



Prepared for Hancock County &
Maumee Watershed Conservancy District

Freshwater Mussel Reconnaissance Survey on Eagle Creek and Aurand Run

October 30, 2019

Prepared by:
Stantec Consulting Services Inc.
11687 Lebanon Road
Cincinnati, OH 45241



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN



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Prepared by Julie Slater
Julie Slater

Reviewed by Dan Symonds
Dan Symonds

Approved by Will Cody Fleece
Cody Fleece

Table of Contents

EXECUTIVE SUMMARY	III
ABBREVIATIONS	IV
1.0 PROJECT BACKGROUND	1.1
2.0 METHODS	2.2
3.0 RESULTS	3.1
3.1 EAGLE CREEK.....	3.1
EC 1 – Embankment Modification (most upstream).....	3.1
EC 2 – Embankment Modification.....	3.1
EC 3 – Embankment Modification.....	3.1
EC 4 – Spillway (most downstream)	3.1
3.2 UNNAMED DITCH.....	3.1
UD 1 – New TWP 77 Bridge (most upstream)	3.1
UD 2 – New TWP 76 Bridge (most downstream).....	3.2
3.3 AURAND RUN	3.2
AR 1 – New TWP 67 Bridge (most upstream).....	3.2
AR 2 – Replace Private Culvert	3.2
AR 3 – Replace TWP 50 Bridge.....	3.2
AR 4 – Replace Private Bridge	3.2
AR 5 – Remove Concrete Weir.....	3.2
AR 6 – Replace CR 9 Bridge (most downstream).....	3.2
4.0 DISCUSSION	4.3
5.0 CONCLUSIONS.....	5.4
6.0 REFERENCES.....	6.5

LIST OF TABLES

Table 1. Survey Site Characteristics and Locations	1.2
Table 2. Survey Results Summary	4.3

LIST OF FIGURES

Figure 1. Aurand Run/Eagle Creek mussel reconnaissance survey results	2.1
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LIST OF APPENDICES

APPENDIX A AGENCY CORRESPONDENCE	A.1
APPENDIX B COLLECTING PERMITS	B.1
APPENDIX C SITE AND SPECIES VOUCHER PHOTOS	C.1



APPENDIX D OHIO MUSSEL HABITAT ASSESSMENT FORMS D.1



EXECUTIVE SUMMARY

A reconnaissance survey to assess the potential presence or probable absence of freshwater mussels took place on July 25 and October 23, 2019 at twelve survey locations on Eagle Creek, Aurand Run, and an unnamed ditch in Hancock County, Ohio. A total of seven species were observed, and no federally or Ohio listed species were found. No mussels (live or shell) were observed at four survey locations, likely due to lack of perennial water and fine sediment dominance. Clear evidence of mussel assemblages was found at two downstream survey locations on Aurand Run and at two upstream survey locations on Eagle Creek. Surveys at three locations were inconclusive due to lack of visibility in turbid water. Additionally, no live mussels were observed at the remaining site on Aurand Run, although mussel shells were found and the substrate appeared suitable for mussel occupancy. Due to their proximity to sites supporting mussel assemblages, mussel presence is probable at these four locations as well. Therefore, the two most upstream sites on Aurand Run and the two sites on the unnamed ditch are the only sites where mussel presence is improbable per Ohio reconnaissance survey protocols.



Abbreviations

ADI	Area of Direct Impact
cm	Centimeter
FNU	Formazin Nephelometric Unit
ft ³ /s	Cubic feet per second
HCFRR	Hancock County Flood Risk Reduction
mi ²	Square mile
MWCD	Maumee Watershed Conservancy District
ODNR	Ohio Department of Natural Resources
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Project Background

1.0 PROJECT BACKGROUND

As part of the continued assistance to Hancock County and MWCD to support the Hancock County Flood Risk Reduction (HCFRR) Program, Stantec conducted a mussel reconnaissance survey for the Eagle Creek Dry-Storage Basin Project (the Project). The Project is located south and west of the City of Findlay, bounded on the west by County Road 9 and bounded on the south by County Roads 48 and 49. The Project includes four survey locations on Eagle Creek south of Findlay, six survey locations on Aurand Run southwest of Findlay, and two survey locations along an unnamed ditch (tributary to Aurand Run) running alongside County Road 49 southwest of Findlay (Table 1, Figure 1). The primary objective of this study was to assess the potential presence or probable absence of unionid mussels within the area of direct impact (ADI) for proposed Eagle Creek Dry-Storage Flow Control Structures (bridge/culvert/weir replacements).

Eagle Creek is a Group 1 stream and has a drainage area of 54.2 square miles at EC 6, the most downstream survey location. Aurand Run is an unlisted stream with an approximate drainage area of 11.4 square miles at AR 6, the most downstream survey location. The unnamed ditch is an unlisted stream with a drainage area of less than 1 square mile. As part of the Project, the unnamed ditch may become a conveyance channel to divert flows from Eagle Creek to Aurand Run during high flows as part of the HCFRR. Both Eagle Creek and Aurand Run flow into the Blanchard River. The surrounding land use is primarily agricultural. At one survey location, AR 5, Aurand Run flows past a lime quarry and into a forested nature preserve.

Previous reconnaissance surveys were conducted in November 2016 on Aurand Run and Eagle Creek (Stantec 2017). The Aurand Run 2016 reconnaissance took place at AR 6 and did not find any evidence (live or shell) of mussel occupancy. The 2016 Eagle Creek reconnaissance took place at two locations near EC 1, one location approximately 0.22 miles upstream and another approximately 0.32 miles downstream. The 2016 Eagle reconnaissance found clear evidence that mussel assemblages were present. Changes to design plans resulted in impacts being moved away from this survey area, necessitating new reconnaissance surveys.

This document was prepared to report the findings of the 12 reconnaissance surveys conducted for this project, as well as to seek concurrence to the findings from the Ohio Department of Natural Resources.



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Methods

Table 1. Survey Site Characteristics and Locations

Stream	Survey Site	Township	County	Drainage Area (mi ²)	River Mile	Latitude	Longitude
Eagle Creek	EC 1 – Embankment Modification	Eagle	Hancock	50.4	5.8	40.97183	-83.65355
Eagle Creek	EC 2 – Embankment Modification	Eagle	Hancock	51.1	4.9	40.9819	-83.6512
Eagle Creek	EC 3 – Embankment Modification	Eagle	Hancock	52	4.6	40.9851	-83.651889
Eagle Creek	EC 4 – Spillway	Eagle	Hancock	54.2	4.3	40.988767	-83.651440
Unnamed Ditch	UD 1 – New TWP 77 Bridge	Eagle	Hancock	<1	-	40.979321	-83.660249
Unnamed Ditch	UD 2 – New TWP 76 Bridge	Eagle	Hancock	<1	-	40.97957	-83.67013
Aurand Run	AR 1 – New TWP 67 Bridge	Eagle	Hancock	1.4	7.0	40.979656	-83.685334
Aurand Run	AR 2 – Replace Private Culvert	Eagle	Hancock	4.6	6.5	40.985178	-83.692066
Aurand Run	AR 3 – Replace TWP 50 Bridge	Eagle	Hancock	4.9	6.1	40.990270	-83.695834
Aurand Run	AR 4 – Replace Private Bridge	Liberty	Hancock	5.2	5.6	40.997207	-83.696719
Aurand Run	AR 5 – Remove Concrete Weir	Liberty	Hancock	8.2	3.8	41.019381	-83.688601
Aurand Run	AR 6 – Replace CR 9 Bridge	Liberty	Hancock	11.4	3.1	41.023843	-83.698351

2.0 METHODS

This survey effort was led by Mr. Daniel Symonds and was conducted on July 25 and October 23, 2019. This field effort was conducted under Stantec’s Federal Permit TE38821A-4 and Ohio Division of Wildlife Animal Permit 20-080 (Appendix B).

Survey methods followed approved Ohio Mussel Survey Protocols (ODNR/USFWS 2018) for reconnaissance of Group 1 systems, appropriate for Group 1 streams or unlisted streams with a watershed ≥ 10 mi².

The survey locations on Eagle Creek were surveyed on July 25, 2019, and the remaining locations were surveyed on October 23, 2019, outside the survey season. Correspondence including approval of the out of season surveys can be found in Appendix A. All survey locations were surveyed beginning approximately 400 feet downstream of the ADI and ending 200 feet upstream. Field personnel moved carefully in an upstream direction taking care not to disturb water visibility. Approximately 1 person-hour was spent visually searching for evidence of mussel presence (e.g., live mussels, shell fragments), and an additional 20 minutes was added if shell fragments were observed. If live mussels were found, surveys were terminated early. Where visibility of the streambed was impaired, results were deemed inconclusive, unless live mussels were found despite poor visibility. Surveyors also assessed physical habitat conditions (e.g., depth, substrate composition, channel stability) in the course of the survey. Depths of pools and riffles were taken using a yardstick and substrate was visually assessed for percent coverage. Water temperatures for each survey date were taken from USGS stream gauge 04188496 (Eagle Creek above Findlay OH). Photographs were taken of the reach in upstream and downstream directions. Representative substrates were also photographed as were exposed bars that could be depositional



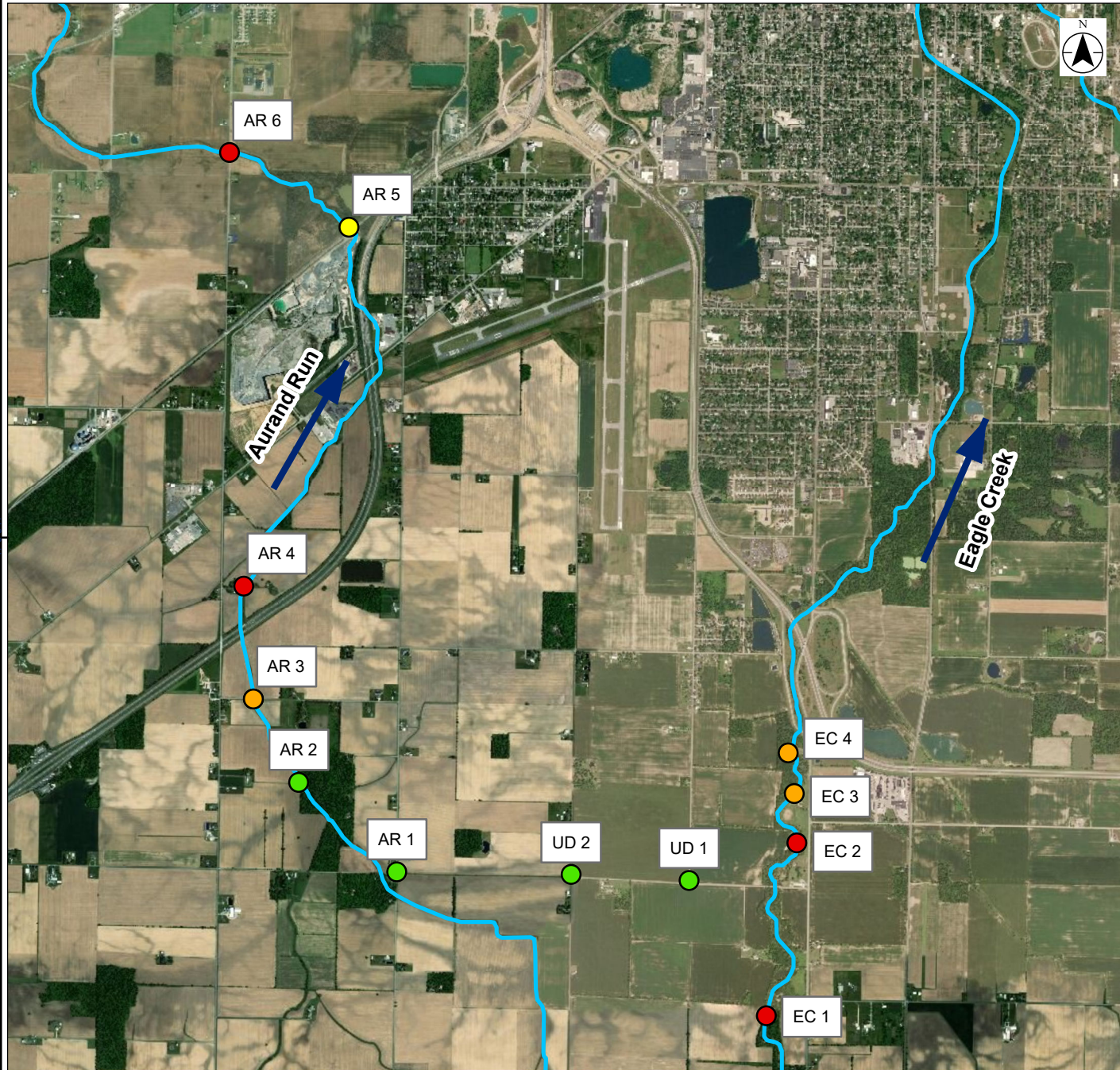
FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Methods

locations for shell fragments. Representative photographs were taken of each mussel species observed. Site and species voucher photos can be found in Appendix C. Completed Ohio Mussel Habitat Assessment Forms can be found in Appendix D.

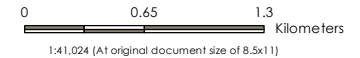


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Legend

- Live Mussels Found
- Mussels Probable - Unconfirmed
- Shells Found - No Live Mussels
- No Mussels Found



Notes

1. Coordinate System: NAD 1983 StatePlane Ohio North FIPS 3401 Feet
2. Base Imagery: ESRI Map Services.



Project Location: Aurand Run, Findlay, Hancock Co., Ohio
 Prepared by EKD on 2019-10-17
 174316204

Client/Project: Maumee Watershed Conservancy District
 Hancock County Flood Control Project

Figure No.: 1

Title: **Aurand Run/Eagle Creek Mussel Reconnaissance Survey Results**

FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Results

3.0 RESULTS

3.1 EAGLE CREEK

EC 1 – Embankment Modification (most upstream)

One living *Lampsilis siliquoidea* was observed at this survey location, along with two shell fragments of *Pyganodon grandis*. Visibility was 15-30 cm. Average stream depth was 15 cm in riffles and 25 cm in runs. Substrates at this location were suitable for mussel occupation and composed of 50% sand, 40% gravel, and 10% cobble.

EC 2 – Embankment Modification

One living *Lasmigona complanata* was found within 10 minutes of visually searching this survey location. Shell fragments of *Anodontooides ferussacianus*, *Fusconaia flava*, and *P. grandis* were also observed. Visibility was 15-30 cm. Average stream depth was 15 cm in riffles and 35 cm in runs. Substrates at this location were suitable for mussel occupation and composed of 60% gravel, 25% sand, 10% cobble, and 5% artificial substrate.

EC 3 – Embankment Modification

Surveys at this location were also inconclusive due to impaired visibility in deep and turbid water. Visibility was 15-30 cm. Average stream depth was 40 cm in runs and 60 cm in pools. Substrates appeared suitable for mussel occupation and were composed of 40% gravel, 30% sand, 20% cobble, and 10% silt.

EC 4 – Spillway (most downstream)

Surveys to determine potential presence of mussels at this location were inconclusive due to impaired visibility in deep and turbid pools. Shell fragments were found from *Amblyma plicata*, *Lampsilis cardium*, *L. complanata*, *L. siliquoidea*, and *P. grandis*. Visibility was 15-30 cm. Average stream depth was 20 cm in riffles, 30 cm in runs, and 120 cm in pools. Substrates were suitable for mussel occupation and were composed of 40% gravel, 30% sand, 20% cobble, and 10% silt.

3.2 UNNAMED DITCH

UD 1 – New TWP 77 Bridge (most upstream)

This survey location contained no water and no clear bed and bank. No mussels shell fragments were observed at this location.



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Results

UD 2 – New TWP 76 Bridge (most downstream)

No mussels or shell fragments were observed at this location. The majority of the stream bed was dry but in areas with standing water the average stream depth was 2 cm. Substrate was visible and composed of 80% organic detritus and 20% silt. This site appears to have intermittent flow.

3.3 AURAND RUN

AR 1 – New TWP 67 Bridge (most upstream)

This survey location was at the confluence of the unnamed ditch and Aurand Run. No mussels or shell fragments were observed. The majority of the stream bed was dry, with an average stream depth of 5 cm. Substrate was visible and composed of 80% organic detritus and 20% silt.

AR 2 – Replace Private Culvert

No mussels or shell fragments were observed at this location. Visibility was 15-30 cm, and average stream depth was 5 cm. The substrate was composed of 60% organic detritus, 20% cobble, 20% gravel.

AR 3 – Replace TWP 50 Bridge

Surveys at this location were inconclusive due to turbidity under the bridge and in deep pools, where live mussels were probable. Two shell fragments from *P. grandis* were found at this survey location. Visibility was 15-30 cm. Average stream depth was 10 cm in runs and 20 cm in pools. The substrate was composed of 40% organic detritus, 30% cobble, 20% silt, and 10% detritus.

AR 4 – Replace Private Bridge

One living *P. grandis* was observed at this location, along with four more *P. grandis* shell fragments. The bed was entirely visible. Average stream depth was 5 cm. The substrate contained 30% silt, 30% organic detritus, 15% cobble, and 15% cobble.

AR 5 – Remove Concrete Weir

Eleven *P. grandis* shell fragments were observed at this location, but no live mussels were found after 120 person-minutes of searching. The bed was entirely visible. Average stream depth was 25 cm in riffles, 20 cm in runs, and 80 cm in pools. Substrates appeared suitable for mussel occupancy and composed of 50% gravel, 40% cobble, and 10% sand.

AR 6 – Replace CR 9 Bridge (most downstream)

One live *L. siliquoidea* and two *P. grandis* shell fragments were observed at this location. The bed was entirely visible. Average stream depth was 20 cm in riffles and 30 cm in runs. The substrate was suitable for mussel occupation and composed of 40% cobble, 40% gravel, and 20% sand.



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Discussion

4.0 DISCUSSION

Reconnaissance surveys were conducted at four survey locations on Eagle Creek, six survey locations on Aurand Run, and two survey locations along an unnamed ditch (Table 2). A total of seven species were observed, and no federally or Ohio listed species were found.

Table 2. Survey Results Summary

Survey Location	Live Mussels Found	Mussels Probable – Unconfirmed	Shells Found – No Live Mussels	No Mussels Found
Eagle Creek				
EC 1 – Embankment Modification (most upstream)	X			
EC 2 – Embankment Modification	X			
EC 3 – Embankment Modification		X		
EC 4 – Spillway (most downstream)		X		
Unnamed Ditch				
UD 1 – New TWP 77 Bridge (most upstream)				X
UD 2 – New TWP 76 Bridge (most downstream)				X
Aurand Run				
AR 1 – New TWP 67 Bridge (most upstream)				X
AR 2 – Replace Private Culvert				X
AR 3 – Replace TWP 50 Bridge		X		
AR 4 – Replace Private Bridge	X			
AR 5 – Remove Concrete Weir			X	
AR 6 – Replace CR 9 Bridge (most downstream)	X			

No mussels (live or shell) or evidence of mussel presence were observed in the unnamed ditch (UD 1 and UD 2) and at the two most upstream survey locations on Aurand Run (AR 1 and AR 2). Despite Aurand Run being classified as a perennial Warmwater Habitat by the Ohio Environmental Protection Agency, the two most upstream sites appear display intermittent tendencies during dry summers (2015). The channel was dry for significant stretches of AR 1 and AR 2. These episodic drying events may contribute to the lack of local mussel populations. Additionally, the surrounding agricultural land is susceptible to erosion, which results in high sediment pollution yields to the stream and degradation of aquatic habitat.

Live mussels were found at two downstream survey locations on Aurand Run (AR 4 and AR 6) and at two upstream survey locations on Eagle Creek (EC 1 and EC 2). This provided clear evidence that mussel assemblages were present at these survey locations. The Aurand Run findings contrast with the 2016 reconnaissance at AR 6, which did not find any evidence (live or shell) of mussel occupancy at that time (Stantec 2017). Reconnaissance at AR 6 was difficult due to dense aquatic vegetation, and this may have caused mussels to be overlooked in 2016. Additionally, mussel relocations occurred in the vicinity in 2018 and may have transferred mussels into the survey area. Evidence of mussel assemblages in Eagle Creek



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Conclusions

are supported by the 2016 reconnaissance which found live mussels at two locations upstream and downstream of EC 1 (Stantec 2017). The Eagle Creek species composition described in this report is similar to that observed during the 2016 reconnaissance.

Surveys at three locations (EC 3, EC 4, and AR 3) were inconclusive due to lack of visibility in turbid water. Discharge and turbidity on both survey dates were relatively low at USGS stream gauge 04188496 (Eagle Creek above Findlay OH). On July 25, discharge was approximately 20 ft³/s, and turbidity was approximately 13 FNU. On October 23, 2019, discharge was approximately 4 ft³/s, and turbidity was approximately 5 FNU. Even under good conditions, it may be difficult to achieve the visibility required for a reconnaissance survey at these three locations. Due to their proximity to upstream sites with mussel and due to observations of mussel shells, mussels are likely to be present at these locations.

No live mussels were observed in Aurand Run at AR 5, although mussel shells were found and the substrate appeared suitable for mussel occupancy. Due to the presence of mussels at sites upstream and downstream of this site, mussels are likely to be present at this location as well.

5.0 CONCLUSIONS

A reconnaissance survey to assess the potential presence or probable absence of freshwater mussels took place on July 25 and October 23, 2019 at twelve survey locations on Eagle Creek, Aurand Run, and an unnamed ditch in Hancock County, Ohio. A total of seven species were observed, and no federally or Ohio listed species were found. No mussels (live or shell) were observed at four survey locations, likely due to lack of perennial water and fine sediment dominance. Clear evidence of mussel assemblages was found at two downstream survey locations on Aurand Run and at two upstream survey locations on Eagle Creek. Evidence of mussel assemblages in Eagle Creek is further supported by a 2016 reconnaissance survey which found live mussels at two sites. Surveys at three locations were inconclusive due to lack of visibility in turbid water. It is likely that the upstream limit for mussel occupancy is at some point south (upstream) of Township Road 50, in between sites AR 3 and AR 2. Because of the evidence presented in this report, we request concurrence from the Ohio Department of Natural Resources that mussels are likely absent at the two sites on the unnamed ditch and the two most upstream Aurand Run sites.



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

References

6.0 REFERENCES

Ohio Environmental Protection Agency (2015). Ohio Water Quality Standards Administrative Code Chapter 2745-1. Revised December 22, 2015.

ODNR/USFWS Ohio Department of Natural Resources and U.S. Fish and Wildlife Service (2018). Ohio Mussel Survey Protocol. April 2018. 47 pp.

Stantec (2017). Mussel Reconnaissance Survey, Blanchard River, Eagle Creek and Aurand Run, Hancock County, Ohio. January 20, 2017.



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Appendix A Agency Correspondence

Appendix A AGENCY CORRESPONDENCE



From: John.Navarro@dnr.state.oh.us
To: [Symonds, Daniel](mailto:Daniel.Symonds@stantec.com)
Cc: [Hayson, David](mailto:David.Hayson@stantec.com); [Dalton, Derek](mailto:Derek.Dalton@stantec.com); [Steve Wilson](mailto:Steve.Wilson@fbfalls.com); [Fleece, Cody](mailto:Cody.Fleece@stantec.com)
Subject: RE: Aurand Run Mussel Reconnaissance Approval
Date: Thursday, October 17, 2019 3:40:02 PM

Please proceed and complete as soon as possible

From: Symonds, Daniel <Daniel.Symonds@stantec.com>
Sent: Thursday, October 17, 2019 2:41 PM
To: Navarro, John <John.Navarro@dnr.state.oh.us>
Cc: Hayson, David <David.Hayson@stantec.com>; Dalton, Derek <Derek.Dalton@stantec.com>; Steve Wilson <scwilson@fbfalls.com>; Fleece, Cody <Cody.Fleece@stantec.com>
Subject: Aurand Run Mussel Reconnaissance Approval

Hello John,

I'm writing to obtain approval to conduct freshwater mussel reconnaissance surveys on Aurand Run south of Findlay, Ohio as part of the Hancock County Flood Control Project. We've identified nine sites (see attached map) where bridges or culverts will potentially be modified during the construction of the flood control structures. These surveys would occur next week, starting October 21, which is after the formal October 1 deadline for mussel field work in Ohio. Aurand Run is an unlisted mussel stream with a drainage area of 17.2 square miles at the most downstream proposed survey site.

Let me know if you have any other concerns or if we may proceed with these surveys.

Thanks,
Dan

Daniel Symonds

Aquatic Ecologist


Direct: 614 282-3215

Daniel.Symonds@stantec.com

Stantec

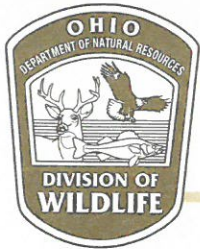
1500 Lake Shore Drive Suite 100

Columbus OH 43204-3800


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Appendix B COLLECTING PERMITS





DIVISION OF WILDLIFE

Ohio Department of Natural Resources

Division of Wildlife Headquarters
2045 Morse Road, Bldg. G
Columbus, Ohio 43229-6693
1-800-WILDLIFE

Chief, Division of Wildlife: **Michael R. Miller**

WILD ANIMAL PERMIT: 20-080

SCIENTIFIC COLLECTION

JAMES D. KISER
STANTEC CONSULTING
10509 TIMBERWOOD CIRCLE, SUITE 100
LOUISVILLE, KY 40223-5301

DATE ISSUED

5/3/2017 Revised: 7/24/2018

Others authorized on permit

YES (SEE ATTACHMENT)

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit. This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective from:

3/16/2017 to: 3/15/2020

The Chief of the Division of Wildlife will not issue permits for Dangerous Wild Animal (DWA) species (ORC 935.01 except native DWA, required for specific projects. The permit issued by the Chief does not relieve the permittee of any responsibility to obtain a permit pursuant to R.C. Chapter 935 except as specified for the animals and purposes permitted herein. The permittee must adhere to all additional requirements under R.C. Chapter 935.

THIS PERMIT IS RESTRICTED AS FOLLOWS:

1. Permittee may collect bats, mussels, fish, salamanders, and aquatic macroinvertebrates for presence/absence of species. Endangered species may be taken in accordance with letter permit from the chief expiring in March, 2017.
2. At least 15 days prior to the initiation of mussel field work, please provide John Navarro (john.navarro@dnr.state.oh.us) with a study plan specifying objectives, location, dates, and all other details, for DOW review and approval.
3. At least two weeks prior to the initiation of field work, you must provide Angela Boyer (angela_boyer@fws.gov) with a study plan specifying objectives, location, dates, and all other details, for review and approval (copy Bridget Brown (Bridget.brown@dnr.state.oh.us)).
4. Collection by mist nets permitted. All specimens are to be immediately released. Radio-transmitters may be applied to bats.
5. At least 24-hrs prior to all collecting activities, permittee must contact the local wildlife officer to advise locations and duration of sampling. Landowner permission must also be obtained.
6. Notify Bridget Brown at 614-265-6764 within 48 hrs if an Indiana bat or Northern long-eared bat is located. All Indiana bats and Northern long-eared bats must be banded using only ODNR bands. ODNR requests that little brown bats (*Myotis lucifugus*) and tri-colored bats (*Perimyotis subflavus*) be voluntarily banded. Contact Bridget for bands.
7. Must maintain and follow restrictions of current U.S. Fish and Wildlife Service permit and WNS decontamination protocols.
8. Please notify John Navarro by email or phone at 614-265-6715 if a new location for a state-listed mussel species is found. Contact Mr. Navarro within 24 hrs if an undocumented invasive species is found.
9. A reference collection of mussel shells may be held at Stantec. All other voucher specimens are to be deposited at the Ohio State University, Museum of Biological Diversity.
10. Collection is prohibited in the Killbuck, Big Darby, Little Darby, tributaries to and east branch of the Chagrin River above I-90, Fish Creek (Williams County) and Division of Wildlife property without explicit written permission from the Division of Wildlife. Sampling is further restricted in streams that may have federally listed mussels. See Appendix A of the Ohio Mussel Survey Protocol (April 2014 @ <http://wildlife.ohiodnr.gov/licenses-and-permits/specialty-licenses-permits>) for locations of federally listed mussels.
11. Permittee must provide an annual electronic report of collecting activities to the Division of Wildlife. Report shall provide species, quantity and locations of collection. Please provide data in the appropriate Wildlife Diversity Database format using the enclosed excel file (bat database for bat information).
12. All work conducted on live federally listed species, as well as identification of all federal species collected, must be conducted by federal permittees. State permittees may assist under the direct, on-site supervision of a federal permittee.

Locations of Collecting:

STATEWIDE WITH NOTED EXCEPTIONS

Equipment and method used in collection:

PRESENCE/ABSENCE BY SNORKELING, DIVING, HAND GRABBING, ELECTROFISHING, MACROINVERTEBRATE SAMPLERS, MIST NETS

Name and number of each species to be collected:

BATS, INCLUDING THE ENDANGERED INDIANA BAT AND THREATENED NORTHERN LONG-EARED BAT. MUSSELS, FISH, AMPHIBIANS AND AQUATIC MACROINVERTEBRATES FOR SURVEY AND INVENTORY. ENDANGERED SPECIES COLLECTION MUST BE CONDUCTED PER CURRENT LETTER PERMIT FROM THE CHIEF.

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? YES

**NO ENDANGERED SPECIES OR AQUATIC NUISANCE SPECIES MAY BE TAKEN
WITHOUT WRITTEN PERMISSION FROM THE CHIEF**

ATTACHMENT

This attachment to permit # 20-080 authorizes the following persons to conduct the activities listed on the permit, within the conditions and restrictions set forth. Each person must carry and exhibit upon request, a copy of the permit and this attachment when conducting any of the listed activities. The person named on the permit assumes full responsibility for the actions of the persons on this list and for completing and submitting all required reports.

Sub-permittee Name


- | | |
|--------------------|----------------|
| DOUG STEPHENS | DANIEL SYMONDS |
| <hr/> | |
| SAM (SKIP) CALL | |
| <hr/> | |
| ANGELA SJOLLEMA | |
| <hr/> | |
| DAVID SAUGEY | |
| <hr/> | |
| MICHAEL DEVILLIERS | |
| <hr/> | |
| CODY FLEECE | |
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| BILL LEOPOLD | |
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| NATHAN NOLAND | |
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| KATE BOMAR | |
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| AARON KWOLEK | |
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| JODY NICHOLSON | |
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**Permit Number: TE38821A-4**

Effective: 07/02/2019 Expires: 12/31/2021

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov


FOR
CHIEF - ENDANGERED SPECIES

Permittee:

STANTEC CONSULTING SERVICES
10509 TIMBERWOOD CIRCLE
SUITE 100
LOUISVILLE, KY 40223-2177
U.S.A.

Name and Title of Principal Officer:

GEORGE ATHANASAKES - ECOSYSTEM RESTORATION SERVICES LEADER

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

ANNUAL REPORT DUE: 01/31

See permit conditions for reporting requirements

Authorizations and Conditions:

- A. General Conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.
- B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other federal law. Necessary state and/or local permits where applicable, must also be acquired and observed; this permit is invalid without such permits.
- C. Valid for use by those identified on the List of Authorized Individuals.
 - C.1. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (LAI) are authorized to conduct activities pursuant to this permit. The LAI, printed on U.S. Fish and Wildlife Service (USFWS) letterhead, and signed and dated by the Region 3 permit issuing office or a Region 3 lead species Field Office, may identify special



Conditions or circumstances under which individuals can conduct authorized activities and it must be retained with these Authorizations and Conditions. Each named individual shall be responsible for compliance with the Authorizations and Conditions of this permit.

Trained assistants not named on the attached LAI may work on permitted activities under the direct and on-site supervision of the individuals named on the LAI. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. Trained assistants may not work independently at a site.

Permittee shall replace outdated LAIs and attach the subsequent current updated version of the LAI to this recovery permit upon receipt. **This permit will be considered invalid without a current attached LAI.**

- C.2. To request changes to the LAI, the Permittee (Principal Officer for business permits) shall submit written requests to the Service's Midwest Region (Region 3) Permit Coordinator identified in Condition J.1. The request shall be submitted at least 30 days prior to the desired effective date. The Permittee shall submit a \$50.00 processing fee unless fee exempt [see 50 CFR 13.11 (d)], the request should include a desired effective date, shall be signed and dated by the Permittee, and shall include the following information:
- C.2.a. The name of each individual (first name, middle initial, last name) to be appended to the LAI, confirmation that the individual is not permitted under another business or individual Federal recovery permit, and indicate the species they will be working with and the activities they will be conducting;
 - C.2.b. The resume/qualifications of each person, including specific information on previous professional experience working with the species/activity affected by the request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate numbers of each species the applicant has worked with at each site (i.e., indicate the number specimens at specific sites or specific activities); names, dates, and location of areas surveyed; and experience with similar species;
 - C.2.c. For each individual: the names, titles, organizations, emails, and telephone numbers of a minimum of two references who can verify experience with the species (reference letters are preferred and always appreciated); and
 - C.2.d. The names of any individuals to be deleted from the LAI.

Note: This procedure is **only** for personnel changes to the LAI. For requests to renew/amend this permit, a complete application and appropriate application processing fee must be submitted to the Region 3 Recovery Permits Coordinator. The application Form 3-200-55 may be obtained at www.fws.gov/endangered/permits/how-to-apply.html.

- D. Acceptance of this permit serves as evidence that the Permittee and its authorized agents understand and agree to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations, Parts 13 and 17, pertinent to issued permits (<https://www.fws.gov/permits/ltr/ltr.html>). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.



A request for permit renewal using Application Form 3-200-55 and the \$100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit (subject to compliance with reporting requirements), while your application request is being processed. When this requirement is not met, this permit becomes invalid on the expiration date. Unless otherwise instructed within the Authorizations and Conditions, **annual reports are due by January 31** following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions, as appropriate. The following website link provides the permit application Form 3-200-55 and the mailing address to this office: <http://www.fws.gov/endangered/permits/how-to-apply.html>.

- E. Permittee (as described in condition C. above) is authorized to take Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), Virginia big-eared bat (*C. t. virginianus*), listed mussel and fish species identified in Attachment 1, copperbelly water snake (*Nerodia erythrogaster neglecta*), and big sandy crayfish (*Cambarus callianus*) for scientific research aimed at recovery of the species: presence/absence surveys, studies to document habitat use, population monitoring, and evaluate potential impacts as described herein. This permit does not authorize the collection of voucher specimens.
- F. Presence/absence surveys and studies to document habitat use are authorized at the following locations:
- F.1. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.
- F.2. Locations within Region 4 of the USFWS: Alabama, Arkansas, Georgia, Louisiana, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.
- F.3. Locations within Region 5 of the USFWS: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.
- F.4. Locations within Region 6 of the USFWS: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from Field Supervisor, as outlined in Condition G.
- F.5. Location within Region 2 of the USFWS: Texas and Oklahoma, upon receipt of written concurrence from Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to 1) surveys of caves known to be used by federally-listed bats, and 2) examinations of caves suspected of containing federally-listed bats species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Biologist), as outlined in Condition G.
- G. For all locations specified in Condition F., Permittee shall notify and request site-specific approval from the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Your notification must be in writing and must indicate:
- G.1. Species for which proposed activities are being conducted.



- G.2. Location of proposed activities, including project site, county, and state.
- G.3. A description of the activities (i.e., surveys, radio-telemetry studies, etc.).
- G.4. Dates when the project is proposed to take place.
- G.5. Evidence that Permittee has received any required contracts to complete the activities.
- G.6. Whether all annual reporting requirements have been fulfilled.
- G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*
- H. Permittee shall adhere to following conditions involving capture and handling of bats:
- H.1. Activities may be conducted by Stantec Consulting Services personnel as described in Condition C.
- H.2. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat Summer Survey Guidelines. Guidelines are available at: www.fws.gov/midwest/angered/mammals/inba/inbasummersurveyguidance.html. Note: Permittee must use the most up-to-date version of the Summer Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.
- H.3. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. Harp traps must be continually monitored. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.
- At least one Permittee must remain present at each mist-net and harp trap site while it is being operated.**
- H.4. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.
- H.5. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured



bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

- H.6. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first. ***Although not required as a condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting and radio-tracking of Indiana bats within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition G.***
- H.7. No trapping activities shall occur within 20 meters of a known or potential summer or winter maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activities are proposed to occur.
- H.8. Caves, mines, or other suitable hibernation sites may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys should not be repeated more often than once every other year in any given hibernaculum that is occupied by endangered or threatened bats. Where hibernacula area and safety conditions allow, individuals entering caves are recommended to utilize night vision goggles or red-filtered light and to remain in the cave no more than 90 minutes to complete the work.
- H.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: www.whitenosesyndrome.org/topics/decontamination.
- H.10. For the Ozark big-eared bat (*Corynorhinus townsendii ingens*) and Virginia big-eared bat (*C. townsendii virginianus*), the USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. Permittees not authorized to handle Ozark big-eared bats and Virginia big-eared bats shall be observant and cautious to eliminate or minimize "take" of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of Ozark or Virginia big-eared bat, you shall document the capture with a photograph and immediately release at the capture site. Within 48 hours, you must notify the USFWS in the state in which you are working of the incidental capture (see www.fws.gov/midwest/endangered/permits/index.html).
- I. Permittee is authorized to take (only in the context of harass by survey) mussel species identified in Attachment 1 for scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for mussel species:



- I.1. Presence/absence studies and surveys to monitor mussel communities shall be conducted by personnel identified in Condition C.
 - I.2. Permittee may take (remove from the substrate for identification, data collection and return) mussels by hand via wading, snorkeling, or using divers.
 - I.3. Permittee may temporarily hold specimens in mesh bags, either suspended in the water or held in a container containing river water, while awaiting identification and data collection. Specimens may be held for up to 3 hours if they are held in the water in bags that allow free movement of water the mussels were taken from or held in large containers of river water that is replaced every hour [every half-hour when air temperatures are at or above 80° Fahrenheit (F)] with water freshly taken from the water where the mussels were collected. When practicable, specimens held in containers must remain in the shade. Specimens must be returned to the locality from which they were taken. Live specimens that cannot be identified at the site must be photographed for identification purposes.
 - I.4. Collection of live mussel specimens must be done only when the air temperature is above 32° F and the water temperature is above 40° F. No collection activities may be conducted when air temperature is above 90° F. Specimens shall be returned to the substrate as follows:
 - I.4.a. For surveys at water temperatures at or above 50° F, mussels may be dropped back into the water after identification.
 - I.4.b. For surveys conducted at water temperatures between 40° and 50° F, mussels must be returned to the substrate, by divers if necessary. Divers must return the specimen to the substrate by hand, placing them on their side and allowing them to burrow on their own. Where the substrate is very compacted cobble, a hole just large enough to receive the animal to a depth of 3/4 its length should be excavated and the mussel placed into it with the siphon (posterior) end up and pointing upstream.
 - I.5. All live mussels will be measured (length and height) and, if possible, sexed and aged. No intrusive activities are permitted. Data collected will include descriptions of external morphometry and reproductive status. All specimens of federally listed species - or a representative sample for each species - must be photographed prior to release.
 - I.6. No live specimens may be removed from the survey sites, except for specimens encountered in circumstances, which would reasonably be expected to result in stranding due to low or receding water. Such specimens may be moved into deeper water at the survey site, to a suitable location near the survey site, or to an alternative location coordinated with and approved by the appropriate U.S. Fish and Wildlife Field Office in Condition R.
 - I.7. The shells of all live specimens collected or captured temporarily must be thoroughly inspected for the presence of zebra mussels (*Dreissena polymorpha*). Unionids with zebra mussels attached must be cleaned by scrubbing prior to returning to the substrate. Document the incidence of zebra mussels and Asiatic clams (*Corbicula fluminea*) at project sites.
- J. Permittee is authorized to take (only in the context of harass by survey) fish species identified in Attachment 1 for



scientific research aimed at recovery of the species. Permittee shall adhere to the following conditions involving presence/absence surveys for fish species:

- J.1. Presence/absence studies and surveys to monitor fish communities shall be conducted by personnel identified in Condition C.
 - J.2. Permittee may hold specimens for a maximum of 15 minutes for photographic documentation and non-intrusive data collection, and release unharmed at the point of capture.
 - J.3. Electrofishing surveys are only authorized by written concurrence of the U.S. Fish and Wildlife Service Field Supervisor for the state in which the activity is proposed.
- K. Permittee shall adhere to the following conditions involving surveys for copperbelly water snake:
- K.1. Activities may be conducted by personnel identified in Condition C., and only by visual searches of habitat to assess habitat quality and to determine presence or absence of copperbelly water snake.
 - K.2. Time searches shall be based on protocol developed and discussed by Bruce Kingsbury (Attachment 2).
 - K.3. Drift fences may also be employed for more quantifiable population estimates.
- L. Upon determination that endangered or threatened species are present at previously undocumented sites, Permittee shall notify the following offices within 48 hours: the U.S. Fish and Wildlife Service Region 3 Office (Condition P.1.), and the USFWS Field Office within the geographic location of study areas (Condition R.).
- M. No injury or mortality is anticipated or allowed as a result of copperbelly water snake surveys. In the event that injury or mortality occurs, all activities must cease. The circumstances of any injury or mortality must be reported in writing within 48 hours to the office listed in Condition P.1., the USFWS Michigan Ecological Services Field Office (Condition R.), and the nearest USFWS Law Enforcement, Special Agent Office (<http://www.fws.gov/offices>). Before you reinitiate studies authorized by this permit, you must receive written authorization from the USFWS Michigan Ecological Services Field Office (Condition R.). Dead or moribund specimens may be retained for further study only with the written permission of the USFWS East Lansing, Michigan Field Office. Any specimens that are not authorized for retention are to be chilled and promptly transferred to the USFWS for potential necropsy and/or contaminants analysis (Condition R.).
- N. Accidental injury and/or mortality of bats, mussels or fish may not exceed two specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must immediately report any bat, mussel, or fish mortality or serious injury to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: www.fws.gov/midwest/endangered/permits/index.html). Written notification must also be made within 24 hours to the Midwest Regional Permits Coordinator (see Condition P.1.), the Species Recovery Lead (Condition Q., if applicable), and the applicable USFWS Field Office in the state in which the incident occurred (Condition R.). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of



any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

- O. An annual report of activities conducted under the authority of this permit is due by January 31 each year the permit is in effect. In addition, copies of all reports and publications resulting from data obtained under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report must include:
- O.1. The date, time, and geographic locations (including datum and projection information), of all specimens encountered as well as all data collected on the individuals (i.e., age, sex, and weight).
 - O.1.a. A completed data collection sheet as found on the Range-wide Indiana Bat Summer Survey Guidelines website page, cited in Condition H.2., and band numbers of all bats banded.
 - O.1.b. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the data collection sheets found on the current Rangewide Indiana Bat Summer Survey Guidelines website page cited in Condition H.2., or other species specific data sheets). Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.
 - O.2. A description of locations surveyed for threatened/endangered species where no specimens were encountered.
 - O.3. Location and characteristics of bat roost trees and bat colonies.
 - O.4. Information on any injuries and/or mortalities and disposition of specimens.
 - O.5. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.
 - O.6. Copies of all site-specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

- P. Copies of your reports shall be sent to all applicable offices indicated below. Your transmittal letter (or email) must cite your Federal permit number. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives cannot be accepted**).
- P.1. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Midwest Region (Region 3)
Ecological Services - Endangered Species
5600 American Blvd. W., Suite 990



Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

- P.2. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov
- P.3. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov
- P.4. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov
- P.5. Regional Recovery Permit Coordinator
U.S. Fish and Wildlife Service - Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

Q. Additionally, based on species, reports and publications shall be submitted to the following:

- Q.1. ***For studies involving gray bat:***
Shauna Marquardt
U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

- Q.2. ***For studies involving Indiana bat:***



Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261; fax 812/334-4273)

Q.3. For studies involving northern long-eared bat:

Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

Q.4. For studies involving Ozark big-eared bat:

Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129
(918/382-4520; fax 918/581-7467)

Q.5. For studies involving Virginia big-eared bat:

Barbara Douglas
U.S. Fish and Wildlife Service
Ecological Services Field Office
90 Vance Drive
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)

R. Additionally, based on geographic area, reports and publications shall be submitted to the applicable offices under "For Fish and Wildlife Permit Holders" at: www.fws.gov/midwest/endangered/permits/index.html.

cc: FWS/Regions 2, 4, 5, and 6 (Attn: Recovery Permits Coordinator)
FWS, TE Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI
DNR/DOC, TE Administrator/Coordinators for IL, IN, IA, MI, MN, MO, OH, and WI

END



United States Department of the Interior



FISH AND WILDLIFE SERVICE

5600 American Boulevard West, Suite 990
Bloomington, Minnesota 55437-1458

IN REPLY REFER TO:

FWS/AES-TE

LIST OF AUTHORIZED INDIVIDUALS TE38821A-4 George Athanasakes (Principal Officer)

July 9, 2019

C.1. Individuals authorized to independently conduct activities under this permit:

- The following individuals are authorized for all activities described for Indiana bat (*Myotis sodalis*), gray bat (*M. grisecens*), northern long-eared bat (*M. septentrionalis*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), and Virginia big-eared bat (*C. t. virginianus*): David Saugey, Joseph Johnson, Lindsay Wight
- The following individuals are authorized for all activities described for gray bat, Indiana bat, and northern long-eared bat only: Wes Cunningham and Lynda Mills
- Cody Fleece is authorized to conduct all activities described for listed mussels and fish species, with the exception of Kentucky arrow darter (*Etheostoma spilotum*).
- Daniel Symonds is authorized to conduct all activities described for listed mussels.
- James Kiser is authorized to conduct all activities described for listed bats, fish, mussels, copperbelly water snake (*Nerodia erythrogaster neglecta*) and big sandy crayfish (*Cambarus callainus*).
- Douglas Stephens is authorized to conduct all activities described for listed bats, fish, and mussels.

Unnamed trained assistants may conduct activities pursuant to this permit only under the direct and on-site supervision of an above-named individual. "On-site supervision" is defined as having the permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. **At least one named permittee must remain present at each mist-net site while it is being operated.**

Acting for George Athanasakes
Chief, Division of Endangered Species

7/9/2019
Date

This List of Authorized Individuals (LAI) is valid only when it is dated on or after the permit issuance date. Federal Permit TE38821A-4 will be considered invalid without this LAI.

Attachment 1: TE38821A-4 (Stantec Consulting Services)
Fish and Freshwater Mussel Species Covered by Permit

Fish Species	
Scientific Name	Common Name
<i>Etheostoma chienense</i>	Relict darter
<i>Etheostoma percnurum</i>	Duskytail darter
<i>Etheostoma spilotum</i>	Kentucky arrow darter
<i>Notropis albizonatus</i>	Palezone shiner
<i>Phoxinus cumberlandensis</i>	Blackside dace
<i>Scaphirhynchus albus</i>	Pallid sturgeon



Freshwater Mussel Species	
Scientific Name	Common Name
<i>Alasmidonta atropurpurea</i>	Cumberland elktoe
<i>Conradilla caelata</i>	Birdwing pearlymussel
<i>Cumberlandia monodonta</i>	Spectaclecase
<i>Cyprogenia stegaria</i>	Fanshell
<i>Dromus dromas</i>	Dromedary parlymussel
<i>Epioblasma brevidens</i>	Cumberland combshell
<i>Epioblasma capsaeformis</i>	Oyster mussel
<i>Epioblasma florentina walkeri</i>	Tan riffleshell
<i>Epioblasma obliquata obliquata</i>	Purple catspaw
<i>Epioblasma torulosa rangiana</i>	Northern riffleshell
<i>Epioblasma triquetra</i>	Snuffbox
<i>Fusconaia cuneolus</i>	Finerayed pigtoe
<i>Fusconaia cor</i>	Shiny pigtoe
<i>Hemistena lata</i>	Cracking pearlymussel
<i>Lampsilis abrupta</i>	Pink mucket
<i>Lampsilis higginsii</i>	Higgins eye
<i>Obovaria retusa</i>	Ring pink
<i>Pegias fibula</i>	Littlewing pearlymussel
<i>Plethobasus cicatricosus</i>	White wartyback pearlymussel
<i>Plethobasus cyphus</i>	Sheepnose
<i>Pleurobema clava</i>	Clubshell
<i>Pleurobema plenum</i>	Rough pigtoe
<i>Pleuronaia dolabelloides</i>	Slabside pearlymussel
<i>Potamilus capax</i>	Fat pocketbook
<i>Ptychobranhus subtentum</i>	Fluted kidneyshell
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot
<i>Quadrula cylindrica strigillata</i>	Rough rabbitsfoot
<i>Villosa fabalis</i>	Rayed bean
<i>Villosa perpurpurea</i>	Purple bean
<i>Villosa trabilis</i>	Cumberland bean



FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN



Appendix C Site and Species Voucher Photos



Appendix C SITE AND SPECIES VOUCHER PHOTOS





Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 1			
Photo Location: EC 1 – Embankment Modification			
Direction: North			
Survey Date: 7/25/2019			
Comments: Viewing upstream from ADI			
Photograph ID: 2			
Photo Location: EC 1 – Embankment Modification			
Direction: South			
Survey Date: 7/25/2019			
Comments: Viewing Downstream from ADI			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 3			
Photo Location: EC 2 – Embankment Modification			
Direction: North			
Survey Date: 7/30/2019			
Comments: Viewing downstream from ADI			
Photograph ID: 4			
Photo Location: EC 2 – Embankment Modification			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Representative Substrate			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 5			
Photo Location: EC 3 – Embankment Modification			
Direction: South			
Survey Date: 7/30/2019			
Comments: Viewing downstream from ADI			
Photograph ID: 6			
Photo Location: EC 3 – Embankment Modification			
Direction: North			
Survey Date: 7/30/2019			
Comments: Viewing upstream from ADI			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 7			
Photo Location: EC 4 – Spillway			
Direction: Northeast			
Survey Date: 7/25/2019			
Comments: Viewing upstream from bridge			
Photograph ID: 8			
Photo Location: EC 4 – Spillway			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Representative Substrate			


Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 9			
Photo Location: EC 4 – Spillway			
Direction: Southwest			
Survey Date: 7/25/2019			
Comments: Viewing upstream from bridge pool			
Photograph ID: 10			
Photo Location: UD 1 – New TWP 77 Bridge			
Direction: East			
Survey Date: 10/23/2019			
Comments: Unnamed ditch and storm drain			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 11			
Photo Location: UD 1 – New TWP 77 Bridge			
Direction: West			
Survey Date: 10/23/2019			
Comments: Unnamed ditch lacking bed and bank			
Photograph ID: 12			
Photo Location: UD 2 – New TWP 76 Bridge			
Direction: East			
Survey Date: 10/23/2019			
Comments: Viewing upstream (away from Aurand Run)			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 13			
Photo Location: UD 2 – New TWP 76 Bridge			
Direction: West			
Survey Date: 10/23/2019			
Comments: Viewing downstream (toward Aurand Run)			
Photograph ID: 14			
Photo Location: UD 2 – New TWP 76 Bridge			
Direction: East			
Survey Date: 10/23/2019			
Comments: Culverts under TWP 76			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 15			
Photo Location: AR 1 – New TWP 67 Bridge (Aurand Run)			
Direction: Southeast			
Survey Date: 10/23/2019			
Comments: Viewing upstream			
Photograph ID: 16			
Photo Location: AR 1 – New TWP 67 Bridge (Aurand Run)			
Direction: East			
Survey Date: 10/23/2019			
Comments: Dry stream bed			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 17			
Photo Location: AR 1 – New TWP 67 Bridge (Unnamed Ditch)			
Direction: East			
Survey Date: 10/23/2019			
Comments: Viewing upstream			
Photograph ID: 18			
Photo Location: AR 1 – New TWP 67 Bridge (Unnamed Ditch)			
Direction: West			
Survey Date: 10/23/2019			
Comments: Viewing downstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 19			
Photo Location: AR 1 – New TWP 67 Bridge (Unnamed Ditch)			
Direction: East			
Survey Date: 10/23/2019			
Comments: Culvert under TWP 67			
Photograph ID: 20			
Photo Location: AR 2 – Replace Private Culvert			
Direction: N/A			
Survey Date: 10/23/2019			
Comments: Representative substrates			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 21			
Photo Location: AR 2 – Replace Private Culvert			
Direction: Southeast			
Survey Date: 10/23/2019			
Comments: Viewing upstream			
Photograph ID: 22			
Photo Location: AR 2 – Replace Private Culvert			
Direction: Northwest			
Survey Date: 10/23/2019			
Comments: Viewing downstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 23			
Photo Location: AR 3 – Replace TWP 50 Bridge (upstream of bridge)			
Direction: Northwest			
Survey Date: 10/23/2019			
Comments: Viewing upstream			
Photograph ID: 24			
Photo Location: AR 3 – Replace TWP 50 Bridge (upstream of bridge)			
Direction: Southeast			
Survey Date: 10/23/2019			
Comments: Viewing downstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 25			
Photo Location: AR 3 – Replace TWP 50 Bridge (downstream of bridge)			
Direction: Southeast			
Survey Date: 10/23/2019			
Comments: Viewing upstream			
Photograph ID: 26			
Photo Location: AR 3 – Replace TWP 50 Bridge (downstream of bridge)			
Direction: North			
Survey Date: 10/23/2019			
Comments: Viewing downstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 27			
Photo Location: AR 4 – Replace Private Bridge			
Direction: South			
Survey Date: 10/23/2019			
Comments: Viewing upstream, representative substrates			
Photograph ID: 28			
Photo Location: AR 4 – Replace Private Bridge			
Direction: South			
Survey Date: 10/23/2019			
Comments: Viewing upstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 29			
Photo Location: AR 4 – Replace Private Bridge			
Direction: Northeast			
Survey Date: 10/23/2019			
Comments: Viewing downstream			
Photograph ID: 30			
Photo Location: AR 5 – Remove Concrete Weir (downstream of weir)			
Direction: Southeast			
Survey Date: 10/23/2019			
Comments: Viewing upstream			



Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 31			
Photo Location: AR 5 – Remove Concrete Weir (downstream of weir)			
Direction: Northwest			
Survey Date: 10/23/2019			
Comments: Viewing downstream			
Photograph ID: 32			
Photo Location: AR 5 – Remove Concrete Weir (upstream of weir)			
Direction: South			
Survey Date: 10/23/2019			
Comments: Viewing upstream			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 33			
Photo Location: AR 5 – Remove Concrete Weir (upstream of weir)			
Direction: North			
Survey Date: 10/23/2019			
Comments: View downstream			
Photograph ID: 34			
Photo Location: AR 5 – Remove Concrete Weir			
Direction: N/A			
Survey Date: 10/23/2019			
Comments: Representative substrates			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 35			
Photo Location: AR 5 – Remove Concrete Weir			
Direction: Northwest			
Survey Date: 10/23/2019			
Comments: View of concrete weir			
Photograph ID: 36			
Photo Location: AR 6 – Replace CR 9 Bridge			
Direction: N/A			
Survey Date: 10/23/2019			
Comments: Representative substrates			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 37			
Photo Location: AR 6 – Replace CR 9 Bridge			
Direction: West			
Survey Date: 10/23/2019			
Comments: Viewing downstream			
Photograph ID: 38			
Photo Location: AR 6 – Replace CR 9 Bridge			
Direction: East			
Survey Date: 10/23/2019			
Comments: Viewing upstream			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 39			
Photo Location: EC 1 – Embankment			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Lampsilis siliquoidea (Fatmucket)			
Photograph ID: 40			
Photo Location: EC 1 – Embankment			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Lampsilis siliquoidea (Fatmucket)			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 41			
Photo Location: EC 2 – Embankment			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Lasmigona complanata (White heelsplitter)			
Photograph ID: 42			
Photo Location: EC 4 – Spillway			
Direction: N/A			
Survey Date: 7/25/2019			
Comments: Weathered Shells			

Client:	Maumee Watershed Conservancy District	Project:	Hancock County Flood Control Project
Site Name:	Eagle Creek and Aurand Run	Site Location:	Findlay, Hancock Co., Ohio
Photograph ID: 43		Photo Location: AR 1 – Replace CR 9 Bridge	
Direction: N/A			
Survey Date: 10/23/2019			
Comments: Lampsilis siliquoidea (Fatmucket)			
Photograph ID: 44		Photo Location: AR 3 – Replace Private Bridge	
Direction: N/A			
Survey Date: 10/23/2019			
Comments: Pyganodon grandis (Giant floater)			

FRESHWATER MUSSEL RECONNAISSANCE SURVEY ON EAGLE CREEK AND AURAND RUN

Appendix D Ohio Mussel Habitat Assessment Forms

Appendix D OHIO MUSSEL HABITAT ASSESSMENT FORMS



most upstream

Line L. siloquidea
2x P. grandis

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin - Eagle Creek Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.97188 Longitude (DD.DDDD): -83.65355
 Stream Name: East creek Group # (From Appendix A): 1

Methods

Name of Surveyor(s): D. Symonds, D. McMillan
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 7/25/19 Distance Surveyed (ft.): 50
 Total Survey Time (min. x people): 10 min Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

N/A
 survey terminated after finding Line L. siloquidea

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 50.4 Water Temp. (°F): 74 Air Temp. (°F): 80

Substrate Types (include %):

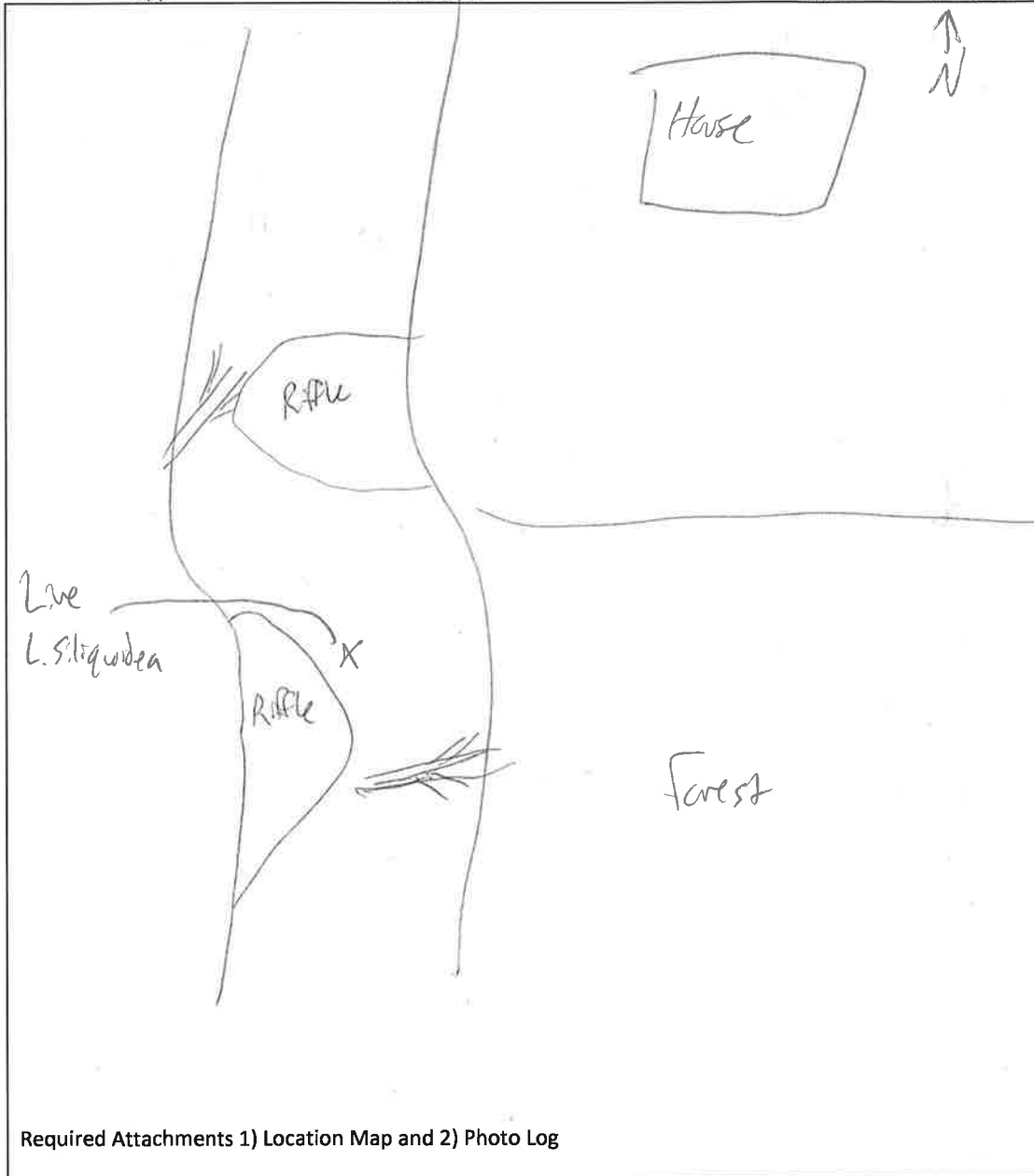
Boulder Gravel 40 Bedrock Detritus Silt
 Cobble 10 Sand 50 Hardpan Muck Artificial
 Water Level: High Up Normal Low Dry/Interstitial
 Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom
 Average Depth (cm): Riffle 15 Run 25 Pool
 Max Depth (cm): Riffle 25 Run 35 Pool

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

2nd most upstream

Live L. complanata

Shell - F. flava
A. ferrusacianus

P. grandis

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin + Eagle Creek Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.9819 Longitude (DD.DDDD): -83.6512
 Stream Name: Eagle Creek Group # (From Appendix A): 7

Methods

Name of Surveyor(s): D. Symonds, D. McNulty
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 7/25/19 Distance Surveyed (ft.): 50
 Total Survey Time (min. x people): 20 min Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

Terminated after 10 min due to live L. complanata

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 51.1 Water Temp. (°F): 74 Air Temp. (°F): 80

Substrate Types (include %):

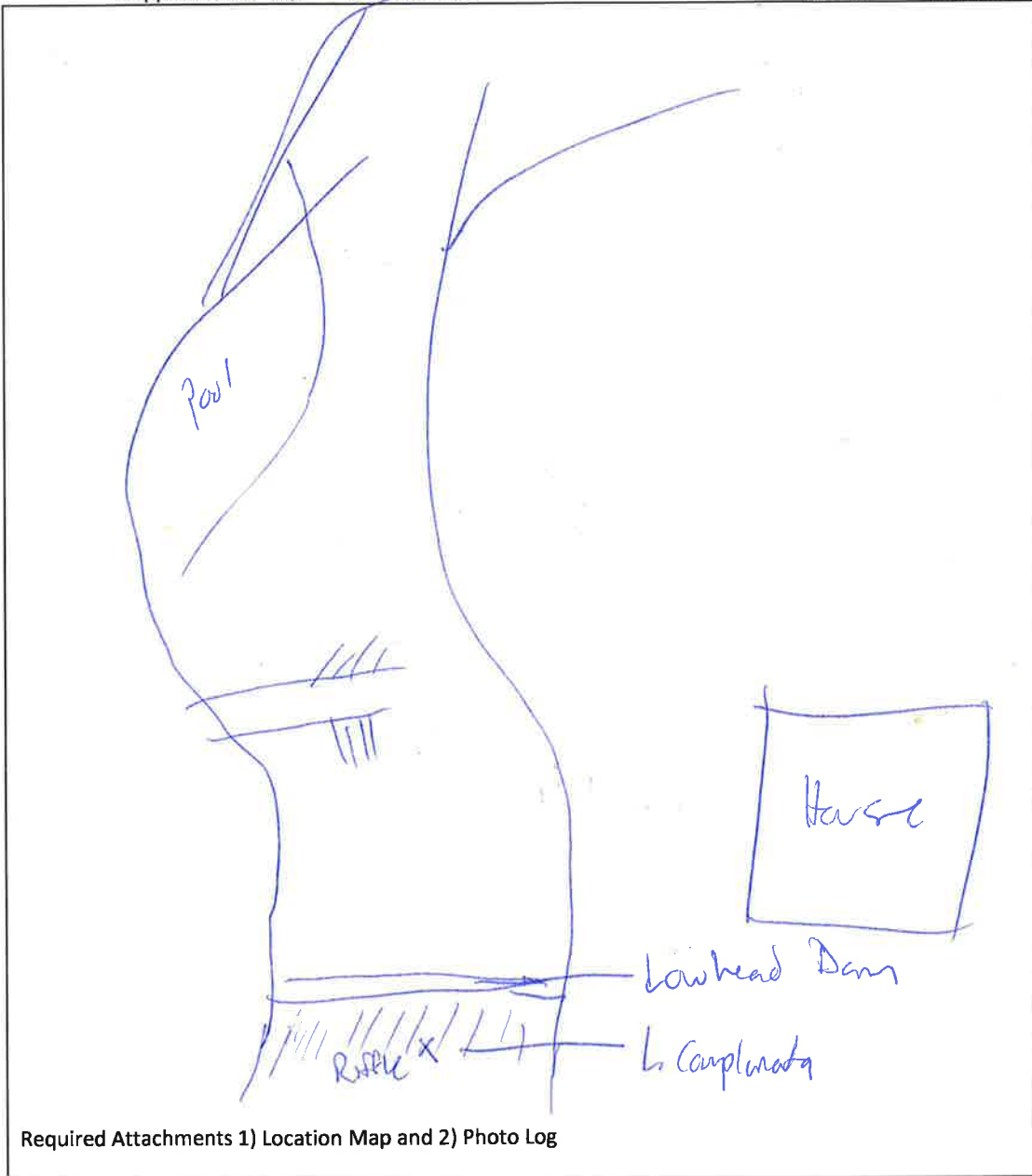
Boulder Gravel 60 Bedrock Detritus Silt
 Cobble 10 Sand 25 Hardpan Muck Artificial 5
 Water Level: High Up Normal Low Dry/Interstitial
 Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom
 Average Depth (cm): Riffle 15 Run 35 Pool
 Max Depth (cm): Riffle 25 Run 50 Pool

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil* Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

2nd Most Downstream

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin - Eagle Creek Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.985170 Longitude (DD.DDDD): -83.651889
 Stream Name: Eagle Creek Group # (From Appendix A): 1

Methods

Name of Surveyor(s): D. Synnuds, D. McNulty
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 7/25/19 Distance Surveyed (ft.): ~250 ft
 Total Survey Time (min. x people): 30 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

- Too deep/turbid to complete survey
 - unable to follow protocols to determine no mussel presence

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 52 Water Temp. (°F): 74 Air Temp. (°F): 80

Substrate Types (include %):

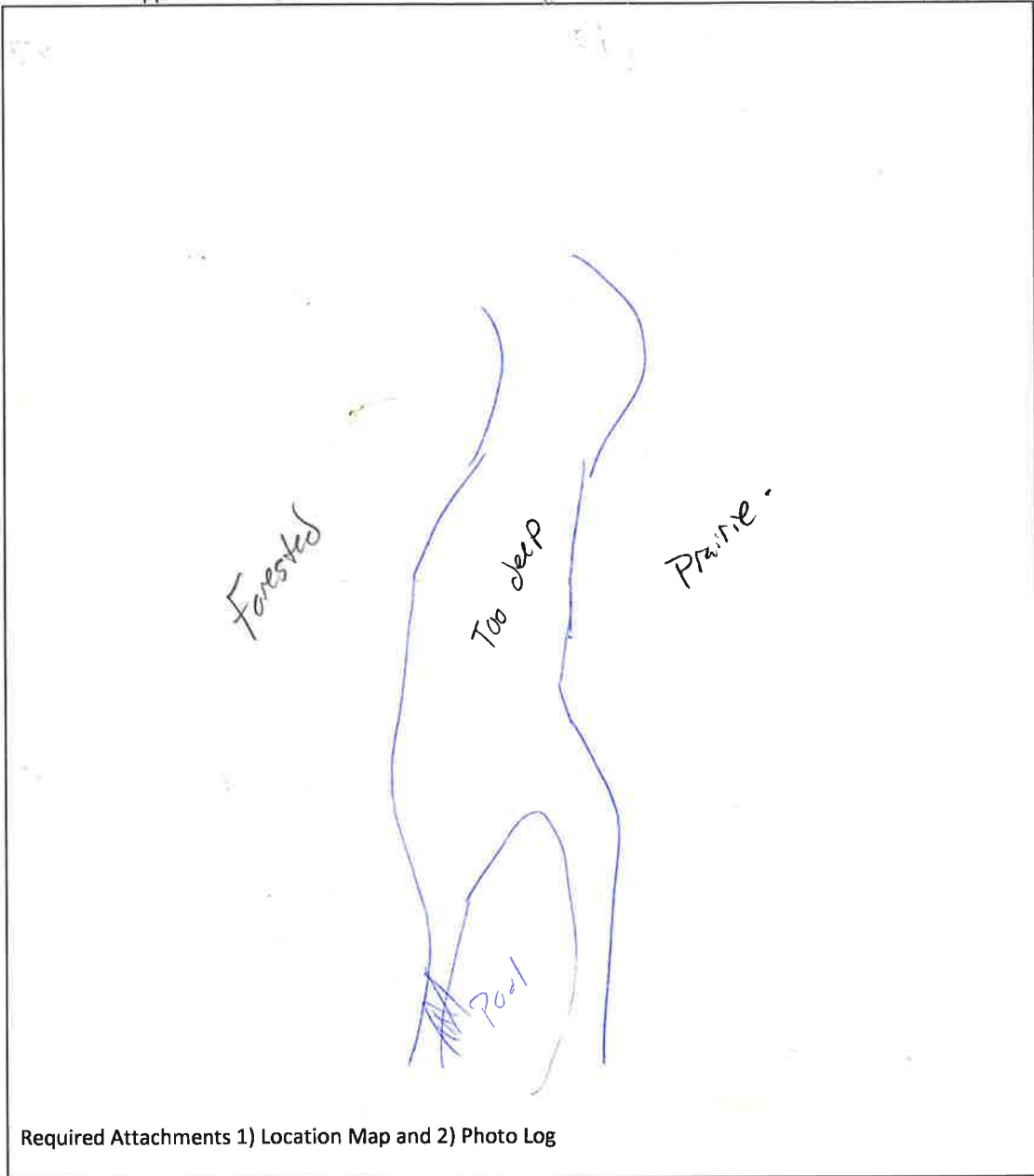
Boulder Gravel 50 Bedrock Detritus Silt
 Cobble 20 Sand 20 Hardpan 10 Muck Artificial
 Water Level: High Up Normal Low Dry/Interstitial
 Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom
 Average Depth (cm): Riffle Run 40 Pool 60
 Max Depth (cm): Riffle Run 60 Pool 200+

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Most Downstream

- A. plicata - W
- L. siligoudea - W
- P. grandis - W
- L. cordata - W

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Finlay Flood Basin - Eagle Creek Reach
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.988767 Longitude (DD.DDDD): -83.651440
 Stream Name: Eagle Creek Group # (From Appendix A): 1

Methods

Name of Surveyor(s): D. Symonds, D. McNulty
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 7/25/19 Distance Surveyed (ft.): ~ 500 ft
 Total Survey Time (min. x people): 80 min Scientific Collector's Permit Number(s): 20-080

Start 11:30 AM
End 12:10 PM

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

- Pools too deep/turbid to survey
 - Not able to follow protocols to confirm no presence

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 54.2 Water Temp. (°F): 23°C Air Temp. (°F): 80 F

Substrate Types (include %):

Boulder Gravel 40 Bedrock Detritus Silt 10
 Cobble 20 Sand 30 Hardpan Muck Artificial

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 20 Run 30 Pool 120

Max Depth (cm): Riffle 35 Run 85 Pool 200+

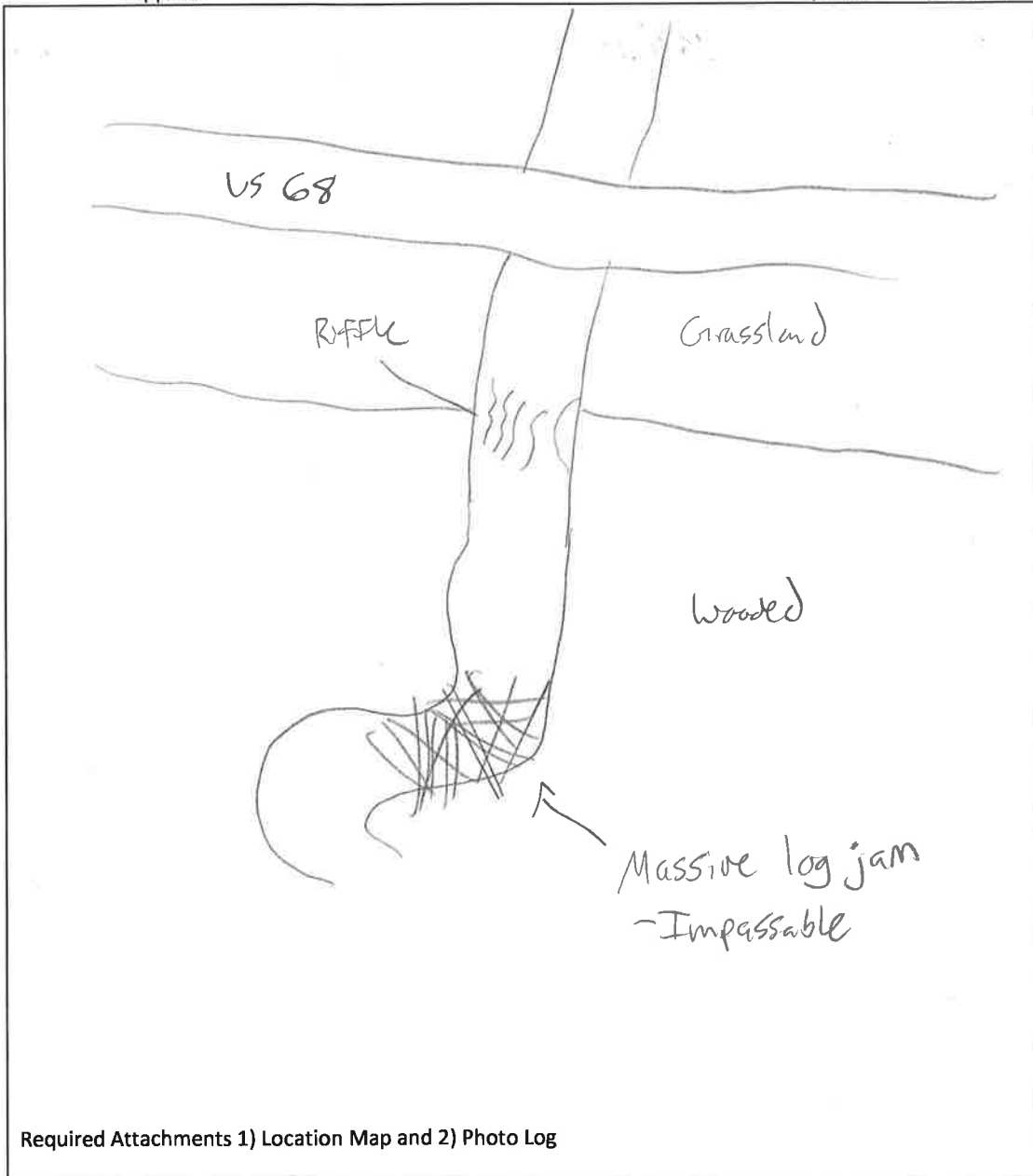
23 cfs
3 - median

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.979321 Longitude (DD.DDDD): -83.660249
 Stream Name: Unnamed Pitch Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 5 x 2 Scientific Collector's Permit Number(s): 207080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

no water - no mussels
 After Oct. 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): <1 Water Temp. (°F): N/A Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel _____ Bedrock _____ Detritus _____ Silt _____
 Cobble _____ Sand _____ Hardpan _____ Muck _____ Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle _____ Run _____ Pool _____

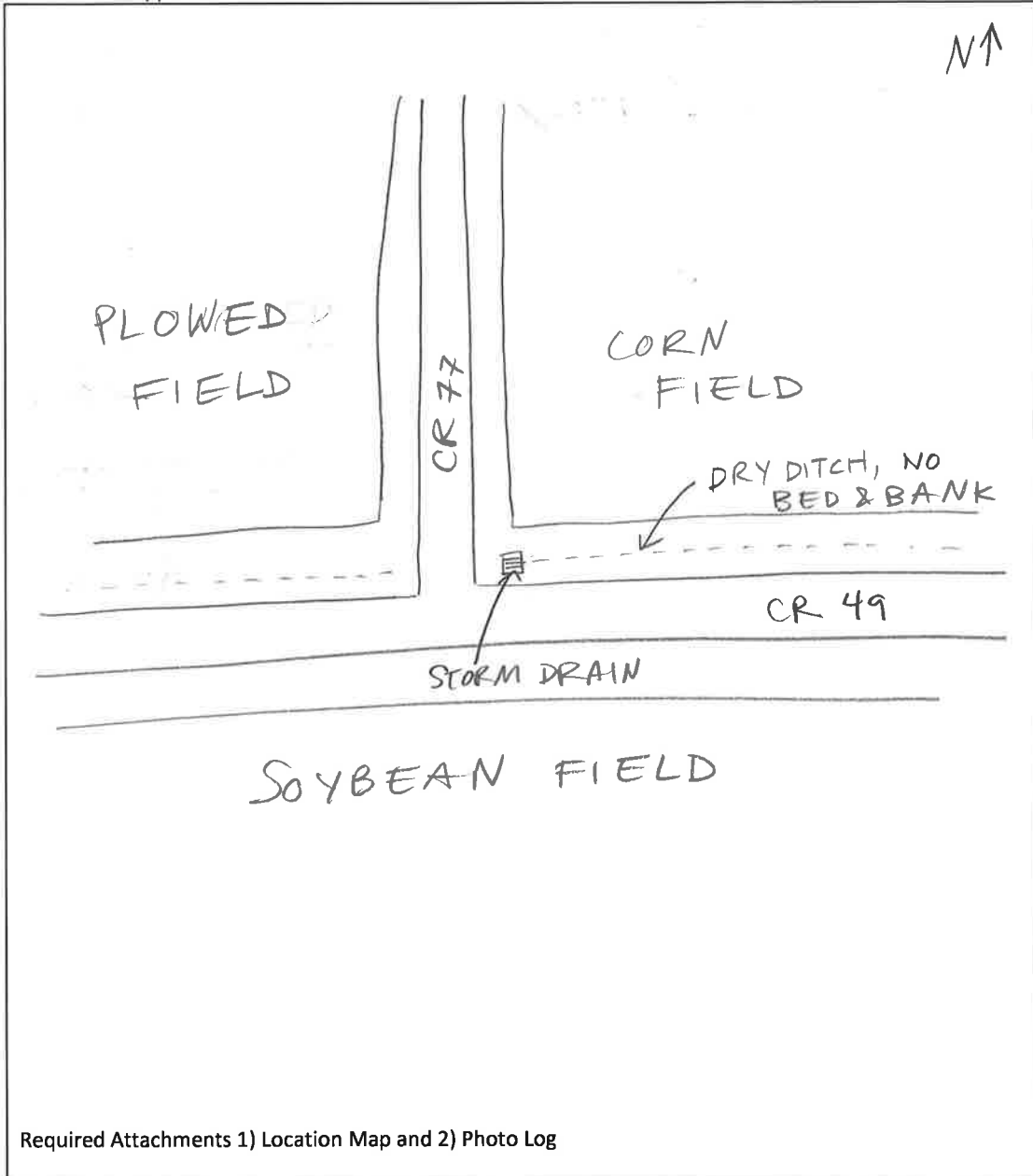
Max Depth (cm): Riffle _____ Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None
- Mussel Shell
- Mussel Shell Only -
- Mussel Shell Only
- Living Mussels
- Only - Subfossil
- Weathered Dead
- Fresh Dead

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.97957 Longitude (DD.DDDD): -83.670135
 Stream Name: Unnamed Ditch Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 30x2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

After Oct 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): <1 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel _____ Bedrock _____ Detritus _____ Silt 20
 Cobble _____ Sand _____ Hardpan _____ Muck 80 Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 2cm Run _____ Pool _____

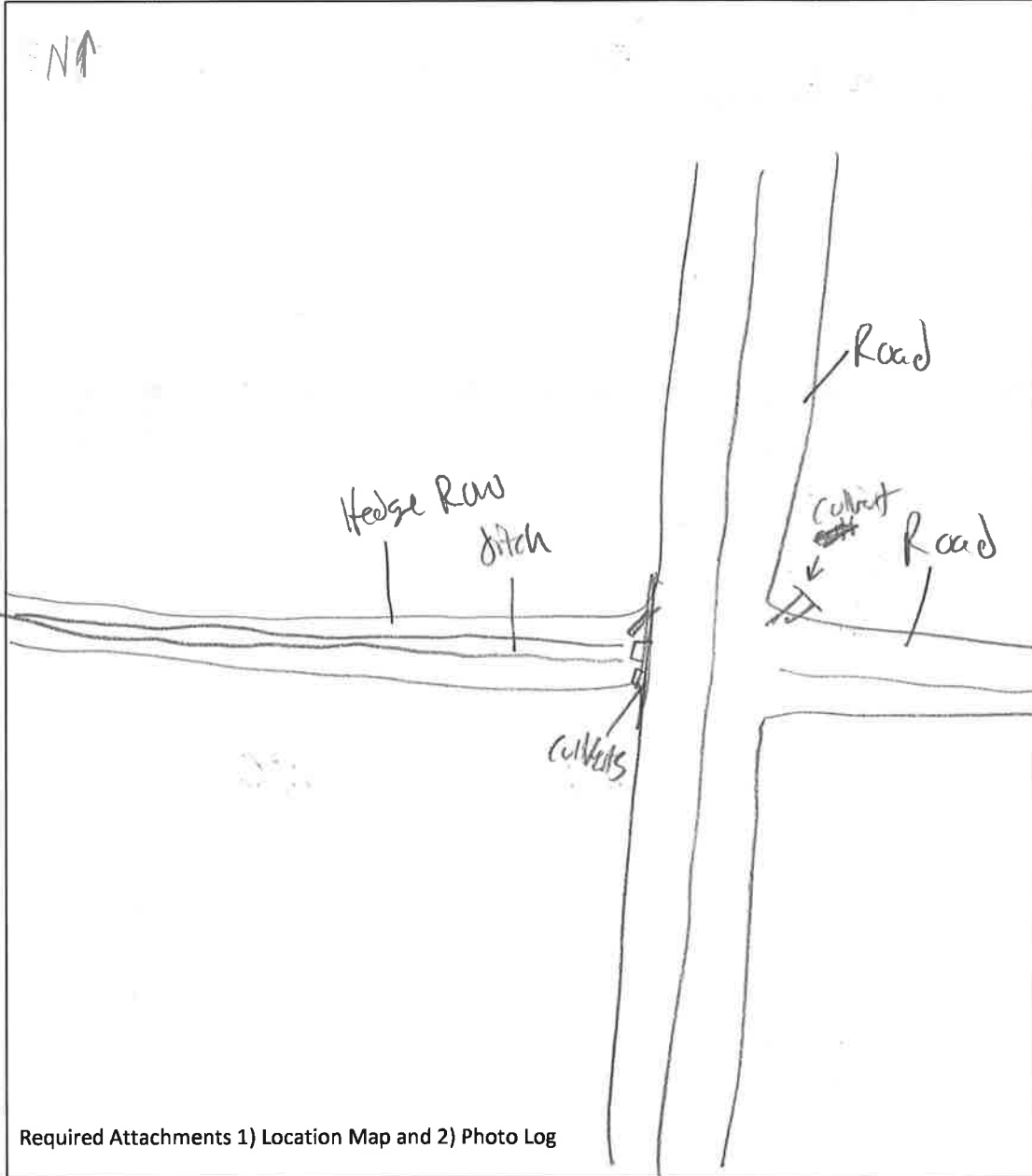
Max Depth (cm): Riffle 5cm Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40:979656 Longitude (DD.DDDD): -83.685334
 Stream Name: Aurand Run / Unnamed Ditch Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 30x2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

no mussels - dry in most places
 After Oct. 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 1.42 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel _____ Bedrock _____ Detritus _____ Silt 20
 Cobble _____ Sand _____ Hardpan _____ Muck 80 Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 5cm Run _____ Pool _____

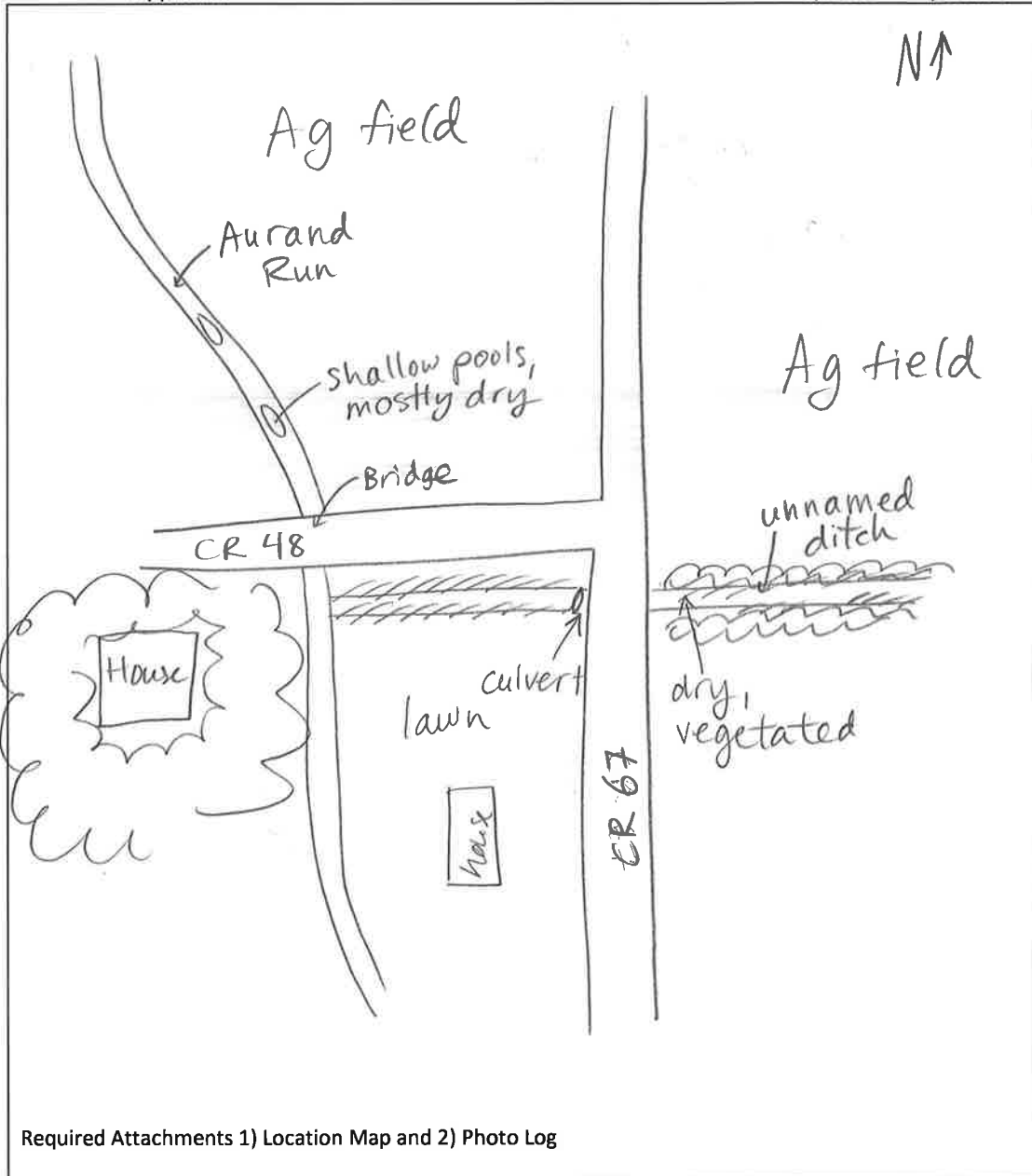
Max Depth (cm): Riffle 10cm Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None
- Mussel Shell Only - Subfossil
- Mussel Shell Only - Weathered Dead
- Mussel Shell Only - Fresh Dead
- Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.985178 Longitude (DD.DDDD): -83.692066
 Stream Name: Aurand Run Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 30 x 2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

After Oct 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 4.56 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel 20 Bedrock _____ Detritus _____ Silt _____
 Cobble 20 Sand _____ Hardpan _____ Muck 60 Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 5cm Run _____ Pool _____

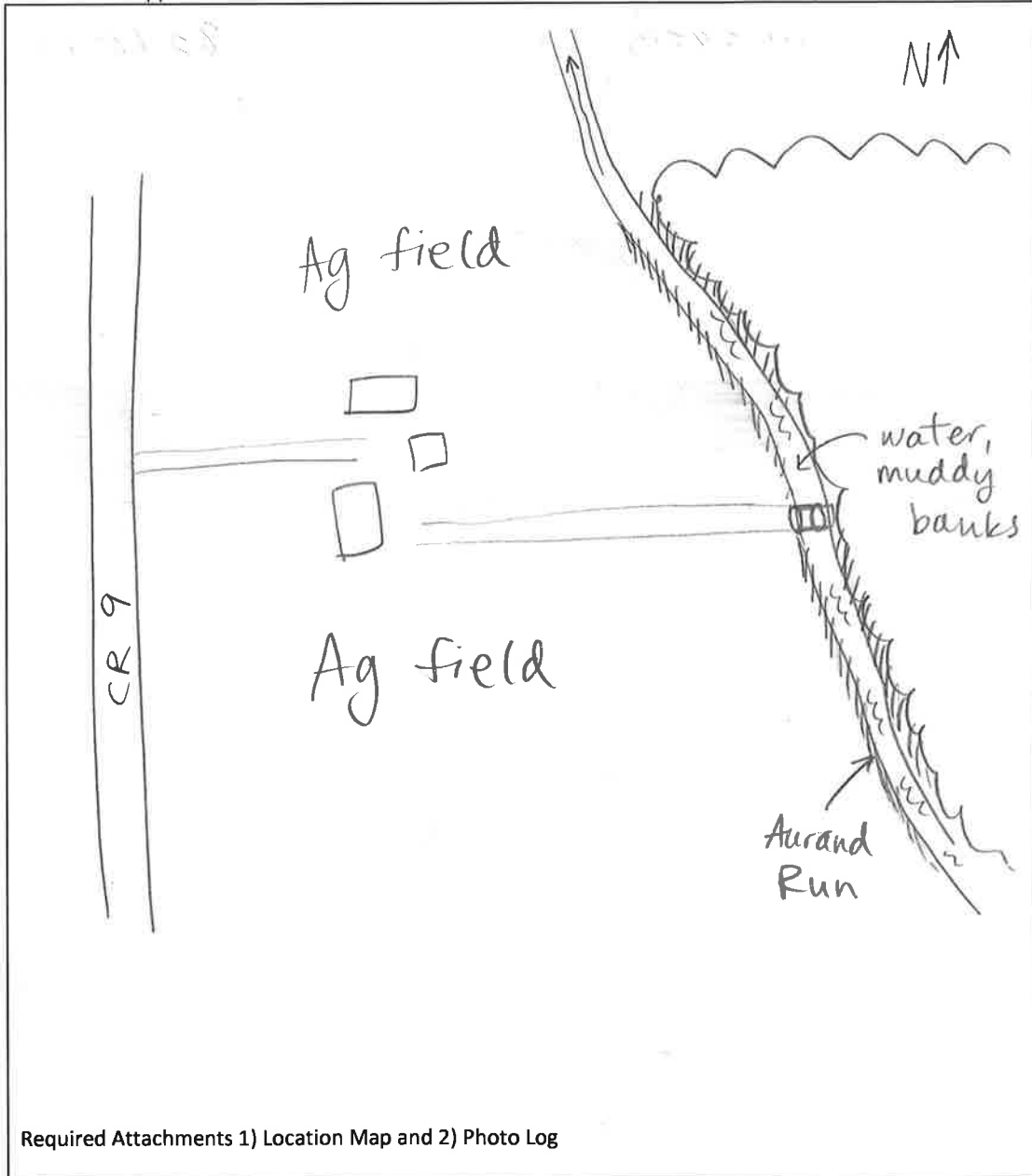
Max Depth (cm): Riffle 20cm Run _____ Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None
- Mussel Shell Only - Subfossil
- Mussel Shell Only - Weathered Dead
- Mussel Shell Only - Fresh Dead
- Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Eagle
 Latitude (DD.DDDD): 40.990270 Longitude (DD.DDDD): -83.695834
 Stream Name: Aurand Run Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 42 x 2 Scientific Collector's Permit Number(s): 70-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

- Stonecast matton visible in pool
 - Shell fragments found downstream - weathered P. grandis
 - too turbid to search under bridge + in deep pools

After Oct. 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 4.89 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel _____ Bedrock _____ Detritus 10 Silt 20
 Cobble 30 Sand _____ Hardpan _____ Muck 40 Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle _____ Run 10 Pool 20

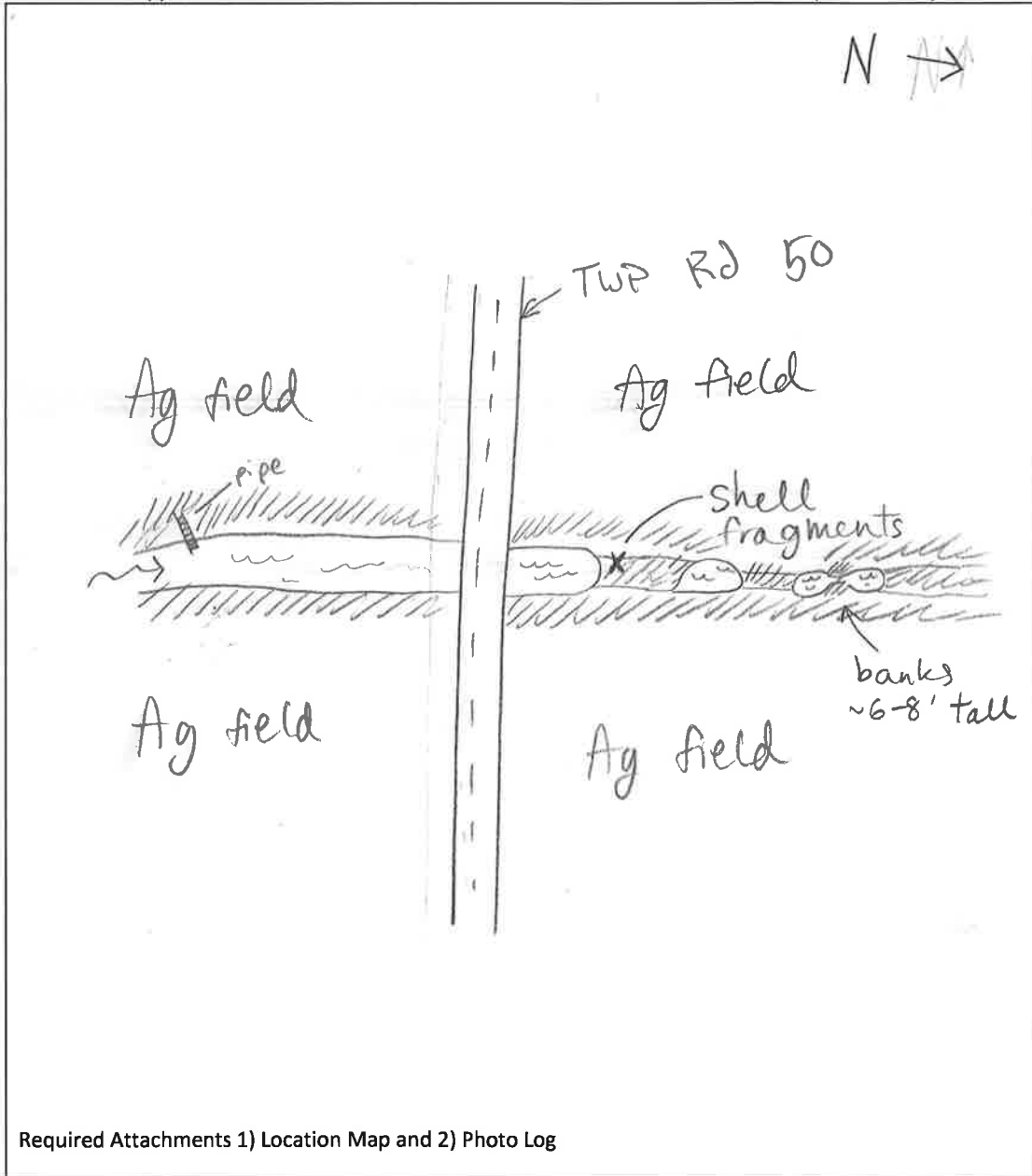
Max Depth (cm): Riffle _____ Run 20 Pool 40

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



P. grandis x2

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Liberty
 Latitude (DD.DDDD): 40.997207 Longitude (DD.DDDD): -83.696719
 Stream Name: Aurant Run Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 400
 Total Survey Time (min. x people): 20 x 2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

After Oct. 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 5.18 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel 15 Bedrock _____ Detritus _____ Silt 30
 Cobble 15 Sand _____ Hardpan _____ Muck 30 Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle _____ Run 5 Pool _____

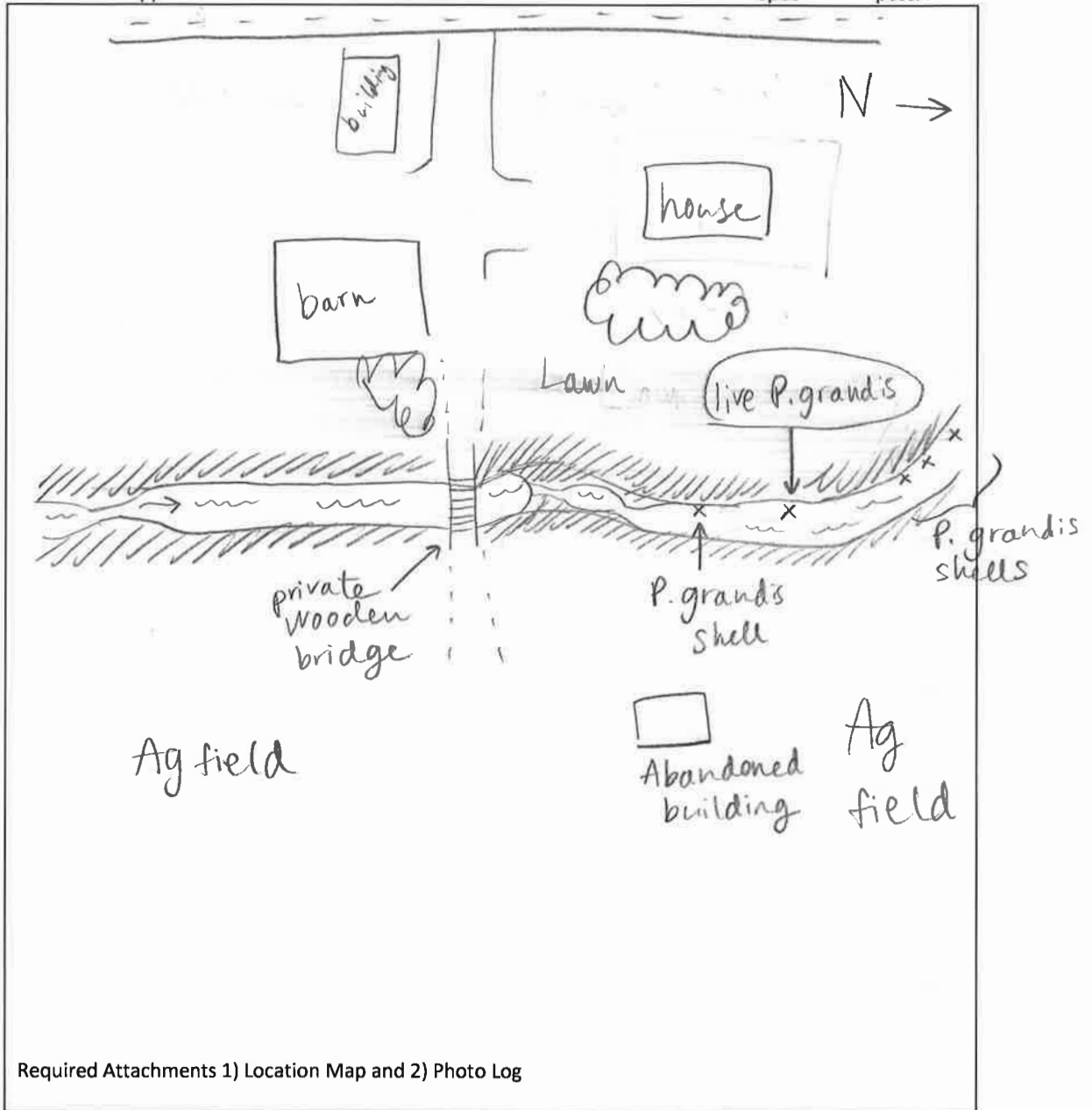
Max Depth (cm): Riffle _____ Run 10 Pool _____

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None
- Mussel Shell Only - Subfossil
- Mussel Shell Only - Weathered Dead
- Mussel Shell Only - Fresh Dead
- Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

dead { Johnny darter x1
Stonecat x3

P. grandis shells x4
Live P. grandis x1

AR5 - Replace Private Bridge

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
 County: Hancock Township: Liberty
 Latitude (DD.DDDD): 41.019381 Longitude (DD.DDDD): -83.688601
 Stream Name: Aurand Run Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): Dan Symonds, Julie Slater
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 10/23/2019 Distance Surveyed (ft.): 600
 Total Survey Time (min. x people): 60 x 2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

After Oct. 1

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 8.22 Water Temp. (°F): 52 Air Temp. (°F): _____

Substrate Types (include %):

Boulder _____ Gravel 50 Bedrock _____ Detritus _____ Silt _____
 Cobble 40 Sand 10 Hardpan _____ Muck _____ Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 25 Run 20 Pool 80

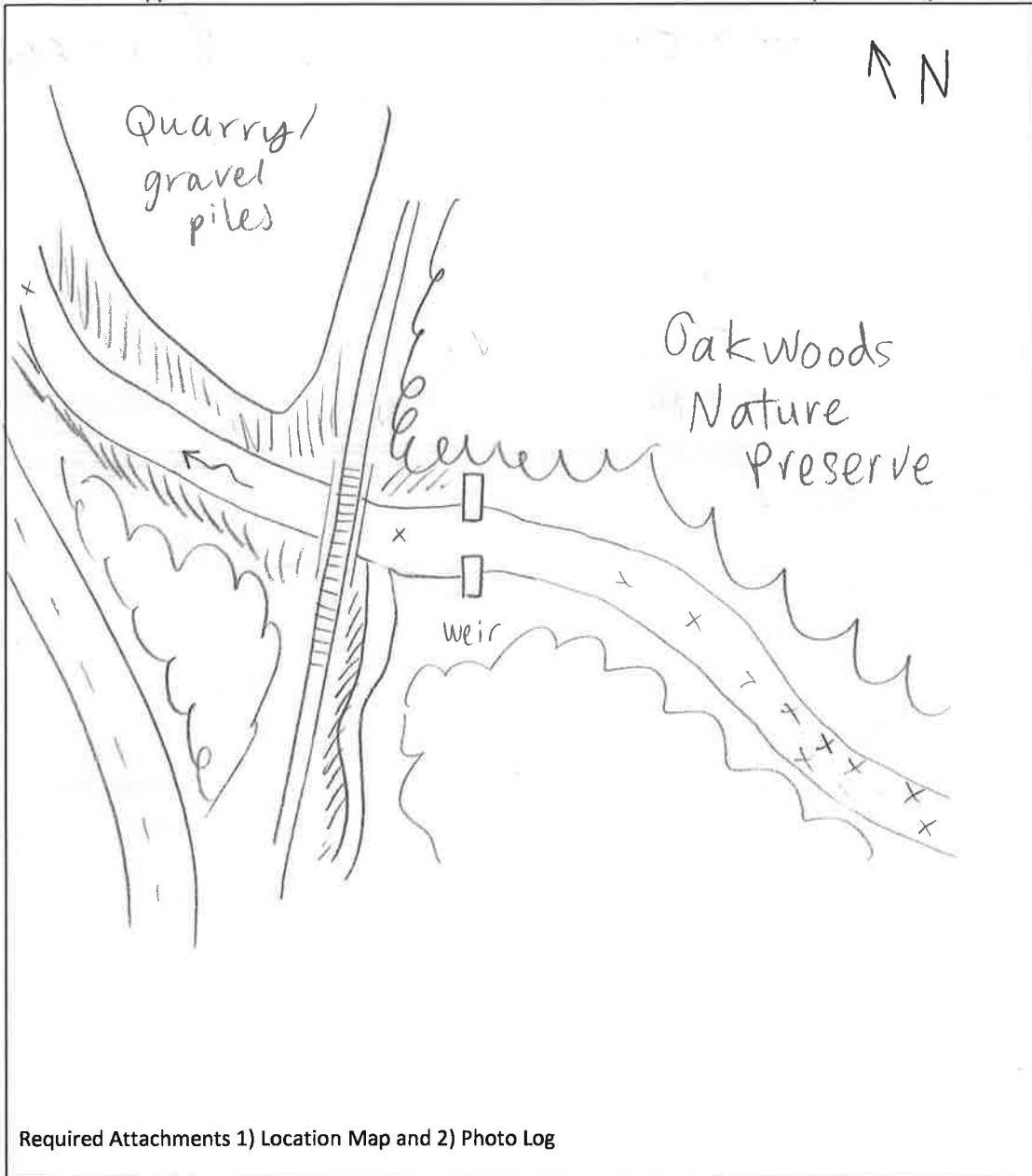
Max Depth (cm): Riffle 40 Run 60 Pool 120

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



P. grandis - IIII IIII

AR 6 - Replace CR 9 Bridge

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Findlay Flood Basin Mussel Recon
County: Hancock Township: Liberty
Latitude (DD.DDDD): 41.023843 Longitude (DD.DDDD): -83.698351
Stream Name: Aurand Run Group # (From Appendix A): unlisted

Methods

Name of Surveyor(s): D. Symonds, J. Slater
Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
Date of Survey: 10/23/2019 Distance Surveyed (ft.): 300
Total Survey Time (min. x people): 20 x 2 Scientific Collector's Permit Number(s): 20-080

Note any deviations from the Ohio Mussel Habitat Assessment Methods:

aquatic veg blocks view of substrate
After Oct. 1

Habitat Description of Survey Area

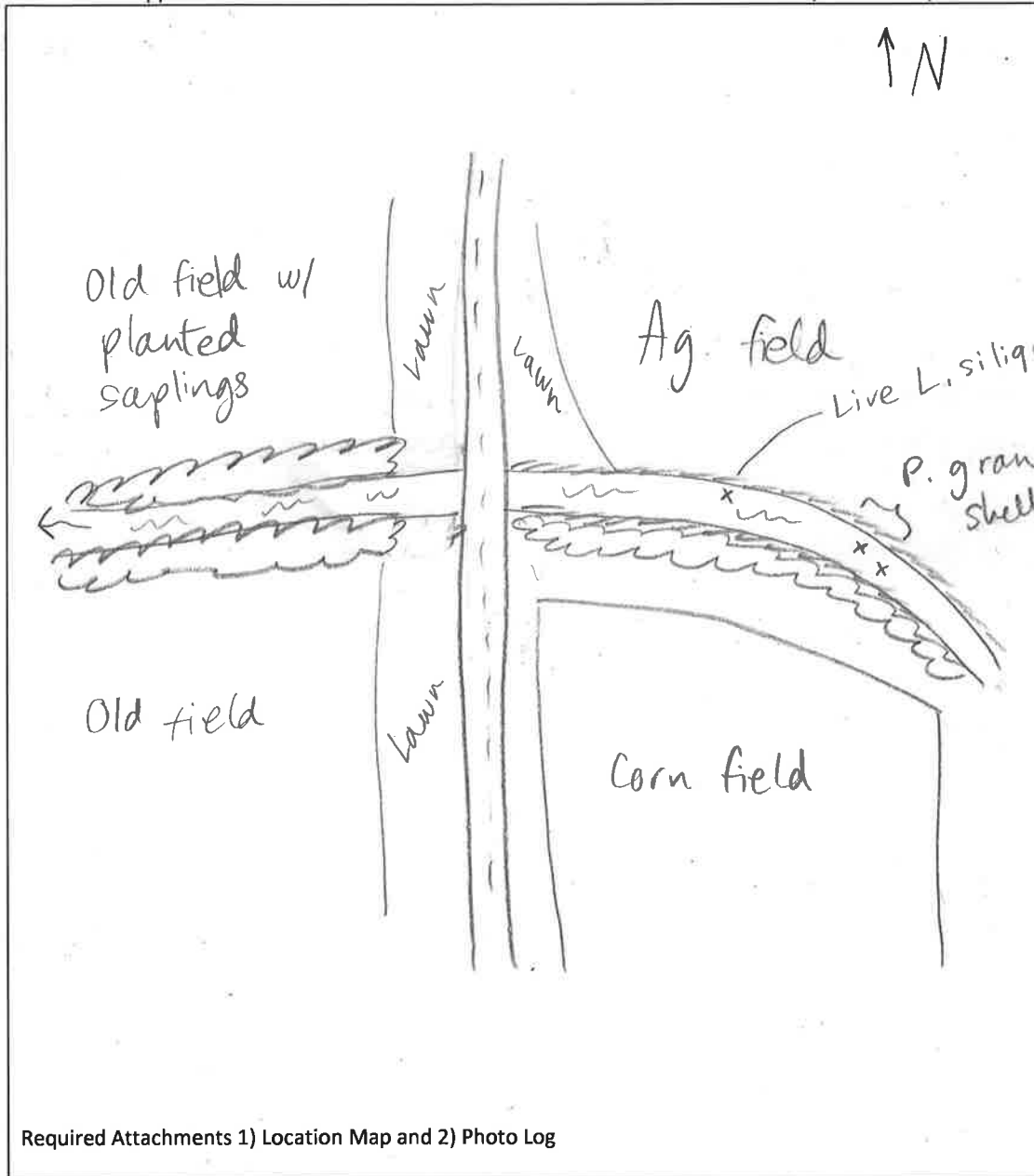
Drainage Area at Survey Location (mi²): 11.4 Water Temp. (°F): 52 Air Temp. (°F): _____
Substrate Types (include %):
 Boulder _____ Gravel 40 Bedrock _____ Detritus _____ Silt _____
 Cobble 40 Sand 20 Hardpan _____ Muck _____ Artificial _____
Water Level: High Up Normal Low Dry/Interstitial
Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom
Average Depth (cm): Riffle 20 Run 30 Pool -
Max Depth (cm): Riffle 30 Run 50 Pool -

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

- P. grandis - 11
- Lampsilis siliquoidea - 1