Appendix A

Living Resources
Umpqua River, Oregon

DRAFT

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Introduction

Information on living resources in the Umpqua River/Oregon Coast offshore areas was obtained from a variety of published and unpublished reports, thesis, and personal communications. Also, field sampling was conducted in 2007 to obtain benthic invertebrate, fish, and epibenthic data specifically in the proposed ocean dredged material disposal site area.

Plankton and Fish Larvae

No specific data is available for zooplankton in the Umpqua River offshore area. However, Keister and Peterson (2003) provided a discussion of the zooplankton community found off the central Oregon Coast (along the Newport hydrographic line). For the Umpqua offshore area, it is likely that zooplankton population dynamics would be similar to those found in the Newport area because of similar oceanographic conditions.

Keister and Peterson (2003) indicate that the zooplankton community is influenced strongly by seasonal variations in wind and current patterns. During late spring and summer, northwesterly winds set up equatorward flow and coastal upwelling. Northwesterly winds dominate from April/May-September; periodic relaxations or southwesterly storms rapidly affect the hydrography of nearshore areas, but offshore of about 30 kilometers, conditions are less variable. Boreal neritic copepods such as *Pseudocalanus mimus*, *Calanus marshallae*, *Centropages abdominalis*, *Acartia longiremis*, and *Acartia hudsonica* dominate the coastal plankton during summer (Peterson and Miller 1977). In early fall, winds reverse and upwelling ceases; during autumn and winter, winds are predominantly southwesterly, the Davidson Current flows poleward, and offshore surface waters are transported onshore. In winter, the coastal zooplankton is populated by warm-water species such as *Mesocalanus tenuicornis*, *Paracalanus parvus*, *Ctenocalanus vanus*, *Clausocalanus spp.*, *Acartia tonsa*, and *Corycaeus anglicus* (Peterson and Miller 1977).

Auth and Brodeur (2006) examined the species composition, distribution, and concentration of ichthyoplankton off the central Oregon coast (along the Newport hydrographic line) to investigate annual, seasonal, vertical, and cross-shelf variability. Larval concentrations were also analyzed in relation to water temperature and salinity. The 281 samples collected from 5 cruises along a historically sampled transect between April and September in 2000 and 2002 yielded 4,944 fish larvae comprising 72 taxa in 28 families. The dominant taxa collected were northern anchovy (*Engraulis mordax*), slender sole (*Lyopsetta exilis*), rockfishes (*Sebastes* spp.), northern lampfish (*Stenobrachius leucopsarus*), and blue lanternfish (*Tarletonbeania crenularis*). Total larval concentration increased from 49.3 per 1000 m^3 in 2000 to 72.0 per 1000 m^3 in 2002, with seasonal concentrations highest in August 2000 (90.3 per 1000 m^3) and April 2002 (151.2 per 1000 m^3). Relatively few larvae were found at depths greater than 100 meters, while highest larval concentrations generally occurred from depths of 0 to 50 meters. However, slender sole concentrations were highest from depths of 50 to 100 meters. Larval diversity and concentration were higher offshore (46-84 kilometers) than in coastal areas (9-28 kilometers). Highest concentrations were normally found at an intermediate station 65 kilometers off the coast. Species designated as either coastal or offshore species by previous studies were predominantly found in

their respective shelf regions. With the exception of slender sole, larval concentrations were positively correlated with temperature and negatively correlated with salinity.

Auth and others (2007) examined the diel vertical distribution, concentration, and community structure of ichthyoplankton from a single station 69 kilometers off Haceta Head on the central Oregon Coast. The depth-stratified samples yielded 1,571 fish larvae from 20 taxa, representing 11 families, and 128 fish eggs from 11 taxa within 9 families. Dominant larval taxa were rockfishes, northern lampfish, and blue lanternfish. The dominant egg taxa were Pacific sardine (*Sardinops sagax*), medusafish (*Icichthys lockingtoni*), Pacific viperfish (*Chauliodus macouni*), and Pacific jack mackerel (*Trachurus symmetricus*). Larval concentrations were found to generally increase from the surface to 50 meters and then decreased with depth. Larval concentrations were higher at night than during the day, and there was evidence of larval diel vertical migration. Depth stratum was found to be the most important factor explaining variability in larval and egg concentrations. The authors noted that the species composition, assemblages, and dominant taxa were similar to those found in other studies conducted during the summer off the central Oregon Coast (Richardson 1973; Richardson and Pearcy 1977; Brodeur et al., 1985; Auth and Brodeur 2006). This similarity provides evidence to support the hypothesis of Auth and Brodeur (2006) that past ichthyoplankton sampling along the Newport hydrographic line during the summer is representative of ichthyoplankton assemblages elsewhere along the Oregon Coast.

Benthic Invertebrates

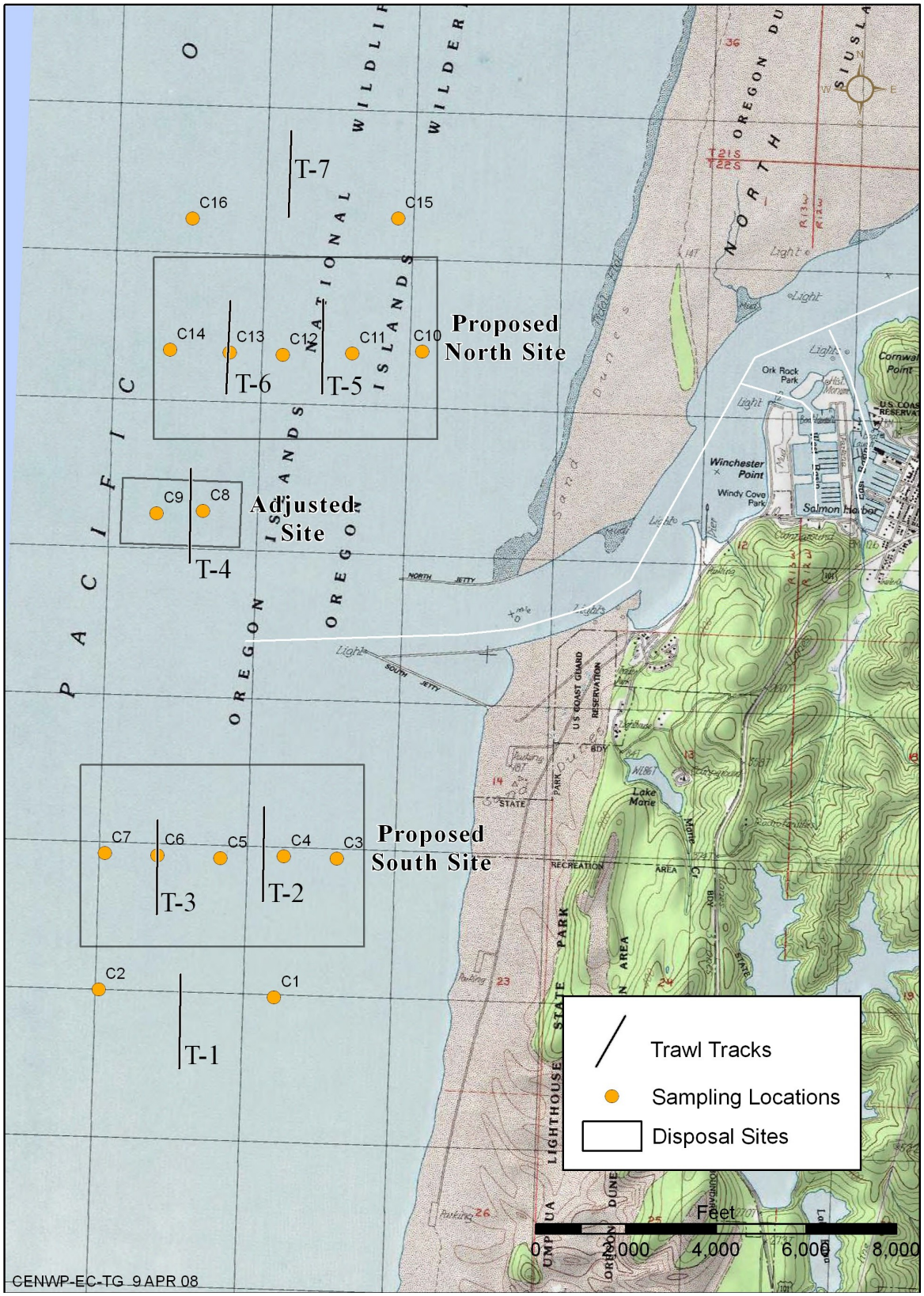
Benthic invertebrates play an important role in secondary productivity in nearshore marine systems. They are not only a direct source of food for many demersal fishes but play an active part in the shredding and breakdown of organic material and in sediment reworking.

In September 1984 and January 1985, field sampling was conducted in water depths from 60 to 120 feet to collect data on benthic invertebrates in and adjacent to the Interim and Section 103 ODMD Sites (Emmett et al., 1987; Corps 1989). The species composition of the area was found to be typical of nearshore high-energy environments. The benthic infaunal community was dominated by gammarid amphipods and polychaete worms.

Field surveys were conducted in July and September 2007 by Marine Taxonomic Services (2008) to provide current information about the benthic invertebrate species present in the vicinity of the proposed North and South ODMD Sites. The benthic infaunal study (Task I) used a 0.096 m^2 modified Gray-O'Hara box core to take 5 biological cores and 1 geological core at each of the 16 sampling sites (Figure A-1).

The benthic invertebrate fauna in the vicinity of the proposed ODMD Sites was found to be typical of the nearshore, high-energy environment found along the Oregon Coast. The density distribution data represents juvenile recruitment of most species from spring spawning. This recruitment includes both opportunistic short-lived species (*Spiophanes bombyx*) and (*Owenia fusiformis*) and longer-lived species (*Siliqua* sp. juv. and *Dendraster excentricus*). The crustaceans show some population spikes throughout the sampling; however, the same species were not always the driving factors. Gammarid amphipods were often present but also present were *Diastylopsis dawsoni (Cumacea)* and barnacles (Cirripedia) which showed up on hard features such as snail shells and the occasional rock. The echinoderms were driven by *Dendraster* sp. juveniles and *Dendraster excentricus* and the other miscellaneous groups were largely populated by Nemertinea and juvenile holothuroids.

Figure A-1. Umpqua River 2007 Sampling Locations



The benthos in the area is typical of the communities found near other ocean disposal sites along the Oregon Coast, such as Coos Bay areas E and F, Rogue River, Siuslaw River, and Chetco River (Hancock et al., 1981; Corps 1985, 1988a, 1988b, 1989, 1990, 1999). This benthic community, largely dominated by very mobile organisms, provides an important link in the marine food web. These organisms serve as a direct food source for other benthic organisms and demersal fishes. They also play an active role in the breakdown of organic debris and the tube-building species help stabilize the marine sediments. Many of the benthic species in this study are able to survive in this dynamic environment being either very mobile or being able to react both to natural or man made perturbations. They readily recolonize in disturbed areas.

Tables A-1 and A-2 show a summary comparing diversity (H' and SDV), evenness (J') and species richness (SR) at the stations sampled in July and September 2007, respectively (also see Figures A-2 to A-5). The tables also include the number of organisms, the calculated number per meter squared (m^2), and the number of species. Table A-3 shows the relative densities of the major taxa at each station. Figure A-6 shows the density of benthic invertebrates at each station. Figures A-7 and A-8 show the density of benthic species for July 2007 and September 2007, respectively, overlayed on the proposed ocean disposal sites.

Table A-1. Densities and Diversity Indices, Benthic Invertebrates, July 2007

Station	# Organisms	# per m^2	# Species	H'	SDV	J'	SR
1	556	1,156.48	42	2.39	0.7993	0.6394	6.4866
2	1,837	3,820.96	79	3.21	0.9253	0.7346	10.3780
3	435	904.80	32	2.04	0.7820	0.5886	5.1026
4	2,101	4,370.08	50	1.28	0.4334	0.3272	6.4051
5	1,461	3,038.88	67	2.97	0.9146	0.7064	9.0574
6	3,074	6,393.92	93	2.86	0.8998	0.6310	11.4560
7	1,987	4,132.96	81	3.10	0.9275	0.7054	10.5341
8	1,076	2,238.08	53	2.67	0.8805	0.6725	7.4488
9	2,470	5,137.60	65	1.83	0.6105	0.4384	8.1926
10	825	1,716.00	45	2.79	0.8983	0.7329	6.5521
11	717	1,491.36	50	2.77	0.8632	0.7081	7.4524
12	824	1,713.92	52	3.23	0.9415	0.8175	7.5959
13	23,853	49,614.24	79	1.63	0.6731	0.3730	7.7384
14	9,491	19,741.28	92	2.24	0.8159	0.4954	9.9366
15	1,554	3,232.32	59	1.37	0.4632	0.3360	7.8927
16	9,994	20,787.52	84	2.61	0.8488	0.5891	9.0122

Key: Species diversity (H' and SDV), evenness (J') and species richness (SR).

Table A-2. Densities and Diversity Indices, Benthic Invertebrates, September 2007

Station	# Organisms	# per m^2	# Species	H'	SDV	J'	SR
1	397	825.76	25	2.50	0.5368	0.7767	4.0107
2	1,340	2,787.20	87	3.57	0.9493	0.7994	11.9437
3	560	1,164.80	37	1.96	0.7491	0.5428	5.6891
4	896	1,863.68	47	2.01	0.6724	0.5221	6.7668
5	1,547	3,217.76	71	2.49	0.8001	0.5841	9.5315
6	1,976	4,110.08	71	2.90	0.9076	0.6803	9.2241
7	1,688	3,511.04	78	3.14	0.9393	0.7207	10.3616
8	2,785	5,792.80	58	2.92	0.9124	0.7191	7.1861
9	5,977	12,432.16	49	2.10	0.7943	0.5396	5.5200
10	2,649	5,509.92	53	1.62	0.6086	0.4080	6.5974
11	1,153	2,398.24	24	2.81	0.8862	0.6920	8.0850
12	5,277	10,976.16	68	1.27	0.4256	0.3010	7.8170
13	12,115	25,199.20	76	2.29	0.8345	0.5288	7.9769
14	6,755	14,050.40	98	2.73	0.8881	0.5954	11.0002
15	1,258	2,616.64	48	2.40	0.8174	0.6200	6.5851
16	3,947	8,209.76	86	2.70	0.8759	0.6061	10.2648

Key: Species diversity (H' and SDV), evenness (J') and species richness (SR).

Table A-3. Relative Density of Major Benthic Invertebrate Taxa

POLYCHAETA July 2007			POLYCHAETA September 2007		
Sta.	# Of Org.	#/m^2	Sta.	# Of Org.	#/m^2
1	105	218.4	1	9	18.7
2	1,032	2,146.6	2	619	1,287.5
3	27	56.2	3	28	58.2
4	83	172.6	4	103	214.2
5	776	1,614.1	5	469	975.5
6	1,454	3,024.3	6	897	1,865.8
7	870	1,809.6	7	680	1,414.4
8	490	1,019.2	8	1,327	2,760.2
9	1,906	3,964.5	9	2,095	4,357.6
10	241	501.3	10	206	428.5
11	133	276.6	11	155	322.4
12	311	646.9	12	610	1,268.8
13	7,554	15,712.3	13	4,372	9,093.8
14	4,737	9,853.0	14	2,672	5,557.8
15	132	274.6	15	158	328.6
16	5,003	10,406.2	16	1,023	2,127.8

MOLLUSCA July 2007			MOLLUSCA September 2007		
Sta.	# Of Org.	#/m^2	Sta.	# Of Org.	#/m^2
1	34	70.7	1	5	10.4
2	197	409.8	2	153	318.2
3	13	27.1	3	34	70.7
4	48	99.8	4	128	266.2
5	270	561.6	5	728	1,514.2
6	892	1,855.4	6	594	1,235.5
7	418	869.4	7	500	1040
8	161	334.9	8	636	1,322.9
9	169	351.5	9	943	1,961.4
10	82	170.6	10	1,669	3,471.5
11	62	129.0	11	231	480.5
12	137	285.0	12	4,110	8,548.8
13	13,307	27,678.6	13	3,484	7,246.7
14	1,396	2,903.7	14	1,438	2,991.1
15	60	124.8	15	411	854.9
16	1,178	2,450.2	16	872	1,813.8

Table A-3 (continued). Relative Density of Major Benthic Invertebrate Taxa

CRUSTACEA July 2007			CRUSTACEA September 2007		
Sta.	# Of Org.	#/m^2	Sta.	# Of Org.	#/m^2
1	380	790.4	1	203	422.2
2	531	1,104.5	2	463	963
3	141	293.3	3	287	597
4	360	748.8	4	128	266.2
5	318	661.4	5	237	493
6	411	854.9	6	243	505.4
7	435	904.8	7	238	495
8	207	430.6	8	544	1,131.5
9	178	370.2	9	2,678	5,570.2
10	434	902.7	10	615	1,279.2
11	242	503.4	11	440	915.2
12	304	632.3	12	426	886.1
13	1,701	3,538.1	13	999	2,077.9
14	921	1,915.7	14	638	1,327
15	194	403.5	15	278	578.2
16	1,743	3,625.4	16	365	759.2

ECHINODERMATA July 2007			ECHINODERMATA September 2007		
Sta.	# Of Org.	#/m^2	Sta.	# Of Org.	#/m^2
1	10	20.8	1	180	374.4
2	2	4.2	2	16	33.3
3	253	526.2	3	207	430.6
4	1,573	3,271.8	4	504	1,048.3
5	22	45.8	5	12	25.0
6	258	536.6	6	157	326.6
7	217	451.4	7	220	457.6
8	171	355.7	8	81	168.5
9	131	272.5	9	88	183.0
10	45	93.6	10	151	314.1
11	238	495	11	290	603.2
12	7	14.6	12	15	31.2
13	850	1,768	13	1,535	3,192.8
14	1,617	3,363.4	14	1,111	2,310.9
15	1,136	2,362.9	15	372	773.8
16	1,216	2,529.3	16	1,201	2,498.1

Figure A-2. Diversity (H') of Benthic Invertebrates at ODMD Site Sampling Stations

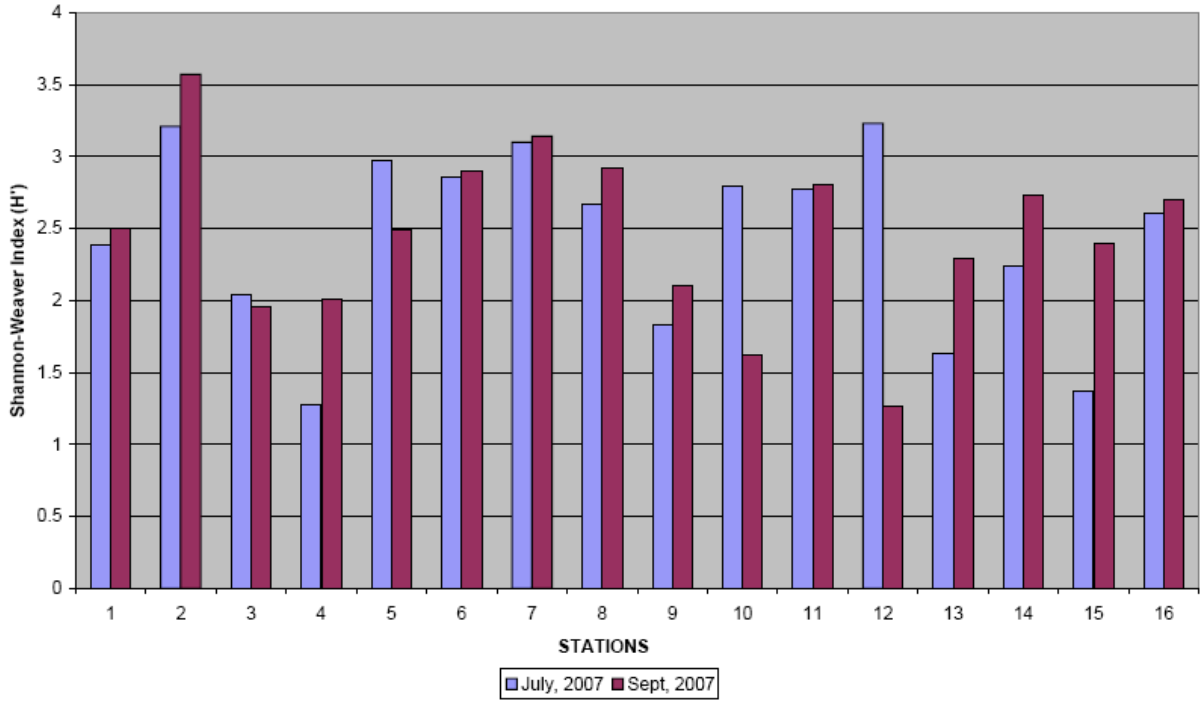


Figure A-3. Diversity (SDV) of Benthic Invertebrates at ODMD Site Sampling Stations

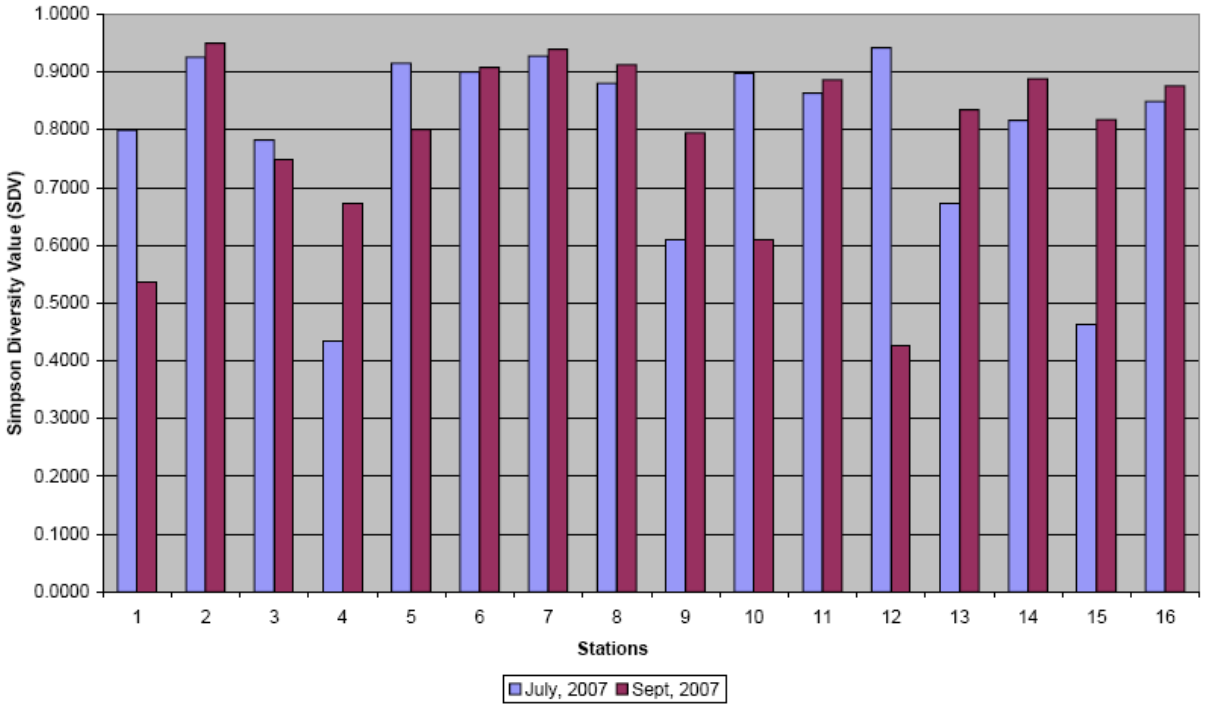


Figure A-4. Evenness (J') of Benthic Invertebrates at ODMD Site Sampling Stations

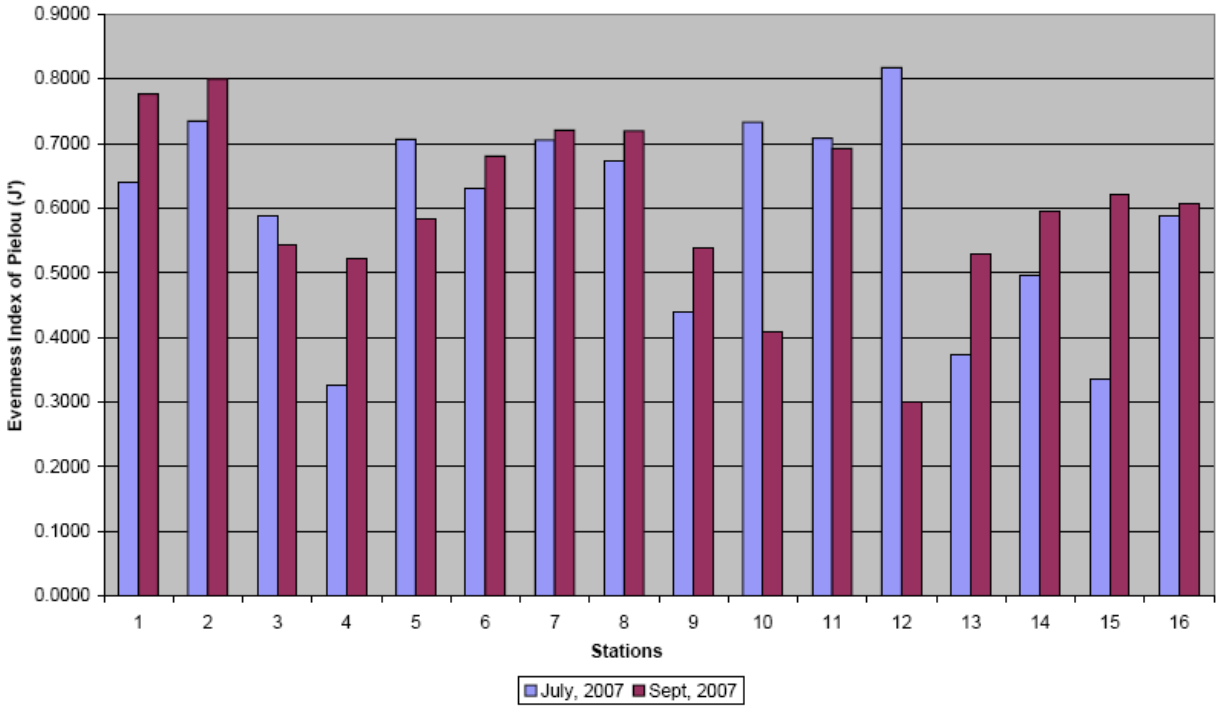


Figure A-5. Species Richness (SR) of Benthic Invertebrates at ODMD Site Sampling Stations

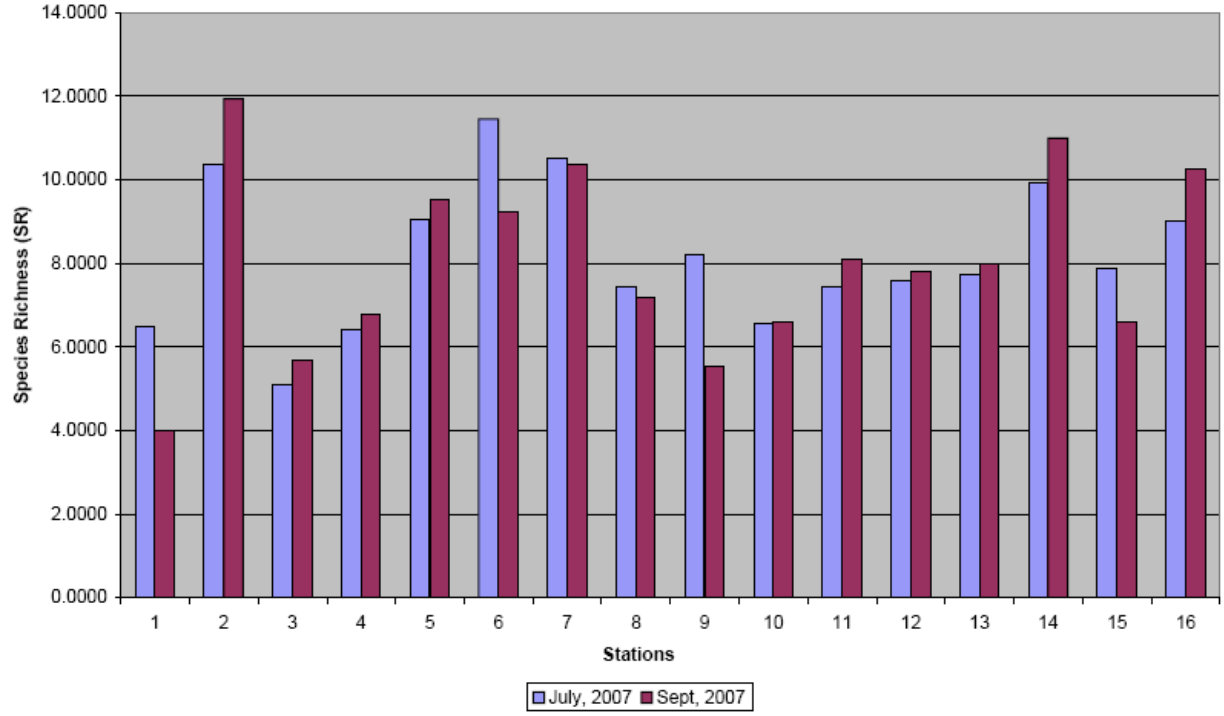


Figure A-6. Density of Benthic Invertebrates at ODMD Site Sampling Stations

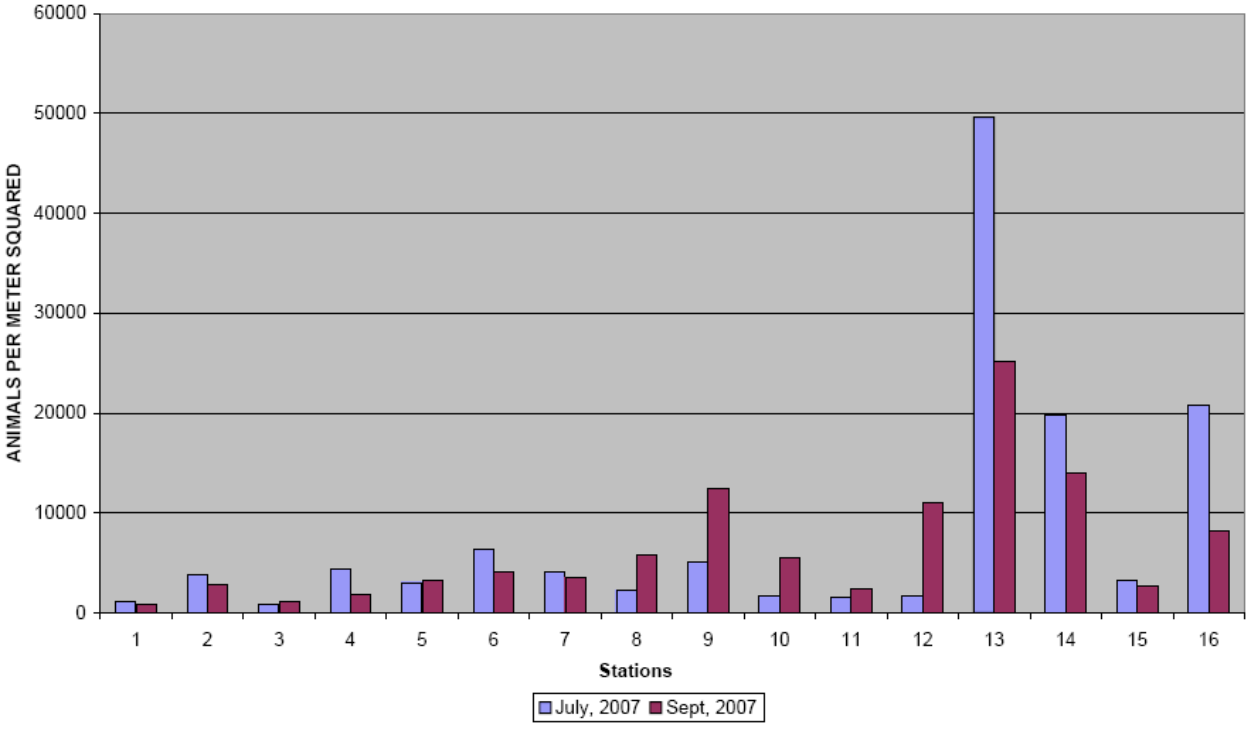


Figure A-7. Density of Benthic Species, July 2007

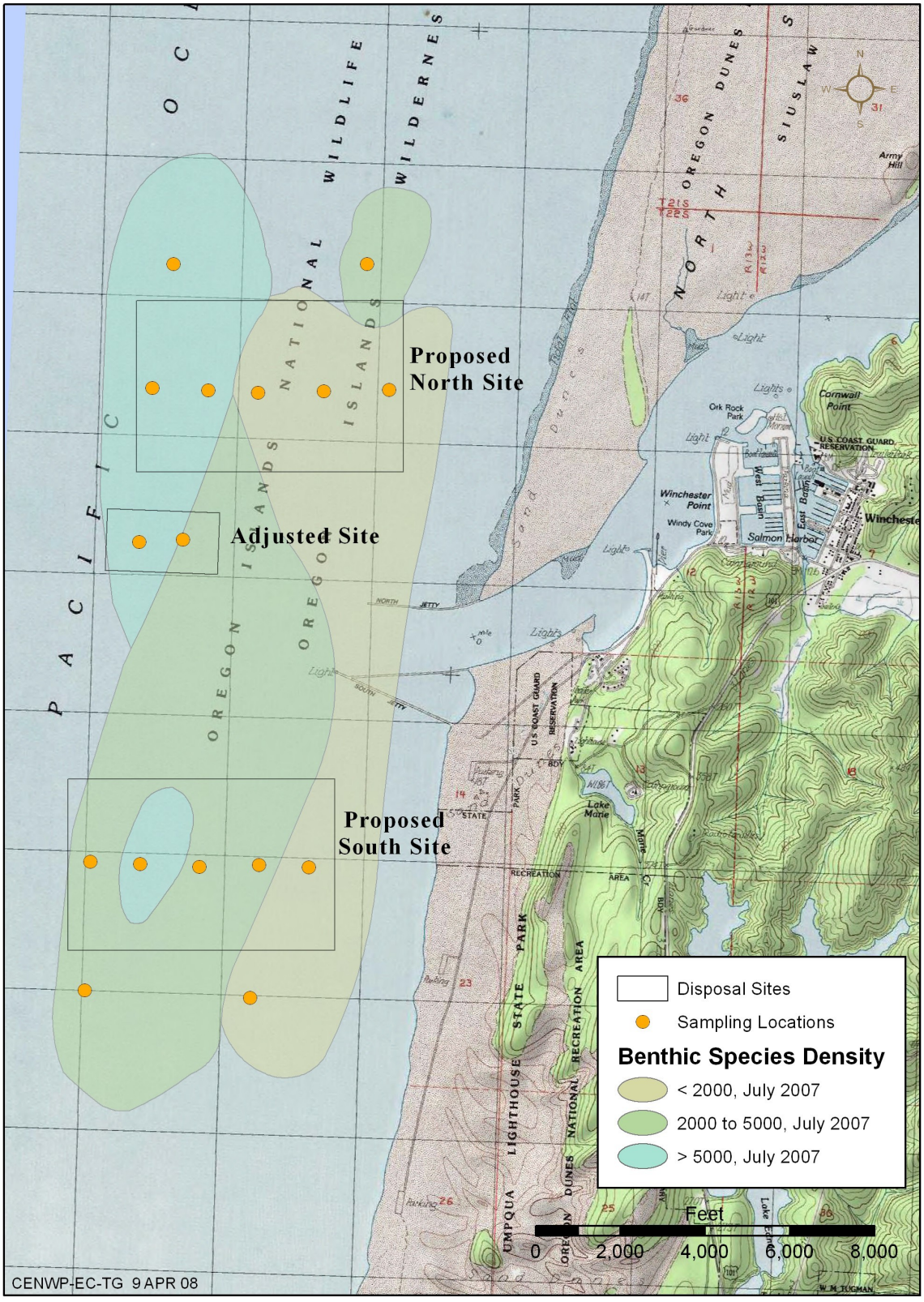
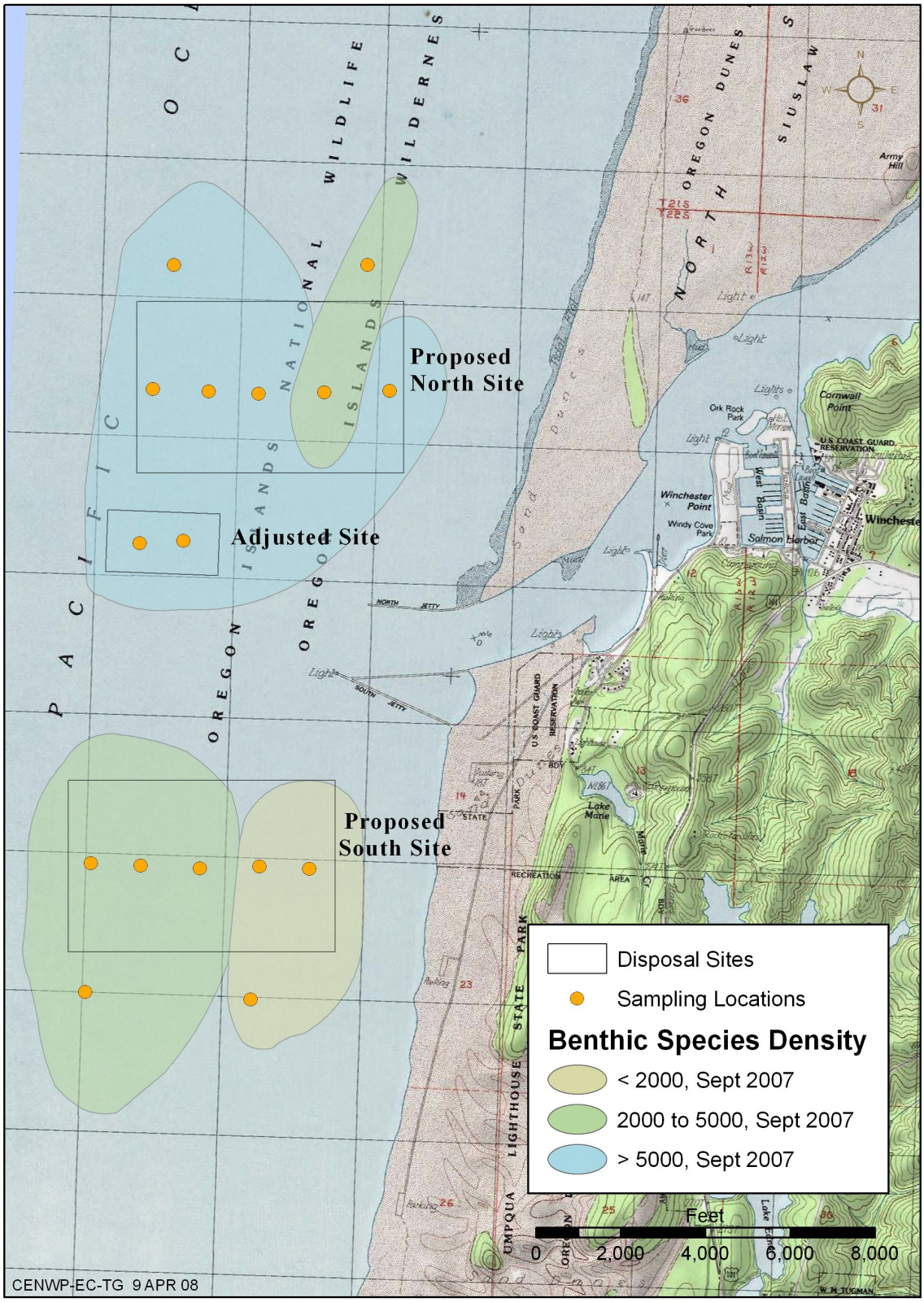


Figure A-8. Density of Benthic Species, September 2007



Fish and Epibenthic Species

Commercially and recreationally important epibenthic species in the Umpqua inshore coastal area are shellfish and Dungeness crabs. Razor clam beds are located north of the jetty along the beach. Recruitment to the inshore beaches comes from the subtidal spawning areas. Gaper, softshell, butter, and bentnose clams are present in large numbers near the mouth and upriver in the estuary proper. Dungeness crab adults occur on sandflat habitat along the entire Oregon Coast. They spawn in offshore areas and the juveniles rear in the estuary. The Oregon Department of Fish and Wildlife (ODFW) has not identified any squid spawning areas off the Umpqua estuary.

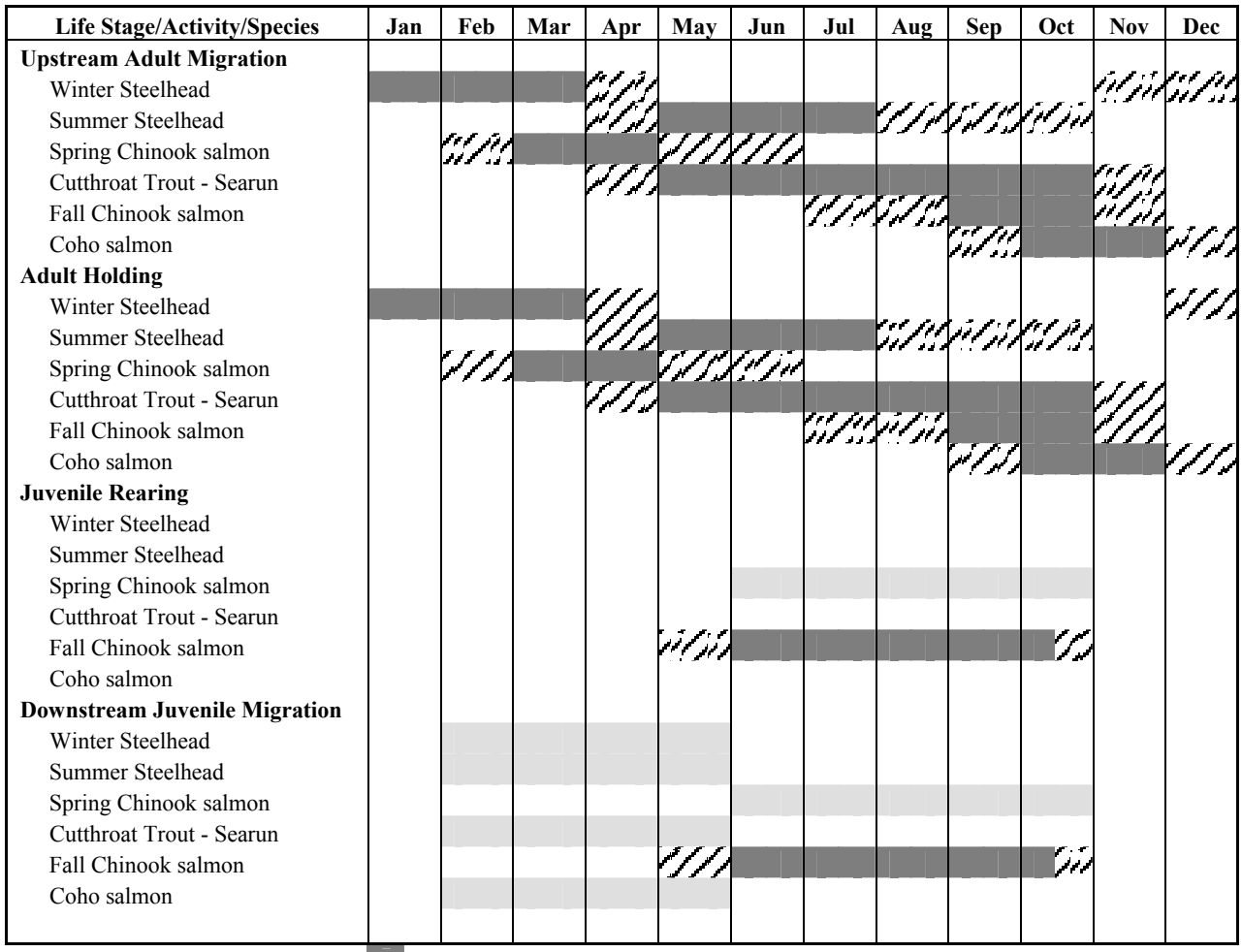
The nearshore area off the Umpqua River supports anadromous salmonids including coho salmon (*Oncorhynchus kisutch*), summer and winter steelhead (*Oncorhynchus mykiss*), spring and fall Chinook salmon (*Oncorhynchus tshawytscha*), and cutthroat trout (*Oncorhynchus clarki*), as well as a variety of other pelagic and demersal fish species. Table A-4 shows the periods of occurrence for the various life stages of anadromous salmonids in Umpqua Bay and the Smith Estuary.

In September 1984 and January 1985, field sampling was conducted in water depths from 60 to 120 feet to collect data on demersal fish in the area of the Interim and Section 103 ODMD Sites (Emmett et al., 1987; Corps 1989). The dominant demersal fish species collected included night smelt (*Spirinchus starksi*), Pacific tomcod (*Microgadus proximus*), sand lance (*Ammodytes hexapterus*), pricklebreast poacher (*Stellerina xyosterna*), speckled sanddab (*Citharichthys stigmaeus*), and sand sole (*Psettichthys melanostictus*). The mean density of fish and crabs collected was significantly greater in January than in September, with more individuals collected in the shallower depths (60 to 70 feet). Length frequency data indicated that most fish collected were juveniles. Dungeness crab (*Cancer magister*) collected in September 1984 were primarily young-of-year [<25 millimeters (mm)], while in January 1985 they were larger and probably adults (>100 mm).

Field surveys were conducted in July and September 2007 by Marine Taxonomic Services (2008) to provide data on fish and epibenthic species present in the area of the proposed ODMD Sites. The demersal fish and epibenthic study (Task II) used a 26-foot semi-balloon otter trawl with a 0.25-inch mesh liner. Ten minute (bottom time) trawls were taken along each of seven trawl tracks (see Figure A-1). Tables A-5 and A-6 show the species captured by otter trawl.

The trawl samples denote the nearshore area as a nursery ground with an abundant food source. Most of the species encountered in the trawl samples were benthic feeders that tend to utilize the shallower areas because of the abundant food and fewer predators. The majority of the fish and crabs captured in the trawls were juveniles and young-of-the-year. However, larger crabs and fish have the ability to avoid the trawl net.

Table A-4. Periods of Occurrence for Anadromous Salmonids, Umpqua Bay and Smith Estuary



Represents periods of peak use based on professional opinion.

Represents lesser level of use based on professional opinion.

Represents periods of presence, either with no level of use OR uniformly distributed level of use indicated.

Based on professional opinion, 90% of the life-stage activity occurs during the time frame shown as the peak use period.
Based on professional opinion, 10% of the life-stage activity occurs during the time frame shown as the lesser use period.

Source: ODFW (http://nrimp.dfw.state.or.us/nrimp/default.aspx?p=259)

Table A-5. Trawl Data, Fish and Epibenthic Species, July 2007

Species	Parameter	Trawl #1	Trawl #2	Trawl #3	Trawl #4	Trawl #5	Trawl #6	Trawl #7
Cancer magister - female Dungeness Crab	number of individuals	11	20	2	2	41	--	24
	size range (mm)	94-125	81-106	94-100	106-106	63-119	--	75-113
	average size (mm)	107	96	97	106	90	--	92
Cancer magister - male Dungeness Crab	number of individuals	6	13	4	10	40	2	21
	size range (mm)	75-134	81-150	88-113	75-119	63-163	150-163	81-136
	average size (mm)	99	109	98	99	96	156	97
Bothidae juvenile	number of individuals	8	5	4	4	4	--	--
	size range (mm)	30-49	29-44	35-54	31-46	31-44	--	--
	average size (mm)	40	38	44	39	36	--	--
Citharichthys sp. Sanddab	number of individuals	29	13	13	6	12	--	11
	size range (mm)	80-130	40-111	35-161	31-148	46-122	--	42-115
	average size (mm)	110	87	93	69	91	--	82
Dendraster sp. juv Sand Dollar	number of individuals	--	714	64	2	--	--	50
	size range (mm)	--	10-20	10-20	10-20	--	--	10-20
	average size (mm)	--	--	--	--	--	--	--
Eopsetta jordani Petrale Sole	number of individuals	5	1	--	--	12	--	--
	size range (mm)	55-152	177	--	--	55-225	--	--
	average size (mm)	108	177	--	--	157	--	--
Gadidae Cod	number of individuals	9	2	--	25	19	--	--
	size range (mm)	41-59	57-67	--	42-91	45-76	--	--
	average size (mm)	52	62	--	59	56	--	--
Isopsetta isolepis Butter Sole	number of individuals	5	3	7	6	7	2	13
	size range (mm)	105-210	97-230	42-164	104-120	105-178	43-131	36-235
	average size (mm)	148	161	111	113	138	87	140
Leptocottus armatus Staghorn Sculpin	number of individuals	1	2	2	2	10	2	4
	size range (mm)	94	107-127	115-135	109-128	105-165	120-154	99-128
	average size (mm)	94	117	125	119	122	137	109

Note: Size range and average size = standard length of fish and carapace width of crabs.

Table A-5 (continued). Trawl Data, Fish and Epibenthic Species, July 2007

Species	Parameter	Trawl #1	Trawl #2	Trawl #3	Trawl #4	Trawl #5	Trawl #6	Trawl #7
Liparis pulchellus Showy Snailfish	number of individuals	--	--	--	6	--	--	1
	size range (mm)	--	--	--	15-35	--	--	22
	average size (mm)	--	--	--	21	--	--	22
Ophiodon elongatus Lingcod	number of individuals	--	1	2	--	--	--	--
	size range (mm)	--	98	115-115	--	--	--	--
	average size (mm)	--	98	115	--	--	--	--
Osmeridae Smelts	number of individuals	87	6	--	1	--	--	--
	size range (mm)	37-61	51-60	--	81	--	--	--
	average size (mm)	56	56	--	81	--	--	--
Pallasina barbata Tubenose Poacher	number of individuals	--	--	--	--	3	--	--
	size range (mm)	--	--	--	--	69-88	--	--
	average size (mm)	--	--	--	--	82	--	--
Parophrys vetulus English Sole	number of individuals	141	37	3	23	44	--	31
	size range (mm)	28-145	28-166	63-89	31-385	30-186	--	27-85
	average size (mm)	41	43	78	80	59	--	42
Pleurenectidae juvenile Flounders	number of individuals	12	9	1	--	11	--	7
	size range (mm)	20-29	26-42	41	--	19-35	--	21-29
	average size (mm)	25	31	41	--	26	--	25
Psettichthys mjelanostictus Sand Sole	number of individuals	14	1	--	--	--	--	--
	size range (mm)	40-330	372	--	--	--	--	--
	average size (mm)	156	372	--	--	--	--	--
Raja binoculata Big Skate	number of individuals	--	--	1	1	--	--	1
	size range (mm)	--	--	241	260	--	--	460
	average size (mm)	--	--	241	260	--	--	460
Stellerina xyosterna Pricklebreast Poacher	number of individuals	1	--	--	--	37	--	38
	size range (mm)	32	--	--	--	27-125	--	25-108
	average size (mm)	32	--	--	--	46	--	41

Note: Size range and average size = standard length of fish and carapace width of crabs.

Table A-6. Trawl Data, Fish and Epibenthic Species, September 2007

Species	Parameter	Trawl #1	Trawl #2	Trawl #3	Trawl #4	Trawl #5	Trawl #6	Trawl #7
Cancer magister - female Dungeness Crab	number of individuals	3	1	--	2	10	2	14
	size range (mm)	81-131	86	--	94-106	81-113	86-100	63-106
	average size (mm)	108	86	--	96	96	94	93
Cancer magister - male Dungeness Crab	number of individuals	2	1	1	--	1	2	2
	size range (mm)	88-94	106	100	--	106	75-86	81-94
	average size (mm)	91	106	100	--	106	81	88
Cancer productus – male Rock Crab	number of individuals	--	--	--	1	--	--	--
	size range (mm)	--	--	--	56	--	--	--
	average size (mm)	--	--	--	56	--	--	--
Citharichthys sp. Sanddab	number of individuals	16	45	5	4	4	5	6
	size range (mm)	25-130	28-131	30-128	40-100	40-68	28-60	50-120
	average size (mm)	87	82	81	83	53	58	86
Cottidae Sculpins	number of individuals	--	--	--	1	--	--	--
	size range (mm)	--	--	--	104	--	--	--
	average size (mm)	--	--	--	104	--	--	--
Engraulis mordax Northern Anchovy	number of individuals	28	4	--	--	--	--	--
	size range (mm)	38-56	41-50	--	--	--	--	--
	average size (mm)	45	46	--	--	--	--	--
Eopsetta jordani Petrale Sole	number of individuals	3	1	--	--	--	--	--
	size range (mm)	112-138	128	--	--	--	--	--
	average size (mm)	126	128	--	--	--	--	--
Gadidae Cod	number of individuals	4	2	--	--	4	--	18
	size range (mm)	55-80	40-49	--	--	53-120	--	82-50
	average size (mm)	66	45	--	--	78	--	69
Isopsetta isolepis Butter Sole	number of individuals	1	4	--	1	7	2	7
	size range (mm)	120	115-235	--	195	86-220	150-178	120-194
	average size (mm)	120	173	--	195	169	164	156

Note: Size range and average size = standard length of fish and carapace width of crabs.

Table A-6 (continued). Trawl Data, Fish and Epibenthic Species, September 2007

Species	Parameter	Trawl #1	Trawl #2	Trawl #3	Trawl #4	Trawl #5	Trawl #6	Trawl #7
Leptocottus armatus Staghorn Sculpin	number of individuals	4	4	--	--	1	--	1
	size range (mm)	110-135	110-170	--	--	100	--	102
	average size (mm)	123	135	--	--	100	--	102
Liparis pulchellus Showy Snailfish	number of individuals	--	--	--	1	1	--	--
	size range (mm)	--	--	--	19	16	--	--
	average size (mm)	--	--	--	19	16	--	--
Ophiodon elongatus Lingcod	number of individuals	1	--	--	--	--	--	--
	size range (mm)	148	--	--	--	--	--	--
	average size (mm)	148	--	--	--	--	--	--
Osmeridae Smelts	number of individuals	40	3	--	--	73	14	196
	size range (mm)	42-111	54-100	--	--	45-82	48-66	35-107
	average size (mm)	65	83	--	--	57	56	57
Parophrys vetulus English Sole	number of individuals	24	57	9	8	29	20	8
	size range (mm)	38-65	35-185	42-55	47-78	35-98	42-80	55-105
	average size (mm)	47	50	49	63	56	56	75
Pleurenectidae juvenile Flounders	number of individuals	--	3	--	--	--	2	--
	size range (mm)	--	30-60	--	--	--	45-52	--
	average size (mm)	--	49	--	--	--	--	--
Psettichthys mjelanostictus Sand Sole	number of individuals	5	11	--	--	1	1	1
	size range (mm)	147-180	105-225	--	--	242	400	320
	average size (mm)	166	161	--	--	242	400	320
Raja binoculata Big Skate	number of individuals	1	--	--	--	--	--	1
	size range (mm)	265	--	--	--	--	--	270
	average size (mm)	265	--	--	--	--	--	270
Stellerina xyosterna Pricklebreast Poacher	number of individuals	3	4	--	1	8	1	8
	size range (mm)	40-134	48-134	--	68	22-90	35	15-151
	average size (mm)	85	81	--	68	44	35	71

Note: Size range and average size = standard length of fish and carapace width of crabs.

Threatened and Endangered Fish Species

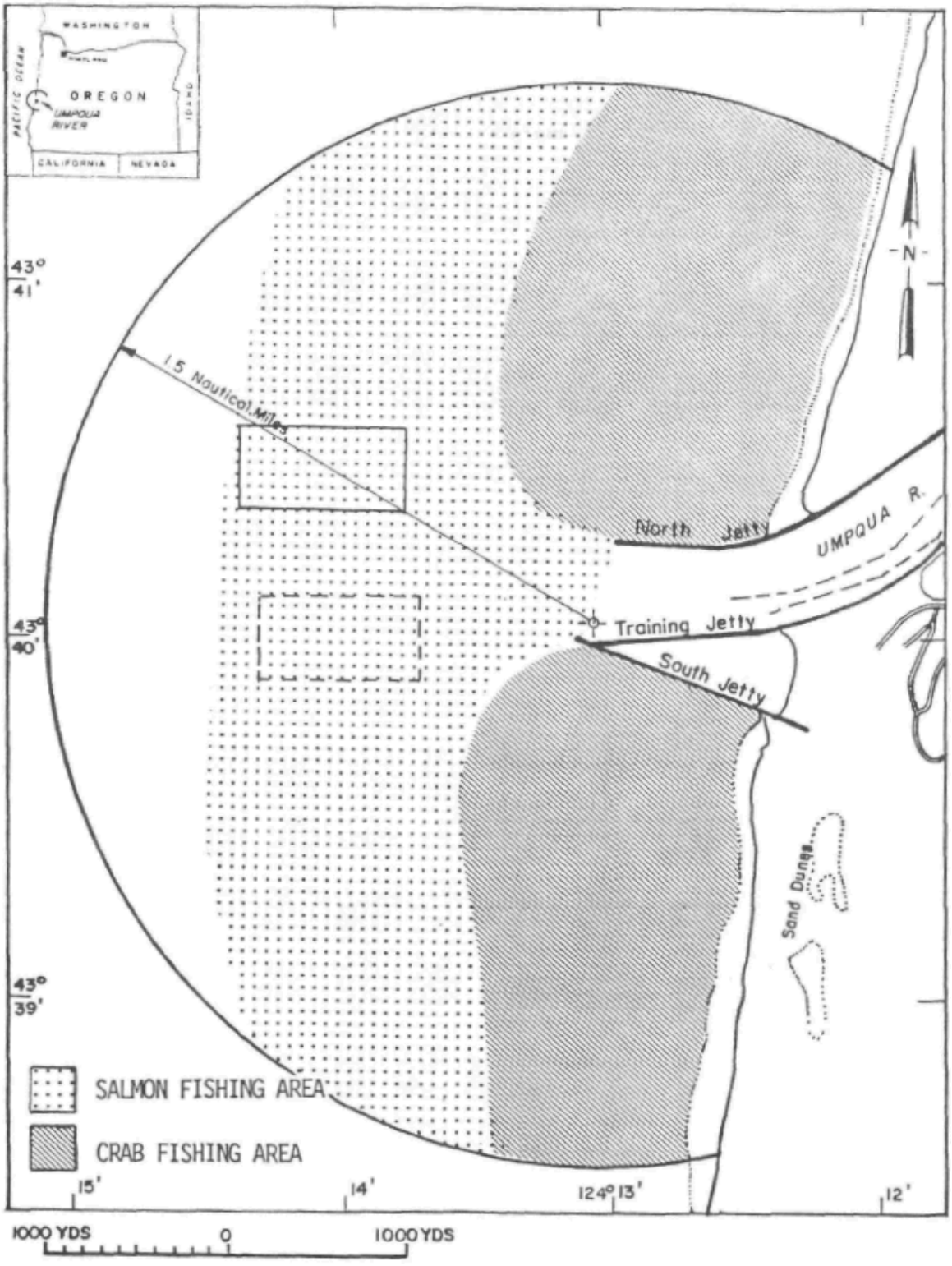
The NMFS announced listing of Oregon Coast coho salmon as a threatened species on February 4, 2008 (see 73 *Federal Register* 7816). The listing includes all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco, including the Cow Creek (ODFW stock # 37) coho hatchery program. Critical habitat also was designated. The Umpqua River and estuary were designated as critical habitat but the ocean area off the Umpqua River was not. Coho are present in the vicinity of the proposed Umpqua River ODMD Sites as both adults and juveniles. Adults hold in the offshore area prior to entering the estuary to migrate up river to spawn. Juveniles rear in the nearshore ocean area after migrating downstream and transitioning to saltwater. Upstream migration of adult coho salmon ranges from August through November. Juvenile outmigration extends from April through June and peaks in May.

The Southern Distinct Population Segment (DPS) of green sturgeon (*Acipenser medirostris*) was listed as threatened on April 7, 2006 (71 *Federal Register* 17757). No critical habitat has been designated. Green sturgeon that spawn to the north primarily in the Klamath and Rogue rivers constitute the Northern DPS, which is not federally listed. These two DPSs were established because they were found to be genetically distinct. Southern DPS green sturgeon may occur in the proposed ODMD SITES areas offshore of the Umpqua River as they migrate to northern estuaries during summer and early fall.

Commercial and Recreational Fisheries

The community of Winchester Bay is located on the central Oregon Coast at the mouth of the Umpqua River about 4 miles south of the City of Reedsport. The major commercial fishing areas in the vicinity of the proposed Umpqua River ODMD Sites are shown in Figure A-9. Based on data from the National Marine Fisheries Service (NMFS 2006) for commercial fishing, in 2000 there were 57 vessels that delivered landings to Winchester Bay (there were no landings in Reedsport). Landings in Winchester Bay were in the following West Coast fisheries (data shown represents landings in metric tons/value of said landings/number of vessels landing/NA = not available): coastal pelagic (NA/NA/1), crab (250.8/$1,170,610/23), groundfish (33.6/$129,193/20), highly migratory species (44.4/$105.495/10), salmon (44.1/$159,668/33), shellfish (NA/NA/3), shrimp (0.1/$711/4), and other species (30.8/$196,940/12). There are two processors located in Winchester Bay. Winchester Bay residents owned 17 vessels in 2000 that participated in West Coast fisheries, 7 of which participated in the federal groundfish fishery. Reedsport residents owned 19 vessels in 2000 that participated in West Coast fisheries, including 9 vessels that participated in the federal groundfish fishery.

Figure A-9. Commercial Fishing Areas in the Vicinity of the Proposed Umpqua River ODMD Sites



Recreational fishing occurs in the same areas as the commercial fishery but generally closer to shore. Based on data from the NMFS (2006), Winchester Bay had at least one outfitter guide business in 2003. Five licensed charter vessel businesses were located in the community in the same year. There was one licensing vendor. In 2003, Reedsport had at least four registered outfitter guide businesses and four licensed charter vessel businesses. Reedsport had three sport fishing license vendors. In 2000, the number of licenses sold by active agents was 2,059 at a value of $34,525. For Winchester Bay, the 2000 recreational salmonid catch in the Ocean Boat Fishery was 4,432 Chinook salmon and 2,882 coho salmon. The recreational non-salmonid catch was 2,147 fish. The top species landed included yellowtail rockfish (*Sebastes flavidus*), lingcod, canary rockfish (*S. pinniger*), yelloweye rockfish (*S. ruberrimus*), greenstriped rockfish (*S. elongatus*), and quillback rockfish (*S. maliger*).

Wildlife

Three species of seals and sea lions inhabit the lower Umpqua River and coastal area. Steller sea lions (*Eumetopias jubatus*), a federally threatened species, and harbor seals (*Pusa vitulina*) are year-long residents, while California sea lions (*Zalophus californianus*) are present most of the year. Steller sea lions forage at river mouths and nearshore areas along the Oregon Coast. Harbor seals breed in the estuary and on nearshore rocks. The Umpqua River nearshore area and shoreline provides important habitat for shorebirds, waterfowl, herons, bald eagles (*Haliaeetus leucocephalus*), hawks, and many other species of birds. Pelagic birds (e.g., murres, auklets, cormorants) likely use the area for foraging.

Federally listed avian species that may be present in the Umpqua River offshore area include the marbled murrelet (*Brachyramphus marmoratus*, threatened), brown pelican (*Pelecanus occidentalis*, endangered), short-tailed albatross (*Phoebastria albatrus*, endangered). Marbled murrelets are observed in small flocks or as individuals in the ocean throughout the year. Brown pelicans are seasonally abundant (June to September) along the Oregon Coast and in the lower reaches of various estuaries, including the Umpqua River. On February 20, 2008, the U.S. Fish and Wildlife Service proposed to remove the brown pelican from the federal list of endangered and threatened wildlife due to recovery (73 *Federal Register* 9407). The short-tailed albatross may forage in open ocean areas off the Oregon Coast.

There are many whale species and sea turtles in Oregon's offshore coastal area that are listed under the Endangered Species Act. The blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), humpback whale (*Megaptera novaeangliae*), and southern resident killer whale (*Orcinus orca*) are all federally endangered species and occur as migrants off the Oregon Coast in waters typically farther from shore than within the proposed Umpqua River ODMD Sites.

Blue whales occur off the Oregon Coast in May and June, as well as from August through October. Blue whales typically occur offshore as individuals or in small groups and winter well south of Oregon. Fin whales also winter far south of Oregon and range off the coast during summer. Sei whales also winter south of Oregon and probably occur in southward migration off the Oregon Coast in late summer and early fall. Sperm whales occur as migrants and some may summer off the Oregon Coast; they forage in waters much deeper than those in the nearshore area. Humpback whales primarily occur off the Oregon Coast from April to October with peak numbers from June through August. Humpback whales are particularly concentrated in Oregon along the southern edge of Heceta Bank and are found primarily on the continental shelf and slope. The range of the southern resident killer whale during the spring, summer, and fall includes the inland

waterways of Puget Sound, Strait of Juan de Fuca, and Southern Georgia Strait. Their occurrence in the coastal waters off Oregon has been documented. Little is known about the winter movements and range.

The loggerhead sea turtle (*Caretta caretta*, threatened), green sea turtle (*Chelonia mydas*, threatened), leatherback sea turtle (*Dermochelys coriacea*, endangered), and olive ridley sea turtle (*Lepidochelys olivacea*, threatened) are all federally listed species and have been recorded from strandings along the Oregon and Washington coasts. The occurrence of sea turtles off the Oregon Coast is associated with the appearance of albacore. Albacore occurrence is strongly associated with the warm waters of the Japanese current. Because these warm waters generally occur 30 to 60+ miles offshore from the Oregon Coast, these sea turtle species do not typically occur in the nearshore area.

Marine Reserves

The State of Oregon has initiated efforts to establish a network of marine reserves as part of an overall strategy to manage its marine waters and submerged lands. The overall purpose would be to protect, sustain, or restore the nearshore marine ecosystem, its habitats, and species. A marine reserve is an area within Oregon's state territorial sea or adjacent intertidal area that is protected from all extractive activities including the removal or disturbance of living and non-living marine resources. Marine reserves are intended to provide lasting protection. In a November 2007 news release to the Oregon Fishing Industry, Governor Ted Kulongoski stated that he was asking the Federal Energy Regulation Commission to limit the number of reserve sites to less than 10 sites. The governor further stated that these reserve sites be large enough to provide for scientifically testing the ecological benefits they produce, but small enough to avoid economic or social impacts such as loss of significant fishing opportunities. Dredging and disposal are identified as disturbances and would be banned from areas designated as marine reserves. At this time, no marine reserves have been designated as the state is still developing the marine reserve selection process. Ocean dredged material disposal sites will need to avoid any marine reserve areas.

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