

May River Project: Assessing Change After 20 Years

Progress Report to Town of Bluffton

3/21/2024

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Headwater Tidal Creek Studies

Six tidal creeks were sampled in the May River estuary in July 2023. Within each creek, one site was sampled for water quality and six sites were sampled for benthic composition and community. One of the six benthic sites was also sampled for sediment chemistry and contamination.

Objective 1: Water quality

Water quality loggers were deployed at all six water quality sites for 25 hours collecting 15-min interval water quality data near-bottom for a total of 100 data points collected per site. Two water samples were collected from each site (12 total) for nutrient analysis. Two water samples were collected from each site (12 total) for Chlorophyll-*a* and bacteria analysis.

Water logger data has been downloaded and quality checked. 12 water samples were sent to Chesapeake Bay Laboratory for nutrient analysis, and the results of this analysis have been incorporated into the water quality data set. SCDNR processed 12 samples each for *Enterococcus* and fecal coliform bacteria and Chlorophyll-*a* concentrations.

Data entry and quality checking is in progress.

Objective 2: Sediment Quality

40 sediment samples were collected for grain-size composition (seven from each creek except at Brighton Beach where only five samples were collected due to hazardous conditions in the upper portion of the creek). Six sediment samples each (one per creek) were collected for chemistry, Microtox, and pore water.

Six porewater samples were processed by SCDNR. 12 chemistry and 12 Microtox samples were sent to a NOAA laboratory for analysis, processing is in progress and SCDNR is awaiting results. Sediment composition sample processing by SCDNR is scheduled to begin 3/27/2024.

Data entry and quality checking is in progress.

Objective 3: Biological Communities

34 benthic grab samples were collected from each creek (six from each creek except at Brighton Beach where only four samples were collected due to hazardous conditions in the upper portion of the creek).

All 34 benthic grabs have been sorted by SCDNR however, some samples had to be resorted to conform to quality control standards for sorting accuracy. Taxonomic identification and enumeration of infauna is ongoing with 22 of the 34 samples completed.

Data entry and checking is in progress.

Tidal Creek and Open Water Studies

Ten sites were sampled in the May River estuary in July 2023, six sites in the mainstem and four sites in adjoining tidal creeks.

Objective 1: Water quality

At all 10 stations, 30 instantaneous water quality measurements were collected; one each at three depths: near-surface, mid-water column, and near-bottom. Water quality loggers were deployed at all 10 sites for 25 hours collecting 15-min interval water quality data near-bottom for a total of 100 data points collected per site. Two water samples were collected from each site (20 total) for nutrient analysis. Two water samples were collected from each site (20 total) for bacteria analysis. Two water samples were collected from each site (20 total) for Chlorophyll-*a* analysis. Secchi disk measurements were taken at nine sampling sites while one open water site was missed.

Water logger data has been downloaded and quality checked. 20 water samples were sent to Chesapeake Bay Laboratory for nutrient analysis, sample processing is in progress and SCDNR is awaiting results. SCDNR processed 20 samples each for *Enterococcus* and fecal coliform bacteria and Chlorophyll-*a* concentrations.

Data entry and quality checking is in progress.

Objective 2: Sediment Quality

10 sediment samples each were collected for grain-size composition, chemistry, Microtox, Total Organic Carbon (TOC), microplastics, and contaminants. Twenty sediment samples were collected for pore water analysis representing two replicates per site.

One replicate sediment sample from each site was processed for the porewater analysis for a total of 10 samples. Chemistry, Microtox, and contaminant samples were sent to a NOAA laboratory for analysis, processing is in progress and SCDNR is awaiting results. TOC samples were sent to the GEL Laboratories here in Charleston for analysis and the results have been incorporated into the sediment quality data set. Sediment composition samples are scheduled to be processed by SCDNR beginning 3/27/2024.

Data entry and quality checking is in progress.

Objective 3: Biological Communities

Two trawl tows were completed at each site for a total of 20 samples. Catch was identified to lowest practical taxonomic level, enumerated, and up to 30 specimens of select species were measured.

Two replicate benthic grab samples were collected from each site for a total of 20 samples. One replicate benthic grab sample from each site was sort by SCDNR and the taxonomic identification and enumeration of infauna is in progress with 8 of 10 completed.

Data entry and checking is in progress.

Oyster Studies

Habitat trays:

The Shellfish Research Section (SRS) placed habitat trays, each containing approximately two gallons of clean, loose oyster shell were placed at six locations in the May River watershed on April 17, 2023 (Figure 1). Two sites were chosen in each of the upper, mid, and lower watershed areas, based upon previous efforts. At each location, three trays were placed, for a total of 18 deployed.

In this current reporting period Shellfish Research Section (SRS) staff scheduled the retrieval of habitat trays placed on April 17, 2023. Retrieval is scheduled for April 8, 2024, approximately one year following deployment, as indicated in the scope of work.

Demographic samples:

The SRS collected demographic samples on August 14 – 15, 2023 at locations near the habitat trays (Figure 1). At each sample location triplicate quadrat samples were collected using a 0.0625 m² quadrat. Samples were returned to the SCDNR laboratory, and all live and recently dead oysters were enumerated and measured and the data entered into a secure Access database maintained on secure SCDNR servers.

Disease and oyster health:

On the August 14 – 15, 2023 field days, SRS staff also collected oysters for the assessment of the oyster diseases Dermo (*Perkinsus marinus*) and MSX (*Haplosporidium nelsoni*), and for the assessment of several other oyster health metrics. At each of the six sites, 30 individual oysters were collected for Dermo and MSX and 30 individual oysters were collected for other oyster health metrics. Oysters were collected by stretching a tape along the reef at the approximate mean low water line, as determined by RTK GPS, and collecting oysters near the tape. Dermo and MSX samples were returned to the SCDNR laboratory where individual oysters were shucked and dissected. Dissected tissues were placed in formalin on August 17 – 18, 2023. Because the process is time-sensitive, all dermo samples were processed and read from August 24 – September 1, 2023, and the results are entered into spreadsheets on secure SCDNR servers. MSX samples, which are not time sensitive, are stored in the SCDNR

laboratory and are scheduled for processing in the winter of 2023 – 2024. The 30 individual samples collected at each site for additional oyster health metrics were placed immediately on ice in the field and transported to the SCDNR campus at Fort Johnson, where they were delivered to NOAA staff on either the afternoon of collection or the following morning.

In this reporting period SRS staff began the histological processing of MSX oyster disease samples which were previously stored in formalin in the laboratory. All 30 samples have undergone the initial processing step of deliquefying the samples and embedding them in wax. The next step, during which the embedded samples are thinly sliced, stained, and cover-slipped, is ongoing.

Time Period	Project Segment	Status
Spring 2023	Deployment of oyster trays (not Town funded)	Complete, to be retrieved in 2024
Early July 2023	Project start	Documents signed 7/21/23
July-August 2023	Field sampling (tidal creeks, open water sites and oyster disease/demography)	Field sampling complete. Tidal creek, open water sites, oysters.
Fall/Winter 2023	Laboratory analyses incl. QAQC	In progress
Winter/Spring 2023/2024	Data analyses incl. QAQC. Collection of oyster trays	
Spring/Summer 2024	Writing and analysis	
Fall 2024	Report complete	
December 2024	Project end	



Figure 1. Locations of habitat trays and quadrat data collection by the SCDNR Shellfish Research Section in the May River watershed.