Monitoring the Status and Species Composition of Submerged Aquatic Vegetation Communities in the Patuxent and Bush Rivers, Chesapeake Bay, Maryland

Submerged aquatic vegetation (SAV) has been monitored since 2007 in an effort to track the status and species composition changes of some of the main SAV beds located within the Jug Bay (Patuxent River) and Otter Point Creek (Bush River) components of the Chesapeake Bay National Estuarine Research Reserve in Maryland. A total of eight species currently occur in each of both components with *Hydrilla verticillata* (Hydrilla – non-native) and *Ceratophyllum demersum* (Coontail) as the dominant species. Hydrilla is the most abundant and has the widest distribution within both rivers; its capability to grow well in a wide range of environmental conditions makes it a great competitor. Three-year monitoring observations has shown an overall peak of SAV growth during August with high variability on species spatial and temporal abundance. A trend of decreasing biomass of Hydrilla was observed throughout the monitoring period. General water quality observations from both components showed a recurrent peak of salinity at OPC during October (2.15 ppt ± 0.02) and higher pH values during the summer (8.42 ± 0.02) compared with Jug Bay (7.10 ± 0.06). Phosphate concentrations were higher at Jug Bay (0.0213 ± 0.0020 mg l⁻¹) than at OPC (0.0040 ± 0.0006 mg l⁻¹), while nitrate concentrations were similar in both sites (0.7454 ± 0.0417 mg l⁻¹ and 0.6034 ± 0.0846 mg l⁻¹ for Jug Bay and OPC, respectively). Higher phosphate concentrations in Jug Bay may be associated to outflows from nearby wastewater treatment plants.

### Monitoring Sites

Monitoring of SAV has been conducted since 2007 in two of the CBNEERR-MD components: Otter Point Creek, Bush River and Jug Bay, Patuxent River. Both components are characterized as tidal freshwater marsh systems.

### Long-term SAV Monitoring Objectives

- Determine short and long-term changes in species composition and abundance.
- Study relationships between environmental parameters and SAV population dynamics.
- Monitor potential impacts of climate change (i.e., salinity, temperature) on native and non-native SAV species.
- Monitor non-native SAV species (particularly *Hydrilla verticillata*) and study potential relationships with water quality and other physical-chemical parameters.

### Sampling Technique and Methodology

- Sampling using with oyster tongs – approximate area: 0.068m²
- Biomass recorded as volume displaced
- Biomass calculated as:
  
  \[ \text{Total Dry Weight (g) using species linear regressions} \]

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