**AquaSmart Planning: Advanced Spatial Analytical Approaches Improve Confidence and Transparency in Aquaculture Site Selection**

KENNETH L. RILEY\*, LISA C. WICKLIFFE, JONATHAN A. JOSSART, and

JAMES A. MORRIS, Jr.

 NOAA National Ocean Service

National Centers for Coastal Ocean Science

 Coastal Aquaculture Siting and Sustainability Program

101 Pivers Island Road

Beaufort, North Carolina 28516

[ken.riley@noaa.gov](file:///%5C%5CNCCOS-S-NCNAS01%5CProjects%5CCAPES_Aquaculture%5CPresentations%5CFY2016%5C001%20WAS%20Las%20Vegas%5CSpatial%20Planning_KLR%5Cken.riley%40noaa.gov)

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With new policies and plans for aquaculture development, the Gulf of Mexico has garnered significant interest from the aquaculture industry, forward-thinking fishermen, and investors that are inspired to bring sustainable seafood, wild and farmed, to market. The Gulf region could support a vibrant finfish aquaculture industry with its warm waters, suitable depths and currents, and access to working waterfronts, processing plants, and wholesale businesses within more than 400 coastal communities. Planning for offshore aquaculture operations in the Gulf of Mexico requires careful spatial and temporal consideration given the diversity of coastal communities, shared natural resources, and multiple ecosystem services provided in the region. A critical element needed by coastal resource managers and stakeholders is awareness and confidence to use science-based decision tools to inform regulation, environmental protection, and equitably resolve points of resistance to industry development.

NOAA is committed to supporting an aquaculture industry that is economically sustainable and environmentally and socially responsible. As part of NOAA’s National Centers for Coastal Ocean Science, the Coastal Aquaculture Siting and Sustainability (CASS) program specializes in understanding environmental interactions of aquaculture within marine ecosystems. The CASS team of multidisciplinary scientists and engineers are working with partners throughout the Gulf region to provide spatial planning and siting guidance for aquaculture development. The aquaculture industry and coastal resource managers in this region need high quality and reliable spatial data products to make smart management and business decisions. CASS has significantly invested in developing innovative web-based mapping applications such as [OceanReports](https://coast.noaa.gov/digitalcoast/tools/ort.html) and the [Gulf AquaMapper](https://coastalscience.noaa.gov/news/new-aquamapper-tool-available-permitting-siting-aquaculture-gulf-mexico/). These online tools support exploration, permitting, and siting of offshore aquaculture.

[OceanReports](https://coast.noaa.gov/digitalcoast/tools/ort.html) is the most comprehensive web-based spatial assessment tool for exploring the coastal ocean. Users can select an ocean space and instantaneously obtain over 80 unique infographics containing analyses of the location, its energy and minerals, natural resources, transportation and infrastructure, the oceanographic and biophysical conditions, and the local ocean economy. Users can then select infographics of interest, explore pertinent ocean data through interactive popups and visualizations, toggle each layer related to infographic content, share results, and print reports to inform various permitting processes. OceanReports was developed from the largest known compilation of U.S. ocean data, encompassing over 150 essential data sets, which have been processed for optimal spatial and temporal resolution within an interactive tool.

The [Gulf AquaMapper](https://coastalscience.noaa.gov/news/new-aquamapper-tool-available-permitting-siting-aquaculture-gulf-mexico/) is an easy-to-use online mapping tool used in screening and scoping sites for marine finfish aquaculture in the federal waters of the Gulf of Mexico. The tool was conceived working with partners throughout the Gulf region to provide planning and siting guidance for aquaculture development. Because of the growing complexity of environmental analyses and the high cost of data acquisition, the Gulf AquaMapper was developed to gather authoritative coastal and environmental intelligence that could be used in planning, scoping, and authorizing ocean use to allow for aquaculture development. The tool compiles data that can be used to determine potential major and minor constraints for aquaculture in the Gulf region. Coastal resource managers and industry can explore and screen areas that may already have multiple existing uses, improving decision-making before entering into the actual permitting process for siting a farm. Streamlining the process prevents coastal managers and offshore aquaculture investors seeking permits with logistical and economic inefficiencies. Data layers in the Gulf AquaMapper are standardized so operators have access to authoritative data to use in the site selection process. Data layers in the Gulf AquaMapper are organized in a way that aids users in looking at major ocean constraints first (e.g., military, navigation, industry) as well as conditional constraints (e.g., sensitive habitats, protected species) that may require in-depth consultation with federal agencies. The Gulf AquaMapper does not provide analyses, but can be used in concert with OceanReports by allowing users to add data from other web services or data files, and to select features to analyze further.

CASS provides marine spatial planning support for aquaculture through screening, alternative siting, and precision siting analyses. Using a form of a Multi-Criteria Decision Analysis (MCDA), a suitability analysis, areas can be screened alternative siting analyses can then occur. This form of suitability analysis examines numerous spatial data layers in an area of interest and identifies low conflict areas with site characteristics suitable for aquaculture. Precision siting is then performed using the best available high-resolution spatial data. These aquaculture siting analyses involve the use of geospatial analytical tools (e.g., GIS – Geographic Information Systems) to integrate pertinent spatial data and generate map products that can be used to inform policy and permitting decisions regarding where operations can be located.