Appendix III/IV.E
Biological Resources

III/IV.E-3: Draft Submerged Aquatic Vegetation Survey Report

9/5/2024

HUDSON HIGHLANDS FJORD TRAIL SOUTH SUBMERGED AQUATIC VEGETATION SURVEY REPORT DRAFT

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1. Introduction

The Hudson Highlands Fjord Trail South/Shoreline Trail Project (the "Project") is located along the eastern shore of the Hudson River from Dockside Park in Cold Spring, NY (**Figure 1**) north to Breakneck Point (**Figure 2**) at the Dutchess/Putnam County line. Several beds of submerged aquatic vegetation (SAV) composed primarily of *Vallisneria americana* (water celery) have been previously documented along the Hudson River shoreline within the estimated limits of disturbance ("LOD") (**Figure 3**) for the Project[1]. Due to the narrow, steeply channelized, and turbid nature of the Hudson River in this segment, there is very little subtidal habitat available for SAV beds, but some suitable SAV habitat is known to occur in shallow backwaters formed by rock formations and broad river bends[2]. Because SAV has been mapped within the Project's LOD and suitable SAV habitat may be present within the shallower waters along the shoreline, a pre-construction survey was conducted on August 6 and August 7, 2024, to identify the presence and extent of SAV in the project area to support the analysis of potential impacts of the Project on aquatic resources.

Figure 1: Southern End of Survey Area at Dockside Park

[1]Hudson River NERR 2019
[2]Findley at al. 2006

Figure 2: Northern End of Survey Area at Catskill Aqueduct Outfall at Breakneck Point

2. Methodology

With the assistance of Princeton Hydro, AKRF conducted a Tier 1 SAV survey in accordance with the Joint Federal Agency SAV Survey Guidance for the New England Region (Updated 8/11/2016)[1] to document the presence and extent of SAV that could potentially be affected by Project-related construction activities taking place within the limits of disturbance (LOD). The survey followed a sampling protocol and overall plan developed by AKRF in coordination with the New York State Department of Environmental Conservation (NYSDEC). The survey was conducted in August 2024, which is within the typical growing season of May to September when SAV biomass is generally at its peak in New York. As shown in **Figure 3**, the survey area followed the eastern shoreline of the Hudson River within the LOD and extended waterward 90 meters to represent the furthest possible extent of turbidity and resuspended sediments resulting from pile installation for the Project or to 6-meter depth contour, whichever came first. The survey intended to demarcate the extent of any SAV beds observed in the survey area, as well as the percent coverage and shoot density within any observed beds.

The survey was conducted using a 17-foot center console boat with 10-inch draft, allowing the survey boat to reach the shallowest areas of the survey area. A Trimble GPS unit along with a field data tablet with ArcMap was used to determine exact (sub-meter) positions within the survey area

[1] https://www.nae.usace.army.mil/portals/74/docs/regulatory/JurisdictionalLimits/Submerged_Aquatic_Vegetation_Survey_Guidance(11-Aug-2016).pdf

as well as to record data points. Due to poor water clarity throughout the survey area and at all depths, an underwater drop-down camera was used to view the river bottom during both days of the survey. Surveyors followed a grid pattern that covered the survey area with transects spaced 10 to 25 meters apart. Along each transect, at least five points were observed using the drop-down camera (at both ends of the transect line, with the remaining points spaced approximately equidistantly along the transect line). At each point, the camera was lowered until the river bottom was visible (generally approximately 6 inches off the bottom) and camera lights were adjusted to achieve the clearest view.

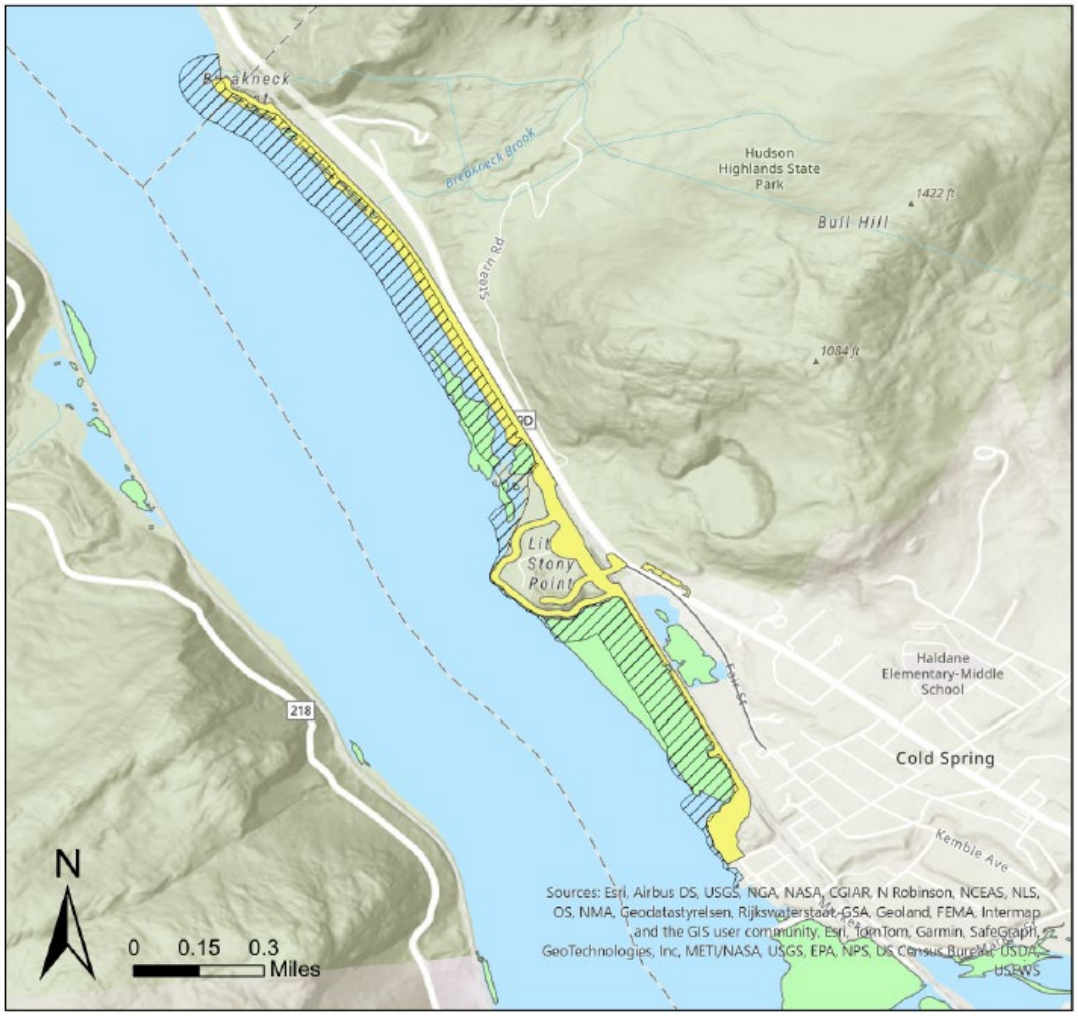

Figure 3: Survey Area

3. Results

In total, over 100 transects were surveyed with at least 5 observation points per transect, resulting in over 500 observation points surveyed throughout the survey area. Sediments throughout the survey area were mainly muddy sand, with rock and cobbles present along the shorelines (**Figures 4 and 5**). No rooted SAV was observed at any location within the survey area during the two-day survey. Over the two-day period, four small clusters of floating water chestnut were observed in the survey area; however, these clusters were not rooted and likely detached from a bed located north of the survey area and floated downstream. No other evidence of SAV species, such as detached leaves or shoots (on the shoreline, river bottom, or in the boat wake), SAV-based detritus, or dead rhizomes were observed within the survey area. In shallow shoreline areas and in shallow parts of areas where SAV was historically present, small tufts of an unidentified green algae were observed to be sporadically growing, with some locations having more widespread coverage of algae than others. The presence of the green algae in areas where SAV was previously documented suggests that light reaching the river bottom is sufficient to support SAV growth in those areas; however, no SAV and no evidence of SAV was observed to be present at any location within the survey area.

Because no SAV was observed in the study area, and thus no data concerning water temperature, turbidity, pH, dissolved oxygen, and salinity was collected in reference to SAV locations, water quality data were collected at three representative locations within the survey area (northern end, middle, and southern end) (**Figure 6, Table 1**).

Figure 4: Representative Mud/Sand Sediments

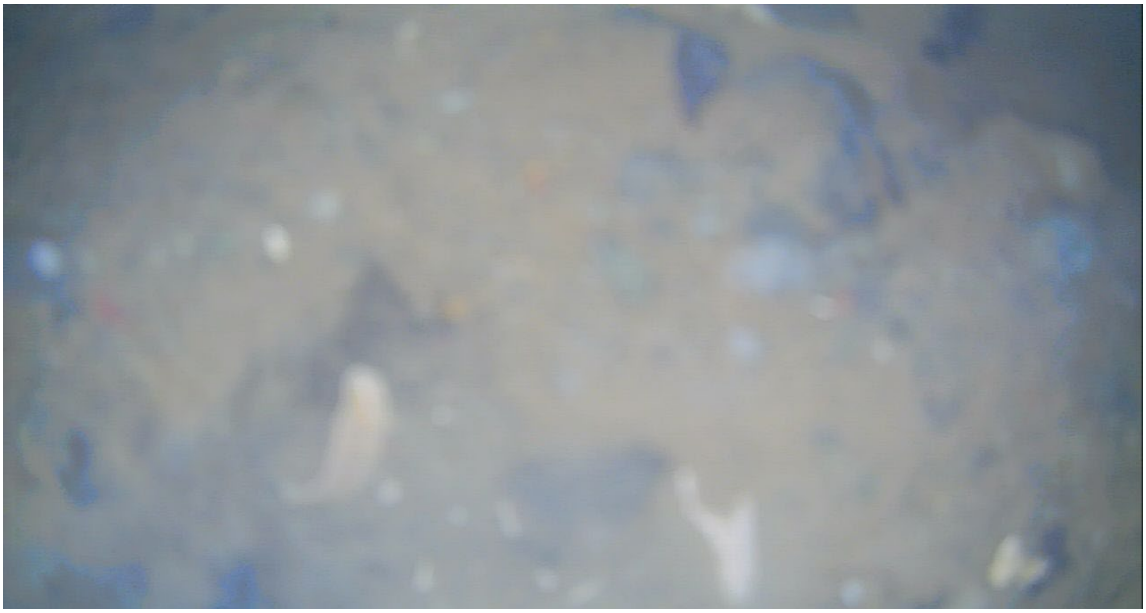

Figure 5: Representative Soft Sediments with Shell/Cobble

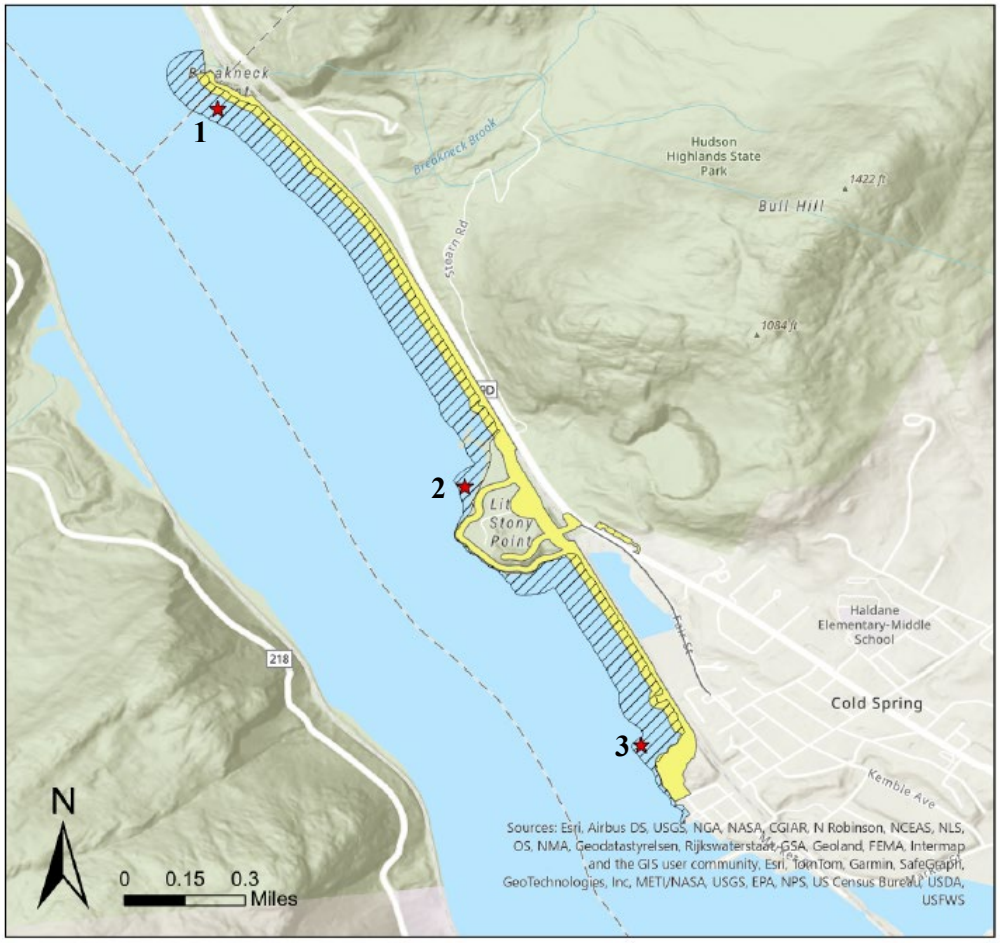

Figure 6: Locations of Water Quality Data Points

Table 1: Water Quality Data

Data Point ID	Latitude	Longitude	Water Depth (m)	Temp. (°C)	Salinity (ppt)	Secchi Depth (m)	Dissolved Oxygen (%)	pH	Sediment Type
1	41.4413	-73.97847	4.57	27.1	0.78	0.9	70.1	7.83	Mud/Sand
2	41.4277	-73.96959	2.83	25.7	0.8	0.65	75.4	7.88	Mud/Sand
3	41.4185	-73.96325	2.90	26.9	1.02	0.65	74.1	7.84	Mud/Sand
Source: AKRF SAV survey conducted August 6 and August 7, 2024									

4. Field Notes

Location: Cold Spring, New York
Survey Extent: immediately north of Catskill Aqueduct outfall at Breakneck Point south to the Cold Spring Pier
Dates: August 6 & 7, 2024
Personnel: Lesley Baggett (AKRF); Michael Ray (AKRF); Jesse Smith (Princeton Hydro)

Day 1: Tuesday, August 6
Start time: 8:00am
End time: 2:30pm
Weather: Partly sunny in morning, changing to cloudy and showers/thunderstorms in afternoon; Minimum air temp = 70°F, Maximum air temp = 82°F
Tides: Low (8:04a.m., 0.1 ft); High (1:41p.m., 2.9 ft)

Day 2: Wednesday, August 7
Start time: 8:00am
End time: 5:00pm
Weather: Cloudy/overcast with occasional light rain all day; Minimum air temp = 63°F, Maximum air temp = 70°F
Tides: Low (8:39a.m. 0.2 ft); High (2:42p.m., 2.8 ft)

5. Literature Cited

Findlay S., D. Strayer, M. Bain, and W.C. Nieder. 2006. Ecology of Hudson River Submerged Vegetation. Final Report to the New York State Department of Environmental Conservation. 99 pps.

Hudson River NERR 2019. Hudson River Estuary Documented Submerged Aquatic Vegetation GIS dataset. Available: https://data.gis.ny.gov/datasets/59c88d82342045049cfd168ddec177f0_6/about