I. Introduction

The purpose of this report is for Quible & Associates, P.C. (Quible) to provide state and federal regulatory agencies with a review of a Submerged Aquatic Vegetation (SAV) study conducted in the Currituck Sound and adjacent canals within the Walnut Island Subdivision (Study Area) located in Currituck County. The Physical Property (Site) is located on the East side of US 158 in the Walnut Island Subdivision located in Grandy, North Carolina (Exhibit A Relevant portion of USGS Topographic Quadrangle-Jarvisburg).

The Study Area shown on the attached Exhibit B, includes two entrances into the Walnut Island Subdivision canal system located on the Currituck Sound. The May 21st, SAV survey was conducted to examine the substrate of shallow waters at the mouth of the two entrances and the immediate canal system for the presence or absence of SAV, and to document the conditions that may relate to SAV habitat. The SAV survey was conducted during the growing season as required by resource management agencies.

Generally, low salinity SAV found in this area of the Currituck Sound prefers low energy shallow water areas where significant photic penetration through the water column to the substrate persists. These species generally go dormant in the winter months as water temperatures decrease and foliage dissipates.

II. Methodology

The accompanying base map (Exhibit B) includes 2016 aerial photography provided by Currituck County with the study area and measured water depths identified. Water depth surveying was conducted throughout the Site on May 21st, 2017. Depths were collected by a survey crew from Quible using survey-grade GPS equipment coupled to a Seafloor Systems Single Beam Echo-Sounder. A bathymetric map (Exhibit A) was generated using the data gathered to illustrate existing water depths.

SAV surveying consisted of a cursory analysis of SAV throughout the Site followed by a detailed survey by establishing a series of transects to fully understand the extent and coverage of SAV. At each station, water depths, substrate types, and SAV species identification was performed and recorded. An outboard powered skiff was used to assist with water depth collection and as a base for the diver/swimmer to access the Study Area. At each sampling station, a 1.0-meter x 1.0-meter PVC quadrat (with holes so that it would sink) was haphazardly tossed[1] into the water. This was done in duplicate at each sampling station to estimate total cover and species of SAV throughout the Study Area (if any SAV was identified). Sampling was performed using a snorkel and mask in multiple free dives, while the other workers collected field data, navigated the boat, and viewed and analyzed bottom samples periodically. Roles were switched to avoid acute fatigue.

The following methodology and information was collected (in general) at each sampling location.

- An estimate of aerial coverage for all species combined within a square meter quadrat (rounded to the nearest five percent); this method of estimating aerial coverage is somewhat standardized and is in use by many SAV investigators.

[1] Haphazardly tossed is a term used to indicate that the quadrat was not systematically placed in a location that was observed prior to the quadrat lying on the substrate.

- An estimate of aerial coverage (expressed as a percent) for each individual species within each quadrat (rounded to the nearest five percent)[2];
- A qualitative description of the substrate type;
- A depth measurement at each sample station, using survey grade GPS

III. Findings and Observations

On May 21st, the winds were moderate (+/- 10-12 mph) and wind tide and precipitation rates resulted in above Normal Water Level (NWL) conditions. This was evident from the adjacent coastal wetlands and water marks on bulkheads along the canals.

SAV was found within the entrances to the canal systems in high percentages (80% to 100%). *Ruppia maritima* (Widgeon Grass), *Potamogeton perfoliatus* (Redhead Grass), and *Vallisneria americana* (Wild Celery) were the species encountered with *R. maritima* being the dominant SAV observed. Substrate was predominantly sandy within areas of rooted SAV and in water depths of two to three and a half feet. Some SAV was found to occur in sandy substrate to depths up to four feet. Exhibit B identifies the areas observed rooted SAV on the date of our survey.

SAV is mostly present in the adjacent open waters of the Currituck Sound and in the shoaled in areas at the canal entrances. Once inside the canals, SAV is no longer present once the substrate changes from sand to unconsolidated muck. No rooted SAV was encountered within the muck bottom of the inner canal system and as shown on the attached Exhibit B.

IV. CONCLUSIONS AND RECOMMENDATIONS

The findings of this study indicate that the inner canals (to the extent surveyed) of the Walnut Island subdivision do not support SAV on the date of the survey. Unconsolidated muck bottom and low visibility are the likeliest natural causes of no SAV presence. The entrance areas to the canals with sand dominated bottoms and waters depths of two feet to four feet support very dense SAV beds extending out into the Currituck Sound, which has been noted to be typical of this region of the Currituck Sound.

A representative of the North Carolina Division of Coastal Management reviewed the Study Area with Quible on May 22, 2018 to confirm our findings and discuss permitting options for dredging the shoaled portions of the canals at Walnut Island. Based on the meeting the DCM Representative, we can expect that interior portions of the man-made canals may be dredged with the appropriate permits (please note that DCM is one of several agencies that review these requests and while they gave verbal agreement other agencies will have a chance to comment). However, DCM will not support any new dredging in the open waters of the Currituck Sound. In addition, DCM prefers that we limit any dredge proposal to one of the canal entrances.

Quible recommends that this report be submitted to the Division of Coastal Management as part of a Scoping Meeting Request. A Scoping Meeting will be required to discuss with all permitting and resource agencies a plan to perform maintenance dredging within the canal system in Walnut Island.

V. References

Aquatic Weeds: A Pocket Identification Guide for the Carolinas, 2012, NC State University Crop Science.

Bay Grass Identification Key, 2008, http://www.dnr.state.md.us/bay/SAV/key/, Maryland Department of Natural Resources.

Caldwell, W.S., 2001, Hydrologic and Salinity Characteristics of Currituck Sound and Selected Tributaries in North Carolina and Virginia, 1998-99, U.S. Geological Survey, Water-Resources Investigations Report 01-4097, 36 p.

Currituck County, 2016, Digital Color Aerial Photography.

Seagrass-Watch Percent Cover Standards, 2010, http://seagrasswatch.org.