

Initial Study: Exception to the California Ocean Plan for the Monterey Bay Aquarium Discharge into the Pacific Grove Area of Special Biological Significance.

Appendices

- Appendix A – 1979 Recon Survey SWRCB Species List
- Appendix B – PISCO Survey species lists
- Appendix C – ASBS Natural Water Quality Committee Summation of Findings
- Appendix D – Mussel Watch Bioaccumulation Data
- Appendix E – List of Species maintained at MBAQ

Appendix A – 1979 Recon Survey SWRCB

http://www.swrcb.ca.gov/publications_forms/publications/general/docs/asbs_pacificgrove.pdf

Species Name	ASBS	Habitat	Survey Date
Abietinaria sp.	19	rocky subtidal	01-Apr-1979
Abietinaria sp.	19	sandy intertidal	01-Apr-1979
Acanthina spirata	19	sandy intertidal	01-Apr-1979
Acanthodoris hudsoni	19	sandy intertidal	01-Apr-1979
Acarus erithacus	19	rocky subtidal	01-Apr-1979
Acarus erithacus	19	sandy intertidal	01-Apr-1979
Aegires albopunctatus	19	sandy intertidal	01-Apr-1979
Aglaophenia sp.	19	rocky subtidal	01-Apr-1979
Aglaophenia sp.	19	sandy intertidal	01-Apr-1979
Ahnfeltia plicata	19	rocky intertidal	01-Apr-1979
Alaria marginata	19	rocky intertidal	01-Apr-1979
Alpheus dentipes	19	sandy intertidal	01-Apr-1979
Alpheus sp.	19	rocky subtidal	01-Apr-1979
Alpheus sp.	19	sandy intertidal	01-Apr-1979
Amphiodia occidentalis	19	sandy intertidal	01-Apr-1979
Amphissa versicolor	19	sandy intertidal	01-Apr-1979
Amplisiphonia pacifica	19	rocky intertidal	01-Apr-1979
Analipus japonicus	19	rocky intertidal	01-Apr-1979
Ancula pacifica	19	sandy intertidal	01-Apr-1979
Anisocladella pacifica	19	rocky intertidal	01-Apr-1979
Anisodoris nobilis	19	rocky subtidal	01-Apr-1979
Anisodoris nobilis	19	sandy intertidal	01-Apr-1979
Anthopleura artemisia	19	rocky subtidal	01-Apr-1979
Anthopleura elegantissima	19	rocky subtidal	01-Apr-1979
Anthopleura elegantissima	19	sandy intertidal	01-Apr-1979
Anthopleura xanthogrammica	19	rocky subtidal	01-Apr-1979
Anthopleura xanthogrammica	19	sandy intertidal	01-Apr-1979
Antithamnion defectum	19	rocky intertidal	01-Apr-1979
Antithamnion kylinii	19	rocky intertidal	01-Apr-1979
Antithamnionella glandulifera	19	rocky intertidal	01-Apr-1979
Antithamnionella pacifica uncinata	19	rocky intertidal	01-Apr-1979
Aplidium arenatum	19	sandy intertidal	01-Apr-1979
Aplidium californicum	19	sandy intertidal	01-Apr-1979
Aplidium solidum	19	sandy intertidal	01-Apr-1979
Aplidium sp.	19	rocky subtidal	01-Apr-1979
Aplysia californica	19	rocky subtidal	01-Apr-1979
Aplysilla glacialis	19	sandy intertidal	01-Apr-1979
Aplysilla polyraphis	19	sandy intertidal	01-Apr-1979
Archidistoma diaphanes	19	sandy intertidal	01-Apr-1979
Archidistoma molle	19	rocky subtidal	01-Apr-1979
Archidistoma psammion	19	rocky intertidal	01-Apr-1979
Archidistoma psammion	19	rocky subtidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Archidistoma psammion	19	sandy intertidal	01-Apr-1979
Archidistoma ritteri	19	sandy intertidal	01-Apr-1979
Archidoris montereyensis	19	rocky subtidal	01-Apr-1979
Archidoris odhneri	19	rocky subtidal	01-Apr-1979
Arthrocardia silvae	19	rocky intertidal	01-Apr-1979
Arthropoma cecili	19	sandy intertidal	01-Apr-1979
Ascidia ceratodes	19	rocky subtidal	01-Apr-1979
Astraea gibberosa	19	rocky subtidal	01-Apr-1979
Astrangia lajollaensis	19	rocky intertidal	01-Apr-1979
Astrangia lajollaensis	19	rocky subtidal	01-Apr-1979
Astrangia lajollaensis	19	rocky subtidal	01-Apr-1979
Astropecten verrilli	19	rocky subtidal	01-Apr-1979
Astylinifer arndti	19	sandy intertidal	01-Apr-1979
Axocelita originalis	19	rocky subtidal	01-Apr-1979
Axocelita originalis	19	rocky subtidal	01-Apr-1979
Axocelita originalis	19	sandy intertidal	01-Apr-1979
Balaenoptera acutorostrata	19	pelagic	01-Apr-1979
Balanophyllia elegans	19	rocky subtidal	01-Apr-1979
Balanophyllia elegans	19	sandy intertidal	01-Apr-1979
Balanus glandula	19	sandy intertidal	01-Apr-1979
Balanus nubilis	19	rocky subtidal	01-Apr-1979
Balanus sp.	19	rocky intertidal	01-Apr-1979
Balanus sp.	19	rocky subtidal	01-Apr-1979
Balanus sp.	19	rocky subtidal	01-Apr-1979
Balgia fusco-purpurea	19	rocky intertidal	01-Apr-1979
Barentsia ramosa	19	sandy intertidal	01-Apr-1979
Berthella californica	19	sandy intertidal	01-Apr-1979
Bittium interfossa	19	sandy intertidal	01-Apr-1979
Bittium sp.	19	sandy intertidal	01-Apr-1979
Blidingia minima minima	19	rocky intertidal	01-Apr-1979
Blinksia californica	19	rocky intertidal	01-Apr-1979
Boltenia villosa	19	rocky subtidal	01-Apr-1979
Bossiella californica var. californica	19	rocky intertidal	01-Apr-1979
Bossiella californica var. californica	19	sandy subtidal	01-Apr-1979
Bossiella chiloensis	19	rocky intertidal	01-Apr-1979
Bossiella chiloensis	19	sandy subtidal	01-Apr-1979
Bossiella orbigniana dichotoma	19	rocky intertidal	01-Apr-1979
Bossiella plumosa	19	rocky intertidal	01-Apr-1979
Bossiella sp.	19	rocky intertidal	01-Apr-1979
Botryocladia pseudodichotoma	19	rocky intertidal	01-Apr-1979
Botryocladia pseudodichotoma	19	rocky subtidal	01-Apr-1979
Botryoglossum farlowianum	19	rocky intertidal	01-Apr-1979
Botryoglossum farlowianum	19	rocky subtidal	01-Apr-1979
Botryoglossum farlowianum	19	rocky subtidal	01-Apr-1979
Brachyramphus marmoratus	19	pelagic	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Bryopsis corticulans	19	rocky intertidal	01-Apr-1979
Bugula sp.	19	rocky subtidal	01-Apr-1979
Cadlina flavomaculata	19	sandy intertidal	01-Apr-1979
Cadlina luteomarginata	19	rocky subtidal	01-Apr-1979
Cadlina luteomarginata	19	sandy intertidal	01-Apr-1979
Cadlina modesta	19	sandy intertidal	01-Apr-1979
Calliarthron cheilosporioides	19	rocky intertidal	01-Apr-1979
Calliarthron tuberculosum	19	rocky intertidal	01-Apr-1979
Calliostoma annulatum	19	rocky subtidal	01-Apr-1979
Calliostoma canaliculatum	19	rocky subtidal	01-Apr-1979
Calliostoma ligatum	19	rocky subtidal	01-Apr-1979
Calliostoma supragranosum	19	rocky subtidal	01-Apr-1979
Callistochiton crassicosatus	19	sandy intertidal	01-Apr-1979
Callithamnion pikeanum	19	rocky intertidal	01-Apr-1979
Callithamnion rupicolum	19	rocky intertidal	01-Apr-1979
Callithamnion sp.	19	rocky intertidal	01-Apr-1979
Callophyllis crenulata	19	rocky intertidal	01-Apr-1979
Callophyllis firma	19	rocky intertidal	01-Apr-1979
Callophyllis firma	19	sandy subtidal	01-Apr-1979
Callophyllis flabellulata	19	rocky subtidal	01-Apr-1979
Callophyllis linearis	19	rocky intertidal	01-Apr-1979
Callophyllis pinnata	19	rocky intertidal	01-Apr-1979
Callophyllis pinnata	19	sandy subtidal	01-Apr-1979
Callophyllis sp.	19	rocky subtidal	01-Apr-1979
Callophyllis violacea	19	rocky intertidal	01-Apr-1979
Callophyllis violacea	19	rocky subtidal	01-Apr-1979
Calycella syringa	19	sandy intertidal	01-Apr-1979
Campanularia sp.	19	rocky subtidal	01-Apr-1979
Campanularia sp.	19	sandy intertidal	01-Apr-1979
Cancer antennarius	19	sandy intertidal	01-Apr-1979
Cancer anthonyi	19	sandy intertidal	01-Apr-1979
Caulibugula ciliata	19	sandy intertidal	01-Apr-1979
Cebidichthys violaceus	19	sandy intertidal	01-Apr-1979
Celleporaria brunnea	19	rocky subtidal	01-Apr-1979
Centroceras clavulatum	19	rocky intertidal	01-Apr-1979
Ceramium gardneri	19	rocky intertidal	01-Apr-1979
Ceramium pacificum	19	rocky intertidal	01-Apr-1979
Ceratostoma foliatum	19	rocky subtidal	01-Apr-1979
Ceratostoma foliatum	19	sandy intertidal	01-Apr-1979
Cerorhinca monocerata	19	pelagic	01-Apr-1979
Chaetomorpha linum	19	rocky intertidal	01-Apr-1979
Chaetopleura gemma	19	sandy intertidal	01-Apr-1979
Chama pellucida	19	sandy intertidal	01-Apr-1979
Chelidonura inermis	19	sandy intertidal	01-Apr-1979
Chondria decipiens	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
<i>Chthamalus fissus</i>	19	sandy intertidal	01-Apr-1979
<i>Citharichthys stigmaeus</i>	19	rocky subtidal	01-Apr-1979
<i>Cladophora columbiana</i>	19	rocky intertidal	01-Apr-1979
<i>Cladophora graminea</i>	19	rocky intertidal	01-Apr-1979
<i>Cladophora sakaii</i>	19	rocky intertidal	01-Apr-1979
<i>Cladophora stimpsonii</i>	19	rocky intertidal	01-Apr-1979
<i>Clathriopsamma pseudonaphya</i>	19	sandy intertidal	01-Apr-1979
<i>Clathromorphum parcum</i>	19	rocky intertidal	01-Apr-1979
<i>Clavelina huntsmani</i>	19	sandy intertidal	01-Apr-1979
<i>Clavularia</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Clinocottus analis</i>	19	sandy intertidal	01-Apr-1979
<i>Clinocottus recalvus</i>	19	sandy intertidal	01-Apr-1979
<i>Cliona celata</i>	19	rocky subtidal	01-Apr-1979
<i>Cliona celata californiana</i>	19	sandy intertidal	01-Apr-1979
<i>Cnemidocarpa finmarkiensis</i>	19	rocky subtidal	01-Apr-1979
<i>Codium fragile</i>	19	rocky intertidal	01-Apr-1979
<i>Codium setchellii</i>	19	rocky intertidal	01-Apr-1979
<i>Coeloseira compressa</i>	19	rocky intertidal	01-Apr-1979
<i>Coilodesme californica</i>	19	rocky intertidal	01-Apr-1979
<i>Coilodesme plana</i>	19	rocky intertidal	01-Apr-1979
<i>Collinsiella tuberculata</i>	19	rocky intertidal	01-Apr-1979
<i>Collisella digitalis</i>	19	sandy intertidal	01-Apr-1979
<i>Collisella limatula</i>	19	sandy intertidal	01-Apr-1979
<i>Collisella ochracea</i>	19	sandy intertidal	01-Apr-1979
<i>Collisella pelta</i>	19	sandy intertidal	01-Apr-1979
<i>Collisella scabra</i>	19	sandy intertidal	01-Apr-1979
<i>Colpomenia bullosa</i>	19	rocky intertidal	01-Apr-1979
<i>Colpomenia peregrina</i>	19	rocky intertidal	01-Apr-1979
<i>Compsomena intricatum</i>	19	rocky intertidal	01-Apr-1979
<i>Constantinea simplex</i>	19	rocky intertidal	01-Apr-1979
<i>Corallina officinalis</i> var. <i>chilensis</i>	19	rocky intertidal	01-Apr-1979
<i>Corallina vancouveriensis</i>	19	rocky intertidal	01-Apr-1979
<i>Corambe pacifica</i>	19	sandy intertidal	01-Apr-1979
<i>Coriophyllum expansum</i>	19	rocky intertidal	01-Apr-1979
<i>Corynactis californica</i>	19	rocky intertidal	01-Apr-1979
<i>Corynactis californica</i>	19	rocky intertidal	01-Apr-1979
<i>Corynactis californica</i>	19	rocky subtidal	01-Apr-1979
<i>Corynactis californica</i>	19	rocky subtidal	01-Apr-1979
<i>Corynactis californica</i>	19	rocky subtidal	01-Apr-1979
<i>Corynactis californica</i>	19	sandy intertidal	01-Apr-1979
<i>Coryphella trilineata</i>	19	rocky subtidal	01-Apr-1979
<i>Coryphella trilineata</i>	19	sandy intertidal	01-Apr-1979
<i>Costaria costata</i>	19	rocky intertidal	01-Apr-1979
<i>Costazia robertsonae</i>	19	rocky intertidal	01-Apr-1979
<i>Costazia robertsonae</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
<i>Costazia robertsonae</i>	19	rocky subtidal	01-Apr-1979
<i>Costazia robertsonae</i>	19	rocky subtidal	01-Apr-1979
<i>Crangon dentysis</i>	19	sandy intertidal	01-Apr-1979
<i>Crangon</i> sp.	19	sandy intertidal	01-Apr-1979
<i>Crisia</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Cryptochiton stelleri</i>	19	rocky subtidal	01-Apr-1979
<i>Cryptochiton stelleri</i>	19	rocky subtidal	01-Apr-1979
<i>Cryptolithodes sitchensis</i>	19	rocky subtidal	01-Apr-1979
<i>Cryptolithodes sitchensis</i>	19	sandy intertidal	01-Apr-1979
<i>Cryptonemia ovalifolia</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptopleura corallinara</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptopleura lobulifera</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptopleura violacea</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptosiphonia woodii</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptosula pallasiana</i>	19	rocky intertidal	01-Apr-1979
<i>Cryptosula pallasiana</i>	19	rocky subtidal	01-Apr-1979
<i>Cucumaria miniata</i>	19	rocky subtidal	01-Apr-1979
<i>Cucumaria piperata</i>	19	rocky subtidal	01-Apr-1979
<i>Cumagloia andersonii</i>	19	rocky intertidal	01-Apr-1979
<i>Cyanoplax dentiens</i>	19	sandy intertidal	01-Apr-1979
<i>Cyanoplax fackenthallae</i>	19	sandy intertidal	01-Apr-1979
<i>Cyanoplax hartwegii</i>	19	sandy intertidal	01-Apr-1979
<i>Cylindrocarpus rugosus</i>	19	rocky intertidal	01-Apr-1979
<i>Cystodytes lobatus</i>	19	rocky subtidal	01-Apr-1979
<i>Cystodytes lobatus</i>	19	sandy intertidal	01-Apr-1979
<i>Cystoseira osmundacea</i>	19	rocky intertidal	01-Apr-1979
<i>Cystoseira osmundacea</i>	19	rocky subtidal	01-Apr-1979
<i>Damalichthys vacca</i>	19	rocky subtidal	01-Apr-1979
<i>Delesseria decipiens</i>	19	rocky intertidal	01-Apr-1979
<i>Dendrochiton thamnoporus</i>	19	sandy intertidal	01-Apr-1979
<i>Dendronotus albus</i>	19	sandy intertidal	01-Apr-1979
<i>Dendronotus frondosus</i>	19	sandy intertidal	01-Apr-1979
<i>Dendronotus subramosus</i>	19	sandy intertidal	01-Apr-1979
<i>Derbesia marina</i>	19	rocky intertidal	01-Apr-1979
<i>Dermasterias imbricata</i>	19	rocky subtidal	01-Apr-1979
<i>Desmarestia latifrons</i>	19	rocky intertidal	01-Apr-1979
<i>Desmarestia ligulata</i>	19	rocky subtidal	01-Apr-1979
<i>Desmarestia ligulata</i>	19	rocky subtidal	01-Apr-1979
<i>Desmarestia ligulata</i> var. <i>ligulata</i>	19	rocky intertidal	01-Apr-1979
<i>Desmarestia tabacoides</i>	19	rocky intertidal	01-Apr-1979
<i>Desmarestia tabacoides</i>	19	sandy subtidal	01-Apr-1979
<i>Diadumene lighti</i>	19	sandy intertidal	01-Apr-1979
<i>Diaulula sandiegensis</i>	19	rocky subtidal	01-Apr-1979
<i>Diaulula sandiegensis</i>	19	sandy intertidal	01-Apr-1979
<i>Dictyoneuropsis reticulata</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Dictyoneuropsis reticulata	19	rocky subtidal	01-Apr-1979
Dictyoneurum californicum	19	rocky intertidal	01-Apr-1979
Dictyota binghamiae	19	rocky intertidal	01-Apr-1979
Dictyota binghamiae	19	sandy subtidal	01-Apr-1979
Didemnum carnulentum	19	rocky intertidal	01-Apr-1979
Didemnum carnulentum	19	rocky subtidal	01-Apr-1979
Didemnum carnulentum	19	sandy intertidal	01-Apr-1979
Dilsea californica	19	rocky intertidal	01-Apr-1979
Diodora aspera	19	rocky subtidal	01-Apr-1979
Diodora aspera	19	sandy intertidal	01-Apr-1979
Diomedea nigripes	19	pelagic	01-Apr-1979
Diopatra ornata	19	rocky intertidal	01-Apr-1979
Diopatra ornata	19	rocky subtidal	01-Apr-1979
Diplosoma macdonaldi	19	rocky subtidal	01-Apr-1979
Diplosoma macdonaldi	19	sandy intertidal	01-Apr-1979
Dirona albolineata	19	sandy intertidal	01-Apr-1979
Dirona picta	19	sandy intertidal	01-Apr-1979
Discodoris heathi	19	sandy intertidal	01-Apr-1979
Dodecaceria fewkesi	19	rocky intertidal	01-Apr-1979
Dodecaceria fewkesi	19	rocky subtidal	01-Apr-1979
Doriopsilla albopunctata	19	rocky subtidal	01-Apr-1979
Doriopsilla albopunctata	19	sandy intertidal	01-Apr-1979
Doto amyra	19	sandy intertidal	01-Apr-1979
Doto kya	19	sandy intertidal	01-Apr-1979
Dynamenella benedicti	19	sandy intertidal	01-Apr-1979
Dynamenella dilatata	19	sandy intertidal	01-Apr-1979
Dynamenella glabra	19	sandy intertidal	01-Apr-1979
Ectocarpus acutus acucus	19	rocky intertidal	01-Apr-1979
Ectocarpus corticulatus	19	rocky intertidal	01-Apr-1979
Ectocarpus parvus	19	rocky intertidal	01-Apr-1979
Egregia menziesii	19	rocky intertidal	01-Apr-1979
Eisenia arborea	19	rocky intertidal	01-Apr-1979
Embiotoca jacksoni	19	rocky subtidal	01-Apr-1979
Embiotoca lateralis	19	rocky subtidal	01-Apr-1979
Endocladia muricata	19	rocky intertidal	01-Apr-1979
Endophyton ramosum	19	rocky intertidal	01-Apr-1979
Enteromorpha flexuosa	19	rocky intertidal	01-Apr-1979
Enteromorpha prolifera	19	rocky intertidal	01-Apr-1979
Epiactis prolifera	19	rocky subtidal	01-Apr-1979
Epiactis prolifera	19	sandy intertidal	01-Apr-1979
Erato sp.	19	rocky subtidal	01-Apr-1979
Erato vitellina	19	sandy intertidal	01-Apr-1979
Erythrocladia irregularis	19	rocky intertidal	01-Apr-1979
Erythrocladia subintegra	19	rocky intertidal	01-Apr-1979
Erythrocytis saccata	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
<i>Erythrophyllum delesserioides</i>	19	rocky intertidal	01-Apr-1979
<i>Erythrophyllum delesserioides</i>	19	sandy subtidal	01-Apr-1979
<i>Erythrotrichia camea</i>	19	rocky intertidal	01-Apr-1979
<i>Erythrotrichia pulvinata</i>	19	rocky intertidal	01-Apr-1979
<i>Eschrichtius gibbosus</i>	19	pelagic	01-Apr-1979
<i>Eubranchus rusticus</i>	19	sandy intertidal	01-Apr-1979
<i>Eucopeia</i> spp.	19	rocky subtidal	01-Apr-1979
<i>Eucopeia</i> spp.	19	rocky subtidal	01-Apr-1979
<i>Eudendrium californicum</i>	19	sandy intertidal	01-Apr-1979
<i>Eudistylia polymorpha</i>	19	rocky subtidal	01-Apr-1979
<i>Euherdmania claviformis</i>	19	sandy intertidal	01-Apr-1979
<i>Eupentacta quinquesemita</i>	19	rocky subtidal	01-Apr-1979
<i>Eurylepta aurantica</i>	19	sandy intertidal	01-Apr-1979
<i>Eurystomella bilabiata</i>	19	rocky subtidal	01-Apr-1979
<i>Eurystomella bilabiata</i>	19	sandy intertidal	01-Apr-1979
<i>Farlowia conferta</i>	19	rocky intertidal	01-Apr-1979
<i>Farlowia mollis</i>	19	rocky intertidal	01-Apr-1979
<i>Feldmannia acuminata</i>	19	rocky intertidal	01-Apr-1979
<i>Feldmannia chitonicola</i>	19	rocky intertidal	01-Apr-1979
<i>Feldmannia cylindrica</i>	19	rocky intertidal	01-Apr-1979
<i>Feldmannia rhizoidea</i>	19	rocky intertidal	01-Apr-1979
<i>Filicrisia franciscana</i>	19	sandy intertidal	01-Apr-1979
<i>Fissurella volcano</i>	19	sandy intertidal	01-Apr-1979
<i>Flabellinopsis iodinea</i>	19	rocky subtidal	01-Apr-1979
<i>Flabellinopsis iodinea</i>	19	sandy intertidal	01-Apr-1979
<i>Flustrellidra corniculata</i>	19	rocky subtidal	01-Apr-1979
<i>Freemanian litoricola</i>	19	sandy intertidal	01-Apr-1979
<i>Fucus distichus</i>	19	rocky intertidal	01-Apr-1979
<i>Fulmarus glacialis</i>	19	pelagic	01-Apr-1979
<i>Garveia franciscana</i>	19	sandy intertidal	01-Apr-1979
<i>Gastroclonium coulteri</i>	19	rocky intertidal	01-Apr-1979
<i>Gelidium coulteri</i>	19	rocky intertidal	01-Apr-1979
<i>Gelidium purpurascens</i>	19	rocky intertidal	01-Apr-1979
<i>Gelidium pusillum</i>	19	rocky intertidal	01-Apr-1979
<i>Gelidium robustum</i>	19	rocky intertidal	01-Apr-1979
<i>Gelidium robustum</i>	19	rocky subtidal	01-Apr-1979
<i>Gibbonsia metzi</i>	19	sandy intertidal	01-Apr-1979
<i>Gibbonsia montereyensis</i>	19	sandy intertidal	01-Apr-1979
<i>Giffordia mitchelliae</i>	19	rocky intertidal	01-Apr-1979
<i>Giffordia saundersii</i>	19	rocky intertidal	01-Apr-1979
<i>Gigartina agardhii</i>	19	rocky intertidal	01-Apr-1979
<i>Gigartina canaliculata</i>	19	rocky intertidal	01-Apr-1979
<i>Gigartina corymbifera</i>	19	rocky intertidal	01-Apr-1979
<i>Gigartina corymbifera</i>	19	rocky subtidal	01-Apr-1979
<i>Gigartina exasperata</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Gigartina exasperata	19	rocky subtidal	01-Apr-1979
Gigartina exasperata	19	sandy subtidal	01-Apr-1979
Gigartina harveyana	19	rocky intertidal	01-Apr-1979
Gigartina harveyana	19	rocky subtidal	01-Apr-1979
Gigartina leptorhynchus	19	rocky intertidal	01-Apr-1979
Gigartina papillata	19	rocky intertidal	01-Apr-1979
Gigartina sp.	19	rocky intertidal	01-Apr-1979
Gigartina spinosa	19	rocky intertidal	01-Apr-1979
Gigartina volans	19	rocky intertidal	01-Apr-1979
Gloiosiphonia capillaris	19	rocky intertidal	01-Apr-1979
Gloiosiphonia verticillaris	19	rocky intertidal	01-Apr-1979
Golfingia hespera	19	sandy intertidal	01-Apr-1979
Golfingia margaritacea californiensis	19	sandy intertidal	01-Apr-1979
Golfingia procera	19	sandy intertidal	01-Apr-1979
Gomontia polyrhiza	19	rocky intertidal	01-Apr-1979
Gonimophyllum skottsbergii	19	rocky subtidal	01-Apr-1979
Gonimophyllum skottsbergii	19	rocky subtidal	01-Apr-1979
Goniotrichum alsidii	19	rocky intertidal	01-Apr-1979
Gonothyrea spp.	19	sandy intertidal	01-Apr-1979
Gracilaria robusta	19	rocky intertidal	01-Apr-1979
Gracilaria sjoestedii	19	rocky intertidal	01-Apr-1979
Grateloupia doryphora	19	rocky intertidal	01-Apr-1979
Grateloupia doryphora	19	rocky subtidal	01-Apr-1979
Grateloupia setchellii	19	rocky intertidal	01-Apr-1979
Gymnogongrus linearis	19	rocky intertidal	01-Apr-1979
Halecium sp.	19	sandy intertidal	01-Apr-1979
Haliclona permollis	19	sandy intertidal	01-Apr-1979
Haliotis rufescens	19	rocky subtidal	01-Apr-1979
Haliotis rufescens	19	sandy intertidal	01-Apr-1979
Haliotis walallensis	19	rocky subtidal	01-Apr-1979
Halosaccion glandiforme	19	rocky intertidal	01-Apr-1979
Halosydna brevisetosa	19	sandy intertidal	01-Apr-1979
Halymenia schizymenioides	19	rocky intertidal	01-Apr-1979
Hancockia californica	19	sandy intertidal	01-Apr-1979
Hapalogaster cavicauda	19	sandy intertidal	01-Apr-1979
Hapalospongidion gelatinosum	19	rocky intertidal	01-Apr-1979
Haplogloia andersonii	19	rocky intertidal	01-Apr-1979
Hecatonema primarium	19	rocky intertidal	01-Apr-1979
Hemigrapsus nudus	19	sandy intertidal	01-Apr-1979
Hemigrapsus oregonensis	19	sandy intertidal	01-Apr-1979
Henricia leviuscula	19	rocky subtidal	01-Apr-1979
Heptacarpus paludicola	19	sandy intertidal	01-Apr-1979
Hermisenda crassicornis	19	rocky subtidal	01-Apr-1979
Hermisenda crassicornis	19	sandy intertidal	01-Apr-1979
Herposiphonia plumula	19	rocky intertidal	01-Apr-1979

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<i>Herposiphonia verticillata</i>	19	rocky intertidal	01-Apr-1979
<i>Hesperophycus harveyanus</i>	19	rocky intertidal	01-Apr-1979
<i>Hexagrammos decagrammus</i>	19	rocky subtidal	01-Apr-1979
<i>Hildenbrandia dawsonii</i>	19	rocky intertidal	01-Apr-1979
<i>Hildenbrandia occidentalis</i>	19	rocky intertidal	01-Apr-1979
<i>Hildenbrandia prototypus</i>	19	rocky intertidal	01-Apr-1979
<i>Hinnites giganteus</i>	19	rocky subtidal	01-Apr-1979
<i>Hippodiplosia insculpta</i>	19	rocky intertidal	01-Apr-1979
<i>Hippodiplosia insculpta</i>	19	rocky subtidal	01-Apr-1979
<i>Hipponix</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Hippothoa hyalina</i>	19	rocky subtidal	01-Apr-1979
<i>Hopkinsia rosacea</i>	19	rocky subtidal	01-Apr-1979
<i>Hopkinsia rosacea</i>	19	sandy intertidal	01-Apr-1979
<i>Hydractinia milleri</i>	19	sandy intertidal	01-Apr-1979
<i>Hydrolithon decipiens</i>	19	rocky intertidal	01-Apr-1979
<i>Hymenamphiastra cyanocrypta</i>	19	rocky intertidal	01-Apr-1979
<i>Hymenamphiastra cyanocrypta</i>	19	rocky subtidal	01-Apr-1979
<i>Hymenamphiastra cyanocrypta</i>	19	sandy intertidal	01-Apr-1979
<i>Hymenena flabelligera</i>	19	rocky intertidal	01-Apr-1979
<i>Hymenena multiloba</i>	19	rocky intertidal	01-Apr-1979
<i>Hypsurus caryi</i>	19	rocky subtidal	01-Apr-1979
<i>Idotea wasnesenskii</i>	19	sandy intertidal	01-Apr-1979
<i>Iridaea cordata</i>	19	rocky intertidal	01-Apr-1979
<i>Iridaea cordata splendens</i>	19	rocky intertidal	01-Apr-1979
<i>Iridaea cordata splendens</i>	19	sandy subtidal	01-Apr-1979
<i>Iridaea flaccida</i>	19	rocky intertidal	01-Apr-1979
<i>Iridaea heterocarpa</i>	19	rocky intertidal	01-Apr-1979
<i>Iridaea lineare</i>	19	rocky intertidal	01-Apr-1979
<i>Ischnochiton regularis</i>	19	sandy intertidal	01-Apr-1979
<i>Janczewskia gardneri</i>	19	rocky intertidal	01-Apr-1979
<i>Katharina tunicata</i>	19	sandy intertidal	01-Apr-1979
<i>Lagenipora</i> sp.	19	rocky intertidal	01-Apr-1979
<i>Lagenipora</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Lagenorhynchus obliquidens</i>	19	pelagic	01-Apr-1979
<i>Laila cockerelli</i>	19	rocky subtidal	01-Apr-1979
<i>Laila cockerelli</i>	19	sandy intertidal	01-Apr-1979
<i>Lamellaria</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Laminaria dentigera</i>	19	rocky intertidal	01-Apr-1979
<i>Laminaria dentigera</i>	19	rocky subtidal	01-Apr-1979
<i>Laminaria ephemera</i>	19	rocky intertidal	01-Apr-1979
<i>Larus philadelphia</i>	19	pelagic	01-Apr-1979
<i>Laurencia blinksii</i>	19	rocky intertidal	01-Apr-1979
<i>Laurencia crispa</i>	19	rocky intertidal	01-Apr-1979
<i>Laurencia pacifica</i>	19	rocky intertidal	01-Apr-1979
<i>Laurencia spectabilis</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
<i>Laurencia spectabilis</i>	19	sandy subtidal	01-Apr-1979
<i>Laurencia spectabilis spectabilis</i>	19	rocky intertidal	01-Apr-1979
<i>Leathesia difformis</i>	19	rocky intertidal	01-Apr-1979
<i>Leathesia nana</i>	19	rocky intertidal	01-Apr-1979
<i>Lepidozonia mertensii</i>	19	sandy intertidal	01-Apr-1979
<i>Leptasterias hexactis</i>	19	sandy intertidal	01-Apr-1979
<i>Leptasterias</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Leptosynapta</i> sp.	19	sandy intertidal	01-Apr-1979
<i>Lessoniopsis littoralis</i>	19	rocky intertidal	01-Apr-1979
<i>Leucandra heathi</i>	19	rocky subtidal	01-Apr-1979
<i>Leucilla nuttingi</i>	19	rocky subtidal	01-Apr-1979
<i>Leucilla nuttingi</i>	19	sandy intertidal	01-Apr-1979
<i>Leucosolenia eleanor</i>	19	rocky subtidal	01-Apr-1979
<i>Leucosolenia eleanor</i>	19	sandy intertidal	01-Apr-1979
<i>Ligia occidentalis</i>	19	sandy intertidal	01-Apr-1979
<i>Lissodendoryx firma</i>	19	sandy intertidal	01-Apr-1979
<i>Lithophyllum imitans</i>	19	rocky intertidal	01-Apr-1979
<i>Lithophyllum lichenare</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium aculciferum</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium aculciferum</i>	19	sandy subtidal	01-Apr-1979
<i>Lithothamnium californicum</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium crassiusculum</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium imitans</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium imitans</i>	19	sandy subtidal	01-Apr-1979
<i>Lithothamnium pacificum</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium phymatodeum</i>	19	rocky intertidal	01-Apr-1979
<i>Lithothamnium phymatodeum</i>	19	sandy subtidal	01-Apr-1979
<i>Lithothrix aspergillum</i>	19	rocky intertidal	01-Apr-1979
<i>Littorina planaxis</i>	19	sandy intertidal	01-Apr-1979
<i>Littorina scutulata</i>	19	sandy intertidal	01-Apr-1979
<i>Lobipes lobatus</i>	19	pelagic	01-Apr-1979
<i>Lophopanopeus bellus</i>	19	sandy intertidal	01-Apr-1979
<i>Lophopanopeus heathii</i>	19	sandy intertidal	01-Apr-1979
<i>Lottia gigantea</i>	19	sandy intertidal	01-Apr-1979
<i>Loxorhynchus crispatus</i>	19	rocky subtidal	01-Apr-1979
<i>Loxorhynchus crispatus</i>	19	sandy intertidal	01-Apr-1979
<i>Loxorhynchus grandis</i>	19	rocky subtidal	01-Apr-1979
<i>Lumbrineris</i> sp.	19	sandy intertidal	01-Apr-1979
<i>Lunda cirrhata</i>	19	pelagic	01-Apr-1979
<i>Macrocystis pyrifera</i>	19	rocky intertidal	01-Apr-1979
<i>Macrocystis pyrifera</i>	19	rocky subtidal	01-Apr-1979
<i>Megaptera novaeangliae</i>	19	pelagic	01-Apr-1979
<i>Megatebennus bimaculatus</i>	19	rocky subtidal	01-Apr-1979
<i>Megatebennus bimaculatus</i>	19	sandy intertidal	01-Apr-1979
<i>Megathura crenulata</i>	19	rocky subtidal	01-Apr-1979

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Melobesia marginata	19	rocky intertidal	01-Apr-1979
Melobesia mediocris	19	rocky intertidal	01-Apr-1979
Melobesia mediocris	19	sandy subtidal	01-Apr-1979
Membranella nitens	19	rocky intertidal	01-Apr-1979
Membranipora fusca	19	sandy intertidal	01-Apr-1979
Membranipora membranacea	19	sandy intertidal	01-Apr-1979
Membranipora sp.	19	rocky subtidal	01-Apr-1979
Membranoptera weeksiae	19	rocky intertidal	01-Apr-1979
Mesophyllum conchatum	19	rocky intertidal	01-Apr-1979
Mesophyllum conchatum	19	sandy subtidal	01-Apr-1979
Mesophyllum lamellatum	19	rocky intertidal	01-Apr-1979
Metandrocarpa taylori	19	rocky subtidal	01-Apr-1979
Metandrocarpa taylori	19	sandy intertidal	01-Apr-1979
Metridium exilis	19	sandy intertidal	01-Apr-1979
Metridium senile	19	rocky subtidal	01-Apr-1979
Microcladia borealis	19	rocky intertidal	01-Apr-1979
Microcladia californica	19	rocky intertidal	01-Apr-1979
Microcladia coulteri	19	rocky intertidal	01-Apr-1979
Microcladia coulteri	19	rocky subtidal	01-Apr-1979
Microcladia sp.	19	rocky intertidal	01-Apr-1979
Microporella ciliata	19	sandy intertidal	01-Apr-1979
Microporella cribrosa	19	sandy intertidal	01-Apr-1979
Mimulus foliatus	19	rocky subtidal	01-Apr-1979
Mimulus foliatus	19	sandy intertidal	01-Apr-1979
Mirounga angustirostris	19	pelagic	01-Apr-1979
Mitra idea	19	rocky subtidal	01-Apr-1979
Mola mola	19	rocky subtidal	01-Apr-1979
Monostroma zostericola	19	rocky intertidal	01-Apr-1979
Mopalia ciliata	19	sandy intertidal	01-Apr-1979
Mopalia hindsii	19	sandy intertidal	01-Apr-1979
Mopalia lignosa	19	sandy intertidal	01-Apr-1979
Mopalia muscosa	19	sandy intertidal	01-Apr-1979
Myrionema balticum	19	rocky intertidal	01-Apr-1979
Myrionema coronnae	19	rocky intertidal	01-Apr-1979
Myxicola infundibulum	19	rocky subtidal	01-Apr-1979
Myxicola infundibulum	19	rocky subtidal	01-Apr-1979
Nemalion helminthoides	19	rocky intertidal	01-Apr-1979
Neoagardhiella baileyi	19	rocky intertidal	01-Apr-1979
Neopolyporolithon reclinatum	19	rocky intertidal	01-Apr-1979
Neoptilota densa	19	rocky intertidal	01-Apr-1979
Neoptilota densa	19	rocky subtidal	01-Apr-1979
Neoptilota hypnoides	19	rocky intertidal	01-Apr-1979
Nereis sp.	19	sandy intertidal	01-Apr-1979
Nereocystis luetkeana	19	rocky intertidal	01-Apr-1979
Nienburgia andersoniana	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Nitophyllum hollenbergii	19	rocky intertidal	01-Apr-1979
Notoacmea inessa	19	sandy intertidal	01-Apr-1979
Notoacmea scutum	19	sandy intertidal	01-Apr-1979
Notoplana acticola	19	sandy intertidal	01-Apr-1979
Nucella emarginata	19	sandy intertidal	01-Apr-1979
Nuttalina californica	19	sandy intertidal	01-Apr-1979
Oceanodroma furcata	19	pelagic	01-Apr-1979
Oceanodroma homochroa	19	pelagic	01-Apr-1979
Oceanodroma leucorhoa	19	pelagic	01-Apr-1979
Ocenebra sp.	19	rocky subtidal	01-Apr-1979
Oligocottus rubellio	19	sandy intertidal	01-Apr-1979
Oligocottus snyderi	19	sandy intertidal	01-Apr-1979
Ophiopholis aculeata	19	sandy intertidal	01-Apr-1979
Ophioplocus esmarki	19	rocky subtidal	01-Apr-1979
Ophioplocus esmarki	19	sandy intertidal	01-Apr-1979
Ophiopteris papillosa	19	rocky subtidal	01-Apr-1979
Ophiopteris papillosa	19	sandy intertidal	01-Apr-1979
Ophiothrix spiculata	19	rocky subtidal	01-Apr-1979
Ophiothrix spiculata	19	sandy intertidal	01-Apr-1979
Ophlitaspongia pennata	19	sandy intertidal	01-Apr-1979
Orcinus orca	19	pelagic	01-Apr-1979
Orthasterias koehleri	19	rocky subtidal	01-Apr-1979
Oxyjulis californica	19	rocky subtidal	01-Apr-1979
Ozophora latifolia	19	rocky intertidal	01-Apr-1979
Pachycerianthus sp.	19	rocky subtidal	01-Apr-1979
Pachycheles rudis	19	sandy intertidal	01-Apr-1979
Pachycheles sp.	19	rocky subtidal	01-Apr-1979
Pachygrapsus crassipes	19	sandy intertidal	01-Apr-1979
Pagurus granosimanus	19	sandy intertidal	01-Apr-1979
Pagurus hemphilli	19	sandy intertidal	01-Apr-1979
Pagurus hirsutiusculus	19	sandy intertidal	01-Apr-1979
Pagurus samuelis	19	sandy intertidal	01-Apr-1979
Pagurus sp.	19	rocky subtidal	01-Apr-1979
Pandalus gurneyi	19	rocky subtidal	01-Apr-1979
Paracyathus stearnsi	19	rocky subtidal	01-Apr-1979
Patiria miniata	19	rocky subtidal	01-Apr-1979
Pelvetia fastigiata	19	rocky intertidal	01-Apr-1979
Pelvetiopsis limitata	19	rocky intertidal	01-Apr-1979
Percusaria dawsonii	19	rocky intertidal	01-Apr-1979
Perophora annectens	19	rocky subtidal	01-Apr-1979
Perophora annectens	19	sandy intertidal	01-Apr-1979
Petalocochus montereyensis	19	rocky intertidal	01-Apr-1979
Petalocochus montereyensis	19	rocky subtidal	01-Apr-1979
Petalonia fascia	19	rocky intertidal	01-Apr-1979
Petrocelis franciscana	19	rocky intertidal	01-Apr-1979

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<i>Petrolisthes cinctipes</i>	19	sandy intertidal	01-Apr-1979
<i>Peyssonellia hairii</i>	19	rocky intertidal	01-Apr-1979
<i>Peyssonellia meridionalis</i>	19	rocky intertidal	01-Apr-1979
<i>Phalaropus fulicarius</i>	19	pelagic	01-Apr-1979
<i>Phidiana pugnax</i>	19	rocky subtidal	01-Apr-1979
<i>Phidolopora pacifica</i>	19	rocky subtidal	01-Apr-1979
<i>Phocoena phocoena</i>	19	pelagic	01-Apr-1979
<i>Phragmatopoma californica</i>	19	rocky intertidal	01-Apr-1979
<i>Phragmatopoma californica</i>	19	rocky subtidal	01-Apr-1979
<i>Phycodrys profunda</i>	19	rocky intertidal	01-Apr-1979
<i>Phyllolithodes papillosus</i>	19	rocky subtidal	01-Apr-1979
<i>Phyllospadix scouleri</i>	19	rocky intertidal	01-Apr-1979
<i>Pikea californica</i>	19	rocky intertidal	01-Apr-1979
<i>Pinnixa occidentalis</i>	19	sandy intertidal	01-Apr-1979
<i>Pisaster brevispinus</i>	19	rocky subtidal	01-Apr-1979
<i>Pisaster giganteus</i>	19	rocky subtidal	01-Apr-1979
<i>Pisaster ochraceus</i>	19	rocky subtidal	01-Apr-1979
<i>Pisaster ochraceus</i>	19	sandy intertidal	01-Apr-1979
<i>Placiphorella velata</i>	19	sandy intertidal	01-Apr-1979
<i>Platythamnion pectinatum</i>	19	rocky intertidal	01-Apr-1979
<i>Platythamnion villosum</i>	19	rocky intertidal	01-Apr-1979
<i>Pleonosporium squarrosus</i>	19	rocky intertidal	01-Apr-1979
<i>Pleonosporium vancouverianum</i>	19	rocky intertidal	01-Apr-1979
<i>Plocamia igzo</i>	19	sandy intertidal	01-Apr-1979
<i>Plocamia karykina</i>	19	sandy intertidal	01-Apr-1979
<i>Plocamium cartilagineum</i>	19	rocky intertidal	01-Apr-1979
<i>Plocamium cartilagineum</i>	19	rocky subtidal	01-Apr-1979
<i>Plocamium violaceum</i>	19	rocky intertidal	01-Apr-1979
<i>Plumularia</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Plumularia</i> sp.	19	sandy intertidal	01-Apr-1979
<i>Pogonophorella californica</i>	19	rocky intertidal	01-Apr-1979
<i>Polycera atra</i>	19	sandy intertidal	01-Apr-1979
<i>Polymastia pachymastia</i>	19	rocky subtidal	01-Apr-1979
<i>Polyneura latissima</i>	19	rocky intertidal	01-Apr-1979
<i>Polyneura latissima</i>	19	sandy subtidal	01-Apr-1979
<i>Polysiphonia hendryi gardneri</i>	19	rocky intertidal	01-Apr-1979
<i>Polysiphonia pacifica determinata</i>	19	rocky intertidal	01-Apr-1979
<i>Polysiphonia pacifica pacifica</i>	19	rocky intertidal	01-Apr-1979
<i>Polysiphonia paniculata</i>	19	rocky intertidal	01-Apr-1979
<i>Polysiphonia scopulorum villum</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra lanceolata</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra nereocystis</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra perforata</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra pulchra</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra schizophylla</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
<i>Porphyra smithii</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyra</i> sp.	19	rocky intertidal	01-Apr-1979
<i>Porphyra thuretii</i>	19	rocky intertidal	01-Apr-1979
<i>Porphyrella gardneri</i>	19	rocky intertidal	01-Apr-1979
<i>Postelsia palmaeformis</i>	19	rocky intertidal	01-Apr-1979
<i>Prasiola meridionalis</i>	19	rocky intertidal	01-Apr-1979
<i>Prionitis australis</i>	19	rocky intertidal	01-Apr-1979
<i>Prionitis australis</i>	19	rocky subtidal	01-Apr-1979
<i>Prionitis lanceolata</i>	19	rocky intertidal	01-Apr-1979
<i>Prionitis lanceolata</i>	19	rocky subtidal	01-Apr-1979
<i>Prionitis linearis</i>	19	rocky intertidal	01-Apr-1979
<i>Prionitis lyallii</i>	19	rocky intertidal	01-Apr-1979
<i>Pseudolithophyllum neofarlowii</i>	19	rocky intertidal	01-Apr-1979
<i>Pseudomelatoma</i> sp.	19	rocky subtidal	01-Apr-1979
<i>Pseudopringsheimia apiculata</i>	19	rocky intertidal	01-Apr-1979
<i>Pseudulvella applanata</i>	19	rocky intertidal	01-Apr-1979
<i>Pterochondria woodii</i>	19	rocky intertidal	01-Apr-1979
<i>Pterochondria woodii</i>	19	sandy subtidal	01-Apr-1979
<i>Pterocladia media</i>	19	rocky intertidal	01-Apr-1979
<i>Pterosiphonia baileyi</i>	19	rocky intertidal	01-Apr-1979
<i>Pterosiphonia bipinnata</i>	19	rocky intertidal	01-Apr-1979
<i>Pterosiphonia dendroidea</i>	19	rocky intertidal	01-Apr-1979
<i>Ptilota filicina</i>	19	rocky intertidal	01-Apr-1979
<i>Ptilothamnionopsis lejolisea</i>	19	rocky intertidal	01-Apr-1979
<i>Ptychoramphus aleuticus</i>	19	pelagic	01-Apr-1979
<i>Puffinus bulleri</i>	19	pelagic	01-Apr-1979
<i>Puffinus creatopus</i>	19	pelagic	01-Apr-1979
<i>Puffinus griseus</i>	19	pelagic	01-Apr-1979
<i>Puffinus puffinus</i>	19	pelagic	01-Apr-1979
<i>Pugettia gracilis</i>	19	sandy intertidal	01-Apr-1979
<i>Pugettia producta</i>	19	rocky subtidal	01-Apr-1979
<i>Pugettia producta</i>	19	sandy intertidal	01-Apr-1979
<i>Pugettia richii</i>	19	rocky subtidal	01-Apr-1979
<i>Pugettia richii</i>	19	sandy intertidal	01-Apr-1979
<i>Punctaria hesperia</i>	19	rocky intertidal	01-Apr-1979
<i>Pycnoclavella stanleyi</i>	19	rocky subtidal	01-Apr-1979
<i>Pycnopodia helianthoides</i>	19	rocky subtidal	01-Apr-1979
<i>Pyura haustor</i>	19	rocky subtidal	01-Apr-1979
<i>Ralfsia pacifica</i>	19	rocky intertidal	01-Apr-1979
<i>Ralfsia</i> sp.	19	rocky intertidal	01-Apr-1979
<i>Reniera</i> sp.	19	sandy intertidal	01-Apr-1979
<i>Rhodochorton concrescens</i>	19	rocky intertidal	01-Apr-1979
<i>Rhodoglossum affine</i>	19	rocky intertidal	01-Apr-1979
<i>Rhodoglossum californicum</i>	19	rocky intertidal	01-Apr-1979
<i>Rhodoglossum roseum</i>	19	rocky intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Rhodoptilum densum	19	rocky intertidal	01-Apr-1979
Rhodoptilum densum	19	sandy subtidal	01-Apr-1979
Rhodymenia californica	19	rocky subtidal	01-Apr-1979
Rhodymenia californica attenuata	19	rocky subtidal	01-Apr-1979
Rhodymenia californica californica	19	rocky intertidal	01-Apr-1979
Rhodymenia californica californica	19	rocky subtidal	01-Apr-1979
Rhodymenia californica californica	19	rocky subtidal	01-Apr-1979
Rhodymenia callophyllidoides	19	rocky intertidal	01-Apr-1979
Rhodymenia callophyllidoides	19	sandy subtidal	01-Apr-1979
Rhodymenia pacifica	19	rocky intertidal	01-Apr-1979
Rhodymenia pacifica	19	rocky subtidal	01-Apr-1979
Rissa tridactyla	19	pelagic	01-Apr-1979
Ritterella pulchra	19	sandy intertidal	01-Apr-1979
Ritterella rubra	19	rocky subtidal	01-Apr-1979
Rostanga pulchra	19	sandy intertidal	01-Apr-1979
Sabellaria sp.	19	rocky subtidal	01-Apr-1979
Salmacina tribranchiata	19	rocky subtidal	01-Apr-1979
Sargassum muticum	19	rocky intertidal	01-Apr-1979
Scagelia occidentale	19	rocky intertidal	01-Apr-1979
Schizymenia pacifica	19	rocky intertidal	01-Apr-1979
Schizymenia pacifica	19	sandy subtidal	01-Apr-1979
Scrupocellaria sp.	19	rocky subtidal	01-Apr-1979
Scyra acutifrons	19	rocky subtidal	01-Apr-1979
Scyra acutifrons	19	sandy intertidal	01-Apr-1979
Scytosiphon dotyi	19	rocky intertidal	01-Apr-1979
Scytosiphon lomentaria	19	rocky intertidal	01-Apr-1979
Sebastes atrovirens	19	rocky subtidal	01-Apr-1979
Sebastes mystinus	19	rocky subtidal	01-Apr-1979
Sebastes paucispinis	19	rocky subtidal	01-Apr-1979
Serpula sp.	19	rocky subtidal	01-Apr-1979
Serpulorbis squamigerus	19	rocky subtidal	01-Apr-1979
Serpulorbis squamigerus	19	sandy intertidal	01-Apr-1979
Serraticardia macmillanii	19	rocky intertidal	01-Apr-1979
Sertularella sp.	19	rocky subtidal	01-Apr-1979
Sertularella sp.	19	sandy intertidal	01-Apr-1979
Sertularella turgida	19	sandy intertidal	01-Apr-1979
Sertularia sp.	19	rocky subtidal	01-Apr-1979
Smithora naiadum	19	rocky intertidal	01-Apr-1979
Soranothera ulvoidea	19	rocky intertidal	01-Apr-1979
Sphacelaria didichotoma	19	rocky intertidal	01-Apr-1979
Sphaciospongia confoederata	19	rocky subtidal	01-Apr-1979
Sphaciospongia confoederata	19	sandy intertidal	01-Apr-1979
Spirontocaris prionota	19	sandy intertidal	01-Apr-1979
Spirorbis sp.	19	rocky subtidal	01-Apr-1979
Spirorbis sp.	19	sandy intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Spirorbis spp.	19	rocky subtidal	01-Apr-1979
Spongomorpha coalita	19	rocky intertidal	01-Apr-1979
Spongonema tomentosum	19	rocky intertidal	01-Apr-1979
Stelletta clarella	19	rocky subtidal	01-Apr-1979
Stenoplax heathiana	19	sandy intertidal	01-Apr-1979
Stercorarius parasiticus	19	pelagic	01-Apr-1979
Stercorarius pomarinus	19	pelagic	01-Apr-1979
Sterna hirundo	19	pelagic	01-Apr-1979
Stichopus californicus	19	rocky subtidal	01-Apr-1979
Streblonema myrionematoides	19	rocky intertidal	01-Apr-1979
Streblonema penetrale	19	rocky intertidal	01-Apr-1979
Streblonema porphyrae	19	rocky intertidal	01-Apr-1979
Strongylocentrotus franciscanus	19	rocky subtidal	01-Apr-1979
Strongylocentrotus purpuratus	19	rocky subtidal	01-Apr-1979
Styela montereyensis	19	rocky subtidal	01-Apr-1979
Styela montereyensis	19	sandy intertidal	01-Apr-1979
Styela truncata	19	rocky subtidal	01-Apr-1979
Stylochoplana gracilis	19	sandy intertidal	01-Apr-1979
Stylochus tripartitus	19	sandy intertidal	01-Apr-1979
Syncoryne eximia	19	sandy intertidal	01-Apr-1979
Synoicum parfustis	19	rocky subtidal	01-Apr-1979
Synoicum pellucidum	19	sandy intertidal	01-Apr-1979
Synthliboramphus antiquus	19	pelagic	01-Apr-1979
Tealia coriacea	19	rocky subtidal	01-Apr-1979
Tealia coriacea	19	sandy intertidal	01-Apr-1979
Tealia lofotensis	19	rocky subtidal	01-Apr-1979
Tealia sp.	19	rocky subtidal	01-Apr-1979
Tedania toxicalis	19	sandy intertidal	01-Apr-1979
Tedanione obscurata	19	sandy intertidal	01-Apr-1979
Tegula brunnea	19	rocky subtidal	01-Apr-1979
Tegula brunnea	19	sandy intertidal	01-Apr-1979
Tegula montereyi	19	rocky subtidal	01-Apr-1979
Tegula pulligo	19	rocky subtidal	01-Apr-1979
Tenarea ascripticia	19	rocky intertidal	01-Apr-1979
Tenarea dispar	19	rocky intertidal	01-Apr-1979
Tethya aurantia	19	rocky subtidal	01-Apr-1979
Tethya aurantia	19	sandy intertidal	01-Apr-1979
Tetilla arb	19	rocky subtidal	01-Apr-1979
Tetilla arb	19	sandy intertidal	01-Apr-1979
Thalamoporella sp.	19	rocky subtidal	01-Apr-1979
Thalasseus elegans	19	pelagic	01-Apr-1979
Thelepus crispus	19	rocky subtidal	01-Apr-1979
Themiste dyscritum	19	rocky subtidal	01-Apr-1979
Themiste dyscritum	19	sandy intertidal	01-Apr-1979
Themiste pyroides	19	sandy intertidal	01-Apr-1979

Species Name	ASBS	Habitat	Survey Date
Tiffaniella snyderiae	19	rocky intertidal	01-Apr-1979
Tonicella lineata	19	rocky subtidal	01-Apr-1979
Tonicella lineata	19	sandy intertidal	01-Apr-1979
Trididemnum opacum	19	rocky intertidal	01-Apr-1979
Trididemnum opacum	19	rocky intertidal	01-Apr-1979
Trididemnum opacum	19	rocky subtidal	01-Apr-1979
Trinchesia abronia	19	sandy intertidal	01-Apr-1979
Trinchesia fulgens	19	sandy intertidal	01-Apr-1979
Trinchesia lagunae	19	rocky subtidal	01-Apr-1979
Trinchesia virens	19	sandy intertidal	01-Apr-1979
Triopha carpenteri	19	rocky subtidal	01-Apr-1979
Triopha carpenteri	19	sandy intertidal	01-Apr-1979
Triopha grandis	19	rocky subtidal	01-Apr-1979
Triopha grandis	19	sandy intertidal	01-Apr-1979
Triopha maculata	19	sandy intertidal	01-Apr-1979
Tritonia festiva	19	sandy intertidal	01-Apr-1979
Tubulanus polymorphus	19	rocky subtidal	01-Apr-1979
Tubulanus sexlineatus	19	rocky subtidal	01-Apr-1979
Tubularia marina	19	sandy intertidal	01-Apr-1979
Tubularia sp.	19	rocky subtidal	01-Apr-1979
Tubulipora sp.	19	rocky subtidal	01-Apr-1979
Ulothrix flacca	19	rocky intertidal	01-Apr-1979
Ulothrix pseudoflacca	19	rocky intertidal	01-Apr-1979
Ulva californica	19	rocky intertidal	01-Apr-1979
Ulva expansa	19	rocky intertidal	01-Apr-1979
Ulva lobata	19	rocky intertidal	01-Apr-1979
Ulva lobata	19	sandy subtidal	01-Apr-1979
Ulva sp.	19	rocky intertidal	01-Apr-1979
Ulva taeniata	19	rocky intertidal	01-Apr-1979
Uria aalge	19	pelagic	01-Apr-1979
Urospora penicilliformis	19	rocky intertidal	01-Apr-1979
Urospora wormskioldii	19	rocky intertidal	01-Apr-1979
Weeksia reticulata	19	rocky intertidal	01-Apr-1979
Weeksia reticulata	19	rocky subtidal	01-Apr-1979
Weeksia reticulata	19	sandy subtidal	01-Apr-1979
Xema sabini	19	pelagic	01-Apr-1979
Xestospongia vanilla	19	rocky subtidal	01-Apr-1979
Xestospongia vanilla	19	sandy intertidal	01-Apr-1979
Xiphister atropurpureus	19	sandy intertidal	01-Apr-1979
Xiphister mucosus	19	sandy intertidal	01-Apr-1979

Appendix B – PISCO Survey species lists

<http://www.piscoweb.org/data/access-and-applications>

Hopkins, Monterey County

January 18, 2003

Species list:

Abietinaria spp	Mastocarpus jardinii
Acanthinucella spp	Mastocarpus papillatus
Alia spp	Mazzaella affinis
Amphissa versicolor	Mazzaella leptorhynchos
Analipus japonicus	Mazzaella spp
Anthopleura elegantissima	Microcladia borealis
Anthopleura sola	Mopalia spp
Aplidium arenatum/propinquum	Mytilus californianus
Aplysina fistularis	Mytilus galloprovincialis/trossulus
Archidistoma psammion	Nucella emarginata/ostrina
Asterina miniata	Nuttallina spp
Balanus glandula	Ocenebra circumtexta
Bittium esrichtii	Ocenebra lurida
Blue green algae	Ophlitaspongia pennata
Bossiella spp	Osmundea spectabilis
Cadlina luteomarginata	Pachygrapsus crassipes
Calliarthron spp	Pagurus granosimanus
Calliostoma canaliculatum	Pagurus hirsutiusculus
Calliostoma ligatum	Pagurus samuelis
Callithamnion pikeanum	Petrocelis spp
Chondracanthus canaliculatus	Petrospongium rugosum
Chondracanthus spinosus	Phidiana hiltoni
Chthamalus spp	Phragmatopoma californica
Cladophora columbiana	Phyllospadix scouleri
Cladophora graminea	Phyllospadix torreyi
Corallina spp	Pisaster ochraceus
Cryptopleura/Hymenena spp	Plocamium violaceum
Distaplia occidentalis	Pollicipes polymerus
Egregia menziesii	Polysiphonia spp
Encrusting coralline	Porphyra spp
Endocladia muricata	Prionitis lanceolata
Epiactis prolifera	Pseudomelatoma torosa
Fissurella volcano	Pterosiphonia baileyi
Gastroclonium subarticulatum	Pugettia producta
Gelidium coulteri	Ralfsiaceae
Gelidium coulteri/pusillum	Rhodymenia californica
Gelidium robustum	Sculpin
Hildenbrandia/Peyssonnelia spp	Serpula vermicularis
Idotea spp	Serpulorbis squamigerus

Lacuna spp	Silvetia compressa
Lepidochitona dentiens	Spirobranchus spinosus
Lepidochitona hartwegii	Spirorbis spp
Leptasterias spp	Strongylocentrotus purpuratus
Littorina keenae	Tegula brunnea
Littorina plena/scutulata	Tegula funebris
Lottia austrodigitalis/digitalis	Tetraclita rubescens
Lottia limatula	Tonicella lineata
Lottia paradigitalis/strigatella	Ulva spp
Lottia pelta	
Lottia scabra/conus	
Lottia scutum	

Hopkins, Monterey County December 1-2, 2006 Species list:	
Abietinaria spp	Lottia pelta
Acanthinucella spp	Lottia scabra/conus
Acmaea mitra	Lottia scutum
Alia spp	Mastocarpus jardinii
Amphissa versicolor	Mastocarpus papillatus
Analipus japonicus	Mazzaella affinis
Anthopleura elegantissima	Mazzaella leptorhynchos
Anthopleura sola	Mazzaella spp
Anthopleura xanthogrammica	Membranipora spp
Aplidium californicum/solidum	Microcladia borealis
Asterina miniata	Mopalia spp
Balanus glandula	Mytilus californianus
	Mytilus
Bittium eschrichtii	galloprovincialis/trossulus
Blue green algae	Nucella emarginata/ostrina
Bossiella spp	Nuttallina spp
Bugula neritina	Ocenebra circumtexta
Calliarthron spp	Ocenebra interfossa
Calliostoma canaliculatum	Ophlitaspongia pennata
Calliostoma ligatum	Osmundea sinicola
Callithamnion pikeanum	Osmundea spectabilis
Centroceras/Ceramium/Corallophila spp	Pachycheles spp
Chondracanthus canaliculatus	Pachygrapsus crassipes
Chondracanthus spinosus	Pagurus granosimanus
Chthamalus spp	Pagurus hirsutiusculus
Cirolana spp	Pagurus samuelis
Cladophora columbiana	Pelvetiopsis spp
Cladophora graminea	Petrocelis spp
Corallina spp	Petrospongium rugosum
Cryptochiton stelleri	Phidiana hiltoni
Cryptopleura/Hymenena spp	Phragmatopoma californica
Diatoms	Phyllospadix scouleri

Egredia menziesii	Phyllospadix torreyi
Encrusting coralline	Pisaster ochraceus
Endocladia muricata	Plocamium pacificum
Epitonium tinctum	Pollicipes polymerus
Fissurella volcano	Porphyra spp
Gastroclonium subarticulatum	Prionitis lanceolata
Gelidium coulteri	Pterosiphonia baileyi
Gelidium pusillum	Pterosiphonia dendroidea/pennata
Henricia spp	Pugettia producta
Hildenbrandia/Peyssonnelia spp	Ralfsiaceae
Lacuna spp	Sarcoditheca gaudichaudii
Laurencia pacifica/masonii	Serpulorbis squamigerus
Lepidochitona dentiens	Sertularella turgida
Lepidochitona hartwegii	Silvetia compressa
Lepidozona spp	Spirorbis spp
Leptasterias spp	Strongylocentrotus purpuratus
Littorina keenae	Tegula brunnea
Littorina plena/scutulata	Tegula funebris
Lottia austrodigitalis/digitalis	Tetraclita rubescens
Lottia limatula	Tonicella lineata/lokii
Lottia ochracea	Ulva spp
Lottia paradigitalis/strigatella	

Source: PISCO 2003, 2006

Appendix C – ASBS Natural Water Quality Committee Summation of Findings

Status of California's Marine Water Quality Protected Areas
Kenneth Schiff, Brenda Luk and Dominic Gregorio
Technical Report 631 - September 2010

Status of California's
Marine Water Quality Protected Areas



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Southern California Coastal Water Research Project

Technical Report 631 - September 2010

Status of California's Marine Water Quality Protected Areas

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Technical Report 629

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ABSTRACT

California has designated 34 different marine water quality protected areas, termed Areas of Special Biological Significance (ASBS), which extend across roughly 500 miles (32%) of state shoreline. Recent surveys observed over 1,600 outfalls into ASBS, most of which are storm drains potentially discharging nonpoint sources of pollutants. The goal of this study was to assess the extent and magnitude of water quality impacts in California's ASBS following storm events. A stratified probabilistic design was used for sampling receiving water shorelines near (discharge) and far (non-discharge) from storm drain outfalls. In all, more than 98 target analytes were measured from 33 sites immediately prior to (pre-storm) and immediately following (post-storm) wet weather. In general, reasonably good water quality exists in California's ASBS following storm events. Many of the target analytes measured did not exceed the State of California's Ocean Plan water quality standards (WQS) and toxicity, using an endemic test species, was rare. The post-storm concentrations of most constituents in discharge and non-discharge strata of ASBS were similar. Likewise, the average concentration increase across all target analytes from pre- to post-storm was less than 3-fold in the discharge stratum. The three potentially problematic parameters identified were total PAH, chromium, and copper. Total chromium did not exceed state WQS such as the instantaneous maximum and daily maximum, but did exceed the six-month median WQS in an estimated 50% of the state's ASBS shoreline-miles. Total PAH exceeded the 30-day average WQS in an estimated 87% of the state's ASBS shoreline-miles. Copper exceeded WQS less extensively (7% of ASBS shoreline-miles), but exclusively in the discharge stratum and for dissolved as well as total copper concentrations. The relatively good water quality on a statewide basis was not evenly distributed. In southern California, whose shoreline is under much more intense development than elsewhere in the state, almost twice as many target analytes exceeded WQS as in central or northern California.

INTRODUCTION

By their proximity, oceans adjacent to coastal land development are continually subjected to pollutant inputs. In the United States, approximately 53% of the population lives in counties bordering the coast, but comprises only 17% of the land area (Culliton *et al.* 1998). This has led to habitat alteration (Boesch *et al.* 2001), eutrophication (Bricker *et al.* 1999), contaminated sediments (USEPA 2005), and accumulation of toxics in tissues of marine organisms (O'Connor 1998).

One conservation strategy used to safeguard the marine environment is the establishment of protected areas where portions of the coast are set aside for limited use. Marine protected areas exist for some of the most ecologically sensitive areas around the world including Australia's Great Barrier Reef, Fiji, the Galapagos Islands, and others. Many marine protected areas also exist within the United States including California, Hawaii, and Florida (NOAA 2008). Virtually all of these marine protected areas, however, were established based upon natural resource needs and not exclusively water quality issues. Almost in unanimity, the aforementioned marine protected areas initially have fisheries-based goals that limit recreational and/or commercial fishing. Water quality goals, if addressed, were not the primary motivation for the establishment of the marine protected area.

Unlike most other coastal conservation strategies, the State of California established 34 marine protected areas in 1974-75 specifically for the protection of water quality (SWRCB 2005). Although they are called areas of special biological significance (ASBS), not all of these marine water quality protected areas also limit harvesting (i.e., fishing). Twenty-five of the ASBS occur on the mainland of California comprising 499 shoreline miles and 32% of the state coastline (Figure 1). The primacy of water quality protection is indicated within state policy whereby all "discharge of waste is prohibited" and "natural water quality must be maintained" in these ASBS (SWRCB 2005).

The State of California has done a remarkable job limiting point source discharges in ASBS. Less than 10 point source discharges exist statewide, and these are almost entirely discharges from marine aquaria and/or flow through seawater systems associated with research academic institutions. However, little attention has been placed on non-point source discharges, which are much more numerous. Over 1,600 outfalls have been identified along ASBS shoreline (SCCWRP 2003). The vast majority of these outfalls were storm drains that could potentially discharge urban and agricultural runoff from upstream development. Large portions of this upstream development did not exist when the ASBS were originally established in the mid-1970's.

The objective of this study was to assess the extent and magnitude of water quality impacts in ASBS following storm events. Further, the magnitude and extent of impact in ASBS was compared between areas near stormwater discharges and areas distant from discharges to determine the potential of storm drain outfalls to cause the observed impacts in water quality. Ultimately, the goal was to determine if significant water quality impacts existed within ASBS, with the results guiding managers on the need and direction of potential future intervention.

METHODS

This study utilized a probabilistic-based design to estimate the shoreline-miles or percent of total shoreline-miles with observed impacts to water quality. Probabilistic designs, wherein sample sites are selected randomly, enable unbiased estimates of extent (Stevens 1997). For the current study design, the sampling frame consisted of all mainland ASBS shoreline, divided into two groups: 1) areas near direct discharges defined as less than 500m from a pipe, drain, or other surface discharge greater than 18 inches diameter; and 2) non-discharge areas defined as more than 500 m distant from direct discharges. The 500 m cutoff was selected based on nearshore modeling studies by Jenkins and Wasyl (2007). All sites were collected from shoreline receiving water. No effluent samples were collected as part of this study. All sites were sampled for only a single storm event between February and April 2009.

A total of 33 sites were selected for sampling. Twenty-one sites were from the discharge stratum and 12 sites were from the non-discharge stratum (Table 1). At each site, samples were collected immediately prior to (<48 hours), then immediately following (<24 hours), significant storm events. Sampling criteria included: 1) all post-storm samples must be collected as soon after the storm event as possible (nearly all were collected less than six hours following cessation of rainfall); 2) at discharge sites, stormwater flows must reach the ocean; and 3) all ocean receiving water samples must be collected by hand from the shore (no boats). These criteria helped ensure that the focus was on receiving waters, that recent stormwater inputs had occurred, and examining the area closest to shore where potentially the least mixing occurs.

All water samples were analyzed for 98 parameters: 1) general constituents including total suspended solids (TSS), dissolved organic carbon (DOC), and salinity; 2) nutrients including nitrate (NO₃-N), nitrite (NO₂-N), ammonia (NH₃-N), total nitrogen (TN), total phosphorus (TP), and ortho-phosphate (PO₄-P); 3) dissolved and total trace metals (As, Cd, Cr, Cu, Ni, Pb, Ag, Se, Zn); 3) chlorinated hydrocarbons including total PCB (sum of congeners 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, 206) and total DDT (sum of o,p'- and p,p'-DDT, DDE, and DDD); 4) total polycyclic aromatic hydrocarbons (28 PAH); and 5) short-term chronic toxicity using an early life stage of an endemic species. All sample analysis followed standard methods and/or EPA approved procedures (APHA 2006). Trace metals were prepared for analysis using ammonium pyrrolidine dithiocarbamate (APDC), a chelation method that concentrates trace metals and removes matrix interferences (USEPA 1996). Fertilization success of the purple sea urchin, *Strongylocentrotus purpuratus*, was used for toxicity testing (USEPA 1995).

The project focused on performance-based measures of quality assurance. In general, laboratory data quality was quite good: no laboratory blank samples greater than the method detection limit; 96% success meeting data quality objectives (DQOs) for precision using laboratory duplicates; 91 % success meeting DQOs for accuracy using spiked samples. The lowest accuracy success rate was for cadmium (12 of 15 batches) and zinc (8 of 16 batches) where the requirement of 75-125% recovery from seawater was not met. This was due, in part, to the APDC chelation method that has lower affinities for extracting cadmium and zinc.

Data Analysis

Based on the study design, two data analysis approaches were utilized to compare spatial (discharge vs. non-discharge strata) and temporal (pre-storm vs. post-storm) relationships. The first approach examined the magnitude of changes in space and time. To do this, area-weighted geometric means were calculated for total ASBS shoreline and for each stratum and time period using a ratio estimator approach following Thompson (1992):

$$m = \frac{\sum_{i=1}^n (p_i * w_i)}{\sum_{i=1}^n w_i} ,$$

Where:

m = Log_{10} of the area-weighted mean concentration for population j .

p_i = Log_{10} of the parameter value (e.g., concentration) at station i .

w_i = Area weight for station i .

n = Number of stations in population j .

The standard error of the mean is calculated using the following equation where the 95% confidence intervals about the mean were calculated as 1.96 times the standard error.

$$\text{Standard error (SE)} = \sqrt{\frac{\sum_{i=1}^n ((p_i - m) * w_i)^2}{\left(\sum_{i=1}^n w_i\right)^2}} ,$$

where:

m = Log_{10} of the area-weighted mean concentration for population j .

p_i = Log_{10} of the parameter value (e.g., concentration) at station i .

w_i = Area weight for station i .

n = Number of stations in population j .

All concentrations below detection limits were treated as zero. Area-weighted geometric means and confidence interval were back-transformed for tables and graphs.

The second data analysis approach focused on estimating the areal extent of impact. To accomplish this, area weights for each sample that exceeded State of California water quality standards (WQS) were summed and divided by the total area-weight for the stratum and time period of interest. The WQS are defined in Table B of the California Ocean Plan (SWRCB 2005). Four WQS exist including six-month median, 30-day average, daily maximum, and instantaneous maximum thresholds.

RESULTS

The post-storm concentrations of most constituents in discharge and non-discharge strata of ASBS were similar (Table 2). Except for DOC and dissolved copper, there was no statistical difference in area-weighted geometric mean concentrations between post-storm discharge and non-discharge strata. In the case of post-storm copper geometric mean concentrations, the discharge stratum was greater than the non-discharge stratum. The case was reversed for DOC; the non-discharge was greater than the discharge stratum. Although not statistically different, the area-weighted geometric mean concentration in the discharge stratum was greater for 14 of the remaining 24 parameters compared to the post-storm non-discharge stratum. Post-storm concentrations of chlorinated hydrocarbons, such as total DDT and total PCB, were uniformly non-detectable in both strata.

On average, the increase in concentration across all target analytes from pre- to post-storm samples was less than 3-fold in the discharge stratum (Table 2; Figure 2). In fact, none of the target analyte concentrations were significantly greater post-storm compared to pre-storm. Average concentrations for 12 of the 25 target analyte actually decreased from pre- to post-storm in the discharge stratum. Of the remaining 13 target analytes, the most substantial concentration increases were for dissolved iron (26-fold) and DOC (15-fold).

In general, exceedence of WQS such as instantaneous maxima, daily maxima, and six-month medians, were infrequent for ammonia and trace metals following storm events (Table 3). None of the target analytes collected post-storm exceeded WQS based on instantaneous maxima. Only a single target analyte collected post-storm exceeded the WQS based on the daily maximum. This analyte, total chromium, exceeded 2% of the post-storm shoreline-miles across all ASBS. Ten of 18 parameters collected post-storm exceeded the WQS based on six-month median objectives. Three parameters were dissolved metals (cadmium, copper, and nickel); none of these dissolved metals exceeded the six-month median in more than 2% of the ASBS shoreline-miles. Seven of the parameters exceeding the six-month median were for total metals. The parameter that exceeded the six-month median WQS most frequently (50% of ASBS shoreline-miles) was total chromium. Total nickel exceeded the six-month median WQS second most frequently (15% of ASBS shoreline-miles). Total arsenic, cadmium, copper, lead and zinc exceeded six-month median WQS between 2 and 7% of the ASBS shoreline-miles.

In contrast to ammonia and trace metals, exceedence of state WQS for trace organic parameters was much more frequent (Table 4). Of the six target organic analytes collected post-storm, only total PAH exceeded the 30-day average WQS. However, total PAH exceeded the 30-day average WQS an estimated 87% of the ASBS shoreline-miles. Other trace organic parameters including total DDTs, total PCBs, chlordane, and dieldrin did not exceed the 30-day average WQS.

Except for total chromium and total nickel, there was no dramatic difference in the extent of post-storm WQS exceedences between discharge and non-discharge strata (Tables 3 and 4). The difference in exceedence of the six-month median WQS following storm events was nearly two-fold for total chromium (35% of shoreline-miles for the non-discharge stratum compared to 61% of shoreline-miles for the discharge stratum) and a factor of eight for total nickel (3% of

shoreline-miles for the non-discharge stratum compared to 24% of shoreline-miles for the discharge stratum).

Contrary to expectations, there was little change in the extent of WQS exceedences from pre- to post-storm in the discharge stratum (Tables 3 and 4). For example, the percent of shoreline-miles that exceeded WQS for chromium and total PAH changed by less than 10% (Figure 3). On the other hand, there were substantial changes in the extent of WQS exceedence from pre- to post-storm in the non-discharge stratum, particularly for these same two target analytes. The extent of shoreline-miles approximately doubled pre- to post-storm for total chromium and total PAH. In fact, the extent of post-storm WQS exceedences of total PAH in the non-discharge stratum looked very much like the extent in the discharge stratum (89% vs. 86% of shoreline-miles, respectively).

Exceedences of the WQS occurred most frequently in southern California compared to northern or central California (Figure 4). The Irvine Coast ASBS in southern California had the greatest number of target analytes (six) sampled post-storm that exceeded WQS and had concentrations that increased from pre- to post-storm. The Robert Badham ASBS followed with four target analytes sampled post-storm that exceeded WQS. No ASBS in Central and Northern California exceeded these same criteria by more than three target analytes. Only a single ASBS in southern California (San Diego-Scripps ASBS) had no exceedences of the WQS for any analyte. There were six ASBS in Central and Northern California that had no analytes exceeding the WQS.

The occurrence of toxicity in post-discharge samples from ASBS was rare. Roughly 3% of the shoreline miles observed post-storm toxicity. This was relatively evenly split between non-discharge and discharge strata.

DISCUSSION

Based on the results from this study, generally good water quality exists in California's ASBS following storm events. Most target analytes measured did not exceed the State of California's WQS and, for the majority of analytes that did exceed the WQS, the relative extent of impact was small (< 7% of ASBS shoreline-miles). All of the target analytes that exceeded WQS have natural as well as anthropogenic sources (e.g., trace metals), but synthetic pesticides (e.g., total DDTs, total PCBs, chlordane and dieldrin) never exceeded WQS and were rarely detected. Additionally, toxicity using an endemic species (sea urchin fertilization test) was infrequent indicating unmeasured analytes were likely not problematic. Finally, average receiving water concentrations of most common stormwater constituents (i.e., lead, zinc, etc.) were statistically similar between the discharge and non-discharge stratum, and average concentrations measured pre-storm were statistically similar to post-storm concentrations in discharge stratum. The lack of demonstrative impact following storm events is an important finding because the greatest perceived risk to ASBS water quality is from stormwater runoff generated by urban, agricultural, and other nonpoint source activities.

While the summary of post-storm water quality in ASBS can be described as good, there were three parameters that stand out as potentially problematic. These include total PAH, chromium, and copper. Total PAH is a known stormwater contaminant from studies not only in California (Stein *et al.* 2006), but around the United States (Hoffman *et al.* 1984). Total PAH concentrations in ASBS were generally low, never exceeding 186 ng/L. Unlike all the other analytes that indicated impairment, the WQS for PAH is based on risk to human health through bioaccumulation in seafood. Hence, the total PAH WQS may be marginally applicable for the protection of marine aquatic life. Interestingly, the frequency of WQS exceedence for total PAH was similar between pre- and post-storm in the discharge stratum so non-storm sources may be at play. Other potential sources could be numerous including dry weather runoff (Stein *et al.* 2006), atmospheric deposition (Sabin *et al.* 2009), or natural seeps (Leifer *et al.* 2006). Clearly, future work on source attribution of total PAH and its potential for biological effects, should be evaluated.

Unlike total PAH, the WQS for chromium is based on the predicted marine life toxicity of its most harmful state, hexavalent chromium. While total chromium is the accepted surrogate for hexavalent chromium in most regulatory applications, no analysis was done in this study to evaluate the relative contribution of hexavalent chromium. Since toxicity was infrequently observed, one can hypothesize that hexavalent chromium was often below the WQS. However, the disparity in the extent of total chromium exceeding WQS between the discharge stratum and non-discharge stratum was sizeable (61% vs. 35% of ASBS shoreline-miles, respectively). Therefore, total chromium in stormwater discharges likely has some influence on ASBS receiving water concentrations. Adding to the concern, total chromium is a commonly found analyte in urban stormwater discharges, with industrial land uses having amongst the greatest concentrations in southern California (Tiefenthaler *et al.* 2008). Chromium is also a naturally occurring component of serpentine rock in many coastal California locations (Caillaud *et al.* 2009). Because of the issues associated with natural versus anthropogenic sources of chromium, surveys focused on chromium and the relationship between total and hexavalent chromium at problematic ASBS may be warranted.

Copper was the final target analyte of concern. The concern was generated by four factors that individually aren't alarming, but collectively may indicate stormwater influences. First, total copper exceeded WQS, although not extensively (7% of ASBS shoreline-miles). However, the extent of impact occurred exclusively in the discharge stratum while the non-discharge stratum was free of copper WQS exceedences. Second, the copper WQS exceedence in the discharge stratum occurred post-storm, but was absent in pre-storm samples. Third, the WQS exceedence occurred not just for total copper, but also for dissolved copper. Fourth, the average dissolved copper concentration was significantly greater post-storm than pre-storm. The third and fourth factors are relevant to stormwater inputs because dissolved copper is more bio-available, and an inherently greater toxicological risk to marine life, compared to total copper (Arnold *et al.*2005). Moreover, copper is consistently observed in stormwater discharges (Tiefenthaler 2008). Further, copper has been identified as the primary toxicant of concern for failed toxicity tests using the sea urchin fertilization test in near coastal water influenced by stormwater runoff (Bay *et al.*2003)

The larger concern for total PAH and total chromium may actually be in the non-discharge stratum. It was in the non-discharge stratum that WQS exceedences rose dramatically from pre- to post-storm. While average concentrations did not dramatically increase, they were very near the state's WQS and the extent of ASBS shoreline-miles exceeding WQS doubled or tripled. In fact, the extent of WQS exceedence in non-discharge areas post-storm looked very similar to the extent observed in the discharge stratum. This study design element was intentional; we wanted to see if discharges either inside or outside of ASBS may impact non-discharge shoreline. The influence of distant sources, at least for these two target analytes, was obvious.

An alternative hypothesis is that applying long-term WQS to short-term events, like storm events, are not appropriate in the nearshore zone. California has several short-term thresholds including instantaneous maximum, daily maximum, and additional long-term thresholds such as the 30-day average (for trace organics) or six-month median (for ammonia and trace metals). However, it is standard regulatory practice to use even single samples to evaluate the long-term thresholds when additional data are not available. In the case of this study, even the most problematic target analytes (total PAH and total chromium, both of which have both natural and anthropogenic sources) did not exceed the short-term thresholds. It was application of the long-term thresholds, whose benchmark concentrations are much lower, when WQS exceedences became problematic. For this reason, a more appropriate measure might be "natural water quality" as designated in state policy. Natural water quality, while attractive, has its own set of technical and political challenges. Since no statewide data exists from natural (e.g., reference) sites, additional data collection would be necessary.

Finally, the notably good water quality on a statewide basis was not evenly distributed throughout the state. Some ASBS exceeded WQS standards at a much greater frequency and these regions should likely receive further attention. For example, sites in southern California fared worse than their northern or central California counterparts. This may be due, in part, to the intense urbanization of the southern region. More than 20 million people live in southern California and coastal development pressure is intense (Ackerman and Schiff 2003). In the survey of storm drain discharges to ASBS, over 46% occurred in southern California. In fact, so

much development occurs in southern California coastal watersheds, that the non-discharge stratum (defined as >500m from drain discharges 18 inches and greater), did not exist in southern California.

REFERENCES

- Ackerman, D. and K. Schiff. 2003. Modeling storm water mass emissions to the Southern California Bight. *Journal of Environmental Engineering* 129:308-317.
- APHA. 2006. Standard Methods for the Examination of Water and Wastewater, 19th edition. American Public Health Association. Washington, DC.
- Arnold W.R., R.C. Santore and S. Cotsifas S. 2005. *Marine Pollution Bulletin* 50:1634-1640.
- Bay, S., B. Jones, K. Schiff and L. Washburn. 2003. Water quality impacts of stormwater discharges to Santa Monica Bay. *Marine Environmental Research* 56:205-223.
- Boesch, D., R. Burroughs, J. Baker, R. Mason, C. Rowe and R. Siefert. 2001. Marine Pollution in the United States. A report to the PEW Oceans Commission. Arlington, VA.
- Bricker, S., C. Clement, D. Pirhalla, S.P. Orlando and D. Farrow. 1999. National estuarine eutrophication assessment: effects of nutrient enrichment in the nation's estuaries. National Oceanic and Atmospheric Administration (NOAA). Silver Spring, MD.
- Caillaud J., D. Proust, S. Philippe, C. Fontaine and M. Fialin. 2009. Trace metals distribution from a serpentinite weathering at the scales of the weathering profile and its related weathering microsystems and clay minerals. *Geoderma* 149:199-208.
- Culliton, T. 1998. Population: Distribution, Density and Growth. State of the Coast Report. National Oceanic and Atmospheric Administration (NOAA). Silver Spring, MD.
- Hoffman, E., G. Mills, J. Latimer and J. Quinn. 1984. Urban runoff as a source of polycyclic aromatic hydrocarbons to coastal waters. *Environmental Science & Technology* 18:580-587.
- Jenkins, S. and J. Wasyl. 2007. Hydrodynamic Simulations of Shoreline Discharges of Laboratory Seawater and Storm Water at Scripps Beach, CA Report to: Facilities Design and Construction, University of California, San Diego. La Jolla, CA
- Leifer I., B. Luyendyk and K. Broderick. 2006. Tracking an oil slick from multiple natural sources, Coal Oil Point, California. *Marine and Petroleum Geology* 23:621-630
- National Oceanic and Atmospheric Administration (NOAA). 2008. Framework for the national system of marine protected areas of the United State of America. NOAA. Silver Spring, MD.
- O'Connor, T. 1998. Mussel Watch Results from 1986 to 1996. *Marine Pollution Bulletin* 37:14-19.
- Sabin, L.D., K.A. Maruya, W. Lao, D.W. Diehl, D. Tsukada, K.D. Stolzenbach and K.C. Schiff. 2009. Exchange of polycyclic aromatic hydrocarbons between the atmosphere, water, and

sediment in southern California coastal embayments. *Environmental Chemistry and Toxicology* 29:265-274.

Southern California Coastal Water Research Project (SCCWRP). 2003. Discharges into State Water Quality Protected Areas. Final Report to the State Water Resources Control Board. SCCWRP. Westminster, CA.

Stein, E.D., L.L. Tiefenthaler and K.C. Schiff. 2006. Watershed-based sources of polycyclic aromatic hydrocarbons in urban storm water. *Environmental Toxicology and Chemistry* 25:373-385.

Stevens, D. 1997. Variable density grid-based designs for continuous spatial populations. *Envirometrics* 8:167-195.

State Water Resources Control Board (SWRCB). 2005. California Ocean Plan. SWRCB. Sacramento, CA.

Thompson, S.K. 1992. Sampling. John Wiley and Sons. New York, NY.

Tiefenthaler, L.L., E.D. Stein and K.C. Schiff. 2008. Watershed and land use-based sources of trace metals in urban stormwater. *Environmental Toxicology and Chemistry* 27:277-287.

United States Environmental Protection Agency (USEPA). 1995. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. Report No. EPA 600/R-95/136. USEPA Office of Research and Development. Cincinnati, OH.

USEPA. 1996. Method 1640: Determination of Trace Metal Elements in Ambient Waters by On-Line Chelation Preconcentration and Inductive Coupled Plasma-Mass Spectrometry. USEPA Office of Water, Engineering and Analysis Division. Washington, DC.

USEPA. 2005. National Coastal Condition Report. EPA/620/R-03/002. USEPA Office of Wetlands, Oceans, and Watersheds. Washington, DC.

Figure 1. Map of California's Water Quality Protected Areas termed "Areas of Special Biological Significance".

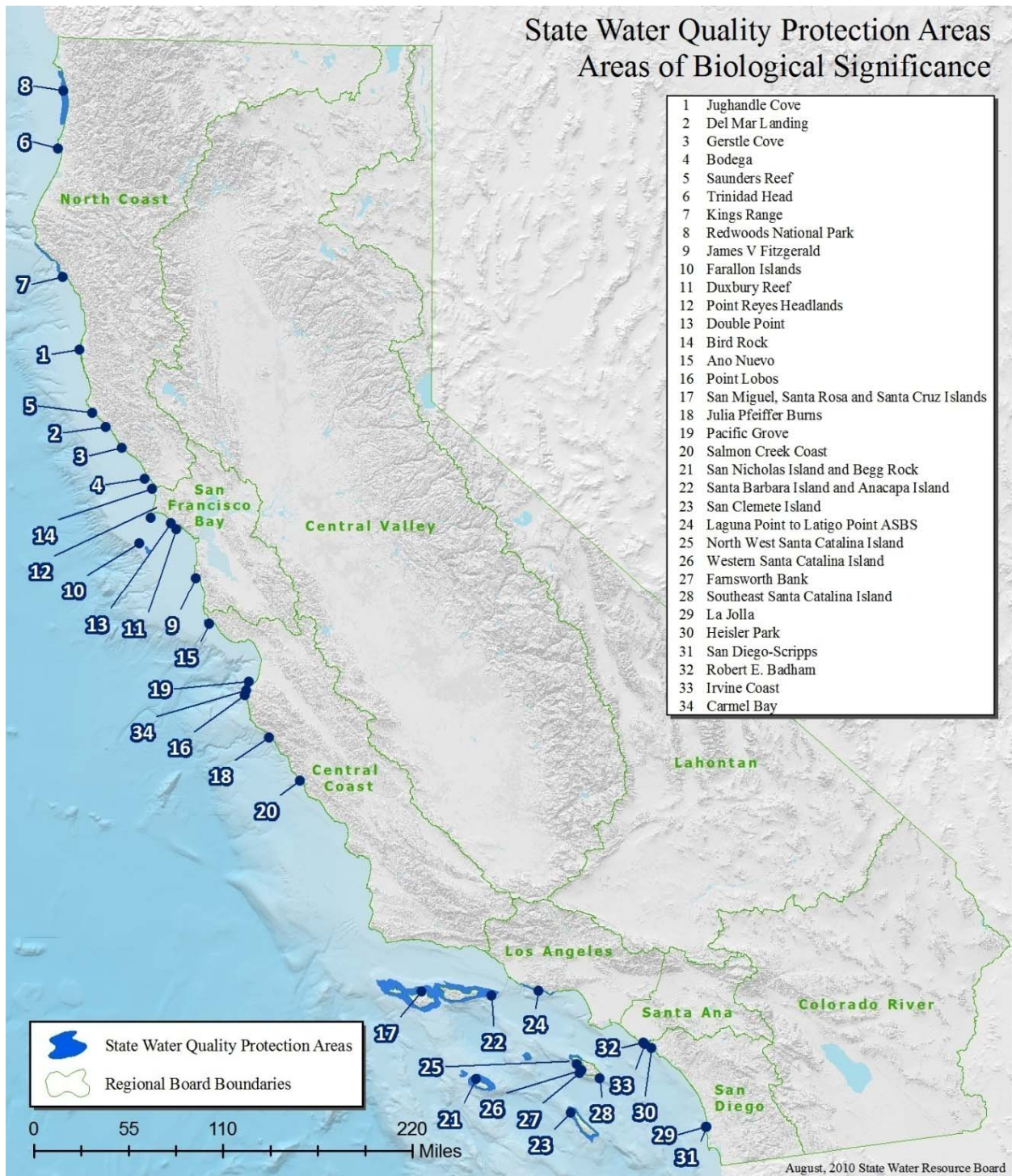


Figure 2. Relative increase of target analyte concentrations in Areas of Special Biological Significance (ASBS) collected <48 hours prior to a storm (pre-) compared to concentrations collected <24 hours following a storm (post-). Unity indicates pre- and post-storm concentrations were the same. Values greater than 1 indicate a post-storm increase in concentration.

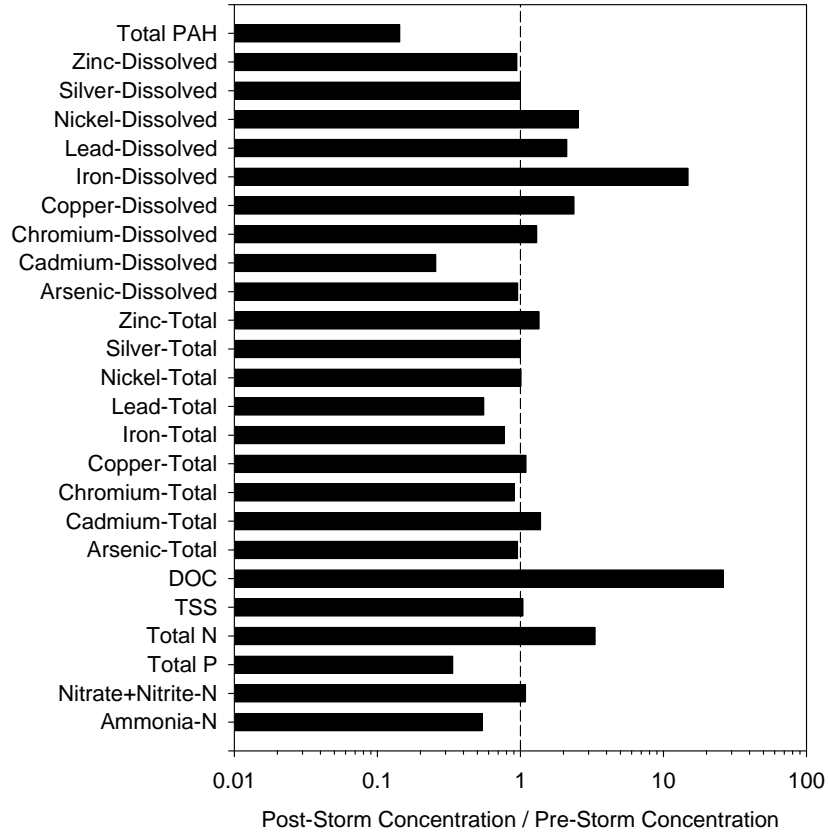


Figure 3. Comparison of the percent shoreline-miles that exceeded State of California 30-day water quality standards for total chromium and total PAH from pre- and post-storm samples in discharge and non-discharge strata.

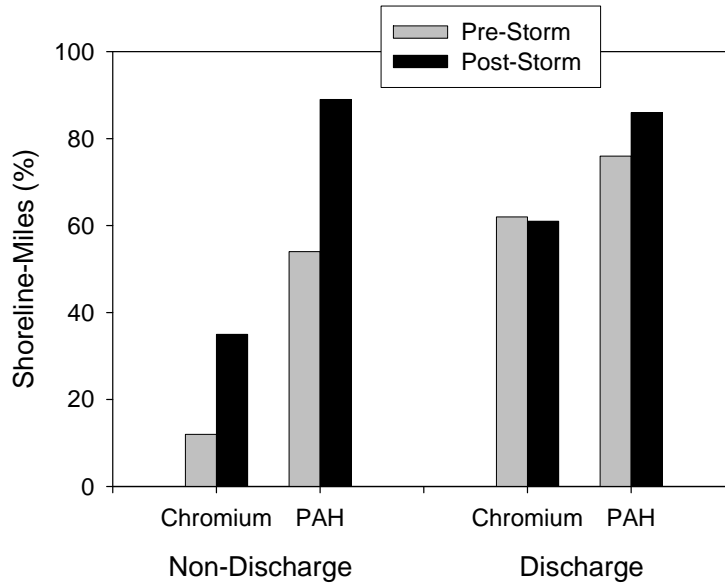


Figure 4. Number of parameters (out of 25) that exceeded State Water Quality Standards (6 month median for ammonia and trace metals, 30-day average for trace organics, SWRCB 2005), and had post-storm concentrations greater than pre-storm concentrations, in each of the sampled Areas of Special Biological Significance (ASBS). Data are presented for both the discharge and non-discharge strata. 0 = no parameters exceeded water quality standard (WQS). nd = no data.

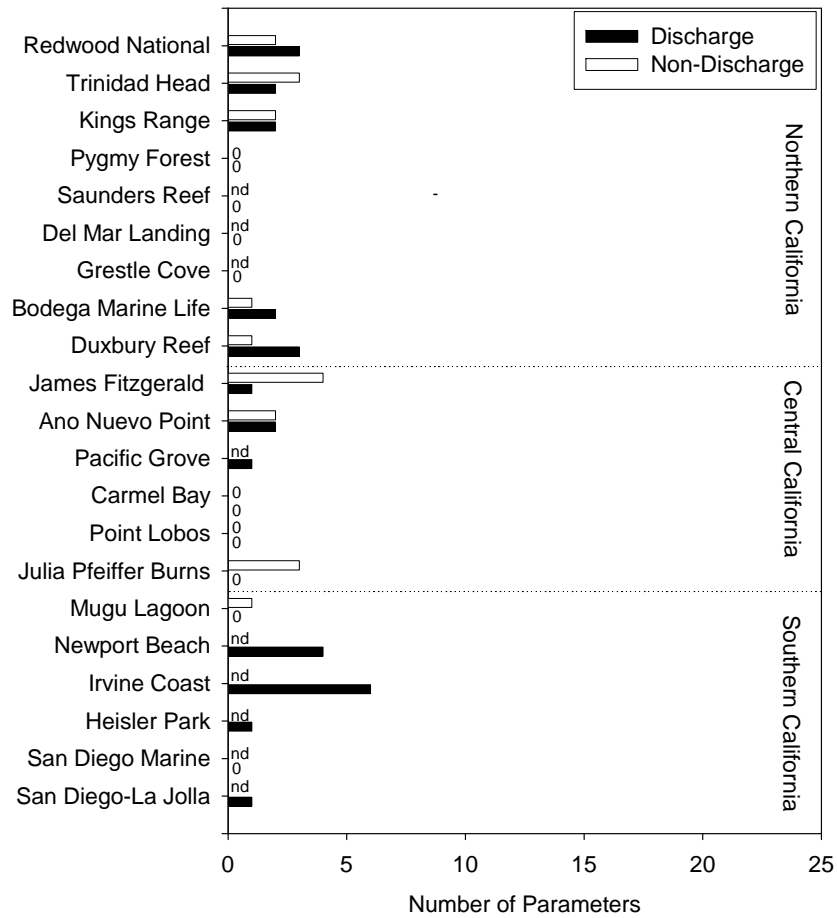


Table 1. List of sample sites.

Stratum	SiteID	Longitude	Latitude	ASBS No.	Location
Non-Discharge	N018	-124.0858	41.3196	7	Redwood National and State Parks ASBS
Discharge	D055	-124.0941	41.2799	7	Redwood National and State Parks ASBS
Discharge	D027	-124.1486	41.0608	5	Kelp Beds at Trinidad Head ASBS
Non-Discharge	N043	-124.1441	41.0573	5	Kelp Beds at Trinidad Head ASBS
Non-Discharge	N243	-124.0796	40.0584	6	Kings Range National Conservation Area ASBS
Discharge	D119	-124.0798	40.0388	6	Kings Range National Conservation Area ASBS
Non-Discharge	N035	-123.8216	39.3808	1	Pygmy Forest Ecological Staircase ASBS
Discharge	D037	-123.8188	39.3764	1	Pygmy Forest Ecological Staircase ASBS
Discharge	D050	-123.6487	38.8519	5	Kelp Beds at Saunders Reef ASBS
Discharge	D042	-123.5116	38.7408	2	Del Mar Landing Ecological Reserve ASBS
Discharge	D043	-123.3315	38.5663	3	Grestle Cove ASBS
Non-Discharge	N038	-123.0742	38.3190	4	Bodega Marine Life Refuge ASBS
Discharge	D046	-123.0704	38.3171	4	Bodega Marine Life Refuge ASBS
Non-Discharge	N051	-122.7192	37.9017	10	Duxbury Reef Reserve and Extension ASBS
Discharge	D067	-122.7111	37.8972	10	Duxbury Reef Reserve and Extension ASBS
Discharge	D058	-122.4986	37.5011	8	James V. Fitzgerald Marine Reserve ASBS
Non-Discharge	N042	-122.4958	37.4956	8	James V. Fitzgerald Marine Reserve ASBS
Discharge	D001	-122.3381	37.1361	15	Ano Nuevo Point and Island ASBS
Non-Discharge	N064	-122.3042	37.1153	15	Ano Nuevo Point and Island ASBS
Discharge	D035	-121.9135	36.6230	19	Pacific Grove Marine Gardens Fish Refuge and Hopkins Marine Life Refuge ASBS
Discharge	D220	-121.9316	36.5396	34	Carmel Bay ASBS
Non-Discharge	N055	-121.9298	36.5232	34	Carmel Bay ASBS
Non-Discharge	N002	-121.9528	36.5183	16	Point Lobos Ecological Reserve ASBS
Discharge	D030	-121.9439	36.5128	16	Point Lobos Ecological Reserve ASBS
Discharge	D031	-121.6973	36.1754	18	Julia Pfieffer Burns Underwater Park ASBS
Non-Discharge	N022	-121.6960	36.1743	18	Julia Pfieffer Burns Underwater Park ASBS
Discharge	D016	-118.8727	34.0373	24	Mugu Lagoon to Latigo Point ASBS
Non-Discharge	N006	-118.8076	34.0008	24	Mugu Lagoon to Latigo Point ASBS
Discharge	NWPT	-117.8675	33.5887	32	Newport Beach Marine Life Refuge ASBS
Discharge	D087	-117.8480	33.5774	33	Irvine Coast Marine Life Refuge ASBS
Discharge	D076	-117.7897	33.5428	30	Heisler Park Ecological Reserve ASBS
Discharge	D080	-117.2535	32.8693	31	San Diego Marine Life Refuge ASBS
Discharge	D074	-117.2637	32.8498	29	San Diego-La Jolla Ecological Reserve ASBS
22					Total No. Sites in Discharge Stratum
11					Total No. Sites in NonDischarge Stratum
33					Total No. Sites

Table 2. Area weighted geomean concentrations ($\pm 95\%$ confidence intervals) for receiving water strata near (discharge) and far (nondischarge) from outfalls in areas of special biological significance <48 hours before (pre-storm) and <24 hours following (post-storm) wet weather events. “--” indicates no detectable quantities.

Parameter	Units	Nondischarge				Discharge			
		Pre-storm		Post-storm		Pre-storm		Post-storm	
		Geomean	(+) 95% CI	Geomean	(+) 95% CI	Geomean	(+) 95% CI	Geomean	(+) 95% CI
Ammonia-N	mg/L	0.001	0.002	0.004	0.008	0.017	0.031	0.009	0.009
Nitrate+Nitrite-N	mg/L	0.13	0.10	0.14	0.10	0.11	0.07	0.12	0.0559
Total P	mg/L	0.41	0.24	0.19	0.09	0.21	0.20	0.07	0.03
Total N	mg/L	0.76	1.22	0.82	1.03	0.37	0.56	1.25	1.44
TSS	mg/L	95.7	145.3	78.5	52.3	91.7	69.2	95.5	75.4
DOC	mg/L	--	--	--	--	0.03	0.06	0.89	1.03
Arsenic-Total	ug/L	1.69	0.35	1.72	0.30	1.96	0.42	1.87	0.40
Cadmium-Total	ug/L	0.05	0.02	0.05	0.02	0.08	0.02	0.11	0.10
Chromium-Total	ug/L	1.61	0.49	2.17	0.74	2.85	1.48	2.59	0.96
Copper-Total	ug/L	0.99	0.32	1.43	0.70	1.09	0.37	1.19	0.43
Iron-Total	ug/L	761	539	1301	1098	1288	919	994	474
Lead-Total	ug/L	0.71	0.82	0.60	0.49	0.89	0.61	0.50	0.13
Nickel-Total	ug/L	2.07	0.84	2.91	0.88	2.87	1.28	2.90	0.95
Silver-Total	ug/L	0.002	0.004	--	--	0.007	0.010	--	--
Zinc-Total	ug/L	1.91	1.76	1.10	1.20	3.39	0.91	4.59	2.86
Arsenic-Dissolved	ug/L	1.43	0.07	1.32	0.16	1.35	0.07	1.29	0.13
Cadmium-Dissolved	ug/L	0.02	0.02	0.03	0.02	0.20	0.27	0.05	0.03
Chromium-Dissolved	ug/L	0.18	0.02	0.18	0.04	0.16	0.01	0.21	0.02
Copper-Dissolved	ug/L	0.17	0.03	0.21	0.05	0.23	0.10	0.54	0.24
Iron-Dissolved	ug/L	0.07	0.12	0.15	0.21	0.36	0.24	5.33	4.90
Lead-Dissolved	ug/L	0.002	0.003	0.003	0.003	0.009	0.006	0.018	0.019
Nickel-Dissolved	ug/L	0.39	0.13	0.47	0.27	0.37	0.15	0.93	0.65
Silver-Dissolved	ug/L	--	--	--	--	--	--	--	--
Zinc-Dissolved	ug/L	0.24	0.34	0.26	0.33	1.53	1.63	1.44	1.84
Total PAH	ug/L	0.020	0.017	0.038	0.033	0.106	0.117	0.015	0.005

Table 3. Percent of shoreline-miles exceeding daily maximum of six-month median water quality standards (WQS) in receiving water either near outfalls (discharge), far from outfalls (nondischarge), or combined (statewide) in areas of special biological significance <48 hours before (pre-storm) and <24 hours following (post-storm) wet weather events.

Parameter	Units	Shoreline-Miles (%) Exceeding Daily Maximum WQS						
		WQS	Pre-Storm			Post-Storm		
			Statewide	Discharge	Non-Discharge	Statewide	Discharge	Non-Discharge
Ammonia-N	mg/L	2.4	--	--	--	--	--	--
Arsenic-Dissolved	ug/L	32	--	--	--	--	--	--
Cadmium-Dissolved	ug/L	4	--	--	--	--	--	--
Chromium-Dissolved	ug/L	8	--	--	--	--	--	--
Copper-Dissolved	ug/L	12	--	--	--	--	--	--
Lead-Dissolved	ug/L	8	--	--	--	--	--	--
Nickel-Dissolved	ug/L	20	--	--	--	--	--	--
Silver-Dissolved	ug/L	2.8	--	--	--	--	--	--
Zinc-Dissolved	ug/L	80	--	--	--	--	--	--
Arsenic-Total	ug/L	32	--	--	--	--	--	--
Cadmium-Total	ug/L	4	--	--	--	--	--	--
Chromium-Total	ug/L	8	--	--	--	2	3	--
Copper-Total	ug/L	12	--	--	--	--	--	--
Lead-Total	ug/L	8	--	--	--	--	--	--
Nickel-Total	ug/L	20	--	--	--	--	--	--
Silver-Total	ug/L	2.8	--	--	--	--	--	--
Zinc-Total	ug/L	80	--	--	--	--	--	--

Table 3. Continued

Parameter	Units	Shoreline-Miles (%) Exceeding 6-Month Median WQS						
		WQS	Pre-Storm			Post-Storm		
			Statewide	Discharge	Non-Discharge	Statewide	Discharge	Non-Discharge
Ammonia-N	mg/L	0.6	--	--	--	--	--	--
Arsenic-Dissolved	ug/L	8	--	--	--	--	--	--
Cadmium-Dissolved	ug/L	1	--	--	--	< 1	< 1	--
Chromium-Dissolved	ug/L	2	--	--	--	--	--	--
Copper-Dissolved	ug/L	3	--	--	--	< 1	< 1	--
Lead-Dissolved	ug/L	2	--	--	--	--	--	--
Nickel-Dissolved	ug/L	5	--	--	--	2	3	--
Silver-Dissolved	ug/L	0.7	--	--	--	--	--	--
Zinc-Dissolved	ug/L	20	--	--	--	--	--	--
Arsenic-Total	ug/L	8	--	--	--	2	3	--
Cadmium-Total	ug/L	1	--	--	--	2	4	--
Chromium-Total	ug/L	2	41	62	12	50	61	35
Copper-Total	ug/L	3	--	--	--	7	5	10
Lead-Total	ug/L	2	11	6	18	5	--	11
Nickel-Total	ug/L	5	3	6	--	15	24	3
Silver-Total	ug/L	0.7	--	--	--	--	--	--
Zinc-Total	ug/L	20	--	--	--	4	7	--

Table 4. Percent of shoreline-miles exceeding 30-day average water quality standards (WQS) in receiving water either near outfalls (discharge), far from outfalls (nondischarge), or combined (statewide) in areas of special biological significance <48 hours before (pre-storm) and <24 hours following (post-storm) wet weather events.

Parameter	Units	Shoreline-Miles (%) Exceeding 30-Day Average WQS						
		WQS	Pre-Storm			Post-Storm		
			Statewide	Discharge	Non-Discharge	Statewide	Discharge	Non-Discharge
Fluoranthene	ng/L	150	--	--	--	--	--	--
Chlordane	ng/L	0.023	--	--	--	--	--	--
DDT	ng/L	0.17	< 1	1	--	--	--	--
Dieldrin	ng/L	0.04	--	--	--	--	--	--
PAHs	ng/L	8.8	66	76	54	87	86	89
PCBs	ng/L	0.019	--	--	--	--	--	--

Appendix D – Mussel Watch Bioaccumulation Data

Summary for Pacific Grove Lovers Point (PGLP)

At PGLP, according to the latest data (2007-2009):

Arsenic concentration (11.6 µg/dry g) is higher than state wide median (9.43 µg/dry g), and lower than statewide 85th percentile (13.28 µg/dry g);

Lead concentration (7.03 µg/dry g) is higher than state wide median (1.36 µg/dry g) and statewide 85th percentile (2.246 µg/dry g) concentration;

Cadmium concentration (12.8 µg/dry g) is higher than statewide median (5.01 µg/dry g) and statewide 85th percentile (7.498 µg/dry g) concentration;

Nickel concentration (2.52 µg/dry g) is higher than state wide median (2.18 µg/dry g), and lower than statewide 85th percentile (4.662 µg/dry g);

Zinc concentration (189 µg/dry g) is higher than statewide median (138 µg/dry g) and statewide 85th percentile (187.8 µg/dry g) concentration;

Mercury concentration (0.0941 µg/dry g) is higher than statewide median (0.074 µg/dry g), and lower than statewide 85th percentile (0.224 µg/dry g).

The other analyzed metals and total PAH concentrations are lower than both statewide median concentration and state wide 85th percentile concentrations.

Between 1985 and 2010, 18 constituents (Total Butyltins, Total Chlordanes, Total DDTs, Total Dieldrins, Total PAHs, Total PCBs, Zinc, Selenium, Tin, Ag, Al, As, Cd, Cr, Cu, Hg, Ni and Pb) were analyzed in Pacific Grove Lovers Point.

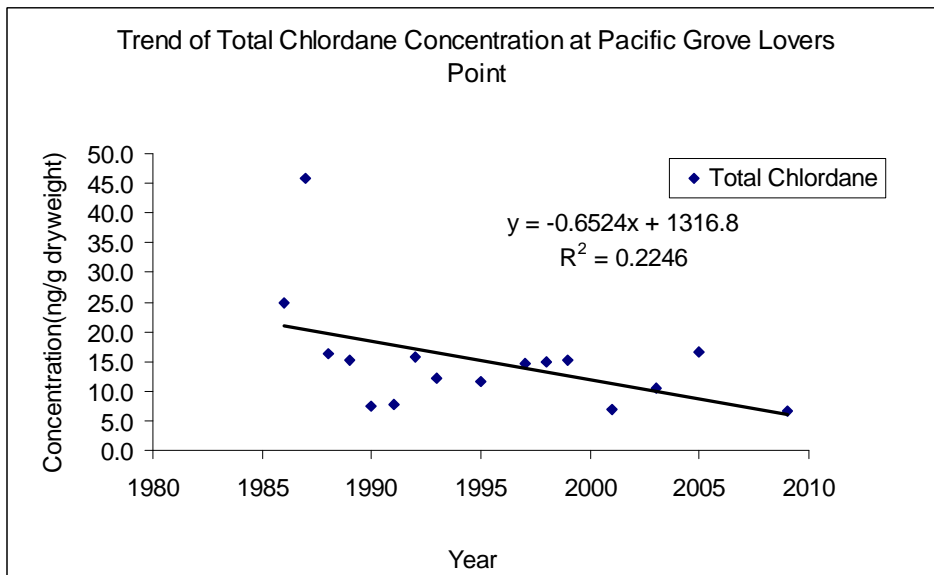
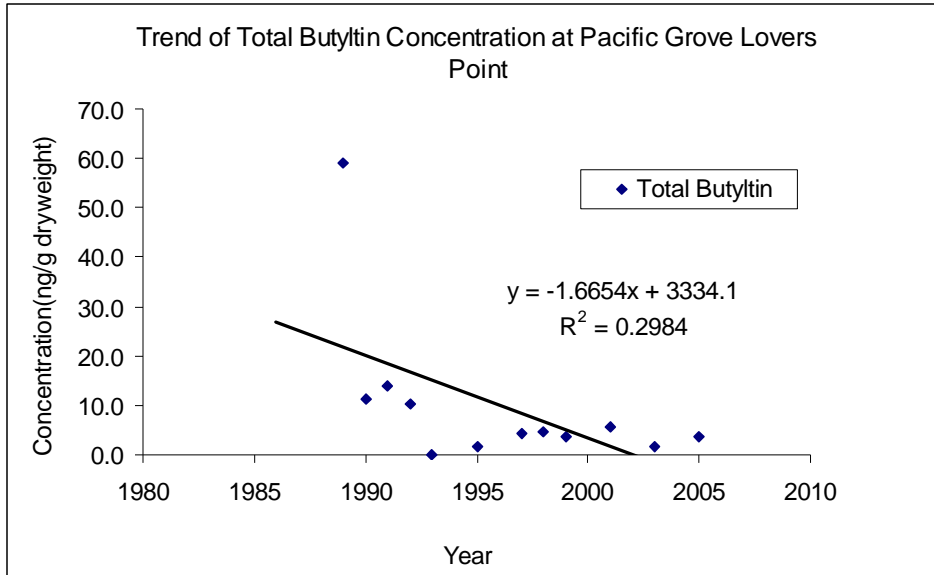
The following table provides the results for the test for a significant correlation coefficient. Highlighted values have statistically significant trends. Arsenic and Tin shows a significant decrease according to historic data (1986 – 2009). Cadmium shows a significant increase. Most of constituents (11 out of 18) show downward trends.

Table 1: Pearson Product-Moment Correlation Coefficient analysis for historical trend data(1986-2009). Highlighted constituents have significant trends.

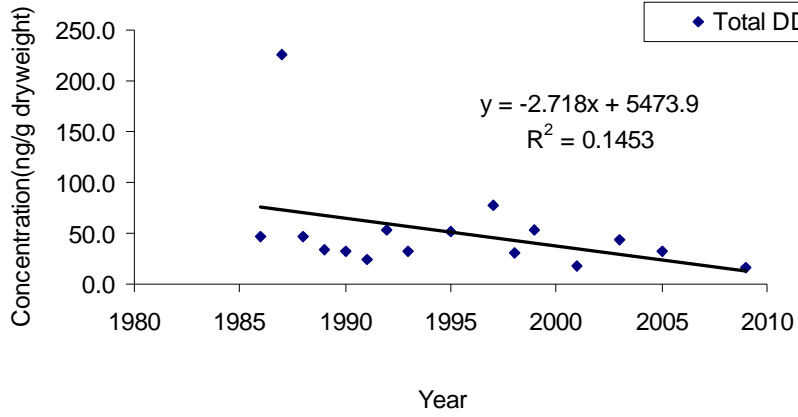
Pacific Grove Lovers Point					
Year	Number of data	R ²	R*	Critical value of the Pearson Product-Moment Correlation Coefficient (0.05)	b**
Total Butlytins	12	0.298	0.546	0.576	-1.67
Total Chlordane	16	0.225	0.474	0.497	-0.65
Total DDT	16	0.145	0.381	0.497	-2.72
Total Dieldrin	16	0.126	0.355	0.497	-0.395
Total PAHs	13	0.068	0.26	0.553	1.27
Total PCBs	13	0.015	0.124	0.553	-0.21
ZN	16	0.01	0.098	0.497	-0.42
Ag	12	0.022	0.147	0.576	0.007
AS	16	0.362	0.602	0.497	-0.24
CD	15	0.269	0.518	0.514	0.27
CR	16	0.171	0.413	0.497	0.04
CU	16	0.077	0.278	0.497	0.078
HG	16	0.053	0.231	0.497	0.0015
NI	16	0.145	0.381	0.497	0.0334
PB	16	0.053	0.23	0.497	-0.09
SB	6	0.879	0.937	0.811	-0.157
SE	16	0.021	0.146	0.497	-0.01
SI	6	0.141	0.375	0.811	-72.06

R-Correlation coefficient; **b- slope of the linear model

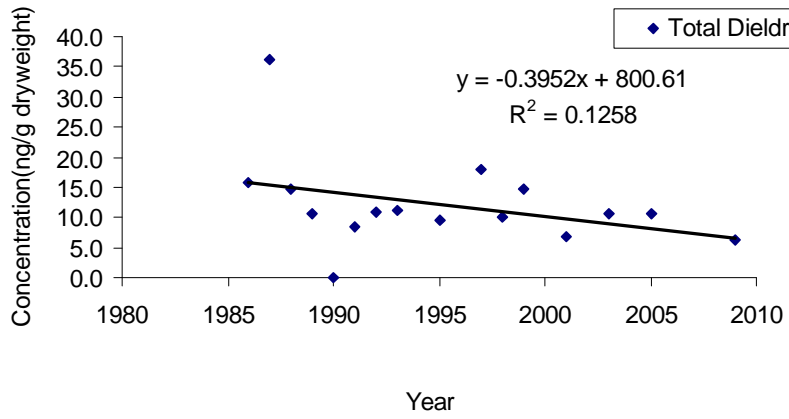
Graphs for mussel watch tissue concentrations over time are provided below.



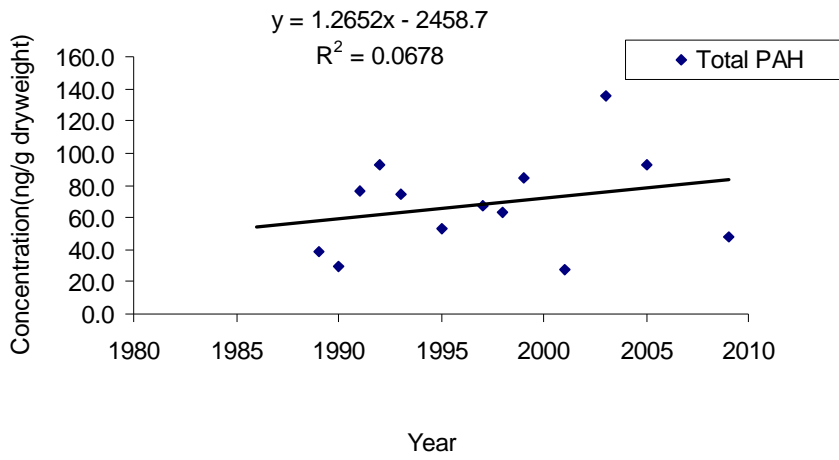
Trend of Total DDT Concentration at Pacific Grove Lovers Point



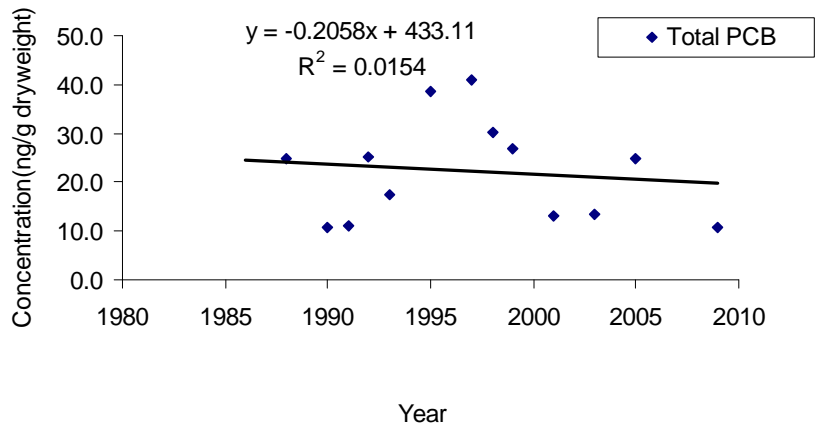
Trend of Total Dieldrin Concentration at Pacific Grove Lovers Point



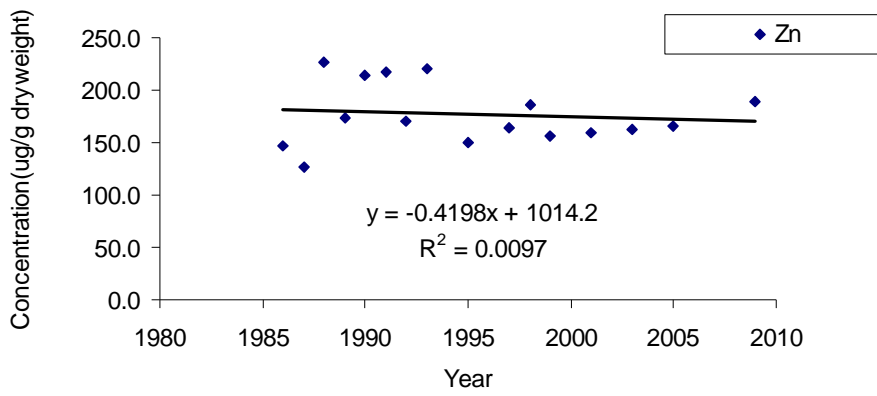
Trend of Total PAH Concentration at Pacific Grove Lovers Point



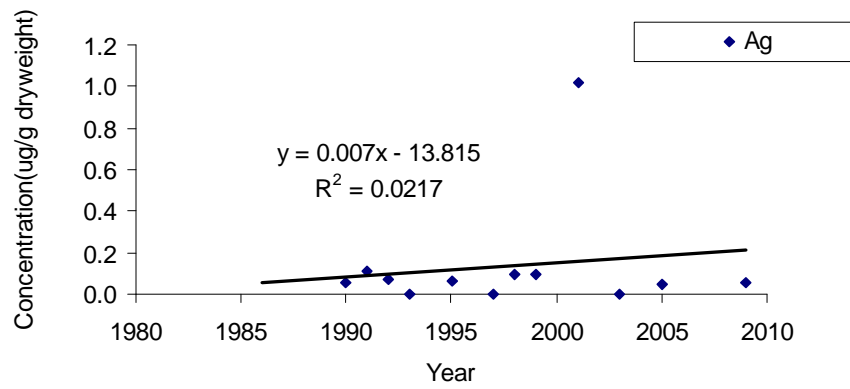
Trend of Total PCB Concentration at Pacific Grove Lovers Point



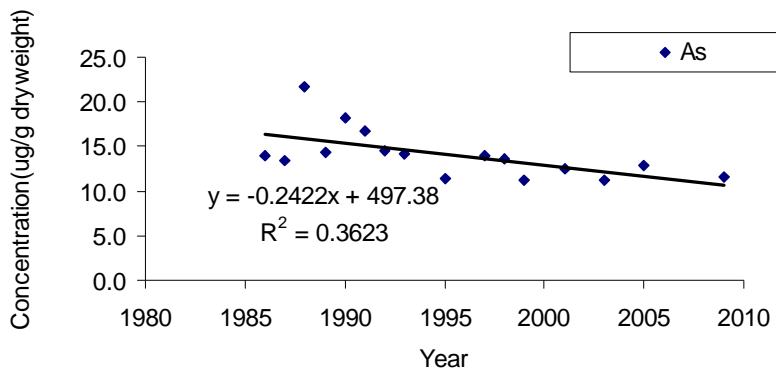
Trend of Zn Concentration at Pacific Grove Lovers Point



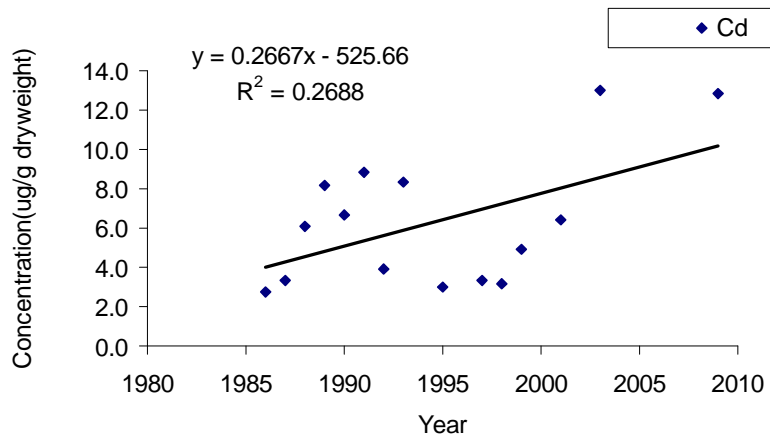
Trend of Ag Concentration at Pacific Grove Lovers Point



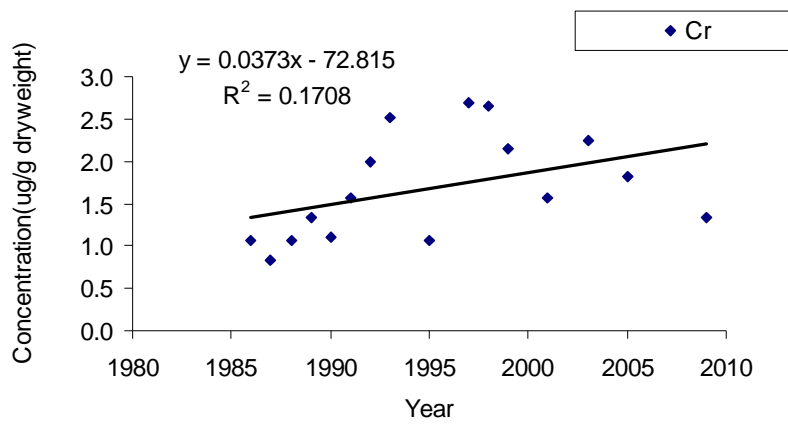
Trend of As Concentration at Pacific Grove Lovers Point



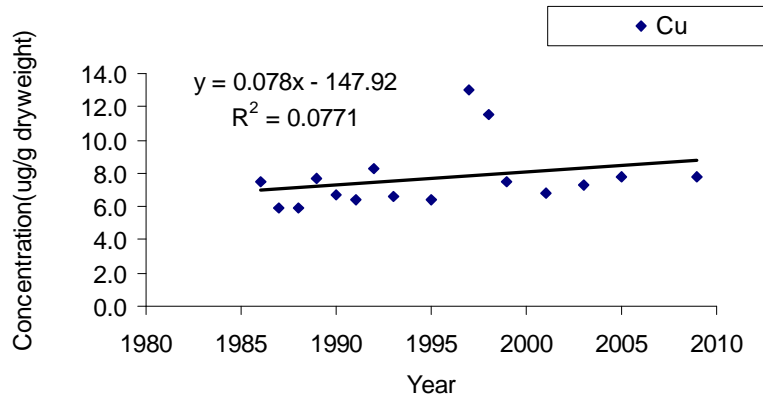
Trend of Cd Concentration at Pacific Grove Lovers Point



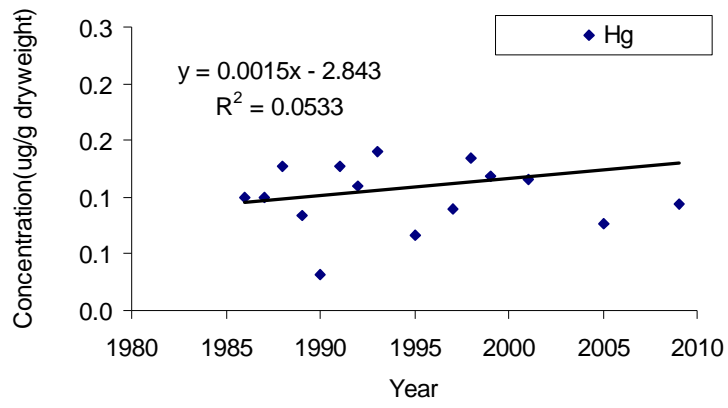
Trend of Cr Concentration at Pacific Grove Lovers Point



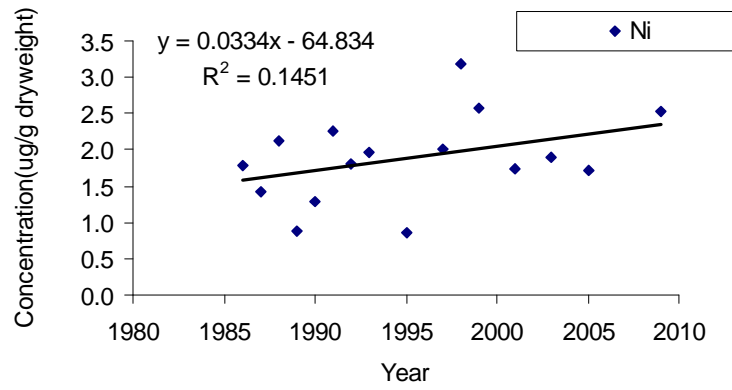
Trend of Cu Concentration at Pacific Grove Lovers Point



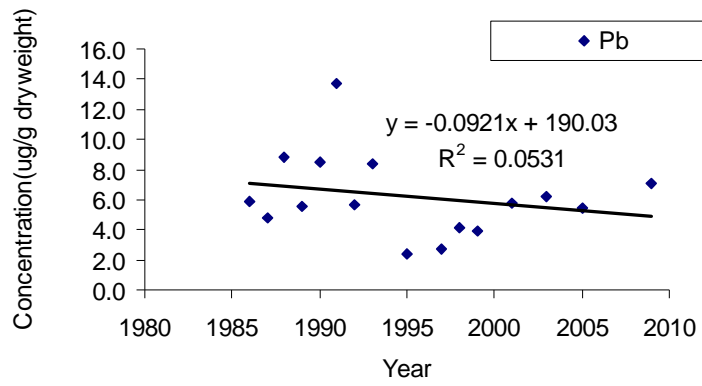
Trend of Hg Concentration at Pacific Grove Lovers Point



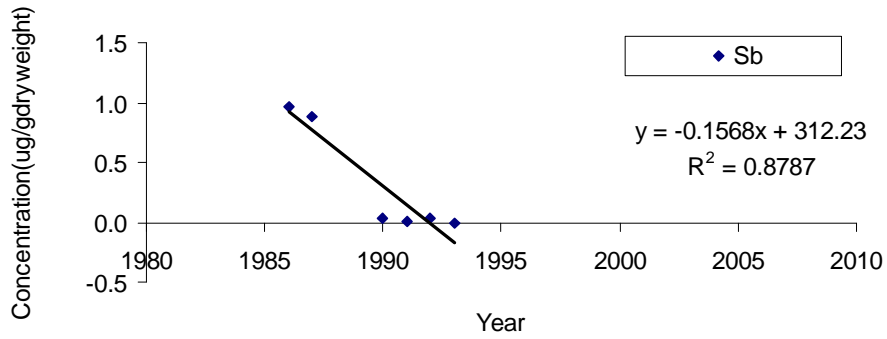
Trend of Ni Concentration at Pacific Grove Lovers Point



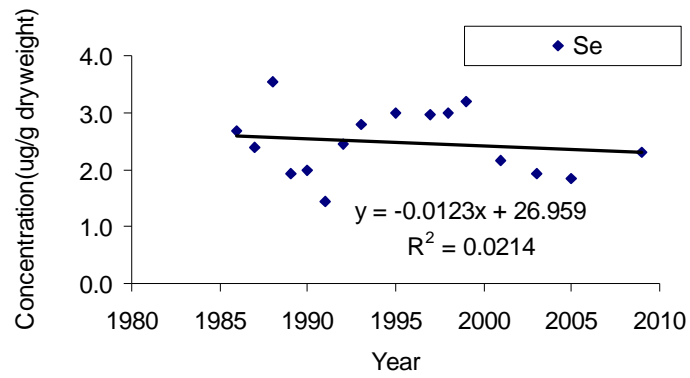
Trend of Pb Concentration at Pacific Grove Lovers Point



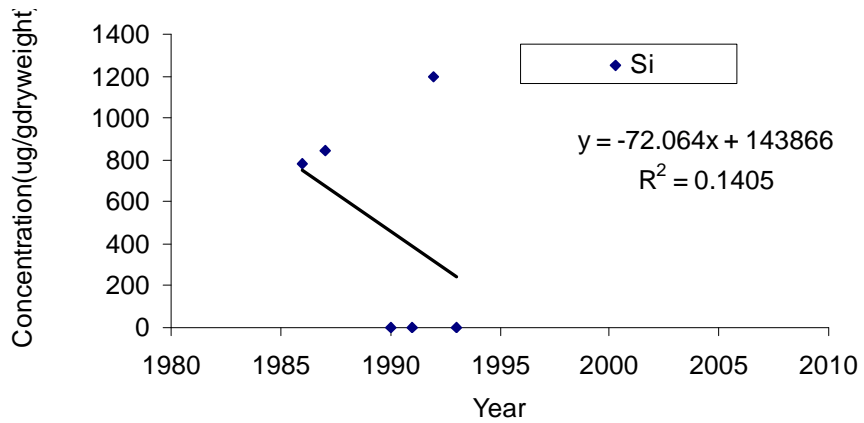
Trend of Sb Concentration at Pacific Grove Lovers Point



Trend of Se Concentration at Pacific Grove Lovers Point



Trend of Si concentration at Pacific Grove Lovers Point



Appendix E– List of Species maintained at MBAQ

The list of species of aquatic plants and animals held at Monterey Bay Aquarium as of June 2006. Each organism is listed by phylum or division, class, family, scientific name (genus-species), and common name, if available. No attempt has been made to quantify specimens, as this number tends to vary, depending upon the date of the census. Scientific nomenclature was derived from the Integrated Taxonomic Information System of USDA.

**Monterey Bay Aquarium
Species List of Regional Plants and Animals**

Phylum or Division	Class	Family	Scientific Name	Common Name
Blue-Green Algae				
Cyanophyta [^]	Hormogoneae	Oscillatoriaceae	<i>Oscillatoria</i> sp.	Oscillatoria
Green Algae				
Chlorophyta [^]	Chlorophyceae	Bryopsidaceae	<i>Bryopsis corticulans</i>	Bryopsis
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Acrosiphonia costata</i>	Acrosiphonia
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Chaetomorpha linum</i>	Chaetomorpha
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Cladophora columbiana</i>	Cladophora
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Cladophora elmorei</i>	Cladophora
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Cladophora graminea</i>	Cladophora
Chlorophyta [^]	Chlorophyceae	Cladophoraceae	<i>Cladophora simpsonii</i>	Cladophora
Chlorophyta [^]	Chlorophyceae	Codiaceae	<i>Codium fragile</i>	Deadman's Fingers
Chlorophyta [^]	Chlorophyceae	Ulvaceae	<i>Enteromorpha intestinalis</i>	Enteromorpha
Chlorophyta [^]	Chlorophyceae	Ulvaceae	<i>Enteromorpha</i> sp.	Enteromorpha
Chlorophyta [^]	Chlorophyceae	Ulvaceae	<i>Ulva lobata</i>	Sea Lettuce
Chlorophyta [^]	Chlorophyceae	Ulvaceae	<i>Ulva</i> sp.	Sea Lettuce
Brown Algae				
Phaeophyta [^]	Phaeophyceae	Alariaceae	<i>Egregia menziesii</i>	Kelp, Feather Boa
Phaeophyta [^]	Phaeophyceae	Alariaceae	<i>Eisenia arborea</i>	Eisenia
Phaeophyta [^]	Phaeophyceae	Alariaceae	<i>Pterygophora californica</i>	Pterygophora
Phaeophyta [^]	Phaeophyceae	Chordariaceae	<i>Anallipus japonicus</i>	Anallipus
Phaeophyta [^]	Phaeophyceae	Cystoseiraceae	<i>Cystoseira osmundacea</i>	Kelp, Bead
Phaeophyta [^]	Phaeophyceae	Dictyotaceae	<i>Dictyota binghamiae</i>	Dictyota
Phaeophyta [^]	Phaeophyceae	Ectocarpaceae	<i>Feldmannia paradoxa</i>	Feldmannia
Phaeophyta [^]	Phaeophyceae	Ectocarpaceae	<i>Hincksia granulosa</i>	Hincksia
Phaeophyta [^]	Phaeophyceae	Ectocarpaceae	<i>Hincksia michelliae</i>	Hincksia
Phaeophyta [^]	Phaeophyceae	Fuaceae	<i>Fucus gardneri</i>	Fucus
Phaeophyta [^]	Phaeophyceae	Fuaceae	<i>Palvetlopsis limifata</i>	Palvetlopsis
Phaeophyta [^]	Phaeophyceae	Fuaceae	<i>Silvetia compressa</i>	Silvetia
Phaeophyta [^]	Phaeophyceae	Laminariaceae	<i>Costaria costata</i>	Costaria

Phylum or Division	Class	Family	Scientific Name	Common Name
Phaeophyta ¹	Phaeophyceae	Laminariaceae	<i>Laminaria setchellii</i>	Sea Weed
Phaeophyta ¹	Phaeophyceae	Laminariaceae	<i>Pleurophycus gardneri</i>	Pleurophycus
Phaeophyta ¹	Phaeophyceae	Lessoniaceae	<i>Diclyoneurospis reticulata</i>	Diclyoneurospis
Phaeophyta ¹	Phaeophyceae	Lessoniaceae	<i>Diclyoneurum californicum</i>	Diclyoneurum
Phaeophyta ¹	Phaeophyceae	Lessoniaceae	<i>Macrocystis integrifolia</i>	Kelp, Giant
Phaeophyta ¹	Phaeophyceae	Lessoniaceae	<i>Macrocystis pyrifera</i>	Kelp, Giant
Phaeophyta ¹	Phaeophyceae	Lessoniaceae	<i>Nereocystis leuckeana</i>	Kelp, Bull
Phaeophyta ¹	Phaeophyceae	Scytosiphonaceae	<i>Colpomenia peregrina</i>	Colpomenia
Phaeophyta ¹	Phaeophyceae	Scytosiphonaceae	<i>Scytosiphon simplicissimus</i>	Scytosiphon
Red Algae				
Rhodophyta ¹	Bangiales	Bangiaceae	<i>Porphyra perforata</i>	Porphyra
Rhodophyta ¹	Bangiales	Erythropeletidaceae	<i>Erythrotrichia</i> sp.	Erythrotrichia
Rhodophyta ¹	Bangiales	Goniotrichaceae	<i>Stylonema alsidii</i>	Stylonema
Rhodophyta ¹	Bangiales	Acrochaetaceae	<i>Acrochaetium</i> sp.	Acrochaetium
Rhodophyta ¹	Bangiales	Acrochaetaceae	<i>Colaconema dawesii</i>	Colaconema
Rhodophyta ¹	Bangiales	Bonnemaisoniaceae	<i>Bonnemaisonia hamifera</i>	Bonnemaisonia
Rhodophyta ¹	Bangiales	Ceramiales	<i>Anthamnon densum</i>	Anthamnon
Rhodophyta ¹	Bangiales	Ceramiales	<i>Anthamnon kyllini</i>	Anthamnon
Rhodophyta ¹	Bangiales	Ceramiales	<i>Callithamnion pikeanum</i>	Callithamnion pikeanum
Rhodophyta ¹	Bangiales	Ceramiales	<i>Callithamnion</i> sp.	Callithamnion
Rhodophyta ¹	Bangiales	Ceramiales	<i>Microcladia borealis</i>	Microcladia
Rhodophyta ¹	Bangiales	Ceramiales	<i>Microcladia coulteri</i>	Microcladia
Rhodophyta ¹	Bangiales	Ceramiales	<i>Neorhodomela larix</i>	Neorhodomela
Rhodophyta ¹	Bangiales	Ceramiales	<i>Platythamnion pectinatum</i>	Platythamnion
Rhodophyta ¹	Bangiales	Ceramiales	<i>Pterothamnion heteromorphyum</i>	Pterothamnion
Rhodophyta ¹	Bangiales	Ceramiales	<i>Pterothamnion villosum</i>	Pterothamnion
Rhodophyta ¹	Bangiales	Ceramiales	<i>Tiffaniella snyderiae</i>	Tiffaniella
Rhodophyta ¹	Bangiales	Corallinales	<i>Calliarthron</i> sp.	Coralline algae
Rhodophyta ¹	Bangiales	Corallinales	<i>Calliarthron tuberculosum</i>	Coralline algae
Rhodophyta ¹	Bangiales	Corallinales	<i>Corallina officinalis</i>	Coralline algae
Rhodophyta ¹	Bangiales	Corallinales	<i>Corallina</i> sp.	Coralline algae
Rhodophyta ¹	Bangiales	Corallinales	<i>Corallina vancouveriensis</i>	Coralline algae
Rhodophyta ¹	Bangiales	Corallinales	Coralline Crusts	Coralline Crusts

Phylum or Division	Class	Family	Scientific Name	Common Name
Rhodophyta ^A	Florideophyceae	Cryptonemiaceae	<i>Halymenia gardneri</i>	Halymenia
Rhodophyta ^A	Florideophyceae	Cryptonemiaceae	<i>Prionitis lanceolata</i>	Prionitis
Rhodophyta ^A	Florideophyceae	Cryptonemiaceae	<i>Prionitis</i> sp.	Prionitis
Rhodophyta ^A	Florideophyceae	Dasyaceae	<i>Heterosiphonia densiuscula</i>	Heterosiphonia
Rhodophyta ^A	Florideophyceae	Dasyaceae	<i>Rhodoptillum plumosum</i>	Rhodoptillum
Rhodophyta ^A	Florideophyceae	Dasyaceae	<i>Anisocladella pacifica</i>	Anisocladella
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>Cryptopleura lobulifera</i>	Cryptopleura
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>Cryptopleura ruprechtiana</i>	Cryptopleura
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>ErythroGLOSSUM californicum</i>	ErythroGLOSSUM
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>Nienburgia anderssoniana</i>	Nienburgia
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>Phycodrys setchellii</i>	Phycodrys
Rhodophyta ^A	Florideophyceae	Delasseriaceae	<i>Polymeura latissima</i>	Polymeura
Rhodophyta ^A	Florideophyceae	Endocladiaaceae	<i>Endocladia muricata</i>	Endocladia
Rhodophyta ^A	Florideophyceae	Gelidiaceae	<i>Gelidium pusillum</i>	Gelidium
Rhodophyta ^A	Florideophyceae	Gelidiaceae	<i>Gelidium robustum</i>	Gelidium
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Chondracanthus canaliculatus</i>	Chondracanthus
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Chondracanthus corymbiferus</i>	Turkish Towel
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mastocarpus spirrosus</i>	Chondracanthus
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mastocarpus papillatus</i>	Mastocarpus
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella flaccida</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella leptorhynchus</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella linearis</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella rosea</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella sp.</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gigartineaceae	<i>Mazzaella splendens</i>	Mazzaella
Rhodophyta ^A	Florideophyceae	Gracilariaceae	<i>Gracilariaopsis lemaneiformis</i>	Gracilariaopsis
Rhodophyta ^A	Florideophyceae	Gracilariaceae	<i>Callophyllis crenulata</i>	Callophyllis
Rhodophyta ^A	Florideophyceae	Gracilariaceae	<i>Callophyllis flabellulata</i>	Callophyllis
Rhodophyta ^A	Florideophyceae	Kalymeniaceae	<i>Callophyllis okamurae</i>	Callophyllis
Rhodophyta ^A	Florideophyceae	Kalymeniaceae	<i>Callophyllis violacea</i>	Callophyllis
Rhodophyta ^A	Florideophyceae	Kalymeniaceae	<i>Pugelia fragilissima</i>	Pugelia
Rhodophyta ^A	Florideophyceae	Nemastomataceae	<i>Schizymenia pacifica</i>	Schizymenia
Rhodophyta ^A	Florideophyceae	Phylloporaceae	<i>Gymnogongrus chiton</i>	Gymnogongrus

Phylum or Division	Class	Family	Scientific Name	Common Name
Rhodophyta ⁴	Florideophyceae	Phylophoraceae	<i>Ozophora clevelandii</i>	Ozophora
Rhodophyta ⁴	Florideophyceae	Plocamiaceae	<i>Plocamium violaceum</i>	Plocamium
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Herposiphonia plumula</i>	Herposiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Murrayellopsis dawsonii</i>	Murrayellopsis
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Neorhodomela tarix</i>	Neorhodomela
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Osmundea spectabilis</i>	Osmundea
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Polysiphonia brodaeii</i>	Polysiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Polysiphonia eastwoodae</i>	Polysiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Polysiphonia mollis</i>	Polysiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Polysiphonia pacifica</i>	Polysiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Polysiphonia scopulorum</i>	Polysiphonia
Rhodophyta ⁴	Florideophyceae	Rhodomelaceae	<i>Pterosiphonia dendroidea</i>	Pterosiphonia
Rhodophyta ⁴	Florideophyceae	Rhodymeniaceae	<i>Botryodictia pseudodictyota</i>	Sea Grapes
Rhodophyta ⁴	Florideophyceae	Rhodymeniaceae	<i>Fauchea laciniata</i>	Fauchea
Rhodophyta ⁴	Florideophyceae	Rhodymeniaceae	<i>Fryxella gardneri</i>	Fryxella
Rhodophyta ⁴	Florideophyceae	Rhodymeniaceae	<i>Rhodymenia californica</i>	Rhodymenia
Rhodophyta ⁴	Florideophyceae	Rhodymeniaceae	<i>Rhodymenia pacifica</i>	Rhodymenia
Rhodophyta ⁴	Florideophyceae	Solieriaceae	<i>Sarcodictyca gaudichaudii</i>	Sarcodictyca
Rhodophyta ⁴	Florideophyceae	Unknown	Non-coraline Crusts	Non-coraline Crusts
Vascular Plants				
Tracheobionta	Equisetopsida	Equisetaceae	<i>Equisetum</i> spp	Horsetail
Tracheobionta	Filicopsida	Blechnaceae	<i>Woodwardia frimbriata</i>	Chainfern, Giant
Tracheobionta	Filicopsida	Dryopteridaceae	<i>Athyrium filix-femina</i>	Fern, Lady
Tracheobionta	Filicopsida	Dryopteridaceae	<i>Polystichum murinum</i>	Swordfern, Western
Tracheobionta	Filicopsida	Pteridaceae	<i>Adiantum aleuticum</i>	Fern, Five-finger
Tracheobionta	Filicopsida	Pteridaceae	<i>Adiantum jordanii</i>	Fern, California Maidenhair
Tracheobionta	Filicopsida	Polypodiaceae	<i>Polypodium californica</i>	Polypodium, California
Tracheobionta	Lillopsida	Cyperaceae	<i>Carex parva</i>	Sedge, Dune
Tracheobionta	Lillopsida	Cyperaceae	<i>Schoenoplectus californicus</i>	Bulrush, California
Tracheobionta	Lillopsida	Iridaceae	<i>Iris douglasiana</i>	Iris, Douglas
Tracheobionta	Lillopsida	Iridaceae	<i>Sisyrinchium bellum</i>	Grass, Western Blue-eyed
Tracheobionta	Lillopsida	Iridaceae	<i>Sisyrinchium californicum</i>	Grass, Golden-eyed
Tracheobionta	Lillopsida	Juncaceae	<i>Juncus balficus</i>	Rush, Baltic

Phylum or Division	Class	Family	Scientific Name	Common Name
Tracheobionta	Liliopsida	Juncaceae	<i>Juncus patens</i>	Rush, Spreading
Tracheobionta	Liliopsida	Orchidaceae	<i>Epipactis giganteum</i>	Orchid, Stream
Tracheobionta	Liliopsida	Poaceae	<i>Distichlis spicata</i>	Grass, Salt
Tracheobionta	Liliopsida	Poaceae	<i>Leymus mollis</i>	Grass, Dune Rye
Tracheobionta	Liliopsida	Poaceae	<i>Muhlenbergia rigens</i>	Deergrass
Tracheobionta	Liliopsida	Sparganaceae	<i>Sparganium eurycarpum</i>	Bur-reed
Tracheobionta	Liliopsida	Typhaceae	<i>Typha latifolia</i>	Cattail, Common
Tracheobionta	Liliopsida	Zosteraceae	<i>Phyllospadix scouleri</i>	Grass, Surf
Tracheobionta	Liliopsida	Zosteraceae	<i>Zostera marina</i>	Grass, Eel
Tracheobionta	Magnoliopsida	Asteraceae	<i>Artemisia pycnocephala</i>	Sagewort, Beach
Tracheobionta	Magnoliopsida	Asteraceae	<i>Artemisia californica</i>	Sagebrush, California
Tracheobionta	Magnoliopsida	Asteraceae	<i>Ambrosia</i> sp.	Bur, Beach
Tracheobionta	Magnoliopsida	Asteraceae	<i>Corethrogyne flaginifolia</i>	Aster, Beach
Tracheobionta	Magnoliopsida	Asteraceae	<i>Erigeron glaucus</i>	Daisy, Seaside
Tracheobionta	Magnoliopsida	Asteraceae	<i>Eriophyllum staechadifolium</i>	Lizardtail
Tracheobionta	Magnoliopsida	Asteraceae	<i>Grindelia stricta</i>	Gumplant, Marsh
Tracheobionta	Magnoliopsida	Asteraceae	<i>Jaumea carnosa</i>	Jaumea, Fleshy
Tracheobionta	Magnoliopsida	Asteraceae	<i>Petalostyles frigidus var palmatus</i>	Coltsfoot, Western
Tracheobionta	Magnoliopsida	Caprifoliaceae	<i>Lonicera involucrata</i>	Twinberry
Tracheobionta	Magnoliopsida	Crassulaceae	<i>Dudleya caespitosa</i>	Live Forever
Tracheobionta	Magnoliopsida	Chenopodiaceae	<i>Salicornia virginica</i>	Pickweed
Tracheobionta	Magnoliopsida	Fabaceae	<i>Baptisia arachnifera</i>	Rattleweed
Tracheobionta	Magnoliopsida	Fabaceae	<i>Lupinus versicolor</i>	Lupine
Tracheobionta	Magnoliopsida	Frankeniaceae	<i>Frankenia salina</i>	Heath, Alkali
Tracheobionta	Magnoliopsida	Lamiaceae	<i>Stachys bulbata</i>	Hedgenettle, California
Tracheobionta	Magnoliopsida	Malvaceae	<i>Lavatera assurgentiflora</i>	Mallow, Island
Tracheobionta	Magnoliopsida	Nyctaginaceae	<i>Abronia angustifolia</i>	Verbena, Purple Sand
Tracheobionta	Magnoliopsida	Papaveraceae	<i>Eschscholzia californica</i>	Poppy, California
Tracheobionta	Magnoliopsida	Plumbaginaceae	<i>Armeria maritima</i>	Thrift Seepink
Tracheobionta	Magnoliopsida	Plumbaginaceae	<i>Limonium californicum</i>	Rosemary, Marsh
Tracheobionta	Magnoliopsida	Polygonaceae	<i>Eriogonum latifolium</i>	Buckwheat, Coast
Tracheobionta	Magnoliopsida	Polygonaceae	<i>Eriogonum parvifolium</i>	Buckwheat, Dune
Tracheobionta	Magnoliopsida	Ranunculaceae	<i>Ranunculus repens</i>	Buttercup, Creeping

Phylum or Division	Class	Family	Scientific Name	Common Name
Tracheobionta	Magnoliopsida	Rosaceae	<i>Fragaria chiloensis</i>	Strawberry, Beach
Tracheobionta	Magnoliopsida	Salicaceae	<i>Populus fremontii</i>	Cottonwood, Fremont
Tracheobionta	Magnoliopsida	Salicaceae	<i>Salix lucida subsp lasiandra</i>	Willow, Yellow
Tracheobionta	Magnoliopsida	Scrophulariaceae	<i>Castilleja latifolia</i>	Paintbrush
Tracheobionta	Magnoliopsida	Scrophulariaceae	<i>Diplacus aurantiacus</i>	Monkeyflower, Sticky
Tracheobionta	Magnoliopsida	Scrophulariaceae	<i>Mimulus cardinalis</i>	Monkeyflower, Red
Tracheobionta	Magnoliopsida	Scrophulariaceae	<i>Mimulus guttatus</i>	Monkeyflower, Yellow
Tracheobionta	Magnoliopsida	Violaceae	<i>Violet spp.</i>	Violet
Tracheobionta	Pinopsida	Cupressaceae	<i>Cupressus goveniana</i>	Cypress, Gowan
Rotifera	Euratoria	Branchionidae	<i>Branchionus plicatilis</i>	Rotifer
Sponges				
Porifera	Calcarea	Clathrinidae	<i>Leucilia nuttingi</i>	Sponge, Vase Or Urn
Porifera	Demospongiae	Aplysiniidae	<i>Aplysina fistularis</i>	Sponge, Yellow
Porifera	Demospongiae	Clathrinidae	<i>Axoclella originalis</i>	Axoclella
Porifera	Demospongiae	Clathrinidae	<i>Ophlasporgia pennata</i>	Sponge, Red Encrusting
Porifera	Demospongiae	Cionidae	<i>Ciona celata</i>	Sponge, Boring
Porifera	Demospongiae	Dysideidae	<i>Acarinus erithacus</i>	Sponge, Red Volcano
Porifera	Demospongiae	Dysideidae	<i>Acarinus sp.</i>	Sponge
Porifera	Demospongiae	Halictondriidae	<i>Halictondria panicea</i>	Sponge, Bread Crumb
Porifera	Demospongiae	Halictonidae	<i>Haliclona sp.</i>	Sponge, Haliclona
Porifera	Demospongiae	Hymedesmidae	<i>Hymenamphiastrea cyanocrypta</i>	Sponge, Cobalt Blue
Porifera	Demospongiae	Polymastilidae	<i>Polymastia pachymastia</i>	Sponge
Porifera	Demospongiae	Tethyidae	<i>Tethya aurantia</i>	Sponge, Orange Puffball
Porifera	Demospongiae	Tethyidae	<i>Tethya aurantia</i>	Sponge, Orange Puffball
Porifera	Demospongiae	Tellinidae	<i>Tellina arb</i>	Sponge, Grey Puffball
Cnidarians and Ctenophores				
Cnidaria	Anthozoa	Actiniidae	<i>Urticina columbiana</i>	Anemone, Sand Rose
Cnidaria	Anthozoa	Actiniidae	<i>Urticina coriacea</i>	Anemone, Stubby Rose
Cnidaria	Anthozoa	Actiniidae	<i>Urticina crassicornis</i>	Anemone
Cnidaria	Anthozoa	Actinidae	<i>Urticina lofotensis</i>	Anemone, White-spotted
Cnidaria	Anthozoa	Actinidae	<i>Urticina piscivora</i>	Anemone, Fish-eating
Cnidaria	Anthozoa	Actinidae	<i>Anthopleura artemisia</i>	Anemone, Moonglow
Cnidaria	Anthozoa	Actiniidae	<i>Anthopleura elegantissima</i>	Anemone, Aggregating Green

Phylum or Division	Class	Family	Scientific Name	Common Name
Cnidaria	Anthozoa	Actiniidae	<i>Anthopleura sola</i>	Anemone, Sunburst
Cnidaria	Anthozoa	Actiniidae	<i>Anthopleura xanthogrammica</i>	Anemone, Green
Cnidaria	Anthozoa	Actiniidae	<i>Epiactis prolifera</i>	Anemone, Proliferating
Cnidaria	Anthozoa	Cerathiidae	<i>Pachyceranthus limbratus</i>	Anemone, Burrowing
Cnidaria	Anthozoa	Corallimorphidae	<i>Corynactis californica</i>	Anemone, Strawberry
Cnidaria	Anthozoa	Dendrophyllidae	<i>Balanophyllia elegans</i>	Cup Coral, Orange
Cnidaria	Anthozoa	Gorgonillidae	<i>Lophogorgia chilensis</i>	Gorgonian, Red
Cnidaria	Anthozoa	Metridiidae	<i>Metridium exilis</i>	Anemone
Cnidaria	Anthozoa	Metridiidae	<i>Metridium giganteum</i>	Anemone
Cnidaria	Anthozoa	Metridiidae	<i>Metridium senile</i>	Anemone, Plumose
Cnidaria	Anthozoa	Metridiidae	<i>Paragorgia arborea</i>	Gorgonian, Pink/Branched
Cnidaria	Anthozoa	Paragorgiidae	<i>Paracyathus stearnsi</i>	Cup Coral, Brown
Cnidaria	Anthozoa	Pendrophyllidae	<i>Ptilosarcus gunneyi</i>	Sea Pen, Orange
Cnidaria	Anthozoa	Pennatulina	<i>Euplexaura marki</i>	Gorgonian, Red Licorice
Cnidaria	Anthozoa	Plexauridae	<i>Swiftia koroidi</i>	Sea Fan, Red
Cnidaria	Anthozoa	Plexauridae	<i>Acanthoplitum</i>	Whip, Monkeytail
Cnidaria	Anthozoa	Virgulariidae	<i>Haliplex californica</i>	Sea Whip
Cnidaria	Anthozoa	Virgulariidae	<i>Aequorea victoria</i>	Jelly, Crystal
Cnidaria	Hydrozoa	Eirenidae	<i>Eutima indicans</i>	Jelly, Umbrella
Cnidaria	Hydrozoa	Plumulariidae	<i>Plumularia</i> sp.	Hydroid, Plumularia
Cnidaria	Hydrozoa	Polychidae	<i>Polyorchis montereyensis</i>	Jelly, Bell
Cnidaria	Scyphozoa	Cyaneidae	<i>Cyanea capillata</i>	Jelly, Lion's Mane
Cnidaria	Scyphozoa	Pelagiidae	<i>Chrysaora fuscescens</i>	Jelly, Chrysaora
Cnidaria	Scyphozoa	Pelagiidae	<i>Chrysaora achlyos</i>	Jelly, Black sea nettle
Cnidaria	Scyphozoa	Pelagiidae	<i>Chrysaora colorata</i>	Jelly, Purple-striped
Cnidaria	Scyphozoa	Ulmariidae	<i>Aurelia aurita</i>	Jelly, Moon (aurita)
Cnidaria	Scyphozoa	Ulmariidae	<i>Phacellophora camtschatica</i>	Jelly, Egg-yolk
Ctenophora	Nuda	Beroiidae	<i>Beroe forskall</i>	Beroe
Ctenophora	Tentaculata	Bolinopsidae	<i>Bolinopsis</i> sp.	Bolinopsis
Ctenophora	Tentaculata	Mnemiidae	<i>Mnemiopsis leydli</i>	Warty Comb Jelly
Ctenophora	Tentaculata	Pleurobrachiidae	<i>Pleurobrachia bachei</i>	Sea Gooseberry

Phylum or Division	Class	Family	Scientific Name	Common Name
Echinodermata	Stelleroidea	Asterinidae	<i>Pycnopodia helianthoides</i>	Star, Sunflower
Echinodermata	Stelleroidea	Asteronychiidae	<i>Asterorhynchus longifissus</i>	Star, Five-armed Basket
Echinodermata	Stelleroidea	Astropectinidae	<i>Astropecten armatus</i>	Star, Sand
Echinodermata	Stelleroidea	Echinasteridae	<i>Henricia lewiscula</i>	Star, Blood
Echinodermata	Stelleroidea	Goniasteridae	<i>Ceremaster patagonicus</i>	Star, Cookie
Echinodermata	Stelleroidea	Goniasteridae	<i>Hippasteria spinosa</i>	Star, Spiny Red
Echinodermata	Stelleroidea	Goniasteridae	<i>Medaster aequalis</i>	Star, Red
Echinodermata	Stelleroidea	Gorgonocephalidae	<i>Gorgonocephalus eucnemis</i>	Star, Basket
Echinodermata	Stelleroidea	Ophiactidae	<i>Ophiactis simplex</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiocomidae	<i>Ophiopsilla californica</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiocomidae	<i>Ophioplectis papillosa</i>	Star, Broad-spined Brittle
Echinodermata	Stelleroidea	Ophiodermatidae	<i>Ophiotrix rudis</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiodermatidae	<i>Ophiotrix spiculata</i>	Star, Spiny Brittle
Echinodermata	Stelleroidea	Ophiotrichidae	<i>Ophioplacus esmarki</i>	Star, Smooth Brittle
Echinodermata	Stelleroidea	Poranidae	<i>Dermasterias imbricata</i>	Star, Leather
Molluscs				
Mollusca	Bivalvia	Anomidae	<i>Pododesmus cepio</i>	Jingle, Abalone
Mollusca	Bivalvia	Cardiidae	<i>Climocardium nuttallii</i>	Cockle, Basket
Mollusca	Bivalvia	Haliotidae	<i>Haliotis cracherodii</i>	Abalone, Black
Mollusca	Bivalvia	Haliotidae	<i>Haliotis rufescens</i>	Abalone, Red
Mollusca	Bivalvia	Hiatellidae	<i>Panopea generosa</i>	Clam, Geoduck
Mollusca	Bivalvia	Machiridae	<i>Tresus nuttallii</i>	Clam, Gaper
Mollusca	Bivalvia	Mytilidae	<i>Mytilus californianus</i>	Mussel, California
Mollusca	Bivalvia	Mytilidae	<i>Mytilus edulis</i>	Mussel, Bay/Blue
Mollusca	Bivalvia	Pectinidae	<i>Hinnites giganteus</i>	Scallop, Rock
Mollusca	Bivalvia	Pholadidae	<i>Chacoia ovoidea</i>	Clam, Wart-necked Piddock
Mollusca	Bivalvia	Pholadidae	<i>Parapholas californicas</i>	Clam, Scale-sided Piddock
Mollusca	Bivalvia	Tellinidae	<i>Saxidomus nuttallii</i>	Clam, Washington
Mollusca	Bivalvia	Veneridae	<i>Protothaca staminea</i>	Clam, Litterneck
Mollusca	Ceplapoda	Octopodidae	<i>Octopus dofleini</i>	Octopus, Giant Pacific
Mollusca	Ceplapoda	Octopodidae	<i>Octopus rubescens</i>	Octopus, Red
Mollusca	Gastropoda	Acmaeidae	<i>Collisella ochracea</i>	Limpet
Mollusca	Gastropoda	Acmaeidae	<i>Collisella pelta</i>	Limpet, Shield

Phylum or Division	Class	Family	Scientific Name	Common Name
Echinodermata	Stelleroidea	Asterinidae	<i>Pycnopodia helianthoides</i>	Star, Sunflower
Echinodermata	Stelleroidea	Asteronychiidae	<i>Asterorhynchus longifissus</i>	Star, Five-armed Basket
Echinodermata	Stelleroidea	Astropectinidae	<i>Astropecten armatus</i>	Star, Sand
Echinodermata	Stelleroidea	Echinasteridae	<i>Henricia lewiscula</i>	Star, Blood
Echinodermata	Stelleroidea	Goniasteridae	<i>Ceremaster patagonicus</i>	Star, Cookie
Echinodermata	Stelleroidea	Goniasteridae	<i>Hippasteria spinosa</i>	Star, Spiny Red
Echinodermata	Stelleroidea	Goniasteridae	<i>Medaster aequalis</i>	Star, Red
Echinodermata	Stelleroidea	Gorgonocephalidae	<i>Gorgonocephalus eucnemis</i>	Star, Basket
Echinodermata	Stelleroidea	Ophiactidae	<i>Ophiactis simplex</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiocomidae	<i>Ophiopsilla californica</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiocomidae	<i>Ophioplectis papillosa</i>	Star, Broad-spined Brittle
Echinodermata	Stelleroidea	Ophiodermatidae	<i>Ophiotrix rudis</i>	Star, Brittle
Echinodermata	Stelleroidea	Ophiodermatidae	<i>Ophiotrix spiculata</i>	Star, Spiny Brittle
Echinodermata	Stelleroidea	Ophiotrichidae	<i>Ophioplacus esmarki</i>	Star, Smooth Brittle
Echinodermata	Stelleroidea	Poranidae	<i>Dermasterias imbricata</i>	Star, Leather
Molluscs				
Mollusca	Bivalvia	Anomidae	<i>Pododesmus cepio</i>	Jingle, Abalone
Mollusca	Bivalvia	Cardiidae	<i>Climocardium nuttallii</i>	Cockle, Basket
Mollusca	Bivalvia	Haliotidae	<i>Haliotis cracherodii</i>	Abalone, Black
Mollusca	Bivalvia	Haliotidae	<i>Haliotis rufescens</i>	Abalone, Red
Mollusca	Bivalvia	Hiatellidae	<i>Panopea generosa</i>	Clam, Geoduck
Mollusca	Bivalvia	Machridae	<i>Tresus nuttallii</i>	Clam, Gaper
Mollusca	Bivalvia	Mytilidae	<i>Mytilus californianus</i>	Mussel, California
Mollusca	Bivalvia	Mytilidae	<i>Mytilus edulis</i>	Mussel, Bay/Blue
Mollusca	Bivalvia	Pectinidae	<i>Hinnites giganteus</i>	Scallop, Rock
Mollusca	Bivalvia	Pholadidae	<i>Chacoia ovoidea</i>	Clam, Wart-necked Piddock
Mollusca	Bivalvia	Pholadidae	<i>Parapholas californicus</i>	Clam, Scale-sided Piddock
Mollusca	Bivalvia	Tellinidae	<i>Saxidomus nuttallii</i>	Clam, Washington
Mollusca	Bivalvia	Veneridae	<i>Protothaca staminea</i>	Clam, Litterneck
Mollusca	Ceplapoda	Octopodidae	<i>Octopus dofleini</i>	Octopus, Giant Pacific
Mollusca	Ceplapoda	Octopodidae	<i>Octopus rubescens</i>	Octopus, Red
Mollusca	Gastropoda	Acmaeidae	<i>Collisella ochracea</i>	Limpet
Mollusca	Gastropoda	Acmaeidae	<i>Collisella pelta</i>	Limpet, Shield

Phylum or Division	Class	Family	Scientific Name	Common Name
Mollusca	Gastropoda	Flabellinidae	<i>Flabellina verrucosa</i>	Nudibranch
Mollusca	Gastropoda	Littorinidae	<i>Littorina planaxis</i>	Snail, Eroded Periwinkle
Mollusca	Gastropoda	Littorinidae	<i>Littorina scutulata</i>	Snail, Checkered Periwinkle
Mollusca	Gastropoda	Lottidae	<i>Lottia asmi</i>	Limpel, Black
Mollusca	Gastropoda	Lottidae	<i>Lottia digitalis</i>	Limpel, Ribbed
Mollusca	Gastropoda	Lottidae	<i>Lottia gigantea</i>	Limpel, Owl
Mollusca	Gastropoda	Lottiidae	<i>Lottia limatula</i>	Limpel, File
Mollusca	Gastropoda	Mitridae	<i>Mitra idea</i>	Snail, Ida's Miter
Mollusca	Gastropoda	Muricidae	<i>Cerastostoma foliatum</i>	Snail, Leafy Hornmouth
Mollusca	Gastropoda	Muricidae	<i>Ocenebra</i> sp.	Snail, Rock
Mollusca	Gastropoda	Nassaridae	<i>Nassarulus</i> sp.	Snail, Nassa
Mollusca	Gastropoda	Naticidae	<i>Polinices lewisii</i>	Snail, Moon
Mollusca	Gastropoda	Olividae	<i>Olivella biplicata</i>	Snail, Olive
Mollusca	Gastropoda	Phasianellidae	<i>Tricola pulchoides</i>	Snail, Sullied Pheasant
Mollusca	Gastropoda	Polyceridae	<i>Tropha maculata</i>	Nudibranch
Mollusca	Gastropoda	Ranelidae	<i>Fusitron oregonensis</i>	Snail, Oregon Triton
Mollusca	Gastropoda	Rostangiidae	<i>Rostanga pulchra</i>	Nudibranch, Rostanga
Mollusca	Gastropoda	Tethyidae	<i>Meiibe leonina</i>	Nudibranch, Meilbe
Mollusca	Gastropoda	Triophidae	<i>Triopha catalinae</i>	Nudibranch, Orange Tipped
Mollusca	Gastropoda	Trochidae	<i>Tegula brunnea</i>	Snail, Brown Turban
Mollusca	Gastropoda	Trochidae	<i>Tegula funebralis</i>	Snail, Black Turban
Mollusca	Gastropoda	Trochidae	<i>Tegula puligo</i>	Snail, Dusky Turban
Mollusca	Gastropoda	Turbinidae	<i>Lithopoma undosum</i>	Snail, Wavy Turban
Mollusca	Gastropoda	Vermetidae	<i>Serpulorbis squamigerus</i>	Snail, Tube
Mollusca	Polyplocophora	Acanthochitonidae	<i>Cryptochiton stelleri</i>	Chiton, Gumboot
Mollusca	Polyplocophora	Lepidochitonidae	<i>Toricella lineata</i>	Chiton, Lined
Mollusca	Polyplocophora	Lepidochitonidae	<i>Lepidochiton cavema</i>	Chiton, Cave
Mollusca	Polyplocophora	Mopaliidae	<i>Katharina tunikata</i>	Chiton, Katharina
Mollusca	Polyplocophora	Mopaliidae	<i>Mopalia</i> sp.	Chiton, Mossy
Mollusca	Polyplocophora	Mopaliidae	<i>Placiphorella velata</i>	Chiton, Carnivorous

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Mollusca	Gastropoda	Flabellinidae	<i>Flabellina verrucosa</i>	Nudibranch
Mollusca	Gastropoda	Littorinidae	<i>Littorina planaxis</i>	Snail, Eroded Periwinkle
Mollusca	Gastropoda	Littorinidae	<i>Littorina scutulata</i>	Snail, Checkered Periwinkle
Mollusca	Gastropoda	Lottiidae	<i>Lottia asmi</i>	Limpel, Black
Mollusca	Gastropoda	Lottiidae	<i>Lottia digitalis</i>	Limpel, Ribbed
Mollusca	Gastropoda	Lottiidae	<i>Lottia gigantea</i>	Limpel, Owl
Mollusca	Gastropoda	Lottiidae	<i>Lottia limatula</i>	Limpel, File
Mollusca	Gastropoda	Mitridae	<i>Mitra idea</i>	Snail, Ida's Miter
Mollusca	Gastropoda	Muricidae	<i>Cerastostoma foliatum</i>	Snail, Leafy Hornmouth
Mollusca	Gastropoda	Muricidae	<i>Ocenebra</i> sp.	Snail, Rock
Mollusca	Gastropoda	Nassaridae	<i>Nassarius</i> sp.	Snail, Nassa
Mollusca	Gastropoda	Naticidae	<i>Polinices lewisii</i>	Snail, Moon
Mollusca	Gastropoda	Olividae	<i>Olivella biplicata</i>	Snail, Olive
Mollusca	Gastropoda	Phasianellidae	<i>Tricola pulchoides</i>	Snail, Sullied Pheasant
Mollusca	Gastropoda	Polyceridae	<i>Tropha maculata</i>	Nudibranch
Mollusca	Gastropoda	Ranelidae	<i>Fusitron oregonensis</i>	Snail, Oregon Triton
Mollusca	Gastropoda	Rostangiidae	<i>Rostanga pulchra</i>	Nudibranch, Rostanga
Mollusca	Gastropoda	Tethyidae	<i>Meiibe leonina</i>	Nudibranch, Meilbe
Mollusca	Gastropoda	Triophidae	<i>Triopha catalinae</i>	Nudibranch, Orange Tipped
Mollusca	Gastropoda	Trochidae	<i>Tegula brunnea</i>	Snail, Brown Turban
Mollusca	Gastropoda	Trochidae	<i>Tegula funebralis</i>	Snail, Black Turban
Mollusca	Gastropoda	Trochidae	<i>Tegula puligo</i>	Snail, Dusky Turban
Mollusca	Gastropoda	Turbinidae	<i>Lithopoma undosum</i>	Snail, Wavy Turban
Mollusca	Gastropoda	Vermetidae	<i>Serpulorbis squamigerus</i>	Snail, Tube
Mollusca	Polyplocophora	Acanthochitonidae	<i>Cryptochiton stelleri</i>	Chiton, Gumboot
Mollusca	Polyplocophora	Lepidochitonidae	<i>Toricella lineata</i>	Chiton, Lined
Mollusca	Polyplocophora	Lepidochitonidae	<i>Lepidochiton cavema</i>	Chiton, Cave
Mollusca	Polyplocophora	Mopaliidae	<i>Katharina tunikata</i>	Chiton, Katharina
Mollusca	Polyplocophora	Mopaliidae	<i>Mopalia</i> sp.	Chiton, Mossy
Mollusca	Polyplocophora	Mopaliidae	<i>Placiphorella velata</i>	Chiton, Carnivorous

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Arthropoda	Malacostraca	Ligiidae	<i>Ligia occidentalis</i>	Roach, Sea
Arthropoda	Malacostraca	Lithodidae	<i>Cryptolithodes typicus</i>	Crab, Butterfly
Arthropoda	Malacostraca	Lithodidae	<i>Cryptolithodes sitchensis</i>	Crab, Umbrella
Arthropoda	Malacostraca	Lithodidae	<i>Lopholithodes formosus</i>	Crab, Brown Box
Arthropoda	Malacostraca	Lithodidae	<i>Paralithodes rathburi</i>	Crab, Spiny King
Arthropoda	Malacostraca	Lithodidae	<i>Paralithodes californiensis</i>	Crab, California King
Arthropoda	Malacostraca	Majidae	<i>Chorilla longipes</i>	Crab, Spider
Arthropoda	Malacostraca	Majidae	<i>Loxorhynchus crispatus</i>	Crab, Decorator
Arthropoda	Malacostraca	Majidae	<i>Loxorhynchus grandis</i>	Crab, Sheep
Arthropoda	Malacostraca	Majidae	<i>Mimusulus foliatus</i>	Crab, Minkering
Arthropoda	Malacostraca	Majidae	<i>Pugetia gracilis</i>	Crab, Graceful
Arthropoda	Malacostraca	Majidae	<i>Pugetia producta</i>	Crab, Kelp
Arthropoda	Malacostraca	Majidae	<i>Pugetia richii</i>	Crab, Graceful Kelp
Arthropoda	Malacostraca	Majidae	<i>Scyra acutifrons</i>	Crab, Sharp-nosed
Arthropoda	Malacostraca	Paguridae	<i>Pagurus armatus</i>	Crab, Armed Hermit
Arthropoda	Malacostraca	Paguridae	<i>Pagurus granosimanus</i>	Crab, Hermit
Arthropoda	Malacostraca	Paguridae	<i>Pagurus hirsutiusculus</i>	Crab, Hermit
Arthropoda	Malacostraca	Paguridae	<i>Pagurus samuelis</i>	Crab, Hermit
Arthropoda	Malacostraca	Paguridae	<i>Pagurus sp.</i>	Crab, Hermit
Arthropoda	Malacostraca	Pallinuridae	<i>Pannulus interruptus</i>	Lobster, California Spiny
Arthropoda	Malacostraca	Pandalidae	<i>Pandalus danae</i>	Shrimp, Coonstripe
Arthropoda	Malacostraca	Pandalidae	<i>Pandalus platyceros</i>	Prawn, Spot
Arthropoda	Malacostraca	Parthenopidae	<i>Heterocypra occidentalis</i>	Crab, Elbow
Arthropoda	Malacostraca	Porcellanidae	<i>Petrolisthes cinctipes</i>	Crab, Flat Porcelain
Arthropoda	Malacostraca	Porcellanidae	<i>Petrolisthes sp.</i>	Crab, Porcelain
Arthropoda	Maxillipoda	Balanidae	<i>Balanus sp.</i>	Barnacle
Arthropoda	Maxillipoda	Balanidae	<i>Megabalanus californicus</i>	Barnacle, Giant
Arthropoda	Maxillipoda	Copepoda ^{oo}		Copepods
Arthropoda	Maxillipoda	Scalpellidae	<i>Pollicipes polymerus</i>	Barnacle, Stalked
Arthropoda	Maxillipoda	Tetracitidae	<i>Tetractita rubescens</i>	Barnacle, Pink Volcano

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordates: Fishes				
Chordata	Actinopterygii	Acipenseridae	<i>Acipenser transmontanus</i>	Sturgeon, White
Chordata	Actinopterygii	Agonidae	<i>Odontopyxis trispinosa</i>	Poacher, Pygmy
Chordata	Actinopterygii	Anarhichadidae	<i>Anarhichthyes ocellatus</i>	Eel, Wolf
Chordata	Actinopterygii	Anoplopomatidae	<i>Anoplopoma fimbria</i>	Sablefish
Chordata	Actinopterygii	Atherinidae	<i>Atherinops affinis</i>	Topsmelt
Chordata	Actinopterygii	Atherinidae	<i>Atherinopsis californiensis</i>	Jacksmelt
Chordata	Actinopterygii	Aulorhynchidae	<i>Aulorhynchus flavidus</i>	Tubesnout
Chordata	Actinopterygii	Bathymasteridae	<i>Rathbunella hypoplecta</i>	Rongull
Chordata	Actinopterygii	Batrachoididae	<i>Parichthys nolatus</i>	Midshipman, Plainfin
Chordata	Actinopterygii	Bothidae	<i>Citharichthys sordidus</i>	Sanddab, Pacific
Chordata	Actinopterygii	Bothidae	<i>Citharichthys stigmaeus</i>	Sanddab, Speckled
Chordata	Actinopterygii	Bothidae	<i>Paralichthys californicus</i>	Halibut, California
Chordata	Actinopterygii	Bythitidae	<i>Brosomphycis marginata</i>	Brotila, Red
Chordata	Actinopterygii	Carangidae	<i>Naucrates ductor</i>	Pilotfish
Chordata	Actinopterygii	Carangidae	<i>Seriola lalandi</i>	Yellowtail, North Pacific
Chordata	Actinopterygii	Carangidae	<i>Trachurus symmetricus</i>	Mackerel, Jack
Chordata	Actinopterygii	Catostomidae	<i>Catostomus occidentalis</i>	Sucker, Sacramento
Chordata	Actinopterygii	Centrarchidae	<i>Archoplites interruptus</i>	Perch, Sacramento
Chordata	Actinopterygii	Centropomidae	<i>Ichthyus lockingtoni</i>	Medusafish
Chordata	Actinopterygii	Clinidae	<i>Gibbonsia elegans</i>	Kelpfish, Spotted
Chordata	Actinopterygii	Clinidae	<i>Gibbonsia montereyensis</i>	Kelpfish, Crevice
Chordata	Actinopterygii	Clinidae	<i>Heterostichus rostratus</i>	Kelpfish, Giant
Chordata	Actinopterygii	Clinidae	<i>Neoclinus bianchardi</i>	Fringehhead, Sarcastic
Chordata	Actinopterygii	Clinidae	<i>Neoclinus stephenseae</i>	Fringehhead, Yellowfin
Chordata	Actinopterygii	Clinidae	<i>Neoclinus uninotatus</i>	Fringehhead, Onespot
Chordata	Actinopterygii	Clupeidae	<i>Sardinops sagax</i>	Sardine, Pacific
Chordata	Actinopterygii	Coryphaenidae	<i>Coryphaena hippurus</i>	Dolphinfish
Chordata	Actinopterygii	Cottidae	<i>Arbedius corallinus</i>	Sculpin, Coralline
Chordata	Actinopterygii	Cottidae	<i>Clinocottus analis</i>	Sculpin, Woolly
Chordata	Actinopterygii	Cottidae	<i>Clinocottus globiceps</i>	Sculpin, Mosshead
Chordata	Actinopterygii	Cottidae	<i>Clinocottus recalyus</i>	Sculpin, Bald
Chordata	Actinopterygii	Cottidae	<i>Enophrys bison</i>	Sculpin, Buffalo

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordata	Actinopterygii	Cottidae	<i>Jordania zorope</i>	Sculpin, Longfin
Chordata	Actinopterygii	Cottidae	<i>Leptocottus armatus</i>	Sculpin, Staghorn
Chordata	Actinopterygii	Cottidae	<i>Naulichthys oculofasciatus</i>	Sculpin, Sailfin
Chordata	Actinopterygii	Cottidae	<i>Oligocottus maculosus</i>	Sculpin, Tidepool
Chordata	Actinopterygii	Cottidae	<i>Oligocottus rimensis</i>	Sculpin, Saddleback
Chordata	Actinopterygii	Cottidae	<i>Orthonopias triacis</i>	Sculpin, Snubnose
Chordata	Actinopterygii	Cottidae	<i>Rhamphocottus richardsoni</i>	Sculpin, Grunt
Chordata	Actinopterygii	Cottidae	<i>Scorpaenichthys marmoratus</i>	Cabezon
Chordata	Actinopterygii	Cyprinidae	<i>Lavina exilicauda</i>	Hitch
Chordata	Actinopterygii	Embiotocidae	<i>Amphistichus argenteus</i>	Surfperch, Barred
Chordata	Actinopterygii	Embiotocidae	<i>Amphistichus rhodoleus</i>	Surfperch, Redtail
Chordata	Actinopterygii	Embiotocidae	<i>Brachyistius frenatus</i>	Surfperch, Kelp
Chordata	Actinopterygii	Embiotocidae	<i>Cymatogaster aggregata</i>	Surfperch, Shiner
Chordata	Actinopterygii	Embiotocidae	<i>Damalichthys vacca</i>	Surfperch, Pile
Chordata	Actinopterygii	Embiotocidae	<i>Embiotoca jacksoni</i>	Surfperch, Black
Chordata	Actinopterygii	Embiotocidae	<i>Embiotoca lateralis</i>	Surfperch, Striped
Chordata	Actinopterygii	Embiotocidae	<i>Hyperprosopon argenteum</i>	Surfperch, Walleye
Chordata	Actinopterygii	Embiotocidae	<i>Hypsurus caryi</i>	Surfperch, Rainbow
Chordata	Actinopterygii	Embiotocidae	<i>Micrometrus aurora</i>	Surfperch, Reef
Chordata	Actinopterygii	Embiotocidae	<i>Micrometrus minimus</i>	Surfperch, Dwarf
Chordata	Actinopterygii	Embiotocidae	<i>Phanerodon furcatus</i>	Surfperch, White
Chordata	Actinopterygii	Embiotocidae	<i>Rhacocottus toxotes</i>	Surfperch, Rubberlip
Chordata	Actinopterygii	Engraulidae	<i>Engraulis mordax</i>	Anchovy, Northern
Chordata	Actinopterygii	Gasterosteidae	<i>Gasterosteus aculeatus</i>	Stickleback, Three Spine
Chordata	Actinopterygii	Gobiessocidae	<i>Gobiesox maenadicus</i>	Clingfish, Northern
Chordata	Actinopterygii	Gobiidae	<i>Coryphopterus nicholsii</i>	Goby, Blackeye
Chordata	Actinopterygii	Gobiidae	<i>Lythrypnus dalli</i>	Goby, Bluebanded
Chordata	Actinopterygii	Gobiidae	<i>Lythrypnus zebra</i>	Goby, Zebra
Chordata	Actinopterygii	Hexagrammidae	<i>Zaniolepis latipinnis</i>	Combfish, Longspine
Chordata	Actinopterygii	Hexagrammidae	<i>Hexagrammos decagrammus</i>	Greenling, Kelp
Chordata	Actinopterygii	Hexagrammidae	<i>Hexagrammos lagocephalus</i>	Greenling, Rock
Chordata	Actinopterygii	Hexagrammidae	<i>Ophiodon elongatus</i>	Lingcod
Chordata	Actinopterygii	Hexagrammidae	<i>Oxybius pictus</i>	Greenling, Painted

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordata	Actinopterygii	Kyphosidae	<i>Girella nigricans</i>	Opaleye
Chordata	Actinopterygii	Kyphosidae	<i>Medialuna californiensis</i>	Halfmoon
Chordata	Actinopterygii	Labridae	<i>Oxyulis californica</i>	Senorita
Chordata	Actinopterygii	Labridae	<i>Semicossyphus pulcher</i>	Sheephead, California
Chordata	Actinopterygii	Malacanthidae	<i>Caulolatilus princeps</i>	Whitefish, Ocean
Chordata	Actinopterygii	Molidae	<i>Mola mola</i>	Sunfish, Ocean
Chordata	Actinopterygii	Myxiniidae	<i>Eptatretus deani</i>	Hagfish, Black
Chordata	Actinopterygii	Myxiniidae	<i>Eptatretus stoutii</i>	Hagfish, Pacific
Chordata	Actinopterygii	Perclithyidae	<i>Morone saxatilis</i>	Bass, Striped
Chordata	Actinopterygii	Pholididae	<i>Prolis clemensii</i>	Gunnel, Longfin
Chordata	Actinopterygii	Pholididae	<i>Prolis ornata</i>	Gunnel, Saddleback
Chordata	Actinopterygii	Pholididae	<i>Uviicola sanctaeosae</i>	Gunnel, Kelp
Chordata	Actinopterygii	Pholididae	<i>Xerripes fucorum</i>	Gunnel, Rockweed
Chordata	Actinopterygii	Pleuronectidae	<i>Hypsopsetta guttulata</i>	Turbot, Diamond
Chordata	Actinopterygii	Pleuronectidae	<i>Microstomus pacificus</i>	Sole, Dover
Chordata	Actinopterygii	Pleuronectidae	<i>Parophrys vetulus</i>	Sole, English
Chordata	Actinopterygii	Pleuronectidae	<i>Platichthys stellatus</i>	Flounder, Starry
Chordata	Actinopterygii	Pleuronectidae	<i>Pleuronichthys coenosus</i>	Turbot, C-O
Chordata	Actinopterygii	Pleuronectidae	<i>Pleuronichthys decurrens</i>	Turbot, Curfin
Chordata	Actinopterygii	Pleuronectidae	<i>Pleuronichthys verticalis</i>	Turbot, Hornyhead
Chordata	Actinopterygii	Pleuronectidae	<i>Psettichthys melanostictus</i>	Sole, Sand
Chordata	Actinopterygii	Polypriionidae	<i>Stereolepis gigas</i>	Bass, Giant/Black Sea
Chordata	Actinopterygii	Pomacentridae	<i>Chromis punctipinnis</i>	Blacksmith
Chordata	Actinopterygii	Pomacentridae	<i>Hypsypops rubicundus</i>	Garibaldi
Chordata	Actinopterygii	Salmonidae	<i>Oncorhynchus kisutch</i>	Salmon, Silver
Chordata	Actinopterygii	Salmonidae	<i>Oncorhynchus mykiss</i>	Steelhead/Rainbow Trout
Chordata	Actinopterygii	Salmonidae	<i>Oncorhynchus tshawytscha</i>	Salmon, King/chinook
Chordata	Actinopterygii	Sclaeinidae	<i>Attractoscion nobilis</i>	Seabass, White
Chordata	Actinopterygii	Scombridae	<i>Euthynnus pelamis</i>	Tuna, Skipjack
Chordata	Actinopterygii	Scombridae	<i>Sarda chiliensis</i>	Bonito, Pacific Eastern
Chordata	Actinopterygii	Scombridae	<i>Scomber japonicus</i>	Mackerel, Pacific
Chordata	Actinopterygii	Scombridae	<i>Thunnus albacares</i>	Tuna, Yellowfin
Chordata	Actinopterygii	Scombridae	<i>Thunnus thynnus</i>	Tuna, Bluefin

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes atrovirens</i>	Rockfish, Kelp
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes auriculatus</i>	Rockfish, Brown
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes babcocki</i>	Rockfish, Redbanded
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes carnatius</i>	Rockfish, Gopher
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes caurinus</i>	Rockfish, Copper
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes chrysomelas</i>	Rockfish, Black & Yellow
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes constellatus</i>	Rockfish, Starry
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes dallii</i>	Rockfish, Calico
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes flavidus</i>	Rockfish, Yellowtail
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes melanops</i>	Rockfish, Black
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes miniatus</i>	Rockfish, Vermilion
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes nebulosus</i>	Rockfish, Blue
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes mystinus</i>	Rockfish, China
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes nebulosus</i>	Rockfish, Tiger
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes nigrochinctus</i>	Rockfish, Bocaccio
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes paucispinis</i>	Rockfish, Canary
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes pinniger</i>	Rockfish, Grass
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes rastrelliger</i>	Rockfish, Rose
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes rosaceus</i>	Rockfish, Yelloweye
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes ruberrimus</i>	Rockfish, Flag
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes rubrivinctus</i>	Rockfish, Treefish
Chordata	Actinopterygii	Scorpaenidae	<i>Sebastes serriceps</i>	Rockfish, Treefish
Chordata	Actinopterygii	Serranidae	<i>Sebastolobus alascanus</i>	Thornyhead, Shortspine
Chordata	Actinopterygii	Serranidae	<i>Paralabrax clathratus</i>	Bass, Kelp
Chordata	Actinopterygii	Serranidae	<i>Paralabrax nebulifer</i>	Bass, Barred Sand
Chordata	Actinopterygii	Sphyraenidae	<i>Sphyraena argentea</i>	Barracuda, California
Chordata	Actinopterygii	Stichaeidae	<i>Anoploarchus insignis</i>	Cockscomb, Slender
Chordata	Actinopterygii	Stichaeidae	<i>Cebidichthys violaceus</i>	Eel, Monkeyface
Chordata	Actinopterygii	Stichaeidae	<i>Chirolophus nugator</i>	Warbonnet, Mosshead
Chordata	Actinopterygii	Stichaeidae	<i>Xiphister atropurpureus</i>	Prickleback, Black
Chordata	Actinopterygii	Stromateidae	<i>Papilius similimus</i>	Butterfish, Pacific
Chordata	Actinopterygii	Syngnathidae	<i>Syngnathus leptorhynchus</i>	Pipefish, Bay
Chordata	Holocephali	Chimaeridae	<i>Callorhynchus callorhynchus</i>	Ratfish, Elephant Nose
Chordata	Holocephali	Chimaeridae	<i>Hydrolagus colliei</i>	Spotted Ratfish

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordates: Sharks and Rays				
Chordata	Chondrichthyes	Carcharhinidae	<i>Galeorhinus zyopterus</i>	Shark, Soupfin
Chordata	Chondrichthyes	Dasyatidae	<i>Dasyatis violacea</i>	Ray, Pelagic
Chordata	Chondrichthyes	Heterodontidae	<i>Heterodontus francisci</i>	Shark, Horn
Chordata	Chondrichthyes	Hexanchidae	<i>Notorynchus cepedianus</i>	Shark, Sevengill
Chordata	Chondrichthyes	Lamnidae	<i>Carcharodon carcharias</i>	Shark, White
Chordata	Chondrichthyes	Myliobatidae	<i>Myliobatis californica</i>	Ray, Bat
Chordata	Chondrichthyes	Rajidae	<i>Raja binoculata</i>	Skate, Big
Chordata	Chondrichthyes	Rajidae	<i>Raja inornata</i>	Skate, California
Chordata	Chondrichthyes	Rajidae	<i>Raja rhina</i>	Skate, Longnose
Chordata	Chondrichthyes	Rhinobatidae	<i>Platyrhinoidis tiseriata</i>	Ray, Thornback
Chordata	Chondrichthyes	Rhinobatidae	<i>Rhinobatos productus</i>	Guitarfish, Shovelnose
Chordata	Chondrichthyes	Scyllorhinidae	<i>Cephaloscyllium ventriosum</i>	Shark, Swell
Chordata	Chondrichthyes	Scyllorhinidae	<i>Parnaturus xanthurus</i>	Shark, Filetail Cat
Chordata	Chondrichthyes	Squalidae	<i>Squalus acanthias</i>	Shark, Spiny Dogfish
Chordata	Chondrichthyes	Squalinidae	<i>Squalina californica</i>	Shark, Pacific Angel
Chordata	Chondrichthyes	Torpedinidae	<i>Torpedo californica</i>	Ray, Pacific Electric
Chordata	Chondrichthyes	Triakidae	<i>Triakis semifasciata</i>	Shark, Leopard
Chordates: Tunicates				
Chordata	Ascidacea	Ascididae	<i>Ascidia ceratodes</i>	Tunicate, Solitary
Chordata	Ascidacea	Botryllidae	<i>Botryllus</i> spp.	Tunicate, Colonial
Chordata	Ascidacea	Clavelinidae	<i>Clavelina huntsmani</i>	Tunicate, Lightbulb
Chordata	Ascidacea	Didemnidae	<i>Didemnum carmulentum</i>	Tunicate, Colonial
Chordata	Ascidacea	Polyclinidae	<i>Apicidium californicum</i>	Tunicate, Yellowish
Chordata	Ascidacea	Polyclinidae	<i>Polyclinum planum</i>	Tunicate, Elephant-ear
Chordata	Ascidacea	Pyuridae	<i>Pyura haustor</i>	Tunicate, Solitary
Chordata	Ascidacea	Styelidae	<i>Botrylloides</i> spp.	Tunicate, Colonial
Chordata	Ascidacea	Styelidae	<i>Cnemidocarpa finmarkiensis</i>	Tunicate, Solitary Red
Chordata	Ascidacea	Styelidae	<i>Styela montereyensis</i>	Tunicate, Monterey Stalked
Chordata	Ascidacea	Styelidae	<i>Styela truncata</i>	Tunicate, Solitary
Chordates: Amphibians				
Chordata	Amphibia	Hylidae	<i>Hyla regilla</i>	Frog, Pacific Tree

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordates: Reptiles				
Chordata	Reptilia	Cheloniidae	<i>Chelonia mydas</i>	Turtle, Green Sea
Chordata	Reptilia	Emyidae	<i>Chemyms marmorata</i>	Turtle, Western Pond
Chordates: Birds				
Chordata	Aves	Alcidae	<i>Uria aalge</i>	Murre, Common
Chordata	Aves	Anatidae	<i>Bucephala albeola</i>	Duck, Bufflehead
Chordata	Aves	Anatidae	<i>Oxyura jamaicensis</i>	Duck, Rudy
Chordata	Aves	Charadriidae	<i>Charadrius alexandrinus</i>	Plover, Rudy
Chordata	Aves	Charadriidae	<i>Charadrius vociferus</i>	Plover, Snowy
Chordata	Aves	Charadriidae	<i>Pluvialis squatarola</i>	Killdeer
Chordata	Aves	Haematopodidae	<i>Haematopus papillatus</i>	Oystercatcher, American
Chordata	Aves	Recurvirostridae	<i>Himantopus mexicanus</i>	Stilt, Black-necked
Chordata	Aves	Recurvirostridae	<i>Recurvirostra americana</i>	Avocet, American
Chordata	Aves	Recurvirostridae	<i>Arenaria interpres</i>	Turnstone, Ruddy
Chordata	Aves	Scolopacidae	<i>Calidris alba</i>	Sanderling
Chordata	Aves	Scolopacidae	<i>Calidris alpina</i>	Dunlin
Chordata	Aves	Scolopacidae	<i>Calidris bairdii</i>	Sandpiper, Baird's
Chordata	Aves	Scolopacidae	<i>Calidris mauri</i>	Sandpiper, Western
Chordata	Aves	Scolopacidae	<i>Calidris minutilla</i>	Sandpiper, Least
Chordata	Aves	Scolopacidae	<i>Calidris pusilla</i>	Sandpiper, Semipalmated
Chordata	Aves	Scolopacidae	<i>Catoptrophorus semipalmatus</i>	Willet
Chordata	Aves	Scolopacidae	<i>Limnodromus scolopaceus</i>	Dowitcher, Long-billed
Chordata	Aves	Scolopacidae	<i>Limosa fedoa</i>	Godwit, Marbled
Chordata	Aves	Scolopacidae	<i>Numerius americanus</i>	Curtlew, Long-billed
Chordata	Aves	Scolopacidae	<i>Phalaropus fulicaria</i>	Phalarope, Red
Chordata	Aves	Scolopacidae	<i>Phalaropus lobatus</i>	Phalarope, Red-necked
Chordates: Mammals				
Chordata	Mammalia	Mustelidae	<i>Enhydra lutris</i>	Otter, Sea

^ADivision

^{ae}Subclass

^{ae}Order

Table A.3
Monterey Bay Aquarium
Species List of Exotic Plants and Animals

Phylum or Division	Class	Family	Scientific Name	Common Name
Phytoplankton				
Chlorophyta [^]	Prasinophyceae	Chlorodendraceae	<i>Tetraselmis chuii</i>	Tetraselmis
Haptophyta [^]	Haptophyceae	Isochrysidaceae	<i>Isochrysis galbana</i>	Isochrysis
Eustigmatophyta [^]	Eustigmatophyceae	Trebouxziophyceae	<i>Nannochloris</i> sp.	Nannochloris
Eustigmatophyta [^]	Eustigmatophyceae	Monopsidaceae	<i>Nannochloropsis oculata</i>	Nannochloropsis
Green Algae				
Chlorophyta [^]	Chlorophyceae	Bryopsidaceae	<i>Bryopsis</i> sp.	Bryopsis
Chlorophyta [^]	Chlorophyceae	Codiaceae	<i>Codium decorticatum</i>	Codium
Chlorophyta [^]	Chlorophyceae	Halimedaceae	<i>Halimeda</i> sp.	Halimeda
Chlorophyta [^]	Chlorophyceae	Valoniaceae	<i>Valonia</i> sp.	Valonia
Brown Algae				
Phaeophyta [^]	Phaeophyceae	Diclyotaceae	<i>Diclyopteris undulata</i>	Diclyopteris
Phaeophyta [^]	Phaeophyceae	Diclyotaceae	<i>Lobophora variegata</i>	Lobophora
Vascular Plants				
Magnoliophyta	Liliopsida	Araceae	<i>Anubias bangkok</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias barteri</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias coffeifolia</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias congensis</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias congo</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias frazeri</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias gigantea</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias gracilis</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias nana</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias pyraeerti</i>	
Magnoliophyta	Liliopsida	Araceae	<i>Anubias</i> sp.	
Magnoliophyta	Liliopsida	Araceae	<i>Cryptocoryne</i> sp.	Watertrumpet
Magnoliophyta	Liliopsida	Cyperaceae	<i>Cyperus papyrus</i>	Papyrus
Magnoliophyta	Liliopsida	Cyperaceae	<i>Eleocharis acicularis</i>	Spikesedge, Needle

Phylum or Division	Class	Family	Scientific Name	Common Name
Magnoliophyta	Liliopsida	Hydrocharitaceae	<i>Byssa auberlii</i>	Byssa, Roundfruit
Magnoliophyta	Liliopsida	Hydrocharitaceae	<i>Byssa heteroclitte</i>	
Magnoliophyta	Liliopsida	Hydrocharitaceae	<i>Byssa japonica</i>	
Magnoliophyta	Liliopsida	Hydrocharitaceae	<i>Otteila uvifolia</i>	
Magnoliophyta	Magnoliopsida	Acanthaceae	<i>Hygrophila corymbosa</i>	Starthorn
Magnoliophyta	Magnoliopsida	Acanthaceae	<i>Hygrophila</i> sp.	Swampweed
Magnoliophyta	Magnoliopsida	Apiaceae	<i>Hydrocotyle sibthorpioides</i>	Marshpennywort, Lawn
Magnoliophyta	Magnoliopsida	Lythraceae	<i>Nesaea pedicularata</i>	
Magnoliophyta	Magnoliopsida	Nymphaeaceae	<i>Nymphaea lotus</i>	Lotus, White Egyptian
Magnoliophyta	Magnoliopsida	Nymphaeaceae	<i>Nymphaea micrantha</i>	Waterlily
Magnoliophyta	Magnoliopsida	Scrophulariaceae	<i>Limnophila</i> sp.	Marshweed
Magnoliophyta	Filicopsida	Dryopteridaceae	<i>Bobbitis heudelotii</i>	Creepingfern
Cnidarians and Ctenophores				
Cnidaria	Anthozoa	Acroporidae	<i>Acropora austera</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora florida</i>	Coral, Bushy Acropora
Cnidaria	Anthozoa	Acroporidae	<i>Acropora formosa</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora latistella</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora microthalma</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora millepora</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora nana</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Acropora procumbens</i>	Coral, Bottle Brush Acropora
Cnidaria	Anthozoa	Acroporidae	<i>Acropora</i> sp.	Coral, Staghorn
Cnidaria	Anthozoa	Acroporidae	<i>Acropora youngi</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Montipora capitata</i>	Coral
Cnidaria	Anthozoa	Acroporidae	<i>Montipora capricornis</i>	Coral, Orange
Cnidaria	Anthozoa	Acroporidae	<i>Montipora digitata</i>	Coral, Velvet Finger
Cnidaria	Anthozoa	Acroporidae	<i>Montipora friabilis</i>	Coral, Orange plating
Cnidaria	Anthozoa	Acroporidae	<i>Montipora</i> sp.	Coral, Montipora encrusting
Cnidaria	Anthozoa	Agaricidae	<i>Pachyseris rugosa</i>	Coral, Elephant Skin
Cnidaria	Anthozoa	Agaricidae	<i>Pachyseris speciosa</i>	Coral
Cnidaria	Anthozoa	Alyoniidae	<i>Lobophytum</i> sp.	Coral, Finger Leather
Cnidaria	Anthozoa	Alyoniidae	<i>Sarcophyton trocheliophorum</i>	Coral, Toadstool
Cnidaria	Anthozoa	Alyoniidae	<i>Simulana dura</i>	Coral, Cabbage Leather

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Cnidaria	Anthozoa	Alcyonidae	<i>Simularia</i> sp.	Coral, Finger Leather
Cnidaria	Anthozoa	Aiptasiidae	<i>Aiptasia californica</i>	Anemone, Tube or Rock
Cnidaria	Anthozoa	Aiptasiidae	<i>Ertacmsea quadricolor</i>	Anemone, Bubble-Tip
Cnidaria	Anthozoa	Anthemiphyllidae	<i>Pavona cactus</i>	Coral, Frilly Cactus
Cnidaria	Anthozoa	Anthemiphyllidae	<i>Pavona decussata</i>	Coral, Cactus
Cnidaria	Anthozoa	Anthemiphyllidae	<i>Pavona</i> sp.	Coral, Cactus
Cnidaria	Anthozoa	Caryophyllidae	<i>Euphyllia ancora</i>	Coral, Anchor/Hammer
Cnidaria	Anthozoa	Caryophyllidae	<i>Euphyllia divisa</i>	Coral, Frog Spawn
Cnidaria	Anthozoa	Clavulariidae	<i>Pachyclavaria</i> sp.	Polyp, Branching Green Star
Cnidaria	Anthozoa	Clavulariidae	<i>Pachyclavaria violacea</i>	Polyp, Encrusting Green Star
Cnidaria	Anthozoa	Dendrophyllidae	<i>Turbinaria peltata</i>	Coral, Cup
Cnidaria	Anthozoa	Dendrophyllidae	<i>Turbinaria reniformis</i>	Coral, Yellow Scroll
Cnidaria	Anthozoa	Favidae	<i>Caulastrea echinulata</i>	Coral, Candy cane
Cnidaria	Anthozoa	Favidae	<i>Caulastrea furcata</i>	Coral, Trumpet
Cnidaria	Anthozoa	Favidae	<i>Goniastrea australensis</i>	Coral, Brain
Cnidaria	Anthozoa	Favidae	<i>Platygyra</i> sp.	Coral, Maze Brain
Cnidaria	Anthozoa	Fungidae	<i>Actinodiscus</i> sp.	Coral, Mushroom Polyps
Cnidaria	Anthozoa	Merulinidae	<i>Hydnophora exesa</i>	Coral, Horn
Cnidaria	Anthozoa	Merulinidae	<i>Hydnophora grandis</i>	Coral, Horn
Cnidaria	Anthozoa	Merulinidae	<i>Hydnophora rigida</i>	Coral, Horn
Cnidaria	Anthozoa	Merulinidae	<i>Merulina ampliata</i>	Coral, Ruffled (green plate)
Cnidaria	Anthozoa	Merulinidae	<i>Merulina scabricula</i>	Coral, Ruffled Lettuce
Cnidaria	Anthozoa	Mussidae	<i>Lobophyllia</i> sp.	Coral, Flat Brain
Cnidaria	Anthozoa	Mussidae	<i>Symphyllia agaricia</i>	Coral, Brain
Cnidaria	Anthozoa	Nephthelidae	<i>Capnella</i> sp.	Coral, Kenya Tree
Cnidaria	Anthozoa	Oculinidae	<i>Galaxea fascicularis</i>	Coral, Galaxy
Cnidaria	Anthozoa	Oculinidae	<i>Polypyllia taipina</i>	Coral, Slipper
Cnidaria	Anthozoa	Pectinidae	<i>Mycoedium elephantotus</i>	Coral, Elephant Nose
Cnidaria	Anthozoa	Pectinidae	<i>Pectinia lactuca</i>	Coral, Frilly Lettuce
Cnidaria	Anthozoa	Pocilloporidae	<i>Pocillopora damicornis</i>	Coral, Cauliflower
Cnidaria	Anthozoa	Pocilloporidae	<i>Pocillopora elegans</i>	Coral
Cnidaria	Anthozoa	Pocilloporidae	<i>Seriatopora hystrix</i>	Coral, Bird's Nest
Cnidaria	Anthozoa	Pocilloporidae	<i>Stylophora pistillata</i>	Coral, Club Foot

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Cnidaria	Anthozoa	Poritidae	<i>Goniopora lobata</i>	Coral, Flowerpot
Cnidaria	Anthozoa	Poritidae	<i>Porites cylindrica</i>	Coral, Yellow Finger Porites
Cnidaria	Anthozoa	Poritidae	<i>Porites lutea</i>	Coral
Cnidaria	Anthozoa	Trachyphyllidae	<i>Trachyphyllia geoffroyi</i>	Coral, Open Brain
Cnidaria	Anthozoa	Xenidae	<i>Anthelia</i> sp.	Polyp, Waving Hand
Cnidaria	Anthozoa	Zoanthidae	<i>Protopalythoa</i> sp.	Polyp, Button
Cnidaria	Anthozoa	Zoanthidae	<i>Zoanthus</i> sp.	Polyp, Button
Cnidaria	Cubozoa	Carybdeidae	<i>Tripidalia cystophora</i>	Jelly, Box
Cnidaria	Scyphozoa	Cassiopeidae	<i>Cassiopea xamachana</i>	Upsidedown Jelly
Cnidaria	Scyphozoa	Catostylidae	<i>Catostylus mosaicus</i>	Jelly, Rhizostome (Catostylus)
Cnidaria	Scyphozoa	Cepheidae	<i>Cotylotriza tuberculata</i>	Mediterranean Jelly
Cnidaria	Scyphozoa	Magistilidae	<i>Magistias papua</i>	Jelly, Rhizostome (Magistias)
Cnidaria	Scyphozoa	Magistilidae	<i>Phyllorhiza punctata</i>	White-Spotted Jelly
Cnidaria	Scyphozoa	Pelagiidae	<i>Chrysaora melanaster</i>	Japanese Sea Nettle
Cnidaria	Scyphozoa	Pelagiidae	<i>Chrysaora quinquecirrha</i>	Atlantic Sea Nettle
Cnidaria	Scyphozoa	Pelagiidae	<i>Aurelia aurita</i>	Moon Jelly (Japanese)
Cnidaria	Scyphozoa	Umaridae	<i>Aurelia eilat</i>	Red Sea Moon Jelly
Ctenophora	Tentaculata	Mnemiidae	<i>Mnemiopsis leydii</i>	Warty Comb Jelly
Echinoderms				
Echinodermata	Echinoidea	Diadematidae	<i>Diadema antillarum</i>	Urchin, Long-spined
Echinodermata	Echinoidea	Echinometridae	<i>Echinometra</i> sp.	Urchin, Tropical
Echinodermata	Echinoidea	Ternnoptauridae	<i>Mespilia globulus</i>	Urchin, Tuxedo
Echinodermata	Stellerioidea	Ophidiasteridae	<i>Lirckia laevigata</i>	Star, Blue Lirckia
Molluscs				
Mollusca	Bivalvia	Cardiaceae	<i>Tridacna crocea</i>	Clam, Giant
Mollusca	Bivalvia	Cardiaceae	<i>Tridacna derasa</i>	Clam, Giant
Mollusca	Bivalvia	Cardiaceae	<i>Tridacna maxima</i>	Clam, Giant
Mollusca	Bivalvia	Mytilidae	<i>Mytilus edulis</i>	Mussel, Blue; Farm-raised
Mollusca	Gastropoda	Neritidae	<i>Neritina recurvata</i>	Nerite, Olive
Mollusca	Gastropoda	Turbinidae	<i>Turbo</i> sp.	Snail, Turbo
Mollusca	Bivalvia	Veneridae	<i>Venerupis philippinarum</i>	Clam, Japanese Littleneck
Worms				
Annelida	Polychaeta	Serpulidae	<i>Spirobranchus spinosus</i>	Worm, Christmas-tree

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Crustaceans				
Arthropoda	Malacostraca	Atyidae	<i>Caridina japonica</i>	Shrimp, Amano
Arthropoda	Malacostraca	Atyidae	<i>Caridina</i> sp.	Shrimp, Red Cherry
Arthropoda	Malacostraca	Hippolytidae	<i>Lysmata amboinensis</i>	Shrimp, Hump-back Cleaner
Arthropoda	Malacostraca	Hippolytidae	<i>Lysmata debelius</i>	Shrimp, Fire Cleaner
Chordates: Fishes				
Chordata	Actinopterygii	Acentrocliniidae	<i>Callopterygion allivelis</i>	Betta, Marine
Chordata	Actinopterygii	Acanthuridae	<i>Ctenochaetus strigosus</i>	Tang, Yellow-eye (Kole)
Chordata	Actinopterygii	Acanthuridae	<i>Paracanthurus hepatus</i>	Tang, Blue (Hippo)
Chordata	Actinopterygii	Acanthuridae	<i>Zebrasoma flavescens</i>	Tang, Yellow
Chordata	Actinopterygii	Albulidae	<i>Siganus delatius</i>	Rabbitfish, Scribbled
Chordata	Actinopterygii	Alestidae	<i>Brycinus longipinnis</i>	Tetra, Longfin
Chordata	Actinopterygii	Alestidae	<i>Phenacogrammus interruptus</i>	Tetra, Congo
Chordata	Actinopterygii	Aplocheilidae	<i>Epiplatys bifasciatus</i>	Killifish
Chordata	Actinopterygii	Aplocheilidae	<i>Epiplatys roloffi</i>	Killifish
Chordata	Actinopterygii	Aplocheilidae	<i>Fundulopanchax gardneri</i>	Killifish
Chordata	Actinopterygii	Apogonidae	<i>Apogon</i> sp.	Cardinalfish, Gold-stripe
Chordata	Actinopterygii	Apogonidae	<i>Pterapogon kauderni</i>	Cardinalfish, Banggai
Chordata	Actinopterygii	Balistidae	<i>Odonus niger</i>	Trigger, Niger
Chordata	Actinopterygii	Blenniidae	<i>Alticus saliens</i>	Blenny, Leaping
Chordata	Actinopterygii	Blenniidae	<i>Parablennius marmoratus</i>	Blenny, Lawnmower
Chordata	Actinopterygii	Chaetodontidae	<i>Chaetodon lunula</i>	Butterflyfish, Raccoon
Chordata	Actinopterygii	Chaetodontidae	<i>Chaetodon miliaris</i>	Butterflyfish, Lemon
Chordata	Actinopterygii	Chaetodontidae	<i>Heniochus acuminatus</i>	Bannerfish, Longfin
Chordata	Actinopterygii	Characidae	<i>Chalceus macrolepidotus</i>	Chalceus, Red-tailed
Chordata	Actinopterygii	Characidae	<i>Melynnis argenteus</i>	Fish, Silver Dollar
Chordata	Actinopterygii	Cichlidae	<i>Astatotilapia</i> sp.	
Chordata	Actinopterygii	Cichlidae	<i>Cyphotilapia frontosa</i>	Cichlid, Humphread
Chordata	Actinopterygii	Cichlidae	<i>Cyprichromis leptosoma</i>	Cichlid, Black-finned slender
Chordata	Actinopterygii	Cichlidae	<i>Juikochromis marlieri</i>	Checkerboard Julie
Chordata	Actinopterygii	Cichlidae	<i>Juikochromis ornatus</i>	Golden Julie
Chordata	Actinopterygii	Cichlidae	<i>Neolamprologus leleupi</i>	Cichlid, Lemon
Chordata	Actinopterygii	Cichlidae	<i>Paratilapiaochromis</i> sp.	Rock Kribensis

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Chordata	Actinopterygii	Cichlidae	<i>Paralabidochromis chiloies</i>	Cichlid, Lake Victoria
Chordata	Actinopterygii	Cichlidae	<i>Tropheus duboisi</i>	Cichlid, Duboisi
Chordata	Actinopterygii	Cichlidae	<i>Tropheus moori</i>	Cichlid, Moori
Chordata	Actinopterygii	Cirrhilabidae	<i>Cirrhilabrys falco</i>	Hawkfish, Falco
Chordata	Actinopterygii	Cyprinidae	<i>Danio albolineatus</i>	Danio, Pearl
Chordata	Actinopterygii	Cyprinidae	<i>Danio spp.</i>	Danio, feeder fish
Chordata	Actinopterygii	Cyprinidae	<i>Puntius tetrazona</i>	Barb, Tiger
Chordata	Actinopterygii	Cyprinidae	<i>Rasbora caudimaculata</i>	Rasbora, Scissortail
Chordata	Actinopterygii	Cyprinidae	<i>Trigonostigma heteromorphia</i>	Rasbora, Harlequin
Chordata	Actinopterygii	Cyprinidae	<i>Trigonostigma hengeli</i>	Rasbora, Red Slender Harlequin
Chordata	Actinopterygii	Dactylopteridae	<i>Dactyloptena orientalis</i>	Gunard, Flying
Chordata	Actinopterygii	Hemiodontidae	<i>Hemiodus gracilis</i>	Hemiodus, Slender
Chordata	Actinopterygii	Holocentridae	<i>Myrpristis amaena</i>	Soldierfish, Brick
Chordata	Actinopterygii	Holocentridae	<i>Myrpristis berndti</i>	Soldierfish, Big Scale
Chordata	Actinopterygii	Holocentridae	<i>Neoniphon sammora</i>	Squirrelfish, Spottin
Chordata	Actinopterygii	Holocentridae	<i>Sargocentron sp.</i>	Squirrelfish, Reef
Chordata	Actinopterygii	Labridae	<i>Gomphosus varlus</i>	Wrasse, Bird
Chordata	Actinopterygii	Mochokidae	<i>Synodontis eupteris</i>	Catfish
Chordata	Actinopterygii	Mochokidae	<i>Synodontis multipunctatus</i>	Catfish
Chordata	Actinopterygii	Mochokidae	<i>Synodontis nigrita</i>	Catfish
Chordata	Actinopterygii	Mochokidae	<i>Synodontis victoriae</i>	Catfish, Back-swimming Congo
Chordata	Actinopterygii	Monodactylidae	<i>Monodactylus argenteus</i>	Mono
Chordata	Actinopterygii	Mormyridae	<i>Gnathonemus petersii</i>	Elephantnose
Chordata	Actinopterygii	Muraenidae	<i>Echidna nebulosa</i>	Eel, Snowflake Moray
Chordata	Actinopterygii	Muraenidae	<i>Enchelycore pardalis</i>	Eel, Dragon Moray
Chordata	Actinopterygii	Muraenidae	<i>Gymnomuraena zebra</i>	Eel, Zebra Moray
Chordata	Actinopterygii	Muraenidae	<i>Gymnothorax favagineus</i>	Eel, Honeycomb Moray
Chordata	Actinopterygii	Muraenidae	<i>Gymnothorax meleagris</i>	Eel, White-mouthed Moray
Chordata	Actinopterygii	Muraenidae	<i>Gymnothorax saxicola</i>	Eel, Black-margined Moray
Chordata	Actinopterygii	Notopteridae	<i>Chitala ornata</i>	Kribiafish, Clown
Chordata	Actinopterygii	Opistognathidae	<i>Opistognathus aurifrons</i>	Jawfish, Yellow-headed/pearly
Chordata	Actinopterygii	Osphronemidae	<i>Betta coccinea</i>	Betta
Chordata	Actinopterygii	Osphronemidae	<i>Macropodus opercularis</i>	Paradise Fish

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Chordata	Actinopterygii	Ospironemidae	<i>Trichogaster leeri</i>	Gourami, Pearl
Chordata	Actinopterygii	Ospironemidae	<i>Trichogaster trichopterus</i>	Gourami, Three-spot
Chordata	Actinopterygii	Pantodontidae	<i>Pantodon buchholzi</i>	Butterflyfish, African
Chordata	Actinopterygii	Pimelodidae	<i>Sorubim lima</i>	Catfish, Striped-shovelnose
Chordata	Actinopterygii	Poeciliidae	<i>Apocheilichthys normani</i>	Lamprey
Chordata	Actinopterygii	Pomacentridae	<i>Amphiprion frenatus</i>	Clownfish, Tomato
Chordata	Actinopterygii	Pomacentridae	<i>Amphiprion ocellaris</i>	Clownfish, Ocellaris
Chordata	Actinopterygii	Pomacentridae	<i>Centropyge loriculus</i>	Angelfish, Flame
Chordata	Actinopterygii	Pomacentridae	<i>Chromis spp.</i>	Damselfish, Green
Chordata	Actinopterygii	Pomacentridae	<i>Chrysiptera cyanea</i>	Damselfish, Yellowtail Blue
Chordata	Actinopterygii	Pomacentridae	<i>Chrysiptera parasmaia</i>	Damselfish, Yellowtail
Chordata	Actinopterygii	Pomacentridae	<i>Chrysiptera taupou</i>	Damselfish, Blue Devil
Chordata	Actinopterygii	Pomacentridae	<i>Dascyllus aruanus</i>	Damselfish, 3-striped
Chordata	Actinopterygii	Pomacentridae	<i>Dascyllus melanurus</i>	Damselfish, 4-striped
Chordata	Actinopterygii	Pomacentridae	<i>Dascyllus trimaculatus</i>	Damselfish, Domino
Chordata	Actinopterygii	Pomacentridae	<i>Pomacentrus coelestis</i>	Damselfish, Pomacentrid
Chordata	Actinopterygii	Pomacentridae	<i>Pomacentrus moluccensis</i>	Damselfish, Yellow
Chordata	Actinopterygii	Pomacentridae	<i>Pomacentrus philippinus</i>	Damselfish, Yellow Tail
Chordata	Actinopterygii	Pomacentridae	<i>Premnas biaculeatus</i>	Clownfish, Maroon
Chordata	Actinopterygii	Scaridae	<i>Cetoscarus bicolor</i>	Parrotfish, Bicolor
Chordata	Actinopterygii	Scaridae	<i>Chlorurus sordidus</i>	Parrotfish, Bullethead
Chordata	Actinopterygii	Scaridae	<i>Hippocampus longiceps</i>	Parrotfish, Pacific longnose
Chordata	Actinopterygii	Scaridae	<i>Scarus psittacus</i>	Parrotfish, Palenose
Chordata	Actinopterygii	Scatophagidae	<i>Scatophagus argus</i>	Scat
Chordata	Actinopterygii	Schilbeidae	<i>Parailia pellucida</i>	Catfish, African Glass
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias bicolor</i>	Anthias, Bicolor
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias pleurotaenia</i>	Anthias, Square-spot
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias rubrizonatus</i>	Anthias, Tricolor
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias sp.</i>	Anthias, Pink
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias squamipinnis</i>	Anthias, Lyretail
Chordata	Actinopterygii	Serranidae	<i>Pseudanthias luka</i>	Anthias, Purple Queen
Chordata	Actinopterygii	Siluridae	<i>Kryptopterus bicirrhus</i>	Catfish, Glass
Chordata	Actinopterygii	Syngnathidae	<i>Hippocampus barbouri</i>	Seahorse, Barbour's

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Chordata	Actinopterygii	Syngnathidae	<i>Hippocampus breviceps</i>	Seahorse, Short Snouted
Chordata	Actinopterygii	Syngnathidae	<i>Hippocampus erectus</i>	Seahorse, Lined
Chordata	Actinopterygii	Syngnathidae	<i>Hippocampus procerus</i>	Seahorse, High-Crown
Chordata	Actinopterygii	Syngnathidae	<i>Hippocampus whitei</i>	Seahorse, White's
Chordata	Actinopterygii	Syngnathidae	<i>Ptycodurus eques</i>	Sea Dragon, Leaty
Chordata	Actinopterygii	Syngnathidae	<i>Syngnathus scovelli</i>	Pipefish, Gulf
Chordata	Actinopterygii	Tetraodontidae	<i>Tetraodon biocellatus</i>	Pufferfish, Eyespot
Chordata	Actinopterygii	Tetraodontidae	<i>Tetraodon nigroviridis</i>	Pufferfish, Spotted Green
Chordata	Actinopterygii	Toxotidae	<i>Toxotes jaculatorix</i>	Archerfish
Chordates: Sharks and Rays				
Chordata	Chondrichthyes	Carcharhinidae	<i>Carcharhinus galapagensis</i>	Shark, Galapagos
Chordata	Chondrichthyes	Carcharhinidae	<i>Carcharhinus melanopterus</i>	Shark, Blacktip Reef
Chordata	Chondrichthyes	Carcharhinidae	<i>Triaenodon obesus</i>	Shark, Whitetip Reef
Chordata	Chondrichthyes	Dasyalidae	<i>Dasyatis americana</i>	Stingray, Southern
Chordata	Chondrichthyes	Hemiscylliidae	<i>Chiloscyllium plagiosum</i>	Shark, White spotted Bamboo
Chordata	Chondrichthyes	Hemiscylliidae	<i>Chiloscyllium punctatum</i>	Shark, Brown banded bamboo
Chordata	Chondrichthyes	Hemiscylliidae	<i>Chiloscyllium sp.</i>	Shark, Bamboo
Chordata	Chondrichthyes	Hemiscylliidae	<i>Hemiscyllium sp.</i>	Shark, Epaulette
Chordata	Chondrichthyes	Mobulidae	<i>Mobula munkiana</i>	Ray, Pygmy Devil
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon leopoldi</i>	Ray, Freshwater Black
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon moleto</i>	Ray, Freshwater Black
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon moleto</i>	Ray, Freshwater (moleto)
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon motoro</i>	Ray, Freshwater (motoro)
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon orbingyi</i>	Ray, Freshwater Spider
Chordata	Chondrichthyes	Potamotrygonidae	<i>Potamotrygon otorongo</i>	Ray, Freshwater (otorongo)
Chordata	Chondrichthyes	Rhinopteridae	<i>Rhinoptera bonasus</i>	Ray, Cownose
Chordata	Chondrichthyes	Rhinopteridae	<i>Aetomylcerus marmoratus</i>	Catshark, Coral
Chordata	Chondrichthyes	Rhinopteridae	<i>Haploblepharus pictus</i>	Shark, Dark Shyshark
Chordata	Chondrichthyes	Rhinopteridae	<i>Haploblepharus sp.</i>	Sharks, Puffader
Chordata	Chondrichthyes	Rhinopteridae	<i>Poroderma africanum</i>	Catshark, Peljama
Chordata	Chondrichthyes	Rhinopteridae	<i>Poroderma pantherinum</i>	Catshark, Leopard
Chordata	Chondrichthyes	Sphyrnidae	<i>Sphyrna lewini</i>	Shark, Scalloped Hammerhead
Chordata	Chondrichthyes	Stegostomatidae	<i>Stegostoma vanium</i>	Shark, Zebra

Phylum or Division	Class	Family	Scientific Name	Common Name
Chordates: Amphibians				
Chordata	Amphibia	Bombinatoridae	<i>Bombina orientalis</i>	Toad, Firebellied
Chordata	Amphibia	Bufoinidae	<i>Bufo asper</i>	Toad, Giant Rock
Chordata	Amphibia	Megophryidae	<i>Megophrys longipes</i>	Frog, Leaf
Chordata	Amphibia	Megophryidae	<i>Megophrys montana</i>	Frog, Dwarf Leaf
Chordata	Amphibia	Megophryidae	<i>Megophrys nasuta</i>	Frog, Asian Leaf
Chordata	Amphibia	Pipidae	<i>Hymenochirus spp.</i>	Frog, African Dwarf
Chordata	Amphibia	Ranidae	<i>Rana erythraea</i>	
Chordata	Amphibia	Rhacophoridae	<i>Polypedates leucomystax</i>	
Chordata	Amphibia	Rhacophoridae	<i>Rhacophorus spp.</i>	Frog, Asian Gliding
Chordates: Reptiles				
Chordata	Reptilia	Batrachuridae	<i>Curo amboinensis</i>	Turtle, Mayalan Box
Chordata	Reptilia	Colubridae	<i>Ahaetulla spp.</i>	Snake, Vine
Chordates: Birds				
Chordata	Aves	Spheniscidae	<i>Spheniscus demersus</i>	Penguin, Blackfooted
Chordates: Mammals				
Chordata	Mammalia	Mustelidae	<i>Aonyx cinera</i>	Otter, Asian Small-clawed
Chordata	Mammalia	Mustelidae	<i>Lutris maculicollis</i>	Otter, Spot-necked

4Division