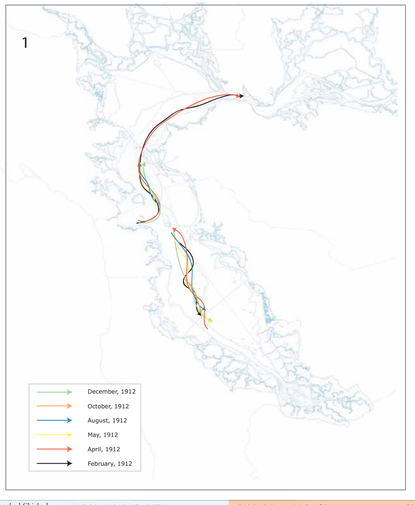
San Francisco Bay Biodiversity

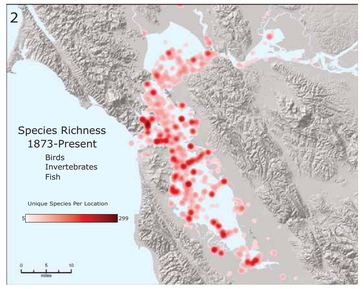
Viewing California Academy of Sciences' Collections with GIS

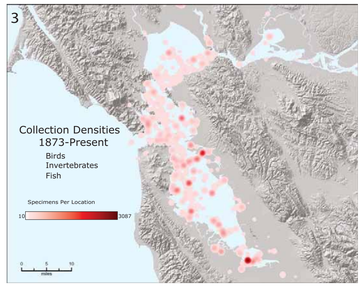
Natural history specimens are integral to biodiversity research, studies exploring the diversity of species and the ecosystems they comprise. Museum specimens are tangible, verifiable means of validating the presence of a species in a given area. The presence of a species may indicate the local habitat, define species and ecosystem extents, and collectively, these records may help determine rates of extinction, rates of endemism, species associations, or species replacements through time. Applying museum specimen data to biodiversity research first requires answers to basic questions: How many specimens are there? Which species are present? Where do they occur in time and space? Here, California Academy of Sciences' collections are displayed using Geographic Information System (GIS) technology to show how museum records can be used to 1) track historic collection events; 2) show biologically rich areas; 3) summarize collection efforts; 4) show where endangered or threatened species have been found; 5) show discrete collection locations; or 6) illustrate relationships between native and introduced species over time. The species checklists at bottom are coastal bird, fish, and invertebrate species as documented by voucher specimens in the San Francisco Bay since 1851.

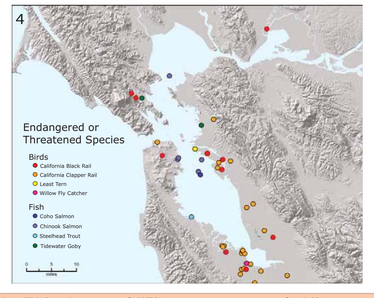
The Center for Biodiversity Research and Information (CBRI), a research center of the California Academy of Sciences, facilitates and conducts multidisciplinary research in biodiversity using natural history collection resources and GIS. For more information, contact cbri@calacademy.org or visit www.calacademy.org/cbri/

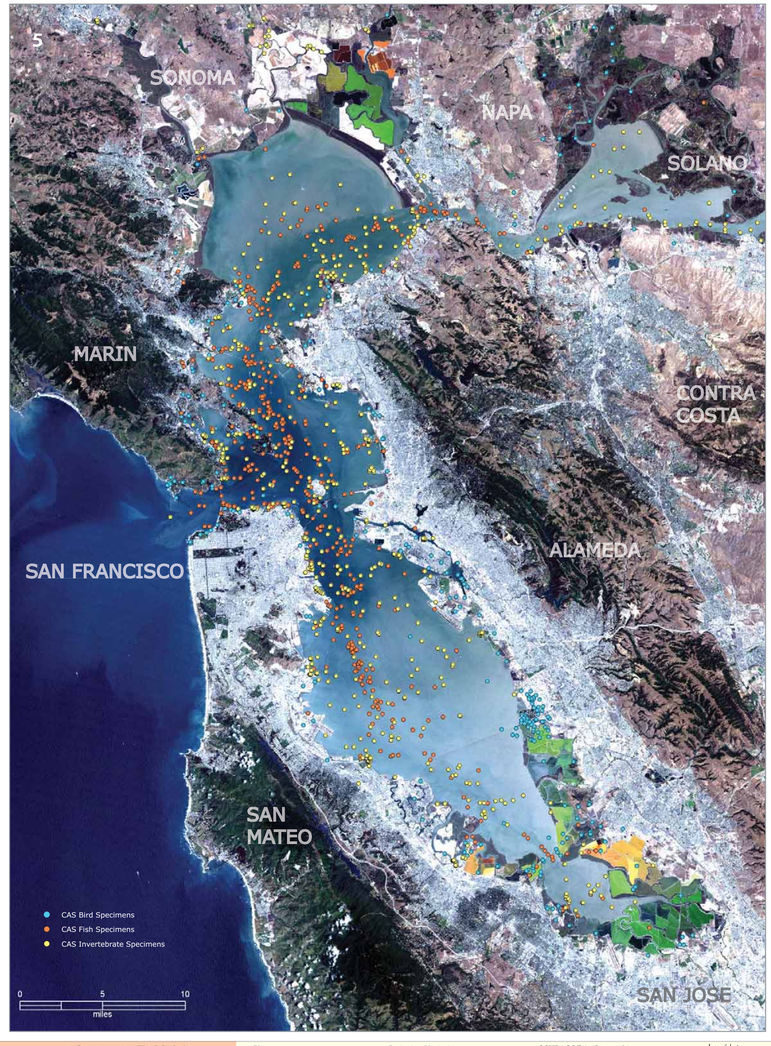
Fisheries research steamer *Albatross* made her first scientific voyage in 1883 off the Atlantic Coast between Washington, D.C. and Woods Hole, Massachusetts. Thus began a nearly 40-year history of both biologic and military service. Between 1883 and 1911 *Albatross* circled the globe collecting hydrographic data and marine specimens from locations such as the Galapagos and Philippines Islands, Hawaii, Mexico, and Japan. Upon reaching San Francisco Bay from a 1911 fisheries survey of Alaskan waters, *Albatross* was found to be unseaworthy and remained for repairs. During this time a biological survey of the Bay was conducted from January 30, 1912 to April 22, 1913. The image to the right shows several collection runs from 1912. These data have been compiled by assigning geographic coordinates to Academy ichthyology specimen records based on original field notes describing collection locations. Once thoroughly overhauled, *Albatross* set out once again, leaving San Francisco for waters off the coast of Washington and Oregon. *Albatross* would continue as a research vessel until she was placed under U.S. Navy control during the First World War, where she patrolled the Caribbean and Gulf of Mexico.[1] She was returned to research in 1919 and decommissioned in 1921 after returning to Woods Hole from a final research expedition in the Gulf of Maine.











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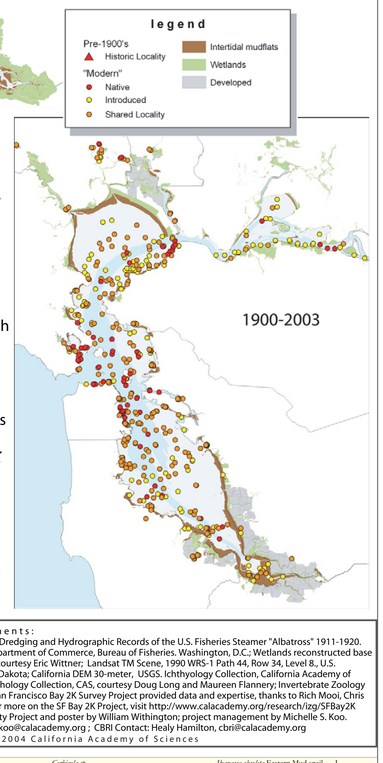
IZ Collections Past & Present

California Academy of Sciences' collections, a verifiable record of biodiversity, spans more than a century. This historical data will increase in importance as we seek to understand how Earth is changing under the influence of modern human societies.

In this map of Invertebrate Zoology's collections from the 1800's, the extent of original wetlands is striking.



Today's biodiversity surveys are critical to provide baseline data for measuring future change. CAS is involved in many such projects, including ***San Francisco Bay:2K***, an effort that combines invertebrate and fish surveys of San Francisco Bay with scientific research experiences for SF high school students.

Many of the modern data points are from specimens sampled and identified in the ***San Francisco Bay:2K*** biodiversity survey.

The results demonstrate the pervasive nature of introduced species throughout all habitats in the Bay.

Data Sources & Acknowledgments:
[1]Northeast Fisheries Science Center, NOAA; [2]Dredging and Hydrographic Records of the U.S. Fisheries Steamer "Albatross" 1911–1920. 1921. Bureau of Fisheries. Washington, D.C.; Wetlands reconstructed base maps: San Francisco Estuary Institute (SFEI), courtesy Eric Wittner; Landsat TM Scene, 1990 WRS-1 Path 44, Row 34, Level 8., U.S. Geological Survey (USGS), Sioux Falls, South Dakota; California DEM 30-meter, USGS. Ichthyology Collection, California Academy of Sciences (CAS), courtesy David Catania; Ornithology Collection, CAS, courtesy Doug Long and Maureen Flannery; Invertebrate Zoology Collection, CAS, courtesy Robert Van Syoc; San Francisco Bay 2K Survey Project provided data and expertise, thanks to Rich Mooi, Chris Brown, Christy Piotrowski, and Vic Smith. For more on the SF Bay 2K Project, visit http://www.calacademy.org/research/izg/SFBay2K
Groundwork for San Francisco Bay Biodiversity Project and poster by William Withington; project management by Michelle S. Koo.
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Checklist of Bird Specimens

Accipitridae
Accipiter striatus Sharp-shinned Hawk
Buteo jamaicensis Red-tailed Hawk
Buteo lagopus Rough-legged Hawk
Buteo lineatus Red-shouldered Hawk
Elanus leucurus White-tailed Kite

Aegithalidae
Psaltriparus minimus Bushtit

Alcedinidae
Ceryle alcyon Belted Kingfisher

Alcidae
Ptychoramphus aleuticus Cassin's Auklet
Synthliboramphus antiquus Ancient Murrelet
Uria aalge Common Murrelet

Anatidae
Aix galericulata Mandarin Duck I
Alca torda Razorbill
Anas acuta Northern Pintail
Anas americana American Wigeon
Anas clypeata Northern Shoveler
Anas crecca Green-winged Teal
Anas cyanoptera Cinnamon Teal
Anas penelope Eurasian Wigeon
Anas platyrhynchos Mallard
Anas querquedula Garganey
Anas strepera Gadwall
Anser albifrons Greater White-fronted Goose
Anser anser Domestic Goose
Aythya affinis Lesser Scaup
Aythya americana Redhead
Aythya collaris Ring-necked Duck
Aythya fuligula Tufted Duck
Aythya marila Greater Scaup
Aythya valisineria Canvasback
Branta bernicla Brant
Branta canadensis Canada Goose
Bucephala albeola Bufflehead
Bucephala clangula Common Goldeneye
Bucephala islandica Barrow's Goldeneye
Chen caerulescens Snow Goose
Chen rossii Ross's Goose
Clangula hyemalis Long-tailed Duck
Cygnus atratus Australian Black Swan I
Cygnus columbianus Tundra Swan
Dendrocygna bicolor Fulvous Whistling-Duck
Histrionicus histrionicus Harlequin Duck
Lophodytes cucullatus Hooded Merganser
Melanitta fusca White-winged Scoter
Melanitta nigra Black Scoter
Melanitta perspicillata Surf Scoter
Mergus merganser Common Merganser
Mergus serrator Red-breasted Merganser
Oxyura jamaicensis Ruddy Duck
Somateria spectabilis King Eider

Ardeidae
Ardea alba Great Egret
Ardea herodias Great Blue Heron
Botaurus lentiginosus American Bittern
Bubulcus ibis Cattle Egret
Butorides virescens Green Heron
Butorides striatus Striated Heron
Egretta thula Snowy Egret
Nycticorax nycticorax Black-crowned Night-Heron

Bombycillidae
Bombycilla cedrorum Cedar Waxwing

Caprimulgidae
Chordeiles acutipennis Lesser Nighthawk

Cardinalidae
Cardinalis cardinalis Northern Cardinal
Pheucticus melanocephalus Black-headed Grosbeak

Charadriidae
Charadrius alexandrinus Snowy Plover
Charadrius hiaticula Greater Sand Plover I
Charadrius semipalmatus Semipalmated Plover
Charadrius vociferus Killdeer
Pluvialis dominica American Golden-Plover
Pluvialis squatarola Black-bellied Plover

Columbidae
Zenaida macroura Mourning Dove

Corvidae
Aphelocoma californica Western Scrub-Jay
Aphelocoma coerulescens Florida Scrub-Jay
Cyanocitta stelleri Steller's Jay

Diomedeidae
Phoebastria immutabilis Laysan Albatross
Phoebastria nigripes Black-footed Albatross

Emberizidae
Junco hyemalis Dark-eyed Junco
Melospiza lincolnii Lincoln's Sparrow
Melospiza melodia Song Sparrow
Passerculus sandwichensis Savannah Sparrow
Passerella iliaca Fox Sparrow
Pipilo crissalis California Towhee
Pipilo erythrophthalmus Eastern Towhee
Pipilo fuscus Canyon Towhee
Pipilo maculatus Spotted Towhee
Zonotrichia atricapilla Golden-crowned Sparrow
Zonotrichia leucophrys White-crowned Sparrow

Falconidae
Falco columbarius Merlin
Falco peregrinus Peregrine Falcon
Falco sparverius American Kestrel
Falco tinnunculus Eurasian Kestrel

Fringillidae
Cardueli laurencei Lawrence's Goldfinch
Cardueli pinus Pine Siskin
Cardueli psaltria Lesser Goldfinch
Cardueli tristis American Goldfinch
Carpodacus mexicanus House Finch
Carpodacus purpureus Purple Finch

Gaviidae
Gavia arctica Arctic Loon
Gavia immer Common Loon
Gavia pacifica Pacific Loon
Gavia stellata Red-throated Loon

Hirundinidae
Hirundo rustica Barn Swallow
Petrochelidon pyrrhonota Cliff Swallow

Hydrobatidae
Oceanodroma furcata Fork-tailed Storm-Petrel
Oceanodroma homochroa Ashy Storm-Petrel
Oceanodroma leucorhoa Leach's Storm-Petrel

Icteridae
Agelaius phoeniceus Red-winged Blackbird
Agelaius tricolor Tricolored Blackbird
Euphagus cyanocephalus Brewer's Blackbird
Icterus bullockii Bullock's Oriole
Icterus cucullatus Hooded Oriole
Icterus galbula Baltimore Oriole
Molothrus ater Brown-headed Cowbird
Sturnella neglecta Western Meadowlark

Laridae
Chlidonias niger Black Tern
Larus argentatus Herring Gull
Larus californicus California Gull
Larus canus Mew Gull
Larus delawarensis Ring-billed Gull
Larus glaucescens Glaucous-winged Gull
Larus hermanni Heermann's Gull
Larus hyperboreus Glaucous Gull
Larus occidentalis Western Gull
Larus philadelphia Bonaparte's Gull
Larus thayeri Thayer's Gull
Rissa brevirostris Red-legged Kittiwake
Rissa tridactyla Black-legged Kittiwake
Stercorarius longicaudus Long-tailed Jaeger
Stercorarius parasiticus Parasitic Jaeger
Stercorarius pomarinus Pomarine Jaeger
Sterna antillarum Least Tern
Sterna caspia Caspian Tern
Sterna forsteri Forster's Tern
Sterna hirundo Common Tern
Sterna maxima Royal Tern
Sterna paradisaea Arctic Tern
Xema sabini Sabine's Gull

Motacillidae
Anthus rubescens American Pipit

Odontophoridae
Callipepla californica California Quail

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Zenaida macroura Mourning Dove

Poecile rufescens Chestnut-backed Chickadee

Paruliidae
Dendroica coronata Yellow-rumped Warbler
Dendroica petechia Yellow Warbler
Geothlypis trichas Common Yellowthroat
Setophaga ruticilla American Redstart
Vermivora celata Orange-crowned Warbler
Wilsonia pusilla Wilson's Warbler

Passeridae
Passer domesticus House Sparrow I

Pelecanidae
Pelecanus erythrorhynchos American White Pelican
Pelecanus occidentalis Brown Pelican

Phalacrocoracidae
Phalacrocorax auritus Double-crested Cormorant
Phalacrocorax pelagicus Pelagic Cormorant
Phalacrocorax penicillatus Brandt's Cormorant

Phasianidae
Phasianus colchicus Ring-necked Pheasant I

Picidae
Colaptes auratus Northern Flicker
Sphyrapicus ruber Red-breasted Sapsucker
Sphyrapicus varius Williamson's Sapsucker

Podicipedidae
Aechmophorus occidentalis Western Grebe
Procellariidae
Fulmarus glacialis Northern Fulmar
Pterodroma inexpectata Mottled Petrel
Puffinus creatopus Pink-footed Shearwater
Puffinus opisthomelas Black-vented Shearwater
Puffinus tenuirostris Short-tailed Shearwater

Rallidae
Coturnicops noveboracensis Yellow Rail
Fulica americana American Coot
Gallinula chloropus Common Moorhen
Laterallus jamaicensis Black Rail
Porzana carolina Sora
Rallus limicola Virginia Rail
Rallus longirostris Clapper Rail

Recurvirostridae
Himantopus mexicanus Black-necked Stilt
Recurvirostra americana American Avocet

Regulidae
Regulus calendula Ruby-crowned Kinglet
Regulus satrapa Golden-crowned Kinglet

Scolopacidae
Actitis macularia Spotted Sandpiper
Aphriza virgata Surfbird
Arenaria interpres Ruddy Turnstone
Arenaria melanophala Black Turnstone
Calidris alba Sanderling
Calidris alpina Dunlin
Calidris bairdii Baird's Sandpiper
Calidris canutus Red Knot
Calidris mauri Western Sandpiper
Calidris melanotos Pectoral Sandpiper
Calidris minutilla Least Sandpiper
Calidris pusilla Semipalmated Sandpiper
Catoptrophorus semipalmatus Willet
Gallinago gallinago Common Snipe
Heteroscelus incanus Wandering Tattler
Limnodromus griseus Short-billed Dowitcher
Limnodromus scolopaceus Long-billed Dowitcher
Limosa fedoa Marbled Godwit
Numenius americanus Long-billed Curlew
Numenius phaeopus Whimbrel
Phalaropus fulicarius Red Phalarope
Phalaropus lobatus Red-necked Phalarope
Phalaropus tricolor Wilson's Phalarope
Tringa flavipes Lesser Yellowlegs
Tringa melanoleuca Greater Yellowlegs

Strigidae
Bubo virginianus Great Horned Owl

Sturnidae
Sturnus vulgaris European Starling I

Timaliidae
Chamaea fasciata Wrentit

Trochilidae
Calypte anna Anna's Hummingbird
Selasphorus sasin Allen's Hummingbird

Troglodytidae
Cistothorus palustris Marsh Wren

Salpiscitta sitokoides Rock Wren
Thryomanes bewickii Bewick's Wren

Turdidae
Catharus ustulatus Hermit Thrush
Catharus ustulatus Swainson's Thrush
Ixoreus naevius Varied Thrush
Turdus migratorius American Robin

Tyrannidae
Empidonax traillii Willow Flycatcher
Myiarchus cinerascens Ash-throated Flycatcher
Sayornis nigricans Black Phoebe
Tyrannus tyrannus Eastern Kingbird

Tytonidae
Tyto alba Barn Owl

Vireonidae
Vireo gilvus Warbling Vireo
Vireo huttoni Hutton's Vireo
Vireo solitarius Blue-headed Vireo

Checklist of Fish Specimens

Acipenseridae
Acipenser medirostris Green Sturgeon
Acipenser transmontanus White Sturgeon

Agonidae
Odontopsyx trigitosus Pygmy Poacher
Pallasina barbata Tubenose Poacher
Stellerina xyosterna Pricklebreast Poacher
Xenetrmus latipinnis Blacktip Poacher
Xenetrmus moaiensis Bluespotted Poacher

Agonopsidae
Aldrovandrichthys tenebricosus California Slickhead

Alepisauridae
Alepisaurus ferox Longnose Lancetfish

Albulidae
Albula vulpes Bonefish

Alopiidae
Alopias vulpinus Thintail Thresher Shark

Ammodytidae
Ammodytes hexapterus Pacific Sand Lance
Ammodytes personatus Pacific Sand Lance

Anarchichadidae
Anarrhichthys ocellatus Wolf Eel

Anguillidae
Anguilla anguilla European Eel I
Anguilla rostrata American Eel I

Anoplopomatidae
Anoplopoma fimbria Sable Fish

Atherinidae
Atherinopsis affinis Topsmelt
Atherinopsis californiensis Jacksmelt
Leuresthes tenuis California Grunion
Menidia beryllina Inland Silverside I

Autorhynchidae
Autorhynchus flandsi Tubesnout Stickleback

Bathymasteridae
Rathbunella alleni Rough Ronquil
Ronquilus jordani Northern Ronquil

Batrachoididae
Porichthys margaritatus Daisy Midshipman
Porichthys notatus Plainfin Midshipman

Blennidae
Plesiobatis Daddy Blenny

Bothidae
Bothus ocellatus Atlantic Pomfret

Bythitidae
Dinematichthys iluzonensis Red Brotula

Carangidae
Seriola dorsalis Yellowtail Amberjack
Trachurus symmetricus Jack Mackerel

Catostomidae
Catostomus occidentalis Sacramento Sucker
Pantosteus sp.

Centrarchidae
Archoplites interruptus Sacramento Perch
Chaenobryttus gulosus Warmouth
Lepomis cyanellus Green Sunfish
Lepomis gibbosus Pumpkinseed
Lepomis macrochirus Bluegill
Lepomis marginatus Dollar Sunfish
Lepomis sp.
Micropterus salmoides Largemouth Bass
Micropterus sp.
Pomoxis nigromaculatus Black Crappie

Phanerodon furcatus White Seaperch
Rhacochilus toxotes Rubberlip Seaperch
Rhacochilus vacca Pile Perch
Sebastes atrovirens Kelp Rockfish
Zalembius rosaceus Pink Seaperch

Engraulidae
Engraulis mordax Northern Anchovy

Fundulidae
Lucania parva Rainwater Killfish

Gadidae
Microgadus proximus Pacific Tomcod

Gasterosteidae
Gasterosteus aculeatus Threespine Stickleback
Gasterosteus sp.

Ginglymostomatidae
Ginglymostoma cirratum Nurse Shark I

Gobiesocidae
Gobiesox maeandricus Northern Clingfish
Gobiesox rhessodon California Clingfish
Gobiesox sp.

Gobiidae
Acanthogobius flavimanus Yellowfin Goby I
Clevelandia ios Arrow Goby
Eucyclogobius newberryi Tidewater Goby
Gillichthys mirabilis Longjaw Mudsucker
Ilypnus gilberti Cheekspot Goby
Lepidogobius lepidus Bay Goby
Rhinogobiops nicholsii Blackeye Goby
Tridentiger bifasciatus Goby
Tridentiger trigonocephalus Chameleon Goby I

Hexanchidae
Heptranchias francisci Horn Shark

Hexagrammidae
Hexagrammos decagrammus Kelp Greenling
Hexagrammos lagocephalus Rock Greenling
Hexagrammos vitulus Whitespotted Greenling
Ophiodon elongatus Lingcod
Oxylebius pictus Painted Greenling

Hexanchidae
Hexanchus griseus Sixgill Shark
Notorynchus cepedianus Sevengill Shark

Holocentridae
Sargocentron ensiferi Yellow-striped Squirrelfish

Icostedae
Ictalurus nebulosus Bullhead

Ictaluridae
Amiurus catus White Catfish
Amiurus melas Black Bullhead
Amiurus nebulosus Brown Bullhead
Ictalurus punctatus Channel Catfish
Ictalurus sp.

Kyphosidae
Girella nigricans Opaleye

Labridae
Choilo inermis Cigar Wrasse
Oxyjulis californica Seaweed Wrasse

Lamnidae
Lamna ditropis Salmon Shark

Liparidae
Liparis florae Tidepool Snailfish
Liparis fucensis Slipskin Snailfish
Liparis pulchellus Showy Snailfish

Macrouridae
Coryphaenoides acrolepis Pacific Grenadier

Merluccidae
Merluccius productus Pacific Hake
Merluccius sp.

Molidae
Mola mola Ocean Sunfish

Moridae
Antimora microlepis Pacific Flatnose

Moronidae
Morone saxatilis Striped Bass

Myctophidae
Lampanyctus ariphous Sunbeam Lampfish

Myliobatidae
Myliobatis californica Bat Ray

Myxinidae
Eptatretus deani Black Hagfish

Ophidiidae
Chilara taylori Spotted Cusk-Eel

Osmeridae
Allosmerus elongatus Whitebait Smelt
Hypomesus olidus Pond Smelt
Hypomesus pretiosus Surf Smelt
Hypomesus transpacificus Delta Smelt
Spirinchus starksi Night Smelt
Spirinchus thaleichthys Longfin Smelt
Spirinchus sp.
Thaleichthys pacificus Eulachon

Ostraciidae
Ostracion melagris Spotted Boxfish

Paralepididae
Lestidiiform sp.

Paralichthyidae
Citharichthys stigmaeus Speckled Sanddab
Citharichthys sordidus Pacific Sanddab
Citharichthys xanthostigma Longfin Sanddab
Paralichthys californicus California Halibut
Platichthys stellatus Starry Flounder

Petromyzontidae
Entosphenus sp.
Lampetra ayresi River Lamprey
Lampetra tridentata Pacific Lamprey

Pholidae
Apodichthys flavidus Penpoint Gunnel
Apodichthys fucorum Rockweed Gunnel

Pleuronectidae
Atheresthes stomias Arrowtooth Flounder
Embassichthys bathybius Deepsea Sole
Engyatria ferlanni Petrale Sole
Glyptocephalus zachirus Rex Sole
Hippoglossoides platessoides American Plaice I
Hypsopsetta guttulata Diamond Turbot
Inopsetta ischyra Hybrid Sole
Isopsetta isolepis Butter Sole
Lepidopsetta bilineata Slender Sole
Lepidopsetta polyxystra
Lopsetta exilis Slender Sole
Microstomus pacificus Dover Sole
Parophrys vetulus English Sole
Platichthys stellatus Starry Flounder
Pleuronichthys decurrens Curlfin Sole
Pleuronichthys ritteri Spotted Turbot
Pleuronichthys verticalis Hornyhead Turbot
Pleuronichthys coenosus C-O Sole
Psettichthys melanostictus Sand Sole

Poeciliidae
Gambusia affinis Western Mosquitofish I

Rajidae
Raja binoculata Big Skate
Raja inornata California Skate
Raja stellulata Starry Skate
Raja rhina Longnose Skate

Rhamphocotidae
Rhamphocottus richardsoni Grunt Sculpin

Rhinobatidae
Platyrhinoidis triseriata Thornback Ray
Rhinobatos productus Shovelnose Guitarfish

Salangidae
Protosalanx chinensis Chinese Noodlefish

Salmonidae
Oncorhynchus gorbuscha Pink Salmon
Oncorhynchus kisutch Coho Salmon
Oncorhynchus mykiss Rainbow Trout
Oncorhynchus tshawytscha Chinook Salmon
Oncorhynchus sp.
Salmo trutta Brown Trout I
Salmo sp.
Salvelinus fontinalis Brook Trout I
Salvelinus namaycush Lake Trout

Sciaenidae
Atractoscion nobilis White Seabass
Genyonemus lineatus White Croaker
Menticirrhus undulatus California Corbina
Roncador stearnsii Spotfin Croaker
Seriphus politus Queenfish
Umbrina roncador Yellowfin Croaker

Scombrenosidae
Cololabis saira Pacific Saury

Scombridae
Scomber japonicus Chub Mackerel
Thunnus alalunga Albacore

Sebastidae
Sebastes aleutus Pacific Ocean Perch
Sebastes atrovirens Kelp Rockfish
Sebastes auriculatus Brown Rockfish
Sebastes brevispinis Silvergray Rockfish
Sebastes caurinus Whitebelly Rockfish
Sebastes chlorostictus Greenspotted Rockfish
Sebastes chrysomelas Black and Yellow Rockfish
Sebastes dallei Calico Rockfish
Sebastes diploproa Splitnose Rockfish
Sebastes elongatus Greenstriped Rockfish
Sebastes entomelas Widow Rockfish
Sebastes flavidus Yellowtail Rockfish
Sebastes goodei Chilipepper (Rockfish)
Sebastes hopkinsanus Bocaccio Rockfish
Sebastes jordani Shortbelly Rockfish
Sebastes levis Cowcod
Sebastes melanops Black Rockfish
Sebastes melanostomus Blackgill Rockfish
Sebastes miniatus Vermilion Rockfish
Sebastes mystinus Blue Rockfish
Sebastes nigrocinctus Tiger Rockfish
Sebastes ovalis Speckled Rockfish
Sebastes panoplitus Bocaccio
Sebastes pinniger Canary Rockfish
Sebastes ruberrimus Yelloweye Rockfish
Sebastes rubrivinctus Flag Rockfish
Sebastes saxicola Stripetail Rockfish
Sebastes serranoides Olive Rockfish
Sebastes serriceps Treefish

Serranidae
Hypanus sabinus
Hypanus triseriatus

Paralabrax maculatofasciatus Spotted Sand Bass

Squatinidae
Squatina californica Pacific Barracuda

Squalidae
Squalus acanthias Spiny Dogfish

Stereopsychidae
Stereopsyches alacaria

Sticheidae
Anoplarchus purpurescens High Cockscomb
Cebidichthys violaceus Monkeyface Prickleback

Stromateidae
Peprilus simillimus Pacific Pompano

Synbranchidae
Monopterus albus Swamp Eel I

Opisthokthus triseriatus Pacific Snake Eel

Syngnathidae
Syngnathus californicus Kelp Pipefish
Syngnathus leptorhynchus Bay Pipefish
Syngnathus sp.

Synodontidae
Synodus lucioceps California Lizardfish

Torpedinidae
Torpedo californica Pacific Electric Ray

Toxotidae
Toxotes jaculatrix Banded Archerfish

Triakidae
Galeorhinus galeus Soupfin Shark
Mustelus henlei Brown Smoothhound
Triakis semifasciata Leopard Shark

Trichiuridae
Benthodesmus simonyi Simony's Frostfish I
Trichiurus nitens Pacific Cutlassfish

Xiphiidae
Xiphias gladius Swordfish

Cuvieridae
Lyanodes parifuscus Blackbelly Eelpout
Dermistator lineatus Pacific Fat Sleeper
Gobiomorus maculatus Spotted Sleeper
Mentelectrum undecimalis California Corbina
Ophiodromus pugettensis
Owenia collaris
Owenia fusiformis
Perenia sp.
Palaemonetes bulbs
Palaemonetes sp.
Paraphrynoglyphes pinnata
Parvarytline californica
Pectinaria hyperborea

Parmaturtes nanirenus Filetail Catshark
Porichthys myriaster Specklefin Midshipman
Radulinus boleoides Darter Sculpin
Rhinoliparis barbulifer Longnose Snailfish
Semicossyphus pulcher California Sheephead
Sphyrnana ensis Mexican Barracuda
Squatina californica Angel Shark
Stereolepis gigas Giant Sea Bass
Synagrapha scalis California Needlefish
Symphurus atricauda California Tonguefish

Checklist of Invertebrate Specimens

ANNELIDA

OLIGOCHAETA
Enchytraeus sp.
Lumbricilus sp.
Pelosiniles sp.
Tectitelus californiae
Tubifeides opottinatus I
Tubifeides northiae

POLYCHAETA (Polychaete Worms)
Armerinna sp.
Amaeana occidentalis Spaghetti worm
Amaeana sp.
Amphiglena laevis
Amphiarete sp.
Amaitides mucosa
Amaitides sp.
Amaitides williamsi
Antinoella sp.
Apeptoniopsis pygmaea
Arabella sp.
Aricidea catherinae
Aricidea fragoi
Aricidea lopezi sp.
Aricidea suecica
Armandia brevis
Armandia brevis
Arydro sp.
Autolytes sp.
Barantolla americana
Barantolla sp.
Boccardia sp.
Boccardiella hamata I
Boccardiella ligerica I
Brachydomates simplex
Capitella capitata (species complex) I
Caulleriella sp.
Chaetopterus cornuta
Chaetopterus sp.
Chone ecuadoria
Chone graciilis
Chone mimeta
Chone sp.
Cirratulus cirratus
Cirratulus sp.
Cirriformia sp.
Cirriformia tentaculata
Cossura candida
Cossura pygodaryata
Cossura sp.
Dentiphilia sp.
Diopatra sp.
Dipolydora caulleryi I
Dipolydora socialis I
Dorvillea sp.
Drilonereis sp.
Eteone californica
Eteone dilatae
Eteone flavescens
Eteone longa
Eteone sp.
Euchone limnicola
Euchone sp.
Eulalia sp.
Eumida bifidata
Eumida sanguinea
Eunoe sp.
Eupolymnia sp.
Eurydice truncata
Exogone hawi
Exogone sp.
Fabricia sp.
Fitzpatricia oregonensis Australian Tubeworm I
Glycera americana
Glycera capitata
Glycera convoluta
Glycera nana
Glycera oxycephala
Glycera robusta
Glycera rouxii

Glycera sp.
Glycera tenuis
Glycera tridentata
Glycinde armigera
Glycinde picta
Glycinde polygnathus
Glycinde sp.
Halosydna brevisetosa Scale worm
Harmothoe crassicirrata
Harmothoe extenuata Scale worm
Harmothoe imbricata Scale worm
Harmothoe lunulata
Harmothoe sp.
Hemipodus borealis
Heteomilia mucilochae
Heteonereis omnivora diff.
Heteonereis sp.
Hesperonoe adventor
Hesperonoe sp.
Hesperonoe laevis
Heteropodarke heteromorpha
Hermenia californica
Hermenia sp.
Hermenia verrucosa
Hermenoides kimberleyi
Hermenoides sp.
Hesperonoe laevis
Hesperonoe sp.
Hesperonoe adventor
*Hesperonoe