EXECUTIVE SUMMARY

The Energy Policy Act of 2005 (EPAct) amended Section 8 of the Outer Continental Shelf Lands Act (OCSLA) (43 USC 1337) to give the Secretary of the Interior authority to issue a lease, easement, or right-of-way on the Outer Continental Shelf (OCS) for activities that are not otherwise authorized by the OCSLA, or other applicable law, if those activities:

1. Produce or support production, transportation, or transmission of energy from sources other than oil and gas; or

2. Use, for energy-related purposes or other authorized marine-related purposes, facilities currently or previously used for activities authorized under the OCS Lands Act, except that any oil and gas energy-related uses shall not be authorized in areas in which oil and gas preleasing, leasing, and related activities are prohibited by a moratorium.

In addition, this subsection does not apply to any area on the OCS within the exterior boundaries of any unit of the National Park System, National Wildlife Refuge System, or National Marine Sanctuary System, or any National Monument.

In response to this new authority, the Minerals Management Service (MMS) of the U.S. Department of the Interior (USDOI) is establishing an Alternative Energy and Alternate Use Program on the OCS to approve and manage these potential activities. This programmatic Environmental Impact Statement (EIS) examines the potential environmental consequences of implementing the program and will be used to establish initial measures to mitigate environmental consequences. As the program evolves and more is learned, the mitigation measures may be modified or new measures developed. Each project developed under this new program will be subject to environmental reviews under the National Environmental Policy Act (NEPA), and each project may have additional project-specific mitigation measures.

Given the rapidly evolving nature of this nascent industry, the MMS cannot reasonably anticipate and assess the potential environmental impacts of all of the various technologies and potential OCS locations where these alternative energy projects could someday be proposed. Accordingly, this EIS is focused on alternative energy technologies and areas on the OCS that industry has expressed a potential interest in and ability to develop or evaluate from 2007 to 2014. In general, the OCS begins 3 nautical miles (mi) off coastal shorelines and extends to about 200 nautical mi offshore, with depths ranging from a few meters to thousands of meters. Exceptions are offshore of Texas and Florida, where the OCS begins 9 nautical mi offshore. However, for the technologies being assessed within the time horizon for this EIS, development is expected to occur near the shore, where maximum water depth would be 100 meters (m) or less for wind and wave technologies and 500 m for ocean current technology (the only OCS area where ocean current technology is feasible for development is in the Florida Current, located off the eastern coast of North America). The analysis is, therefore, limited to the area defined by this water depth in the Atlantic, Gulf of Mexico, and Pacific regions.

For the purposes of this EIS, development of alternative energy sources around Hawaii is not analyzed for two reasons: (1) there is a steep drop-off of the OCS in waters beyond the 3 nautical mi State boundary, where depths easily exceed 100 m in most areas; and (2) almost all areas on the OCS with depths of less than 100 m are part of a national marine sanctuary and, therefore, are not under MMS jurisdiction. Development of alternative energy sources on the OCS in the Alaska region is also not evaluated at this time because of the relatively harsh environment and probability that no potential projects will be pursued in Federal waters.

The types of alternative energy projects that are analyzed in detail in this EIS are offshore wind, wave, and ocean current energy capture technologies. The MMS anticipates receiving applications for development of these technologies on the OCS over the next 5 to 7 years (i.e., 2007–2014). Solar energy capture technologies are not analyzed because the technology is not yet considered technologically and economically viable in the marine environment. Hydrogen energy storage technologies are considered unlikely to be demonstrated or developed in the offshore marine environment in the 5- to 7-year time frame based on the current available market for the product and technological considerations for development on the OCS. Tidal energy projects are also not analyzed, because these types of projects will be developed in areas very close to shore and outside the jurisdiction of the MMS.

The MMS also was given jurisdiction over other projects that make alternate use of existing oil and natural gas platforms in Federal waters. Alternate uses of existing facilities may include, but would not be limited to, alternative energy production, aquaculture, and research and monitoring. At this time, oil and gas structures are present only in OCS waters of the Gulf of Mexico and southern California (none are in the Atlantic). Therefore, alternate use of existing structures will be limited to facilities in the Gulf of Mexico and southern California over the next 5 to 7 years. The MMS will work closely with other agencies with relevant jurisdiction and/or expertise in addressing these alternate uses.

PROPOSED ACTION AND ALTERNATIVES

The proposed action analyzed in this programmatic EIS is the establishment of the MMS Alternative Energy and Alternate Use Program on the OCS through rulemaking. This programmatic EIS examines the potential impacts of alternative energy and alternate use activities that could result from implementation of the new authority under the EPAct to issue leases, easements, and rights-of-way from initial site characterization through decommissioning. The programmatic nature of the EIS requires that the examination of environmental consequences and potential mitigation measures be conducted at a broader scale than would be appropriate for site-specific projects. Therefore, additional environmental review pursuant to the NEPA will be required for all future site-specific projects on the OCS.

Under the proposed action, a program would be established for granting leases, easements, or ROWs for any alternative energy activities on the OCS. A product of the process of preparing the programmatic EIS is the development of policies and best management practices (BMPs) that may be adopted as mitigation measures by the Alternative Energy and Alternate Use Program. Such policies and BMPs are intended to decrease the environmental impacts from

alternative energy activities by including consistent stipulations for data collection, facility siting, mitigation, and ongoing impact evaluation. This program would also provide a road map for developers to follow during the permitting process, allowing developers to more adequately estimate the resources required for a proposed project. This would in turn result in fewer failed proposals, because developers would know the requirements before investing in projects or locations. Overall, having a program in place for permitting alternative energy activities on the OCS would result in decreased time to obtain permits, thereby facilitating faster development of the alternative energy industry on the OCS.

Another alternative analyzed is the case-by-case alternative (i.e., the MMS would consider individual project proposals for alternative energy or alternate use on a case-by-case basis but would not issue formal regulations). Under the case-by-case alternative, the MMS would evaluate individual project proposals for alternative energy or alternate use on a case-by-case basis as they are submitted by applicants. The case-by-case alternative would have minimal administrative rules, application, and review process requirements. The case-by-case alternative would not have the same comprehensive, formal regulations for granting and managing a lease, ROW, or rights-of-use or easement (RUE) or the same information requirements as the proposed action.

The evaluation of alternative energy or alternate use project proposals by the MMS would be performed pursuant to nationwide guidelines and informed by BMPs. An applicant's request for authorization under the case-by-case alternative would include a summary of the proposed activities and satisfactory evidence that the applicant is qualified to hold a lease, easement, or ROW on the OCS. The MMS would issue leases, RUEs, or ROWs that would be based on project-specific NEPA analyses tiered to this EIS. The findings of individual NEPA analyses would form the basis of any mitigation requirements and would be incorporated into lease or grant terms and conditions. Authorized activities would be regulated by the terms and conditions established in individual lease, RUE, and ROW instruments developed and issued for each project as well as conditions of approval for plans of operations.

One possible consequence of a case-by-case alternative could be longer delays in the development of alternative energy resources due to increased time to process project applications. It is also possible that such delays could increase project costs, resulting in fewer alternative energy projects. In both scenarios, adverse impacts could occur if there were an increased reliance on energy generated by other sources to meet increasing energy demands.

The no action alternative considered would be for the MMS not to develop the Alternative Energy and Alternate Use Program on the Federal OCS. In other words, the MMS would not issue leases, easements, and ROWs on the OCS for alternative energy and alternative use activities. Under the no action alternative, potentially significant offshore alternative energy resources in the United States would remain largely unexploited (although individual States might authorize development on State submerged lands). As a further consequence, a potentially significant option for meeting U.S. energy demands would be eliminated, and the United States would be less competitive in alternative energy development and implementation worldwide. In turn, the impacts from coal, nuclear, and natural gas usage to satisfy expanding energy demand

would be increased, and the potential increase in liquefied natural gas (LNG) imports would further U.S. dependence on foreign sources of energy.

In addition, under the no action alternative, there would be limited opportunities to employ existing oil and gas facilities located on the OCS for alternate uses. The impacts of this reduction would be to limit the research, development, and implementation of potentially beneficial alternate uses of these structures.

A preferred alternative is also analyzed. Through the process of developing this programmatic EIS, the MMS has taken a hard look at the alternatives and has concluded that it would be preferable to approach development of an Alternative Energy and Alternate Use Program through rulemaking by combining elements of the proposed action and the case-by-case alternative. The alternative energy and alternate use activities that would be the subject of approvals under the preferred alternative, the proposed action, and the case-by-case alternative are the same. What differs is the process by which the MMS would approve such activities. The combination of the proposed action and case-by-case alternative provides the MMS greater flexibility to manage the issuance of leases, RUEs, and ROWs for alternative energy and alternate use activities.

Following an interim period where leases, RUEs, and ROWs would be issued on a case-by-case basis, the preferred alternative would ultimately establish a nationwide, comprehensive Alternative Energy and Alternate Use Program with the benefit of regulations. Upon promulgation of the final rule, all leases, RUEs, and ROWs for alternative energy and alternate use activities would be issued subject to its comprehensive provisions. Impacts from the preferred alternative would be the same as or similar to the case-by-case alternative prior to promulgation of the final rule. Following promulgation of the final rule, the impacts would be the same as or similar to those of the proposed action.

SUMMARY OF POTENTIAL IMPACTS AND MITIGATION FOR ALTERNATIVE ENERGY DEVELOPMENT

The potential environmental impacts related to alternative energy development on the OCS are summarized below for each technology evaluated (i.e., wind, wave, or current energy) and for each phase of development (technology testing, site characterization, construction, operation, and decommissioning). These impacts may occur under either the proposed or case-by-case alternatives considered. However, the case-by-case alternative has the potential for higher adverse impacts, as previously discussed.

The conclusions for most analyses in this EIS use a four-level classification scheme (negligible, minor, moderate, or major [see Section 5.1]) to characterize the impacts predicted if the activities occur as assumed. Negligible impacts are those that are not measurable, while minor impacts could be avoided with proper mitigation, or the affected resource would recover completely if the impacting agent were eliminated. Both moderate and major impacts are defined as unavoidable. For moderate impacts, the viability of the affected resource is not threatened although some impacts may be irreversible, or proper mitigation would allow complete recovery

of a resource. Major impacts would threaten a resource's viability and result in incomplete recovery, even with proper mitigation.

Wind Energy

Wind turbines harness the kinetic energy of the moving air and convert it to electricity. A wind turbine can be compared to a fan operating in reverse: rather than using electricity to produce wind, the turbine uses the wind to make electricity. Principal components of an OCS wind turbine generator (WTG) include the following:

- Rotor (blades and blade hub), which is connected through a drivetrain to the generator;
- Turbine assembly, which includes the gearbox and generator and is enclosed by a shell or nacelle;
- Tower, which supports the turbine assembly, houses the remaining facility components, and provides sheltered access for personnel; and
- Foundation or structure to support the tower.

A wind energy facility would also have an electric service platform (ESP) to provide a common electrical interconnection for all of the WTGs. The ESP would house transformers to bring the generated electricity into phase and step up the voltage for transmission to an onshore substation. An ESP could have up to four transformers containing up to 37,500 L (10,000 gal) of dielectric fluid each.

In general, most impacts would be negligible to moderate for all phases of wind energy development assuming that proper siting and mitigation measures are followed. Human activity on the OCS related to a wind facility is relatively low, with only a few support vessels in operation at any one time during the highest activity period (construction). Potential impacts during the construction phase are the highest, because this phase involves the highest amount of vessel traffic, noise generation, and air emissions. There is a potential for major impacts to some threatened and endangered species of marine mammals, birds, or sea turtles from vessel or turbine strikes, disturbance of nesting areas, alteration of key habitat, or low-probability large spills of fuel or lubricating oil or dielectric fluids, because population-level impacts are possible from injury or death of individual females if population numbers are critically low. Compliance with the regulations and coordination with appropriate wildlife protection agencies would ensure that project activities would be conducted in a manner that would greatly minimize or avoid impacting these species or their habitats. Moderate impacts to fish and fisheries could occur due to the establishment of exclusion zones within wind energy facilities. Potential visual impacts can be mitigated through several means, especially siting facilities away from sensitive areas. The following summary discusses the more notable impacts that could occur during each phase of development.

Technology Testing

European pilot and commercial offshore wind projects have provided information to demonstrate the feasibility of offshore wind power generation. This experience, combined with the fact that a large portion of the costs of development are for offshore activities that require expensive installation equipment, means that, in the United States, developers would likely skip the pilot and demonstration phase and move directly to commercial operations.

It is possible that new types of foundations for WTGs located farther offshore or in deeper waters would need to be demonstrated. Such demonstrations could involve noise-generating activities including geological, geotechnical, and/or geophysical studies of the seafloor, pile driving for installation of the structures, removal of structures by cutting or the use of explosives, and vessel traffic to and from the demonstration site. Because of the limited amount of these activities, impacts to marine mammals, birds, sea turtles, and fish are anticipated to be negligible to minor.

Site Characterization

Site characterization activities would involve geological, geotechnical, and/or geophysical studies of the seafloor to ensure that turbines can be properly located, as well as baseline data collection on the composition of potentially affected benthic, marine mammal, bird, sea turtle, and fish communities. Site survey techniques could also include erection of meteorological towers to monitor weather for approximately one year or more to verify the availability of suitable wind patterns. The disturbance from these activities could have minor to moderate impacts on marine mammals. Installation of a meteorological tower would result in disturbance of the seabed, causing negligible to minor impacts to the seafloor habitat, and potential moderate impacts could occur for threatened and endangered species of marine mammals and sea turtles from noise generated by pile-driving activities.

Construction

The largest impacts from wind facility construction activities are likely to come from installation of the wind turbine and ESP foundations and the submarine power cable from each turbine to the central ESP and from the ESP to an onshore substation. As discussed for site characterization, moderate noise impacts to marine mammals, sea turtles, and fish due to pile-driving activities could occur during foundation installation. Without proper mitigation to avoid uncommon or sensitive habitats, disturbance of the seafloor could result in moderate to major impacts on seafloor habitat under and adjacent to the foundations and cables. Construction activities such as transmission cable installation and construction of onshore facilities could result in negligible to moderate impacts to coastal habitats (e.g., wetlands, barrier beaches). Such impacts could be avoided through the use of noninvasive techniques and avoidance of sensitive areas. Onshore and offshore construction activities could result in minor to moderate air quality impacts, mainly from fugitive dust emissions, and emissions of SO_2 and ozone precursors.

Construction activities could interfere with nesting and forage habitat for birds, resulting in negligible to moderate impacts depending on location and species.

Operation

Minimal maintenance vessel activity and underwater disturbance during operations is expected, resulting in generally negligible to minor impacts from vessel traffic (noise and collisions with marine mammals or sea turtles). Some small minor-impact spills of fuel or lubricating oil or dielectric fluids may be expected. A larger spill of dielectric fluid stored on an ESP or of fuel or lubricating oil from a vessel could cause moderate to major impacts but is highly unlikely. Impacts from a spill as a consequence of a vessel collision could be moderate to major.

If onshore facilities are located in nesting areas, operation of these facilities could cause minor to moderate adverse impacts to sea turtles due to hatchling disorientation from the lighting with possible major impacts on sea turtles if nests or aggregates of hatchlings are destroyed. Above water, populations of marine and coastal birds as well as migrating inland birds may experience minor to potentially major impacts due to turbine collisions; endangered species would be the most impacted. Because of the height and size of the wind turbine generators, impacts to visual resources may occur. The perception of visual impacts varies among viewers and may be positive or negative. With proper siting of the facility, adverse impacts on radar operations are expected to be negligible.

Decommissioning

Vessel traffic impacts to aquatic species could occur during decommissioning as during construction and operation. There could be localized effects on biotic resources including marine mammals, sea turtles, and fish, especially if explosives were used for removing the wind turbine generator and ESP foundation structures. The activity would be of limited duration with potential minor to moderate impacts on these resources.

Mitigation Measures

Proper siting of the wind facility and its power cable to onshore facilities would minimize impacts to ocean sediments, marine and aeronautical navigation, commercial shipping, fishing activities, seafloor habitats, marine mammals, sea turtles, birds, tourism and recreation, areas of special concern, visual resources, archaeological sites, and U.S. Department of Defense (USDOD) training and exercise activities. Noise impacts from pile driving or removal can be mitigated by measures such as deterring the local aquatic species from the area before startup and ceasing work when individuals from sensitive species are in the area. The potential for adverse impacts from spills can be decreased through adherence to required U.S. Coast Guard oil spill response plans, and through the use of environmentally friendly chemicals (e.g., transformer fluids and antifouling coatings). Nonexplosive decommissioning methods (e.g., cutting pilings

just beneath the seafloor bed) can be used for structure removal, avoiding noise and concussion impacts to the ecological system.

Wave Energy

A variety of technologies have been proposed to capture the energy from waves; however, each is in too early a stage of development to enable prediction of which technology or mix of technologies would be most prevalent in future commercialization. Some of the technologies that have been the target of recent developmental efforts and are appropriate for OCS applications are terminators, attenuators, point absorbers, and overtopping devices.

Terminator devices extend perpendicular to the direction of wave travel and capture or reflect the power of the wave. The oscillating water column (OWC) is a form of terminator in which water enters through a subsurface opening into a chamber with air trapped above it. The wave action causes the captured water column to move up and down like a piston to force the air though an opening connected to a turbine. Attenuators are long, multisegment floating structures oriented parallel to the direction of the wave travel. The differing heights of waves along the length of the device cause flexing where the segments connect, and this flexing is connected to hydraulic pumps or other converters. Point absorbers have a small horizontal dimension relative to the vertical dimension and utilize the rise and fall of the wave height at a single point to create hydraulic pressure for wave energy conversion (WEC). Overtopping devices have reservoirs that are filled by impinging waves to levels above the average surrounding ocean. The released reservoir water is used to drive hydroturbines or other conversion devices. Wave energy facilities would also require connection of each WEC to a transformer as part of synchronization with the onshore power grid. Small transformers (e.g., with a 1 MW capability) could be integral to each WEC device or distributed among “hub” or “collector” buoys. At this stage of development, large electrical service platforms similar to those for wind facilities are not envisioned, at least within the next 5 to 7 years.

Technology Testing

Single demonstration units may be tested with minimal disturbance to the environment. They are delivered prefabricated to the supporting port facility, or final assembly occurs there. WEC devices are then towed to their operating location. Because WEC devices float on the water surface, they do not require robust foundations such as those used for wind turbine generators. To keep WEC devices in the proper location, some type of tether fixed to an anchor point on the ocean floor is required. A single full-size point absorber or a smaller scale terminator, attenuator, or overtopping device may be expected for use in research projects as in the past. Negligible to minor impacts from technology testing are expected because activities will occur on a smaller scale compared to full-scale facilities as discussed in the following section on construction and operation of larger facilities.

Site Characterization

Site characterization activities would involve geological and geophysical studies of the seafloor to ensure that anchors for generation units and submarine cables can be properly located. Baseline data collection on the composition of potentially affected benthic, marine mammal, bird, sea turtle and fish communities would also occur. Because of the limited number and duration of these activities, negligible to minor impacts on resources are anticipated.

Construction

The largest impacts from wave energy facility construction activities are likely to come from installation of the submarine power cable from each WEC device to a collection hub and from the hub to an onshore substation. Potential moderate noise impacts to marine mammals, sea turtles, and fish could occur from these activities. Without proper mitigation to avoid uncommon or sensitive habitat, disturbance of the seafloor could result in minor to moderate impacts on seafloor habitat, although the amount of seafloor disturbance would be substantially less than for wind facilities. Onshore construction activities could result in minor to moderate air quality impacts, mainly from fugitive dust emissions, and negligible to moderate impacts to coastal habitats (e.g., wetlands, barrier beaches). Such impacts would be avoided through the use of dust-control measures, low-emission fuels, noninvasive techniques, and avoidance of sensitive areas. Construction activities could interfere with nesting and forage habitat for birds, resulting in negligible to moderate impacts depending on location and species.

Operation

Large wave energy facilities could lower wave energy levels reaching the coast, resulting in minor impacts due to altered sediment transport. Maintenance vessel activity and underwater disturbance during operations are expected, but generally negligible to minor impacts from vessel traffic (noise and collisions with marine mammals and sea turtles) are expected. Moderate impacts to fish and fisheries could occur due to the establishment of exclusion zones within wave energy facilities. Impacts to threatened and endangered marine mammals could be minor to major if individuals were lost due to entanglement in moorings. Impacts to sea turtles from the operating terminators and overtopping WEC devices could be minor to moderate because of the technologies' potential to impede sea turtle movement and the potential of entrainment in overtopping WEC devices. Additionally, if onshore facilities are located in nesting areas, operation could cause minor to moderate adverse impacts to sea turtles due to hatchling disorientation from the lighting, with possible major impacts if turtle nests or aggregates of hatchings are destroyed. Some small minor-impact spills of fuels, lubricants, and dielectric fluids may be expected. Impacts from a fuel or lubricating oil spill as a consequence of a vessel collision could be moderate to major.

Decommissioning

Vessel traffic impacts to aquatic species could occur during decommissioning as during construction and operation. There could be localized effects on biotic resources including marine mammals, sea turtles, and fish. The activity would be of limited duration with potential minor to moderate impacts on these resources.

Mitigation Measures

Proper siting and design of wave energy facilities and associated power cables would minimize impacts to coastal sediment transport processes, marine navigation, commercial shipping, fishing activities, seafloor habitats, marine mammals, sea turtles, areas of special concern, archaeological sites, and USDOD training and exercise activities. Entanglement and entrainment potential may be reduced through the use of sonic pingers and/or turtle exclusion devices. The potential for adverse impacts from spills can be decreased through adherence to U.S. Coast Guard oil spill response plans and through the use of environmentally friendly chemicals.

Ocean Current Energy

Ocean currents are relatively constant and flow in one direction only, in contrast to the tidal currents closer to shore where the varying gravitational pulls of the sun and moon result in diurnal high tides. Only a small number of prototypes and demonstration units have been tested to date. One such technology involves submerged turbines. Energy can be extracted from the ocean currents by using submerged turbines that are similar in function to wind turbines, capturing energy through the processes of hydrodynamic, rather than aerodynamic, lift or drag.

Mechanisms such as posts, cables, or anchors are required to keep the turbines stationary relative to the currents with which they interact. Turbines may be suspended from a floating structure or fixed to the seabed. Turbines may be anchored to the ocean floor in a variety of ways. They may be tethered with cables, with the relatively constant current interacting with the turbine used to maintain location and stability. In large areas with powerful currents, it would be possible to install turbines in groups or clusters to create marine current facilities. One or more turbines would require cable interconnections and a central transformer to synchronize the electricity for compatibility with the onshore grid. At this stage of development, large electrical service platforms similar to those for wind facilities are not envisioned, at least within the next 5 to 7 years.

The extraction of energy from ocean currents requires a location that has strong, steady currents. The only known ocean current that has these characteristics on the OCS is the Florida Current, located off the eastern coast of North America. Discussion of impacts associated with the use of ocean current technologies in this programmatic EIS is, therefore, limited to consideration of the area of the Florida Current.

Technology Testing

Ocean current devices require some type of tether fixed to an anchor point on the ocean floor, whether it is a cabling system with multiple anchor points or a post on a single foundation. Because of the limited duration and amount of activity, installation of a single unit for research purposes would result in impacts similar to those discussed below for construction and operation, but on a smaller scale. The most notable impacts are expected to be from noise and seafloor disturbance. These activities are anticipated to result in negligible to minor impacts for marine mammals, sea turtles, and fish.

Site Characterization

Site characterization activities would involve geological and geophysical studies of the seafloor to ensure that anchors or foundations for generation units and connecting submarine cables can be properly located. Baseline data collection on the composition of potentially affected benthic, marine mammal, bird, sea turtle, and fish communities would also occur. Acoustic doppler current profilers would likely be used to measure the current strength. The disturbance from these activities could have minor to moderate impacts on marine mammals, with negligible to minor impacts of other resources.

Construction

The largest impacts from ocean current energy facility construction activities are likely to come from installation of the turbine anchors or foundations, and the submarine power cable from each ocean current device to a collection hub and from the hub to an onshore substation. Potential moderate noise impacts on fish, sea turtles, and marine mammals from pile-driving activities could occur from installation of any anchors or foundations. Without proper mitigation, disturbance of the seafloor could result in moderate to major impacts on seafloor habitat. Construction activities may result in moderate air quality impacts, mainly from fugitive dust emissions, and moderate impacts to coastal habitats (e.g., wetlands, barrier beaches). Construction activities could interfere with nesting and forage habitat for birds, resulting in negligible to moderate impacts depending on location and species.

Operation

Minimal maintenance vessel activity during operations is expected, resulting in generally negligible to minor impacts from vessel traffic (noise and collisions with marine mammals or sea turtles). If the onshore facilities are located in nesting areas, operation of these facilities could cause minor to moderate adverse impacts to sea turtles due to hatchling disorientation from the lighting, with possible major impacts on sea turtle if nests or aggregates of hatchlings are destroyed. Impacts to marine mammals and sea turtles from the operating underwater turbines could be minor to major because of the potential for a blade to strike individuals (especially juveniles) passing through a turbine. These impacts could be major for some threatened and

endangered species. Some small minor-impact spills of fuels, lubricants, and dielectric fluids may be expected. Impacts from a fuel or lubricating oil spill as a consequence of a vessel collision could be moderate to major. At development levels expected over the next 5 to 7 years, impacts on regional climate and ecology from ocean current energy capture are not expected.

Decommissioning

Vessel traffic impacts to aquatic species would occur during decommissioning as during construction and operation. There could be localized effects on biotic resources including marine mammals, sea turtles, and fish, especially if explosives were used for removing any anchor or foundation structures. The activity would be of limited duration with potential minor to moderate impacts on these resources.

Mitigation Measures

Proper siting of the ocean current facility and its power cable to onshore facilities would minimize impacts to ocean sediments, marine navigation, commercial shipping, fishing activities, seafloor habitats, marine mammals, sea turtles, areas of special concern, archaeological sites, and USDOD training and exercise activities. Noise impacts from pile driving or removal can be mitigated by measures such as deterring the local aquatic species from the area before startup and ceasing work when individuals from sensitive species are in the area. The potential for adverse impacts from spills can be decreased through adherence to required oil spill response plans, and through the use of environmentally friendly chemicals. Nonexplosive decommissioning methods (e.g., cutting pilings just beneath the seafloor bed) can be used for structure removal to avoid noise and concussion impacts to the ecological system.

SUMMARY OF POTENTIAL IMPACTS AND MITIGATION FOR ALTERNATE USE OF EXISTING FACILITIES

Rehabilitation and modification of oil and gas structures currently or previously used for activities authorized under OCSLA for an alternate use could result in both beneficial and adverse impacts. While specific impacts cannot be determined at this time because of the programmatic nature of this EIS, potential impacts at a general level are discussed for possible alternate use of decommissioned offshore oil and gas platforms on the OCS. Alternate uses in the foreseeable future for which such platforms could be adapted include alternative energy production, aquaculture, and research and monitoring.

Impacts from any alternate use of existing oil and gas platforms include fisheries enhancement and economic benefits. Removal of a platform structure from the OCS would result in the destruction of the ecological system developed around the invertebrate species and plant life that envelop a platform’s structure after emplacement. This ecological system includes smaller fish feeding on plant life up to other marine life including mammals and predator fish

feeding off the smaller fish species, resulting in enhanced recreational diving and recreational and commercial fishing opportunities.

Alternative Energy Production

Existing oil and gas platforms can be used for site characterization for alternative energy facilities. If sited in a suitable location, a platform could become the base of operations for a characterization effort that could provide observation facilities (e.g., a meteorological tower, observation deck, underwater exploration) or support facilities (e.g., vessel docking and sheltering). Impacts from characterization efforts would remain the same, but the environmental impacts (habitat disturbance) caused by platform removal and facility installation would be eliminated. A wind turbine generator could be mounted on a single decommissioned oil and gas platform, but an entire wind facility with multiple turbines would require installation of additional foundations.

Oil and gas platforms could also be used as ESPs for alternative energy facilities. The platforms are large enough to handle the required electrical equipment, they have docking facilities for service boats, and many have or could be modified to support a helipad for transport of maintenance crews. Thus, impacts related to installation of a hub are eliminated. In addition, some oil and gas platforms (particularly in the Pacific) already have existing submarine cable connections to onshore locations for electrical power that could be used for transmitting rather than receiving power, thus lessening the need to install new cable between onshore and offshore locations.

Research and Monitoring

Oil and gas platforms provide a stable, local base in the marine environment. They provide docking facilities for watercraft (some with landing pads for helicopters), crew quarters, and a power source for operations. For startup use as a research outpost, negligible to minor impacts to the environment are expected from supply and crew boats. If a platform's future use were strictly limited to monitoring, negligible to minor impacts would be expected. Supply or maintenance boats would be calling periodically to ensure continued operations.

Actions to mitigate potential impacts from alternate use of oil and gas platforms would be specific to a given project. In all cases, normal procedures such as collection of generated waste for onshore disposal and operation of crew and supply boats or helicopters according to applicable regulations should minimize impacts to the environment.

Aquaculture

Offshore aquaculture is expected to have impacts similar to those from coastal aquaculture operations. Impacts related to waste generation, native and non-native species,

fisheries, and predators need to be recognized and addressed. With proper design and management, impacts to the environment would be negligible to moderate.

Pollution is a major concern related to aquaculture. Wastes that must be anticipated include urine (nitrogenous wastes), feces (highly organic wastes), excess feed materials, pharmaceuticals (e.g., antibiotics), growth-enhancing chemicals (e.g., hormones), and antifoulant chemicals. There could be adverse impacts whether the aquaculture species is native or non-native to the region where cultivation is planned. It is generally agreed that non-native species should not be used so as to avoid their establishment in the local ecosystem along with the introduction of new non-native diseases. However, escape of cultured native species could also lead to a shift in the wild gene pool or the spread of disease. Predators can be a problem for aquaculture facilities. Attracted by the culture species and their feed, predatory biota, including marine birds and mammals such as seals and sea lions, need to be somehow excluded from the facilities.

Mitigation Measures

An important mitigation measure associated with the alternate use of OCS facilities would be aimed at minimizing the risk of vessel collisions with platforms. Such a measure includes maintaining the navigational aids and warnings currently associated with these structures. Mitigation measures for alternate use activities involving alternative energy technologies would be similar to those measures discussed in Chapter 5. Aquaculture operations should cultivate native species, be located away from Essential Fish Habitat (EFH) and traditional fishing grounds, and take actions to minimize pollution from animal feed, waste, and medication. Methods such as facility siting, netpen design, and acoustic deterrents could be used to discourage predation and injury to predators. For an alternate use involving research and monitoring, additional mitigation measures would depend on the nature of the work being conducted. In all cases, alternate use of existing facilities should take into account impacts on USDOD at-sea training activities, to include air, surface, and subsurface operations.

IMPACTS FROM NONROUTINE CONDITIONS

Nonroutine conditions could cause impacts to human health and the environment during alternative energy development or alternate use of existing facilities on the OCS. Such nonroutine conditions include industrial accidents; collisions between marine vessels and either fixed components of the facilities or other vessels constructing, servicing, or maintaining the facilities; natural events, such as hurricanes and earthquakes; and sabotage or terrorism events.

Two of the primary occupational hazards during wind project development are working at heights and working on or over water. Accidents during these activities could result in both worker injuries and fatalities.

Collisions, natural events, and sabotage or terrorism events could cause human casualties and could also cause spills of hazardous materials that would result in adverse impacts to many

marine resources. Because there would generally be few personnel present at alternative energy facilities and alternate use facilities, the number of human casualties from these types of occurrences would be relatively low. An exception would be accidental capsizing of the vessel or electrocution of ship personnel if fishing vessel equipment became caught on undersea cables.

For all these types of facilities, the types and amounts of hazardous materials in storage would generally be low, with the exception of fuel on construction and service vessels and dielectric fluids on ESPs or in transformers. The amount of hazardous material, such as diesel fuel, that could be released by a marine vessel involved in a collision would depend on the type of vessel and severity of the collision. Releases on the order of 37,500 L (10,000 gal) are possible. A similar volume of dielectric fluid could be released from an ESP or transformer. Although such large releases are unlikely in association with collisions, natural events, or terrorism, if a large release occurred, it could result in moderate to major impacts to marine resources. Impacts would depend greatly on the material spilled, the size and location of a spill, the meteorological conditions at the time, and the speed with which cleanup plans and equipment could be employed.

Mitigation measures that decrease the likelihood of occupational accidents include adherence to established regulations and safety guidelines. The likelihood of accidental vessel collisions with alternative energy facility structures can be decreased through the use of navigational aids and through adherence to Coast Guard-approved navigation safety plans. If accidental spills of hazardous materials did occur, impacts would be minimized through adherence to spill response plans. Entanglement with undersea cables can be avoided by burying the cables.

An example of a mitigation measure specific to aquaculture is the locating of netpens farther below the water surface to reduce the possibility of damage in extreme weather events such as hurricanes.

CUMULATIVE IMPACTS OF THE PROPOSED ACTION

Cumulative impacts result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency, industry, or person undertakes the other actions. This programmatic EIS examines the potential impacts of new alternative energy development on the OCS and of alternate uses for existing oil and gas platforms. There are several proposed wind facilities for the North Atlantic region and GOM, several wave facilities proposed for the north and central Pacific region, and a few current facilities proposed off the coast of Florida. The most prevalent current and foreseeable use of the OCS is for oil and gas production and for marine transportation.

Other OCS activities considered in the cumulative impacts assessment include multiple alternative energy facilities, existing and future oil and gas development, marine transport, commercial fishing, recreational activities, including fishing and diving, dredging, and military uses. Development and production of oil and gas are particularly intense in the Gulf of Mexico where about 4,000 oil and gas platforms already exist on the OCS; there are 23 platforms in the

Pacific region, and there are none operating in the Atlantic region, although oil and gas transportation into Atlantic ports occurs.

While neither the identity of the existing oil and gas platforms nor the nature of alternate use projects are known, the incremental impacts of leaving the structures in place added to other past, present, and reasonably foreseeable actions would include artificial reef effects, continuing vessel usages, and potential collision with vessels. When alternate uses of existing facilities are proposed, the cumulative impacts from the alternate use facility and other activities and processes will be assessed in the environmental review for the proposed project.

Potential cumulative impacts from routine activities at alternative energy facilities could be most significant for marine mammals, marine and coastal birds, commercial fisheries, fish resources and EFH, sea turtles, coastal and seafloor habitats, and visual resources.

The potential for impacts to marine mammals from construction and operational noise, marine vessel strikes, entanglement in moorings at wave energy facilities, and collisions with marine current turbines would increase as more facilities are sited and more activities are ongoing in a single region. This is also true for fish, sea turtles, marine and coastal birds, and some terrestrial birds and bats migrating over the OCS (bird impacts would be mainly associated with wind facilities). Cumulative impacts to commercial fisheries could be of concern if several large exclusion areas were established close to one another. Also, increased fishing and shipping pressure may occur in areas outside of alternative energy facilities due to displacement of the activities from within exclusion areas. Recreational fishing and diving could be similarly affected. Cumulative impacts to visual resources could occur if more than one wind facility were sited in close proximity (i.e., multiple facilities within visual range). The potential for cumulative impacts to these resources would require particular attention when planning and siting new alternative energy facilities.