

Got Mussels?

Freshwater Mussel Volunteer Survey Program



What kind of mussels are we talking about?

Umm..
Not
these!





And not these
either –
(Saltwater mussels-
yummmmm)

Freshwater mussels!

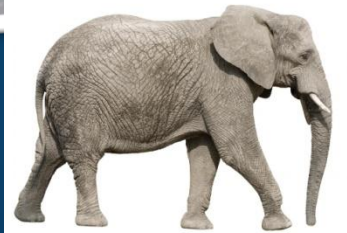
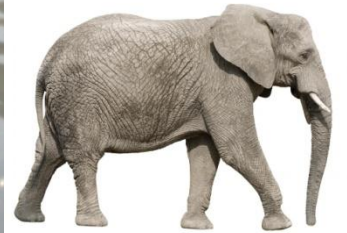
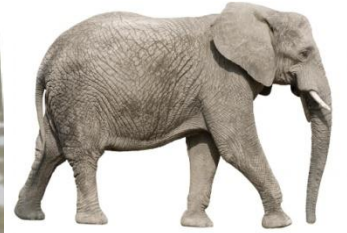
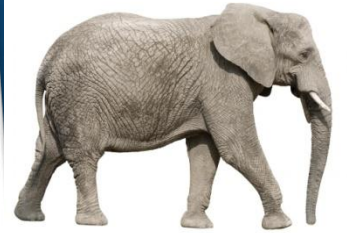
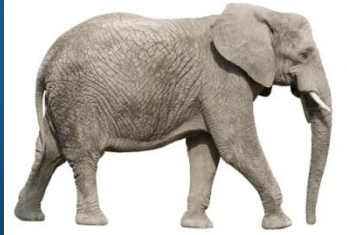
- Bivalves (meaning “2 shells”)
- Some species live 80-100 years!
- Not at all good to eat (unlike their delicious, shorter-lived saltwater cousins).
- Provide incredible eco-services:
 - Water filtration (20+ gallons/day per adult mussel in warm seasons)
 - Streambed erosion prevention
 - Food & Habitat for other animals





Once commonly found in local creeks, rivers and ponds – you may have stepped on one & didn't even know it!

A healthy population of freshwater mussels does the work of a small water filtration plant, capable of removing an estimated 26 metric tons of sediment from a 6-mile stream segment in a single summer season.



It's not hard to see...



...that streams without freshwater mussels are
at a SERIOUS disadvantage.



Slides from Dick Neves, VA Tech

Mussels are in trouble

Patchy, Impaired



Elliptio complanata

Rare



Strophitus undulatus

Endangered



Alasmidonta heterodon

		State Conservation Status		
Scientific Name	Scientific Name	DE	NJ	PA
<i>ALASMIDONTA HETERODON</i>	DWARF WEDGEMUSSEL	Endangered	Endangered	Critically Imperiled
<i>ALASMIDONTA UNDULATA</i>	TRIANGLE FLOATER	Extirpated ?	Threatened	Vulnerable
<i>ALASMIDONTA VARICOSA</i>	BROOK FLOATER	Endangered	Endangered	Imperiled
<i>ANODONTA IMPLICATA</i>	ALEWIFE FLOATER	Extremely Rare	no data	Extirpated ?
<i>ELLIPTIO COMPLANATA</i>	EASTERN ELLIPTIO	common	common	Secure
<i>LAMPSILIS CARIOSA</i>	YELLOW LAMPMUSSEL	Endangered	Threatened	Vulnerable
<i>LAMPSILIS RADIATA</i>	EASTERN LAMPMUSSEL	Endangered	Threatened	Imperiled
<i>LASMIGONA SUBVIRIDIS</i>	GREEN FLOATER	no data	Endangered	Imperiled
<i>LEPTODEA OCHRACEA</i>	TIDEWATER MUCKET	Endangered	Threatened	Extirpated ?
<i>LIGUMIA NASUTA</i>	EASTERN POND MUSSEL	Endangered	Threatened	Critically Imperiled
<i>MARGARITIFERA MARGARITIFERA</i>	EASTERN PEARLSHELL	no data	no data	Imperiled
<i>PYGANODON CATARACTA</i>	EASTERN FLOATER	no data	no data	Vulnerable
<i>STROPHITUS UNDULATUS</i>	SQUAWFOOT	Extremely Rare	Species of Concern	Apparently Secure

So where are they in the Delaware Estuary?



Just as important—
where **AREN'T** they now?

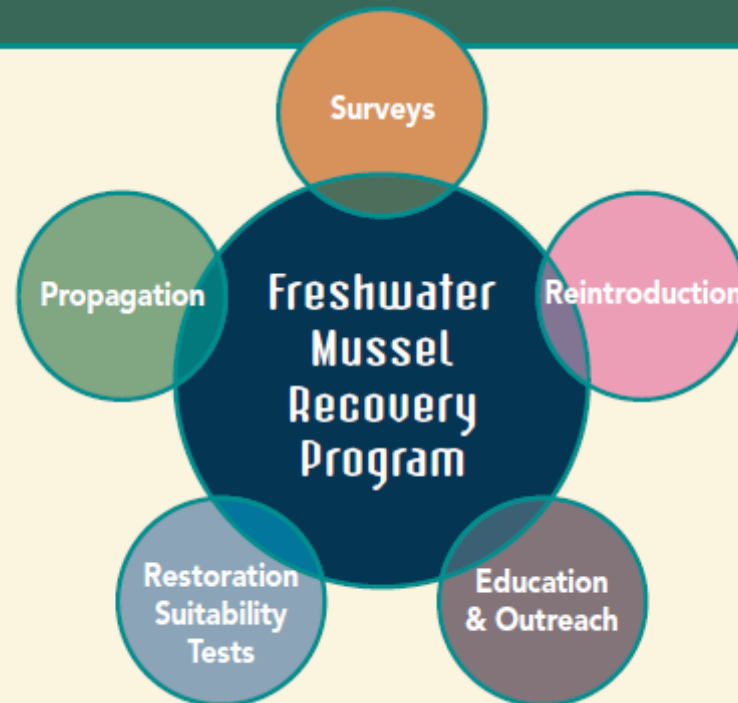
PDE decided to find out...

- Where mussels are and if they are healthy enough to use for brood stock in a hatchery.
- Where they are not, and determine if those stream segments can support a re-introduction of mussels in a future project phase.





The Partnership for the Delaware Estuary (PDE), through a multi-tiered approach, is working to rebuild mussel populations in the Delaware Estuary. With a goal to restore native species in their native waters, PDE aims to rebuild mussel beds that will provide cleaner water for everyone.



PDE and Academy of Natural Science staff found 7 native species in the Delaware River in May 2010 –

3 of which were believed to be extinct in PA!

Then we really got excited...
but how could we possibly survey
the entire watershed?



Enormous watershed
– nearly 6,500 square
miles

Historically home to
12-14 freshwater
mussel species – but
only ONE species is
(somewhat)
commonly found now.

Last in-depth
freshwater mussel
surveying took place
in 1919.



Problem(s):

- Too few scientists
- Too few dollars
- Too many stream miles

Solution:

Show us your mussels...

A call for trained volunteers!!!



Grant Received – EPA, PA CZM & Pilot Program created

- First ever Delaware Estuary Freshwater Mussel Guidebook written and printed.
- 2 Training Workshops scheduled and completed with 2 watershed organization's volunteers.
 - Tookany-Tacony Frankford Watershed Partnership
 - Chester Ridley Crum Watershed Association
- Trained volunteers surveyed all summer & uploaded their photos and data via web portal.
- 5 stream miles DONE in summer 2012!



How to Survey Mussels:

1. Download a data sheet from www.Delawareestuary.org/musselsurvey.
2. Choose a section of creek to survey. Do not trespass on private property. Always walk upstream (against the current), so cloudy water stays behind you.
3. **Fill out Section 1 of the data sheet.** This section is VERY important. If you have a GPS, record a beginning point.
4. Decide what type of search you will do:
 - Shoreline Search** — Most effective when water levels are low. Walk along the shoreline and look for shells that have washed up or were discarded by predators.
 - Wading Survey** — Use polarized sunglasses, or a clear bottomed bucket or plastic container in shallow waters. This method is better than shoreline surveys because you can find live animals more easily.
5. **Look for mussels:** If wading, zig-zag to cover the entire bottom. Mussels may be visible on the stream bottom, or slightly buried in the silt or sand. You may only see a black line, which is the gap between their shells. If you find a mussel, search the area to see if there are any others, since they tend to congregate.

14

6. When removing mussels from the streambed to identify and photograph, be gentle! Note which end is pointing up out of the sand or mud so you can put it back exactly as you found it (see page 10). **Fill out Section 2 of data sheet.**
7. If you have a GPS, record the location. Take 3 pictures of the mussel on a light background (such as the palm of your hand). If you have an empty shell, photograph it inside and out. Record what you see on the data sheet.
8. Return the mussel to where you found it, in as close to 1 as possible with the hinge end down (see page 10). If you have an empty shell, place the mussel on top of sand or mud in slow motion.
9. Record the number of empty shells and live mussels on the data sheet. For empty shells, note if the shell halves are still connected.
10. When you stop surveying, **fill in Section 3 on the data sheet.** Describe the place that you stopped surveying, and if you have a GPS, record an end location and at least 2 pictures of the stream along the length of stream you covered and the amount of time you spent there.
11. Go over the data sheet and make sure you have filled it out before leaving.
12. Upload information from the data sheet and pictures to www.dela.gov or give it to your coordinating organization. Be sure to use the data sheets for searches that did not turn up any mussels or shells to help target streams in need of mussel restoration.



Freshwater Mussels of the Delaware Estuary




Identification Guide & Volunteer Survey Guidebook

Project Product – The first ever Delaware Estuary Freshwater Mussel Guidebook!

- 24-page, spiral bound, laminated for easy field use.
- Created with input from watershed organizations.

Downloadable data sheets & web portal to upload survey findings-also tested with watershed volunteer groups.

Freshwater Mussel Survey Data Sheets



Section 1: Survey Summary

Please complete 1 data sheet per location and survey day

Date:	Time start:
Names of participants:	Organization (if one):
My/our experience mussel surveying is: <input type="checkbox"/> I'm new at this <input type="checkbox"/> I've done it 2-5 times <input type="checkbox"/> I dream of mussels I do this so often Phone # / E-mail:	Weather (e.g. cloudiness, wind): Air Temperature (°F): Water Condition (e.g. clear, cloudy):
Technique In stream: _____ Snorkel (underwater): _____	
Please provide names and description to help us find the streams, other): _____ _____ _____	
Latitude: _____ Longitude: _____ _____ _____	





TTF

2 Pilot WORKSHOPS

Goal – train 20 volunteers

80 attended workshops!

160 volunteers surveyed
throughout the summer!



CRC

CRC Field Training



Ridley Creek State Park
Found LOTS of Elliptios
(common)

Younger volunteers found
the MOST! (and squealed
the loudest)

TTF Field Training

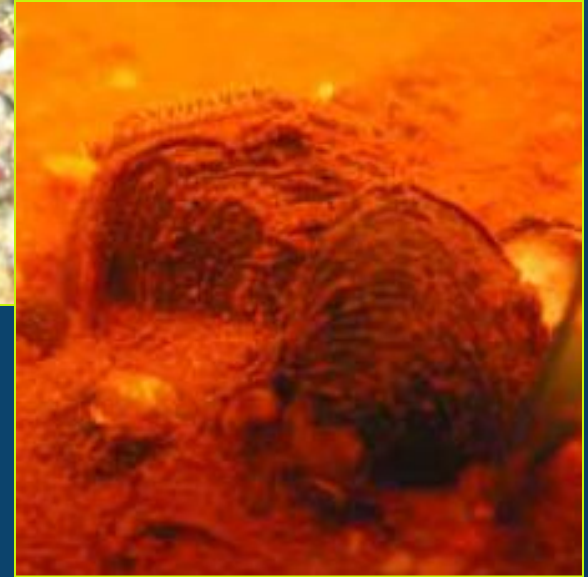


**Rock Creek (Tacony
Creek tributary)**

**ZERO mussels found
– so this is a stream
where they are not!**



The mussels we are
looking for-
Not always easy to spot!



Invasive (non-native)
freshwater clams – We
found LOTS of these!



Next Steps

- Get other watershed organizations involved and seek grant funds to train new volunteer groups.
- Analyze data – both volunteer and scientific.
- Continue hatchery work.
- Determine best streams for restoration of freshwater mussel species.
- Reintroduce native mussels to their native waters.





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