECDTOR

October 17, 2019

Rick Schneider
NatureServe
2550 South Clark Street, Suite 930
Arlington, VA 22202

| | |
|---|---|
| Project: | Test report 1 |
| Project ID: | 20-0043 |
| Project Type: | Standard (*customers will be invoiced), 1 mile buffer ($120 fee) |
| Site Acreage: | 4,647.41 |
| Site Lat/Lon: | 37.195770 / -86.178174 |
| County: | Edmonson |
| USGS Quad: | RHODA |
| Watershed HUC12: | Buffalo Creek-Green River; Echo River-Green River |

Dear Rick Schneider,

This letter is in response to your data request for the project referenced above. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Office of Kentucky Nature Preserves occur within your general project area. Your project does pose a concern at this time, therefore please see the attached reports for more detailed information.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Office of Kentucky Nature Preserves, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Office of Kentucky Nature Preserves." The exact location of plants, animals, and natural communities, if released by the Office of Kentucky Nature Preserves, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Biological Assessment Branch (300 Sower Blvd - 4th Floor, Frankfort, KY, 40601. Phone: 502-782-7828).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage

Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions, or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Nour Salam
Geoprocessing Specialist

# Standard Occurrence Report
## KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11910 | *Acidic mesophytic forest* | | GNR | S5 | N | | | 2007-05-01 | S | B | 37.1635 / -86.1651 | No active manipulation is required. Management is primarily aimed at reducing effects of anthropogenic disturbances. This includes allowing succession to proceed naturally, leaving down and standing snags in place. Spread of exotics into these systems is best prevented by avoiding disturbance of the substrate i.e. through trail construction or timber management activities, and restricting visitation to foot travel. Monitoring tree fall gaps on an annual basis can help to ensure invasives do not establish by means outside of human disturbances. | Mammoth Cave NP, Heading west on US 70 within park, travel 0.75 miles past Cedar Sink Rd to base of hill. Park and hike 0.15 mile SSW along base of slope to EO. |
| 340 | *Acidic sub-xeric forest* | | GNR | S5 | N | | | 2007-05-01 | S | C | 37.1614 / -86.1728 | Management is primarily aimed at reducing effects of anthropogenic disturbances. This includes allowing succession to proceed naturally, leaving down and standing snags in place. Spread of exotics into these systems is best prevented by avoiding disturbance of the substrate i.e. through trail construction or timber management activities, and restricting visitation to foot travel. Maintaining a large forested buffer also helps to reduce infestations and could increase long-term survival of this stand. Monitoring tree fall gaps on an annual basis can help to ensure invasives do not establish by means | Circa 2.0 air mi N JCT KY 422 and KY 259 at Pig, ca 1.2 rd mi W JCT KY 70 and KY 422. |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | outside of human disturbances. | |
| 4322 | *Amblyopsis spelaea* | Northern Cavefish | G2G3 | S3 | S | SOMC | Y | 1962- | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean streams with consolidated mud-rock substrates in shoals and silt-sand substrates in pools (Kuehne 1962, Poulson 1963, Clay 1975, Cooper 1980). |
| 493 | *Antroselates spiralis* | Shaggy Cavesnail | G3 | S2 | S | | | 1963-pre | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Found on the undersides of large stones in running water of springs and streams in caves (Hubricht 1963, Burch 1989). Occurs only in base-level cave streams and their spring orifices, and was taken on the undersides of submerged planks and slabs of breakd |
| 1083 | *Antroselates spiralis* | Shaggy Cavesnail | G3 | S2 | S | | | 1994-09-04 | S | NR | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Found on the undersides of large stones in running water of springs and streams in caves (Hubricht 1963, Burch 1989). Occurs only in base-level cave streams and their spring orifices, and was taken on the undersides of submerged planks and slabs of breakd |
| 3191 | *Antroselates spiralis* | Shaggy Cavesnail | G3 | S2 | S | | | 1963-pre | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Found on the undersides of large stones in running water of springs and streams in caves (Hubricht 1963, Burch 1989). Occurs only in base-level cave streams and their spring orifices, and was taken on the undersides of submerged planks and slabs of breakd |
| 6340 | *Antroselates spiralis* | Shaggy Cavesnail | G3 | S2 | S | | | 1994-10-17 | G | B | 37.1667 / -86.0833 | ECHO RIVER SPRING BASIN. | Found on the undersides of large stones in running water of springs and streams in caves (Hubricht 1963, Burch 1989). Occurs only in base-level cave |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | streams and their spring orifices, and was taken on the undersides of submerged planks and slabs of breakd |
| 8796 | *Antroselates spiralis* | Shaggy Cavesnail | G3 | S2 | S | | | 1993-pre | G | B | 37.1833 / -86.05 | PIKE SPRING BASIN. | Found on the undersides of large stones in running water of springs and streams in caves (Hubricht 1963, Burch 1989). Occurs only in base-level cave streams and their spring orifices, and was taken on the undersides of submerged planks and slabs of breakd |
| 1726 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1989-09-01 | S | C | 37.1744 / -86.1533 | MAMMOTH CAVE NATIONAL PARK, NE-FACING BLUFF ABOVE GREEN R, CA 0.3 MI UPSTREAM FROM HEAD OF SAND CAVE ISLAND (011A, 20). CA 0.1 MI DOWNSTREAM, CA 60 FT ABOVE WATER (011B, 8). | Canopy openings in mixed hardwood forests on limestone slopes associated with large streams and rivers.. |
| 4337 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1989-09-08 | S | B | 37.1686 / -86.162 | Along Green River, approx. 1.59km SE of confluence of Blowing Spring Branch and Green River (013A, Old Margnum 22). MAMMOTH CAVE NATIONAL PARK, E-FACING BLUFF ABOVE GREEN R FROM HEAD OF BOARDCUT ISLAND UPSTREAM JUST PAST FIRST RAVINE TO SOUTH (013B, 14). | Canopy openings in mixed hardwood forests on limestone slopes associated with large streams and rivers.. |
| 7181 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1995-09-13 | S | B | 37.1897 / -86.1883 | MAMMOTH CAVE NATIONAL PARK, OPEN LIMESTONE BLUFF 35'-40' ABOVE GREEN R ACROSS FROM CONFLUENCE W/ SAL HOLLOW. | Canopy openings in mixed hardwood forests on limestone slopes associated with large streams and rivers.. |
| 8406 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1989-08-30 | S | B | | Sensitive Element - | Canopy openings in mixed |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Contact OKNP at naturepreserves@ky.gov | hardwood forests on limestone slopes associated with large streams and rivers.. |
| 9455 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1989-09-01 | S | C | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Canopy openings in mixed hardwood forests on limestone slopes associated with large streams and rivers.. |
| 9889 | *Aureolaria patula* | Spreading False Foxglove | G3 | S3 | S | | | 1995-09-13 | S | A | 37.1871 / -86.1687 | MAMMOTH CAVE NATIONAL PARK, SHORE OF GREEN R ABOUT 10'-15' ABOVE WATER, CA 0.5 AIR MI UPSTREAM OF STICE ISLAND (MARGNUM 56, 014A). E-SE-S-FACING BLUFF ABOVE GREEN RIVER, FROM STICE ISLAND UPSTREAM TO BOARDCUT ISLAND (MARGNUM 42, 014C). SHORE OF GREEN R AT | Canopy openings in mixed hardwood forests on limestone slopes associated with large streams and rivers.. |
| 5201 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2010-02-24 | S | B | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 5788 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2002-02-14 | S | F | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 6938 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2007-01-23 | S | F | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 8162 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 1960-01 | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 12417 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2007 | S | E | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 12418 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2007-07-28 | S | B | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 12632 | *Corynorhinus rafinesquii* | Rafinesque's Big-eared Bat | G3G4 | S3 | S | SOMC | Y | 2007-07-15 | S | E | 37.1982 / -86.1559 | Buffalo Trail, at jct to road to Turnhole Bend, Mammoth Cave National Park. | This bat uses a variety of sites for roosting including caves, protected sites along clifflines, large, hollow trees, old mine portals, abandoned tunnels, cisterns, old or seldom used buildings, etc. |
| 8246 | *Cryptobranchus alleganiensis alleganiensis* | Eastern Hellbender | G3T2 | S2S3 | S | SOMC | Y | 1935-04-24 | S | H | 37.2081 / -86.1079 | Green River, Mammoth Cave ferry. | Confined to running waters of fairly large streams and rivers, especially in stretches with large flat stones. |
| 5017 | *Cyprogenia stegaria* | Fanshell | G1Q | S1 | E | LE | Y | 1989-09-01 | S | D | 37.1867 / -86.1486 | GREEN R MILE 194.7, 10.5 KM ESE BROWNSVILLE. | Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989). |
| 7644 | *Cyprogenia stegaria* | Fanshell | G1Q | S1 | E | LE | Y | 1989-09-06 | S | C | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989). |

# Standard Occurrence Report
## KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8843 | *Cyprogenia stegaria* | Fanshell | G1Q | S1 | E | LE | Y | 1989-09-11 | S | D | 37.1845 / -86.1508 | GREEN R MILE 194.5, 10.4 KM ESE BROWNSVILLE. | Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989). |
| 15385 | *Cyprogenia stegaria* | Fanshell | G1Q | S1 | E | LE | Y | 2017-10-09 | S | E | 37.1784 / -86.1583 | At downstream end of Boardcut Island, ca 8.9 stream km below Green River Ferry. | Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989). |
| 10013 | *Dryobates borealis* | Red-cockaded Woodpecker | G3 | SX | X | LE | Y | 1958-09-12 | M | X | 37.2072 / -86.1439 | Mammoth Cave National Park, along small rd leading to Good Spring Church. | Appalachian pine-oak forests along sandstone ridgetops. The well developed mid-stories (dominated by maples, sourwood, and dogwood) have been removed by the U.S. Forest Service at all known colonies starting in 1989. |
| 16232 | *Ellipsaria lineolata* | Butterfly | G4G5 | S4S5 | N | | Y | 2017-10-10 | S | E | 37.1796 / -86.1581 | Green River at Boardcut Island, MCNP ca 4 air km west of Green River Ferry. | |
| 16233 | *Elliptio crassidens* | Elephantear | G5 | S3S4 | S | | Y | 2017-10-10 | S | E | 37.1796 / -86.1581 | Green River at Boardcut Island, MCNP ca 4 air km west of Green River Ferry. | |
| 3796 | *Epioblasma rangiana* | Northern Riffleshell | G2 | S1 | E | LE | Y | No Date | S | X | 37.1903 / -86.1353 | Green R mile 195.4-195.5. | Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987). |
| 5193 | *Epioblasma triquetra* | Snuffbox | G3 | S1 | E | LE | Y | 1989-09-01 | S | F | 37.1903 / -86.1353 | GREEN R MILE 194.5-195.5. | Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murrary and Leonard |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by coll |
| 204 | *Fusconaia subrotunda* | Longsolid | G3 | S3 | S | | Y | 1989-09-06 | S | NR | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Gravel bars and deep pools in large rivers and large to medium-sized streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967). |
| 15386 | *Fusconaia subrotunda* | Longsolid | G3 | S3 | S | | Y | 2017-10-09 | S | E | 37.1789 / -86.1582 | Downstream end of Boardcut Island, ca. 8.9 stream km below Green River Ferry. | Gravel bars and deep pools in large rivers and large to medium-sized streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967). |
| 8851 | *Glandularia canadensis* | Rose Mock-vervain | G5 | S1? | E | | | 1968-04-15 | G | H | 37.1625 / -86.1583 | MAMMOTH CAVE NP, ALONG KY 70 ABOVE TURNHOLE BEND. | Sandy or rocky prairies and barrens, roadsides, etc. (Fernald 1970); glades, disturbed soils, edges of bluffs. |
| 3306 | *Lampropeltis elapsoides* | Scarlet Kingsnake | G5 | S1 | E | | Y | 1940-pre | G | H | 37.1836 / -86.1454 | Mammoth Cave. | Burrows in soft soils of upland oak and oak-hickory forests, may also occur in oak-pine. |
| 8333 | *Lampsilis ovata* | Pocketbook | G5 | S1 | E | | Y | 2009-08-24 and 08-25 | S | C | 37.1872 / -86.1256 | Green River, Edmonson County: from RM 196.1 to RM 194.7, 10.5 KM ESE BROWNSVILLE. | Considered a large river species (Clench and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976), but occurs in medium-sized streams in gravel, sand, or even mud (Parmalee 1967, Johnson 1970, Gordon and Layzer 1989). In the Lower Wabash and Ohio Rivers s |
| 14610 | *Lampsilis ovata* | Pocketbook | G5 | S1 | E | | Y | 2017-10-13 | S | E | 37.1784 / -86.1583 | Green River at Blowing Spring Branch, 5.75 stream miles upstream from Houchins Ferry Rd crossing (145A).; At Turnhole Bend, ca 4.8 stream mi below Green River Ferry (145B).; At Boardcut Island ca 5.4 stream mi (145C), 5.5 stream mi (145D), and 5.6 | Considered a large river species (Clench and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976), but occurs in medium-sized streams in gravel, sand, or even mud (Parmalee 1967, Johnson 1970, Gordon and Layzer 1989). In the Lower Wabash and Ohio Rivers s |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | stream | |
| 15832 | *Lanius ludovicianus* | Loggerhead Shrike | G4 | S3S4B,S4N | S | SOMC | Y | 1991-08-13 | Q | NR | 37.1875 / -86.1875 | Somewhere on quadrangle outside of NW block | |
| 16234 | *Ligumia recta* | Black Sandshell | G4G5 | S4 | S | | | 2017-10-10 | S | E | 37.1796 / -86.1581 | Green River at Boardcut Island, MCNP. Ca 4 air km W of Green River Ferry. | |
| 5874 | *Lytrosis permagnaria* | A Geometrid Moth | G3G4 | S1S2 | E | SOMC | | 1927-05-26 | G | H | 37.1836 / -86.1454 | MAMMOTH CAVE NATIONAL PARK. [Edmonson County] | Dry oak, oak-hickory, or scrub, sometimes with southern pines in canopy. May be restricted to old-growth areas (Schweitzer 1989). |
| 8523 | *Myotis austroriparius* | Southeastern Myotis | G4 | S3 | S | SOMC | Y | 1982-02-16 | S | F | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Primarily uses caves for hibernacula and uses caves, bridges, and hollow trees as summer maternity and roosting sites. |
| 4190 | *Myotis grisescens* | Gray Myotis | G4 | S2 | T | LE | Y | 2002-02-14 | S | F | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Primarily use caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females. Smaller colonies also occasionally roost under bridge structures. |
| 14739 | *Myotis lucifugus* | Little Brown Bat | G3 | S2 | T | | | 2009-02-25 | S | E | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | |
| 13675 | *Myotis septentrionalis* | Northern Long-Eared Bat | G1G2 | S1 | E | LT | | 1985-03-20 | S | F | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | In winter, Northern Long-eared bats use caves, mine portals, abandoned tunnels, protected sites along clifflines and similar situations that afford protection from cold. They are easily overlooked as they often wedge themselves back into cracks in the wal |
| 5252 | *Myotis sodalis* | Indiana Bat | G2 | S1S2 | E | LE | Y | 2009-02-25 | S | D | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Primarily use caves for hibernacula, although they are occasionally found in old |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | mine portals. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottomland or floodplain habitats, but also in upland situations. |
| 11361 | *Myotis sodalis* | Indiana Bat | G2 | S1S2 | E | LE | Y | 2007-07-15 | S | E | 37.2039 / -86.1704 | Mammoth Cave National Park, along Buffalo Trail ca 1.3 air mi WSW of Good Spring Church (165A), at jct to road to Turnhole Bend (165B), and ca 75 m S of Buffalo Trail pulloff ca 1.85 rd mi W of gate (165C). | Primarily use caves for hibernacula, although they are occasionally found in old mine portals. During summer, colonies are found behind slabs of exfoliating bark of dead trees, often in bottomland or floodplain habitats, but also in upland situations. |
| 8948 | *Obovaria retusa* | Ring Pink | G1 | S1 | E | LE | Y | 1989-09-06 | S | D | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Large river species that inhabits gravel and sand bars (Bogan and Parmalee 1983, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Stansbery 1976). |
| 2034 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1994-09-04 | S | C | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 5504 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1994-08-06 | S | D | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 5834 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1994-09-04 | S | D | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 5986 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1966-10-29 | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 6868 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1956-11-17 | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 7271 | *Orconectes pellucidus* | Mammoth Cave Crayfish | G4 | S3 | S | SOMC | Y | 1994-10-29 | S | A | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters (Hobbs 1976). |
| 885 | *Palaemonias ganteri* | Mammoth Cave Shrimp | G1 | S1 | E | LE | Y | 1985-09 | G | D | 37.1497 / -86.179 | DOUBLE SINK BASIN. | Large base level stream passages (i.e., lowest level) and associated tributaries characterized by slow flow, coarse to fine grain sand |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | and coarse silt sediments, and abundant quantities of organic material (USFWS 1988). |
| 887 | *Palaemonias ganteri* | Mammoth Cave Shrimp | G1 | S1 | E | LE | Y | 1985-09 | M | A | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Large base level stream passages (i.e., lowest level) and associated tributaries characterized by slow flow, coarse to fine grain sand and coarse silt sediments, and abundant quantities of organic material (USFWS 1988). |
| 4772 | *Palaemonias ganteri* | Mammoth Cave Shrimp | G1 | S1 | E | LE | Y | 1994-08-19 | G | D | 37.0911 / -86.0707 | Turnhole Spring Basin. (3708621-246, 370800N, 860400W), (3708518-4, 370500N, 0855900W), (3708612-7, 370600N, 860700W), (3708622-46, 370900N, 860800W), (3708528-41, 370900N, 855900W). | Large base level stream passages (i.e., lowest level) and associated tributaries characterized by slow flow, coarse to fine grain sand and coarse silt sediments, and abundant quantities of organic material (USFWS 1988). |
| 10295 | *Palaemonias ganteri* | Mammoth Cave Shrimp | G1 | S1 | E | LE | Y | 1985-09 | M | A | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Large base level stream passages (i.e., lowest level) and associated tributaries characterized by slow flow, coarse to fine grain sand and coarse silt sediments, and abundant quantities of organic material (USFWS 1988). |
| 1973 | *Paravitrea lapilla* | Gem Supercoil | G2 | SH | H | | | 1957-07-28 | M | H | 37.1653 / -86.1575 | MAMMOTH CAVE NATIONAL PARK, TURNHOLE SINK (MAPPED AT TURNHOLE SPRING). | Under moist leaf litter on wooded hillsides and ravines (Hubricht 1985). |
| 14801 | *Perimyotis subflavus* | Tricolored Bat | G2G3 | S2 | T | | | 2009-02-25 | S | E | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | |
| 4893 | *Peucaea aestivalis* | Bachman's Sparrow | G3 | S1B | E | SOMC | Y | 1959-pre | G | X | 37.1836 / -86.1454 | Mammoth Cave National Park. | Early successional areas with scattered saplings (often pines), bushes, or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles. |
| 15519 | *Phaeophyscia leana* | Lea's Bog Lichen | G2 | S1? | E | | | 1979-08 | M | E | 37.1648 / -86.1592 | Mammoth Cave National Park, Turnhole Bend Trail | Floodplain forests along the Ohio River, occurs on the |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | off Highway 70 | trunks of hardwood trees. Occurs in an elevation zone where the spring flood crests average 8 m above the normal pool level of the Smithland Dam. |
| 15389 | *Phenacobius uranops* | Stargazing Minnow | G4 | S2S3 | S | | Y | 2017-08-24 | S | E | 37.1918 / -86.1885 | Green River just below Boardcut Island, ca 9 stream km below Green River Ferry (067A).; Green River at Poteet Hollow, ca. 7.2 stream km above Houchins Ferry (067B). | Inhabits medium-size streams to small rivers with high gradient, permanent flow, clear water, and pebble and gravel substrates (Burr and Warren 1986). |
| 8285 | *Pituophis melanoleucus melanoleucus* | Northern Pine Snake | G4T4 | S1 | E | SOMC | Y | 1935-05-17 | M | H | 37.2212 / -86.1835 | Mammoth Cave National Park, N side Green River nr Ollie. | Inhabits dry woodlands and edges, especially in upland oak, oak-hickory, and oak-pine forests. Soft, sandy soils may be critical for burrowing. |
| 12018 | *Pituophis melanoleucus melanoleucus* | Northern Pine Snake | G4T4 | S1 | E | SOMC | Y | 1988-05-26 | S | NR | 37.1767 / -86.2093 | KY 70 at Brooks Knob Road. | Inhabits dry woodlands and edges, especially in upland oak, oak-hickory, and oak-pine forests. Soft, sandy soils may be critical for burrowing. |
| 8418 | *Plestiodon anthracinus* | Coal Skink | G5 | S1 | E | | Y | 1973-05 | M | NR | 37.2345 / -86.19 | Mammoth Cave National Park, somewhere NE of Brownsville, probably just inside northern boundary. | |
| 2256 | *Plethobasus cyphyus* | Sheepnose | G3 | S1 | E | LE | Y | 1989-09-06 | S | D | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989). |
| 6820 | *Plethobasus cyphyus* | Sheepnose | G3 | S1 | E | LE | Y | 2017-10-09 | S | E | 37.1664 / -86.1575 | Green River mile 192.8, 3.9 mi ENE Rhoda.(091A).; ca 7.8 stream km below Green River Ferry (091B).; | Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989). |
| 14588 | *Plethobasus cyphyus* | Sheepnose | G3 | S1 | E | LE | Y | 2017-08-03 | S | E | 37.1868 / -86.1690 | Green River. 5.75 stream miles upstream from Houchins Ferry Rd crossing | Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989). |

# Standard Occurrence Report
## KNP monitored species within 1 Miles of Project Area

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14613 | *Plethobasus cyphyus* | Sheepnose | G3 | S1 | E | LE | Y | 2017-08-03 | S | E | 37.1724 / -86.1488 | Green River. 3.6 (155A) and 3.7 (155B) stream miles downstream of the Green River Ferry Road Crossing. Sand Cave Island. | Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989). |
| 2109 | *Pleurobema clava* | Clubshell | G1G2 | S1 | E | LE | Y | No Date | S | X | 37.1697 / -86.1611 | Green R mile 192.5, 6.0 km ENE Rhoda. | This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watte |
| 9471 | *Pleurobema clava* | Clubshell | G1G2 | S1 | E | LE | Y | No Date | S | H | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watte |
| 4598 | *Pleurobema plenum* | Rough Pigtoe | G1 | S1 | E | LE | Y | 1989-09-06 | S | D | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Medium to large rivers in sand, gravel, and cobble substrates (Ahlstedt 1984, Bogan and Parmalee 1983, Clarke 1981, Neel and Allen 1964). |
| 3158 | *Pleurobema rubrum* | Pyramid Pigtoe | G2G3 | S1 | E | SOMC | Y | 1989-09-01 | S | D | 37.1903 / -86.1353 | GREEN R MILE 195.4-195.5. | Inhabits medium to large rivers and usually occurs in sand or gravel bottoms in deep waters (Ahlstedt 1984, Murray and Leonard 1962, Parmalee et al. 1982). |
| 4025 | *Primula frenchii* | French's Shooting Star | G3? | S3 | S | | | 1990-04-27 | S | B | 37.2231 / -86.1947 | CA 0.8 MI SW OF OLLIE. | Sandstone rockhouses and overhangs. |
| 10948 | *Pseudanophthalmus inexpectatus* | Surprising Cave Beetle | G1G2 | S1S2 | T | | | 2002-10-23 | S | B? | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Cave obligate. Wet wood and damp mud banks (Barr 1995). |
| 9339 | *Pseudognaphalium micradenium* | Small Rabbit-tobacco | G4G5T3? | SH | H | | | 1940-09-11 | G | H | 37.1925 / -86.1581 | MAMMOTH CAVE. | Oak, oak-pine, pine woodlands; also sandhills (Weakley 1998). |
| 924 | *Pseudosinella espanita* | A Cave Obligate Springtail | G1 | S1S2 | S | | | 1980-02-09 | M | NR | | Sensitive Element - | Cave obligate. |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Contact OKNP at naturepreserves@ky.gov | |
| 9616 | *Pseudosinella espanita* | A Cave Obligate Springtail | G1 | S1S2 | S | | | 1979-06-30 | M | NR | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Cave obligate. |
| 14053 | *Sinkhole/depression marsh* | | GNR | S1S2 | E | | | 2014-07-09 | S | B | 37.2014 / -86.1524 | Ecological quality of these systems is frequently compromised by an altered hydrological regime. Restoration of the historical hydrologic regime can be beneficial, whereas further impacts on the hydrology could result in a decrease in species diversity and an alteration in community structure. This community is also very susceptible to invasion by exotic species warranting regular monitoring and possible eradication efforts. Spread of exotics into these systems is best prevented by avoiding disturbance of the substrate i.e. through land management activities involving heavy equipment, trail construction, and restricting visitation to foot trails. Maintaining a buffer of native vegetation around the marsh can reduce risk of invasions by exotic species, and limit erosion and sedimentation risks. | Mammoth Cave National Park; 0.5 mi south-southwest of Good Spring Church. From Good Spring Church Rd. (or Maple Springs parking lot), take Buffalo Trail ca 0.75 mi west. Turn north, off trail, and hike ca 300-600 ft north to depression wetland (Bestsource). |
| 14072 | *Sinkhole/depression marsh* | | GNR | S1S2 | E | | | 2014-10-07 | S | B | 37.2025 / -86.2186 | Ecological quality of these systems is frequently compromised by an altered hydrological regime. Restoration of the historical hydrologic regime can be beneficial, whereas further impacts on the hydrology could result in a decrease in | In Brownsville (Edmonson Co), take St. Rt. 70/259 southeast (out of town) ca 1.4 mi. Where St.Rt. 70/259 split, turn left (east) staying on St. Rt. 70 (Mammoth Cave Rd.). Continue on St. Rt. 70 for ca 2.8 mi and turn left (north) onto Brooks Knob Lookout Tower Rd. Take this |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | species diversity and an alteration in community structure. This community is also very susceptible to invasion by exotic species warranting regular monitoring and possible eradication efforts. Spread of exotics into these systems is best prevented by avoiding disturbance of the substrate i.e. through land management activities involving heavy equipment, trail construction, and restricting visitation to foot trails. Maintaining a buffer of native vegetation around the marsh can reduce risk of invasions by exotic species, and limit erosion and sedimentation risks. | road north into Mammoth Cave NP ca 1.25 mi and park alongside the dirt/gravel road (Crumps Knob is just west of here). Hike ca 1.0 mi, west (past Crumps Knob) and then northwest to unnamed ridge to wetland (which is half mile north of Dry Branch) (Bestsource). |
| 7394 | *Stylurus notatus* | Elusive Clubtail | G3 | S1 | E | SOMC | | 1970-pre | C | X? | 37.1966 / -86.2585 | Edmonson County. | Large-river species (Schweitzer 1989). |
| 3925 | *Thryomanes bewickii* | Bewick's Wren | G5 | SHB | H | SOMC | Y | 1986-06-16 | S | NR | 37.1759 / -86.2075 | Demunbruns BBS Route, Stop 29. | Brushy areas, thickets and scrub in open country, open and riparian woodland. Found in rural towns and farmsteads. |
| 925 | *Typhlichthys subterraneus* | Southern Cavefish | G4 | S2S3 | S | SOMC | Y | 1994-09-04 | S | NR | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P |
| 980 | *Typhlichthys subterraneus* | Southern Cavefish | G4 | S2S3 | S | SOMC | Y | 1962-09-28 | G | H | 37.1872 / -86.1031 | MAMMOTH CAVE. | Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble |

| EO ID | Scientific Name | Common Name | GRank | SRank | SPROT | USESA | STWG | Last Obs Date | Precision | EO Rank | Lat / Lon | Directions | Habitat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P |
| 3471 | *Typhlichthys subterraneus* | Southern Cavefish | G4 | S2S3 | S | SOMC | Y | 1994-10-29 | S | B | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P |
| 5551 | *Typhlichthys subterraneus* | Southern Cavefish | G4 | S2S3 | S | SOMC | Y | 1957-pre | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P |
| 6232 | *Typhlichthys subterraneus* | Southern Cavefish | G4 | S2S3 | S | SOMC | Y | 1971-pre | M | H | | Sensitive Element - Contact OKNP at naturepreserves@ky.gov | Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, P |

## Critical Habitats within 1 Miles of Project Area

| Critical Habitat Name | Unit Name | Subunit Name | Federal Register Link |
|---|---|---|---|
| *Kentucky (Mammoth) Cave shrimp* | Mammoth Cave National Park | Roaring Paunch River system | https://ecos.fws.gov/docs/federal_register/fr755.pdf |

## Managed Areas within 1 Miles of Project Area

| MA ID | Managed Area Name | Unit Type | Owner Name | Managing Institution |
|---|---|---|---|---|
| 125 | *Green River (RM 181.7 to 207.8) Outstanding Resource Water* | | Multiple | Division of Water |
| 345 | *Green River Wild River* | | National Park Service & Private Individuals | Office of Kentucky Nature Preserves |
| 349 | *Mammoth Cave National Park* | | National Park Service | National Park Service |

## Wild Rivers within 1 Miles of Project Area

| Wild River Name | Future Field |
|---|---|
| *Green River Wild River* | |

## Areas of Significant Biodiversity within 1 Miles of Project Area

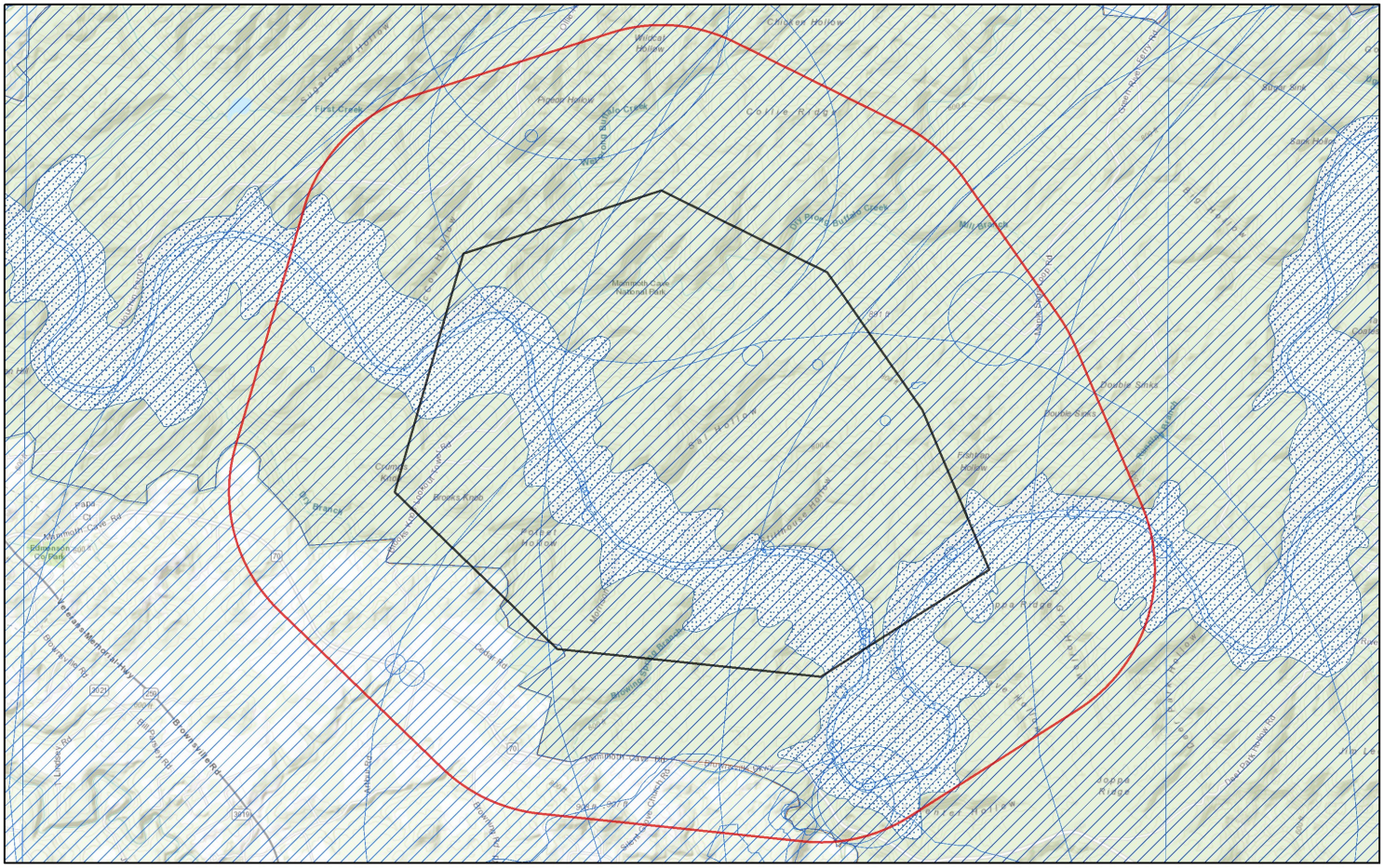
| Site ID | Site Name |
|---|---|
| 442 | *Green River Bioreserve Megasite* |
| 801 | *Green River Macrosite* |
| 845 | *Mammoth Cave NP Ridgetop Wetlands (north)* |

## Bat Habitats within 1 Miles of Project Area

| Habitat | Species | USFWS |
|---|---|---|
| *S1 + W2* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *S1+W2* | *M. septentrionalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *S2 + W1* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *SUMMER 1* | *M. septentrionalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *SWARMING 2* | *M. septentrionalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Sensitive Areas - requires coordination* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Sensitive* | *M. septentrionalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Summer 1* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Summer 2* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Swarming 1* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |
| *Swarming 2* | *M. sodalis* | *Contact USFWS at (502) 695-0468 or KentuckyES@fws.gov* |

THESE DATA ARE VALID ONLY ON THE DATE ON WHICH THE REPORT WAS GENERATED.
THESE DATA MAY ONLY BE USED FOR THE PROJECT NAMED ABOVE.

# Test report 1



October 17, 2019

- Project Boundary
- Buffered Project Boundary
- Element Occurences
- USFWS Critical Habitats
- Wild River Corridors

1:52,568

0 0.45 0.9 1.8 mi

0 0.5 1 2 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri