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April 28, 2020

Via Electronic Mail and Private Carrier

Matthew Wallach
Tidal Wetlands Division
Wetlands & Waterways Program
Maryland Dept. of the Environment
1800 Washington Blvd, Suite 430
Baltimore, MD 21230

Subject: Transmittal of Expanded SAV Survey for Cow Pen Creek and Dark Head Cove
Lockheed Martin Corporation; Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Mr. Wallach:

This submittal describes an expanded submerged aquatic vegetation (SAV) survey to be conducted in Dark Head Cove off the Lockheed Martin Middle River Complex. The actions described herein are an addendum to those described in the Cow Pen Creek and Dark Head Cove SAV Restoration and Monitoring Work Plan (Tetra Tech, 2017).

Introduction

In summer 2020, Tetra Tech will conduct a survey of the naturally occurring submerged aquatic vegetation (SAV) bed(s) along the southeastern shoreline of Dark Head Cove. The purpose of this survey is to characterize the natural conditions of SAV bed growth, including decline or other changes, to compare it to the current status of SAV that was planted during site restoration. Survival of the restored beds has been limited, but SAV throughout the Middle River area has also declined over the past several years. Surveying naturally occurring SAV will enable us to compare it to the current conditions existing in the restored areas. Survey results will also be qualitatively compared to the results of the previous baseline SAV survey conducted in 2015. The survey described in this document will help determine SAV presence and species composition in the survey area, the amount and relative density of the SAV bed(s) and habitat; and, will provide spatially-relevant information about survey-area resources. Because SAV beds can gradually shift in both location and density over time, obtaining current survey data is necessary to evaluate the natural conditions compared to the restored beds in Dark Head Cove and Cow Pen Creek.

Approach

SAV samples, collected via boat operated by Tetra Tech staff, will be collected to evaluate the density and species composition of the bed(s). Sampling locations will be pre-programmed into a global positioning system (GPS) unit (Trimble or equivalent). Samples will be collected along the southern shore of Dark Head Cove out to the 10-foot bathymetric contour interval. SAV generally does not grow at depths greater than two meters in the Chesapeake Bay region (Batiuk et al., 2000), so sampling beyond this depth is not warranted. Sampling locations will be spaced at five-meter intervals in each direction, in the area shown on Figure 1.

The primary modification to the survey methods used previously (in 2015) will be that the survey area will not include the area on the northern shoreline of Dark Head Cove or areas within Cow Pen Creek where SAV has successfully been restored. This area was originally surveyed in 2015 to establish baseline conditions of SAV bed distribution prior to restoration; however, it is not necessary to survey in 2020, the primary purpose being to establish conditions *outside* the restored area. For the restored areas, a diver survey will be used in 2020 to evaluate the SAV in the restored areas of Cow Pen Creek and Dark Head Cove.

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Field methodology

Field scientists (including an SAV taxonomic expert) will access the sampling locations with naturally occurring SAV via a shallow draft boat. The team will start the survey at one corner of the survey area and will move on top of the collection site to collect the samples. The collection sites will be pre-selected before mobilization, and global positioning system (GPS) coordinates of these sampled naturally occurring SAV sites will be recorded for future reference. Two (2) metal leaf rakes bolted back-to-back, with handles removed and attached to a rope, will be used from the boat to collect SAV (see Figure 2). The rake will be thrown into the water, dragged across the creek bottom, and brought to the surface. This will be repeated twice, for a total of three throws. Vegetation, when present, will be taken on board where it will be identified to the species level using Bergstrom et al. (2006) and other manuals for identification. The density of the vegetation will also be noted. Density estimates, as well as species composition, will be recorded in a field data notebook, and subsequently transcribed to a spreadsheet. SAV density measurements will be based on a modified Braun-Blanquet scale (Braun-Blanquet, 1932) using density values ranging from 0 (no plants present) to 4 (representing a 70-100% cover), as shown on Figure 3. All values will be recorded in a field notebook and transcribed to a spreadsheet upon return to the office. Water depth measurements will also be collected at each naturally occurring SAV sampling location.

The density values will be incorporated into an ArcGIS kriging program; this software will analyze the data and generate a map that represents the spatial extent and relative density of the SAV beds. Figure 4 is the ArcGIS map produced for the 2015 baseline survey as an example. In addition, the species data obtained during the survey will be used to determine the observed species frequency of occurrence. These results, including all maps produced by ArcGIS software and the summary data used to produce the maps, will be provided for review via a technical memorandum and be included in the 2020 annual monitoring report.

If you have any comments, we respectfully request to receive them by May 22, 2020.

I am available for your questions; my office phone is (301) 548-2209.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation

cc: via email (without enclosure)
Gary Schold, MDE
Mark Mank, MDE
Cheryl Kerr, MDE
Christine Kline, Lockheed Martin
Norman Varney, Lockheed Martin
Michael Martin, Tetra Tech
Cannon Silver, CDM Smith

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Brian Dietz, MDE
Becky Golden, DNR
Greg Golden, DNR
Kristy Beard, NOAA
Tom Green, LMCPI

References

Literature cited

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Bergstrom, P.W., R.F. Murphy, M. Naylor, R.C. Davis, and J.T. Reel. 2006. Underwater grasses in Chesapeake Bay & Mid-Atlantic coastal waters: Guide to identifying submerged aquatic vegetation, 80. College Park, MD: Maryland Sea Grant College.

Braun-Blanquet, J. 1932. Plant Sociology (Transl. G. D. Fuller and H. S. Conrad), 539. New York: McGraw-Hill.

Tetra Tech. 2017. *Cow Pen Creek and Dark Head Cove SAV Restoration and Monitoring Work Plan, Lockheed Martin Middle River Complex*. Lockheed Martin Middle River Complex, Middle River, Maryland. December.

Figures

Figure 1: SAV survey area denoted by green hashed area

Figure 2. Modified rake used for conducting SAV surveys.

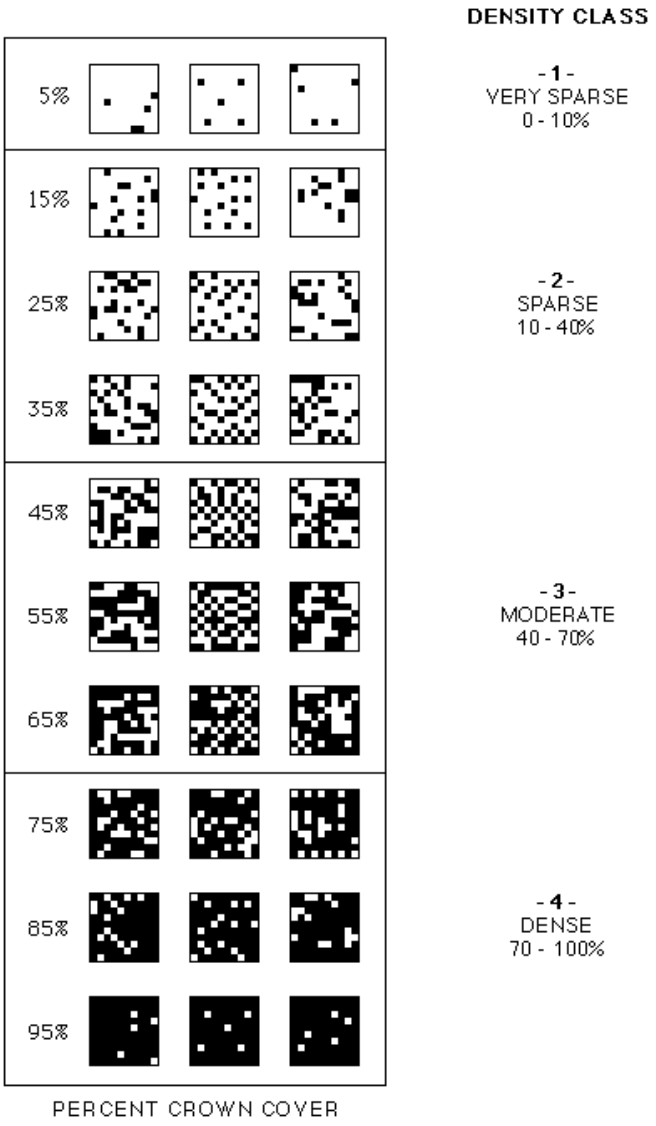

Figure 3. Scale used to measure the density of SAV rake survey grabs. The scale is based on a modified Braun-Blanquet (1932) scale with values ranging from 0 (no plants present) to 4 (70-100% cover).

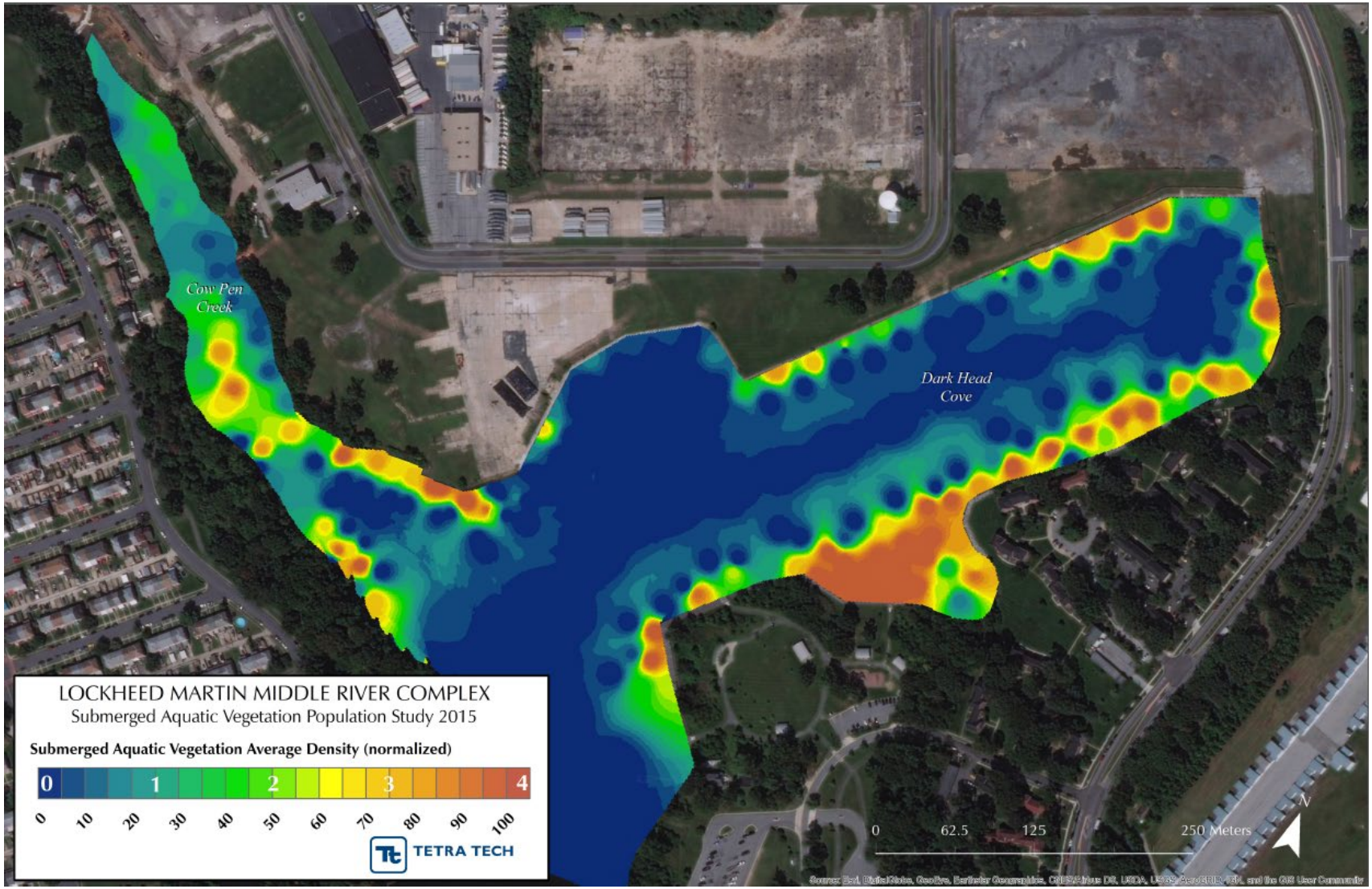

Figure 4. Map of SAV density developed from 2015 baseline survey data.