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STUDY TITLE: Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship

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CONTRACT NUMBER: M10PC00097

SPONSORING OCS REGION: Atlantic – Office of Renewable Energy Programs

APPLICABLE PLANNING AREA(S): North Atlantic

FISCAL YEAR(S) OF PROJECT FUNDING: 2010; 2011

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COSTS: $745,000

PROJECT MANAGER(S): Jennifer McCann

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KEY WORDS: monitoring protocols, potential effects, framework, cumulative impact

BACKGROUND: In September of 2010, the Bureau of Ocean Energy Management (BOEM), the Department of Energy (DOE), and the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) announced eight joint research awards totaling nearly $5 million to support the responsible siting and permitting of offshore wind energy facilities and ocean energy generated from waves, tides, currents and thermal gradients. The University of Rhode Island was awarded one of the eight research awards, to develop environmental protocols and modeling tools to support ocean renewable energy, such as wind facilities. This critical research would address key information gaps regarding the potential environmental effects of renewable ocean energy. This collaborative, interagency effort would help lay the foundation for a clean, renewable offshore energy industry that will diversify our nation's energy mix, enhance our energy security, create American manufacturing jobs, and reduce carbon emissions.

OBJECTIVES: The objectives of this study were to develop and test standardized protocols for baseline studies and monitoring for the collection and comparison of scientifically valid and comparable date for specific offshore renewable energy (ORE) issues. Also, developing a conceptual framework and approach for cumulative environmental impact evaluation of ORE development, as part of a larger framework for a site evaluation tool for decision makers.

DESCRIPTION: Offshore renewable energy (ORE) development is the construction and operation of one or more devices designed to harness power from the marine environment (wind, tidal, and wave power considered in the study), and includes any necessary infrastructure, including subsea cables, the vessels necessary to construct or install an ORE development, and the footprint of a project. The motivation for the study was to provide BOEM and the nation with a comprehensive, yet flexible and test

means of making efficient and balanced assessments regarding the impacts of a broad range of ORE projects on marine and human ecosystems. With these tools, BOEM will have the capacity to proactively and comprehensively manage ocean renewable energy resources and implement adaptive management techniques for the benefit of natural and human ecosystems and the nation. The goal of this particular project was to develop and test standardized protocols for baseline studies and monitoring for the collection and comparison of scientifically valid and comparable data for specific ORE issues, which seamlessly integrate with a newly designed conceptual framework and approach for cumulative environmental impact evaluation of ORE development.

STUDY RESULTS:

- In total, 31 monitoring protocols were developed, with each tied to one or more indicators of a potential effects.
- Identified fifty-seven moderate or major potential effects across ecosystem components for ORE developments at multiple scales that should be monitored in the future.
- Decision trees were developed to identify suites of effect at three development scales depending on energy, structure and foundation type in order to help managers and regulators choose appropriate monitoring protocols for specific ORE projects.
- No potential effects of ORE have been newly identified since the publication of the PEIS of 2007.
- The appropriate monitoring protocols for a given project were project-and site-specific, determined by the size of the project and the potential for environmental effects, in turn determined by the location and the species present at the project site.
- An adaptive monitoring framework was proposed based on indicators of the likely changes to the marine ecosystem due to ORE developmement.

STUDY PRODUCT(S):

- The University of Rhode Island maintained a description of the study through the RI Sea Grant Website: http://seagrant.gso.uri.edu/coast/nop.html
- McCann, J. "An adaptive framework for selecting environmental monitoring protocols to support ocean renewable energy development" in The Scientific World Journal, Volume 2013 (in press)
- McCann, J. Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy, Herndon, VA., OCS Study BOEM 2012-082.

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