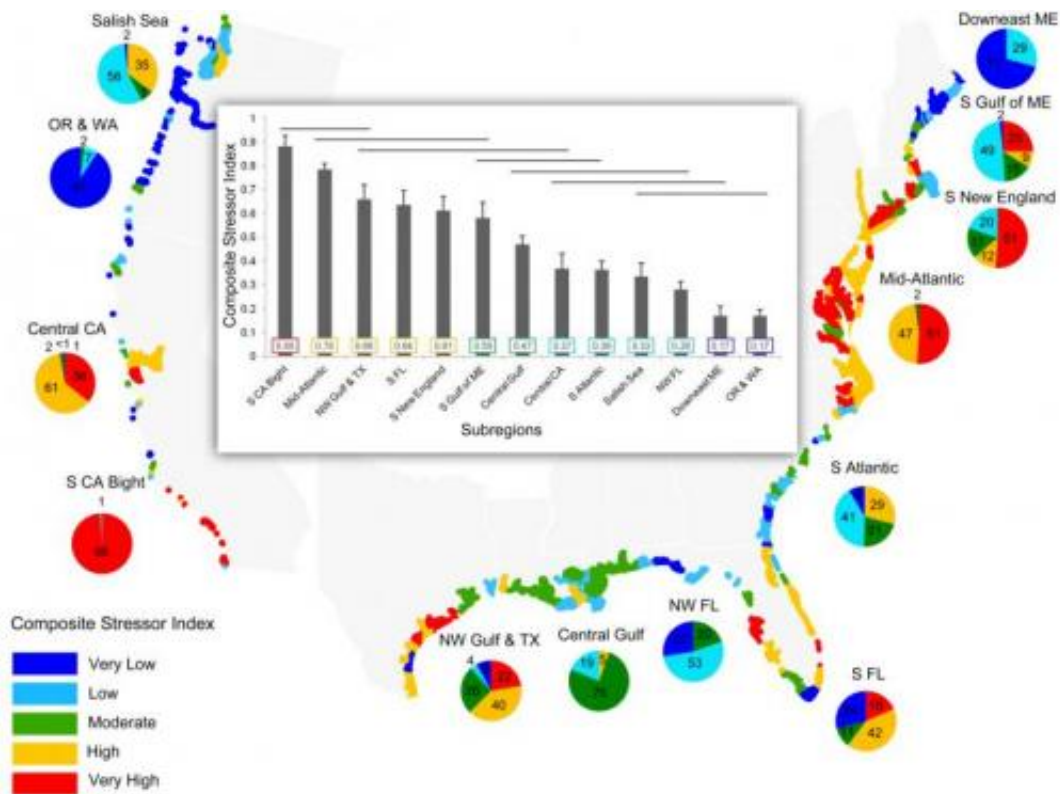


# Project serves up big data to guide managing nation's coastal waters

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These are the scores for the composite stressor index; map shows scores for individual estuaries, while pie charts represent the percentage of total estuarine area for each subregion falling within each of five index categories (very low to very high based on index quintiles). In the center bar chart, dark gray vertical bars represent the mean of the individual estuary composite stressor index scores within each subregion. Credit: Michigan State University

When it comes to understanding America's coastal fisheries, anecdotes are gripping – stories of a choking algae bloom, or a bay's struggle with commercial development. But when it comes to taking action, there's no beating big data.

In this week's edition of *Estuaries and Coasts*, a Michigan State University doctoral student joins with others to give a sweeping assessment to understand how human activities are affecting estuaries, the nation's sounds, bays, gulfs and bayous. These are places where freshwater flows into the oceans, and the needs of the people blend with a wide variety of fish and shellfish that support both commercial and recreational fishing.

This first comprehensive look at changes in land cover, river flow, pollution and nutrient levels offers a comprehensive look at the state of America's estuaries.

It's a first look for a lot of eyes. Estuaries are tended to by many agencies at the federal, state, local and non-profit levels. Land use changes, through commercial and residential development, farming and industrial activities, can threaten delicate ecosystems that nurture valuable fishing resources. Yet many of these managers don't have the resources to examine long-term changes, or compare themselves to other ecological systems, said Joe Nohner, who is pursuing a PhD in fisheries and wildlife in the Center for Systems Integration and Sustainability.

"Estuaries provide ecosystem services for commercial and recreational purposes, and are important to us all," Nohner said. "But groups charged with protecting them need to determine what areas should receive their funding and effort. They don't always have the broad-scale data to help set these priorities. What we've created is an informational tool that helps them determine what problems to address and where."



This is an estuary -- where freshwater rivers flow into the ocean. Credit: USGS

The project gathered and crunched a nation's stockpile of data gleaned from monitoring an [estuary](#)'s stressors. Taking a big-picture view, from small river mouths to large deltas over a decade or more tells a crucial story of what is happening.

These individual stories – reflecting sewage leaking into a river, deforestation thanks to recent urbanization and changes in the flow of a watershed – are compiled into a broad narrative.

"There's a myriad of ways we impact our land and waterways, and we've been able to create an overview of the cumulative changes of a lot of small decisions that normally slip under the radar," Nohner said. "It can be hard to have that cumulative perspective, especially for areas being managed by small organizations."

Project overview figureThe estuary assessment was part of a nationwide assessment of estuaries, rivers, and reservoirs produced by the National Fish Habitat Partnership. A map of the results and data downloads are available online so managers can not only have information about their

corner of the fisheries world, but how it compares to others.

"It gives a metric to compare themselves to others so they can lobby for funding and resources," Nohner said. "It gives them the ability to say 'this is how we stack up to others,' or 'we're doing great so we need resources to preserve this ecosystem.' This assessment gives small groups leverage, and it gives big groups context."

**More information:** "A National Assessment of Stressors to Estuarine Fish Habitats in the Contiguous USA" *Estuaries and Coasts*, 2014.

Provided by Michigan State University

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