

**REPORT**

**Submerged Aquatic Vegetation Survey in the Hudson River and  
Normanskill for the Port of Albany Project in Bethlehem, New York**

*prepared for*

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July 2020



Hudson River shoreline along the proposed Port of Albany development project.

## INTRODUCTION

Biodiversity LLC conducted a submerged aquatic vegetation (SAV) survey in the Hudson River and Normanskill for the proposed Port of Albany development project in Bethlehem, New York. The objectives of the survey were document the presence, species composition and relative abundance, density, depth distribution, and areal coverage of SAV along approximately 900 meters of Hudson River shoreline and a 350-meter reach of the lower Normanskill.

## SURVEY DATE AND CONDITIONS

The SAV survey was completed concurrently with, and with the same personnel, as a freshwater mussel survey on five consecutive days, from June 15-19, 2020. Weather was sunny and warm on all five days, with air temperature in the mid-80s to low 90s. Water clarity was variable depending on the tidal cycle, but generally turbid (no more than 2-3 ft visibility) in the Normanskill and moderately turbid (usually 6-10 ft visibility) in the Hudson River. Water temperature was

in the low 70s. Low tide, which was the optimal time for surveying subtidal areas, was at approximately 7:30 am on June 15 and then an hour later each day, which was ideal timing for conducting the survey.

## SURVEY AREA

In the Hudson River, the survey spanned 900 meters of shoreline, from near the transmission line crossing at the downstream end to the mouth of the Normanskill (Figure 1). The survey area also included a 350-meter reach of the lower Normanskill, from upstream of a proposed new bridge out to its confluence with the Hudson River, including the entire channel (bank to bank) (Figure 1).

## METHODS

Due to deep and turbid water, biologists conducted surveys of the subtidal areas of the Hudson River and Normanskill almost entirely by SCUBA diving. As part of the concurrent mussel study, biologists surveyed as far as 50 meters from the shoreline, to water depths



Normanskill near the proposed bridge, looking downstream toward its confluence with the Hudson River.

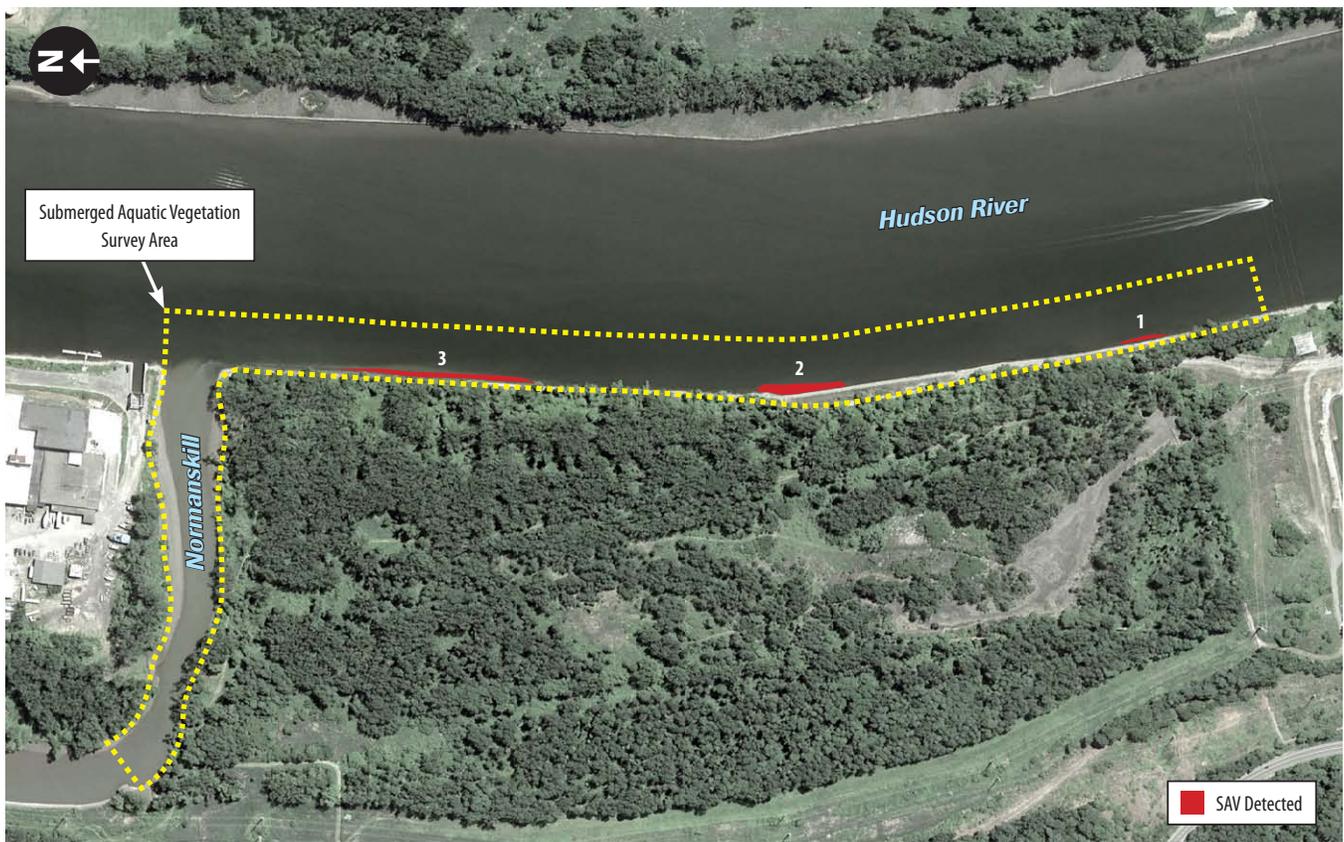
of 9.5 meters (31 ft) below mean high tide, but all SAV was confined to shallow nearshore subtidal areas. In addition to SCUBA surveys, the entire length of the Hudson River shoreline, and both shorelines of the Normanskill, were surveyed at low tide to check the lower intertidal zone and shallow subtidal zone for SAV. Some of the methods originally proposed for this study were modified due to the absence or paucity of SAV in the survey area (confirmed during the concurrent mussel survey). Biologists recorded locations (upstream and downstream limits) of SAV patches using GPS, and recorded the widths and water depths of each patch. Biologists recorded and photographed SAV species present, approximate and relative density, and substrate.

## RESULTS

**Hudson River:** Only three patches of SAV were detected in the survey area (Figure 1, Table 1), including two with a very low density of *Vallisneria americana* along with very few solitary *Trapa natans* and *Potamogeton crispus*, and one with a moderate to high density of *V. americana* and very low densities of *T. natans* and *P.*

*crispus*. Overall, the most important habitat features in the Hudson River include a large tidal range, and a heavily modified/armored shoreline. An old timber retaining wall runs nearly the entire length of the study area, and there are various types of shoreline armoring (stone, concrete). These features have greatly altered intertidal and nearshore subtidal habitats, and helped to create a steep depth gradient with very little shallow subtidal habitat. Substrate is primarily coarse rock and silt/muck out into deep water, with more sand and gravel in deeper areas. Flow velocities vary with tides, but are generally slow. Turbidity likely limits the presence and depth distribution of submerged aquatic vegetation, since sunlight barely penetrates more than 5-6 ft.

**Normanskill:** No SAV was observed anywhere in the lower Normanskill. The Normanskill has a large tidal range and a heavily modified shoreline, although it also has extensive intertidal mudflats along portions of the shoreline that were not historically armored. Aside from large rock (riprap) near its confluence with the Hudson River and along its southern shoreline (river-right), substrate was primarily silt/muck, sand,



**Figure 1.** Submerged aquatic vegetation (SAV) survey area in the Hudson River and Normanskill for the proposed Port of Albany development project, showing where patches were detected. See Table 1 for descriptions of the three areas where SAV was detected.

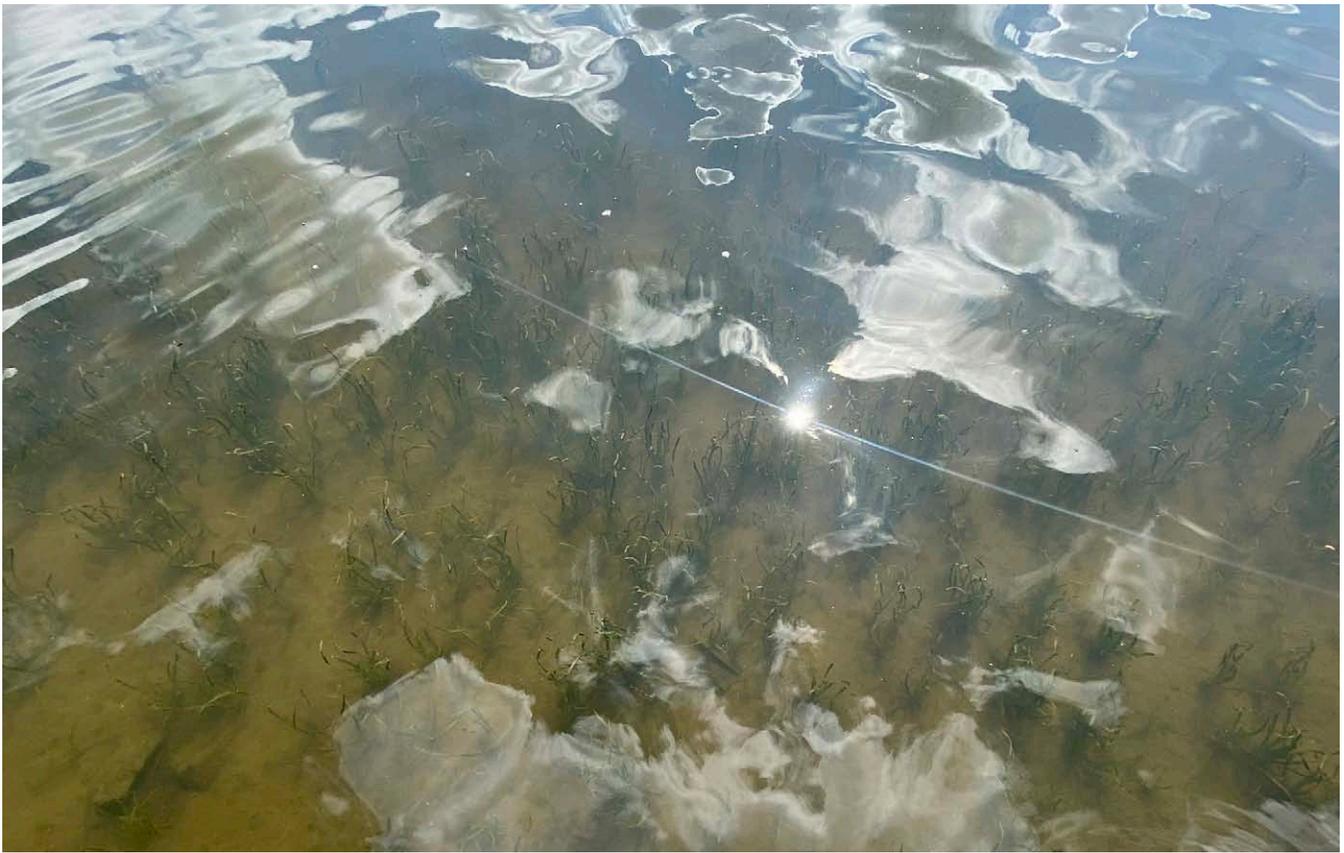
**Table 1.** Description of the three areas where SAV was detected.

Patch	Length (m)	Width (m)	Area (m <sup>2</sup> )	SAV Density	Composition and Description
1	25.0	3.0	75.0	Very low	Isolated tufts of <i>V. americana</i> in depths of 2.0-3.5 ft along the edge of the timber retaining wall, in a substrate of silt, gravel, and cobble.
2	75.0	7.5	560.0	Moderate to high	An established bed of <i>V. americana</i> along the edge of the timber retaining wall, on a shallow subtidal shelf in depths of 1.5 to 3.5 ft, in a mix of silt, sand, gravel, cobble, and riprap. Solitary strands of <i>T. natans</i> and <i>P. crispus</i> present among the <i>V. americana</i> .
3	170.0	5.0	850.0	Very low	A long narrow shallow shelf along the edge of the concrete-armored shoreline, with very low density of <i>V. americana</i> , <i>T. natans</i> , and <i>P. crispus</i> growing in shallow water no farther than ~5 meters from the mean low water line.

and gravel in intertidal and subtidal areas. There were only small amounts of emergent aquatic vegetation in the upper intertidal zone. The Normanskill is very turbid, and the subtidal zone cannot support SAV due to poor light penetration.

## CONCLUSION

The primary objective of this SAV survey was to determine the presence, species composition and relative abundance, density, depth distribution, and areal coverage of SAV in areas of the Hudson River or Normanskill that would be affected by the proposed Port of Albany development project. SAV was not observed



Bed of water celery, *Vallisneria americana* (Patch 2).



Solitary water chestnut, *Trapa natans*.



Solitary curly leaved pondweed, *Potamogeton crispus*.

in the Normanskill, and was generally very sparse in the 900-meter reach of the Hudson River, with one notable patch (Patch 2) that contained moderate to high stem densities of *V. americana* in an area approximately 560 m<sup>2</sup> (75 meters long x 7.5 meters wide). All SAV observed in the Hudson River was concentrated

very close to shore, in water depths shallower than 4 ft (at low tide), and was likely limited by a combination of turbidity, limited light penetration, and a heavily modified shoreline that essentially eliminated nearly all shallow subtidal areas.



Representative Hudson River shoreline at low tide, Sections 8-9.



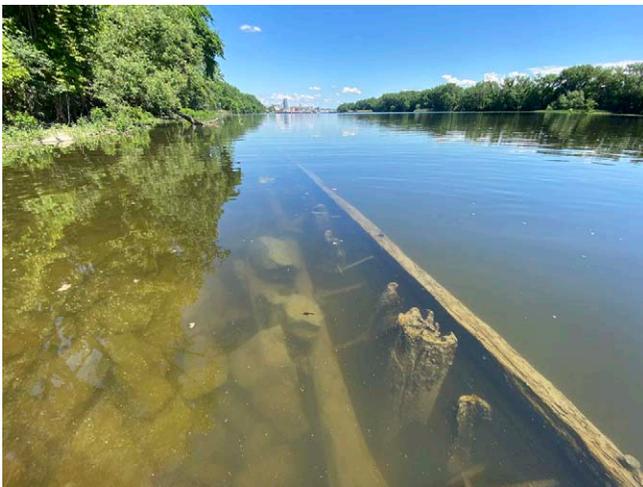
Intertidal mudflat in the Normanskill, river-right.



Representative Hudson River shoreline at low tide, Sections 5-6.



Intertidal mudflat in the Normanskill, river-left.



Representative Hudson River shoreline at high tide, near Sections 1-2.



Confluence of the Normanskill and Hudson River, Section 11.