

Appendix D: Benthic Habitat Types

Six assemblage types were identified in California bays and estuaries by Ranasinghe *et al.* (2008). The assemblage types correspond to physical habitat differences, which result in benthic species composition differences that can be used to verify habitat type membership.

The six habitat types were:

- Southern California Marine Bays (Habitat C)
- Polyhaline San Francisco Bay (Habitat D)
- Shallow Wetlands and Coastal Bays (Habitat E)
- Very Coarse Saline Sediments (Habitat F)
- Mesohaline San Francisco Bay (Habitat G)
- Oligohaline and limnetic waters (Habitat H).

The habitat type is determined by physical habitat characteristics and can be verified by species composition. The physical habitat criteria for inclusion in these habitats are presented in Table D1. The criteria vary slightly in different latitudinal segments, reflecting differences in exposure to freshwater inputs due to climatic differences. Within San Francisco Bay, freshwater and sediment grain size influences were integrated by geography.

Table D1. Criteria for determining habitat type

Latitudinal Segment	Criteria and Habitat
San Francisco Bay Latitude (37.4° to 38.25°N)	<p>Fines \leq 2.5%: Habitat F Otherwise Inside San Francisco Bay:</p> <ul style="list-style-type: none"> ▪ Red Rock Location: Habitat F ▪ Shallow wetland samples: Habitat E ▪ Otherwise <ul style="list-style-type: none"> • Dumbarton Bridge to Richmond-San Rafael Bridge: Habitat D • N of Richmond-San Rafael Bridge or S of Dumbarton Bridge: Habitat G <p>Outside San Francisco Bay: Habitat E</p>
Central California (Latitude 34.5° to 37.4°N)	<p>Salinity < 7.5 psu: Habitat H Otherwise Fines \leq 2.5%: Habitat F Otherwise: Habitat E</p>
Southern California (Latitude < 34.5°)	<p>Salinity < 10 psu : Habitat H Otherwise Fines \leq 2.5%: Habitat F Otherwise Salinity 10-27 psu: Habitat E Salinity > 27 psu: Habitat C</p>
Northern California and Oregon (38.25° to 47.0°)	<p>Salinity < 5 psu: Habitat H Otherwise Fines \leq 2.5%: Habitat F Otherwise: Habitat E</p>
Puget Sound Latitude (> 47.0°N)	<p>Salinity < 5 psu: Habitat H Otherwise Fines \leq 2.5%: Habitat F Otherwise</p> <ul style="list-style-type: none"> ▪ Coastal Bays (Longitude > 123.8°W): Habitat E ▪ Fines < 20: Habitat B ▪ Fines \geq 41%: Habitat A ▪ Fines \geq 20-<41% <ul style="list-style-type: none"> • <i>Depth</i> < 75m: <i>Habitat B</i> • <i>Depth</i> \geq 75m: Habitat A

Table D2. Species characteristic of west coast bay and estuary habitats. Presented are exclusivity values for abundant (mean abundance > 100 m⁻²) taxa with fidelity > 50% or exclusivity > 80% in each assemblage. Taxonomic nomenclature for provisional taxa (e.g., *Cossura* sp A) follows SCAMIT Edition 4 (Southern California Association of Marine Invertebrate Taxonomists 2001). Fidelity was calculated as the frequency of occurrence of a taxon in assemblage samples, expressed as a percentage. Exclusivity was the abundance of a taxon in assemblage samples, expressed as a percentage of its total abundance in all samples.

Taxon	Higher Taxon	Assemblage							
		A	B	C	D	E	F	G	H
<i>Euphilomedes product</i>	Arthropoda : Ostracoda	92							
<i>Eudorella pacifica</i>	Arthropoda : Cumacea	91							
<i>Axinopsida serricata</i>	Mollusca : Bivalvia	89							
<i>Protomedeia articulata</i> Complex	Arthropoda : Amphipoda	89							
<i>Protomedeia grandimana</i>	Arthropoda : Amphipoda	82							
<i>Amphiodia</i> spp.	Echinodermata : Ophiuroidea	73							
<i>Prionospio (Minuspio) lighti</i>	Annelida : Polychaeta	68							
<i>Levinsenia gracilis</i>	Annelida : Polychaeta	47							
<i>Erichthonius rubricornis</i>	Arthropoda : Amphipoda		100						
<i>Phyllochaetopterus prolific</i>	Annelida : Polychaeta		100						
<i>Ampelisca agassizi</i>	Arthropoda : Amphipoda		100						
<i>Alvania compacta</i>	Mollusca : Gastropoda		94						
<i>Tellina modesta</i>	Mollusca : Bivalvia		89						
<i>Rocheffortia tumida</i>	Mollusca : Bivalvia		84						
<i>Aphelochaeta glandaria</i> Complex	Annelida : Polychaeta		81						
<i>Prionospio (Prionospio) dubia</i>	Annelida : Polychaeta		71						
<i>Nutricola lordi</i>	Mollusca : Bivalvia		63						
<i>Parvilucina tenuisculpta</i>	Mollusca : Bivalvia		55						
<i>Euphilomedes carcharodonta</i>	Arthropoda : Ostracoda		49	15					
<i>Mediomastus</i> spp.	Annelida : Polychaeta		9	42	16				
<i>Amphideutopus oculatus</i>	Arthropoda : Amphipoda			100					

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Taxon	Higher Taxon	Assemblage							
		A	B	C	D	E	F	G	H
<i>Caecum californicum</i>	Mollusca : Gastropoda			100					
<i>Cossura</i> sp A	Annelida : Polychaeta			100					
<i>Barleeia</i> spp.	Mollusca : Gastropoda			100					
<i>Synaptotanaeis notabilis</i>	Arthropoda : Tanaidacea			100					
<i>Scoletoma</i> sp C	Annelida : Polychaeta			100					
<i>Paracerceis sculpta</i>	Arthropoda : Isopoda			99					
<i>Prionospio (Prionospio) heterobranchia</i>	Annelida : Polychaeta			99					
<i>Fabricinuda limnicola</i>	Annelida : Polychaeta			99					
<i>Tagelus subteres</i>	Mollusca : Bivalvia			96					
<i>Pseudopolydora paucibranchiata</i>	Annelida : Polychaeta			89					
<i>Musculista senhousia</i>	Mollusca : Bivalvia			87					
<i>Theora lubrica</i>	Mollusca : Bivalvia			72					
<i>Pista percyi</i>	Annelida : Polychaeta			65					
<i>Leitoscoloplos pugettensis</i>	Annelida : Polychaeta			63					
<i>Euchone limnicola</i>	Annelida : Polychaeta			45					
<i>Exogone lourei</i>	Annelida : Polychaeta			28	56				
<i>Crepidula convexa</i>	Mollusca : Gastropoda				100				
<i>Sabaco elongates</i>	Annelida : Polychaeta				99				
<i>Ampelisca abdita</i>	Arthropoda : Amphipoda				94				
<i>Caprella</i> spp.	Arthropoda : Amphipoda				94				
<i>Sinocorophium heteroceratum</i>	Arthropoda : Amphipoda				94				
<i>Molgula</i> spp.	Chordata : Ascidiacea				92				
<i>Photis brevipes</i>	Arthropoda : Amphipoda				90				
<i>Sphaerosyllis californiensis</i>	Annelida : Polychaeta				87				
<i>Monocorophium acherusicum</i>	Arthropoda : Amphipoda				84				
<i>Leptochelia dubia</i>	Arthropoda : Tanaidacea				72				
Oligochaeta	Annelida : Oligochaeta				8	60			19
<i>Americorophium stimpsoni</i>	Arthropoda : Amphipoda					100			
<i>Pygospio elegans</i>	Annelida : Polychaeta					99			
<i>Eogammarus confervicolus</i> Complex	Arthropoda : Amphipoda					99			
<i>Americorophium spinicorne</i>	Arthropoda : Amphipoda					98			

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Taxon	Higher Taxon	Assemblage							
		A	B	C	D	E	F	G	H
<i>Hobsonia florida</i>	Annelida : Polychaeta					97			
<i>Gnorimosphaeroma insulare</i>	Arthropoda : Isopoda					97			
<i>Potamopyrgus antipodarum</i>	Mollusca : Gastropoda					93			
<i>Cryptomya californica</i>	Mollusca : Bivalvia					91			
<i>Pseudopolydora kemp</i>	Annelida : Polychaeta					91			
<i>Neanthes limnicola</i>	Annelida : Polychaeta					87			
<i>Gnorimosphaeroma oregonense</i>	Arthropoda : Isopoda					83			
<i>Macoma balthica</i>	Mollusca : Bivalvia					82			
<i>Capitella capitata</i> Complex	Annelida : Polychaeta					82			
<i>Eohaustorius estuaries</i>	Arthropoda : Amphipoda						90		
<i>Corbula amurensis</i>	Mollusca : Bivalvia							99	
<i>Marenzelleria viridis</i>	Annelida : Polychaeta							98	
Insecta	Arthropoda : Insecta								99
<i>Boccardiella ligerica</i>	Annelida : Polychaeta								93
<i>Corbicula fluminea</i>	Mollusca : Bivalvia								92
Chironomidae	Arthropoda : Chironomidae								86
<i>Americorophium salmonis</i>	Arthropoda : Amphipoda								29