

October 11, 2015

Glenn Normandeau, Exec. Dir.
NH Fish and Game Department
2 Hazen Drive
Concord, NH 03301

RE: Freshwater Mussel Survey
Hooksett, NH

Dear Mr. Normandeau,

Dubois & King, Inc. retained Oak Hill Environmental Services to conduct a Phase One survey to determine the presence or absence of the State-Endangered brook floater mussel (*Alasmidonta varicosa*) in a section of the Merrimack River located in Hooksett, New Hampshire. The NHB data base has flagged this section of the Merrimack for possible impacts on the brook floater mussel and the NH Fish and Game recommended a Phase 1 study be performed. The proposed pedestrian bridge replacement project involves work within the river. Field results were negative for the subject species. No live specimens of the brook floater mussel or any empty shells for this species were found in the study area. The methodology employed to survey the study area and the research findings are as follows:

Methodology

The Phase 1 survey was conducted following established Survey Protocols for the Assessment of Endangered Freshwater Mussels by the USFWS.

The study area included an intensive sweep of the stream bottom of the Merrimack River from bank to bank beginning at a point approximately 450 feet downstream (south) of the existing bridge to a point 150 feet upstream (north) of the bridge. Two divers performed a search pattern beginning downstream, spaced side by side, conducting lateral, overlapping, transects from bank to bank that covered the entire study area. Hand sifting was conducted in all areas of substrate. Specimens were examined by the principal at the surface and replaced to the bottom properly.

Air and water temperatures were recorded. All mussel species, water depths and the variety of substrate present throughout the study area were noted. The survey was completed in one full day, Thursday, September 10, 2015.

Conditions and Findings

The study area is located in the, Merrimack River, Hookset, New Hampshire. The Lilac pedestrian bridge is a three span structure with a total length of 489.5 between back-walls

of the abutments. There are three separate bridge structures crossing the river in close proximity to each other at this location including the proposed "Lilac" pedestrian bridge, a railroad bridge and the NH Rte. 3A roadway bridge. The Lilac bridge is approximately 2,500 feet downstream of the Hookset Hydro dam. The study area included 150 feet upstream of the pedestrian bridge and 450 feet downstream to the roadway bridge area. Weather conditions were good, partly sunny with clouds. Air temperature was 79F; water temperature was 64F. Water levels were slightly lower than normal at the dam as reported by dam engineer. The Merrimack River is approximately 490 feet wide at this location. Some narrow sandy shelves were present along the west side with a water depth ranged between 1-3ft. Average deepest depth across the width of the river was 14 feet with some 16ft and 17ft pockets.

The substrate characteristics were consistent for approximately 80% of the entire study. Downstream of the pedestrian bridge (south) the entire river bottom is covered in very large boulders mostly (6ft.x10ft.), one glacial erratic of giant size (15ft. x 40ft.) and numerous large rocks throughout. Occasional very small patches of pebble, cobble and coarse sand substrate was present but ranged in size from 2ft to 5ft wide. When present these patches were 20ft to 30ft apart. Many smaller patches of 2in. to 3in. deep sand on top of deeper boulders were scattered throughout the boulder field. The substrate in the remaining 20% of the study area was coarse sands in the vicinity upstream of the Lilac Bridge and an area in the western third of the stream immediately south of the Lilac bridge. A few scattered *Elliptio*'s were present in this area and many of the Asian clams.

One species of mussels was found; Eastern *Elliptio*, *Elliptio complanata* also, Asian Clam *Corbicula fluminea* present.

Approximately 70 individual live specimens of *Elliptio*'s were observed throughout the entire study area ranging in size from 3.5 to 4.5 inches (90-115mm). They were found in small clusters numbering 4 -10 individuals downstream of the Lilac bridge and predominantly in the western 1/3 of the river. No mussels were observed between the RR bridge and the Highway bridge. No live Brook floater mussels, Eastern pond mussel or any other species of mussels were observed throughout the study area. Asian clams present in many of the small open patches and sands in the western half of the river, immediately downstream of the Lilac bridge.

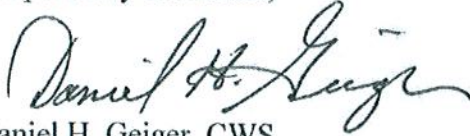
All mussel specimens were identified as *Elliptio complanata*.

The brook floater (*Alasmidonta varicosa*) was not observed during this survey and no relic shells were found.

In summary, an intensive survey resulted in a negative finding for the state endangered brook floater mussel (*Alasmidonta varicosa*) within the study area. Approximately 70 live specimens of the more common *Elliptio complanata* mussels were observed within the study area. No high concentrations of *Elliptio*'s were observed. Small clusters of two or three mussels were observed in any one open patch of suitable substrate mostly and a few clusters of 4-10 specimens together. The survey within the Merrimack River was conducted under good conditions with moderate visibility so hand lanterns were

employed allowing a thorough and comprehensive coverage of the entire study area. The substrate is not very suitable habitat for freshwater mussels in approximately 80% of the study area. In all a low number of live *Elliptio complanata* mussel's were present in this section of the Merrimack River. The degree of coverage of the river bottom by glacial erratic's and extremely large boulders and stones was dominant and only a low percentage of the total area provided suitable substrate for fresh water mussel's.

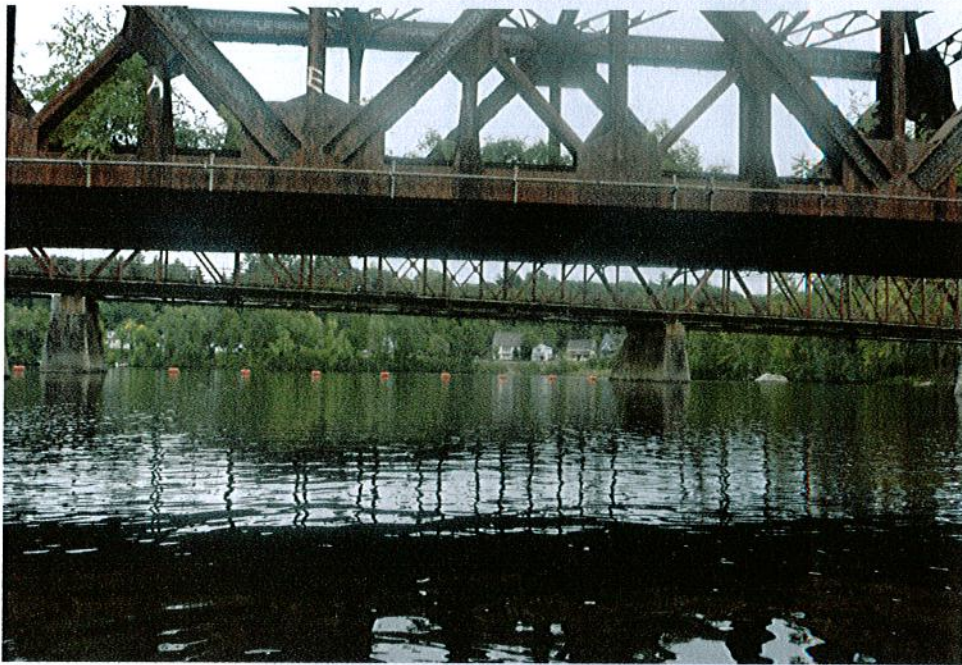
Respectfully submitted,



Daniel H. Geiger, CWS
Oak Hill Environmental Services



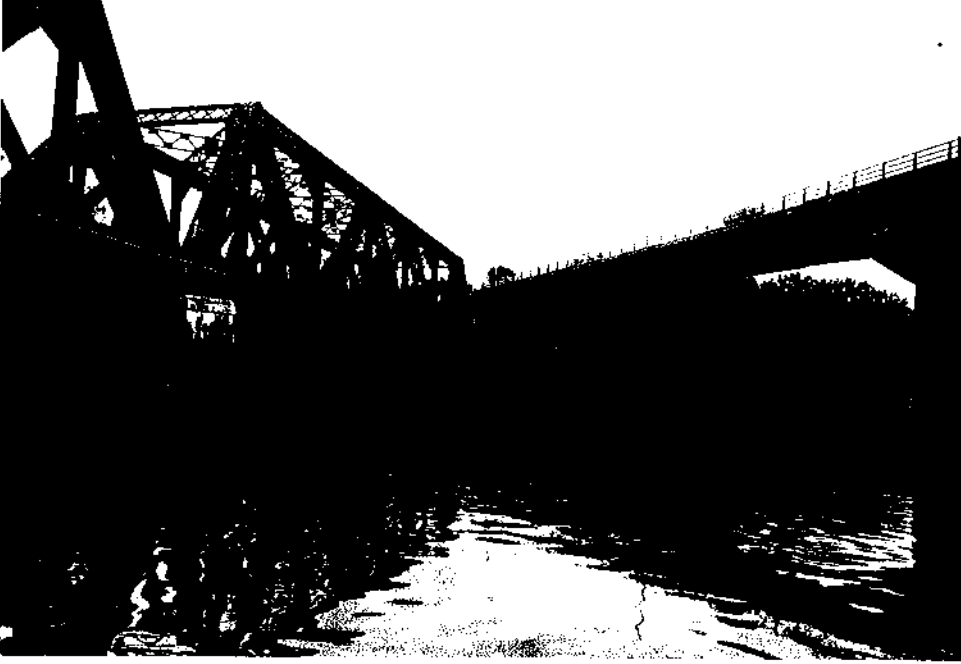
Hooksett, Lilac Bridge, Brook Floater Survey, Sept. 10, 2015



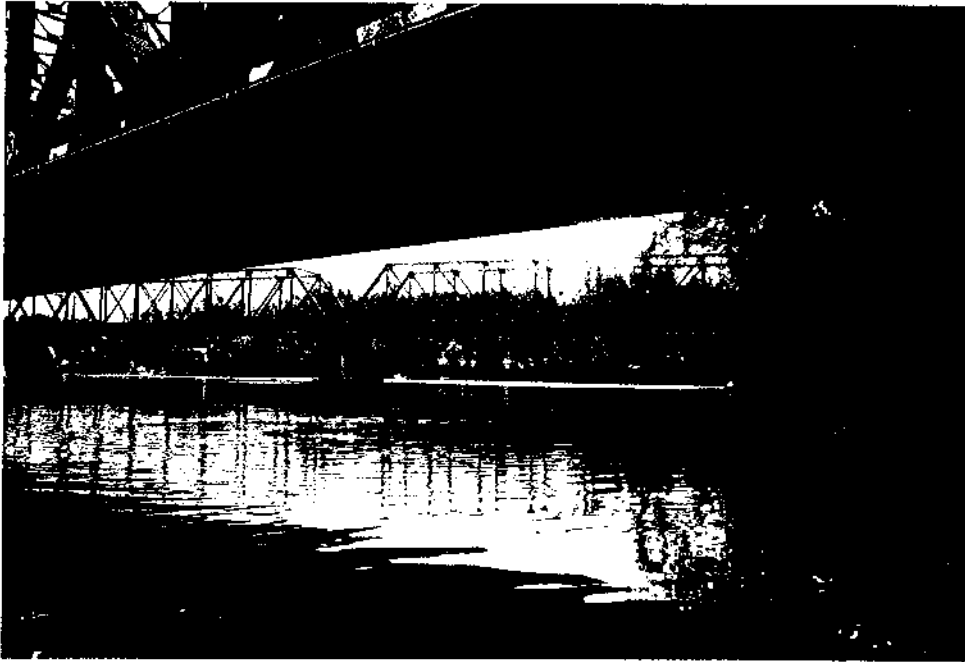
View North, downstream of Lilac & RR bridges.



Substrate between boulders, typical.



View East between RR & Hwy Bridges, note large erratic boulder in center (15x40ft)



View North along east shore