

will also serve as the "reference area" for site monitoring.

2. Location in Relation to Breeding, Spawning, Nursery, Feeding, or Passage Areas in Adult and Juvenile Phases

Many open-ocean nearshore organisms occur in the water column over the proposed Shallow Water site. These organisms include zooplankton (copepods, euphausiids, pteropods, and chaetognaths) and meroplankton (fish, crab and other invertebrate larvae). These organisms display a normal range of change in abundance by season. The populations at or near the proposed Shallow Water site are not unique to the proposed site. They are present over most of the coast. Overall coastal populations are not dependent on those located near the MCR. Based on zooplankton and larval fish studies, it appears that there will be no impacts to organisms in the water column.

Offshore areas (beyond the 200-foot depth contour) including the proposed Deep Water site, have consistently higher densities and numbers of benthic species (diversity) than nearshore shallower areas such as the proposed Shallow Water site. Therefore, placement of dredged material in the Deep Water site would be expected to have a greater impact to the benthic infaunal community than placement of dredged material in nearshore locations.

The proposed sites are located in an area off the mouth of the Columbia River which supports a variety of pelagic and demersal fish species as well as shellfish including Dungeness crab. Pelagic species include anadromous salmon, steelhead, cutthroat trout, striped bass, lamprey, smelt, herring, sturgeon, and shad that migrate through the estuary to upriver spawning areas. Juveniles of these species are present in the area following their migration out of the river or estuary into the ocean. Some remain in the nearshore area for various periods of time feeding and rearing, while others move directly offshore. Other pelagic species include the Pacific herring, anchovy, surf smelt, and sea perch. Surf smelt are in nearshore areas and in the estuary in large numbers during the summer. Demersal species present in the nearshore area include juvenile flatfish which rear in the area. Resident species occur in the offshore area throughout the year with many using the estuary as a rearing and nursery area. Species present include various flatfish, rockfish and other demersal fish.

Potentially, 30 cetacean species can occur along the coast although their numbers are generally limited. Harbor

porpoises and gray whales are prevalent in shelf waters less than 600 feet deep. The larger cetaceans (whales) typically occur as migrants in the spring and fall, such as the California gray whale. Smaller cetaceans, principally dolphins, porpoises, and some small whales are also present. Five species of pinnipeds are known to occur along the coast: northern sea lion, California sea lion, harbor seal, northern elephant seal and northern fur seal. Harbor seals are resident whereas the four other species of pinnipeds are more transient in nature. Harbor seals and California/northern sea lions are the principal species observed in the estuary. All three species are known to forage within the estuary and adjacent ocean waters.

Four species of marine turtles (loggerhead, green, Pacific ridley, and Pacific leatherback) have been recorded from strandings along the coastline since 1982. Marine turtles are unusual in their occurrence along the Pacific Coast as they are typically associated with warmer marine waters.

Pelagic birds are extremely numerous in the offshore area. Studies have found that seabird populations were most densely concentrated over the continental shelf (less than 600 feet in depth). Shearwaters, storm petrels, gulls, common murre and Cassin's auklets numerically dominated the pelagic bird fauna from late spring through late summer. Phalaropes, fulmars, and California gulls are important constituents of the fall pelagic bird flocks. The principal species in the winter are phalaropes, California gulls, fulmars, other gulls, murre, auklets, and kittiwakes. Red-throated, Pacific and common loons occur as spring and fall migrants. Western, red-necked, horned, and eared grebes also occur in the area. Brown pelicans occur from late spring to mid-fall along the coast. This species forages in nearshore waters of the Pacific Ocean and estuarine waters of the Columbia River. Concentrations of up to 1,000 birds have been reported. Three species of cormorants and three species of terns occur and forage in nearshore Pacific Ocean waters and the estuary.

The federally listed threatened and endangered species which may occur within the area of the proposed sites include: listed salmon and steelhead stocks; blue, finback, sei, right, humpbacked and sperm whales; loggerhead, green, Pacific ridley, and Pacific leatherback sea turtles; northern (Steller) sea lion; marbled murrelet; bald eagle; Aleutian Canada goose; peregrine falcon; and brown pelicans. Occurrence of these species varies by season and location in the offshore area.

Disposal at both of the proposed sites is expected to result in the mortality of benthic organisms and some crabs as an immediate result of material burying organisms as it hits the ocean floor. Recolonization near the burial sites is expected. Disposal at the proposed Deep Water site is expected to have a greater, but not unacceptable, negative impact to the benthic community because of its higher benthic infaunal density and diversity relative to the proposed Shallow Water site. The density and diversity of benthic organisms at the proposed Deep Water site is expected to be changed by the point-dump disposals that will ultimately create the 40-foot mound. With respect to the other living resources that use the proposed Shallow Water and Deep Water sites, the sites are not being located in areas that are limited or that are unique breeding, spawning, nursery, feeding, or passage areas.

3. Location in Relation to Beaches and Other Amenity Areas

The proposed Shallow Water site would be located on the north side of the entrance channel in 45 feet to 75 feet of water. Most of the dredged material to be placed in the Shallow Water site is expected to move north onto Peacock Spit. Some material can be expected to move toward Benson Beach, or possibly back into the entrance channel. The Shallow Water site, as a dispersive site, has the potential to feed sand into the littoral system that nourishes the beaches. Material placed at the Shallow Water site probably does not directly nourish the beaches. The shoreward edge of the proposed Deep Water site would be located about 4.5 nautical miles off the beaches of Oregon and Washington in about 200 feet of water. Material placed at the Deep Water site is expected to create a mound of material that is not available to the littoral system and is lost to the beaches.

4. Types and Quantities of Wastes Produced To Be Disposed of, and Proposed Methods of Release, Including Methods of Packing the Waste, If Any

The sites that are proposed to be designated will receive dredged materials determined to be suitable for ocean disposal that are transported by either government or private contractor hopper dredges or ocean-going bottom-dump barges towed by tugboat. Both types of equipment release the material at or very near the surface. The majority of material expected to be disposed in the proposed sites is anticipated to come from Corps maintenance dredging of shoals in the MCR entrance channel federal project. These sediments consist