

May River Project: Assessing Change After 20 Years

Progress Report to Town of Bluffton

9/26/2024

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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 analyses.

Water logger data have been downloaded and quality checked. Twelve water samples were sent to the Chesapeake Bay Laboratory for nutrient analysis, and the results of these analyses have been incorporated into the water quality data set. SCDNR research staff processed 12 samples for *Enterococcus*, fecal coliform bacteria, and chlorophyll-*a* concentrations.

Data entry and quality checking has been completed.

Objective 2: Sediment Quality

Forty sediment samples were collected to determine grain-size composition (7 samples from each creek except for Brighton Beach where only 5 samples were collected due to hazardous conditions in the upper portion of the creek). Six sediment samples (one per creek) were collected to evaluate sediment chemistry, Microtox, and pore water composition.

Six porewater samples were processed by SCDNR research staff. Six chemistry and six Microtox samples were processed by NOAA collaborators and the data have been received by the SCDNR research team. Sediment composition sample processing by SCDNR staff has been completed.

Data entry and quality checking has been completed.

Objective 3: Biological Communities

Thirty-four benthic grab samples were collected from each creek (6 samples from each creek except at Brighton Beach where only 4 samples were collected due to hazardous conditions in the upper portion of the creek).

All 34 benthic grabs have been sorted by SCDNR research staff. Taxonomic identifications and enumerations of infauna have been completed. Taxonomic QA/QC of specimens collected in headwater tidal creek benthic grab samples has been completed by SCDNR research staff.

Data entry and checking have been completed.

Tidal Creek and Open Water Studies

Ten sites were sampled in the May River estuary in July 2023: 6 sites in the mainstem and 4 sites in adjoining tidal creeks.

Objective 1: Water quality

At all 10 stations, 30 instantaneous water quality measurements were collected; one at each of 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 (total n =20) for nutrient analyses. Two water samples were collected from each site (total n =20) for bacteria analysis. Two water samples were collected from each site (total n =20) for chlorophyll-*a* analysis. Secchi disk measurements were taken at 9 sampling sites, while one open water site was not sampled.

Water logger data has been downloaded and quality checked. Twenty water samples were processed by collaborators at the Chesapeake Bay Laboratory for nutrient analysis and the SCDNR research team has received the results. SCDNR research staff have processed 20 samples each for *Enterococcus*, fecal coliform bacteria, and chlorophyll-*a* concentrations.

Data entry and quality checking have been completed.

Objective 2: Sediment Quality

Ten sediment samples each were collected to determine grain-size composition, sediment chemistry, Microtox, total organic carbon (TOC), and contaminant levels. Two sediment samples were collected for pore water chemistry analysis at each site (total n =20).

Sediment chemistry, Microtox, and contaminant levels were evaluated by NOAA collaborators, and the SCDNR research team has received the results. Samples to quantify total organic carbon (TOC) were processed by GEL Laboratories in Charleston and the results have been incorporated into the sediment quality data set. Sediment grain size composition and porewater chemistry processing by SCDNR researchers has been completed.

Data entry and quality checking have been completed.

Objective 3: Biological Communities

Two trawl tows were completed at each site (total n = 20). Organisms retained as part of each catch were identified to the lowest practical taxonomic level and enumerated. Up to 30 specimens of select species were also measured.

Two replicate benthic grab samples were collected from each site (total n = 20). One replicate benthic grab sample from each site was sorted and retained organisms were identified to the lowest taxonomic level. Taxonomic QA/QC of specimens collected in tidal creek and open water benthic grab samples has been completed by Poseidon Taxonomic Services. Results have been incorporated into benthic fauna data sets.

Data entry and quality checking have been completed.

Oyster Studies

Habitat trays:

The Shellfish Research Section (SRS) at SCDNR's Marine Resources Research Institute (MRRRI), placed habitat trays (0.14 m² surface area mesh-covered plastic tray), each containing approximately two gallons of clean, loose oyster shell at 6 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, with the intention to mirror previous efforts. At each location, 3 habitat trays were deployed (total n = 18).

SRS staff retrieved the 18 habitat trays, approximately one year following the deployment, on April 8, 2024. Habitat tray samples were processed in the laboratory at the MRRRI. For each tray, all live and recently dead oysters and spat were counted and measured using digital calipers and all data were entered into a digital database on secure SCDNR servers. Additionally, key fauna, including 6 species of fish, crabs, and shrimp, were identified and enumerated.

Oyster demographic samples:

SRS staff collected oyster (*Crassostrea virginica*) 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 MRRRI laboratory, and all live and recently dead oysters were enumerated and measured and the data were 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 30 oysters from each site for the assessment of the highly prevalent oyster diseases Dermo (caused by *Perkinsus marinus*) and MSX (caused by *Haplosporidium nelsoni*). 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 MRRRI 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 were entered into spreadsheets on secure SCDNR servers. MSX samples, which are not time sensitive, were stored in the SCDNR MRRRI laboratory and are being processed.

All histological processing of MSX oyster disease samples which were previously stored in formalin in the laboratory has been completed. All 30 samples have been deliquesced, embedded in wax, thinly sliced,

mounted on microscope slides, stained and cover-slipped. The next step will include reading the prepared slides to determine the prevalence and intensity of MSX oyster disease.

At each site, an additional 30 individual oysters were collected for other oyster health metrics. These samples were placed immediately on ice in the field and transported to the SCDNR MRRI at Fort Johnson, where they were delivered to NOAA staff on either the afternoon of collection or the following morning.

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	In progress
Spring/Summer 2024	Writing and analysis	In progress
Fall 2024	Report complete	
December 2024	Project end	

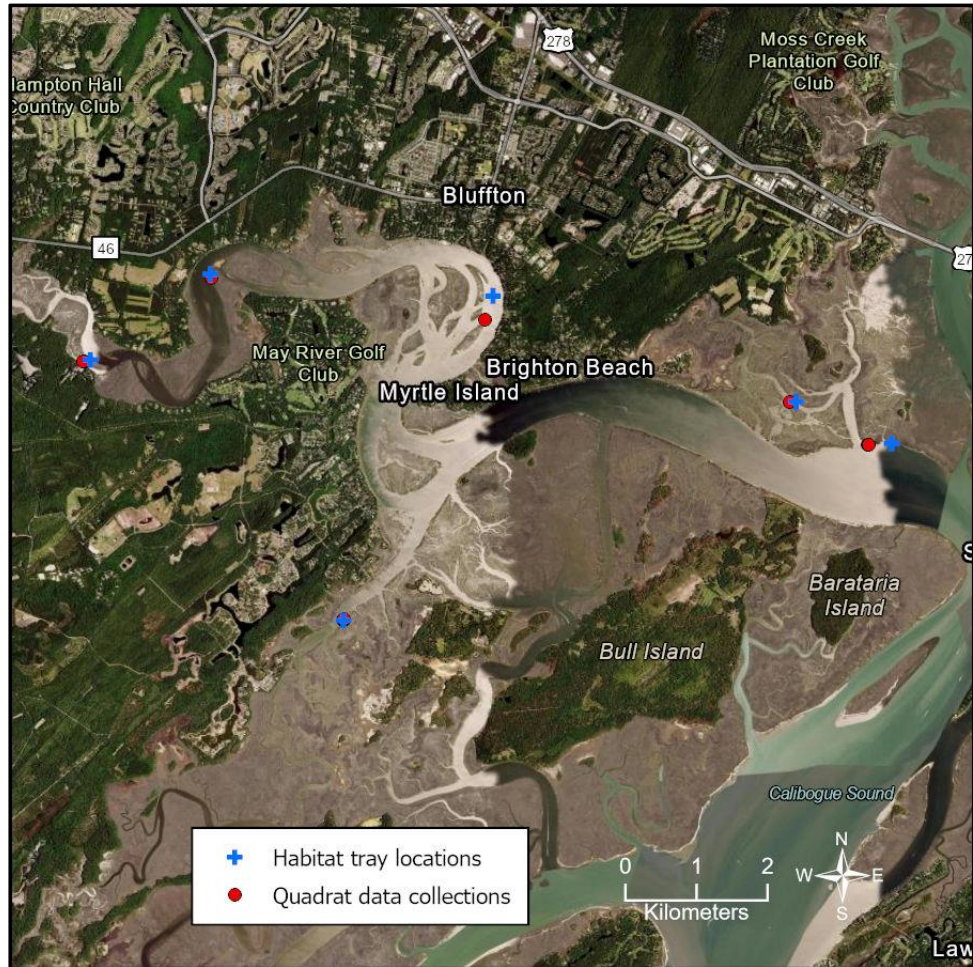


Figure 1. Locations of habitat tray deployments and quadrat data collections by the SCDNR MRRI Shellfish Research Section (SRS) research team in the May River watershed.