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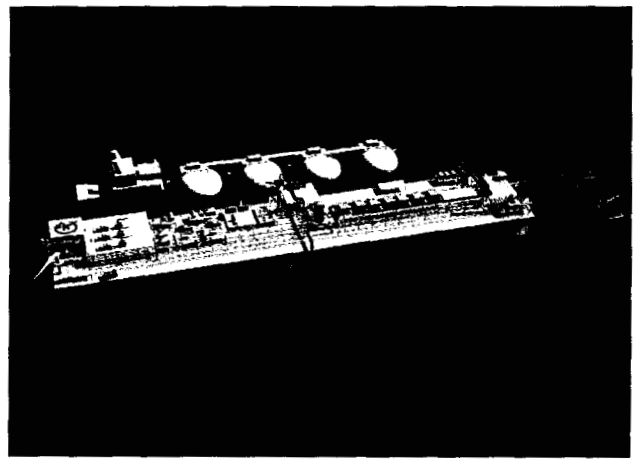
Section 5
Cumulative and Other Impacts

USCG-2004-16860-34



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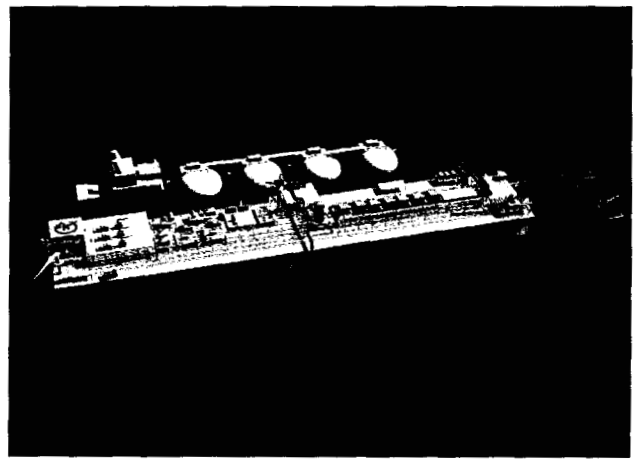

5. Cumulative and Other Impacts

5.1 Cumulative Impacts

CEQ defines cumulative impacts as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Although individual impacts of various actions might be minor, taken together their effects could be significant.

Impacts subject to cumulative impacts analysis are identified by reference to the temporal span and spatial area in which the Proposed Action would cause impacts. For the purposes of this analysis, the temporal span of the Proposed Action is the expected service life of the Port, an estimated 30 years. The spatial area exceeds the immediate footprint of the proposed Terminal and rights-of-way for the five take-away pipelines. The purpose of the Proposed Action is to help satisfy the Nation's energy needs. In that regard, it is similar in function and range of activities to OCS leasing and energy production programs. Accordingly, this EIS considers the OCS and directly affected shore areas to be the region in which cumulative effects could occur.

In November 2002, the MMS prepared an EIS entitled *Gulf of Mexico OCS Oil and Gas Lease Sales: 2003–2007.*[23] The EIS evaluates five lease sales in the Central Planning Area and four lease sales in the Western Planning Area that are planned to occur through 2007. Its discussions take into account a wide variety of activities that flow from OCS leases: exploration, pipeline and platform construction, emplacement, and removal; oil and gas production operations, to include use of support vessels and helicopters; and ship transit and anchoring. The programmatic EIS also considers the relationships of these actions on other activities not driven by the OCS Program that occur on the OCS and nearby shores, such as recreational pursuits and commercial fishing. In light of the similarity between the Proposed Action evaluated in this EIS and the MMS's OCS Proposed Action, the Secretary adopts the MMS's summaries and conclusions concerning cumulative impacts of its OCS Program.

The MMS EIS for oil and gas lease sales includes offshore scenario information related to OCS Program activities in the GOM for the years 2003 to 2042. Estimations for those future activities pertain to various water depths. Table 5-1, extracted from information in the MMS EIS, shows selected estimates for activities occurring in water less than 60 m (197 ft) deep (the area most like the Proposed Action). It also provides estimates for activities Gulf-wide at all water depths.

The MMS estimates there are presently 4,000 offshore structures. Over the next 40 years, an estimated 2,987 to 3,999 production structures will be installed and an estimated 6,303 to 7,296 production structures, mostly in water depths up to 60 m (197 ft), might be removed. The net result of these actions would be a substantial decrease in the number of structures in the GOM. The MMS made its estimates, however, before Congress amended the law to allow the construction and operation of deepwater ports for natural gas.

Since amendment of the Deepwater Port Act in 2002 to encompass deepwater ports for natural gas, the USCG has received four complete LNG deepwater port license applications for the GOM and one application for a facility in the Pacific off of the California coast. In addition to this application from Gulf Landing LLC, license applications in the GOM have also included proposals by Port Pelican LLC for a GBS platform in Vermilion Block 140 to provide 1.0 Bcfd (license granted); El Paso Energy Bridge Gulf

[23] The EIS may be accessed at *http://www.gomr.mms.gov/homepg/regulate/environ/nepa/CW2003-2007.html.*

of Mexico LLC for a submerged turret loading system in West Cameron Block 603 to provide 0.5 Bcfd (license awaiting final signatures); and Freeport McMoRan Energy LLC for modification of an existing platform in Main Pass Block 299 to provide 1.5 Bcfd and 28 Bcf of natural gas storage (application in review). BHP Billiton LNC International Inc. ("Port Cabrillo") for a floating, storage, and regasification unit off coastal California to provide 0.9 Bcfd (license application under review).[24]

Table 5-1. OCS Activity Levels, 2003–2042 (estimates)

Activity	Water 0–60 Meters	All Water Depths
Exploration and delineation well drilled	3,409–3,977	8,996–11,333
Development well (oil and gas)	7,390–8,181	17,148–21,079
Production structures installed	2,239–2,969	2,897–3,999
Production structures removed	5,286–6,069	6,303–7,296
Length of installed pipelines (km)[1]	9,800–24,374	27,590–52,364
Service vessel trips (1,000 trips)	9,689–9,835	11,889–12,479
Helicopter trips (1,000 trips)	11,374–18,920	27,997–50,692

Source: MMS 2002a

Notes: [1] Excludes pipelines in state waters.

The USCG and MARAD have received informal inquiries concerning application procedures for other deepwater ports for natural gas.[25] Developments within the LNG industry point to substantial increases in import capacity; more than two dozen proposals to build new LNG regasification terminals in North America over the next several years are in various stages of planning and permitting (EIA 2003). The considerable majority of the proposals to expand the Nation's LNG importation capacity, however, are for land-based receipt, storage, and regasification facilities. In light of the variety of all the potential projects and proposals, the USCG anticipates that ultimately there might be five LNG deepwater port licenses approved in the GOM. The addition of these deepwater ports to the inventory of off-shore facilities would not substantially affect the MMS estimates of Gulf-wide activities shown in Table 5-1.

For the purposes of this EIS, assessment of potential effects cumulative with the proposed Gulf Landing LLC Port will be limited to complete Deepwater Port applications for facilities in the GOM west of the Mississippi River discharge plume. To date, activities cumulative to Gulf Landing are limited to the Port Pelican, and El Paso Energy Bridge deepwater port proposals. These proposed ports are located 30 and 116 miles off of the Louisiana coast. The proposed ports are located at a distance between 45 mi and 90 mi from each other.

The USCG and MARAD would not expect operation of the proposed Port to result in cumulative impacts on several resources in the GOM. These include coastal barrier beaches and associated dunes, wetlands, seagrass communities, recreational beaches, land use and coastal infrastructure, demographics, and environmental justice. The impacts associated with the proposed ports are not synergistic and do not

[24] The Port Pelican, El Paso Energy Bridge, and Port Cabrillo license applications were announced at Vol. 67, *Federal Register*, No. 249, Friday, December 27, 2002, pp 79234-79235; Vol. 68, *Federal Register* No. 15, Thursday, January 23, 2003, pp 3299–3301; Vol. 69, *Federal Register*, No. 17, Tuesday, January 27, 2004, pp 3934–3934, respectively.

[25] The USCG declines to speculate on where additional deepwater ports for natural gas might be located, what technologies they might employ, if applications not yet deemed complete will be, or whether the inquiries that have been made to date will, in fact, result in license applications.

overlap in any measurable way. Potential cumulative impacts associated with onshore port construction will be addressed in supplemental NEPA documentation.

The No Action Alternative is represented by denial of the license sought by the Applicant. In such case, the proposed Port would not proceed and the circumstances characterizing the baseline environment would not be affected by potential impacts associated with the Proposed Action (grant of the license). Accordingly, the subsequent subsections address potential cumulative effects only in the context of implementation of the Proposed Action.

5.1.1 Water Quality

Activities that can affect water quality include installation/removal of platforms, laying pipelines, service vessel operations, supporting infrastructure discharges, and oil spills. Non-OCS sources include industrial, recreational, agricultural, and natural activities as well as oil and gas activities in state waters. Coastal water quality would be impacted by service vessels. In light of the substantial number of tug and supply vessel trips serving the OCS and the small number of service vessel trips associated with the proposed ports, cumulative effects on coastal waters would be negligible. Cumulative impacts on the water quality of the marine environment result from the addition of discharges from exploratory and production activities to a relatively pristine environment. As long as discharge criteria are met, impacts on the marine environment are not expected to be adversely significant.

Potential water quality impacts associated with the proposed Gulf Landing, Port Pelican, and El Paso Energy Bridge ports are not expected to result in cumulative impacts. The impacts are localized to within 100 m (328 ft) of each port, are not synergistic and do not overlap in any measurable way.

5.1.2 Biological Resources

Marine Mammals. OCS activities could affect protected cetaceans and sirenians. These marine mammals could be impacted by the degradation of water quality resulting from operational discharges, vessel traffic, noise generated by platforms, drill ships, helicopters and vessels, seismic surveys, explosive structure removals, oil spills, oil-spill response activities, loss of debris from service vessels and OCS structures, commercial fishing, capture and removal, and pathogens. The cumulative impact on marine mammals would be expected to result in a number of chronic and sporadic sublethal effects (behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) that might stress or weaken individuals of a local group or population and predispose them to infection from natural or anthropogenic sources. Few deaths are expected from oil spills, chance collisions with OCS service vessels, ingestion of plastic material, commercial fishing, or pathogens. Collisions between cetaceans and ships, could cause serious injury or mortality. Biological significance of any mortality would depend, in part, on the size and reproductive rates of the affected stocks, as well as the number, age, and size of animals affected. The incremental contribution of the Proposed Action to cumulative impacts on marine mammals, as one of several thousand energy-related activities occurring in the GOM, is slight.

Effluents are routinely discharged into offshore waters and are regulated by USEPA NPDES permits. Cetaceans might periodically be exposed to these discharges; however, direct effects on cetaceans would not be expected to be lethal. Indirect effects via food sources would not be expected due to dilution and dispersion of offshore operational discharges. However, any pollution in the effluent could potentially poison, kill, debilitate, or stress marine mammals and adversely affect prey species and other key elements of the GOM ecosystem, and operational discharges could periodically contact or affect marine mammals.

Helicopter traffic is assumed to occur on a regular basis. The FAA (Advisory Circular 91-36C) states that helicopters must maintain a minimum altitude of 213 m (700 ft) while in transit offshore and 152 m (500 ft) while working between offshore structures. It is unlikely that cetaceans would be affected by routine OCS helicopter traffic at these altitudes, provided pilots do not alter their flight patterns to more closely observe or photograph marine mammals that they encounter. It is also expected that 10 percent of helicopter trips would occur at altitudes below the specified minimums listed above as a result of inclement weather. Occasional overflights probably have no long-term consequences on cetaceans; however, frequent overflights could have long-term consequences if they occur repeatedly and disrupt vital activities such as feeding and breeding. The OCS-related helicopters are not the only aircraft that fly over the coastal and offshore areas. Military, private, and commercial aircraft also traverse these areas and might affect marine mammals.

Numerous vessel trips including trips from OCS service vessels, container cargo ships, fishing vessels, and recreastional vessels occur annually in the GOM. Noise from service vessel traffic might elicit a startle or avoidance reaction by cetaceans and mask their sound reception. Service vessel traffic could affect cetaceans either by active avoidance or displacement of individuals or groups to less suitable habitat areas. In addition to OCS-related vessel trips, there are numerous other vessels traversing coastal and offshore waters that could affect marine mammals. A large number of commercial and recreational fishing vessels use these areas.

The increase in vessel traffic and helicopter traffic associated with the three proposed Ports would be negligible when compared to other vessel operations in the GOM (e.g., approximately 315 thousand service trips and 1.7 million helicopter trips per year). A general increase in vessel activity in inshore and offshore waters of the Gulf of Mexico would likely increase the risk of marine mammals, including endangered sperm whales, taken by injury or mortality in vessel collisions. However, a condition of the license, if issued, will require the Applicant to adhere to the provisions set forth in MMS Notice to Lessees No. 2003-G10, *Vessel Strike Avoidance and Injured/Dead Protected Species Reporting.* MMS requires OCS lessees to follow this guidance. Adherence to these provisions would further reduce the risk associated with vessel strikes or disturbance of protected species that might result from the proposed Port's operations.

Sea Turtles. OCS activities could harm sea turtles and their habitats. These activities include structure installation, dredging, water quality and habitat degradation, OCS-related trash and flotsam, vessel traffic, seismic surveys, explosive structure removals, oil spills, oil-spill response activities, natural catastrophes, pollution, dredge operations, vessel collisions, commercial and recreational fishing, human consumption, beach lighting, and power plant entrainment. Sea turtles could be killed or injured by chance collision with service vessels or by eating marine debris, particularly plastic items lost from OCS structures and service vessels. It is expected that deaths due to structure removals would rarely occur due to mitigation measures (e.g., NOAA Fisheries Observer Program). The presence of, and noise produced by, service vessels and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt normal activities. Contaminants in waste discharges and drilling muds might indirectly affect sea turtles through food-chain biomagnification; the possible effect is uncertain. Oil spills and oil-spill response activities are potential threats that might cause turtle deaths. Contact with, or consumption of oil and oil-contaminated prey might seriously affect turtles. Sea turtles have been seriously harmed by oil spills in the past. The majority of OCS activities are estimated to be sublethal (behavioral effects and nonfatal exposure to intake of OCS-related contaminants or debris). Chronic sublethal effects (e.g., stress) resulting in persistent physiological or behavioral changes or avoidance of impacted areas could cause declines in survival or productivity, resulting in either acute or gradual reduction in population. The incremental contribution of the Proposed Action to cumulative impacts on sea turtles, as one of several thousand energy-related activities occurring in the GOM, is slight.

As discussed earlier, the increase in vessel traffic and helicopter traffic associated with the three proposed Ports would be negligible when compared to other vessel operations in the GOM (e.g., approximately 315 thousand service trips and 1.7 million helicopter trips per year). A general increase in vessel activity in inshore and offshore waters of the Gulf of Mexico would likely increase the risk of sea turtles taken by injury or mortality in vessel collisions. However, a condition of the license, if issued, will require the Applicant to adhere to the provisions set forth in MMS Notice to Lessees No. 2003-G10, *Vessel Strike Avoidance and Injured/Dead Protected Species Reporting.* MMS requires OCS lessees to follow this guidance. Adherence to these provisions would further reduce the risk associated with vessel strikes or disturbance of protected species that might result from the proposed Port's operations.

Coastal and Marine Birds. OCS activities would detrimentally affect coastal and marine birds. It is expected that the majority of effects from the major impact-producing factors on coastal and marine birds would be sublethal (behavioral effects and nonfatal exposure to or intake of contaminants related to OCS activities or discarded debris) and would usually cause temporary disturbances and displacement of localized groups inshore. The net effect of habitat loss from oil spills, new construction, and maintenance and use of pipeline corridors and navigation waterways would alter species composition and reduce the overall carrying capacity of disturbed areas in general. The incremental contribution of the Proposed Action would be negligible. The cumulative effect on coastal and marine birds would be expected to result in a discernible decline in the numbers of birds that form localized groups or populations, with associated change in species composition and distribution. Some of these changes would be expected to be permanent (as exemplified in historic census data) and to stem from a net decrease in preferred or critical habitat.

Fish Resources and EFH. Human activities including the degradation of water quality resulting from effluent discharges, vessel traffic, machinery-generated noise, explosive structure removals, oil spills, loss of debris from service vessels and OCS structures, and fishing have the potential to cause detrimental effects on fish resources and EFH in the northern GOM. Natural gas deepwater ports would represent a new source of human activity in the GOM.

To date, the USCG and MARAD have assessed two other deepwater port license applications (Port Pelican, LLC and El Paso Energy Bridge GOM, LLC) for natural gas deepwater ports in the GOM, west of the Mississippi River discharge plume. This application is the third for the GOM. All three proposed use sea water to warm LNG as part of the regasification process. In addition, the USCG and MARAD estimate that a total of five natural gas deepwater ports could be built in the GOM over the next 10 years. Currently, it is unrealistic to estimate the impact of any additional natural gas deepwater ports in the GOM. The impact of individual natural gas deepwater ports depends on the site of the deepwater port, the technology utilized for regasification, and the technology utilized to construct the deepwater port, among other factors.

It is difficult to quantify the impact that proposed deepwater ports would have on ichthyoplankton, fisheries resources, and EFH. Annual seawater intake and annual estimates of eggs and larvae potentially entrained for all three proposed LNG terminals are presented in Table 5-2. Total annual seawater intake by the three deepwater ports is orders of magnitude smaller than the total volume of the GOM. The volume of the GOM is 6.42×10^{18} gallons (2.43×10^{6} km^3) (Wiseman and Sturges 1999), while the total annual intake of the three deepwater ports is 1.2×10^{5} gallons (4.54×10^{-8} km^3). Intuitively, impacts of the three proposed ports' regasification systems are also expected to be minimal (i.e., the proposed ports are not expected to sanitized the entire GOM).

Table 5-2. Annual Seawater Intake and Annual Estimates of Eggs and Larvae Potentially Entrained for the Three Proposed Deepwater Ports

Proposed Deepwater Port	Annual Seawater Intake (Million Gallons)	Estimated Eggs Entrained Annually (Million Eggs)	Estimated Larvae Entrained Annually (Million Larvae)
Gulf Landing	46,640	540	210
Port Pelican	51,465	596[a]	1,210[a]
El Paso	18,873	95[b]	199[b]

Notes: [a] Based on the mean number of eggs and larvae in the SEAMAP data in the area of the proposed Port Pelican Terminal (USCG and MARAD 2003a).

[b] Based on the mean number of eggs and larvae in the SEAMAP data in the area of the proposed El Paso Energy Bridge (USCG and MARAD 2003b).

In this analysis, the cumulative impacts of the three ports' regasification systems are estimated by using age-1 equivalent losses of the eggs and larvae that might be entrained. Age-1 equivalent losses are defined as the number of potentially entrained eggs and larvae that would have survived to age-1 under natural conditions. An analysis of age-1 equivalent losses for the proposed Gulf Landing Port (Section 4.2.2.2) indicates that the operation of the ORV would not significantly impact fish populations, either directly or indirectly. As noted in Section 4.2.2.2 all estimates must be viewed with an understanding of the data limitations associated with SEAMAP data and the assumptions used to create the life history tables. Limitations in the life history tables are a result of the lack of applicable data on the early life history characteristics of individual species. Life history data used for this evaluation is present in Appendix F, Table F-8.

For this analysis, age-1 equivalent losses were estimated using 100 percent of the estimate of eggs and larvae potentially entrained at each site without regards to taxa (derived from SEAMAP data). A detailed explanation of the age-1 equivalency calculations is present in Section 4.2.2.2 and Appendix F, Table F-8. This approach was used to compensate for a lack of detailed information on the SEAMAP ichthyoplankton samples in the vicinity of the proposed Port Pelican and El Paso terminal. The estimated number of eggs and larvae potentially entrained annually at each site were multiplied by 3 for gear inefficiency. A range of age-1 equivalent losses are presented in Table 5-3 for eggs and 5-4 for larvae.

The range of age-1 equivalent losses that result from potentially entrained eggs was calculated using the red snapper table for the lower estimate and the bay anchovy table for the upper estimate. The red snapper table represents species with high natural mortality from egg to age 1 and results in the lowest number of age-1 equivalent losses. The bay anchovy table represents species with lower natural mortality from egg to age-1 and results in the highest number of age-1 equivalent losses. For larvae, the lower estimate of age-1 equivalents was a result of using the red snapper table and assuming that all the larvae are yolk-sac larvae and the upper estimate of age-1 equivalent losses was a result of using the bay anchovy and assuming that all the larvae were post yolk sac larvae.

The range of age-1 equivalent losses for each site presented Tables 5-3 and 5-4 indicate a possible range of total age-1 equivalent losses from entrained eggs and larvae. The range of age-1 losses at each site in Tables 5-3 and 5-4 could be comprised of up to 120 or more taxa at each site.

Indirect impacts can be judged by the minimal age-1 equivalent losses of bay anchovy and menhaden. Bay anchovy and menhaden are highly abundant and important forage fish. Losses reported for drum and snappers are not likely to adversely affect populations of these species. Red drum and red snapper are important commercial and recreational fish. Based on the age-1 equivalent losses estimated for these

species, it is unlikely that eggs and larvae potentially entrained by the ORV would have an adverse economic impact on these recreational and commercial fisheries. Based on a review of these data, no significant cumulative impacts would be associated with the three proposed ports.

Table 5-3. Age-1 Equivalent Losses that Result from the Adjusted Annual Estimates of Eggs Potentially Entrained at the Three Proposed Deepwater Ports

Proposed Deepwater Port	Adjusted Estimated Eggs Entrained Annually (Million Eggs)	Total Age-1 Equivalent Losses[a]
Gulf Landing	1,620[b]	2,602 – 91,387
Port Pelican	1,789[c]	2,874 – 100,961
El Paso	285[d]	457 – 16,063

Notes: [a] Lower age-1 equivalent losses estimated using 100 percent of the adjusted eggs entrained annually in the red snapper life history table. Upper age-1 equivalent losses estimated using 100 percent of the adjusted eggs entrained annually in the bay anchovy life history table.

[b] Based on the mean number of eggs potentially entrained annually in the area of the Gulf Landing Terminal multiplied by 3 to account for gear inefficiency.

[c] Based on the number of eggs potentially entrained annually, in the area of the proposed Port Pelican Terminal and multiplied by 3 to account for gear inefficiency (USCG and MARAD 2003a).

[d] Based on the mean number of eggs potentially entrained annually, in the area of the proposed El Paso Energy Bridge multiplied by 3 to account for gear inefficiency (USCG and MARAD 2003b).

Table 5-4. Total Age-1 Equivalent Losses that result from the Adjusted Annual Estimates of Larvae Potentially Entrained at the Three Proposed Deepwater Ports

Proposed Deepwater Port	Adjusted Estimated Eggs Entrained Annually (Million Larvae)	Total Age-1 Equivalent Losses[a]
Gulf Landing	629[b]	3,211 – 617,058
Port Pelican	3,632[c]	18,534 – 3,760,126
El Paso	596[d]	3,211 – 651,641

Notes: [a] Lower age-1 equivalent losses estimated using 100 percent of the adjusted larvae entrained annually in the red snapper (yolk sac larvae) life history table. Upper age-1 equivalent losses estimated using 100 percent of the adjusted larvae entrained annually in the bay anchovy life (post-yolk sac larvae) history table.

[b] Based on the mean number of larvae potentially entrained annually in the area of the Gulf Landing Terminal multiplied by 3 to account for gear inefficiency.

[c] Based on the number of larvae potentially entrained annually, in the area of the proposed Port Pelican Terminal and multiplied by 3 to account for gear inefficiency (USCG and MARAD 2003a).

[d] Based on the mean number of larvae potentially entrained annually, in the area of the proposed El Paso Energy Bridge multiplied by 3 to account for gear inefficiency (USCG and MARAD 2003b).

It must be noted that the entrainment estimates presented in this section assumed that 100 percent of estimated ichthyoplankton concentration in the seawater was entrained and no exclusion credit for mitigation measures was used. Mitigation measures were proposed for all three proposed deepwater Ports. For the case of the two deepwater ports with the higher entrainment estimates (Port Pelican and Gulf Landing) the seawater intake would be located in the lower half of the water column. It is expected that this mitigation measure would reduce the entrainment of ichthyoplankton by at least 50 percent further reducing the cumulative impacts of the deepwater ports. Based on the analysis above, it is unlikely that a single regasification system, or up to three regasification systems at three ports, would

materially affect fish stocks. The numbers presented above are estimates made with many limitations and assumptions and should be viewed that way. Monitoring at the proposed deepwater ports would give a reliable estimate of ichthyoplankton.

Past, present, and future LNG deepwater ports as well as other activities, including shipping and OCS activities) could result in an increase of the amount of GOM waters being affected by processes that entrain and kill ichthyoplankton, zooplankton other than ichthyoplankton, and phytoplankton. Although, Federal agencies must now consider impacts on EFH when proposing such activities, the effects of most anthropogenic impacts, with the exception of fishing, are not distinguished from effects of natural mortality in fisheries stock assessments. As such, the incremental contribution of the Proposed Action's impacts on fisheries resources and EFH, as well as the impact of future natural gas deepwater ports in the GOM, would be indistinguishable from most other anthropogenic impacts on fisheries resources and EFH.

5.1.3 Cultural Resources

Several impact-producing factors might threaten historic archaeological resources. An impact could result from contact between an OCS activity (pipeline and platform installations, drilling rig emplacement and operation, dredging, and anchoring activities) or an historic shipwreck on the continental shelf. The archaeological surveys and resulting archaeological analysis and clearance that are required before an operator begins oil and gas activities are expected to be highly effective at identifying possible historic shipwrecks. The OCS development prior to requiring archaeological surveys has possibly affected wrecks containing significant or unique historic information. The loss or discard of ferromagnetic debris associated with oil and gas exploration and development and trawling activities could result in the masking of historic shipwrecks. Loss of significant or unique historic archaeological information from commercial fisheries (trawling) is not expected. It is expected that dredging, sport diving, commercial treasure hunting, and tropical storms have impacted and would continue to impact historic period shipwrecks. In the case of factors related to OCS Program activities, it is reasonable to assume that most impacts would have occurred before 1973, the date of initial archaeological survey and clearance requirements. The incremental contribution of the Proposed Action would be expected to be very small due to the efficacy of the required remote sensing survey and archaeological report. However, an interaction between bottom-disturbing activity (rig emplacement, pipeline trenching, and anchoring) and an historic shipwreck is possible.

Several impact-producing factors might threaten prehistoric archaeological resources in the GOM. An impact could result from contact between an OCS activity (pipeline and platform installations, drilling rig emplacement and operation, dredging, and anchoring activities) and a prehistoric archaeological site on the continental shelf. The required archaeological surveys and resulting archaeological analysis and clearance that are required before an operator begins oil and gas activities in a lease are expected to be highly effective at identifying possible prehistoric sites. OCS development prior to requiring archaeological surveys (before 1973) has possibly affected sites containing significant or unique prehistoric information. The shallow depth of sediment disturbance caused by commercial fisheries activities (trawling) would not be expected to exceed that portion of the sediments that have been disturbed by wave-generated forces. Effects of various past impact-producing factors have likely resulted in the loss of significant or unique prehistoric archaeological information. The incremental contribution of the Proposed Action is expected to be very small due to the efficacy of the required remote-sensing survey and concomitant archaeological report and clearance. Survey and mitigation requirements for all of the ports, including unanticipated discovery plans would minimize the potential for any impacts to cultural resources. With these mitigation measures in place no cumulative impacts are anticipated.

5.1.4 Geological Resources

Activities that can affect geological resources principally include installation/removal of platforms and laying of pipelines. The Proposed Action would disturb surficial sediments in the immediate vicinity of the GBSs, mooring and berthing dolphins, and supports for the livings quarters and flare. Burial of the proposed take-away pipelines extending a total of 65.7 NM and anchorage of LNGCs awaiting berthing space at the proposed Terminal would also disturb surficial sediments. Most disturbed sediments would be deposited at or near their prior locations. Cumulative effects on sediments would be expected to be minor.

5.1.5 Socioeconomics

Employment. Activities related to the OCS would produce only minor economic changes in the Texas, Mississippi, and Alabama coastal areas, typically generating an increase of less than 1 percent in employment in any of the coastal subareas in these states. There would be very little economic stimulus in Florida coastal subareas (assuming that the state of Florida remains opposed to mineral extraction anywhere along its coastline). Substantial impacts on Louisiana coastal subareas would be expected. OCS-related employment for Louisiana's western coastal parishes would be expected to peak as high as 6.3 percent during the period 2004–2012.

Commercial Fisheries. Activities resulting from the Proposed Action, OCS Program, and non-OCS events have the potential to cause detrimental effects on commercial fishing, landings, and the value of those landings. Activities expected to substantially affect commercial fishing include commercial and recreational fishing techniques or practices, hurricanes, installation of production platforms, underwater OCS obstructions, production platform removals, seismic surveys, petroleum spills, subsurface blowouts, pipeline trenching, and offshore discharges of drilling muds and produced waters. Resultant influence on commercial fishing, landings, and the value of those landings would be expected to be substantial and easily distinguished from effects due to natural population variations. The incremental contribution of the Proposed Action to the cumulative impact is small.

5.1.6 Recreation

Activities that can affect recreation include installation of the take-away pipeline segments and operations from the Onshore Base to and from the proposed Terminal. Recreational fishing could be affected because of temporary displacement due to the installation of the take-away pipelines and service vessel activities. Shoreline recreational activities (e.g., beaches, birdwatching) are not expected to be affected.

Activities that can affect transportation include operation of ocean-going ships and other vessels in the GOM. Implementation of the proposed Port would not affect access to transportation routes or result in crowding of routes that might lead to substantially increased risks of collisions or other mishaps. However, the forecasts for increased demands for natural gas, coupled with the extension of the Deepwater Port Act to include natural gas activities, suggests that additional license applications would be forthcoming (to date, the USCG and MARAD have received two such applications; this one for the GOM and one for California). To the extent that additional deepwater ports for natural gas might be licensed, there would be an increased number of LNGCs operating in the GOM and increased numbers of support vessels attending port operations. In light of the extensive domestic and foreign maritime industry that exists in the northern GOM, the incremental increase in use of major trade shipping routes that might be brought about by additional deepwater ports would be minor. Moreover, appropriate dispersion of the ports would avoid cumulative effects on transportation.

In November 2002, Port Pelican, LLC received a license for a deepwater port on Vermilion Block 140. This port, 61 km (38 mi) from the Louisiana coast, would be approximately 76 km (47 mi) southeast of Gulf Landing. In January 2003, El Paso Energy Bridge Gulf of Mexico, LLC sought a license for a proposed deepwater port on West Cameron Area, South Addition, Block 603 (awaiting final signatures). This port, 174 km (108 mi) from the Louisiana coast, would be approximately 127 km (79 mi) south of Gulf Landing. LNGCs transiting to and from the Port Pelican or El Paso Energy Bridge GOM deepwater ports would use the Gulf Fairway and Sabine Pass Fairway. LNGCs traveling to and from all three deepwater ports would be a small fraction of the many cargo vessels transiting the GOM. For instance, the Port of Houston, ranked first in the United States in foreign waterborne commerce, was called on by more than 6,400 ships in 2002 (Port 2004). It is likely that the vast majority of these ships used the Gulf, Sabine Pass, and Calcasieu Fairways.

5.1.7 Air Quality

It is assumed that OCS emissions would maintain present levels, with projected decreases in future years in relation to projected declining trends in OCS activity in the GOM and advances in control technology. Emissions of pollutants into the atmosphere from OCS activities are generally not projected to have significant effects on onshore air quality because of prevailing atmospheric conditions, emissions rates and heights, and the resulting pollutant concentrations. The incremental contributions of the Proposed Action to cumulative impacts are not significant and not expected to alter onshore air quality classifications. This conclusion only considers the impact on air quality from OCS sources. If onshore sources are considered, there might be considerable adverse effects on O_3 concentration and on visibility. The OCS contribution to the air quality problem in the coastal areas is small, but total impact from onshore and offshore emissions might be significant because of the O_3 nonattainment problems in southeast Texas and Baton Rouge, Louisiana. Air resource modeling for the three ports indicate that air emissions with the ports would not reach any sensitive onshore resources individually or collectively. The distance between these ports (45 – 90 mi) is sufficient to prevent cumulative air impacts.

5.1.8 Noise

Activities that can affect the noise environment include construction, installation, operation, and decommissioning of proposed terminal facilities and the take-away pipelines. The proposed Port would be distant from any onshore (human) noise-sensitive areas. Activities at the proposed Terminal site (e.g., arrival/departure of LNGCs, operation of pump systems and other equipment) might deter larger marine mammals in the vicinity of the proposed Port. Implementation of the proposed Port would not contribute significantly to the overall marine noise environment that is affected by OCS and non-OCS-related activities involving mineral exploration, service and cargo vessel transit, and OCS platform operations. Potential noise impacts associated with the Gulf Landing, Port Pelican and El Paso Energy Bridge ports are not expected to be cumulative. These impacts are typical of other noises generated by OCS activities, and are at to large of a distance to be synergistic and do not overlap in any measurable way.

5.1.9 Risk Management

Operational risk management procedures are site-specific and not amenable to cumulative impacts. Adherence to established navigation routes and observance of safety zones at OCS structures are enforced by several entities in addition to the USCG, to include owners and operators of ships and structures. Implementation of the proposed project would not result in cumulative effects on safety. The distance between Gulf Landing, Port Pelican and the El Paso Energy Bridge ports is between 45 to 90 mi, more than adequate to prevent cumulative safety and hazard impacts.

5.2 Unavoidable Impacts

Unavoidable adverse impacts are anticipated to be primarily short-term and localized.

Water Quality. Routine offshore operations would have unavoidable effects to varying degrees on the quality of the surrounding water if the proposed project were to be implemented. Construction of the terminal and pipe-laying activities would cause an increase in the turbidity of the affected waters for the duration of the activity periods. The discharge of treated sewage from the rigs and platforms would increase the levels of suspended solids, nutrients, chlorine, and BOD in a small area near the discharge point for a short period of time. Accidental spills from the proposed Terminal could result in increases of pollutant levels in the water column in the vicinity of the GBSs. Vessel traffic would contribute to the degradation of GOM waters through inputs of chronic oil leakage, treated sanitary and domestic waste, bilge water, and contaminants known to exist in ship paints.

Biological Resources. Unavoidable effects on listed and other marine mammals, listed sea turtles, fish, and migratory birds would result from the installation and operation of the proposed Terminal and take-away pipeline, as well as vessel and helicopter traffic. Marine animals would be affected by noise and disturbances associated with the offshore activities. Losses to fishing resources and fishing gear could occur from placement of the proposed GBSs and laying of the take-away pipelines. Localized populations of fish species would be expected to be impacted; however, these impacts are not expected to result in population-level effects.

Cultural Resources. Construction of the proposed Port could result in the loss of unique or significant archaeological information. Required archaeological surveys significantly lower the potential for this loss by identifying potential archaeological sites prior to an impact, thereby making avoidance or mitigation of impacts possible. In areas of high sedimentation rates, however, survey techniques might not be effective in identifying a potential resource.

Geological Resources. Unavoidable disturbance of surficial sediment would occur during installation of the proposed Terminal and associated structures and laying (burial) of the take-away pipelines.

Socioeconomics. Whether there would be any unavoidable effects on socioeconomics cannot be determined pending identification of the location of the GBS fabrication facilities. The effects on socioeconomics will be analyzed in a subsequent, tiered NEPA document.

Recreation. Creation of a Safety Zone in the vicinity of the proposed Terminal would result in limited displacement of commercial and recreational fishing during the period the deepwater Port would be licensed for operations. The minor effects on fishing would be unavoidable because of the need to ensure the safety of the facilities.

Transportation. There would be no unavoidable effects on transportation.

Air Quality. Mitigation of long-term effects would be accomplished through existing regulations and ongoing development of new emission control technology. Short-term effects from nonroutine catastrophic events (accidents) are uncontrollable.

Noise. Effects on the marine noise environment, caused by service and cargo vessel Terminal operations, would be unavoidable.

Reliability and Safety. There would be no unavoidable effects on reliability and safety.

5.3 Coastal Zone Management Act Consistency

Congress enacted the CZMA in 1972 to encourage states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats.

The license sought by Gulf Landing LLC to own and operate a deepwater port requires concurrence in a consistency certification (15 CFR 930.57) by the state of Louisiana. The request for the state's concurrence must be accompanied by all necessary data and information (15 CFR 930.58). Gulf Landing LLC has submitted appropriate documentation to the LDNR Coastal Zone management authority to establish compliance with CZMA requirements. A copy of the consistency certification, when available, will be included in this EIS.

5.4 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered. Examples are when a species becomes extinct or when wetlands are permanently converted to open water. In either case, the loss is permanent.

Chronic low-level pollution can injure and kill organisms at virtually all trophic levels. Mortality of individual organisms can be expected to occur, and possibly a reduction or even elimination of a few small or isolated populations.

Structure removal by "generic" explosives (less than 50-pound charges), such as may occur for removal of berthing dolphins and the crew berthing and flaring structures during decommissioning, would cause mortality to fish resources, including commercial and recreational species, and might affect listed species. Small numbers of fish kills, including such valuable species as red snapper, are known to occur when explosives are used to remove structures in the GOM. Structure removal by explosives could adversely affect the commercial fishing industry close to the removal site.

Although the effect on archaeological resources as a result of implementing the Proposed Action would be expected to be low, any interaction between an impact-producing factor (e.g., placement of the GBSs and laying of the take-away pipelines) and a significant historic shipwreck or prehistoric site could destroy information contained in site components and their spatial distribution. This could cause a permanent loss of potentially unique archaeological data.

The OCS oil and gas exploration, development, production, and transportation are carried out under comprehensive, state-of-the-art, enforced regulatory procedures designed to ensure public safety and environmental protection. Nonetheless, some loss of human and animal life is inevitable from unpredictable and unexpected acts of man and nature (accidents, human error and noncompliance, and adverse weather conditions). Some normal and required operations, such as structure removal, can result in the destruction of viable marine life. Although the possibility exists that individual marine mammals, marine turtles, birds, and fish can be injured or killed, there is unlikely to be a lasting effect on baseline populations.

5.5 Relationship between Short-Term Uses and Long-Term Productivity

Short-term refers to the total duration of construction and operation of the proposed Port, and long-term refers to an indefinite period following decommissioning.

The principal short-term use of the OCS is to acquire energy resources for the Nation. Short-term project operational activities might result in chronic impacts over a longer period. Platform emplacement and removal would cause minor, localized impacts in the short-term; the impacts of site clearance might be last longer because of minor elements that would be left in place. The short-term use might have long-term impacts on biologically sensitive offshore areas or archaeological resources. Upon completion of licensed activities, the marine environment would generally be expected to remain at or return to its normal long-term productivity levels.

The OCS development off Louisiana and Texas has enhanced recreational and commercial fishing activities, which in turn have stimulated the manufacture and sale of larger private fishing vessels and special fish recreational equipment. Commercial enterprises such as charter boats have become heavily dependent on offshore structures for satisfying recreational customers. The Proposed Action could increase these incidental benefits of offshore development. Offshore fishing and diving has gradually increased in the past 3 decades; platforms have been the focus of much of that activity. As mineral resources throughout the GOM become depleted, platform removals would occur and might result in a decline in these activities. To maintain the long-term productivity of site-specific uses, artificial reefs attractive to fishermen and divers might eventually need to replace removed platforms.

No long-term productivity or environmental gains are expected as a result of the Proposed Action. The benefits of the Proposed Action are expected to be principally those associated with an increase in supplies of natural gas for domestic consumption. While no reliable data exist to indicate long-term productivity losses as a result of use of the OCS, such losses are possible.

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