

SECOORA Modeling and Reporting Workshop

January 30–31, 2025

Scientists and managers use data to protect human health

The Southeast Coastal Ocean Observing System Regional Association (SECOORA) hosted a workshop in Wilmington, North Carolina from January 30–31, 2025, as a follow up to previous nowcasting workshops. The Coastal Predictions Workgroup has generated several prediction and reporting tools in Southeastern states, which were discussed, as well as new and potential future tools. These tools should be strongly connected to shellfish and recreational water quality decision making. Participants included representatives from state departments of health and state shellfish sanitation decision makers, data providers, modelers, and other data users. Several topics were discussed during the workshop, including:

- Existing and future communication outputs and platforms
- Modeling methods and techniques to predict coastal conditions
- Data sources and inputs (e.g., Enterococci, fecal coliform, closures, rainfall, sunlight, salinity, tides, wind, waves, temperature) currently available and future needs
- How to improve existing tools to maximize their utility for decision makers
- Establish future research and analysis objectives

The workshop provided rich discussion and brainstorming for temporary beach swimming advisory and shellfish closure decision making.

Prediction and reporting tools

How's the Beach?

How's the Beach? aims to assist public health, beach management, and tourism with informed decision making, by providing daily nowcasts for recreational water quality at selected swimming beaches and recreational waters. For more information visit <https://howsthebeach.org/>.

ShellCast

ShellCast creates predictions of temporary shellfish area closures based on rainfall forecasts, reporting probable unit closures for the next three days. The reports can be received via text or email or found at go.ncsu.edu/shellcast.

Beach Conditions Reporting System

The Beach Conditions Reporting System (BCRS) is a volunteer-based program that reports on conditions at participating locations. The BCRS aims to protect public health and enhance the beachgoing experience with informed decision making. See <https://visitbeaches.org/>.

Sonde-based NowCasting

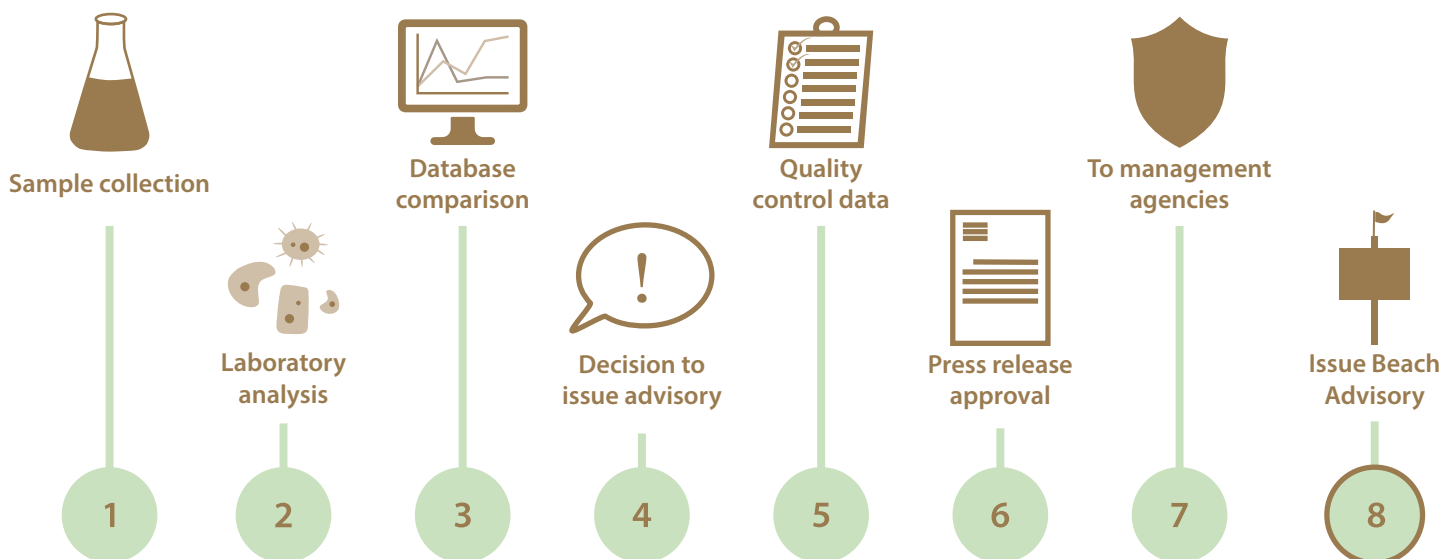
This project aims to improve understanding of coastal water quality by using targeted sampling to develop models that estimate fecal bacteria concentrations in coastal waters. This system is in development as part of an ongoing PhD project.



Streamlining beach swimming advisories

Recreational swimming advisories are based on water quality analysis results. Advisories need to be accurate and issued as swiftly as possible to protect public health and safety. Decision-makers from North Carolina provided insight into the process that leads to a beach swimming advisory. The process includes water sampling and laboratory analysis, which is repeated if the sample exceeds the state fecal indicator bacteria threshold. If the exceedance is confirmed, a decision is made to issue the advisory, which includes issuing a press release to management agencies, and posting the beach advisory using signage.

For high use recreation areas like beaches, the potential presence of disease-causing pathogens needs to be communicated as quickly and clearly as possible, as direct contact with the water puts people at risk for adverse effects. However, regular sampling and analysis takes time. As a result, swimming advisories might be 1-2 days after water samples are first taken. Rainfall-based thresholds or predictive tools could enable precautionary advisories that could be issued before results of the water samples are known, and reduce risk to the public. Community outreach, communication, and education improvements could increase public awareness around important pollution issues and future closures.



Decision-making process for beach swimming advisories as a result of high bacteria levels.

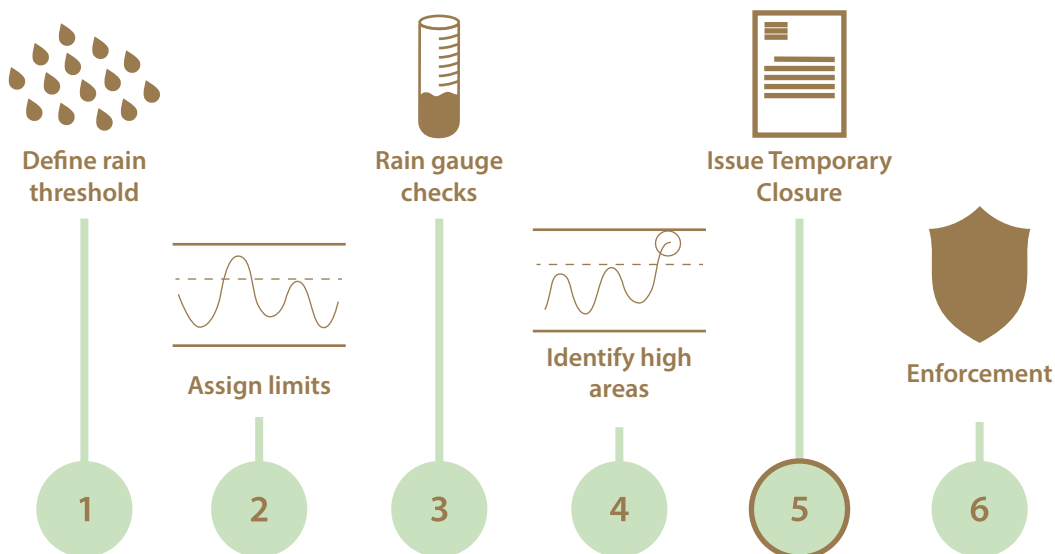
Beach advisory sign in Myrtle Beach, SC. Photo Credit: Heath Kelsey.



Maintaining shellfish food safety

Water quality at shellfish growing areas is important for the health of the shellfish, and for the health of those who consume them. Excessive rainfall and stormwater runoff can cause high bacteria in shellfish waters. Shellfish can ingest and concentrate pathogens from this stormwater, so rainfall totals are closely monitored to ensure that shellfish are not harvested when bacteria levels may be high. Historical records are used to identify rainfall amounts that typically result in high bacteria concentrations for specific shellfish growing areas. Rain gauges are checked in the morning, areas surpassing rainfall thresholds are identified, and a temporary harvest closure is implemented. Anyone found harvesting at a closed area is required to dispose of the entire day's harvest.

The process to reopen a closed shellfish area begins days to weeks following the end of the rain event. Water quality samples are analyzed until samples fall below the threshold bacteria levels, and the temporary closure is released. The thresholds that dictate closures and reopening of shellfish areas vary by state, type of water body, and local conditions. Additional research to review the relationship of rainfall to bacteria and to understand the time required for bacteria counts to return to normal following exceedance of rainfall thresholds could help regulators streamline procedures that benefit harvesters and protect public health.



Decision-making process for shellfish harvest area closures due to rainfall amounts that can result in poor water quality and risk to consumers.

Oystering in Apalachicola Bay. Photo credit: Stan Kirkland/Florida Fish and Wildlife.



Improving tools for the future

While many useful tools are available to manage shellfish and recreational waters, there are barriers to use these tools. In the workshop, several key barriers were identified, including lack of human capacity, equipment needs, data accessibility and confidence, and approval procedure challenges. Participants discussed ways to overcome these challenges.

Several research needs were identified that can provide meaningful information for recreational and shellfish decision making. For recreational waters, analysis of rainfall and Enterococci data would allow establishment of rainfall-based thresholds that would trigger precautionary advisories for days when water sampling results are not available. Additionally, examining the effect of stormwater infrastructure modifications could be used to assess the effectiveness of infrastructure investments. For shellfish harvest areas, creating standard data analysis methods for creation of rainfall-based thresholds for closure of conditionally approved shellfish harvest areas and for assigning the time required for re-opening harvest areas after closure would create consistency in methodology between states and regions. For recreation and shellfish decision making, new tools on harmful algal blooms and *Vibrio* bacteria should also be developed.



Participants discuss barriers to action. Photo Credit: Alex Fries.



Attendees of the SECOORA Forecasting Workshop in Wilmington, NC.

Acknowledgments

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