

March 1, 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 second quarterly report for work on RFP #01 – Mussel Introduction into an Urban Stream Environment covering the period from October 1 to December 31, 2020. Work during this quarter included an initial stocking of translocated and hatchery-raised mussels into the restored Reston streams. The objective was to assess the potential of the restored stream channels to maintain a healthy population of stocked freshwater mussels. Data from the growth and survival of these mussels will inform us of obstacles to stocking a larger population in the spring and the ability of stocked mussels to survive over winter.

A translocation of adult *Elliptio complanata* mussels collected from Bull Run was carried out along with a small stocking of hatchery-raised *Utterbackiana implicata*. Given the shallow and cobble-dominated nature of the restored streams, we were concerned that the potential over-winter mortality of juvenile mussels in enclosures may not be indicative of survivorship for adult, free-ranging mussels in these streams. Stocking and subsequent census of translocated adult mussels would provide a better basis for assessing the over-winter suitability of this habitat. In addition, the growth and survivorship of juvenile mussels may depend in part on flow and water quality conditions. As it is anticipated that flow and water quality monitoring will begin in April 2021, it was advantageous to align our growth and survivorship monitoring with the availability of these data. Lastly, deferring the larger-scale stocking to Spring provided an opportunity to test alternative enclosure designs that may be better suited for the shallow and cobble-dominated habitat found in the Reston restored streams.

On November 11, 2020, 50 *Elliptio complanata* mussels collected from Bull Run were tagged and released into Snakeden Creek. In addition, 60 hatchery-raised *Utterbackiana implicata* were placed in cages and installed at two sites in Glade Creek. Three cage designs were used at each site including a concrete silo, a pyramid cage, and a cube cage (see photos below). Three replicates of each design were used for a total of 9 cages at each site. To avoid negative effects of cages on growth and survival the number of stocked mussels was limited to 5 per cage. Smaller mussels (<15mm) was used for the silo enclosures due to limited space within

those enclosures. The upstream site substrate was primarily large cobble, while the downstream site had more sand and pebble sized substrate. Each cage was labeled with a metal tag indicating whether the cage was going to the upstream or downstream site. Cages were dispersed to prevent situational issues within each site from effecting the entire mussel stock. The cube and pyramidal cages were anchored using either a duckbill anchor or a twist in anchors.



Shown from left to right, the square, pyramidal and concrete (silo) enclosures tested at the Reston restored streams.

On November 20, 2020, follow-up monitoring was conducted after a high discharge event on November 12 (~1600 cfs recorded at USGS 01646000 Difficult Run near Great Falls, VA). The pit tags allowed us to locate 47 of the 50 *Elliptio complanata* mussels in Snakeden. A search of the enclosures revealed that all of the hatchery-raised *Utterbackiana implicata* were present and alive. Enclosures were still anchored and had retained their internal sediment.

Activities during the third quarter of this project (January 1 to March 31, 2021 will focus on planning for the stocking of juvenile, hatchery-raised mussels in the spring, and periodic checks of the enclosures and their mussels deployed in November.

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 or concerns.

Sincerely,



Paul A. Bukaveckas