**Mussel reestablishment as a best management practice: scaling their nutrient effects from the individual to the stream.**

# Resource Protection Group, Inc. – Mussel Performance in an Urban Stream Environment.

# QUARTERLY PROGRESS REPORT

**For Period April 31st to June 1st, 2025**

***PROJECT NUMBER***: Stream RFP #6

***PERSONNEL***: Sally Entrekin, Jess Jones, Athan Anderson, Donya Mohamed, Chester Zarnoch, Rowan Scott, Denise Bruesewitz, Paul Angermeier

***COOPERATORS***: Resource Protection Group, Inc. and USGS

***START DATE***: October 1st, 2022

***END DATE***: September 30th, 2027

## *OBJECTIVES*:

We will measure and analyze features of individual mussels, mussel beds, and stream reaches to describe the role mussels play in stream ecosystem function. Our fisheries management plan, focused on fish-host needs of the mussel populations, will be informed by species-specific responses of reintroduced mussels and their effectiveness in assimilating nutrients and changing physical and chemical conditions of the sediments to facilitate nitrogen removal via denitrification.

# *PROGRESS DURING PERIOD*:

SITES

- *Ligumia nastuta* were cultivated at the Freshwater Mollusk Conservation Center at Virginia Tech and to monitor mussels in Snakeden and Glade. The day-to-day captive care is a lot of work and consumes much of our overall activity, e.g., feeding fish and mussels, maintaining aquaculture systems, conducting water quality, etc.
- Jess Jones' Mussel Team made several field collection trips to obtain broodstock mussels from various streams, including trips to the mainstem Potomac River at several location, the Cacapon River, WV and Cedar Run in Prince William County near Manassas, VA.
- Jess Jones' Mussel Team also made several field trips to collect fish hosts used to propagate the mussels.
- Jess Jones Mussel Team made two trips to the Snakeden and Glade streams to monitor the mussels. These trips are 2-3 days and involve overnight stays and meals; hence, travel costs associated with the project.
- Jess Jones' Mussel Team transported ~2,000 mussels to National Harbor, MD on the Potomac River in coordination with Maryland DNR for further growout to maximize their size for stocking in Glade, in hopes they will have a bigger ecological impact. These mussels will be released in Glade in early October. The MDDNR staff checked on these mussels early last week and they are growing and surviving well.

DATA:

1. Rowan Scott, Amanda Flores and Chester Zarnoch presented at the annual Society for Freshwater Science meeting in San Juan Puerto Rico, May 2025. Presentations linked below.
2. Rowan Scott has continued to download the sondes and organized the data that is in the project shared drive.
3. Brendan Foster, USGS, provided a project update. Presentation linked below.

PRESENTATIONS:

- Rowan Scott (VT) presented an analysis of how benthic macroinvertebrates have changed since the restoration:
    - https://docs.google.com/presentation/d/1yZSipWwe5SmRpXJXocjtnwFKLYDk2WBM/edit?usp=sharing&ouid=108652984633679672870&rtpof=true&sd=true

- Donya Mohamed (VT) presented how mussels change physiological processes in response to NaCl.
    - https://docs.google.com/presentation/d/1F8pStswSnCkBI9LSO2hODJUFgrt9MQMr/edit?usp=sharing&ouid=108652984633679672870&rtpof=true&sd=true

- Chester Zarnoch (Baruch) presented how mussels are changing the nutrient cycles in chamber experiments.
    - https://docs.google.com/presentation/d/1Ff-CT0TzKU1BKOk4RF6eFzU6OVB23QmD/edit?usp=sharing&ouid=108652984633679672870&rtpof=true&sd=true

- Brendan Foster (USGS) provided the Board with an update on USGS monitoring and nutrient load model progress:
    - https://docs.google.com/presentation/d/13P03ZPyBDlwxekezFihInwpK9SeE3XcW/edit?usp=sharing&ouid=108652984633679672870&rtpof=true&sd=true

- Amanda Flores (Baruch) presented data on how mussel deposition and filtering in the Glade and Snakeden.
    - https://docs.google.com/presentation/d/1Gc-WpO3u3BNT76tCIDu4rMtZOL47rUZ4/edit?usp=sharing&ouid=108652984633679672870&rtpof=true&sd=true

# *PLANS FOR NEXT QUARTER:*

1. Jess and Athan will grow out the second species of mussel, *Ligumia nastuta*, at the National Harbor, Virginia. The plan now is to introduce ~3000 to Glade Run in October 2025.
2. Sally will work with the team on an expanded experimental design that assesses how pool-specific mussel density change water and sediment nutrient chemistry in the Glade.