BOEMRE ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Pacific OCS Region

Planning Area: Oregon-Washington, Northern and Southern California

Title: Bayesian Integration for Marine Spatial Planning and Renewable Energy Siting

BOEMRE Information Need(s) to be Addressed: The information presently available for ocean renewable energy project siting in the context of coastal and marine spatial planning is often uncertain, incomplete and evolving. This tool will be inherently capable of integrating the biological, social, and economic data for assisting BOEMRE and other decision makers in the evaluation of proposed renewable energy project sites.

Total BOEMRE Cost: $499,974.95 **Period of Performance:** FY 2011-2012

Conducting Organizations: Parametrix, Inc. (Firm-Fixed Price Contract, M10PC00089)

Principal Investigators: Kevin Halsey

BOEMRE Contact: Mark Eckenrode

Description:
Background: With the support of the National Oceanographic Partnership Program, this study project (Topic 8) was solicited through a competitive joint funding process known as a Broad Agency Announcement. This innovative partnership between Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), the Department of Energy (DOE), and the National Oceanic and Atmospheric Administration created a common research portfolio that meets key management needs. This significantly magnifies the impact of all three agencies' research funding by eliminating redundancies, supporting complementary work, and sharing the results of research findings.

The Energy Policy Act of 2005, Section 388 provides for alternative energy-related uses on the OCS. This provision gives authority to the Department of Interior, BOEMRE, to act as lead agency to facilitate the permitting processes for alternative energy projects on the OCS, including renewable energy such as wind, wave, and solar power generation. The marine wind and hydrokinetic energy industry is advancing at an unprecedented pace with technology advances fostering proposals from around the nation in both state and federal waters for leasing and licensing of offshore renewable energy facilities. These proposals must properly account for cumulative effects, ecosystem services, and the tradeoffs associated with alternative human uses of the ocean. Coastal and marine spatial planning (CMSP) is an adaptive, science-based approach that addresses these deficiencies by analyzing current and future uses of marine and coastal areas, assessing tradeoffs between uses, and allocating space to different ocean uses. Siting ocean renewable energy facilities in the context of CMSP requires that information on the physical environment, ecosystems and human use patterns be integrated to evaluate: 1) The cumulative impacts of proposed offshore renewable energy projects relative to

stewardship objectives for the specific location for which they are proposed; and/or, 2) The suitability of coastal and marine areas for different types of human activity including offshore renewable energy development, thereby assisting state and federal agencies with ocean zoning activities.

Objectives: Parametrix and their partners will develop a robust, quantifiable analysis system to assist decision makers in accurately siting future ocean renewable energy projects. The study will focus on the west coast of the United States and will utilize and compliment on-going State efforts with analytical tools being developed for assessing hydrokinetic energy projects. The proposed system will be designed for application in a science-based regulatory environment that requires the use of best available scientific, economic, and social information to produce a multi-criteria analysis to assist federal, state or regional siting programs with future ocean renewable energy project decisions. The system is designed to integrate oceanographic, ecological, human use data, stakeholder inputs, and cumulative impacts for the evaluation of ocean renewable energy proposals. This is a two year desk effort to develop a spatial multi-criteria decision analysis system utilizing Bayesian decision methods and GIS-based data processing.

Methods: Primary study methods to achieve these goals include the development of the following:

Task 1: Model Development
This task is to create the framework model to incorporate the important environmental (ecological, economic, and social) aspects associated with marine and coastal areas that will assist decision makers in better understanding the effect on the environment in which ocean renewable energy projects occur. This task development will involve the integration of the *Renewable Energy Resource Assessment (RERA)* model that is a spatially explicit decision support tool which is being applied to an evaluation of the cumulative effects of wave energy projects in Oregon.

Task 2: Creating the Decision Support System
This task involves the development of a spatial multi-criteria decision analysis (SMCDA) for marine spatial planning efforts to assist federal, state or regional siting programs with future ocean renewable energy project decisions. This effort will integrate Bayesian Decision Support System (DSS) tools with the geo-spatial framework for the west coast of the United States. Key actions are to: 1) Integrate the Bayesian system with existing cumulative impact and ecological databases; and, 2) Develop a set of measures and relationships needed for ocean renewable energy site planning.

Task 3: Support Stakeholder Deliberation
The ultimate goal is to support the public process of the siting of ocean renewable energy projects that minimizes environmental impacts, maximizing ocean energy potential, and takes into account careful deliberation to ensure stakeholder and public involvement in a transparent, efficient, and legally defensible manner. Stakeholder values and input resulting from deliberations will be reflected in the decision support system.

Current Status: The contract was awarded on September 23, 2010 and the post award kick off meeting was held October 20, 2010.

Final Report Due: September 2012

Publications: None at this time

Affiliated Websites: None at this time

Revised date: March 4, 2011