

Volunteer-based stewardship of Murrells Inlet drives watershed-based management efforts targeted at improving water quality in tidal creeks

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Background

Murrells Inlet, SC is a regional destination, known for its seafood and water-based recreational activities. The cultural identity of Murrells Inlet has been closely tied to the adjacent tidal creeks and estuary for generations. In 2008, a Volunteer Water Quality Monitoring Program (VWQMP) was implemented in Murrells Inlet, monitoring eight locations.

A fecal coliform Total Maximum Daily Load for Murrells Inlet was approved in 2005. In the past decade there has been an increase in shellfish bed closure areas due to the presence of fecal coliforms. The Volunteer Water Quality monitors saw the increase in closure areas and in the span of a year have had a large impact on the future management in Murrells Inlet. The citizen scientists have become active participants in the future management and their role as volunteer water quality monitors has given them direct access to the decision makers.



Figure 1. Volunteer Monitor collecting a water sample from tributary discharging into a tidal creek.

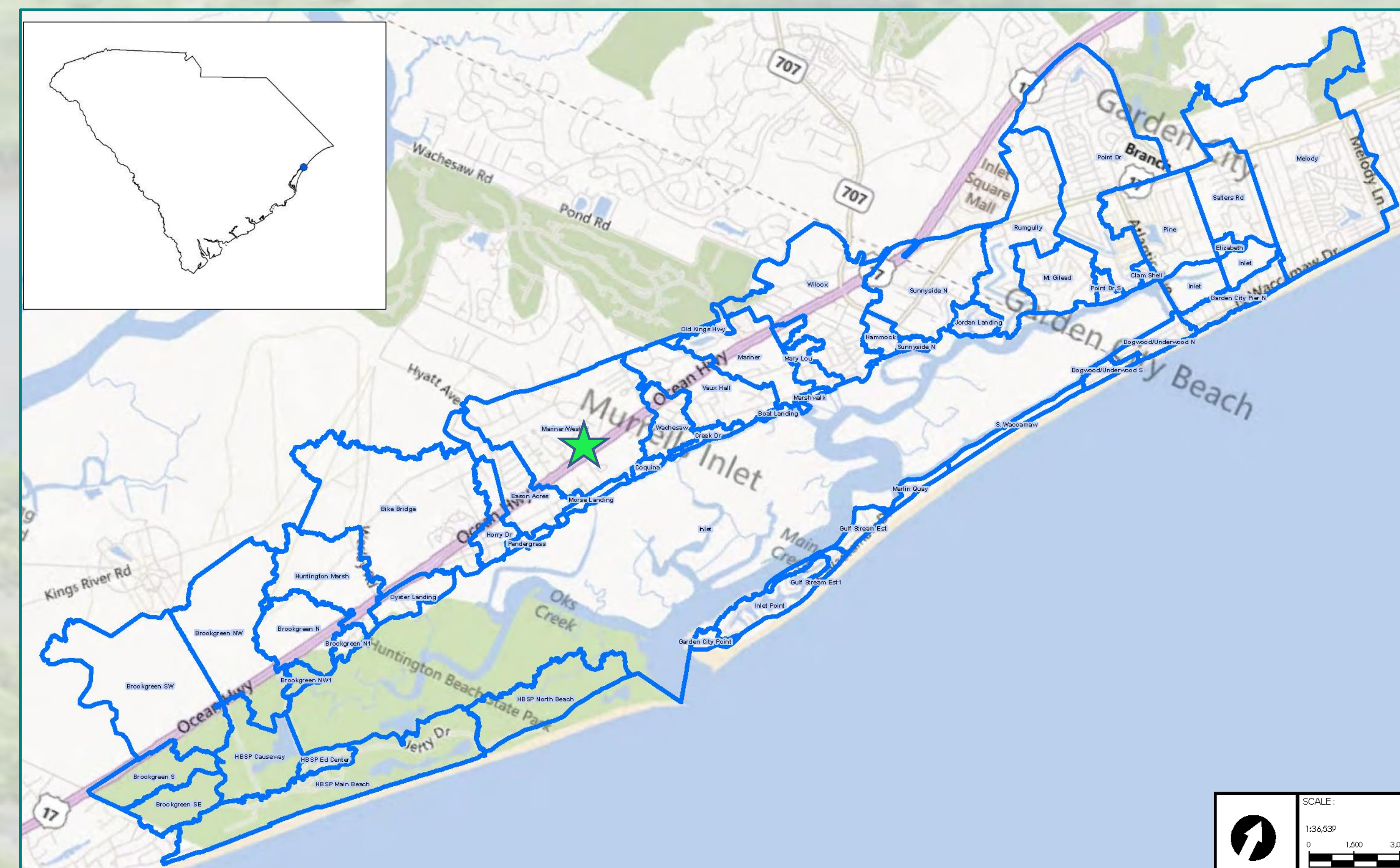


Figure 2. The blue polygons represent individual sub-watersheds that feed into Murrells Inlet, developed for the watershed planning process.

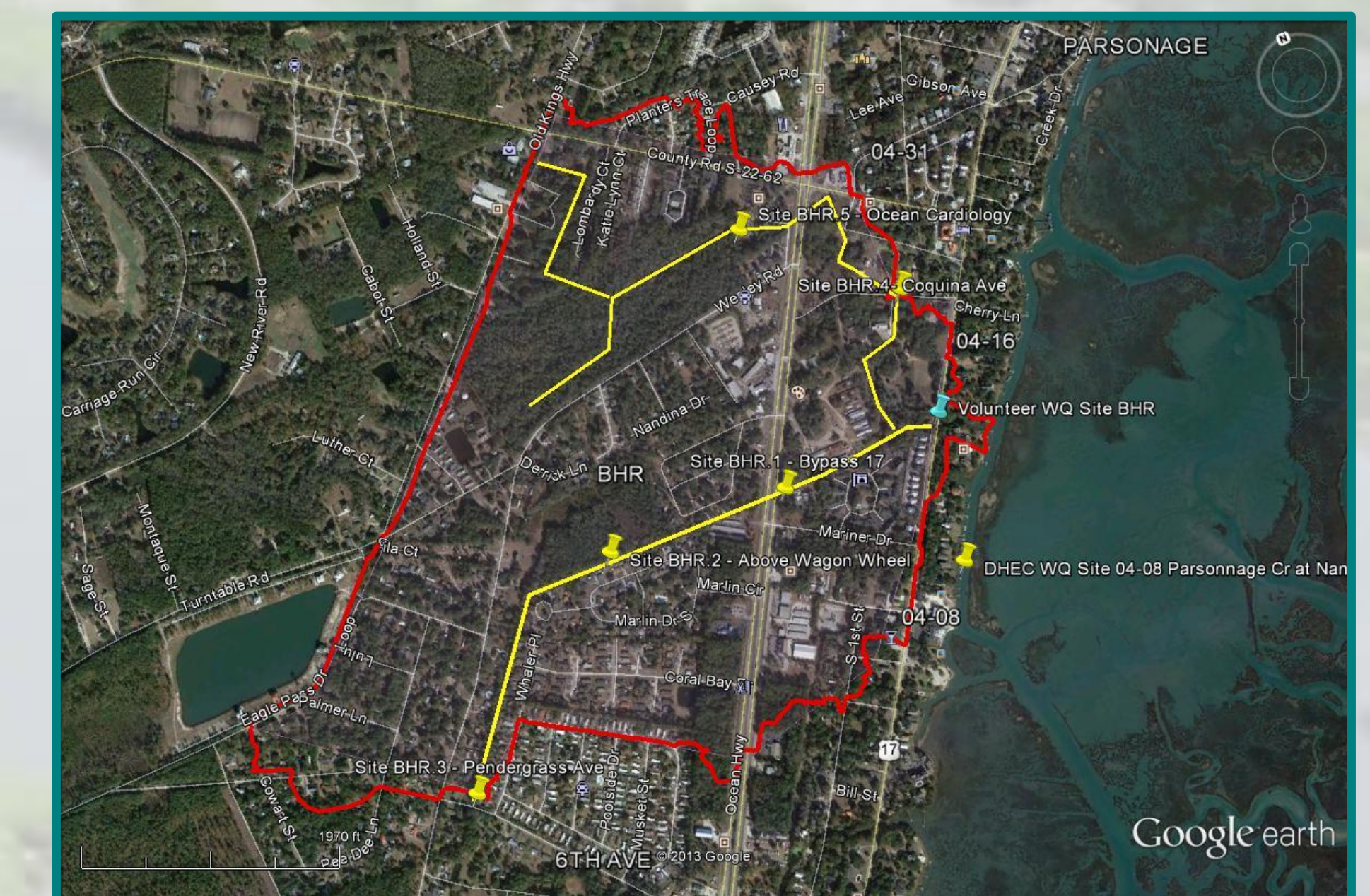


Figure 3. Map of volunteer-based upstream sampling plan in one of the sub-watersheds, which is noted by a green star on Figure 2.

Management Directions

The VWQMP has enabled the volunteers to take ownership of their data and understand the implications of water quality in the tidal creeks. By the conclusion of the 2012 Annual Data Conference, the volunteers had made it clear to the local decision makers that it was time to move forward. After 4 years of data collection, it was clear that some of the tributaries were likely contributing high levels of bacteria into the inlet. Three main projects started in the following year, all at the direct behest of the volunteers.

1. Performance of Microbial Source Tracking using qPCR assays

In recent years Coastal Carolina University's (CCU) Environmental Quality Laboratory has been developing and building local Microbial Source Tracking capabilities. This new tool facilitates improved and expanded partnerships with local stormwater managers throughout the region to better identify possible sources of stormwater pathogens. The volunteers requested the work be expanded to include Murrells Inlet. This has included the use of genotypic and chemical tracers to better resolve host animal sources of fecal bacteria. Horry County stormwater managers worked with CCU to set up sampling sites. Nine sites were sampled under the initial phase, and plans are underway to expand to additional sites in the watershed.

2. Development of a Watershed-based Plan

The volunteers recognized that in order to move forward in a meaningful and coordinated way, a watershed plan would have to be developed. It was acknowledged that developing a watershed plan would open up funding opportunities for future water quality improvement projects. Almost immediately partners were engaged and six months later funds were in hand to do a formal watershed plan for Murrells Inlet with funding from USEPA's 319 program. The volunteers have been active participants in the planning process, assisting with identification of potential legacy sources.

3. Volunteer-based microbial source tracking using upstream monitoring


The volunteers desired to expand their existing volunteer monitoring activities and implemented upstream monitoring on 4 priority tributaries that feed into the tidal creeks of Murrells Inlet (Figure 3). The volunteers took upon themselves the site selection, sought permission of property owners and created sampling plans based on existing Volunteer Monitoring protocols. One of the goals of the additional monitoring was to assist in finding potential pathogen hot spots. While no point sources were identified during the expanded monitoring, the information is being used to assist with the development of the sampling plan for the second phase of qPCR-based Microbial Source Tracking efforts in Murrells Inlet.

Conclusion

The VWQMP has provided a platform for citizens to become active, involved and most importantly influential in their community. Through their diligent and timely efforts, additional information is now available to better inform development and implementation of the watershed-based plan. Action items in the watershed plan are better able to be targeted during plan development. The volunteers are now highly motivated to continue monitoring to document water quality improvements that should arise from implementation of their management recommendations.


Acknowledgements

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MURRELLS INLET, S.C.
Volunteer Water Quality Monitoring Program

For more information and data, go to:
<http://bccmws.coastal.edu/volunteermonitoring/>
Then select a program to view and choose: Murrells Inlet
For more information, email: VMWQ@coastal.edu



Murrells Inlet, S.C.
Volunteer Water Quality Monitoring Program

PARAMETERS SAMPLED:
Water Temperature • Dissolved Oxygen • pH • Nutrients • Turbidity
Salinity & Conductivity • Total coliform & E. coli bacteria

Sponsors:

