

Overcoming Propagation and Juvenile Care Bottlenecks for Two Native Freshwater Mussel Species in a Novel Hatchery Setting

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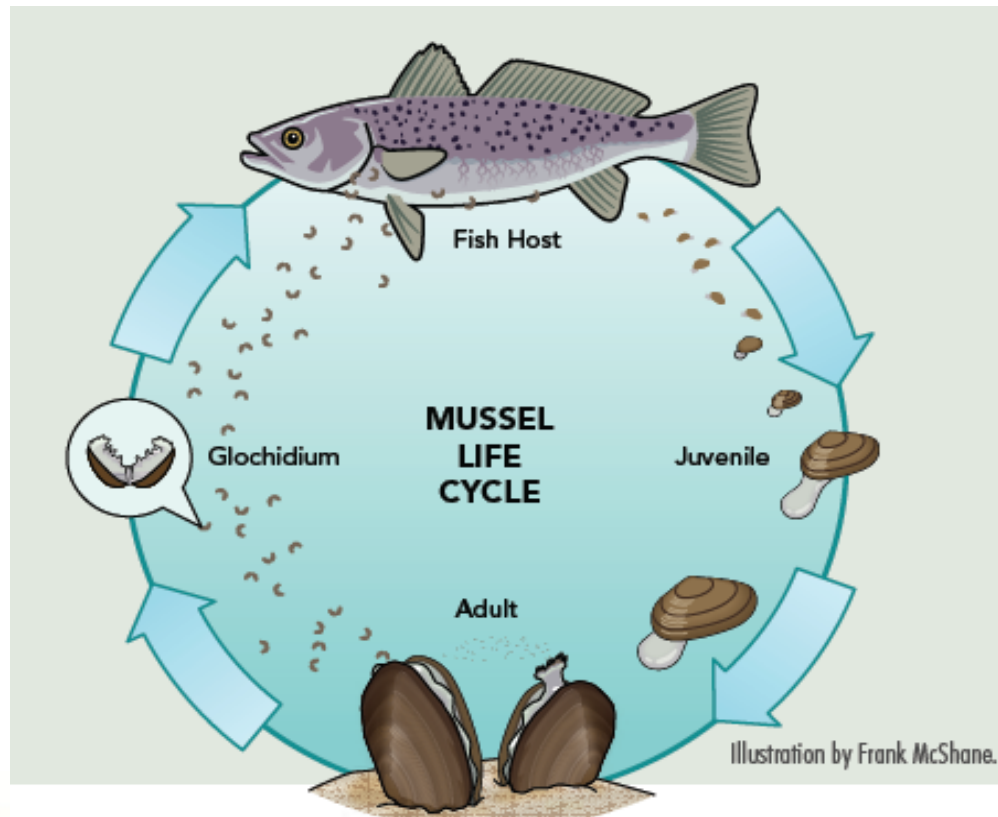
Background – Freshwater Mussels

- Bivalve shellfish
- 981 species worldwide
 - Over 300 species in North America
- Highly imperiled group
 - Habitat degradation
 - Pollutants
 - Fish population declines



Background – Freshwater Mussels

- Larval mussels (glochidia) parasitize fish hosts



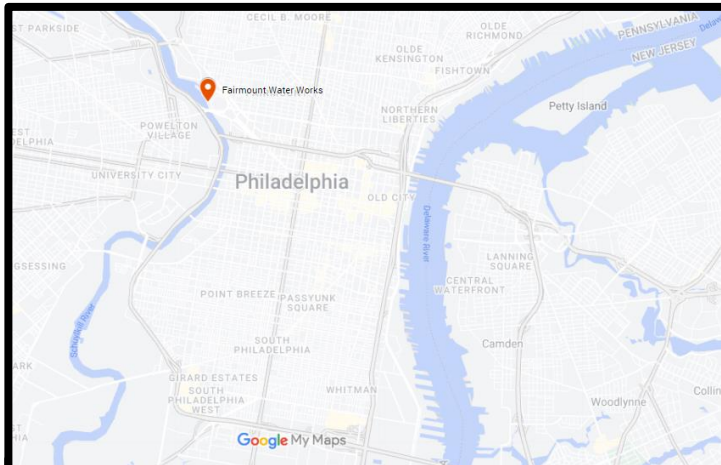
Background – Hatchery Propagation

- Hatcheries enable controlled reproduction of freshwater mussels
- Introduce glochidia to fish hosts
- Juvenile mussels raised in hatchery for 2-3 months
 - Bigger mussels have higher survival once transplanted

Background – Fairmount Water Works Interpretive Center Hatchery

- Demonstration freshwater mussel hatchery
 - Education & Outreach
 - Research & Development
- Operated by the Philadelphia Water Department since 2017
- Three species successfully propagated
 - Alewife Floater (*Utterbackiana implicata*)
 - Eastern Pondmussel (*Sagittunio nasutus*)
 - Eastern Elliptio (*Elliptio complanata*)

Background – Fairmount Water Works Interpretive Center Hatchery



Target Species for 2022

- Eastern Elliptio (*Elliptio complanata*)
 - Most abundant species in Delaware River Basin
 - High water quality uplift ecosystem services
 - No previous propagation success
- Eastern Pondmussel (*Sagittunio nasutus*)
 - Prior propagation successes
 - High survival and growth rates
 - Ideal for system testing



Eastern Elliptio



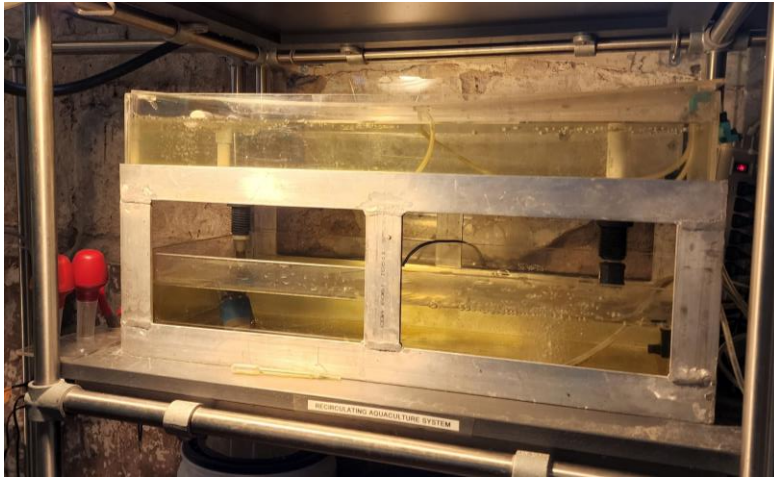
Eastern Pondmussel

2022 Improvements – Fish Host

- Brook Trout (*Salvelinus fontinalis*)
- Trialed as a host fish for *Elliptio complanata*
 - Previous trials used American Eel (*Anguilla rostrata*)

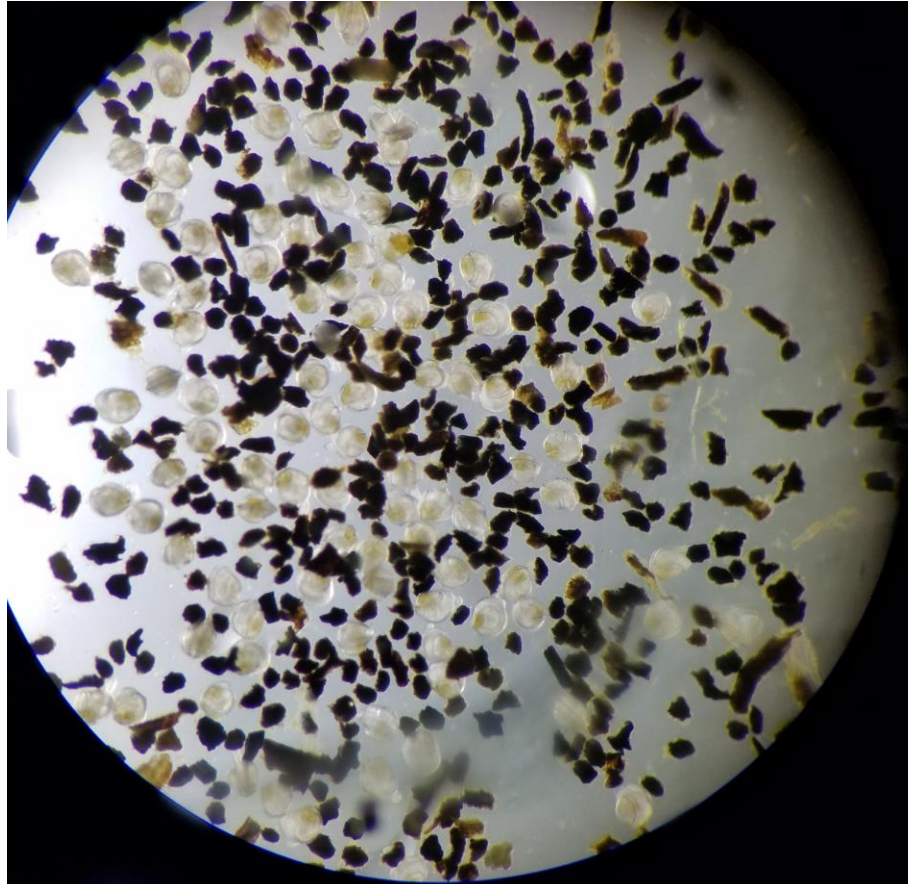


2022 Improvements – Systems



2022 Improvements – Water Source

2022 Improvements – Substrate



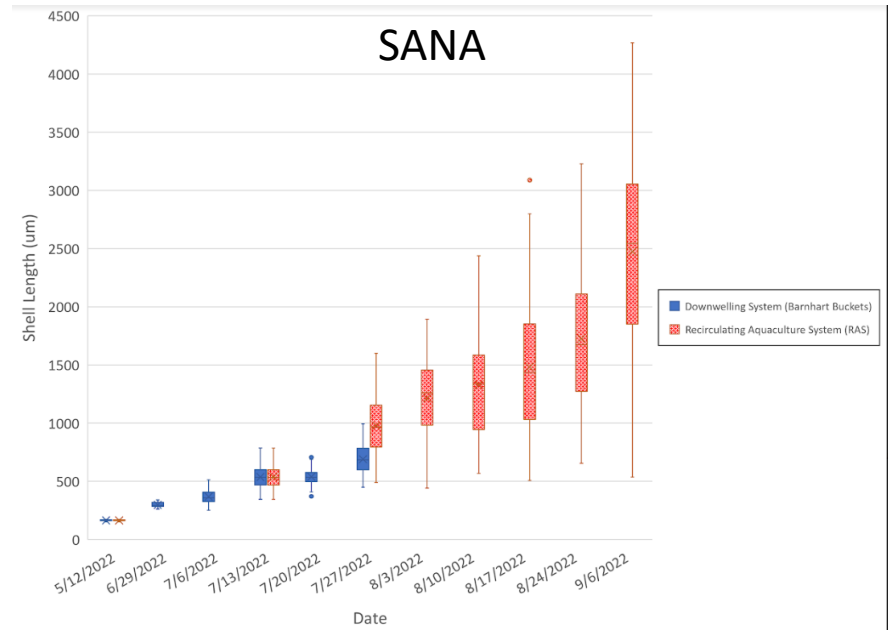
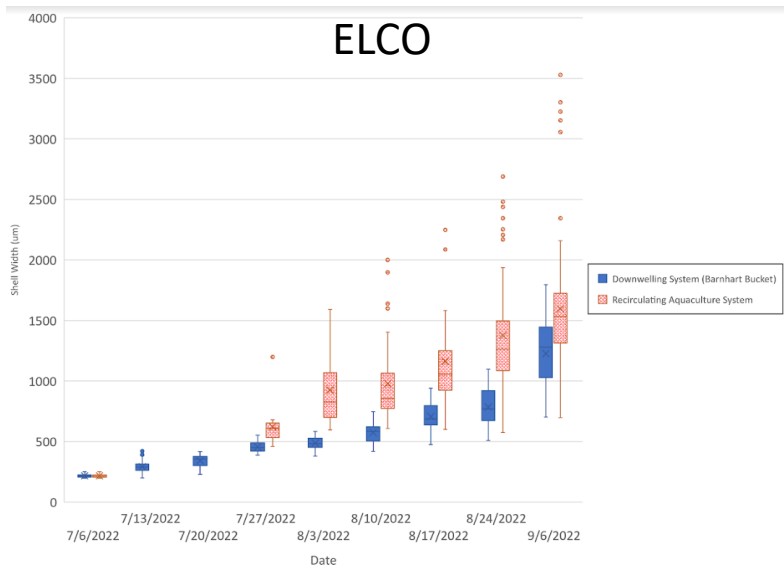
Results

Qualitative

- Substrate
 - Improved monitoring efficiency
- Water

Results

Quantitative



Plans for 2023

- Propagation of four species
 - Alewife Floater (*Utterbackiana implicata*)
 - Eastern Elliptio (*Elliptio complanata*)
 - Eastern Pondmussel (*Sagittunio nasutus*)
 - Tidewater Mucket (*Atlanticoncha ochracea*)
- Continue juvenile system R&D
- Juvenile mussel growth trials
 - Water types
 - Food dosage



Alewife Floater



Eastern Elliptio



Eastern Pondmussel



Tidewater Mucket

Thank You!



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