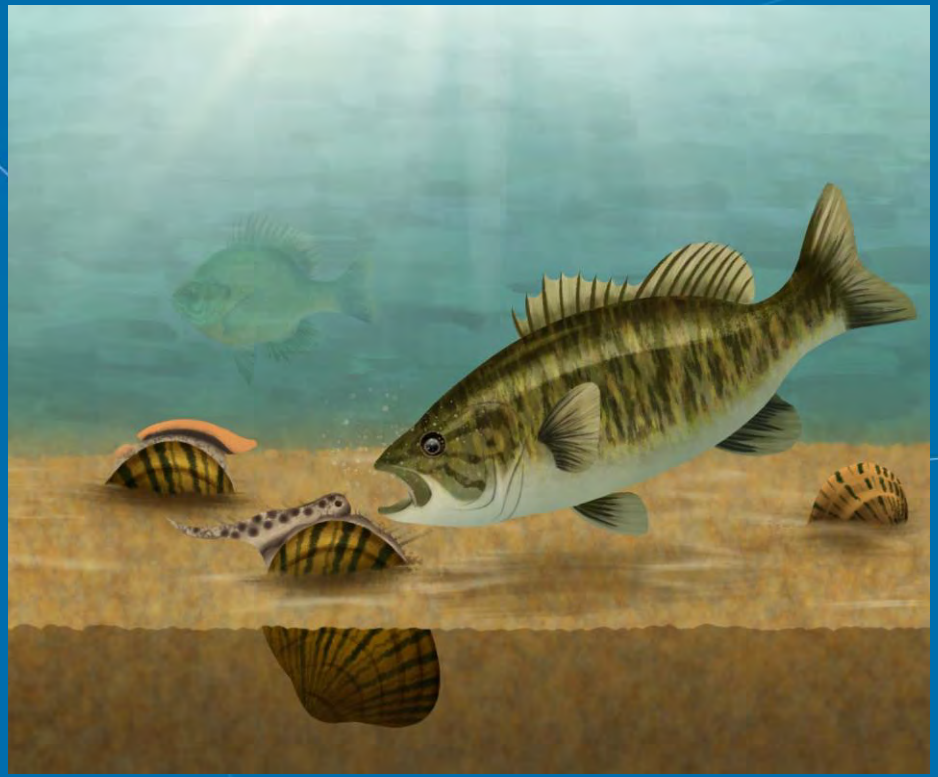
Huron River Watershed Council



Creating a Citizen Science Freshwater Mussel Monitoring Program in the Huron River Watershed

Dr. Paul Steen,
Huron River Watershed Council,
MiCorps Stream Program Manager

Acknowledgement: Amani Tolin, University of Michigan, HRWC Summer Intern, ASTI Environmental

Freshwater Mussels (Unionidae)

Food for Predators
Muskrats, raccoons, salamanders, fish

Habitat Quality Indicators
Sensitivity to pollution & habitat change

Filter Feeders
Algae, bacteria, organic matter

Macroinvertebrate Habitat
Serve as stable substrate

Fish Host Interactions
Life history & reproductive strategies

Mussels are susceptible to the threats we put on aquatic systems

31 of Michigan's 43 known species are listed as threatened, endangered, or special concern!!!

Threats include:

Overharvesting	Collected for decorative industries like buttons and freshwater pearls
Dams	Prevent spread of host fish species
Exotic species	Competition with zebra mussels, asian clams, quagga mussels
Pollution	Pesticides, poison for lamprey control & excessive siltation
Parasites	Worms, watermites, bitterlings
Climate Change	Impacts on temperature and stream hydrology
Stream Alteration	Flow, temperature, hydrology, substrate

People don’t know freshwater mussels

- Not seen or appreciated; unknown or forgotten by normal people and scientists alike.
- Legal protections on mussels make them difficult to study.
- Relatively hard to identify (as compared to fish or macroinvertebrates)
- Experts themselves are a rare breed… “musselheads”. Many are close to retirement.

Action is needed now

- Highly threatened mussel populations… the round hickorynut was federally listed just this year. Will keep happening.
- Water groups who already do macroinvertebrate studies are uniquely suited to teach people about mussels.
- Inspire the next generation
- HRWC ran a pilot project in the summer of 2023 to feel out the possibilities.

Conservation Efforts

01

Dam removal

Facilitate fish host movement

02

Relocation

Move threatened populations

03

Riparian buffers

Reduce input of pollution & siltation

05

Exotic species control

Prevent spread of zebra mussels

06

Fish host preservation

Protect fish host populations

07

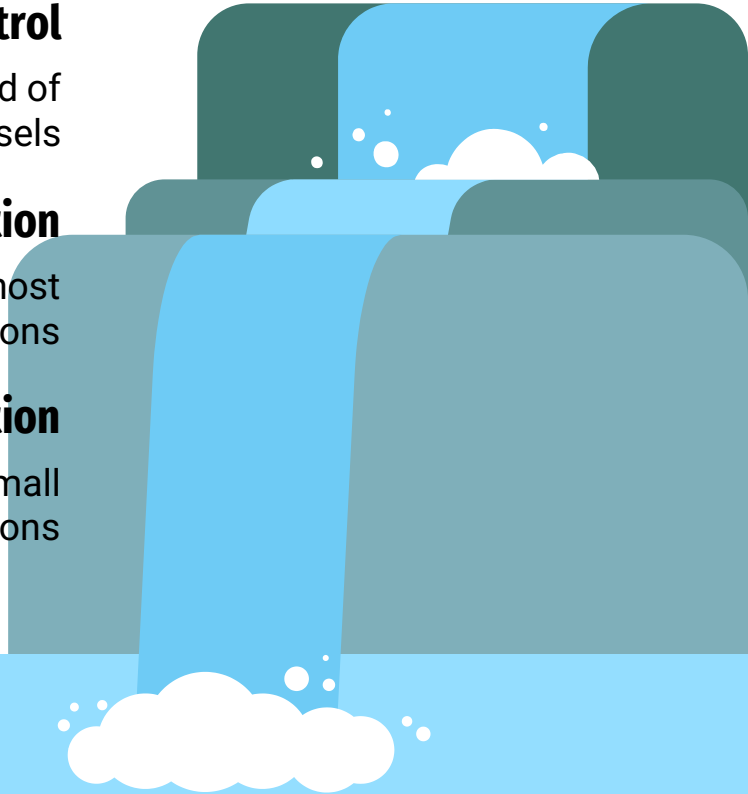
Lab propagation

Help augment small populations

08

Monitoring

Assess mussel distributions & status



How do we proceed?

01 Legal Requirements

02 Designing Survey Protocol

03 Creating Educational Materials

04 Get out there and try it

05 We have data; now what?

01 Legal Requirements

3 Different Permit Types

1

State Special Concern

Collector's Permit - MDNR

2

State Listed

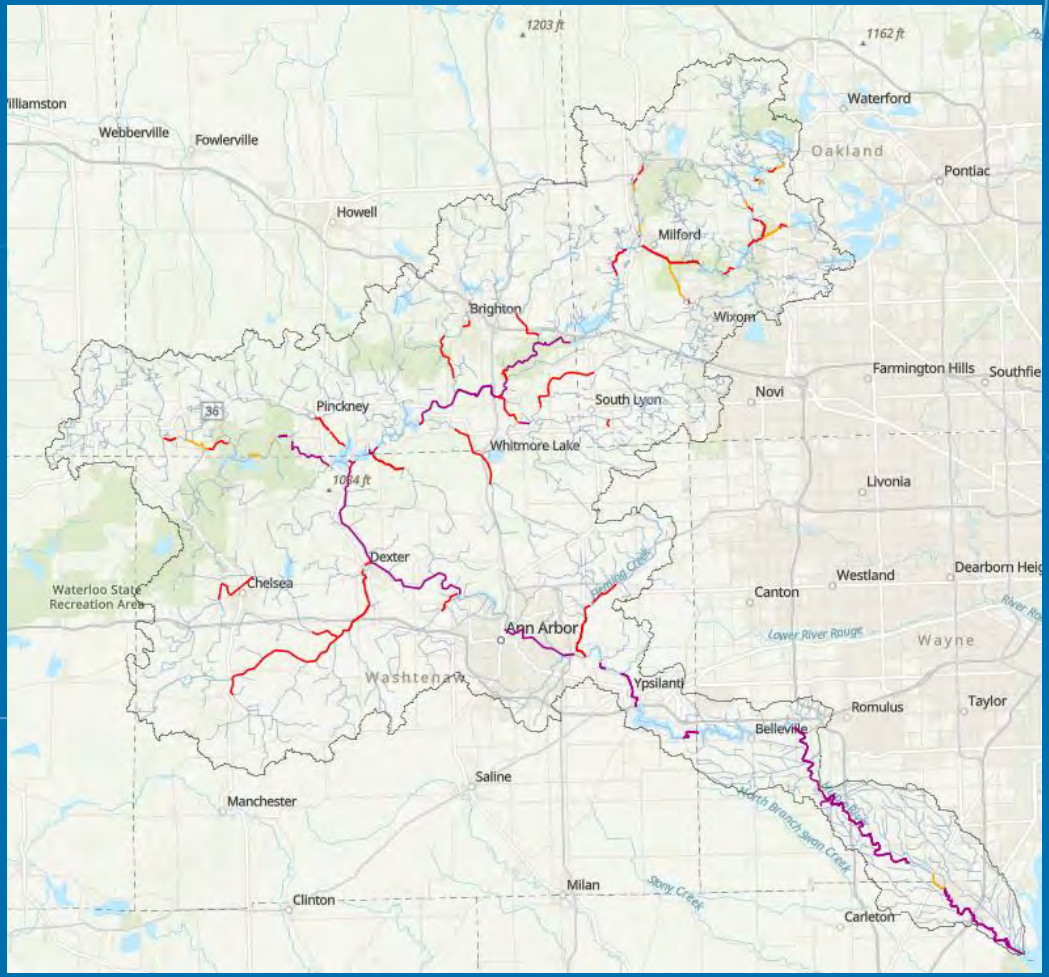
State T/E Permit - MDNR

3

Federally Listed

Federal T/E Permit - USFWS

All 3 permits allow for volunteers to participate– if the permit holder is there overseeing the work.



02 Designing a Survey Protocol

1. Note site info
2. **Search for and collect mussels**
3. Identify mussels
4. Take photos and record
5. Return mussels to water

Appendix B. Mussel Survey Report Form

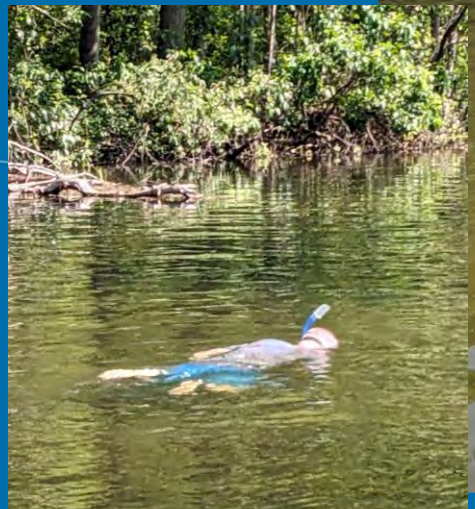
Date:	Site and Stream Name:	GPS Coordinates:
Survey Leaders:		

Site Information:

Stream Max Depth:	Water Flow Speed:	Water Temperature:	Substrate Type:
% Flowering Plants:	% Fruiting Plants:	6 plant species present:	

Survey Results:

Species	# of Alive Adults	# of Alive Juveniles	# of Dead Shells	Notes



MI Freshwater Mussel Survey Protocol

"Reconnaissance Survey"

Vs.

Semi-quantitative or quantitative

https://mnfi.anr.msu.edu/pdfs/MI_Freshwater_Mussel_Survey_Protocol_May_2021_V3.pdf

Michigan Freshwater Mussel Survey Protocols and Relocation Procedures for Rivers and Streams

May 2021, Version 3

Scott Hanshue – Michigan Department of Natural Resources

Joseph Rathbun – Michigan Department of EnvironmentalQuality

Peter Badra- Michigan Natural Features Inventory

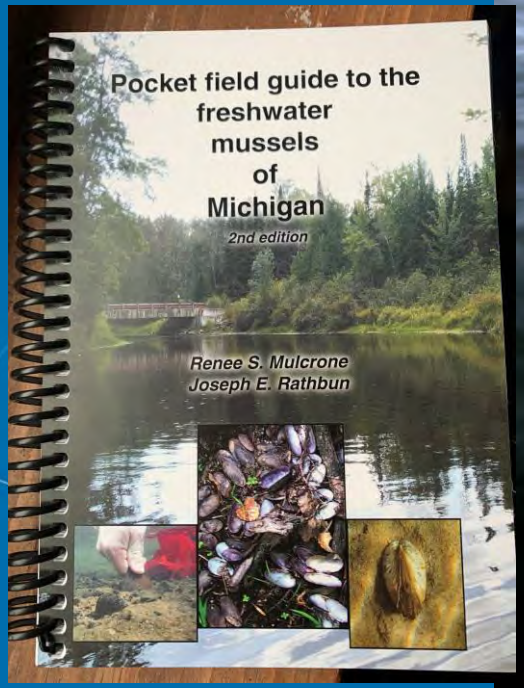
James Bettaso, Barbara Hosler, Jessica Pruden – U.S. Fish and Wildlife Service

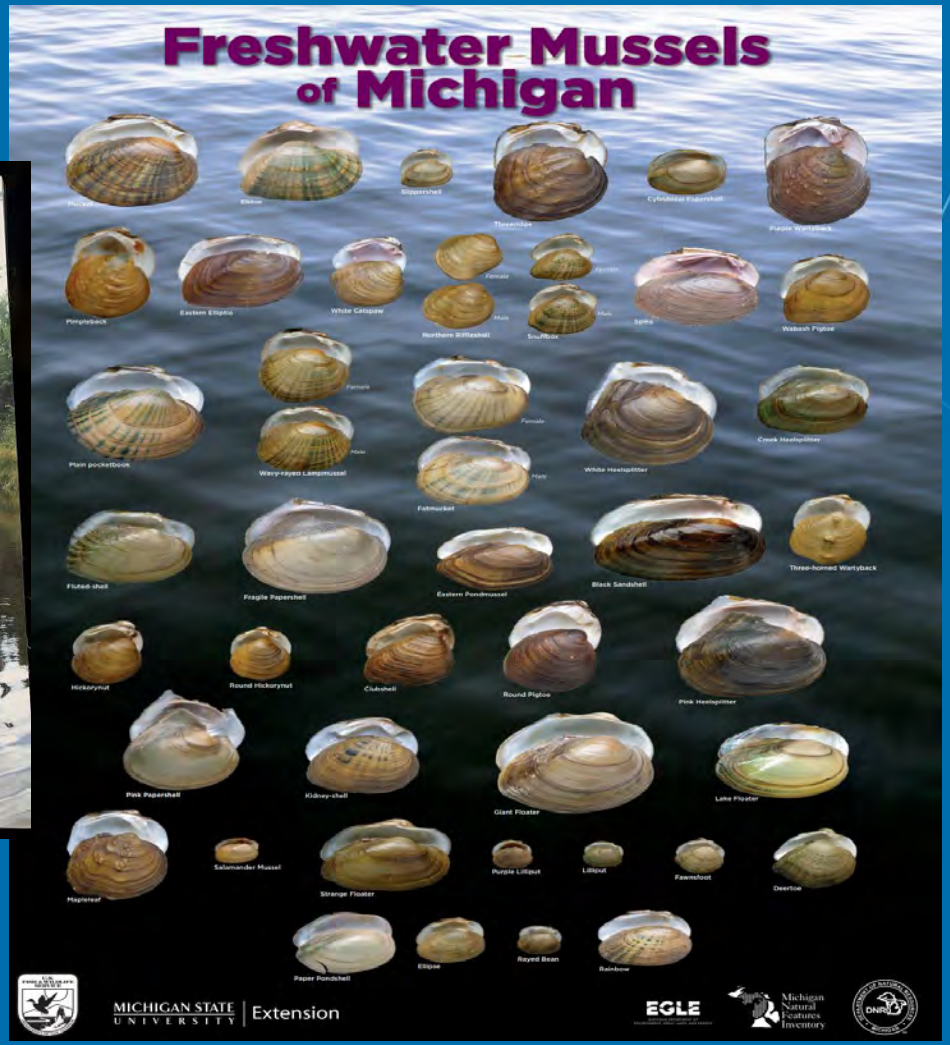
Jeffery Grabarkiewicz – Michigan Department of Transportation

03 Creating Educational Materials

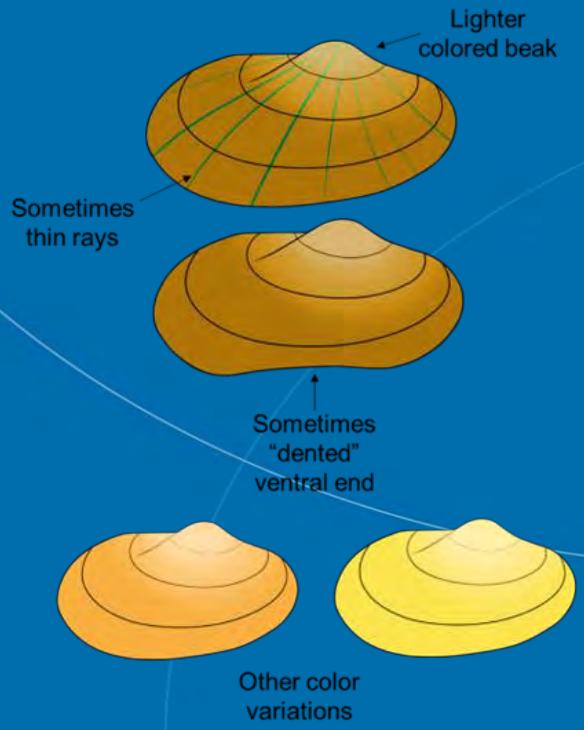
Protocol

1. Note site info
2. Search for and collect mussels
3. **Identify mussels**
4. Take photos and record
5. Return mussels to water

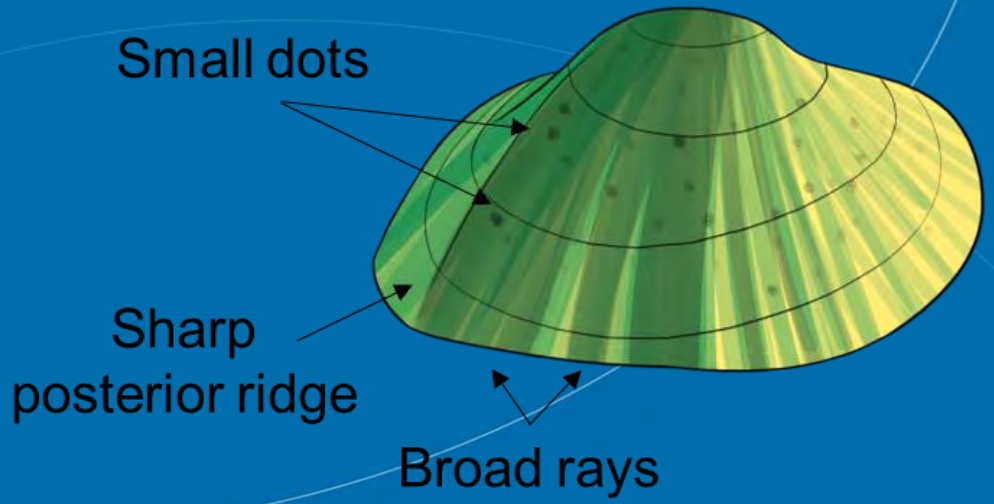




Illustrations for a Huron specific guide

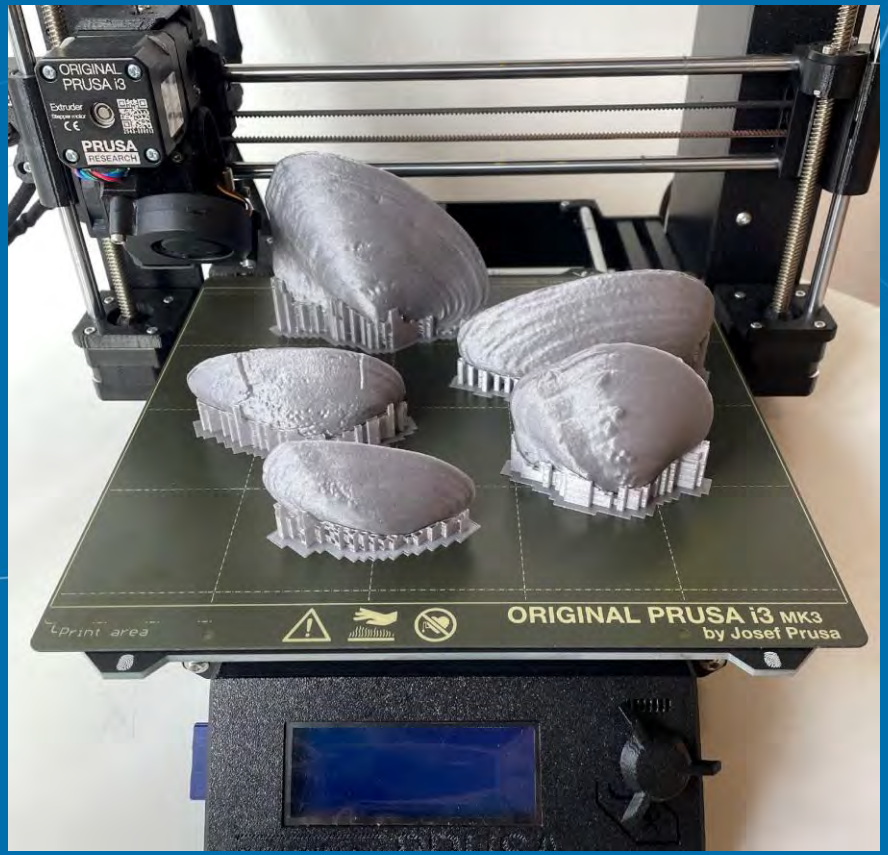


Cylindrical papershell, *Anodontoides ferussacianus*



Elktoe, *Alasmidonta marginata* (Special Concern)

Creation of 3D printed mussels



03

Creating Educational Materials

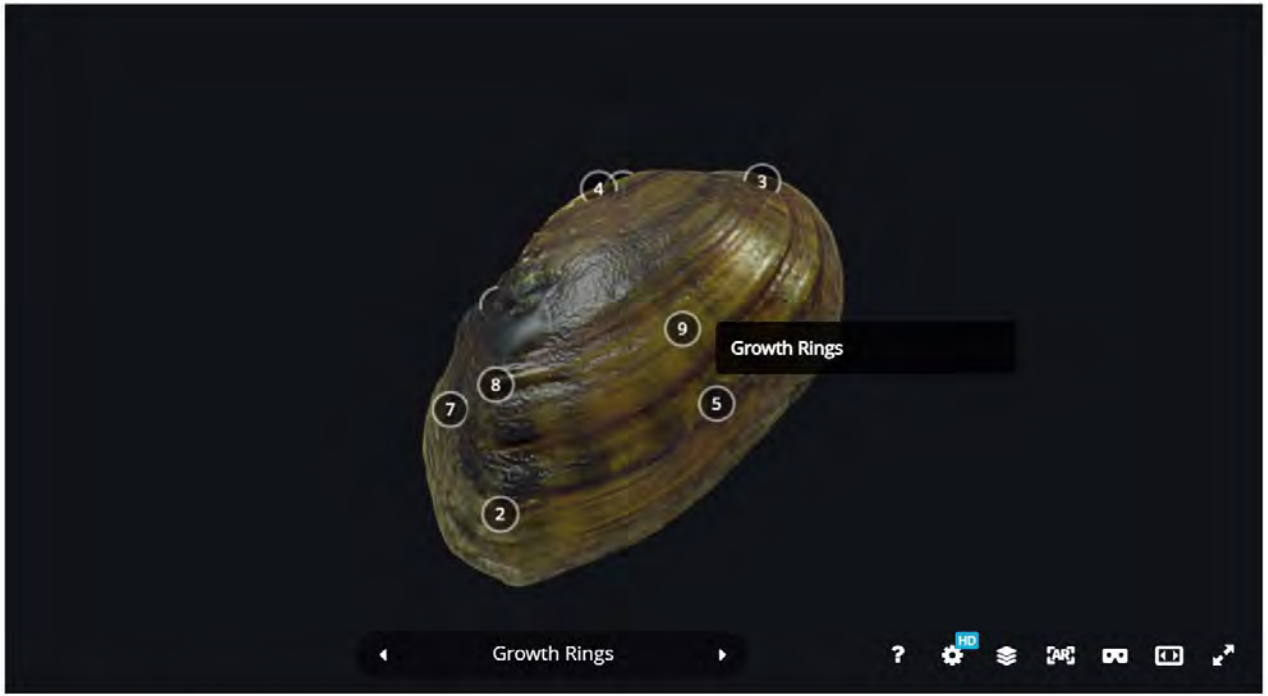
Creation of 3D printed mussels

03

Creating Educational Materials

Scans put online and annotated

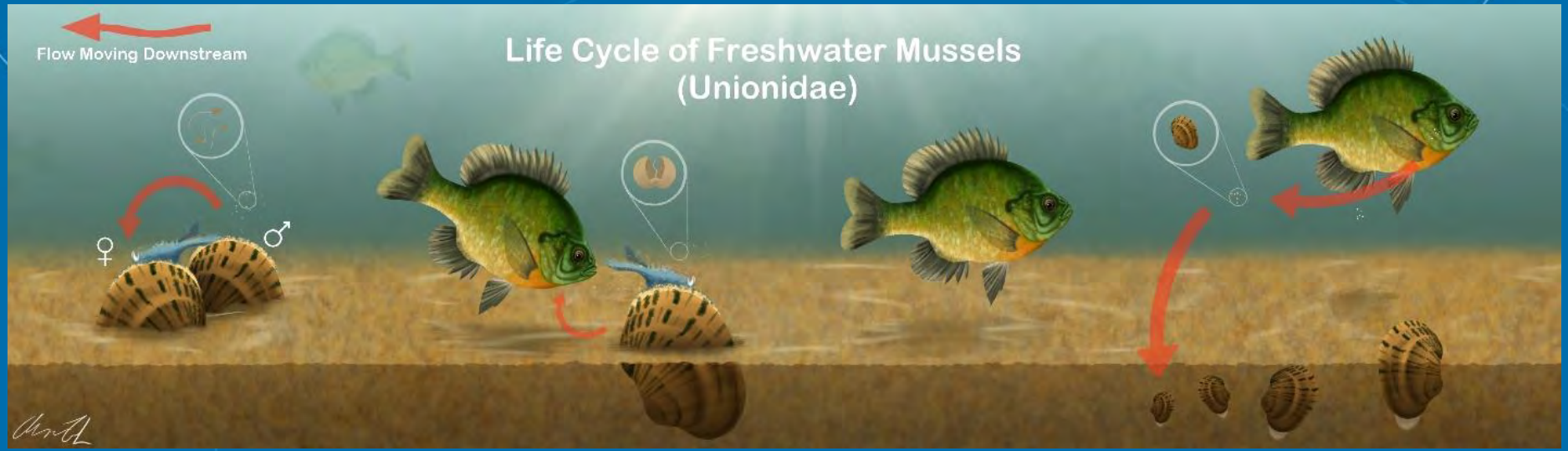
- https://sketchfab.com/atolin/collections/freshwater-mussels-of-the-huron-river-mi-e9de9db859c64b3297d3348461bcf9fd



Email me to ask for link

psteen@hrwc.org

Mural


Flow Moving Downstream
Life Cycle of Freshwater Mussels
(Unionidae)
♀
♂

04 Get out there and try it

- For its pilot year, HRWC planned on going out each Tuesday morning from June through August.

- Due to weather and staff summer vacations, we had 7 trips.
- All of the sites required either Permit level 1 or 2 (not 3).
- We mixed up the people involved each week
    - Staff only (first time)
    - College aged summer interns
    - Parents/ kids
    - Retired folk

- Did we find mussels? YES! And… NOT ALWAYS!

04 Get out there and try it

04

Get out there and try it

Sometimes, the data we get is “no data”

05 We have data; now what?

Possibilities:

- Mussel abundance and species distribution
- Habitat and species modeling
- Evidence of T/E species where not previously observed
- Data informs where restoration efforts have worked or are needed
- Follow-up studies on relocation efforts
- Participate in updating the MNFI online map

We need to get the HRWC data into some type of a statewide mussel database

Can Our Data Be Used to Improve This Map?

1

State Special Concern

Collector's Permit - MDNR

2

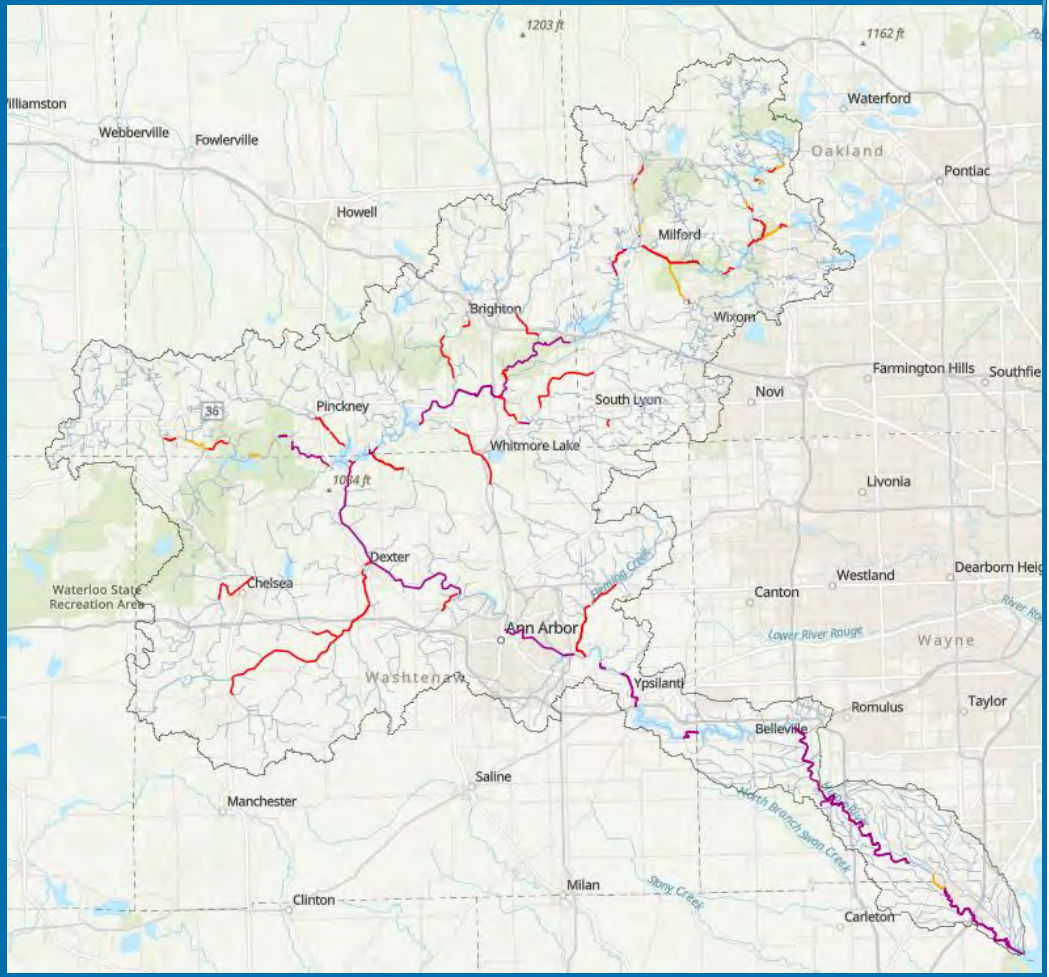
State Listed

State T/E Permit - MDNR

3

Federally Listed

Federal T/E Permit - USFWS



Michigan Natural Features Inventory

Michigan Mussels Web App

About

About

The Michigan Mussels Web App contains federal and state-listed mussel species occurrence by HUC 10 watershed. These mussel records are from the Michigan Natural Features Inventory (MNFI) Heritage Database of rare species and high-quality natural communities and are updated weekly.

Also included are the Mussel Protocol Stream Groups created by Michigan DNR and the USFWS. The group number triggers the type of mussel survey protocols and relocation procedures that must be followed.

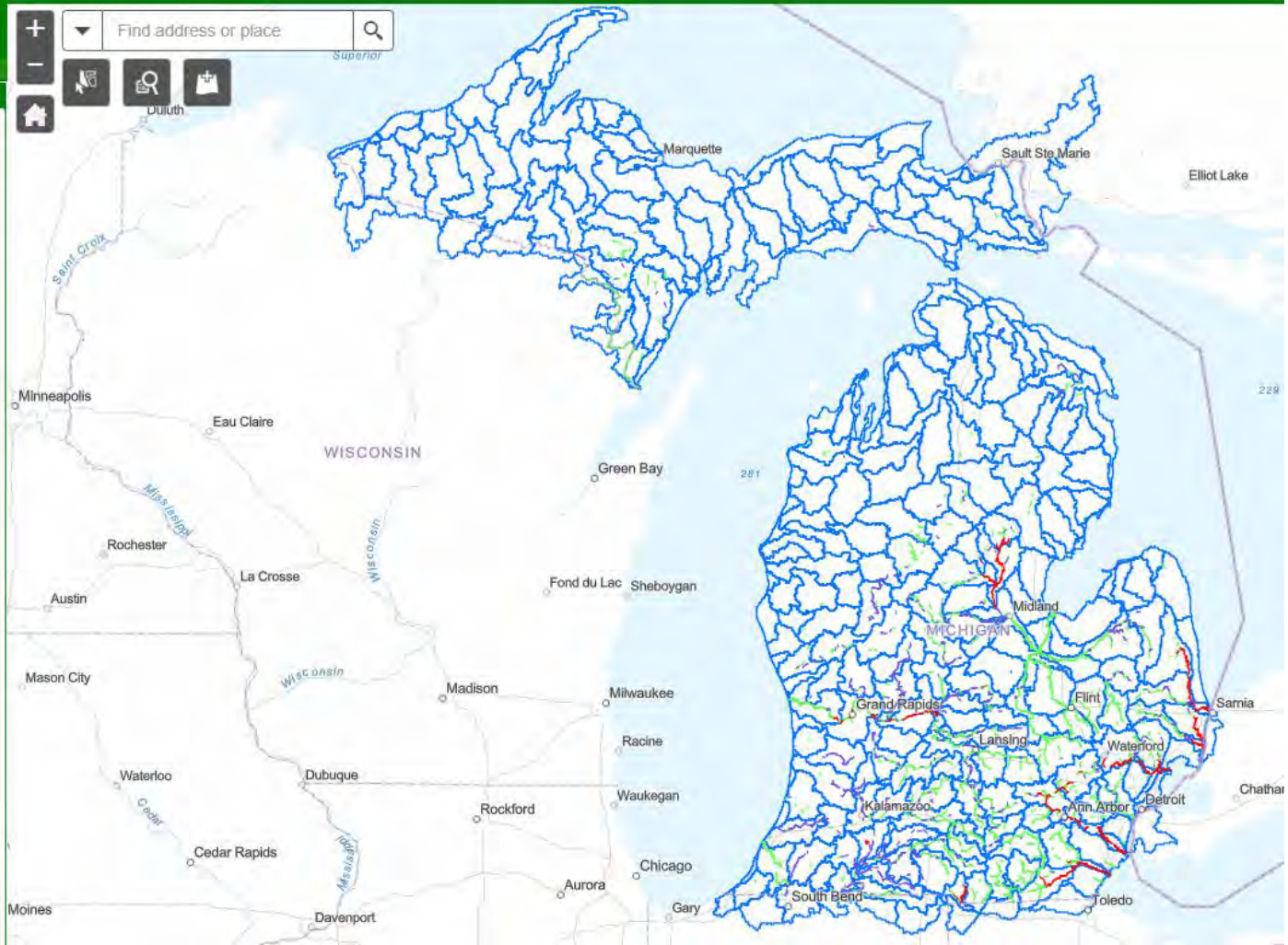
Query mussels by species or common name. In the Query Results tab, click the three horizontal dot menu and select "Show all related records" to view a layer of all the watersheds in which the mussel occurs.

U.S. FISH & WILDLIFE SERVICE

DEPARTMENT OF THE INTERIOR

Michigan Natural Features Inventory

Discover. Define. Deliver.



HRWC's next mussel steps next summer

- Pausing our volunteer reconnaissance surveys
- 180 quantitative transects across a 150 foot river. A permit 3, USFWS experience