III. B. Biological Characteristics

1. Vulnerable Coastal Habitats

1. Vulnerable Coastal Habitats: This section focuses on coastal habitats, which almost entirely surround this particular OCS lease area. Some of the important coastal habitats include the kelp beds on shallow-water banks in which sea otters feed, the streams and estuaries in which salmon spawn, and the intertidal region. These habitats are described in this section; the likelihood of accidental oilspills impacting these habitats, and persistence of oil in these habitats, will be described later.

Extensive Shallow-Water Banks: The extent of the impacts on shallow water banks is related to the depth to which oil from surface slicks mixes downward in the water column. Oil may easily mix downward through the surface mixed layer, which is about 20 meters deep (or 10 fathoms or 60 feet) in Shelikof Strait. The depth of the mixed layer in lower Cook Inlet is quite variable due to the tidal mixing.

Extensive shallow-water banks less than 20 meters deep occur on the northwestern side of Shelikof Strait, from Cape Chiniak north to Kiukpalik Island and south to Niskshak Island. Extensive shallow-water banks also occur further south in Shelikof Strait, in Katmai and Alinchak Bays. On the southeastern side of Shelikof Strait, there are extensive shallow-water banks at the east end of Kupreanof Strait near Whale Island and south of Talnik Point. These last mentioned areas are near the possible pipeline and tanker routes in Marmot Bay that are identified in the scenario for the proposed leasing (appendix A).
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An extensive shallow-water bank in lower Cook Inlet occurs in Kamishak Bay and north along the western edge of the inlet. Other extensive shallow-water banks occur south of Kalgin Island and along the east edge of the inlet.

The persistence of spilled oil in these shallow-water banks and in embayments is partly related to the flushing rate of the water. For example, in Kupreanof Strait and south of Kalgin Island where there is rapid tidal flushing, spilled oil in the mixed layer and/or in shallow-water sediments would probably not persist for very long. In contrast, the long fjords or bays along the northwestern coast of Kodiak Island are flushed very slowly, so spilled oil would probably persist in the water column for a relatively long time. Further descriptions of the tidal flushing and circulation in shallow-water areas of lower Cook Inlet and Shelikof Strait are included in section III.A.2.g. on physical oceanography.

Coastline and Littoral Biota: Descriptions of the shallow-water, littoral biota and food webs have been analyzed by Dames and Moore (1975, a and b), and by Palmisano and Estes (1977). The following description is paraphrased from the lower Cook Inlet Interim Synthesis Report (Science Applications, Inc., 1979).

> The littoral communities have been divided by Lees (1978) into four vertical zones each with a composition of dominant flora/fauna generally distinct from adjacent zones. These zones are the upper intertidal (that area above mean sea level, MSL); the middle intertidal (that area between MSL and the mean lower low water, MLLW); the lower intertidal (that area from MLLW to extreme low water, ELW); and the shallow subtidal zone. Though the presence or absence of a given species in a zone is dependent on many factors, tolerance to varying periods of exposure is of key importance in vertical distribution.
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> Evidence from California and the Aleutian Islands indicates that the sea otter is a key species in determining the structure of nearshore communities. In areas with dense sea otter populations, sea urchins, limpets, and chitons are reduced to sparse populations of small individuals; macroalgae flourish, providing food and shelter for a variety of organisms, especially crustaceans; wave exposure is reduced, siltation increases, and overall productivity is high. In contrast, similar areas with few or no sea otters have dense populations of large herbivores; macroalgae are severely overgrazed; bare rocky substrates are exposed to wave action; and overall productivity is low.
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> The lowest reaches of the rocky intertidal and nearshore eelgrass beds are critical to the life cycle of such commercially important species as the king crab, Paralithodes camtschatica and Dungeness crab, Cancer magister.
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> The nearshore region of lower Cook Inlet is also an important spawning area for several commercially important pelagic, demersal, and anadromous fish species. In the summer, maturing salmonids congregate at the mouths of natal streams (shown on graphic 3) before migrating upstream to spawn. In late spring and summer, Pacific herring, chum and pink salmon, and some demersal species spawn in intertidal and shallow subtidal regions. Some flatfish are thought to spawn near shore in lower Cook Inlet in winter and spring.

The kelp and macroalgae beds, as well as providing habitat for sea otters (section III.B.4), provide a substrate on which herring spawn. Both the herring and their roe (herring eggs) are quite valuable commercially (section III.B.2).

Other shallow-water organisms that are commercially valuable are the razor clam and scallop. The distribution in lower Cook Inlet and Shelikof Strait of these organisms in commercially exploited quantities and/or areas of dense concentrations is shown on graphic 2. The distribution of both scallops and razor clams is based on information from the Alaska Department of Fish and Game (1978).

The vulnerable coastal habitats have been outlined in the previous paragraphs. The probability of these habitats being impacted by oilspills is described later in section IV.A.1.d. The persistence of spilled oil in these habitats is described in section IV.A.1.e., and the possible effects on the biota are described in section IV.A.2.a.