

July 19, 2021

Michael S. Rolband
Resource Protection Group, Inc.
c/o Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155

Dear Mike,

This letter constitutes my fourth quarterly report for work on RFP #01 – Mussel Introduction into an Urban Stream Environment. The objective of this research is to assess the potential of the restored stream channels to support freshwater mussels. Data on survivorship and growth of the translocated and hatchery-raised mussels are being used to assess the viability of the restored streams for stocking a larger population. This report covers the period from April 1 to June 30, 2021.

Work during this quarter included surveys of translocated and hatchery-raised mussels in Snakeden and The Glade conducted on April 28 and June 9. The translocated (free-ranging) mussels are checked by locating their PIT tags. A subset of these are extracted from the stream bed to assess health and determine length. The hatchery-raised mussels (Alewife Floaters) include a Fall 2020 and Spring 2021 cohort which are kept within enclosures. These are checked for condition and measured for length. At present, we have ~190 mussels in the two streams. Preliminary findings are as follows:

Fate of translocated *Elliptio complanata* mussels collected from Bull Run: 100 adult *Elliptio complanata* mussels were tagged and released in Snakeden (50 individuals) and The Glade (2 sites, 25 individuals at each site) on November 11, 2020. Subsequent surveys detected 75 and 81 individuals (February and April, respectively). During the April census, a subset of these individuals (N=31) were retrieved to assess condition and growth. All were found to be in good condition.

Survivorship of hatchery-raised *Utterbackiana implicate*: 60 Alewife Floaters were stocked across two sites in The Glade on November 11, 2020. Survivorship was 78% through February and 77% through April. No dead individuals were found; missing individuals were mostly from one enclosure, which had been displaced or removed from the stream. An additional 60 individuals were stocked at The Glade and Snakeden (30 at each stream) on April 28, 2021. Survivorship was 75% through June (5 dead, one enclosure missing).

Growth of hatchery-raised *Utterbeckiana implicate*: Results suggest that growth rates of over-wintering mussels in The Glade were low in comparison to mussels over-wintering in hatchery ponds (Table 1).

Table 1. Over-winter growth rates of *Utterbeckiana* mussels stocked in restored Reston streams and HLNFH ponds during Fall 2020.

Site	Type	Date		Length (mm)		N	GR	GR (mm/d)	
		Start	End	Start	End		%	Mean	SE
Glade #1	Urban-restored	11/11/2020	2/24/2021	56.6	56.4	22	-0.4%	-0.002	0.002
		2/24/2021	4/28/2021	56.3	56.5	21	0.3%	0.003	0.003
Glade #2	Urban-restored	11/11/2020	2/24/2021	56.6	56.8	26	0.3%	0.002	0.001
		2/24/2021	4/28/2021	57.0	56.9	22	-0.1%	-0.001	0.003
HLNFH F1	Hatchery Pond	11/11/2020	5/30/2021	54.7	58.4	15	6.8%	0.021	0.001

Spring growth rates were also low in comparison to the hatchery ponds, but similar to the low growth rates observed at our rural stream reference site (Kimages Creek).

Table 2. Spring growth rates of *Utterbeckiana* mussels stocked in restored Reston streams, a rural reference stream, and HLNFH ponds.

Site	Type	Date		Length (mm)		N	GR	GR (mm/d)	
		Start	End	Start	End		%	Mean	SE
Glade	Urban-restored	4/28/2021	6/9/2021	57.8	57.8	34	0.0%	0.000	0.002
Snakeden	Urban-restored	4/28/2021	6/9/2021	57.3	57.0	24	-0.6%	-0.008	0.002
Kimages	Rural-Reference	5/14/2021	6/16/2021	57.9	57.7	15	-0.3%	-0.006	0.003
HLNFH F1	Hatchery Pond	5/14/2021	6/17/2021	58.8	61.4	15	4.5%	0.077	0.008

Activities during the next quarter will focus on continued monitoring of the stocked and translocated mussels. I will provide a copy of this report to our Contracts office and you should receive a separate invoice. Please contact me if you have any questions.

Sincerely,



Paul A. Bukaveckas