

Atlantic Marine Fisheries Priority Studies List Development October 21, 2011

BACKGROUND: Through public comments and outreach in New England and the Mid-Atlantic (planning and analysis for offshore wind development in the South Atlantic has only just begun) BOEMRE has received many comments and questions from fishing constituents regarding the social and environmental impacts for the development of alternative energy facilities on the Atlantic outer continental shelf (OCS) as well as the quantity and quality of the data used to evaluate such impacts. BOEMRE would like to utilize the expertise of the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils, and the Atlantic States Marine Fisheries Commission, and to prioritize these studies given the level of concern/impact and the status of existing information.

OBJECTIVE: To identify and prioritize fishery-related studies in regards to impacts from alternative energy facility construction and operation on the Atlantic OCS utilizing the expertise of fishery science and management entities.

Publically Submitted Study Topics for Consideration (in random order)

- Identify discrete fishing areas of the Atlantic by target species, gear type, and economic value of the catch from those areas.
 - It is envisioned that this project would be an analysis of existing data (e.g., VMS, VTR, previously published fishing atlases, etc.) that would be compiled into a search geospatial database.
- Identify marine habitat that may be vulnerable to negative impacts, including loss of fishery production, from alternative energy construction and operations.
 - It is envisioned that this project would create a habitat suitability index based upon current value. This project could conflict/overlap with several habitat classification and habitat suitability index projects already ongoing.
- Identify hazards and mitigations to navigation within wind turbine arrays.
 - Although this is a concern, it may not rise to the level of a stand-alone study since there is much information on this issue available from Europe.
- Effect of wind facility structures on global and local oceanic and atmospheric circulation patterns and larval disbursement from wind energy areas of the northwest Atlantic.
 - It is envisioned that this study would give an overview of possible impacts identify new or existing models that could help answer this question on a regional and project-specific basis.
- In situ investigation of the effect of buried DC and AC electric power cables on commercially and recreationally important fish and invertebrates of the NW Atlantic.

- This study is currently taking place in the Pacific with AC cables. However, studies in the Pacific may not satisfy the concerns of stakeholders in the Atlantic.
- Fisheries Baseline Data Collection.
 - It is envisioned that this study would identify existing fishery baseline data (e.g., State data, NEAMAP, SEAMAP, NEFSC bottom trawl survey, etc) and collect additional fisheries independent data for areas under consideration for offshore wind development. This study would likely be for finfish only.
- Fishery Physical Habitat and Epibenthic Invertebrate Baseline Data Collection.
 - It is envisioned that this study would build upon and continue the work conducted by the Marine Fisheries Research Group from the School for Marine Science and Technology University of Massachusetts Dartmouth. This group has conducted extensive video surveys in the Mid-Atlantic and New England Regions for the purpose of characterizing habitat and providing population estimates of sea scallops.

Ongoing Fishery-Related Studies

BOEM currently has several fishing related studies that are ongoing. Below is a short list of new or newly completed studies. Full profiles are attached.

- The Socioeconomic Impact of OCS Wind Development on Fishing (\$750K).
- Development of Mitigation Measures to Address Potential Use Conflicts Between Commercial Wind Energy Lessees/Grantees and Commercial Fishers on the Atlantic Outer Continental Shelf (\$450K).
- Renewable Energy *in situ* Power Cable Observation
- Protocols for Baseline Studies and Monitoring For Ocean Renewable Energy (\$500K)
- Effects of Pile Driving Sounds on Auditory and Non-Auditory Tissues of Fish (\$860K)
- Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship (\$750K).
- Characteristics, Behavior and Response Effectiveness of Spilled Dielectric Insulating Oil in the Marine Environment

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2011-2013

Region: Atlantic

Planning Area(s): North Atlantic, Mid-Atlantic, and South Atlantic

Title: The Socio-Economic Impact of OCS Wind Development on Fishing

BOEMRE Information Need(s) to be Addressed: Concerns have surfaced on the potential impacts that OCS wind development may have on commercial and recreational fishing. These impacts are not currently well understood. Results of the study will be used in BOEMRE Atlantic Region environmental assessments.

Cost Range: (in thousands) \$500-\$750 **Period of Performance:** FY 2012-2013

Description

Background: The Atlantic OCS Region extends from the Canadian border to the tip of Florida. The diversity of fish resources is large and the manner of fishing varied. In New England and the northern mid-Atlantic offshore banks and major inshore marshes and estuaries are important habitats and fishing areas. In the southern mid-Atlantic and eastern Florida open water and reefs are important for fish resources and fishing. Fishing along the Atlantic seaboard supports direct and indirect food sales, industrial processing, and provides valuable recreational experiences. In 2008, commercial fishery landings in the Atlantic Region totaled approximately 1.4 billion pounds with a value of over \$1.43 billion. (NOAA, 2008). In 2008, over 1.58 million recreational anglers took 9.2 million fishing trips in New England alone with a value (fishing trip and durable equipment expenditures) of \$1.8 billion (NOAA 2008).

The BOEMRE is considering renewable energy development from southern New England to southern Florida. Key challenges relative to Atlantic Region fisheries are to minimize space-use conflicts, estimate artificial reef effects, avoid habitat alteration, reduce noise from pile driving, and moderate effects from electromagnetic fields, if any. For the Atlantic Region, the most noteworthy gap related to fisheries is that regarding potential space-use conflicts for commercial fishing, especially for the mid-Atlantic. The concern relates to the potential economic loss to fisheries. In addition offshore wind facilities could be de facto protected areas due to the inability of commercial fishers to obtain insurance to fish in wind facilities and thus benefit recreational fisher or the fishery resource itself due to the exclusion.

It is important to note that this study will focus on fishing effects in particular, as opposed to space-use conflicts in general (social, cultural, other economic, etc.), which are being examined under the 2009 study "AE: OCS Renewable Energy and Space-Use Conflicts and Related Mitigation".

Objective: The objective of this study is to assess the potential socio-economic burdens or benefits to commercial fishing along the Atlantic coast. Offshore wind facility assessments not only have to evaluate the impact to essential fish habitat and fishery resources themselves,

but also evaluate potential displacement/fishing effort changes and economic impacts from site development.

Methods: Information about major fishing grounds along the Atlantic coast will be collected in a form compatible with georeferencing. Interface will be established between these fisheries and the locations where industry interest on the OCS has occurred and been documented. Estimates will then be made as to the potential economic loss to these specific areas and how fishing behavior might be altered. Additionally, the literature on marine protected areas will be investigated for insights on commercial fishers.

Revised Date: September 29, 2010

Development of Mitigation Measures to Address Potential Use Conflicts Between
Commercial Wind Energy Lessees/Grantees and Commercial Fishers on the Atlantic
Outer Continental Shelf

Background: State-Led Initiatives

State-led initiatives to engage the fishing community early in the planning of the OCS were implemented in both Massachusetts and Rhode Island. These initiatives have developed stakeholder groups and conducted outreach to fishing interests. The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) has established a Fisheries Working Group (FWG) to consult directly with fishing interests on offshore renewable energy, as well as a Habitat Working Group (HWG) to consider ecosystem issues. The Commonwealth also invited the Mayor of New Bedford, who is known as an important advocate of the commercial fishing community, to become a member of the BOEMRE-Massachusetts Intergovernmental Renewable Energy Task Force. BOEMRE and the Commonwealth of Massachusetts engaged commercial fishing interests in public meetings held in New Bedford and subsequently took action to address their concerns. As a result of EEA's consultations with the FWG, the HWG, and other stakeholders, they were able to raise significant concerns about the potential for adverse effects on important fishing grounds to BOEMRE.

In planning for BOEMRE's issuance of a Call for Information and Nominations for renewable energy leasing in the Area of Mutual Interest (AMI) located on the OCS off Massachusetts and Rhode Island, the State of Rhode Island established a Fisheries Advisory Board (FAB) to consult directly with Rhode Island fishing interests. The Rhode Island FAB has consulted independently with Rhode Island officials, and members of the FAB have participated with the Massachusetts FWG.

The most recent effort to consult with Massachusetts and Rhode Island fishing interests was conducted by the Massachusetts EEA, which held a workshop in New Bedford on June 10, 2011, to bring members of the Massachusetts FWG and Rhode Island FAB, and other fishermen together with OCS renewable energy developers to discuss the practices of their respective industries. The tone of this session generally remained civil. There was significant productive dialogue, including useful exchanges on liability issues associated with potential damage to transmission cables and whether turbine arrays could be laid out so as to not impede the activities of mobile gear fishermen. Additionally, there were also several contentious moments between fishermen and developers, with some fishermen at this workshop expressing a general suspicion, distrust, and frustration with the offshore wind energy industry and, to some extent, with the OCS renewable energy leasing and development process.

3. Objective

The objective of this contract is to cooperate with the three Atlantic Regional Fishery Management Councils directed by the MSFCMA to address potential impacts of non-fishing activities on fisheries and fish habitat to facilitate close consultation with

representatives of affected commercial and recreational fishing interests and offshore wind energy developers—best management practices and mitigation measures to offset impacts and foster compatible use of areas of the OCS for analysis and decision making under NEPA. The contractor will cooperate with the three Councils to use existing regional network of advisors, meeting schedules and information systems to facilitate discussions between the two principal stakeholders, as well as among other interested and affected parties including federal, state, and local government officials to arrive at recommended best practices and mitigation measures to reduce or eliminate the impact on fishing or fish habitat that may be incorporated in NEPA reviews relating to leasing, site characterization and site assessment, and construction and operations of OCS renewable energy projects. Furthermore, these regional facilitated meetings will encourage an open dialogue and foster the building of relationships between offshore wind energy developers, fishing interests, and government regulators.

4. Scope

The contractor will be responsible for coordinating with BOEMRE, the Regional Fishery Management Councils and NOAA Fisheries in completing the tasks described below in Section 5 for areas on the Atlantic Coast where offshore wind energy development may conflict with existing commercial and/or recreational fishing activities or habitat that support these fisheries. The recreational fishing sector includes personal/private vessels, fore-hire and charter vessels. The balance between recreational and commercial fishing sectors will reflect the level of participation and effort in a specific region (recreational fishing is predominant in the mid and South Atlantic regions versus New England and should be reflected in the meeting structure.) The area of the Atlantic that BOEMRE is proceeding with planning for OCS commercial wind leasing includes Massachusetts, Rhode Island, New Jersey, Delaware, Maryland, and Virginia. Similar planning efforts are anticipated for the OCS off Maine, New York, North Carolina, and possibly South Carolina and Georgia. Thus fishing areas off of these states are considered a priority. However, fishing interests and efforts are regional in many cases but in some cases are interrelated throughout the entire Atlantic area with fishing fleets from one state deploying in the waters off other states at different times of the year. The contractor, in coordination with BOEMRE, the New England, Mid-Atlantic and South Atlantic Fishery Management Councils, and NOAA Fisheries, would define which areas of each region or the larger Atlantic OCS may have conflict associated with wind development potentially impacting recreation and or commercial fishing sectors or habitat they depend on and ports or fishing communities that could be most affected by leasing activities in these areas. This contract would have a 3-year period of performance following the date of award.

5. Tasks

- A.** Consult with BOEMRE, NOAA Fisheries, the New England Fishery Management Council, the Mid-Atlantic Fishery Management Council, the South Atlantic Fishery Management Council, state, and local government agencies and other appropriate groups to develop a detailed work plan and recommend to BOEMRE

DRAFT DOCUMENT FOR DISCUSSION PURPOSES ONLY

an approach to completing the work within that plan. Regional plans should build on existing Council network of advisors to engage recreational and commercial fishing

- B.** Implement regional work plans, convene parties as necessary, and facilitate development of best practices and mitigation measures to reduce or eliminate the impact on fishing or fish habitat with general applicability throughout the Atlantic region and for specific OCS areas and associated actions being considered by BOEMRE.
- I. There shall be a minimum of 4 one day meeting in the New England, Mid-Atlantic and South Atlantic regions during the one-year period between BOEMRE's acceptance of the work plans (Task A) and submission of the report(s) of findings (Task C) in the three targeted areas of the Atlantic Coast. The target areas and scale (regional or local) will be identified in the work plan (see Task A). An agenda would be prepared in advance of each meeting.
 - II. The meetings should include representatives from organizations and groups representing both commercial and recreational fishing. Commercial fishing activities will engage advisors participating in managed fisheries and using allowable gear specified by each Regional Council. Representatives of the recreational sector will represent the fisheries and gears employed in each region and cover three main categories private rental fishermen, charter and for-hire covering multiple fisheries and gears which may overlap seasonally or in space recreational. The meetings shall include wind energy developers with an expressed interest in Atlantic offshore wind energy. Where renewable energy/fishery working groups are already established (see Section 2) they should be incorporated.
 - III. The meetings should provide an overview of wind development technology and practices from site location to operation followed by small group (~5-10 people) discussions by fishery and or gear type around a particular previously identified conflict issue towards identifying best management practices (BMPs) or measures to reduce or eliminate the impact on fisheries or fish habitat.
- C.** Prepare a report (or a series of reports if a phased approach is implemented) that:
- summarizes all consultation efforts by region and resulting recommendations to BOEMRE regionally and where appropriate applicable to Atlantic development;
 - identifies key findings for BOEMRE, NOAA Fisheries and the Regional Fishery Management Councils ; and presents the practices and measures for BOEMRE in a form that can be readily incorporated into NEPA review and decision making documents relating to OCS renewable energy leasing and development.

BOEMRE ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Pacific OCS Region

Planning Area(s): All

Title: Renewable Energy *in situ* Power Cable Observation

BOEMRE Information Need(s) to be Addressed: The BOEMRE requires information concerning the level of impacts of electromagnetic field (EMF) on some marine species. Submarine transmission cables that power offshore oil platforms in the Pacific Region provide an opportunity to assess potential behavior and reaction of electromagnetic sensitive species to industry activities. The information will be applicable to all renewable energy power cable EMF considerations and will determine effectiveness of the commonly proposed mitigation of cable burial.

Total BOEMRE Cost: TBD **Period of Performance:** FY 2011-2014

Conducting Organization: TBD

Principal Investigator: TBD

BOEMRE Contact: [Dr. Ann Bull](#)

Description:

Background: Renewable energy technologies, for the foreseeable future, will be focused on the generation of electricity. In all cases, we expect the individual devices will be interconnected with power cables to transmit the electricity to a platform or gathering site, and a single cable will connect the entire facility to shore. The power cable will transmit either alternating current or direct current. If the cable uses alternating current, it will generate both electric and magnetic fields. Proper shielding can block electric fields but not magnetic fields, which, in turn, can induce secondary electric fields. One of the potential impacts from energized power cables may be the local attraction or repulsion of electrosensitive species to the EMF. Several economically important species and as well as species' crucial habitat are in the immediate area of the existing cables. These species include, but are not limited to, the thresher shark, *Alopias macrourus*, the angel shark, *Squatina squatina*, and the longnose skate, *Raja rhina*, whose nursery ground is in the area nursery ground.

Submarine transmission cables that power offshore oil platforms in the Pacific Region provide a unique opportunity to assess potential behavior and reaction of electromagnetic sensitive species to industry activities. Knowledge gained from this study will be directly applicable to renewable energy projects in any OCS planning area. In the Pacific Region, there are two identical power cables, several miles long, located in the same corridor on the seafloor within the Santa Ynez Unit offshore Southern California Planning Area. Both of these cables use the industry standards of the power cables that will be used for connecting

devices (35 KV) within renewable energy installations. These cables were emplaced concurrently by the manufacturer. One cable is unenergized and disconnected from the grid, and one cable is energized. The energized power cable will be compared to the unenergized cable to determine potential impacts from electromagnetic fields while controlling for habitat contributed by the cable structure.

We will compare species densities among cable treatments to determine attraction/repulsion of electrosensitive species to energized and unenergized power cables. Data from the on-going EMF Synthesis Study NSL-PC-08-08 will determine the sampling width for the present cable biological survey transects. Data from the on-going Completion of Fish Assemblage Survey NSL PC-10-03 study will be used for habitat assemblage comparisons. Contemporaneously with the biological surveys, we will measure EMF emissions along both cables.

Objectives: The objectives of this study are to determine: 1) the strength, spatial extent, and variability of EMF's along both energized and unenergized cables; 2) whether electrosensitive species that are regional important such as sharks and rays respond (attraction/repulsion) to the EMF's of an *in situ* power transmission cable; 3) differences among fish communities associated with cable habitat and fish communities in natural habitats obtained from other BOEMRE- funded studies; and 4) the effectiveness of the commonly proposed mitigation of cable burial.

Methods: The evaluation would initially involve multiple cable surveys and EMF measurement, followed by a comparison of species at both cables to determine potential impacts from electromagnetic fields while controlling for habitat contributed by the cable structure.

- 1) Conduct fish surveys using the *Delta* submersible, a 4.6 m, 2-person vessel, operated by Delta Oceanographics of Oxnard, California along cable transects about two meters from the substrata. Conduct transects along both cables and in proximate habitat near the cables;
- 2) During all transects document (a) species; (b) estimated total length; (c) its distance and position relative to the cables and proximate habitat;
- 3) Measure EMF's using existing equipment;
- 4) Determine electrosensitive species response (attraction/repulsion) to the EMF's of an energized and unenergized, *in situ*, power transmission cable; and,
- 5) Using data from 4, analyze effectiveness of the commonly proposed mitigation of cable burial.

Current Status: In Procurement

Final Report Due: TBD

Publications Completed: None

Affiliated WWW sites: None

Revised Date: July 20, 2011

BOEMRE ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Pacific OCS Region

Planning Area(s): Oregon/Washington, Northern and Southern California

Title: Protocols for Baseline Studies and Monitoring For Ocean Renewable Energy

BOEMRE Information Needs to be Addressed: The final product will provide guidance on a consistent approach to collecting baseline and pre-construction information regarding the human, marine, and coastal environment prior to offshore renewable energy projects. In addition, the study will also provide guidance on the stressors to monitor, and the methodology for monitoring, after offshore renewable energy facility emplacement. The final product will be very useful to the BOEMRE environmental reviews of proposed and eventual environmental monitoring of actual offshore renewable energy facilities.

Total BOEMRE Cost: \$499,705 **Period of Performance:** FY 2010-2012

Conducting Organizations: Pacific Energy Ventures; National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center.

Principal Investigators: Justin Klure

BOEMRE Contact: [Dr. Ann Bull](#)

Description:

Background: With the support of the National Oceanographic Partnership Program, this study project (Topic 2) 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 (NOAA) 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 BOEMRE, an agency of the U.S. Department of the Interior, is charged with the responsibility of considering the effects of its actions on the human, marine, and coastal environments. Under the Energy Policy Act of 2005, BOEMRE is responsible for permitting renewable energy activities on the Outer Continental Shelf (OCS). There are a number of different renewable energy projects and offshore technologies that can capture energy from wind, wave, tidal flow, and/or ocean current. In order to effectively manage coastal and offshore renewable energy projects a significant amount of environmental data needs to be collected in baseline and pre-construction studies, and in operational monitoring. Currently, no standards exist to ensure that data collection methodologies produce

scientifically valid and comparable data. Standard protocols and formats for the collection and comparison of data clearly are needed for offshore renewable energy. In order to ensure that these protocols are accepted by both regulatory agencies and developers alike, and to reduce potential conflicts, it is important that these protocols be developed in a fashion that takes into account input from stakeholders. The primary outcome of this project will be a *Protocol Framework* for identifying, collecting and comparing environmental data relevant to offshore renewable energy projects. The *Protocol Framework* will be developed and evaluated by leading scientists and stakeholders (*i.e.*, regulators, agencies, environmental and non-governmental organizations, ocean users, and industry representatives). The *Protocol Framework* will outline the criteria and thresholds for collecting data for both (1) baseline and (2) operational monitoring studies for wave, tidal, and offshore wind projects with focus on the U.S. West Coast (California Current large marine ecosystem).

Objectives: The study objectives are to develop and execute a collaborative process to design a suite of protocols for the collection of data in baseline studies and operational monitoring for offshore renewable energy projects. The project will develop and validate a *Protocol Framework* that will: 1) Identify key environmental issues to guide development and adoption of protocols for collecting baseline and monitoring data for wave, tidal, and offshore wind projects; 2) Be expandable to include protocols for other offshore renewable energy resource technologies, sites, and conditions; and, 3) Be applicable to California Current large marine ecosystem (LME) focus, but also applicable to other LMEs.

Methods: The approach consists of four major tasks:

Task 1: Protocol Framework and Case Studies. Develop a framework to identify: 1) the key ecological and physical issues present when renewable energy devices and arrays are installed and developed; and 2) standard assessment and monitoring protocols and metrics to address issues in an adaptive management context. In essence, the *Protocol Framework* will identify what gets measured, how it's measured, and how the data sets are compared and analyzed.

Task 2: Stakeholder Engagement. Lead and engage stakeholders to: 1) establish a stakeholder advisory team; 2) establish priorities for protocol development; 3) review *Protocol Framework* and protocols; and 4) lead process to adopt *Protocol Framework* and representative protocols.

Task 3: Final Protocol Recommendations. Synthesize results of the Protocol Workshop (Task 1.5), incorporating stakeholder comments to produce final draft of *Protocol Frameworks*.

Task 4: Final Process Recommendations. Use stakeholder engagement to produce final process recommendations for future adoption of protocols utilizing the *Protocol Framework*.

Current Status: The contract to Pacific Energy Ventures was awarded on September 23, 2010 and the post award kick off meeting was held October 21, 2010. The

Intra-agency Agreement from BOEMRE to NOAA was finalized in November 2010.
The DOE is directly funding its Pacific Northwest National Laboratory.

Final Report Due: September 2012

Publications: None at this time.

Affiliated Websites: None at this time

Revised date: March 4, 2011

ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

MMS OCS Region: National

Title: Effects of Pile Driving Sounds on Auditory and Non-Auditory Tissues of Fish

Total Cost: \$860,000

Period of Performance: FY 2008-2012

Conducting Organization: University of Maryland, Department of Biology

MMS Contact: Dr. Michael Rasser

Description:

Background This study will investigate the effects of high intensity sounds produced from pile driving activities on the non-auditory tissues of fish species. The effects of sound have been studied for marine mammals, but little information exists about the effects on fish. Using a newly designed acoustic wave tube, fish will be exposed in the laboratory to actual pile driving signals that have acoustic parameters very similar to those that a fish is likely to be exposed to in the field as a result of any pile driving activity. The experiments will examine a variety of exposure parameters including, but not limited to, signal spectrum, number of pile driving strikes, time between strikes, accumulation of effects, etc. Both short-term and long-term effects of exposure will be examined. Experiments will include several different species, representing different fish morphologies and behaviors. The results of this quantitative study will provide the first comprehensive understanding of the effects on fish tissues of pile driving and some other impulsive sounds as well. Results will be applicable to pile driving activities such as construction of offshore wind parks.

These experiments will provide the first highly controlled and quantified effect of any impulsive sound on fish. The advantage of laboratory work is that the stimulus to which the fish are exposed can be controlled and measured. Additionally, the specially designed apparatus allows the measurement of the ratio of pressure to particle motion of the stimulus, which is critical to understanding the effects of sound on fish.

Objectives The objective of the study is to evaluate the effects of impulsive pile driving sounds on the body tissues of exposed fish, taking into account the species, size, post-exposure intervals and sound variables.

Methods Experimental fish will be placed in a unique laboratory device called a High Intensity Controlled Impedance – Fluid-filled wave Tube (HICI-FT) and exposed to pile driving sounds. Post-exposure, pathological (and histopathological examinations of fish tissues will be examined to determine the effects of sound exposure. Examinations will evaluate damage to the swim bladder, internal bleeding, and effects at the cellular and subcellular levels to all organ systems. Species chosen will reflect diversity in terms of anatomy and function, for example, fish with and without swim bladders and fish with different mechanisms for filling the bladder. An advisory group will be engaged to ensure that the experimental design is sound and statistically valid.

Importance to MMS With our new mandate to oversee alternative energy development, the Bureau needs to evaluate the possible adverse environmental impacts of noise on marine organisms. Pile driving and other activities for the construction of alternative energy facilities will generate considerable noise, the intensity and duration of which may cause damage to fish in the same area. Where we have considerable knowledge already on the effects of noise on marine mammals, we are lacking the equivalent information on fish. This study will provide us with essential information on such adverse impacts and it is fundamental research that needs to be conducted before more focused research can follow.

Current Status: Experiments are being conducted.

Final Report Due: February, 2012

Publications: None.

Affiliated WWW sites: <http://www.life.umd.edu/biology/popperlab/>

Revised date: October 15, 2009

BOEMRE ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

Region: Atlantic

Planning Area(s): North Atlantic

Title: Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship (AT-10-x16)

Total Cost: \$745,000 (\$230K BOEMRE, \$250K DOE, \$300K NOAA)

Period of Performance: FY 2010-2012

Conducting Organization: University of Rhode Island

BOEMRE Contact: Algene Byrum

Description:

Background: This study builds upon 35 years of world renowned expertise in applying coastal and marine spatial planning tools towards ecosystem based management and ocean renewable energy site evaluation and management, most recently demonstrated through the Rhode Island Ocean Special Area Management initiative (Ocean SAMP). Rhode Island is well-positioned to be the first state in the nation to have a wind farm operating in its coastal waters in 2012. Representing the largest single investment in research in Rhode Island coastal waters in at least three decades, the Ocean Special Area Management Plan has catapulted Rhode Island to a national leadership position in terms of siting offshore renewable energy resources projects.

This effort will build upon the recently approved Rhode Island Ocean SAMP, which allowed Rhode Island to better manage its offshore waters and to proactively determine where and under what conditions offshore renewable energy activities should be allowed. The Ocean SAMP will serve as a federally recognized coastal management and regulatory tool that, using the best available science, will promote a balance and comprehensive ecosystem-based adaptive management approach to the development and protection of Rhode Island's ocean-based resources, including the siting of offshore renewable energy.

Objectives:

- To develop and test standardize protocols for baseline studies and monitoring for the collection and comparison of scientifically valid and comparable data for specific offshore renewable energy issues that are developed in coordination with and ultimately supported by scientists, regulators, and industry.
- To develop a conceptual framework and approach for cumulative environmental impact evaluation of offshore renewable energy development, as part of a larger framework for a site evaluation tool for decision makers.

Methods: These protocols and monitoring procedures will be integrated and tested through both the Ocean SAMP monitoring and evaluation process and through the modeling tools. In order to ensure approval and adoption of final products, avoid duplication, and leverage other initiatives, the project team will engage major stakeholders (regulators, scientists, industry) in the implementation of all project objectives and task.

Importance to BOEMRE: In order for BOEMRE to effectively manage offshore wind, wave, and hydrokinetic energy projects, a significant amount of environmental data needs to be collected in baseline and pre-construction studies, and in operational monitoring. Currently, no standards exist to ensure that data collection methodologies produce scientifically valid and comparable data. In order to ensure that these protocols are accepted by both regulatory agencies and developers alike, and to reduce potential conflicts, it is important that these protocols be developed in a fashion that takes into account input from scientist, regulators, environmental NGOs, and industry.

Current Status: Awarded 9/10/10 and ongoing.

Final Report Due: September 30, 2012

Publications:

Affiliated WWW Site:

Revised Date: December 16, 2010



Projects by Number
TA&R
TA&R International
Oil Spill Response
Ren Eng Research
Wave Test Tank
Safety & Engineering
Projects by Category
TA&R Workshops
Need a Report?
Research Proposals
Offshore Home
5-Year Program
Enviro. Stewardship
Economics Division
GOMESA Rev. Sharing
International Activities
CIAP
Jobs
Leasing
Mapping and Data
Moratoria
Offshore Safety
Offshore Stats & Facts
Operations
Past 5-Year Programs
Penalties
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2006 Resource Maps
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Hot Topics:[NEW Reforms](#)[Reorganization](#)[Public Comment](#)**Technology Assessment & Research (TA&R) Program**

Project Number	636
Date of Summary	July 18, 2011
Subject	Characteristics, Behavior and Response Effectiveness of Spilled Dielectric Insulating Oil in the Marine Environment
Performing Activity	Louisiana State University
Principal Investigator	Dr. Edward Overton Mr. Scott Miles, Ms. Buffy Ashton, and Mr. Robert Wong
Contracting Agency	BOEMRE
Estimated Completion	Completed
Description	<p>Planned wind projects on the U.S. Outer Continental Shelf could consist of wind turbine generators connected to a centralized electrical service platform (ESP). The ESP could contain approximately 40,000 gallons of dielectric insulating oil and approximately 2,000 gallons of assorted oil-based fluids (diesel fuel, lubricating oils, etc.) stored on site for facility maintenance. In addition, each wind turbines could have several hundred gallons of lubricating fluid. The dielectric insulating fluid used in the ESP is typically a mineral oil, but vegetable based oils (soybean oil) may also be used. Several concerns have been raised by regulatory agency and environmental conservancy groups as to the environmental effects of a possible oil spill due to accidental vessel collision or natural catastrophe. The two main concerns addressed were probability of oiling and the minimum transit time of the oil to area and resources at risk.</p> <p>Numerous toxicological studies have been performed on mineral and vegetable-based oils over the last decade. Mineral and vegetable-based oils display low direct toxicity because they do not contain the water soluble and multi-ringed poly-nuclear aromatic hydrocarbons typically found in petroleum-based oils. Due to their low toxicity and usage, little research has been performed on the response options available to cleanup a spill of dielectric fluids on the marine environment. In the unlikely event of a spill, how would the dielectric insulating oil be removed from our oceans and shorelines? How persistent are these oils in the marine environment?</p> <p>To provide a comprehensive analysis of the possible fate and effects of spilled dielectric insulating oil, LSU and BOEMRE will conduct a collaborative one (1) year project to provide a detailed literature review and scientific information on the characteristics, weathering behavior, and window of opportunity for using short-term response options for removal of spilled dielectric fluids in the marine environment. The goals of this project will be achieved through a series of laboratory and field-scale studies conducted at research facilities in Baton Rouge, Louisiana (LSU) and Leonardo, New Jersey (Ohmsett). The results from this project will have a direct effect on the spill response policies and decision-making of federal and state agencies when dealing with accidental releases of dielectric insulating fluids in the marine environment. Results from this study will aide planning and management personnel when designing coastal use permits for future offshore wind generation systems.</p> <p>Objectives: The goals of this one (1) year scientific project are to provide detailed literature review and produce valid data and results on the characteristics, weathering behavior, and window of opportunity for using short-term response options for removal of spilled dielectric fluids in the marine environment. The goals of the proposed project will be achieved through a series of six (6) tasks:</p>

[Hurricane Season 2011 Updates](#)

[Status of Gulf of Mexico Well Permits](#)

[Status of Gulf of Mexico Well Plans](#)



Contact: [OEMM Web Team](#)



	<ol style="list-style-type: none"> 1. An intensive literature review of US and European sources 2. A series of laboratory flask studies to determine weathering characteristic, product dispersibility, and accurate analytical methodology 3. A field study to accurately determine applicability of in-situ burning as a response tool 4. A laboratory flask study to measure the affects of long-term weathering and biodegradation on dielectric insulating fluid in the marine environment 5. A series of field studies to accurately determine capabilities/limitations of conventional response tools for removal of dielectric fluids from the marine environment 6. Preparation and submittal of a final draft and report to BOEMRE <p>All tasks, except task No. 5, will be performed at LSU in Baton Rouge, Louisiana. Task No. 5 will be completed at the Ohmsett facility in Leonardo, New Jersey.</p>
<p>Progress</p>	<p>BOEMRE has researched, selected and sourced 1,000 gallons of MIDEL 7131 dielectric insulating oil (transformer Fluid) from M&I Materials, Manchester, UK. Samples of this oil were sent from the Ohmsett facility to Louisiana State University's (LSU) Department of Environmental Science for analyses.</p> <p>From April 12-16, 2010, experiments were conducted at the Ohmsett facility to determine the capabilities and limitations of using conventional mechanical response equipment, namely oleophilic skimmers (disc, drum, rope mop) to recover the dielectric fluid. Experiments will be conducted to determine the dispersibility of the MIDEL 7131 dielectric insulating oil using Corexit 9500 dispersant. For the mechanical recovery experiments, two additional oils a Hydrocal (a medium viscosity lubricating oil and diesel fuel will be used for comparative purposes. Mechanical recovery experiments will follow American Society of Testing and Materials (ASTM) F 2709-08. Research scientists from LSU participated in the Ohmsett experiments. A representative from M&I Materials, Manchester, UK traveled to Ohmsett to observe the mechanical recovery and dispersant experiments.</p> <p>Long term weathering and biodegradations experiments are complete. BOEMRE has received the draft final report for this project. Revisions to the final report have been delayed due to the principal investigators involvement on scientific research cruises following the Deepwater Horizon oil spill. The revised draft final report is expected by April 22, 2011.</p> <p>The final report was received On July 12, 2011. BOEMRE has reviewed and accepted the final report for the project.</p>
<p>Report</p>	
<p>AA</p>	<p>Final Report: "Characteristics, Behavior and Response Effectiveness of Spilled Dielectric Insulating Oil in the Marine Environment"</p>

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