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 implementing an Alternative Energy and Alternate Use Program on the OCS with associated rulemaking to approve and manage these potential activities. The program rules are being developed to guide the development of the program activities. This programmatic Environmental Impact Statement (EIS), which is being developed concurrently with the program rules, 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.

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. The OCS begins 3 to 9 nautical miles off coastal shorelines and extends to about 200 nautical miles offshore, with depths ranging from a few meters to thousands of meters. However, for the technologies being assessed within the time horizon for this EIS, development is expected to occur nearer to shore where maximum water depth would be 100 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 mile 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 to be analyzed in this programmatic EIS is the establishment of the MMS Alternative Energy and Alternate Use Program on the OCS and promulgation of associated regulations (i.e., development of a program and issuance of regulations governing activities related to granting of a lease, easement, or right-of-way for the production of alternative energy on the OCS, and issuance of regulations for alternate use of existing oil and gas facilities on the OCS). This programmatic EIS examines the potential impacts of the activities that could result from implementation of the new regulatory authority provided by the EPAct, 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 higher scale than would be appropriate for site-specific projects. Therefore, additional environmental review pursuant to the National Environmental Policy Act (NEPA) will be required for all future site-specific projects on the OCS.

Under the proposed action, there would be regulations in place for granting leases, easements, or rights-of-way for any alternative energy activities on the OCS. Most importantly, the regulations would likely decrease the environmental impacts from alternative energy activities by including consistent stipulations for data collection, facility siting, mitigation, and ongoing impact evaluation. These regulations 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 that would ultimately prove unacceptable because of unforeseen adverse impacts. Overall, it would also be anticipated that having regulations 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., not establishing a program and not issuing regulations related to granting of a lease, easement, or right-of-way for the production of alternative energy on the OCS or for the alternate use of existing facilities). In this case, OCS alternative energy development and alternate use of oil and gas infrastructure would proceed without development of an Alternative Energy and Alternate Use Program.

This does not mean that such projects would not be permitted, but simply that there would be no general regulations governing such projects, so that the lease terms and stipulations put in place for different projects would be handled on a case-by-case basis. The potential lack of consistency in MMS permitting of OCS alternative energy projects and alternate use projects that would result under the case-by-case alternative could have adverse impacts in the following areas: (1) possible incomplete or inadequate preproject data collection requirements, resulting in poor siting decisions; (2) possible inconsistent or inadequate mitigation stipulations for some projects, leading to adverse environmental impacts; (3) increased permitting time, leading to increased costs for developers and delays in alternative energy production; and (4) confusion regarding the roles and responsibilities of various Federal, State, and local agencies with respect to regulation of the OCS alternative energy facilities and alternate use projects. Although the magnitude of such adverse impacts under the case-by-case alternative is not known, because the number of inquiries regarding leases, easements, and rights-of-way for new alternative energy and alternate use projects on the OCS is increasing, the potential likelihood of these adverse impacts is also increasing.

One consequence of delays in alternative energy production due to increased permitting times would be that the electricity not produced from OCS alternative energy facilities would be provided from other sources (e.g., coal-fired power plants or natural gas–fired plants) that could result in higher adverse impacts to the environment. Another consequence would be that potentially beneficial use of existing oil and gas facilities might not occur for some facilities.

The no action alternative considered would be for the MMS not to develop the Alternative Energy and Alternate Use Program on the Federal OCS and not issue the associated rulemaking. In other words, the MMS would not authorize OCS alternative energy 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.

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. 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.

In general, impacts from 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. 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). Impacts from spills of oil and other hazardous material from vessels or platforms on the OCS are expected to be negligible to minor with proper implementation of oil spill prevention and response plans as required by the MMS. However, impacts from a spill as a consequence of a vessel collision could be moderate to major (see "Impacts from Nonroutine Conditions" later in the Executive Summary). Vessel collisions with marine mammals are expected to result in minor impacts but could have moderate impacts in a few instances involving threatened or endangered species. The following summary covers the other more notable impacts that could occur.

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, and vessel traffic to and from the demonstration site. The noise from these limited activities is anticipated to result in negligible to minor impacts for fish, sea turtles, and marine mammals.

Site Characterization

Site characterization activities would involve geological, geotechnical, and/or geophysical studies of the seafloor to ensure that turbines can be properly located. In addition, this could include erection of meteorological towers to monitor weather for approximately one year or more to verify the availability of suitable wind patterns. The noise from these activities could have minor to moderate impacts on fish, sea turtles, and marine mammals. Installation of a meteorological tower would result in disturbance of the seabed causing moderate impacts to the seafloor habitat, and potential moderate impacts could occur for fish, sea turtles, and marine mammals from noise generated by pile-driving activities.

Construction

The largest impacts from wind farm construction activities are likely to come from installation of the wind turbine foundations and the submarine power cable from each turbine to a central electric service platform (ESP) and from the ESP to an onshore substation. As discussed for site characterization, moderate noise impacts on fish, sea turtles, and marine mammals due to pile-driving activities could occur during foundation installation. Without proper mitigation, disturbance of the seafloor could result in moderate to major impacts on seafloor habitat and archaeological sites on and adjacent to the foundations and cables. Construction activities such as transmission cable installation could result in moderate impacts to coastal habitats (e.g., wetlands, barrier beaches). For example, the activities could interfere with forage habitat for birds, resulting in negligible to moderate impacts depending on the location and species. Onshore construction activities could result in minor to moderate air quality impacts, mainly from fugitive dust emissions. 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 negligible to minor impacts from vessel traffic (noise and collisions with marine mammals and sea turtles). If the facilities are located in nesting areas, operation of onshore facilities could cause moderate to major adverse impacts to sea turtles due to hatchling disorientation from the lighting. Above water, marine and coastal birds as well as migrating inland birds may experience minor to moderate impacts due to turbine collisions; birds with migratory patterns over the Gulf of Mexico could be particularly 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 would occur during decommissioning as during construction and operation. There could be localized effects on biotic resources including fish, sea turtles, and marine mammals, 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 park and its power cable to onshore facilities would minimize impacts to ocean sediments, marine and aeronautical navigation, commercial fishing activities, seafloor habitats, marine mammals, sea turtles, birds, tourism and recreation, areas of special concern, visual resources, and archaeological sites. Noise impacts from pile driving can be

mitigated by measures such as deterring the local aquatic species from the area before startup (e.g., by gradually increasing noise levels over a period of time to give sensitive species time to move out of the affected 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 (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.

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 at the port facility. 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 they will occur on a smaller scale compared to full-scale facilities as discussed below for construction and operation of full-size facilities.

Site Characterization

Site characterization activities would involve geological and geophysical studies of the seafloor to ensure that anchors for generation units, a foundation for an ESP, and connecting submarine cables can be properly located. The noise from these studies could have minor to moderate impacts on fish, sea turtles, and marine mammals.

Construction

The largest impacts from wave energy facility construction activities would come from installation of the ESP and the submarine power cable from each WEC device to the ESP and from the ESP to an onshore substation. Potential moderate noise impacts on fish, sea turtles, and marine mammals from pile-driving activities could occur from installation of the ESP foundation. Without proper mitigation, disturbance of the seafloor could result in minor to moderate impacts on seafloor habitat and archaeological sites. Onshore construction activities could result in minor to 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 and underwater disturbance during operations is expected, resulting in negligible to minor impacts from vessel traffic (noise and collisions with marine mammals and sea turtles). Impacts to threatened and endangered marine mammals would 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 transport and the potential of entanglement for overtopping WEC devices. Additionally, if facilities are located in nesting areas, operation of onshore facilities could cause moderate to major adverse impacts to sea turtles due to hatchling disorientation from the lighting. Impacts from spills of oil and other hazardous material from vessels or platforms on the OCS are expected to be negligible to minor with proper implementation of oil spill prevention and response plans as required by the MMS. However, impacts from a spill as a consequence of a vessel collision could be moderate to major.

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 fish, sea turtles, and marine mammals, especially if explosives were used to remove the WEC device 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 WEC 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, and archaeological sites. Noise impacts from pile driving can be mitigated by measures such as deterring the local aquatic species from the area before startup. Entanglement potential may be reduced through the use of sonic pingers. Nonexplosive decommissioning methods (e.g., cutting pilings just beneath the seafloor bed) can be used for any structure removal, avoiding noise and concussion impacts to the ecological system. The potential for adverse impacts from spills can be decreased through adherence to regional oil spill prevention and 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. Such a configuration would be analogous to underwater kite flying, where the kite is a turbine designed to keep upright and the kite flyer is the anchor.

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 these types of facilities being constructed in 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. 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. The noise from these activities is anticipated to result in negligible to minor impacts for fish, sea turtles, and marine mammals.

Site Characterization

Site characterization activities would involve geological and geophysical studies of the seafloor to ensure that anchors or foundations for generation units, a foundation for an ESP, and connecting submarine cables can be properly located. The noise from these studies could have minor to moderate impacts on fish, sea turtles, and marine mammals.

Construction

The largest impacts from ocean current energy facility construction activities would come from installation of the turbine anchors or foundations, the ESP, and the submarine power cable from each ocean current device to the ESP and from the ESP 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. Disturbance of the seafloor could result in minor to moderate to major impacts on seafloor habitat and archaeological sites. Onshore construction activities may result in minor to 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 negligible to minor impacts from vessel traffic (noise and collisions with marine mammals and sea turtles). If the facilities are located in nesting areas, operation of onshore facilities could cause moderate to major adverse impacts to sea turtles due to hatchling disorientation from the lighting. Impacts to sea mammals and sea turtles from the operating underwater turbines could be minor to moderate because of the potential for a blade to strike individuals (especially juveniles) passing through a turbine. These impacts could be major if the species affected were threatened and endangered. Impacts from spills of oil and other hazardous material from vessels or platforms on the OCS are expected to be negligible to minor with proper implementation of oil spill prevention and response plans as required by the MMS. However, impacts from a 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 fish, sea turtles, and marine mammals, 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, and archaeological sites. Noise impacts from pile driving can be mitigated by measures such as deterring the local aquatic species from the area before startup. The potential for adverse impacts from spills can be decreased through adherence to required oil spill prevention and 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 any structure removal, avoiding 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 platforms for an alternate use during or after oil and gas production has ceased could result in 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 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, such 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 farm 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 such 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 obviating the need to install new cable between onshore and offshore locations.

Aquaculture

Offshore aquaculture is expected to have impacts similar to those experienced 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), excessive feed materials, pharmaceuticals, growth-enhancing chemicals, 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. Also, escape of cultured native species could 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, need to be somehow repelled within the bounds of regulations and public sentiment.

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.

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 of 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 and traditional fishing grounds, and take actions to minimize pollution from animal feed, waste, and medication. For an alternate use involving research and monitoring, additional mitigation measures would depend on the nature of the work being conducted.

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. 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 10,000 gallons are possible. 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.

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. The most prevalent current and foreseeable use of the OCS is for oil and gas production and transport activities. Development and production are particularly intense in the Gulf of Mexico where about 4,000 oil and gas platforms already exist on the OCS; there are only 23 platforms in the Pacific region, and there are none currently operating in the Atlantic region, although oil and gas transport into Atlantic ports occurs. Other current and potential uses of the OCS and nearby State-regulated waters include use for other alternative energy facilities, commercial and recreational vessel traffic, dredging, waste effluent disposal, Department of Defense (DOD) activities, commercial and recreational fishing, LNG terminals, and mineral extraction, including sand and gravel.

At this time, the precise locations of potential new alternative energy facilities or alternate use program facilities are unknown. When such facilities or alternate uses of existing facilities are proposed, the cumulative impacts from all the facilities combined would be assessed in the environmental reviews for the proposed projects.

Potential cumulative impacts from alternative energy facilities could be most significant for water quality, acoustic environment, marine mammals, marine and coastal birds, fish resources and essential fish habitat, sea turtles, coastal and seafloor habitats, commercial fisheries, and visual resources.

Impacts to marine mammals from construction and operational noise, marine vessel strikes, and turbine collisions 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 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. Similarly, cumulative impacts to visual resources could occur if more than one facility were sited in a sensitive area. The potential for cumulative adverse impacts to these resources would require particular attention when planning and siting new alternative energy facilities.