UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

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Minerals Management Service
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Dear Ms. Bomholdt:

The National Oceanic and Atmospheric Administration (NOAA) has reviewed the Minerals Management Service's (MMS) draft Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf (DPEIS). NOAA appreciates the opportunity to comment on this draft document and looks forward to working closely with MMS on future development and implementation of this important new program. NOAA commends MMS on developing the DPEIS in furtherance of the Administration's alternate energy legislative initiative culminating in MMS' responsibilities under the Energy Policy Act of 2005. The proposed action analyzed in the DPEIS is the establishment of the MMS Alternative Energy and Alternate Use Program on the Outer Continental Shelf (OCS) and promulgation of associated regulations.

The types of alternative energy projects covered by the DPEIS represent the application of a number of new and emerging technologies, and expansion of some existing technology from the land into the Nation's oceans. Development of the emerging technologies of wind, wave, and current energy generation on the OCS presents many scientific and management questions and uncertainties regarding impacts to living marine resources and their habitats. Scientific investigations associated with the development and operations of the new technologies in the marine environment would strengthen the understanding of impacts on marine life and inform management decisions; such studies should be included in planning and development of these activities.

There are great variations in the physical, oceanographic, and biological features within and among the three OCS planning areas. These variations are further complicated by seasonal and even daily changes in occurrence and distribution of living marine resources including fishes, sea turtles, and marine mammals. Therefore, NOAA urges MMS to proceed with extra caution when establishing regulations governing these activities.

Alternate Energy-Related Uses on the OCS is a new program within MMS, involving the implementation of relatively new and emerging technologies while considering creative uses of existing facilities. The depth and scope of information needed to evaluate impacts to living marine resources may vary by technology and location. There is incomplete knowledge of the technologies' full adverse impacts on marine resources. Consequently, NOAA recommends MMS implement the Program in a phased manner to enable agencies to develop efficient procedures that will avoid or minimize adverse impacts on marine resources. The use of pilot projects could contribute to the assessment of these new technologies and their potential impacts under the variable conditions in a range of geographic locations.

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NOAA has a number of concerns regarding the adequacy of the analysis of impacts to marine resources that is presented in the DPEIS. The document should be revised to better analyze impacts to living marine resources and their habitats, including a more scientifically rigorous approach that utilizes published literature references to a much greater degree. The cumulative impacts analysis in this DPEIS should be expanded, especially in regard to marine mammals, sea turtles, fisheries, essential fish habitat, and other topics that overlap with NOAA's natural resource management mission. Each project has numerous potential impacts, but the document does not provide a way to synthesize these impacts. These sections should be expanded so that there is a better understanding of the potential impacts of widespread commercial energy production in the OCS.

NOAA is also concerned about the National Environmental Policy Act (NEPA) process that MMS may employ for development and implementation of alternative energy production in the OCS. NOAA is concerned that MMS will develop subsequent NEPA analyses for "development" or "testing" projects that may be found to have few serious direct or cumulative impacts due to their local nature and anticipated short duration. However, in some cases, "development" and "testing" will lead to "commercial operation" or "commercial production", so the cumulative impacts of development or testing projects may never be considered until substantial effort and funding has been invested in technology and there is considerable pressure to use the now-proven technology. A better approach would be a more detailed analysis of long-term effects in the DPEIS.

Given the scope and complexity of activities and their potential impacts on living marine resources and their habitats, NOAA recommends that MMS consider a tiered NEPA approach by producing three separate future planning and analysis documents, one for each of the three OCS planning areas. Those documents should provide a more detailed, geographically specific analysis of proposed activities and their potential impact on living marine resources and their habitats, and more detail on how these activities will relate in time and space to other important ocean activities.

Our comments originate from three Line Offices within NOAA: the National Marine Fisheries Service, the National Ocean Service, and NOAA's General Counsel. The contacts for these offices respectively are:

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We hope our comments will assist you. Thank you for giving us the opportunity to review this document.

Sincerely,

Rodney F. Weiher, Ph.D.
NEPA Coordinator

Enclosure

National Oceanic and Atmospheric Administration (NOAA) Comments on Mineral Management Service's (MMS) Draft Programmatic Environmental Impact Statement (DPEIS) for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf

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I. General Comments

Overall Comments

NOAA agrees with MMS' general approach to develop a comprehensive set of regulations and regulate Outer Continental Shelf (OCS) Alternative Energy and Alternate Use Program activities, which may have substantial effects on resources for which the National Marine Fisheries Service (NMFS) has responsibility under various laws, rather than simply issuing regulations that govern access to OCS areas or taking no action.

Coordination with the Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) issued a Notice of Inquiry and Interim Statement of Policy regarding Preliminary Permits for Wave, Current, and Instream New Technology Hydropower Projects. Although MMS' DPEIS provides substantially more information about potential activities and environmental impacts under its program, there is potential for overlap between FERC's authorities and MMS' authorities for such activities, and the DPEIS does not explain how MMS would coordinate or provide consistency with FERC in exercising the agencies' respective authorities. This is a concern for agencies such as NOAA, which has responsibility under various laws for resources that are potentially impacted by these activities, in order to avoid duplication of effort and the potential for inconsistencies between MMS and FERC in exercising respective authorities over these activities.

The DPEIS does not explain how MMS and/or its program applicants would coordinate or consult with other agencies such as NOAA in reviewing site-specific applications for program activities and addressing impacts to resources from site-specific activities. NOAA recommends that the MMS regulations incorporate any necessary coordination or

consultation with NOAA regarding potential impacts to resources for which NOAA has responsibilities early in the permitting process in order to develop the necessary analyses and approvals in a comprehensive and timely manner.

The authority given to MMS in the Energy Policy Act (EPAct) is limited to activities not otherwise authorized by other applicable law. The scope of the DPEIS should be clarified to identify which (and where) alternative energy activities are subject to MMS jurisdiction and which (and where) activities are subject to FERC jurisdiction.

Also, note that MMS's authority is discretionary. MMS should clarify whether a project that MMS chooses not to authorize can still go forward without federal oversight. This appears to be a large loophole that could allow projects with potentially severe environmental effects to go forward.

Exercising Caution in Decision Making over Offshore Uses

In its DPEIS, MMS makes it clear that it will not be able to anticipate and assess the potential environmental impacts of all the various technologies and potential locations where alternative energy and alternate uses will be proposed. Furthermore, MMS indicates that additional environmental review pursuant to the National Environmental Policy Act (NEPA) will be required for all future site-specific projects on the OCS. In its meeting on January 26, 2007, with NOAA on the DPEIS, MMS indicated that it planned to develop an Environmental Impact Statement (EIS) on all proposed activities (with the possible exception of research) in light of current information gaps. It is unclear whether or not MMS still plans to pursue this course. MMS should clarify its intent regarding future NEPA analyses.

In the absence of information on localized impacts and a comprehensive understanding of the cumulative impacts of proposed alternative energy and alternate uses on the OCS, it is important that MMS exercise caution when evaluating these uses. In light of the anticipated uncertainty surrounding proposed activities under the Alternative Energy and Alternate Use Program on the OCS, particularly during early development of the program, NOAA believes that MMS should develop an EIS for all initially proposed activities.

Informed and Consistent Decision Making over Proposed Offshore Activities

The DPEIS outlines several regulatory options for proposed offshore activities besides the no action alternative. These options include:

(1) Establishment of the MMS Alternative Energy and Alternate Use Program on the OCS, and the promulgation of associated regulations for granting leases, easements, or rights-of-way for any alternative energy activities on the OCS; and

(2) Establishment of lease terms and stipulations for alternative energy projects on a case-by-case basis (in lieu of establishing a program and issuing regulations related to the

granting of leases, easements, or rights-of-way for alternative energy activities on the OCS).

Of these options, NOAA believes the development of a program and the promulgation of associated regulations is the most effective option. In concurrence with MMS, NOAA believes this option will provide the greatest opportunity for consistency in the permitting of alternative energy projects. Furthermore, this option will provide more definitive information for potential developers, which should reduce permitting time, relative to the establishment of lease terms and stipulations on a case-by-case basis.

NOAA does not believe the no action alternative is feasible, given the current and forecasted demand for alternative energy resources and alternate uses of oil and gas facilities on the OCS.

Potential Impacts and Mitigation for Alternative Energy Development

In its discussion of potential impacts and mitigation for alternative energy development, MMS describes a four-level classification scheme (negligible, minor, moderate, or major) to characterize the predicted impacts if the proposed activities occur. MMS asserts that many proposed activities will result in negligible to minor impacts for fish, sea turtles, endangered species, and other resources, based upon qualitative estimates that fail to address the scope and scale of proposed activities. NOAA believes there is inadequate information provided in the DPEIS to support the impacts predicted and that MMS should conduct additional NEPA analyses that better support predicted environmental impacts.

Federal Coordination and Decision Making over Offshore Uses

In setting objectives for the new program, MMS discusses providing access to the OCS for these projects in a way that balances competing and complementary uses of offshore areas. NOAA agrees that this is a critical objective for such a program. MMS has not proposed a mechanism to reconcile the multi-sector strategic goals and objectives for alternative uses of the OCS by government, industry, and public sector interests. One or more of these proposed activities in a particular area of the Exclusive Economic Zone (EEZ) will preclude other uses in the same offshore waters and in some instances, these uses may not be compatible with current activities, designations, or other proposed activities.

Before decisions are made over offshore activities, it is imperative that MMS, in collaboration with NOAA and other pertinent federal agencies, develop processes and tools to: (1) evaluate the impact of proposed uses on existing uses and marine resources in the vicinity, (2) ensure federal consistency in decision making over proposed uses of the EEZ; and (3) comprehensively involve in the review and decision making process the multi-sectoral stakeholders that will be impacted by a permit applicants' activity.

In addition, although a particular activity in offshore waters may have a negligible impact on marine resources and current uses, offshore activities may cumulatively have significant adverse impacts on marine resources or their uses. Sufficient impact analysis and monitoring must be conducted to analyze the impacts of options and prevent unintended adverse consequences and conflicts.

Finally, applicants seeking a permit for activities in the OCS may not be informed of all the pertinent federal statutory requirements. Applicants should be informed of requirements at the beginning of the permit application process to avoid frustration, duplication of effort and delays.

Informed and Consistent Decision Making over Proposed Offshore Activities

> **<u>NOAA Comment/Recommendation</u>: Development of a comprehensive integrated information system of activities and designations in the offshore environment is necessary to assist in decision making over proposed uses of the EEZ. MMS' Multipurpose Marine Cadastre could provide such a tool for decision making if the system is sufficiently comprehensive, updated, and accessible.**

At present, MMS is working with NOAA and other federal partners on development of an integrated information system, referred to as the Multipurpose Marine Cadastre (MMC), to provide spatial data on designations, uses, restrictions, and responsibilities in the marine environment, in fulfillment of its requirements under the Energy Policy Act. The Energy Policy Act requires the Secretary of Interior, in cooperation with the Secretary of Commerce, the Commandant of the Coast Guard, and the Secretary of Defense, to develop an interagency comprehensive digital mapping initiative for the OCS to assist in decision making related to the siting of offshore energy development activities. NOAA has submitted comments on development of the MMC and looks forward to working with MMS and other federal partners in further developing this information system.

The MMC in development should provide essential information that is needed to examine and evaluate proposed offshore activities (under authority of Section 388 of the Energy Policy Act). However, it is critical that MMS include all pertinent information in its integrated information system; provide opportunities whereby information can be updated, added, and amended as necessary on a timely basis; and allow other local, state, and federal agencies, potential applicants, and the public access to this information as appropriate. This includes metadata on social and economic use and non-use values associated with the geographic areas delineated in the database.

> **<u>NOAA Comment/Recommendation</u>: To provide federal consistency and coordination in decision making over proposed uses of the EEZ, pertinent federal statutes and regulatory requirements on offshore activities should be identified, and MMS, in collaboration with NOAA and other pertinent federal agencies, should develop a multi-criteria evaluation and decision process to provide guidance for policy making on proposed offshore activities.**

Once MMS develops its regulatory program for alternate energy-related uses of the OCS and permits are sought for proposed offshore activities, as currently proposed, MMS will be put in a position of making decisions without the guidance of a systematic review process or information on critical factors to review for decision-making. MMS, in collaboration with NOAA and other pertinent federal agencies, should establish a venue for consistent decision making through the identification of pertinent federal statutes, and development of criteria and a process for evaluating alternatives based on the multiple statutory goals, objectives and standards.

Identification of all applicable federal statutes will help ensure there is coordination and communication with all appropriate federal agencies on proposed offshore activities. Development of criteria and a process for evaluating alternatives will help avoid user conflicts over proposed offshore uses and help MMS fulfill its regulatory responsibilities using a consistent, transparent ecosystem approach to management (see further discussion below).

Criteria for evaluating proposed offshore uses should include an examination of the impacts a proposed offshore use would have on living marine resources, habitat, and ecosystem functions and benefits. Three strategic goals for every proposed use area should be to:

1. Ensure sustainability of resources
2. Conserve biodiversity
3. Maintain economic, social and cultural access to resources

Other criteria include measuring the complete suite of societal benefits and costs, including ecosystem goods and services in four categories:

1. Provisioning services (e.g., products obtained from the ecosystem such as food, water, minerals);
2. Regulating services (benefits derived from regulation of ecosystem processes such as climate regulation, disease regulation);
3. Cultural services (nonmaterial or non-market benefits obtained from ecosystems, such as recreation and ecotourism, aesthetic, cultural heritage); and
4. Supporting services (services necessary for the production of all other services, such as nutrient cycling, primary production).

There is still much to be learned about marine ecosystems. The limitations of scientific knowledge make it impossible to predict with any certainty the future state of any ecosystem or to understand the forces that created an observed state. Given this uncertainty, policy decisions on alternate energy uses in the OCS should proceed cautiously. In addition, the Council on Environmental Quality regulations that implement NEPA require MMS to follow the procedure set forth at 40 C.F.R. §1502.22 when dealing with incomplete or unavailable information in the DPEIS.

NMFS commends MMS for committing to involving stakeholders through the program and regulation development process, and for coordinating with other federal agencies concerning activities that may affect them. This approach will help MMS develop a federal regulatory framework that is consistent with other federal mandates while addressing local and regional needs and concerns.

Impact Assessment and Monitoring of Offshore Uses

> **<u>NOAA Comment/Recommendation</u>: Impact assessments and monitoring of offshore uses should be conducted to identify, quantify, and evaluate short-term and cumulative impacts of proposed offshore activities.**

In its decision over whether or not a proposed activity should be permitted, MMS will be required to complete individual NEPA analyses. Such analyses will include: (1) assessing what impacts these uses will have on marine resources and uses in vicinity of the proposed activity; (2) determining if mitigation measures are necessary to address adverse impacts of the activity on marine resources and uses; and (3) determining what level of monitoring is appropriate to evaluate impacts. In some areas of the EEZ, information on resources may be limited, thereby preventing a comprehensive examination of the impacts a proposed use would have on these resources. Development of an activity may have unforeseen adverse consequences, such as degradation of marine resources and conflicts between current uses.

Any Environmental Assessment or Environmental Impact Statement should be conducted prior to initiation of a proposed offshore use to help identify and evaluate impacts on marine resources and current uses in the region where an activity has been proposed. Assessments should be broad in scope, and include an evaluation of the present and cumulative impacts of activities on living marine resources, habitat and physical features, other environmental features (such as water quality), cultural resources and current uses (and non-uses).

Once an activity is permitted, monitoring is critical for evaluating impacts. NOAA recommends that the establishment and approval of monitoring plans be a permit requirement for applicants and the costs borne by the permit holder. All monitoring plans must be of sufficient frequency, scope, and scientific integrity to satisfy federal data quality, peer review, and conflict of interest requirements. Their intended use would include evaluation of short-term impacts on resources and uses and to provide information for the development of long-term impact assessments.

Transparent and Informed Permit Application Process

> **<u>NOAA Comment/Recommendation</u>: MMS, in collaboration with NOAA and other pertinent federal agencies, should develop and provide information to applicants seeking permits for offshore activities on federal statutory requirements that may be applicable in order to provide a transparent application process and avoid delays in decision making.**

When seeking a permit for activities in the OCS, applicants may not be informed of all the pertinent federal statutory requirements. Informing applicants of statutory requirements once an application has already been submitted may be disruptive, frustrating, and lead to time delays in permit review and approval. To avoid this situation, MMS should develop, in collaboration with NOAA and other pertinent federal agencies, information for potential applicants seeking offshore permits on relevant federal statutory requirements. In addition to requirements established under Section 388 of the Energy Policy Act, other statutes that may be applicable to offshore activities include (but are not limited to):

- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 *et seq.*)
- Marine Mammal Protection Act (16 U.S.C. §1361 *et seq.*)
- National Environmental Policy Act (42 U.S.C. §4321 *et seq.*)
- National Marine Sanctuaries Act (16 U.S.C. §1431 *et seq.*)
- Endangered Species Act (16 U.S.C. § 1531 *et seq.*)
- Coastal Zone Management Act (16 U.S.C. § 1451 *et seq.*)
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-666c)
- National Fishing Enhancement Act of 1984 (33 U.S.C. § 2101 *et seq.*)

Protected Resources

The scope of information and description of potential impacts of alternative energy projects on protected species is overly general, and therefore it is difficult to provide comments on specific sections. The Programmatic Environmental Impact Statement (PEIS) should provide more specific species information, the quality of the protected species portion of this document is poor, and NOAA suggests these sections be rewritten. The material is not the best information available, in part because the document relies too much on web-based material. A more thorough review of the primary scientific literature is needed, and the PEIS should include specific, relevant information for each species in the appropriate geographic regions. The level of information provided for each species (*i.e.,* distribution, habitat, diet, migration & movement, etc.) is also inconsistent. Hence, NOAA offers numerous specific suggestions to provide a general overview of the suggested revisions, but does not provide complete coverage of all issues in need of revision.

Also, please note that MMS needs to consult with NOAA under the ESA and MSA (for EFH), as well as any MMPA, CZMA, and marine sanctuary consultations as appropriate, for the development of this program. Consultation is required for each specific authorization issued under this program.

Geographic Scope

Excluding Alaska and/or tidal projects from the document may be ill-advised. Petroleum News recently announced that the federal government has recently issued permits for

feasibility studies on tidal power plants in Alaska. Although tidal power plants are not considered in this DPEIS, the technology is very similar to that described for generating energy in the Florida Current, and impacts on ESA-listed marine mammals in Alaska would be similar to those identified for marine mammals in Florida. Further, it seems likely that, if one type of alternative energy technology is going to be tested in Alaska, there will be interest in testing other types of technology. Including projects in Alaska in the analysis would ensure that there is one common program for the entire country. Failing to include Alaska projects in the analysis may delay the speed at which Alaska projects can be approved, and may allow an Alaska-specific approach that may not be consistent with a national approach towards authorizing alternative energy development in the OCS.

Comparison with Existing Energy Sources

An informative method of assessing impact would be an explicit consideration of the status quo. For example, generation of 1000 MW at a coal or oil-fired plant should be compared with the potential impacts of an alternative energy source. The possible consequences of dispersing mineral oil from a wind turbine transformer should be compared to the risks of hundreds of thousands of oil ton-miles to produce an equivalent amount of energy. While this may be beyond the scope of this report, such information would help evaluate impacts from a range of different energy sources. Chapter 7.4 addresses alternatives in a very general way, but a proper comparison would compare these impacts on a per delivered-BTU or other energy measurement basis. A few comparative tables depicting such results would be a very helpful addition to the report.

National Marine Sanctuaries Act Compliance

The DPEIS should clarify and/or correct NOAA's OCS jurisdictions under the Marine Protection Research and Sanctuaries Act and the National Marine Sanctuaries Act (NMSA).

- Table 1.6-1 lists the US Environmental Protection Agency and the US Army Corps of Engineers as the responsible agencies under the Marine Protection Research and Sanctuaries Act. This should be corrected to include NOAA.

- NOAA's responsibilities under the NMSA should be listed in Table 1.6-1 and the directives of the NMSA should be described in section 1.6 ("OCS Regulatory Framework") to include a statement such as:

  The National Marine Sanctuaries Act (NMSA) prohibits the destruction, loss of, or injury to any sanctuary resource managed under law or regulations for the sanctuary in question and any violation of the act, any regulations, or permits issued thereunder (16 U.S.C. § 1436). In addition, section 304(d) of the NMSA (16 U.S.C. § 1434(d)) requires Federal agencies to consult with the Secretary of Commerce, through NOAA, on Federal agency actions internal or external to any national marine sanctuary that are likely to destroy, cause

the loss of, or injure any sanctuary resource. Thresholds for consultation vary according to each sanctuary's designation document. If NOAA determines that the action is likely to destroy, cause the loss of, or injure sanctuary resources, NOAA shall recommend reasonable and prudent alternatives that can be taken by a Federal agency to protect sanctuary resources. The Federal agency may choose not to follow these alternatives provided the reasons are submitted in writing. However, if the head of a Federal agency takes an action other than an alternative recommended by NOAA and such action results in the destruction of, loss of, or injury to a sanctuary resource, the head of the agency shall promptly prevent and mitigate further damage and restore or replace the sanctuary resource in a manner approved by NOAA.

- While the comments that follow this section deal with resources managed by NOAA under multiple statutes including the NMSA, the following comments address marine birds managed by NOAA as sanctuary resources solely under the authority of the NMSA: Wind turbine generators (WTGs) on the Outer Continental Shelf are potential threats to marine birds. This issue should be thoroughly explored and seabird habitat considered in siting if wind power generators are planned. The western wall of the Gulf Stream at the Outer Continental Shelf of eastern North America between the Virginia-North Carolina border and Cape Canaveral (South Atlantic Bight) was ranked as the highest priority marine bird habitat at a Marine Bird Conservation Workshop in Shepherdstown, West Virginia in 2007. This area has the highest species diversity of any priority marine habitat identified at the workshop. Furthermore, the diversity includes one endangered species, the Bermuda Petrel, and several other species of special concern (e.g., Black-capped Petrel, Madeira/Fea's Petrels, Herald Petrel, and Audubon Shearwater) because of low population numbers. These species are documented as occurring on the Outer Continental Shelf off Cape Hatteras in the area called "The Point" (Lee 1999).

  Although precise documentation of the Madeira/Fea's Petrel may not be certain because of the close resemblance to two other "soft plumaged" petrel species, all four are eastern Atlantic species and only the Madeira/Fea's petrels are known to occur in the Western North Atlantic. These birds fly long distances to forage and spend most of their time at sea in the air. The Bermuda Petrel presently exists as a population of only about 30 pairs, breeding only in Bermuda (Lee, in prep.). The global population of the Black-capped Petrel is estimated at 1,000-2,000 pair, breeding only in Hispanola. They feed their young by foraging on the Outer Continental Shelf off eastern North America, flying back and forth between the OCS and Hispanola possibly daily. The Madeira Petrel is considered the rarest bird in Europe, the entire population consisting of less than 50 pairs and maybe only 20 (Lee 1999). The Fea's Petrel population consists of only a few hundred pairs. The Herald Petrel population also consists of only a few hundred pairs. The current population of the Audubon Shearwater is 3000-5000 pairs (Lee 2000). All are long-lived, late maturing species with few young. Populations

have been depleted by damage to nesting colonies through predation or habitat degradation. Any increase in the mortality of adults could be devastating to these populations.

II. Marine Mammals

General

There is concern over the impacts of noise generation from OCS development on marine mammals and other marine fishery resources. NOAA recommends that MMS prioritize research efforts in order to collect information on the impacts of noise on marine mammals and other protected species prior to widespread OCS development. NOAA recommends that MMS include in the environmental consequences and cumulative impacts analyses in the DPEIS a thorough analysis of how marine mammals react to sound, both in the short-term and cumulative sense. In addition, NOAA recommends that the analyses also include an understanding of protected species or fish seasonal habitat needs to accurately site offshore energy production facilities in areas that will avoid impacts. Since placement of facilities outside of areas of concern is one of the key mitigation tools, adequate information needs to be provided in order to make these site placement decisions.

Ocean Ambient Noise

In order to fully assess the potential impacts of noise generated from the new alternative energy development and production activities on the existing acoustic environment and marine mammals within the three OCS planning areas, it is imperative to have a good understanding of ambient noise characteristics of these oceans for the purpose of establishing an acoustic environment baseline. The *Acoustic Environment* sections (Section 4.2.5, Sections 4.3.5, and 4.4.5 for the Atlantic, Gulf of Mexico and Pacific regions, respectively) of Chapter 4 *Affected Environment* of the DPEIS provides a brief discussion on ocean ambient noise in terms of spectra and major sources, however, it fails to provide any quantitative analysis of ambient noise levels as a whole in these areas.

Although in a later section (Section 5.2.5.3.2 *Pile-Driving Noise*) in Chapter 5 *Potential Impacts of Alternative Energy Development on the OCS and Analysis of Potential Mitigation Measures*, the MMS assumes that an ambient noise level in open oceans at 130 dB *re* 1 μPa (page 5-23), NOAA considers that assumption inaccurate and believes it may represent an overestimation for most of the open ocean.

The overall open ocean ambient noise levels are summarized by Wenz (1962) in a graph known as the Wenz Curves. The Wenz Curves cover ambient noise source spectra from many sources, including frequencies from 1 Hz to 100 kHz, and spanning five decades. Though it is a generalization of ambient noise levels in a typical ocean environment, it is widely used to approximate and address the acoustic environment (e.g., Richardson *et al.*, 1995; NRC, 2003).

Understandably, ambient noise levels in shallow waters (< 200 m) over the continental shelf are more variable, both in time and from place to place, and are highly dependent on wind velocity and breaking waves (Worley and Walker, 1982; Wille and Geyer, 1984; Zakarauskas *et al.*, 1990; Tkalich and Chan, 2002). Nonetheless, many measurements have been made of ambient noise levels in shallow waters off the coast of North America, and the overall results more or less agree with the Wenz Curves (e.g., Knudsen *et al.*, 1948; Piggott, 1964; Worley and Walker, 1982; Zakarauskas *et al.*, 1990; Andrew *et al.*, 2002; Black and Greene, 2002; McDonald *et al.*, 2006; also see review by Urick, 1983; Zakarauskas, 1986). Therefore, NOAA strongly recommends that the MMS provide a more detailed analysis of the ocean ambient noise levels for the three OCS planning regions.

Calculation of Zone of Influence (ZOI)
In calculation of the ZOI, NOAA believes that sound propagation from specific acoustic sources is highly variable and dependent on local bathymetric and environmental conditions. The ranges from sources in various operational areas to specified received levels, and consequently the zone of influence may vary by orders of magnitude depending on these conditions. These zones of influence should properly be determined using empirical measurements and sufficient sound propagation models that consider such factors. NOAA encourages MMS to this approach in its analyses.

Marine Mammal Monitoring and Detection

Many of the proposed MMS OCS project areas are frequented by a wide range of marine mammal species and provide important habitats for these species. The DPEIS acknowledges that construction and operation of the proposed project could potentially affect some of these species, and provides some mitigation measures. Nonetheless, NOAA believes that the proposed mitigation measures provided in the DPEIS are inadequate, given that the DPEIS did not provide any marine mammal monitoring and detection procedures that could significantly reduce these potential adverse impacts.

NOAA strongly recommends that the MMS employ qualified marine mammal observers (MMOs) on the construction sites and vessels to conduct marine mammal monitoring before, during and after the construction of the proposed project in the vicinity of the project area. The MMOs would be responsible for visually locating marine mammals at the ocean's surface and, to the extent possible, identifying the species. The MMOs would monitor the construction area using 25x power binoculars and/or hand-held binoculars. Night vision devices should be provided as standard equipment for monitoring during low-light hours and at night.

Safety zones of specific threshold sound pressure levels should be established before the start of any construction activities. MMOs should monitor the safety zones for a minimum of 40 minutes to make sure that no marine mammals are present within the safety zones before initiation of any construction activities, and continue monitoring the safety zones during the construction period. In addition, power down and shut down

protocols shall be established and implemented should a marine mammal be detected or believed to have entered the safety zones during the construction.

Potential Impacts and Mitigation Measures of Helicopter Over-flights
The MMS DPEIS states that helicopters may be used to ferry workers or materials to offshore work sites, and that noise from helicopters could penetrate below the water surface, though mainly below the craft (5-24 of the DPEIS). NOAA agrees with MMS' assessment on helicopter noise. However, the mere presence of helicopters over a pinniped rookery or haul-out could disturb animals that are hauled-out, and could even cause stampedes. Mortalities and injuries could occur during a stampede, especially if pups are present. Mortalities due to pup abandonment could also occur if mothers are driven into the water by helicopter over-flights during nursing season.

The DPEIS did not analyze these adverse impacts to pinnipeds that could occur due to over-flight of helicopters for the proposed projects, which is of greatest concern along the Pacific Coast. NOAA recommends that MMS conduct an analysis of the potential impacts to pinnipeds that could result from helicopter over-flights, and develop appropriate mitigation measures, such as avoidance of over-flights above known pinniped rookeries and haul-outs.

Vessel Strike

The MMS DPEIS identifies that vessel strikes have been recorded in U.S. waters in almost every coastal state, and that collision between whales and vessels have been most commonly reported along the Atlantic Coast, followed by the Pacific Coast (including Alaska and Hawaii) (page 5-40 of the DPEIS). However, the DPEIS does not provide any effective mitigation measures that would prevent or reduce the potential of marine mammal vessel strikes that could result from the proposed OCS project.

To avoid and prevent marine mammal injury and mortality by vessel strike, NOAA recommends that, while underway, all construction vessels remain 500 yd (457 m) away from the northern right whales, as required under NOAA's right whale vessel approach regulations (50 CFR 224.103). In addition, NOAA suggests that all construction vessels remain 100 yd (91 m) away from all other marine mammals to reduce potential impacts by traveling vessels.

Additional mitigation measures such as limiting vessel speeds within the national marine sanctuaries and within certain seasonal management areas should also be established, especially off the Atlantic Coast in the vicinity of the North Atlantic right whale critical habitat and the Stellwagen Bank National Marine Sanctuary.

Potential Impacts on Feeding Gray Whales

The MMS DPEIS states that there would be electrical cabling to interconnect wind turbines and other project facilities and high voltage (115 kV or greater) cables that deliver the electricity to the existing transmission system on land in the proposed OCS

project area (5-78 of the DPEIS). These cables are likely to be trenched into the seabed and would generally be buried 1 to 3 m (3 to 10 ft) into the seafloor. However, it is not known whether these cables would adversely affect gray whale's bottom-feeding behavior. Although the MMS' proposed Pacific Coast OCS project area is outside the normal gray whale's summer and fall feeding grounds in the Arctic, some whales spend the summer feeding along the coast in other parts of their range (Jones and Swartz, 2002). Also, whales destined for the summer grounds sometimes stop to feed periodically on the way if the opportunity arises.

It is well documented that gray whale's bottom-feeding leaves mouth-sized depressions or "feeding pits" in the sea floor that indicate whale jaws are penetrating 10-40 cm deep into surface sediment (Nerini and Oliver 1983). Industry standard for target cable burial depth on nearshore areas of the continental shelf where gray whales feed is normally 1 m (3.3 feet), but achieved burial commonly is between 0 and 0.3 meters (<1 foot). NOAA believes there is a reasonable concern that feeding gray whales could interact with and entangle on shallowly buried transmission cables.

III. ESA-Listed Species

Sea Turtles

Personal communication citations should not be used when written, peer-reviewed documents are available. Most or all NOAA 2006c citations should be replaced with citations to written documents (preferably primary literature).

The definition of juvenile turtles ("those which have commenced feeding but have not attained sexual maturity") does not match typical descriptions of the juvenile stage of sea turtles, and may incorrectly imply that hatchlings are not feeding.

The sentence *"These species use coastal waters for foraging…"* should be amended to include oceanic foraging.

It is not clear what is meant by *"Mating may occur directly off the nesting beaches or remotely."* MMS should better describe what is meant by "remotely."

The range of the leatherback turtle extends much further south than stated. The statement that *"The leatherback's range in the Atlantic extends from Cape Sable, Nova Scotia, south to Puerto Rico and the US Virgin Island."* should be amended. If the document is only discussing the range of the leatherback WITHIN the action area, this should be explicitly stated, otherwise the full extent of the species range should be provided along with a literature citation.

The statement that *"Thousands of subadult loggerhead turtles forage on horseshoe crabs in Chesapeake Bay during the summer months"* seems out of place. Mentioning only a single location and single food source inappropriately emphasizes one small portion of the range and diet.

When considering impact and mitigation measures, the DPEIS seems to focus on protecting nesting females (which is certainly important), but the document should also thoroughly discuss mitigation measures to protect aggregations of juveniles and non-nesting adults. A more thorough discussion of distribution patterns and water temperature would help.

In several sections, the document suggests juvenile and adult sea turtle avoid dangerous situations *("areas with heavy vessel traffic," entanglements, entrainments, etc."*). Statements that sea turtles are *"active swimmers"* and *"slow and deliberate swimmers"* are not scientifically sufficient to support the premise that all sea turtles will actively avoid dangerous situations. Sea turtles are found entangled in fixed fishing gear (gillnets, pound net leaders, and lines associated with crab, whelk, and lobster gear), documented with propeller marks from boat motors, and caught in dredges and mobile fishing gear. Hence, it is inappropriate to suggest that turtles are likely to avoid dangerous situations, unless scientific evidence is provided to support this claim.

The fact that alternative energy actions (*e.g.,* construction of alternative energy sites) are expected to be staggered does not diminish the impacts to sea turtles, unless the actions are limited to times and areas where the distribution of sea turtles is limited.

The document inappropriately argues that because sea turtles are threatened and endangered, there are few of them, and therefore the total impact is necessarily low (*i.e.,* because there are so few animals to impact). Hence, the following sentence and all similar and associated statements should be revised: *"However, because of the threatened or endangered status of all the sea turtle species, impacts could be minor for these species."* Relatively minor impacts to individuals or populations may be important to recognize and mitigate and should be better characterized and evaluated in the PEIS. Even impacts to a few individuals could be problematic if the populations are low and the resilience is weak.

ESA Consultation and Related Issues

On Page ES-2 and elsewhere, MMS states that the proposed action analyzed in the DPEIS is the establishment of the MMS Alternative Energy and Alternate Use Program on the OCS and the promulgation of associated regulations. However, neither the program nor the associated regulations are described. Although the analysis generally explains the potential impacts of the activities that could result from wind, wave, and current energy projects on the OCS, from initial site characterization through decommissioning, it is not described in the context of a Federal program overseeing these activities. This presents difficulties in understanding how site selection for projects would occur, how site-specific studies would be identified and carried out, and how mitigation measures would be identified and implemented. Section 3.5 (beginning on Page 3-17) describes the steps to be undertaken in testing a technology, characterizing potential sites, construction of the facility, and its operation. MMS should clarify how each of these steps would be addressed in a rule.

Page 2-4, MMS states that it intends to ask industry to identify those areas with the most potential for development through a call for interest, which would be announced after promulgation of the final rule. MMS does not intend to identify zones for resource-specific development or no-development at this time. Considering the mitigation measures called for in the PEIS, there are several areas along the coasts where alternative energy projects should not be proposed due to concerns for marine mammals, sea turtles, marine protected areas, or other natural resources. In general, the presence of protected species or other wildlife and their habitats should be given equal consideration in characterizing a site for a wind, wave, or current energy project. A project proponent should examine the biological characteristics of a potential site and nearby areas as well as the geological and meteorological potential for the site.

The DPEIS covers the wide range of environmental issues that must be addressed for any wind, wave, energy, or alternate use project. The potential impacts are generally described and mitigation measures presented. NOAA recommends the PEIS reiterate the need to conduct project-specific environmental review and that additional or more detailed mitigation measures will likely be necessary for each project. For example, on Page ES-4, the summary of potential impacts and mitigation for Alternative Energy Development should include a statement regarding site-specific information that would be developed, reviewed, and additional mitigation measures identified.

The DPEIS reiterates potential impacts for technology testing, site characterization (geological and geophysical surveys, permitted or accidental releases of liquid waste, solid debris, or fuel), construction (noise, vessel traffic, permitted and accidental releases of liquid waste, solid debris, and fuel), operation, and decommissioning. As for the four-level classification scheme (negligible, minor, moderate, or major), the conclusions drawn for ESA-listed species could mislead future project-specific evaluations. This four-level classification scheme is not consistent with the ESA and this disparity should be spelled out in the DPEIS so as not to cause confusion with the need for ESA Section 7 consultation. Any potential take by harassment, harm, or by other means would require a Section 7 consultation under the ESA. Minor is the category for impacts that "could be avoided with proper mitigation" or, "if impacts occur, the affected resource will recover completely without any mitigation once the impacting agent is eliminated." Although the species as a whole may not suffer significant population declines due to impacts to one or few individuals, there could be consequences from which a species may not recover completely with or without mitigation. Moreover, impacts classified as moderate for some endangered species should probably be characterized as "major."

The conclusions on impacts to sea turtles and fish, as well as for marine mammals appear to be for the species rather than for populations or individuals, but this is not clear in all cases. This should be clarified.

Also, conclusions that impacts are negligible or minor would be inaccurate if an individual is taken by harassment, harm, wounding, etc. NOAA would not consider the previously listed types of takes to be negligible or minor. For example, for impacts

discussed in sections 5.2.12.2.1, 5.2.12.3.1, and others, sea turtles exposed to geological and geophysical surveys could exhibit behavioral responses that result in harassment or experience impacts to their hearing abilities. Such consequences would be considered a "take" under the ESA.

For each alternative energy project, additional environmental impact evaluations must be conducted under ESA section 7. Additional measures may be required to minimize impacts to listed species or critical habitats. The PEIS should mention that requirements for additional mitigation measures could result from project-specific section 7 consultations. During section 7 consultations, assessments will describe how listed species may be taken and jeopardized and how designated critical habitat may be destroyed or adversely modified, unless listed species or critical habitat are not likely to be adversely affected. If the ESA-listed species would be taken incidentally, an incidental take statement will be issued that contains terms and conditions for minimizing the impact of the take. If the species would likely be jeopardized or their critical habitat destroyed or adversely modified, then NMFS will develop reasonable and prudent alternatives to the proposed action.

As alternative energy projects are proposed, a separate Biological Assessment may need to be prepared in accordance with the regulations for interagency cooperation (50 CFR Part 402). Biological Assessments are required for "major construction activities" and should describe the listed and proposed species and designated and proposed critical habitat that may be present in the action area and the evaluation of potential effects of the action on such species and habitat. The purpose and content of Biological Assessments are contained in 50 CFR Part 402.12.

For all decibel measurements, please provide the reference pressure (i.e., with reference to 1 μPa for underwater sounds or 20 μPa for sounds in air). Given that the PEIS covers sounds in both air and water, it is difficult to discern in all cases in the DPEIS whether the received or source levels refer to sound in the air or underwater.

The accuracy of the accounts for threatened and endangered species must be verified. For example, Table 4.3.8-1 (Page 4-141) lists the fin whale as present in the Gulf of Mexico from December to March. This species is rare in the Gulf, as noted in the text in section 4.3.8.2.1 (bottom of Page 4-143). Also, the fin whale does not appear to undertake distinct annual migrations as stated in this section.

Fishery resource and EFH discussions should include an analysis of impacts to endangered fishes, such as endangered and threatened Pacific salmon, sturgeons, and Atlantic salmon. Other listed species that may be affected include Johnson's seagrass and white abalone. Furthermore, species proposed for listing and species of concern should be included in the analyses. Attached is a list of the Species of Concern that could be included in the PEIS.

The analysis generally describes the impacts to listed species or similar taxa. For a section 7 consultation on the program, NMFS would need additional details on the extent

of activities and impacts to listed species and designated critical habitat. The information in the DPEIS does not appear to be sufficient to conduct a consultation and determine whether a species would be jeopardized or critical habitat destroyed or adversely modified. Additional information on the number, type, and locations of potential projects within the timeframe of the PEIS would be helpful, including map products that show at least the general geographic locations and spatial extent of proposed activities.

The DPEIS does not provide enough information to conduct a Section 7 consultation on site characterization studies that may be conducted in the near future. In order to conduct a meaningful analysis on the impacts to marine mammals and endangered and threatened species, MMS needs to provide information on the locations, extent of area covered and duration of seismic surveys, the number and sizes of airgun arrays, and other related information.

MMS should discuss listed critical habitat for Steller sea lions in Oregon as a site of importance in the DPEIS (58 FR 45269). Haulout sites of importance for Steller sea lions are not sufficiently reported. Please refer to Jeffries et al. 2000 to determine haulouts in Washington and to Scordino 2006, or contact Oregon Department of Fish and Wildlife (ODFW), Marine Region, to determine haulouts in Oregon.

MMS should discuss Southern Resident killer whales in the list of evaluated listed species.

There are additional breeding sites for northern Elephant seal in Oregon and Washington waters. Contact OR Department of Fish and Wildlife, Marine Regions (Robin Brown), Oregon Institute of Marine Biology (Jan Hodder) and Washington Department of Fish and Wildlife (WDFW) Marine Mammal Investigations (Steve Jeffries) for additional information.

Impacts of sound on migration appear to be only considered for construction activity. An analysis should be presented on whether or not operating facilities will affect passage of migrating whales.

IV. Fish and Fisheries

Essential Fish Habitat

NOAA recommends MMS include in Section 8.3 an explanation of how they will address project-level essential fish habitat (EFH) consultations pursuant to the process identified in the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA requires Federal agencies to consult with the Secretary of Commerce, through NMFS with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under this Act." 16 U.S.C. § 1855(b)(2). When a Federal action agency determines that an action may adversely affect EFH, the Federal action agency must initiate consultation with NOAA. 16 U.S.C. §1855(b)(2). In order to carry out this EFH

consultation, NOAA regulations at 50 C.F.R. § 600.920(e)(3) call for the Federal action agency to submit to NOAA an EFH assessment containing "a description of the action; an analysis of the potential adverse effects of the action on EFH and the managed species; the Federal agency's conclusions regarding the effects of the action on EFH; and proposed mitigation, if applicable." Should the project result in substantial adverse impacts to EFH, an expanded EFH consultation may be necessary. 50 C.F.R. § 600.920(i). NOAA recommends MMS identify in the PEIS a process for conducting project-level EFH consultations to ensure the requirements of the MSA are satisfied prior to authorizing any site-specific projects. NOAA will work with MMS to ensure the process meets the requirements of the MSA.

In Table 7.1.1-1, which summarizes "Potential Impacts from Testing, Site Characterization, Construction, Operation, and Decommissioning for Wind, Wave, and Ocean Current Technologies" NOAA notes that MMS anticipates only minor to moderate impacts to fishery and EFH resources, yet impacts to coastal habitats (which include EFH) would range from negligible to major. Major impacts are defined by MMS as those that would threaten a resource's viability and result in incomplete recovery, even with proper mitigation. Major impacts to coastal habitats (for example estuarine wetlands and seagrass beds) may constitute a major impact to EFH and associated fishery resources. Therefore, MMS should revise the classification of potential EFH impacts to include a range from minor to major, and these impact levels should be consistent throughout the document. Prior to authorization of any site-specific or technology-specific authorizations, MMS should develop EFH mitigation measures in cooperation with NOAA to ensure that resultant impacts to EFH will be negligible to minor in scope and that unavoidable impacts are appropriately compensated for.

The Fish Resources and Essential Fish Habitat subsections of the Affected Environment Sections for each region should include a discussion of the Habitat Areas of Particular Concern (HAPC) designated in each fishery management plan (FMP) for the appropriate regional Fishery Management Council.

Coastal Habitat Impacts

All proposed alternative energy technologies under consideration would involve: (1) the installation of submarine cables from proposed offshore facilities under the sea bottom through Federal waters; (2) power transmission cables through the seabed from the OCS and state waters to onshore land-based substation facilities; and (3) onshore transmission cables from land-based substations to power grids for distribution. Similarly, all technologies would require the construction of new onshore support facilities in the coastal zone that may impact coastal habitats. The Coastal Habitats and Seafloor Habitats Sections of the Affected Environment chapter acknowledge the potential for installation of cables and construction of supporting offshore and onshore facilities to damage coastal habitats. Estuarine EFH along the coast that may be impacted includes, but is not limited to, shallow subtidal and intertidal unvegetated bottom substrates, oyster reefs and shell substrate, coral reefs, seagrass beds, mangroves, estuarine emergent marsh, and coastal forested wetlands.

MMS concludes that existing Federal, state, and local permitting regulations followed during the review of project-specific environmental analyses would ensure that resultant impacts from alternative energy projects are negligible to moderate. Despite the existing Clean Water Act and Rivers and Harbor Act regulatory framework, typical oil and gas development activity and pipeline installation in the coastal zone authorized by U.S Army Corps of Engineers (COE) has resulted in extensive historic and ongoing coastal habitat loss. For example, while excavation and fill activities in tidal wetlands are regulated by the COE, significant wetland losses have resulted from associated unregulated aspects of pipeline installation, such as vehicle tracking, soil compaction from equipment operation, saltwater intrusion, and clearing of forested wetlands. Also, restoration of organic coastal marsh soils in pipeline corridors is very difficult due to compaction and oxidation of organic soils, which limits the ability to fully restore wetlands to pre-project elevations. Finally, studies conducted for the Texas Parks and Wildlife Department have shown that over 50% of wetland losses due to pipeline installation occur outside the permitted construction right of way and often are not restored.

NOAA recommends MMS consider including precautionary license conditions, regulatory guidelines, and enforceable mechanisms, in cooperation with the COE and NOAA, as mitigation measures to ensure that individual and cumulative impacts of alternative energy facilities, associated transmission cables, and alternative use facilities to EFH and associated coastal habitats are fully mitigated. Because impacts to EFH could occur from the proposed siting of onshore facilities and associated installation of cable and transmission lines, NOAA recommends that MMS fully analyze all measures to avoid, minimize, and mitigate impacts to EFH rather than deferring such analyses and responsibility to later COE permitting activities. MMS should also monitor and evaluate the impacts to EFH and associated coastal habitats of all authorized construction activities, including required impact restoration and mitigation activities in an annual report and require necessary corrective actions through adaptive management to ensure no net loss.

Submarine Cables and Transmission Lines

Electromagnetic Fields

NOAA believes sections discussing electromagnetic fields (EMFs) (Sections 4.2.7, 4.3.7, 4.4.7, 5.2.7, 5.3.7, and 5.4.7) should be developed in more detail with respect to the ecological effects on marine life. Previous studies have shown that several marine species make use of geomagnetic fields for navigation; however little work has been done to determine the effects of EMFs on species that are known to use geomagnetic fields. Benthic species such as skates and dogfish use electroreception as their primary methods for locating food. Migratory fish, such as salmon, navigate by using geomagnetic fields. While, at present, there is no conclusive evidence that EMFs have an adverse effect on marine species, NOAA believes MMS should devote more attention to potential impacts to sensitive species since these new technologies will substantially increase the number of submarine cables on the OCS.

NOAA is concerned MMS' proposed action could significantly increase the number of submarine cables in the marine environment with undetermined impacts to marine life. Submarine cables and their associated EMFs are a common design component of all of the technologies proposed to be developed on the OCS. Currently, few major submarine cables occur on the OCS and limited research has been conducted on the associated EMFs and their individual and cumulative impacts on marine life. As mitigation for EMFs, MMS has recommended proper cable shielding and burial. In some cases, electrical fields can be produced outside the cable if it is not perfectly shielded, and magnetic fields can exist beyond even industry-standard shielded cables. In addition, burial may not be appropriate in areas where the seafloor composition or habitat type limits trenching. Therefore, impacts may occur even after steps are taken to mitigate them.

Consequently, NOAA recommends MMS conduct studies on the potential impacts of this common programmatic component of all OCS alternative energy technologies. Subsequently, MMS could also require in initial leases the measurement of EMF levels at different operating capacities that could help assess the potential for impacts to marine life from EMFs.

Cable placement

NOAA recommends MMS expand its analysis of impacts from cable placement and anchoring. Cables should be placed along the least environmentally-damaging route. Sensitive habitats such as hardbottom (e.g., rocky reefs), submerged aquatic vegetation, native oyster reefs, emergent marsh, and mudflats should be avoided. If unavoidable, compensatory mitigation should be implemented. Cables should be buried to a minimum of three feet beneath the sea floor, whenever possible. Particular considerations (i.e., ocean and/or tidal currents) may require deeper burial or weighting to maintain adequate cover. Buried cables should be examined periodically for maintenance of adequate cover. NMFS can provide assistance for identifying the least environmentally-damaging route for cable placement.

Due to logistical and economic considerations, burial of cables and other submarine transmission lines is often limited to the near-shore and landfall area. Additionally, some geologic bottom features may preclude trenching and burying of cables. Free-laid cables have the potential to sway and therefore sweep large areas within their corridor thereby impacting live bottom communities. Another aspect of free-laid cable to be considered is potential conflict with fishing gears that could result in loss or damage to the fishing gear.

Operation of cables can also impact benthic fauna by increasing the temperature of surrounding sediments and water. All of the potential alternative energy methods described in the DPEIS include connection of offshore equipment with onshore facilities via cables. As such, the PEIS should include a discussion of potential temperature-related impacts.

Acoustics

Pile Driving
Underwater noise resulting from construction of alternative energy facilities can potentially impact fish and their habitats. NOAA is concerned about contributions to ambient noise in the water column as well as periodic, acute noise generated from construction activities like pile driving. Pile driving using impact hammers can generate intense underwater sound pressure waves that may adversely affect fish species and their water column habitats. The pressure waves from pile driving have been shown to injure and kill fish (CalTrans 2001; Longmuir and Lively 2001). Injuries directly associated with pile driving include rupture of the swim bladder and internal hemorrhaging, but are poorly studied (CalTrans 2001).

NOAA encourages MMS to require monitoring of noise levels for installation activities like pile driving during the construction of new alternative energy facilities on the OCS. Many of these new technologies will require novel anchoring technologies that may not have been used before. Since the impacts of installing these components on the OCS have not been studied in detail to this point, NOAA encourages MMS to proceed cautiously in permitting noise-related construction activities of new facilities. In particular, NOAA recommends that MMS consider:

1. The use of bubble curtains or cofferdams where possible.
2. The utilization of appropriate work windows to avoid impacts during sensitive times of year (e.g., anadromous fish runs and spawning, larval, and juvenile development periods).
3. The use of any other new technologies and methods that may minimize impacts to fish and fish habitat

Facility Siting

NOAA recommends MMS establish "no activity/no development zones" for alternative energy and alternative use projects similar to the MMS-established no activity zones for traditional OCS oil and gas leasing activities in the Gulf of Mexico. Establishment of no activity zones would ensure avoidance of direct impacts to high quality bottom habitats from anchoring, pile driving, or foundation construction. Sensitive offshore resources that should be avoided include: topographic highs, live bottom (pinnacle trends), and all habitat areas of particular concern (HAPC) as defined in the fishery management plans for the appropriate Fishery Management Councils. In addition, MMS should require site-specific bottom habitat surveys of all offshore areas under consideration for development prior to providing access rights to OCS lands for alternative energy and alternative use.

Unlike conventional terrestrial power plants, alternative energy facilities on the OCS may involve significant spatial requirements. From the 1-2 square miles detailed in the DPEIS for wave and ocean current projects to over 50 square miles for a wind facility, the project footprints will affect other existing and potential users of the marine environment. The possible socioeconomic effects from the exclusion of commercial and recreational

vessels, proposed as a mitigation measure to preserve water quality, are inadequately addressed in subsequent analyses regarding ***Tourism and Recreation*** and ***Fisheries***. In addition, even if alternative energy facilities are not completely closed to vessel traffic the spacing of individual units may preclude traditional use of these areas by certain vessel types (*e.g.*, recreational sailboats) or commercial pursuits (*e.g.*, commercial longline or large-scale trawl fishing vessels). NOAA recommends MMS expand the analysis of such impacts and consider approaches to mitigate existing uses, including consideration of potential compensation methods, in the development of the AERU Program.

NOAA recommends MMS broaden its ***Tourism and Recreation*** analysis beyond visual and auditory impacts. As described above, depending on the extent of outright vessel restrictions or operating limitations posed by individual unit spacing within an alternative ocean energy facility, existing activities by these sectors may be adversely affected. In addition, because of the potentially large footprint of these facilities, movement of displaced users to other areas may result in resource conflicts and degraded environmental conditions for increased use concentrations in the new areas. The ***Tourism and Recreation*** and ***Fisheries*** analyses should be revised to reflect these concerns.

Impingement, Entrainment, and Trapping from Wave Energy Generation Units

Section 5.3.11.1 and 5.3.11.4 note the potential for fish at various life stages to become impinged on screens, entrained through turbines, or trapped within water collection chambers. MMS concludes there would be negligible impacts to fish resources and no detectable changes in fish populations because only a small number of fish would be affected regardless of the unit design. However, no supporting research or study documentation is provided to support this conclusion. NOAA recommends MMS provide additional information regarding the anticipated water volume intake, the velocity and location of the intakes, the size and maintenance requirements of the intake screens, the methods that would be employed to ensure various life stages of fish are not trapped within water collection chambers, and the results of any relevant studies or sampling undertaken to document the number of eggs, larvae, juvenile, and adult fish that are likely to be entrained, trapped, or subject to impingement by wave energy generation units.

Impingement, Entrainment, Trapping and Turbine Strikes from Current Energy Units

Section 5.4.11.1 and 5.3.11.4 mention the potential for fish at various life stages to become impinged on screens; entrained through turbines, concentrators, or shrouds; struck by turbines; or trapped within various components of current energy units. MMS concludes there would only be negligible impacts to fish resources and no detectable changes in fish populations because only a small number of fish would be affected regardless of the unit design. However, no supporting research or study documentation is provided to support this conclusion. Because ocean currents are a known method of

transport and dispersal for early life history stages (e.g., egg, pre-larval, and larval) of many fish species, NOAA is concerned that MMS has not fully considered the potential population-level impacts of current-based energy production.

NOAA recommends that MMS' analysis include information regarding the anticipated water volume intake, necessary velocity and location of current flow through turbines, the size and maintenance requirements of the intake screens, the methods that would be employed to ensure various life stages of fish are not trapped within current energy generation units, and the results of relevant studies or sampling undertaken to document the number of eggs, larvae, juvenile, and adult fish that are likely to be entrained, trapped, impinged, or struck by components of current energy generation units and turbines.

Aquaculture

NOAA recommends MMS coordinate potential development of aquaculture facilities at existing OCS platforms with NOAA's Aquaculture Program. The MSA provides NMFS, in conjunction with regional Fishery Management Councils, the authority over fishery management in Federal waters of the EEZ to include aquaculture activities. Therefore, any aquaculture activity conducted in the EEZ is subject to all applicable FMP regulatory requirements (e.g., size limits, bag limits, and fishing permit requirements). However, current U.S. law does not provide clear mechanisms to allow commercial aquaculture operations in Federal waters.

In response to this statutory need, in March 2007, the Administration proposed the National Offshore Aquaculture Act of 2007 that would give the Secretary of Commerce authority to issue permits for offshore aquaculture in federal waters of the Exclusive Economic Zone. Section 4(e) of the proposed legislation includes provisions with respect to Department of Interior jurisdiction over OCS facilities. In April 2007, the Administration's bill was introduced as H.R. 2010. While this legislation has not passed to date, the purpose of the Act is to create a regulatory framework that allows for safe and sustainable aquaculture operations for fish and shellfish in the EEZ. The 2007 Act includes requirements to ensure that offshore aquaculture proceeds in an environmentally responsible manner that is consistent with stated policy to protect wild stocks and the quality of marine ecosystems and is compatible with other uses of the marine environment.

The NOAA Aquaculture Program can assist MMS in identifying additional documents and other sources of information that are relevant to the PEIS for alternate use of OCS facilities. NOAA encourages MMS to coordinate with the NOAA Aquaculture Program with respect to alternate use of OCS facilities for aquaculture. Please contact Michael Rubino, Aquaculture Program Manager or Susan Bunsick, Policy Analyst, at 301-713-9079.

MMS should also coordinate with the Gulf of Mexico Fishery Management Council, which is currently in the process of working with NOAA to draft generic amendments to their fishery management plans to authorize aquaculture activities in the EEZ of the Gulf

of Mexico in advance of the national legislation. MMS should also contact the other Fishery Management Councils to develop approaches for aquaculture that are consistent with evolving policies of those Councils.

Section 6.3.2.3 lists potential mitigating measures that could be employed to avoid adverse impacts from aquaculture operations on the OCS. This section states that facility siting should avoid all EFH. While it would be difficult to avoid all EFH on the OCS, NOAA is especially concerned that offshore aquaculture facilities not be constructed on or near sensitive habitats including but not limited to: topographic highs, live bottom (pinnacle trends), or any HAPCs as defined in the appropriate fishery management plans of the regional Fishery Management Councils. NOAA concurs that feed, animal waste, antibiotics, and chemicals should be monitored to avoid pollution of the surrounding environment by excess material.

V. Siting in Pacific Northwest Waters

According to DPEIS, optimal energy capture from wave energy is from facilities placed at 50 feet depth. Furthermore, the document states that wind power facilities are economically viable between 16 and 64 feet depth and currently have a maximum depth of 144 feet. NOAA examined waters off the Oregon and Washington coast to determine areas with highest potential for OCS developments within the Region. Most of the Oregon and Washington coastline is deeper than 100 feet at the 3 mile state boundary. The exception is from the Columbia River to Destruction Island, Washington where the 100 foot depth contour ranges from 4 to 6.5 nautical miles from shore.

The DPEIS stated that all wind and wave energy projects will be in waters shallower than 100 meters during the next 5 – 7 years. One hundred meter contour line generally ranges from 3.5 nautical miles offshore in southern Oregon to 19 nautical miles just north of the Columbia River and back to 7.5 nautical miles at Cape Flattery. At Heceta Bank the 100 meter contour extends out to 27 nautical miles offshore. This site is extremely important to marine mammals due to ocean productivity caused by upwelling. The PEIS should state how it will permit work, or mitigate for effects of projects, in biologically important or sensitive areas like Heceta Bank that are not protected by marine sanctuaries.

Current energy conversion is not proposed for the OCS within the Region, however, numerous major projects are proposed in inland waters habitats. MMS should describe how the differences between these areas or jurisdictions will be rectified.

MMS appears to assert that the proposed alternative will effectively address confusion regarding the roles and responsibilities of various Federal, state and local agencies with respect to OCS alternative energy facilities. It is unclear why such clarification is not possible prior to selection of a proposed alternative or why it is not provided in this document.

Given the diversity of project types and technologies, it seems that “class by class” or regional alternatives may be more applicable.

Site characterizations are limited to geological, geotechnical and/or geophysical aspects while biological habitat or living resource considerations are not elevated to a suitable level of importance. (Regional example: Gray whale migratory routes or feeding habitats are not called out for special consideration or site restrictions).

VI. Siting in Southeast U.S. Waters

The following comments pertain to category 1) environmental concerns, and category 3) siting and technology concerns.

Critically important water depths for wind turbine generators (WTGs) are between 16 – 148 ft and the most economically viable depth for WTGs is 16 – 66 ft (Chapter 3). For ocean current technologies, depths depend on the technology but can range from as little as 59 - 118 ft. In the South Atlantic Bight of the U.S., these depths directly coincide with the warm stable temperature zone (59 – 180 ft) of the continental shelf, the most productive area of the shelf for economically important reef fish (Miller & Richards, 1980). The immediate footprint of the pilings for individual towers would kill sedentary benthic organisms and other organisms that depend on the benthos for food and shelter. Major projects that cover areas of 4 - 23 mi^2 with multiple platforms dispersed within the project area could result in substantial changes in the local community assemblage. However, if construction of the majority of platforms on the OCS occurs in areas with soft sediments (p. 5-62) and if sensitive seafloor habitats such as live bottoms and coral reefs are avoided, impacts to benthic communities would be reduced. NOAA proposes that MMS work with NOAA to identify and avoid sensitive habitats such as live bottom, among others.

These water depths also overlap with depths dived by recreational SCUBA divers. In the Southeast U.S., the recreational diving community represents a significant component of the coastal economy. Alternative energy operators will need to consider this user group and whether or not access would be restricted around alternative energy facilities (see section 5.2.22).

The assertion is made on p. 5-79 that mobile organisms would likely move temporarily from affected areas but could return after construction of alternative energy platforms is completed. MMS should provide scientific evidence to support this statement.

The transmission of generated energy from the OCS to the shoreline will take place via sub-sea cables, many that will be buried underneath the sediment. Page 3-23 indicates that "additional precautions would be needed if it were deemed necessary to transmit the energy over rocky or seismically active areas." Live bottom (rocky) reef habitat comprises a large area of the continental shelf in the South Atlantic Bight of the U.S. (Miller & Richards, 1980; Sedberry & Van Dolah, 1984; Levin & Hay, 1996), and this habitat supports sponges, hydroids, corals, invertebrates, seaweed beds, and a diverse assemblage of tropical and temperate fishes. Therefore, the specific methods and plan for

routing cables through these rocky habitats must be included here, rather than the generic "additional precautions."

The fact that the precise locations of potential new alternative energy facilities or alternate use program facilities are currently unknown (ES-14) indicates that selection of locations needs to be a priority, identified well in advance of operations. Although the DPEIS is programmatic and, therefore, evaluates the generic impacts from potential activities occurring in the environment (p. 1-4), it is critical that the location of alternative energy facilities be determined as early as possible during the planning stages of these projects.

As stated throughout the document, most impacts from nearly all phases of development and production (i.e., technology testing, site characterization, construction, operation, and decommissioning) are expected to be negligible to minor **if the proper siting and mitigation measures** are followed (emphasis). The most important component of the previous statement is that proper siting and mitigation measures need to be followed, and this would be dependent on accurate characterizations of benthic habitats in the proposed areas of interest. With regard to the southeast U.S., the most extensive and best evaluation of the distribution of bottom habitats from Florida through North Carolina, and from the beach out to 200 m depth is a coarse estimate (1 min grid squares, SEAMAP-SA, 2001). Until estimates of the distribution of bottom habitats in this region is improved, proper siting and mitigation measures will be nearly impossible to achieve. Impacts thought to be negligible or minor may instead trend towards moderate and higher levels unless the distribution of bottom habitats is more accurately known.

Much of the DPEIS suggests that noise impacts to marine communities from Alternative Energy Development will be the primary impact affecting fish, sea turtles, and marine mammals. While increased noise may be a key impact for marine mammals and some turtles and fishes, the direct effect on marine communities of disturbance to the seafloor should not be discounted, whether through Technology Testing, Site Characterization, or Construction (see Decommissioning). Various bottom habitats can be essential habitat for commercially and recreationally harvested species and the alteration and destruction of bottom habitats may be as, or more important than noise to many marine community members.

The Atlantic Region Planning Area divided into North, Mid, and South Atlantic areas (Chapter 4) is artificial with respect to biological communities. North Carolina south of Cape Hatteras should be grouped with South Carolina, Georgia, and Florida to approximately Cape Canaveral (or all of Florida for convenience, although the distributions of many sub-tropical and tropical fauna begin to appear around Cape Canaveral), while North Carolina north of Cape Hatteras is appropriately grouped with Virginia, Maryland, and Delaware. The distinction is based on the presence of a warm-temperate fauna in the former grouping and a more strictly temperate fauna in the latter grouping. These biological groupings are well known and are based on the distribution of fish, mollusks, and decapod crustaceans (Briggs, 1974).

Land based wind parks can require substantial land areas. Assuming that the largest available land based turbine is used (currently, 1.5 MW), the total acreage for a wind park with 400 turbines in optimal wind conditions could require more than 2,000 acres; about 200 acres would be dedicated to the turbine footprint (assuming approximately 0.5 acres per turbine base, p. 7-21). Offshore WTGs are bigger than onshore turbines—a typical onshore turbine installed today has a tower height of about 60 to 80 m (200 to 260 ft) and blades about 30 to 40 m (100 to 130 ft) long; most offshore wind turbines are larger in size, and new prototype designs are even bigger (p. 3-4). Given the larger size and footprints of offshore WTGs, the DPEIS does not provide sufficient scientific support for the conclusions that it reaches.

VII. Specific Comments

Page ES-5 states, "In general, impacts …measures are followed." This summary sentence is not supported by a scientific or policy foundation. It is likely that the full effects of siting alternative power generation facilities will not be known for years without a robust monitoring and adaptive management program.

Page ES-6, Decommissioning – MMS should require a bond for any alternative energy project that is developed to account for impacts to the environment and NOAA trust resources given that these are largely untested technologies.

Page ES-7, Technology Testing – "Single demonstration … environment." MMS assumes minimal disturbance. That conclusion is dependent on where the facility is sited. Without the requirement to collect baseline information prior to installation and to monitor impacts for a year after installation, it is not appropriate to draw this conclusion in this DPEIS.

Page ES-8, Operation – The DPEIS states that "minimal maintenance vessel activity and underwater disturbance during operation is expected." MMS needs to provide information in the PEIS to support this statement. Long-term maintenance will have some impact on the surrounding environment of an alternative energy facility and should be considered with the overall impacts of each project.

Page ES-13, Paragraph 6 – The DPEIS states, "Mitigation measures that decrease the likelihood of occupational accidents include adherence to established regulations and safety guidelines." MMS needs to discuss which regulations and safety guidelines it is referring to, perhaps by expanding the discussion on laws identified in Table 6-1.

Table 1.6-1, Pg 1-14 – Regarding US Fish and Wildlife Service and NMFS – modify the last phrase of pertinent provisions to "…or result in the destruction or adverse modification of critical habitat designated for such species."

Table 1.6-1, Pg 1-17 – For NMFS there should also be treaty tribe responsibilities listed.

2.4, Pg 2-4 – NOAA disagrees with the dismissal of Alternatives 2.4.1, regulations by energy source (i.e., wind, wave, and tidal) and 2.4.2, identification and analysis of coastal areas with greatest resource potential. These alternatives should be further developed or perhaps incorporated into existing alternatives. Although commonalities exist between the technologies assessed, there are significant differences between the relative risks these technologies pose for living resources (e.g., stationary, floating, actively turning sub-surface blades). Similarly, affects on animal feeding habitats or migratory routes may vary widely by geographic region. The document would be strengthened by providing a more definitive programmatic model for consideration.

As additional resource information is obtained by MMS, it may in the future establish "resource specific development zones" or "no-development zones" likely through coordination with potential affected states. MMS should clarify when and how they intend to do this, and should elaborate upon this idea.

3 & 7 – Statistical experts should be consulted to devise acceptable protocols for site characterization, monitoring, and impact assessment of OCS alternative energy projects. To adequately characterize the biological attributes of a site, samples must be taken many times during the year. For impact assessment, a major concern is subtracting out background variability from the variability due to construction, operation, maintenance, and disassembly of OCS alternative energy projects. This is very difficult and challenging to do, particularly in offshore seafloor habitats.

3 – The photographs help visualize what the new technology looks like and are a very helpful part of the document.

3.1 – A 1-megawatt generating device would provide sufficient energy for ~770 households in 2003. MMS should use this information instead of the 1000 household assumption in the first paragraph of section 3.1

3.5.3, Pg 3-23 Subsea Cables – MMS should state how deep the cables would be buried using the jet-plow technique. Fishes and fisheries would generally be less impacted if cables were buried.

4 & 5 – The marine resources that might be affected by development of alternative energy sources in the OCS have been described and potential impacts have also been listed. However, the impacts to the different biological resources and their habitats are treated in isolation from each other. The physical, geological, chemical, and biological resources in marine environment are interactive and dynamic. This should be addressed in this DPEIS in terms of description and potential impact. The difficulty in quantitatively determining impact at this level should also be addressed. Pertinent literature should also be cited.

4.2.2.1.1 – The sentence *"While the location of a large percentage of the right whale population…"* needs revision. The phrase *"a small group of pregnant females overwinter in waters offshore Florida and Georgia, an area considered to be a calving*

ground…" implies that pregnant females are aggregated on the calving grounds off the coasts of Florida and Georgia. This is incorrect and "offshore" can be interpreted as beyond coastal waters, where most mother/calf pairs are found. MMS should better describe and characterize seasonal and spatial habitat use patterns by north Atlantic right whale mother/calf pairs off the Southeast U.S. coast.

Fin whale: The Blaylock (1985) reference is outdated and should be replaced with current references. NOAA is in the process of revising the fin whale recovery plan. A revised draft recovery plan is available on the NOAA website at http://www.nmfs.noaa.gov/pr/pdfs/recovery/draft_finwhale.pdf. The draft recovery plan includes a list of current fin whale literature that MMS should consult.

Humpback whale: MMS should provide a reference source for the sentence *"Humpback whales may be observed migrating north offshore of the Atlantic States during mid-to late spring and mid-to- late fall.*" It does not seem logical that this species exhibits two northern migration patterns. The sentence *"Humpbacks are rarely observed inshore north of North Carolina, but from Cape Hatteras south to Florida, inshore sighting occur more frequently"* is unclear, and not completely accurate. During winter, humpbacks are sighted in coastal waters south and north (*i.e.,* vicinity of Chesapeake and Delaware Bays) of Cape Hatteras.

Regarding Sperm whales, an example of Web-based information that is not pertinent to the Atlantic coast is the text, *"Sperm whales generally inhabit..., but do come close to shore where submarine canyons or other geophysical features bring deep water near the coast."* This is true in the Pacific (*i.e.,* Monterey Canyon) or in the Mediterranean, but not along the U.S. Atlantic coast.

The seasonal distribution information contained in Waring *et al*. (2006) only pertains to survey sightings data, and does not represent the distribution of the "North Atlantic Stock."

4.2.5.1 – The document should not refer to websites for information, as the sites may change after this document is made available in final form, and a reader will not be able to find the information it references. NOAA strongly suggests referring to published scientific literature instead.

4.2.5.1 – The DPEIS states "The threshold of pain is an SPL of 140dB." MMS should clarify whether this is for humans, and whether it is in air or in water. Discussion should consistently involve information on sound in water, and be focused on marine resources of concern (e.g., marine mammals, sea turtles, fish). Figure 4.2.5-1 should be replaced by something that provides information on sound levels in the water.

4.2.5.3, Pg 4-32 – Footnote 17 is key and should be in the main text, not in a footnote.

There is limited scientific information on the effects of anthropogenic noise on fish. Very little is known about the effects of anthropogenic noise on marine mammals,

particularly when there are multiple sources along a migratory route. Assessing this will require better baseline information about a well-established migration route and commitment to multi-year scientific investigations to assess changes as development and commercialization increases. The few studies that have been conducted on the effects of sound on marine mammals have primarily involved impacts of seismic air guns on large whales; much less is known about effects of other sound sources.

4.2.8 – The sentence *"Occurrence of cetacean species…"* is somewhat misleading. A suggested rephrasing is: Occurrence of cetacean species is generally widespread in Northwest Atlantic waters; many of the large whales and populations of smaller toothed whales undergo seasonal migrations along the U.S. Atlantic coast.

The last sentence in the paragraph should be rephrased to: "The order Pinnipedia includes four species of seals, which are mainly found in the North Atlantic."

4.2.8.1 – The sentence *"All of the endangered cetaceans…*" is misleading. The time period (*i.e.,* March through April) provided for the northern migration of large whales is too precise for the state of existing knowledge. For example, blue whales are rarely sighted off the U.S. Atlantic coast, and migration may vary by size/sex/age classes (*i.e.,* as in sperm whales).

Table 4.2.8-1, Pg 4-51 – The criteria for classifying occurrence as "common, occasional, uncommon…," and typical habitat as "coastal, shelf, slope/deep" are not described, although Waring *et al*. 2006 is cited. NOAA suggested revisions are contained in an abbreviated version of the table provided at the end of this document as an attachment.

Table 4.2.8-1 – The occurrence of north Atlantic right whales is "uncommon" throughout the area simply because they are extremely rare. Animals are "commonly" seen in areas designated as critical habitat under the ESA; since these areas do overlap significantly with areas under consideration for AE development, they should be specifically shown. Further, the text indicates that right whales occur near the coast, but there is no "X" in the "Coastal" column in the table. This should be added.

Throughout the DPEIS MMS is describing species of marine mammals, but NOAA manages based on marine mammal stocks. Impacts of offshore development may impact some stocks within a species, but not others. NOAA suggests revising the text to reflect current marine mammal management practices.

Table 4.2.8-1 includes similar information as table 4.3.8-1, but has a different format. MMS should consider clarifying the information in these tables.

4.2.8.2, Nonendangered species, Paragraph 1 – The scientific name for harbor porpoise is misspelled, the correct spelling is *Phocoena phocoena*.

4.2.8.2, Paragraph 2 – The sentence *"A limited migration or season distribution …and returning south in the fall and winter"* is not completely accurate. The distribution of

marine mammals off the U.S. Atlantic coast is based on seasonal surveys, conducted principally during the summer. The winter distribution and migration for most small odontocetes is not well known; hence, it is not correct to state that *"Most species are present in the mid-Atlantic area throughout the year."* Some species that occupy mid-Atlantic waters in late autumn to early spring move into North Atlantic waters in summer.

4.2.8.2, Paragraph 3 – The scientific name for pilot whales (*Globicephala melaena*) is outdated. Further, two species of pilot whales utilize shelf edge habitats: long-finned pilot whales *(Globicephala melas*) and short-finned pilot whales (*G. macrorhynchus*).

4.2.8.2, Paragraph 4 – The reference to "harbor seal" in the second sentence should be changed to harp seal. The occurrence of both harp and hooded seals in U.S. Atlantic waters are considered to be outside the normal ranges for these species.

Figure 4.2.10-1 appears to be missing an "S" (as indicated in the legend) for the Gerry E. Studds Stellwagen Bank National Marine Sanctuary in Massachusetts Bay.

Table 4.2.11-1, Pg 4-65 – This table should be either broken out for each region or added to each region's description in full.

Table 4.2.11-2, entitled "Fish Species for Which Essential Fish Habitat Has Been Designated in the Atlantic, Gulf, and Pacific Regions" is not accurate. For example, the table only identifies five species for the South Atlantic Fishery Management Council. A comprehensive list of species managed by the Fishery Management Councils can be found at the appropriate Council website. NMFS' webpage provides links to the individual Councils' websites at http://www.nmfs.noaa.gov/councils.htm.

4.2.14 Seafloor Habitats and Chapter 5: – The importance of soft sediment seafloor habitats on fisheries and EFH needs to be better emphasized in the DPEIS. Soft sediments on the OCS are dynamic habitats, not just mixtures of different grain-sized mineral particles. Seafloor sediments contain varying amounts of organic matter depending on grain size and oceanographic conditions. Thousands of invertebrates per square meter live in—or on— the sediments of the ocean bottom, along with bacteria and protozoa. Amphipod and polychaete tubes can cover and cement the sediment surface over hundreds of square km^2 at certain locations during certain time periods. These emergent tubes can provide habitat for other important macroinvertebrates, as well as fish. Bioturbation and microbial metabolism recycle nutrients into the overlaying water column. There are also many important biogeochemical processes within the sediments. All of these processes form a mosaic of structure and function within the sediments. The macrofauna, meiofauna, and microfauna associated with the sediments account for a major portion of the biomass in the ocean, and constitute an integral part of the marine food web that supports exploitable fish species. MMS should describe how OCS alternative energy projects would disturb and affect these processes within the soft sediments.

4.2.14, Paragraph 3 Seafloor Habitats, Pg 4-79 – MMS should check up-to-date references on slope habitats. Wigley and Theroux used 1mm sieve sizes that may have missed many smaller invertebrates.

4.2.14.1 – This section should refer to maps where Stellwagen Bank, the Charleston Bump, and the Oculina Bank are depicted. Topographic Features including ridge and swale structure should also be mentioned under this section. MMS should describe the function and importance of the ridge and swale topography. There is an extensive ridge and swale system off the NJ coast and also in other areas along the Atlantic. The Hudson Shelf Valley is also an important topographic feature of the NY Bight.

4.2.14.2, Sentences 1 & 2 Benthic Communities, Pg 4-81 – MMS should include "Crustaceans" in these sentences.

4.2.14.2, Pg 4-82 – MMS should explain why the ridge and swale topography is important to the OCS environment and (Chapter 5) how alternative energy development will directly or indirectly affect these habitats.

Figure 4.2.15-1 should be corrected to read: *MONITOR* National Marine Sanctuary.

Table 4.2.23-1, Pg 4-111 – This table should be broken out for each region or be added to each region's description in full.

Figure 4.4.10-1 includes a reference to National Marine Sanctuaries in the legend, but the sites are not included in the figure. They are, however, referenced in the text beginning on page 4-252.

4.4.11.1 – The Affected Environment section for Fish Resources and Essential Fish Habitat in the Pacific Region should include a discussion of the green sturgeon in Section 4.4.11.1, Threatened or Endangered Species

4.4.11.1.3, Pg 4-238 – Pink salmon are not listed under the ESA. The sentence needs to be rewritten. NOAA suggests moving the bracketed list of all five salmon stocks to page 4-241 where they describe salmon in general.

4.4.11.2.1 Anadromous Fishes, Pg 4-241 – There are other fish that occur that are not listed here, e.g. sea-run cutthroat trout, sturgeon, and shad.

4.4.11.2.2, Pg 4-242 – There is currently no foreign fishing fleet fishing in the EEZ, delete reference. The text refers to the "Southwest Fishery Management Council." The correct name is the Pacific Fishery Management Council.

Chapter 5 of the DPEIS recommends specific mitigation actions for each area of potential adverse impact. However, the DPEIS does not explain how MMS would implement or enforce these mitigation measures with program applicants on a site-specific basis.

Therefore, it is difficult to determine how effective these mitigation actions would be in addressing potential adverse impact.

Chapter 5 of the DPEIS provides conclusions regarding potential adverse impacts for biological and physical resources. Although the DPEIS appears to provide substantial analysis and discussion to support conclusions in some areas (for example, section 5.2 regarding impacts of wind energy activities in general), the DPEIS provides substantially less citations to scientific literature, analysis, or discussion to support conclusions in other areas (for example, sections 5.4.8 and 5.4.11 regarding impacts of ocean current energy development on marine mammals, fish resources, and essential fish habitat). The lack of information to support conclusions in some areas makes it difficult to determine the basis for and comment on the accuracy of the conclusions in those areas.

Chapter 5 – More attention should be given to possible functional effects due to loss of resources or loss of habitat. In many sections throughout Chapter 5, especially under seafloor habitats, statements are made that disturbance will be small compared to the availability of similar seafloor habitats in surrounding areas. This cannot be known until the proposed site has been characterized.

5.2.1.4 – NOAA agrees that some fish species could be attracted to the new structure in the ocean. However, whether these fish species are the same that would "normally" be found in the area is unclear. Adding structure may change the local fish community in unpredictable ways.

5.2.5 (and other sections that address the acoustic impacts of ocean industrial development on marine mammals, such as 5.2.8.2.1) – NOAA agrees that the acoustic impacts of technology testing on marine mammals would be minor to moderate. Under certain situations, marine mammals have been known to divert away from an area to avoid certain localized anthropogenic sound sources. To date, no long-term negative impacts have been found (although few, if any, studies have been directed at addressing this issue). However, once the collection of wind or wave energy is proposed on a commercial level and at a very broad scale, there is not sufficient information to assess whether the impacts will be moderate, and it is very possible that the impacts of commercial scale development will have "major" impacts on some marine mammal populations. It is possible, for instance, that coastal migrations of some marine mammals (e.g., gray whales, harbor porpoise) could be sufficiently disrupted that their migration stops, or that the migration changes in a manner that puts the population at risk. It is clear in the literature on terrestrial mammals that anthropogenic changes to a landscape sometimes prove to be insurmountable barriers to migratory behavior. A recent paper (Berger et al 2006) describes historical migratory routes of pronghorn antelope that have been abandoned. There seems to be an assumption that marine mammals will simply migrate around anthropogenic activities and use a different path to get to their destination. However, there is not a complete understanding of what constitutes a "barrier" – either natural or anthropogenic – to a marine mammal, so assumptions about avoidance of widespread activity in migratory paths should not be made. Widespread

installation of alternative energy technology in the paths of marine mammal migrations may well have unintended, unexpected outcomes that go well beyond the "minor" or "moderate" impacts discussed in this document.

5.1.1, Pg 5-2 – In the definition of "Major" the word "or" should be used instead of "and". Using "and" is likely to result in an under representation of major impacts from the development and implementation of alternative energy projects.

5.2.5 – The DPEIS should estimate Potential Impacts of Alternative Energy Development and Production relative to the Acoustic Environment based on the best available science and/or areas of current scientific uncertainty.

5.2.5.3.1, Pg 5-21 includes the following statement:

> *Underwater noise from propeller cavitation is the strongest noise from ships. As shown in Table 5.2.5-2, this broadband noise can range from subsonic to ultrasonic frequencies and can reach 160 dB (re 1µPa at 1 m) … sound levels from ships, including ship sonar, may affect behavior and disturb communication of marine mammals (Thomsen et al. 2006), but not cause physical harm. In areas of existing shipping, these effects would be reduced due to habituation by the animals. In previously undisturbed areas, fish and mammals might avoid the work area or experience some other temporary behavior changes. Such changes would not be expected to affect the survival of these species in the vicinity of projects.*

Levels of underwater noise associated with ships can range much higher than 160 dB re 1µPa, with levels varying among ship types, though generally positively correlated with increasing size and/or speed (Richardson et al., 1995; Heitmeyer et al., 2004). Support and supply ships (with lengths between 55 and 85 meters) are likely to represent a large proportion of vessels associated with both alternative energy infrastructure construction and operational maintenance. Source levels of such vessels generally range between 170 and 180 dB re 1 µPa at 1 meter, with higher speeds and thruster use increasing source levels significantly (Richardson et al., 1995). Additionally, the concept of marine animals "habituating" to high-noise environments is poorly understood (National Research Council, 2005). Currently, there is little scientific evidence to support hypotheses that the reproductive and/or biological fitness of marine animals commonly exposed to higher background levels of noise is either enhanced or reduced by additional sources of noise (National Research Council, 2005). NOAA is particularly concerned with the addition of stressors to the environment for endangered and/or threatened species that spend some or all of their time within national marine sanctuaries. The information in Table 5.2.5-2 demonstrate that several of the below-water noise sources associated with alternative energy siting, construction and/or operation are above 200dB re 1 µPa. Based on a simplified model of transmission loss (distance to isopleth of frequency X=10^((205-X)/15), where propagation model is between cylindrical and spherical) for a source level of 205 dB re 1 µPa (as listed as a upper limit for pile driving in Table 5.2.5-2), an area with a 1 km radius would be ensonified over 160dB re 1µPa, and an area over 46 kilometers would be ensonified over 120 dB re 1µPa (a level still well above both

narrow and broad bandwidths of concern in several areas of the deep and shallow water ocean environment). Studies have shown that intense sources of impulse sound associated with alternative energy construction are likely to disrupt the behavior of marine mammals at ranges of many kilometers (Madsen et al., 2006). Even less intense sources associated with alternative energy operation have documented responses from marine mammal populations in the vicinity of these sites (Koschinski et al., 2003). Thus, impacts from all sources should be discussed and estimated based on the best available science and, where necessary data is absent, should highlight data needs.

5.2.5.3.1, Pg 5-21, bottom paragraph – The DPEIS states, "In areas of existing shipping, these effects would be reduced due to habituation by the animals." This is an assumption that may have little scientific support; a literature citation should be provided. Very little is known about animals' responses to shipping, but much variation has been observed.

Table 5.2.5-2, Below-Water Noise Sources, Pg 5-22 – Seismic airgun arrays emit higher frequencies as well as the frequencies listed. Also, currently seismic explosions are rarely used in the marine environment; this is an outdated method for geological and geophysical surveys.

5.2.5.3.2, Pg 5-23, Paragraph 1 – an assumption of 130 dB for ambient ocean noise levels may be artificially high. MMS should use a lower ambient level, particularly one taken from empirical measurements.

5.2.5.3.2, Pg 5-23 includes the following assertion:

> *Assuming an ambient noise level in open ocean of 130 dB and a transmission loss of 4.5 dB per doubling of distance for a 205-dB source at 30 m (98 ft), a simple transmission model would estimate that pile-driving noise would be distinguishable for up to 2,000 km (1,240 mi)(i.e., 16 doublings of 30 m).*

Despite evidence of 20th century increases in the ambient levels of underwater noise (particularly for low frequencies and in areas with high commercial shipping traffic) (Andrew et al., 2002; MacDonald et al., 2006) the value of 130 dB represents an upper limit for only the very lowest frequencies (0-50Hz) and for all other frequencies is far higher than is supported by the literature (Wenz, 1962; Cato, 1976) (including studies that have focused specifically on measuring windfarm related underwater noise in densely populated coastal zones (Thomsen et al., (2006)). Accurate estimation of ambient noise levels is critical to assessing the possible impact of additional noise sources related to alternative energy development. For this reason, the discussion of ambient noise levels in deep ocean and shallow continental shelf marine environments should be expanded to discuss all available information on ambient noise levels currently documented for the range of marine environments of interest for alternative energy development. Citations used in the discussion on the acoustic environment should describe the frequency bandwidths that they are based upon. Finally, this discussion should state that ambient levels are likely to vary significantly among sites due to variation in levels of human activity and environmental conditions affecting noise

propagation, and thus evaluations of the spatial extent of noise impacts associated with alternative energy development need to be evaluated site-specifically. Such an expanded discussion will give readers and consulting agencies a general understanding of how individual sources related to alternative energy development will and/or will not add acoustic energy to omnipresent background levels, as well as what specific information will be necessary to evaluate on a case-by-case basis.

5.2.5.6 Mitigation Measures, Pgs 5-29 to 5-30 – trained monitors or observers must be used to search areas where fish, mammals, and other marine life may be harmed by pile driving. If sensitive marine life is found, pile driving must be postponed, in addition to being temporarily halted. Additional measures that should be considered for use during pile driving and seismic surveys include the following:

- Passive acoustic monitoring (PAM) is another tool that could alert operators about the presence of vocalizing marine species. PAM use should be considered in conjunction with visual monitoring.
- Limits on nighttime pile driving, seismic surveys, and use of explosives.
- In some cases cutting of foundation pilings is the preferred method of removal rather than the use of explosives.

5.2.8 Marine Mammals – This section pertains to impacts to marine mammals due to site characterization, seismic surveys, construction, vessel traffic, discharge of waste, operation and decommission of meteorological, wind towers, etc. Similar information pertaining to marine mammals is contained in the various sections/subsections; therefore, the following comments pertain to all sections (*i.e.,* 5.3.8, 5.4.8, 7.5.2.8)

Overall, the information pertaining to potential impacts of various activities on marine mammals is overly general, with the possible exception of literature pertaining to noise impacts on marine mammals. Furthermore, without site-specific studies, phrases such as *"impacts from vessel noise or construction, etc, are expected to be negligible for most species, and minor for species that are threatened or endangered"* cannot be evaluated.

Text contained in this section implies that alternative energy projects will not occur within coastal waters, (*i.e.,* OCS pertains to 3 to 200 nm); however, the wind farm proposed for Horseshoe Shoals (in Federal waters) in Nantucket Sound is certainly within a coastal habitat. Construction and vessels activity in this region can be expected to disturb gray seals (contrary to 5.2.8.2.1- 4th para.), particularly during the pupping period. The largest gray seal pupping colony in U.S. Atlantic waters is on Muskeget Island, which is located a few miles south of Horseshoe Shoals.

5.2.8.2.1, Paragraph 2 – The statement that side-scan sonar does not impact marine mammals should have references added or be deleted.

5.2.8.2.1, Paragraph 3 – Text states that there is currently no evidence that significant adverse impacts to cetaceans can be attributed to geological and geophysical surveys (USDOI/MMS 2004a). However, what is not stated is that these impacts would most

likely be sub-lethal and very difficult to assess. The absence of evidence should not be interpreted as evidence that significant impacts do not occur

5.2.8.2.2 – This section states that population effects to marine mammals are not expected, but that individuals will be affected. This would constitute harassment under the Marine Mammal Protection Act and an Incidental Harassment Authorization would have to be issued for each project.

5.2.8.2.2, Pg 5-39, last sentence – Displacement of marine mammals is an impact itself and could lead to "moderate" impacts if the displacement prevents animals from biologically important activities.

5.2.8.2.3 Vessel Traffic, Paragraph 3, Pg 5-40 – This paragraph briefly mentions large whale vessel strikes in Atlantic, Gulf of Mexico, and Pacific OCS regions. Large whales that are not explicitly mentioned (*e.g.,* blue, sei) are considered to be rare or extralimital. However, there is no mention of the difficulty of detecting vessel collisions with some deepwater species. Further, text in this paragraph implies that a correlation exists between species abundance and vessel strikes. Therefore, northern right whales **are not** listed as *"species considered most likely to encounter vessels,"* **although vessel strikes are one of the leading causes of northern right whale serious injury and mortality**.

5.2.8.3.1 Geological and Geophysical Surveys, Pg 5-42 – Marine mammals exposed to seismic surveys and exhibiting behavioral changes may be harassed. An MMPA incidental take or incidental harassment authorization will be necessary.

5.2.8.3.3, Paragraph 3 – This paragraph appears inconsistent with the fifth paragraph in the prior section on vessel traffic. Section 5.2.8.2.3 states that "it is unlikely that there would be encounters between manatees and meteorological tower construction vessels," whereas Section 5.2.8.3.3 states that "the endangered West Indian manatee…could be injured or killed by collisions with construction support vessels." There is there a difference between the two sections that should be clarified.

5.2.8.3.3, Paragraph 4 – The sentence *"many of these species, such as dolphins and seals, are commonly attracted to moving vessels and spend periods of time following moving vessels or swimming with the bow waves of ships…"* is an overgeneralization of the behavioral response of these animals to vessels. Further, a primary literature citation is required for the sentence *"Because these species are agile, powerful swimmers, they are also capable of avoiding collisions with oncoming vessels, although some may be injured by contacting propellers while following ships."* It seems very unlikely that animals will approach moving vessels from astern and make contact with the propellers.

5.2.8.6 Mitigation Measures – The scope of the additional general mitigation measures implies that measures will be implemented to minimize impacts on (a) marine mammals during critical life history phases, or (b) important habitats. If implemented, these should reduce the likelihood of impact on marine mammals. A mitigation measure that has not been mentioned is the need for protected species monitoring studies during all phases of

potential projects. Without independent studies, it will be difficult to evaluate statements like (5.4.8.2.1, Paragraph 2), *"Because most of the potentially affected marine mammals are highly mobile species, they may be expected to quickly leave an area when a survey is initiated, thereby greatly reducing their exposure to minimal sound levels and, to a lesser extent, masking frequencies."*

5.2.8.6 – Gray whales are not endangered; however, the proposed mitigation measure is appropriate. For many species of marine mammals, there is not sufficient information available about seasonal distribution and habitat use to reliably avoid placement of facilities in sensitive cetacean congregation, mating, or feeding areas. This information should be collected prior to permit authorization.

5.2.8.6 Mitigation Measures, Pg 5-47 – Measures to minimize the risk of vessels strikes should be included in this section. Also, measures to raise awareness and prevent accidental marine debris should be included. The mitigations for platform removal by explosive-severance in the Gulf of Mexico are updated to reflect the 2006 biological opinion and 2007 incidental take authorization. Some of these measures may be applicable to the alternative energy projects.

5.2.11 & 5.2.14 – Depending on the type of installation, there may be substantial localized destruction of seafloor and EFH habitat. Section 5.2.14.3 indicates that construction could take 6 months to 2 years. It is unknown how quickly a benthic community would rebound after disturbance for this length of time.

5.2.11.2, Pg 5-60, Paragraph 2 – The last two sentences appear to contradict each other. If any additional mortality of adult rockfish could be considered a major impact, then even a small number of meteorological towers requiring removal could have a major impact on rockfish.

5.2.11.3, Pg 5-61, Paragraph 2 – Clarify or provide the rationale for the statement that "…wind structures for a particular project would be somewhat dispersed over the project area and the total area affected by seafloor disturbance would usually be relatively small compared to the availability of similar seafloor habitat in surrounding areas."

5.2.11.3, Pg 5-61, Paragraph 4 – Clarify or provide the rationale for the statement "Overall, the noise associated with placement of platforms would not result in measurable changes in fish populations, although distribution of fishes within the project area could be temporarily altered."

5.2.12.1 Technology testing, Pg 5-65 – the last sentence about the minor impacts to sea turtles contradicts earlier statements in the paragraph that no impacts to sea turtles are anticipated.

5.2.12.2.5, Pg 5-68, Paragraph 2 (also on Page 5-73, Paragraph 4) – Acoustic criteria used in section 7 consultations for underwater explosions have been 182 dB re $1\mu Pa^2 \cdot sec$

and 12 psi. However, acoustic criteria continue to evolve and will likely be different for projects proposed in the future.

5.2.12.3.2, Pg 5-69, Paragraph 4 – Provide the basis with literature references for the assumption "that habitats such as sea-grass beds and live-bottom areas commonly used by turtles for feeding or resting would be avoided during facility siting and pipeline routing, and that some soft-bottom areas affected by construction or trenching would recover."

5.2.12.3.3 Vessel Traffic, Paragraph 1, Pg 5-70 – Provide the basis with literature references for the statement that "juvenile and adult sea turtles might avoid areas with heavy vessel traffic" and "most species generally exhibit considerable tolerance to ships."

5.2.12.3.3 Vessel Traffic, Paragraph 2, Pg 5-70 – Sea turtles are usually difficult to spot, even in daylight and clear visibility and *are* very difficult to spot from a moving vessel when below the water surface.

5.2.12.4.4, Pg 5-72, Paragraph 4 – Correct "hatching" to hatchlings. This misspelling is repeated in other sections. Perform a search and replace, as appropriate.

5.2.12.5, Pg 5-73, Paragraph 2 – Explain what is meant by decommissioning activities would be similar to construction *but at lower levels.*

5.2.12.6, Pg 5-74, Mitigation Measures – Measures to be taken during explosive-severance removals should be updated to reflect the 2006 biological opinion and 2007 incidental take authorization for removals in the Gulf of Mexico. Some of these measures may be applicable to the alternative energy projects.

5.2.14.2, Paragraph 2, Pg 5-80 – The gravel pavement and ridge and swale should also be avoided. It cannot be certain that natural habitat conditions would return in one or two years after removal of pilings.

5.2.14.4, Pg 5-82, last paragraph -- The effects of operations on diversity and abundance are discussed. MMS should describe the effects on ecological function especially for the large-scale projects.

5.2.14.6 – Gravel pavements and ridge and swale should be added to the second mitigation measure.

5.2.15 Areas of Special Concern – Although alternate energy projects cannot be sited within marine sanctuaries, areas closed to fishing or HAPC, care must be taken as to where these projects are sited outside of such areas. Alternate energy projects should not be sited in areas where they would interfere with the transport of fish and invertebrate larvae destined to settle in areas of special concern.

The DPEIS's estimates of Potential Impacts to Areas of Special Concern should be expanded, as described below, to address impacts to National Marine Sanctuaries from activities occurring both within and outside their boundaries.

5.2.15.2, Pg 5-86 – "Site Characterization" states the following:

> *Depending on the distance from project areas to areas of special concern, geological and geophysical surveys could potentially affect fish (Section 5.2.11.2) and marine mammals (Section 5.2.8). Similarly, the use of explosives to remove meteorological towers once site characterization activities have been completed could harm nearby fish and marine mammals. Overall, such impacts would be negligible to minor in terms of potential impacts on populations of organisms. Pile driving, if needed to install meteorological towers, would be unlikely to have more than temporary and negligible effects on populations of fishes or marine mammals within offshore areas of special concern.*

Given the source levels (many of which are over 200 dB re 1μPa and significantly overlap frequencies used by species protected in areas of special concern and/or listed under the Marine Mammal Protection Act and/or the Endangered Species Act) associated with several alternative energy construction activities, this statement does not accurately portray the possible impacts that noise and/or vessel activities associated with construction activities could have on sanctuary resources. As stated in other comments, acoustic energy from high-intensity sources such as seismic airguns, positioning of construction barges, pile driving and blasting is likely to ensonify very large areas at intensities well above ambient levels within frequency bandwidths of concern. The ranges of impact from alternative energy construction and operation from acoustic sources as well as other transient activities should therefore be reflected in siting decisions as well as mitigation and monitoring designs.

5.2.15.4, Pg 5-88 – "Operations" states the following:

> *Noise and vibrations associated with the operation of the turbines would be transmitted into the water column and through the sediment. Depending on the proximity of OCS wind turbines to areas of special concern and the intensity and frequency of the sounds generated, such noises could potentially disturb or displace some marine mammals (Section 5.2.8) or fish (Section 5.2.11) within areas of special concern or could mask sounds used by these species for communicating and detecting prey. The potential for such effects would be project specific and would be considered further during project-specific evaluations.*

We agree with this statement's inclusion of masking as an impact of particular concern due to increasing noise levels from industrial activities adjacent to sanctuaries, and reiterate the importance of using site-specific modeling techniques to estimate the propagation of noise within various frequency bandwidths to educate decision making during all phases of alternative energy development in the OCS.

5.2.15.6. – Because the noise and physical disturbance of construction and operation will extend beyond the physical structure of the wind structure, one appropriate mitigation measure would be a buffer zone around Areas of Special Concern where no structures can be located.

5.2.23 & 5.3.23 – For both wind and wave energy, it seems that the installation of multiple projects could negatively impact commercial fisheries as they would preclude fishing in some areas and cause changes in fish distribution, both of which could reduce the market value of a fishery. Some benefits could occur if commercially-important fish are attracted to the new "structure" in the water column. The analysis defers potential impacts on fishery resources to site-specific NEPA analyses. However, site-specific analyses are very focused and do not necessarily consider the impacts of a policy that promotes large-scale changes in the use of the marine environment. It is possible that site-specific analyses would conclude that there are no important impacts on commercially-important fish species, yet the unprecedented broad scale development of the coastal zone for energy production would have an impact. This issue should be better understood before commercial operations are allowed.

5.3.1.4 – In this section, the DPEIS needs to discuss in detail how the conclusion of minimal impact was developed for geohazards such as storm surge. MMS should consider including a discussion of climate change and its impacts on ocean and coastal conditions to better address this issue.

MMS needs to evaluate whether decommissioning is actually a realistic requirement. Section 5.3.1.5 states, "During decommissioning, the wave energy facility and its mooring and scour protection systems would be removed …shore." This is not the case for the proposed wave energy project off the Oregon coast at Reedsport. The company informed NOAA that if the project is decommissioned, even with 14 buoys (rather than the 200 buoy potential build out), it would be cost prohibitive to remove the concrete moorings placed on the seafloor.

Section 5.3.1.6 states, "Potential impacts to littoral (longshore) sediment transport could be mitigated by altering the design and location of the facility." This mitigation measure may not be possible because wave energy devices need to be situated in the water at a certain depth and angle from shore to maximize their energy production. MMS needs to analyze existing wave energy facilities (as a start) to explore the real potential for carrying out this mitigation measure.

5.3.2.4 – MMS needs to establish a minimum number of inspections performed by the operator of a wave energy facility and a detailed list of inspection requirements for maintenance.

Section 5.3.4.4 states that, "routine wastewater discharges would be regulated under the NPDES program." MMS needs to provide an analysis of how NPDES permits would be used in the context of an offshore wave energy facility and how, in particular, mixing zones would be considered.

5.3.5.1 Technology Testing – This section needs to describe in detail impacts to NOAA trust resources associated with attraction or repulsion to wave energy devices. The description should provide species-specific detail. This section also should describe how NOAA trust resources and the project areas would be monitored during a technology testing event.

5.3.8.1 – MMS needs to provide an analysis in the PEIS about the potential collisions of whales with wave energy devices or with the vessels that are servicing those facilities. This could involve examining exiting wave energy facilities and extrapolating impacts over a number of years and a projects number of completed facilities.

5.3.8.4.1 – MMS states that a wave energy facility may have up to 2,500 mooring lines. As the section notes, this will pose a substantial entanglement hazard to some species of marine mammals, as well as sea turtles and other large marine species. It will be difficult to completely avoid placing structures in areas that do not overlap with entanglement-prone species. Reliable mitigation methods must be used to prevent entanglements; NOAA believes that the effectiveness of "pingers" is not sufficiently proven to achieve the mitigation that would be needed with this number of vertical lines.

There should be some analysis of risk potential associated with these components of a facility.

- Based on mitigation section 5.3.8.4.6, it is unclear if pingers will be required for mooring lines or if it is a measure that may be adopted. Furthermore, if pingers are used, MMS should state how often applicant will have to test their effectiveness and reliability.
    - MMS should identify which types of pingers it proposes to use.
    - MMS should discuss the effects of pingers on the acoustic environment and the potential for impacting the passage of whales.

Gray whales, humpback whales, and killer whales are known to migrate and feed within the project boundaries outlined in the DPEIS. MMS should provide specific analysis on the effects of projects on known migration routes and feeding areas.

5.3.8.6, Pg 5-178, Mitigation Measures – The first set of measures regarding siting of facilities is critical. NOAA fully supports these measures for all types of alternative energy projects.

Section 5.3.11.1 states, “Therefore, as long as sensitive seafloor habitats are identified and avoided, impacts to fish resources would be negligible.” NOAA disagrees with this statement. MMS should analyze the potential for the installation of a wave energy facility to change the surrounding environment by attracting and/or repelling aquatic organisms, thereby impacting fish resources.

5.3.11.1, Pg 5-187, last paragraph – Most shellfish are not mobile.

5.3.11.6, Pg 5-193, first mitigation measure – As stated on Page 5-178, surveys to characterize potentially sensitive habitats for fish should be conducted during siting studies, rather than prior to facility construction. Earlier studies and proper siting would ensure that impacts to sensitive habitats could be avoided. Also, NOAA commends MMS for including the other mitigation measures, such as to design wave energy generation units to reduce the potential for entrainment, entrapment, or impingement of fish an invertebrates and avoiding the use of explosives for removing pilings.

5.4.5.4, Pg 5-279, Paragraph 7 – Underwater noise from ocean current turbines should be measured to verify whether underwater noise from the turbines would be low.

5.4.5.6 Mitigation Measures, Pg 5-281 includes the following statement:

> *Impacts to marine species from pile driving or the use of explosives may be mitigated by a number of means involving either removing animals from the work area or reducing sound emissions into water. Mitigation by removal of species would typically involve deterring fish and mammals by various proven means such as horn blasts, charges, strobes, electric seines; avoiding migration periods; or simply ramping up noise levels gradually, in the case of pile driving. Mitigation of piling noise at the source is possible by various means, including the use of bubble curtains, insulated piles, working inside of caissons or coffer dams, or working during periods of slack tide (Lewis 2005). Finally, monitors who have a clear view of the surrounding area can be stationed to alert operators of the presence of sensitive marine life so that pile driving can be halted until the area is clear.*

For many of the populations of marine animals whose life histories rely heavily on acoustic reception and transmission, (particularly low-frequency active baleen whales, most of which are endangered or threatened in US waters) the option of "removing the animals from the work area" is impractical and the use of additional acoustic sources to deter their presence may necessitate additional consultation with NOAA under the MMPA, ESA and/or NMSA. Thus, this section of the DPEIS should be expanded to relate possible mitigation measures to classes of marine animals of concern (fish, sea turtles, seabirds, odontocete species, pinnipeds, baleen whales, etc.) according to both the feasibility of available mitigation designs and their effectiveness, including the strengths and weaknesses of all approaches. The list of possible mitigation measures should be expanded to include the use of passive acoustic technology to increase the effectiveness of visual monitoring programs, as well as to monitor the acoustic footprint of the alternative energy site, monitor the presence/absence of vocally-active marine animals in the areas surrounding the site, and/or to mitigate vessel-whale collisions using real-time capabilities.

5.4.8 – This section states in a few places that marine mammals would avoid operating turbine facilities, so implies that the risk of injury or death as a result of striking the rotors would be low. There is no evidence provided to support the assertion that the rotors would be avoided by marine mammals. The concerns raised about turbine noise possibly

causing abandonment of feeding or mating grounds are valid and serious. Sufficient information about seasonal habitat use of marine mammals must be obtained to make informed decisions about where these facilities can be located in order to avoid impacts on marine mammals.

5.4.12.1.2, Pg 5-309 – MMS should state how deep the turbine blade rotors would be placed.

5.4.12.6 Mitigation Measures, Pg 5-316 – An additional measure to protect turtles would be to design and place rotors to avoid turtles from being struck by the blades or other moving parts.

6 – Using existing oil and gas platforms as part of an alternative energy project will reduce the construction and site selection work needed for a new facility and would be a helpful addition to a project.

6.3.2.2, Pg 6-10, Paragraph 3 – NOAA agrees with the statement by MMS: "With proper design and management, impacts to the environment would be negligible to moderate."

6.3.2.2, Pg 6-10, last paragraph – In the third sentence, MMS states that "It is generally agreed that non-native species should not be used…" In order to be consistent with the Administration's position in the National Offshore Aquaculture Act of 2007, NOAA recommends adding a sentence requiring a scientific risk analysis for the use of non-indigenous or genetically modified marine species, and noting that use of non-indigenous or genetically modified marine species should only be allowed if the risk of harm to the marine environment is negligible or can be effectively mitigated. See section 4(a)(4)(E) of the Administration's bill, which is available on the web at www.aquaculture.noaa.gov.

6.3.2.2, Pg 6-11, Paragraph 2 – NOAA agrees that marine mammals may be attracted to an aquaculture facility, but the standard industry practice is to keep these predators out of aquaculture enclosures rather than to actively repel them. This is done through cage design, use of strong materials, and in some cases the installation of predator nets. The Marine Mammal Protection Act regulates the extent to which an aquaculture operation could employ active methods of repelling marine mammals.

6.3.2.2, Pg 6-11, Paragraph 3 – NOAA recommends editing the 1st sentence to read: "Siting of an aquaculture facility should consider impacts on areas essential to the commercial fishing industry…" (rather than "avoid areas…") Aquaculture is not categorically incompatible with traditional fishing grounds or essential fish habitat. In addition, MMS only has the authority to permit aquaculture on sites that have already been permitted for other uses.

6.3.2.3, Pg 6-11, Paragraph 4 – This paragraph on mitigation measures needs to be edited to reflect NOAA comments with respect to non-native species and siting of aquaculture facilities, specifically:

- At the end of the second sentence, add: "unless a scientific risk analysis shows that the risk of harm to the marine environment from the offshore culture of non-indigenous or genetically modified marine species is negligible or can be effectively mitigated."
- Revise the last sentence to read: "facility siting should consider impacts on essential fish habitat and traditional fishing grounds" (rather than "should avoid…")

6.4, Pg 6-12 – Several other uses seem possible for retired oil and gas platforms. Although such proposals are not expected within the next 5 to 7 years, MMS should state whether these facilities will be included within MMS' program for alternative energy and alternate use.

7 – This section indicates that the impacts to marine mammals could range from minor to major; NOAA concurs with this range of expected impacts. The section also states that impacts to fisheries should be negligible to minor. There is not sufficient evidence provided in the DPEIS to either support or refute that the development of large areas within the OCS for alternative energy use would cause negligible to minor impacts to fisheries. MMS should provide additional information to support this conclusion.

Table 7.1.1-1 – For the marine mammal summary, Guadalupe fur seals do not occur in the areas being considered for testing or development of ocean current generators. The table should reflect potential impacts on the endangered North Atlantic right whale, which does occur in this area. There is insufficient information to support or refute that wind or wave facilities would not incur population level impacts.

Section 7.5 of the DPEIS discusses potential cumulative impacts from the proposed action. Although NOAA agrees with the conclusion of the DPEIS that the development and issuance of regulations for alternative energy projects proposed for the OCS would provide increased assurance that potential adverse effects on humans and biota from such projects would be more thoroughly considered, the assessment of cumulative impacts should be expanded.

The DPEIS states that because the precise locations of potential new alternative energy and use facilities are unknown the cumulative impacts can only be assessed generically at this time. While it is true that cumulative impact assessments should be an iterative process that assesses incremental impacts from new projects, a more substantive assessment of cumulative impacts could be made in the PEIS if the preferred areas for projects are identified and separately assessed. At this time, many of the potential areas of preferred use have already been identified by the industries associated with the alternative energy development and other alternative OCS uses. The weaknesses of relying solely on a piecemeal approach based on project site impacts is already evident with the difficulties seen with balancing cumulative assessments from competing projects as seen with the reviews of the deepwater port projects proposed off of the coast of Massachusetts. Therefore, NOAA recommends that the PEIS include a cumulative impact assessment based on a regional ocean management structure focusing on areas of

known interests for alternative energy development could help determine: (1) the project capacity of areas of preferred development; (2) potential for conflict with other uses of the areas; and (3) assessment of impacts on resources of those areas looking at existing and proposed uses of the areas.

7.5.1.1, Pg 7-29 – GOM is also an acronym for the "Gulf of Maine."

7.5.1.1.2 – There should be a specific discussion on the cumulative impacts of oil and gas exploration on the marine habitats and biological resources in the Gulf of Mexico.

7.5.2 – The cumulative impacts analyses of most concern to NMFS (marine mammals, sea turtles, marine and coastal birds, fish resources and EFH, and fisheries) are very brief. There are little to no data available to assess whether extensive development of the OCS for power production will have population-level effects on any of these resources. Cumulative impacts could be significant if multiple alternative energy projects are located relatively close to each other, although each project by itself may not pose any significant concerns. MMS should describe plans to address this issue in its program. MMS should consider including a thorough cost-benefit comparison of OCS development to land-based power generation.

Also, the DPEIS's discussion of cumulative impacts should be expanded, as described below, to address impacts to National Marine Sanctuaries from activities occurring both within and outside their boundaries.

7.5.2.15, Pg 7-40 -- "Areas of Special Concern" includes the following statement:

> *For all types of activities on and near the OCS, impacts to areas of special concern are site-specific impacts that depend on locations of facilities and activities. … Impacts from construction, other noise-generating activities or activities that release wastes to the water (in State-regulated and OCS waters)… are expected to be minimal assuming that facilities would not be sited in the immediate vicinity of special marine-protected areas.*

It is unclear which marine-protected areas would be classified as "special" in the final sentence of this statement, however the term "immediate" vicinity does not adequately capture the range of distances over which some impacts from alternative energy construction and operation are estimated to be of concern. Initial determination of the spatial and temporal extents of the proposed development should be conservative. Thus, all activities taking place within the largest scientifically-supported area to be affected should be evaluated relatively to cumulative affects on areas of concern and their resources (many of which are not contained by the boundaries of protected areas).

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Attachment: Species of Concern

Common Name	Scientific Name	Candidate Species	Yr Listed	Area of Concern	Regions	Notes
Alabama shad	*Alosa alabamae*	No	1997	Gulf of Mexico - AL, FL, anadromous	SE	
alewife	*Alosa pseudoharengus*	No	2006	Atlantic - Newfoundland to North Carolina	NE	
Atlantic halibut	*Hippoglossus hippoglossus*	No	2004	Atlantic - Labrador to southern New England	NE	
Atlantic salmon	*Salmo salar*	Yes	1997	Atlantic - Gulf of Maine (other populations in streams and rivers in Maine outside the range of the listed Gulf of Maine DPS); anadromous	NE	
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	Yes	1988	North America, Atlantic coastal waters	NE	
Atlantic wolffish	*Anarhichas lupus*	No	2004	Atlantic - Georges Bank and western Gulf of Maine	NE	
barndoor skate	*Dipturus laevis*	No	1999	Atlantic - Newfoundland, Canada to Cape Hatteras, NC.	NE	
Black abalone	*Haliotis cracherodii*	Yes	1999	Pacific - OR, CA, Baja California	NW, SW	only planktonic larvae might be offshore
blueback herring	*Alosa aestivalis*	No	2006	Atlantic - Cape Breton, Nova Scotia, to St. John's River, FL	NE, SE	
bocaccio	*Sebastes paucispinis*	No	1999	Pacific - Southern DPS (Northern CA to Mexico)	SW	
Chinook salmon	*Oncorhynchus tshawytscha*	No	1997	Pacific - Central Valley, fall and late fall-run ESU	SW	
coho salmon	*Oncorhynchus kisutch*	No	1997	Pacific - Puget Sound/Strait of Georgia ESU; anadromous.	NW	
cowcod	*Sebastes levis*	No	2004	Pacific - Central OR to central Baja California and Guadalupe Island, Mexico	NW, SW	
cusk	*Brosme brosme*	Yes	2004	Atlantic - Gulf of Maine	NE	
dusky shark	*Carcharhinus obscurus*	No	1997	Atlantic; Gulf of Mexico; Pacific	SE, SW, P	
Green abalone	*Haliotis fulgens*	No	2004	Pacific - Point Concepcion, CA to Bahia de Magdalena, Gulf of CA, Mexico	SW	only planktonic larvae might be offshore
green sturgeon	*Acipenser medirostris*	No	2003	Pacific - northern DPS (including coastal spawning populations from the Eel River north, to the Klamath rivers); anadromous	NW	
Ivory bush coral	*Oculina varicosa*	No	1991	Atlantic - West Indies, Bermuda, NC, FL, Gulf of Mexico, Caribbean	SE	
Key silverside	*Menidia conchorum*	No	1991	Atlantic - Florida Keys	SE	only planktonic larvae might be offshore
largetooth sawfish	*Pristis pristis*	No	1988	Atlantic - TX, FL Gulf Coast	SE	no confirmed US sightings since the 1940s
mangrove rivulus	*Rivulus marmoratus*	No	1997	Atlantic - FL, estuarine	SE	only planktonic larvae might be offshore
Nassau grouper	*Epinephelus striatus*	No	1991	Atlantic - NC southward to Gulf of Mexico	SE	
night shark	*Carcharinus signatus*	No	1997	Atlantic; Gulf of Mexico	SE	

Common Name	Scientific Name	Candidate Species	Yr Listed	Area of Concern	Regions	Notes
opossum pipefish	*Microphis brachyurus lineatus*	No	1991	Atlantic - Florida (Indian River Lagoon)	SE	only juveniles (plankton or Sargassum habitats) and planktoinc larvae offshore
Pacific hake	*Merluccius productus*	No	1999	Pacific - Georgia Basin DPS	NW	
Pink abalone	*Haliotis corrugata*	No	2004	Pacific - Point Concepcion, CA to Bahia de Tortuga, Gulf of CA, Mexico	SW	adults in < 120 feet depth only, larvae planktonic
Pinto abalone	*Haliotis kamtschatkana*	No	2004	Pacific - Sitka, AK to Point Conception, CA	A, NW, SW	adults in < 330 feet depth only, larvae planktonic
porbeagle shark	*Lamna nasus*	No	2006	Atlantic, Newfoundland, Canada to New Jersey	NE	
rainbow smelt	*Osmerus mordax*	No	2004	Atlantic - Labrador to NJ; anadromous	NE	
saltmarsh topminnow	*Fundulus jenkinsi*	No	1991	Atlantic - TX, LA, MS, AL, FL	SE	only planktonic larvae might be offshore
sand tiger shark	*Carcharias taurus*	No	1997	Atlantic; Gulf of Mexico	SE	
speckled hind	*Epinephelus drummondhayi*	No	1997	Atlantic - NC to Gulf of Mexico	SE	
steelhead trout	*Oncorhynchus mykiss*	No	1997	Pacific - OR Coast ESU; anadromous	NW	
steelhead trout	*Oncorhynchus mykiss*	Yes	1997	Pacific - Puget Sound; anadromous	NW	
thorny skate	*Raja radiata*	No	2004	Atlantic - West Greenland to NY	NE	
warsaw grouper	*Epinephelus nigritus*	No	1997	Atlantic - MA southward to Gulf of Mexico	SE	
white marlin	*Tetrapturus albidus*	No	2002	Atlantic	NE, SE	

"Table 4.2.8-1"

Species	Occurrence			Typical habitat		
	S. Atl.	Mid-Atl.	N.Atl.	Coastal	Shelf	Slope/deep
RIGHT WHALE	C	O	C	X	X	
BLUE	A	A	O		X	X
BRYDE'S	O	O	EX		X	X
FIN	UC	O	C	X	X	X
HUMPBACK	UC	O	C	X	X	X
MINKE	EX	EX	C	X	X	X
SEI	A	UC	C		X	X
DWARF SPERM WHALE	O	O	UC			X
P. SPERM	UC	UC	O			X
SPERM WHALE	UC	X	C			X
BLAINVILLE'S BEAKED WHALE	O	O	?			X
CUVIER'S	O	O	O			X
GERVAIS'	O	O	?			X
TRUE'S	O	O	?			X
SOWERBY'S	EX	UC	C			X
SHORT-BEAKED COMMON DOL.	A	C	C		X	X
PANTROPICAL	C	O	O			X
BOTTLENOSE	C	C	C	X	X	X
CLYMENE	O	UC	A			X
FALSE KILLER	O	UC	A			X
FRASER'S	EX	A	A			X
WHITE-SIDED	A	EX	C		X	X
WHITE-BEAKED	A	A	UC		X	
KILLER WHALE	UC	UC	UC		X	X
MELON-HEADED	O	O	A			X
ATLANTIC SPOTTED	C	C	C			X
PYGMY	O	EX	EX			X
SHORT-FINNED PILOT	C	C	O		X	X
LONG-FINNED	A	UC	C		X	X
RISSO'S DOLPHIN	O	C	C			X
ROUGH-TOOTHED	UC	UC	A			X
SPINNER	O	UC	A			X
STRIPED	A	C	O			X
HARBOR PORPOISE	A	O	C	X	X	
W. INDIAN MANATEE	C	EX	EX	X		
HARBOR SEAL	A	UC	C	X	X	
GRAY SEAL	A	UC	C	X	X	
HARP SEAL	A	EX	O	X	X	
HOODED SEAL	EX	EX	EX		X	X

Table Name corrections:

Dwarf sperm whale (*Kogia sima*)
Pantropical spotted dolphin (*Stenella attenuata*)
Short-finned pilot whale
Long-finned pilot whale (*Globicephala melas*)