



The National Centers for Coastal Ocean Science (NCCOS) provides foundational science and services supporting the U.S. aquaculture industry. NCCOS' contribution to the growth of aquaculture builds on a long history of using ocean intelligence to guide coastal development and directly supports the President's Executive Order 14276, "[Restoring American Seafood Competitiveness](#)."

NCCOS informs aquaculture development by implementing a data-driven marine spatial planning process. Marine spatial planning identifies optimal locations for farming by identifying coastal areas that have minimal conflicts with other industries and services (such as oil and gas wells, commercial fishing, and shipping lanes) and ideal environmental conditions for farming. This process has improved regulatory efficiencies, enhanced interagency and intergovernmental collaboration, reduced costs and delays in commercial development, and engaged stakeholders in a transparent regulatory process.

## Developing Aquaculture Opportunity Areas

At a regional scale, NCCOS conducts marine planning to inform siting of [Aquaculture Opportunity Areas](#) (AOAs) which are defined geographic areas containing relatively suitable sites for sustainable commercial aquaculture. AOA development is a multi-year process that involves engaging stakeholders, identifying important data and conflicts, and developing a comprehensive data inventory for the coastal ecosystem. This inventory includes data layers relevant to administrative boundaries, national security (i.e., military), navigation and transportation, energy and industry infrastructure, commercial and recreational fishing, natural and cultural resources, and oceanography.

NCCOS' Aquaculture Atlases are comprehensive spatial studies that identify options for siting AOAs. NCCOS has led regional spatial studies for the Gulf of America, the Southern California Bight, and state waters of Alaska, constituting the most comprehensive spatial studies to site coastal industries to date. This work is done in partnership with NOAA's National Marine Fisheries Service (NMFS) Office of Aquaculture, NMFS Regional Offices, state and federal management agencies, tribes, foundations, regional associations, and private sector stakeholders.





# The Science to Grow Aquaculture in the U.S.

## Supporting Business Development and Permitting

On a local scale, NCCOS uses spatial data and models to inform individual projects, assisting industry by informing business planning and making federal and state permitting more efficient. These detailed site assessments identify environmental parameters involved in siting, including physical (e.g. coastal topography, bathymetry, sediment type), chemical (dissolved oxygen, turbidity, organic matter) and biological (chlorophyll, harmful algal blooms, predators) factors, as well as the nutrient discharge and environmental effects of the fish farm. NCCOS is currently supporting:

- Finfish aquaculture in New Hampshire, New York, Florida, and California
- Kelp and shellfish farm development in Southern California, and Rhode Island
- Shellfish aquaculture in New England
- Siting framework development for Hawaii



*Aquaculture projects supported by NCCOS throughout the U.S.: (from left) Net pen farming in Hawaii, kelp farming in California, and clam harvesting in Florida.*

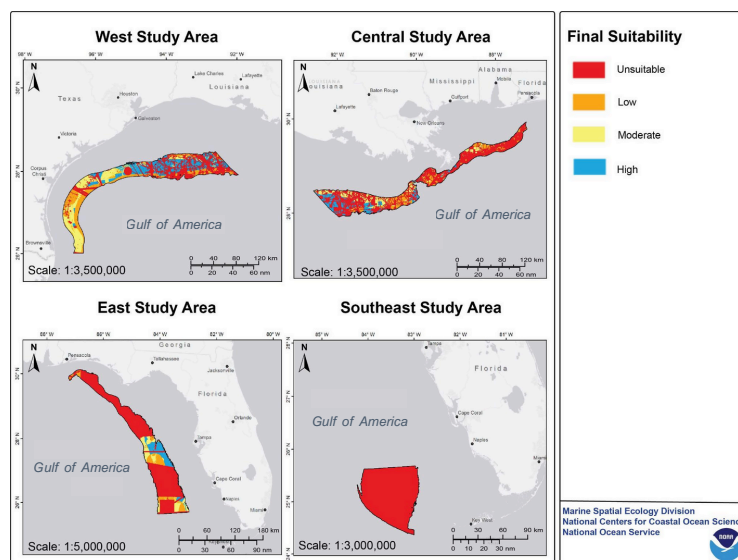
## Providing Planning Tools

NCCOS has developed [The Coastal Aquaculture Planning Portal](#), a suite of coastal planning tools designed to assist managers, planners, and industry with sustainable aquaculture development. Some successful tools include:

- [OceanReports](#), an automated spatial planning tool
- [National AquaMapper](#), a web mapping interface with relevant data for aquaculture planning
- Entanglement simulator, a simulation tool to assist in engineering and risk assessment
- Region-specific aquaculture siting tools for Alaska, New England, the Mid-Atlantic, the Southeast, the Gulf of America, the Pacific Coast, the U.S. Caribbean, and Hawaii

NCCOS has also developed many issue-specific studies (e.g., protected species interactions) and recommendations for best management practices for many different regions and types of aquaculture approaches.

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*Spatial suitability for aquaculture in the Gulf of America.*

