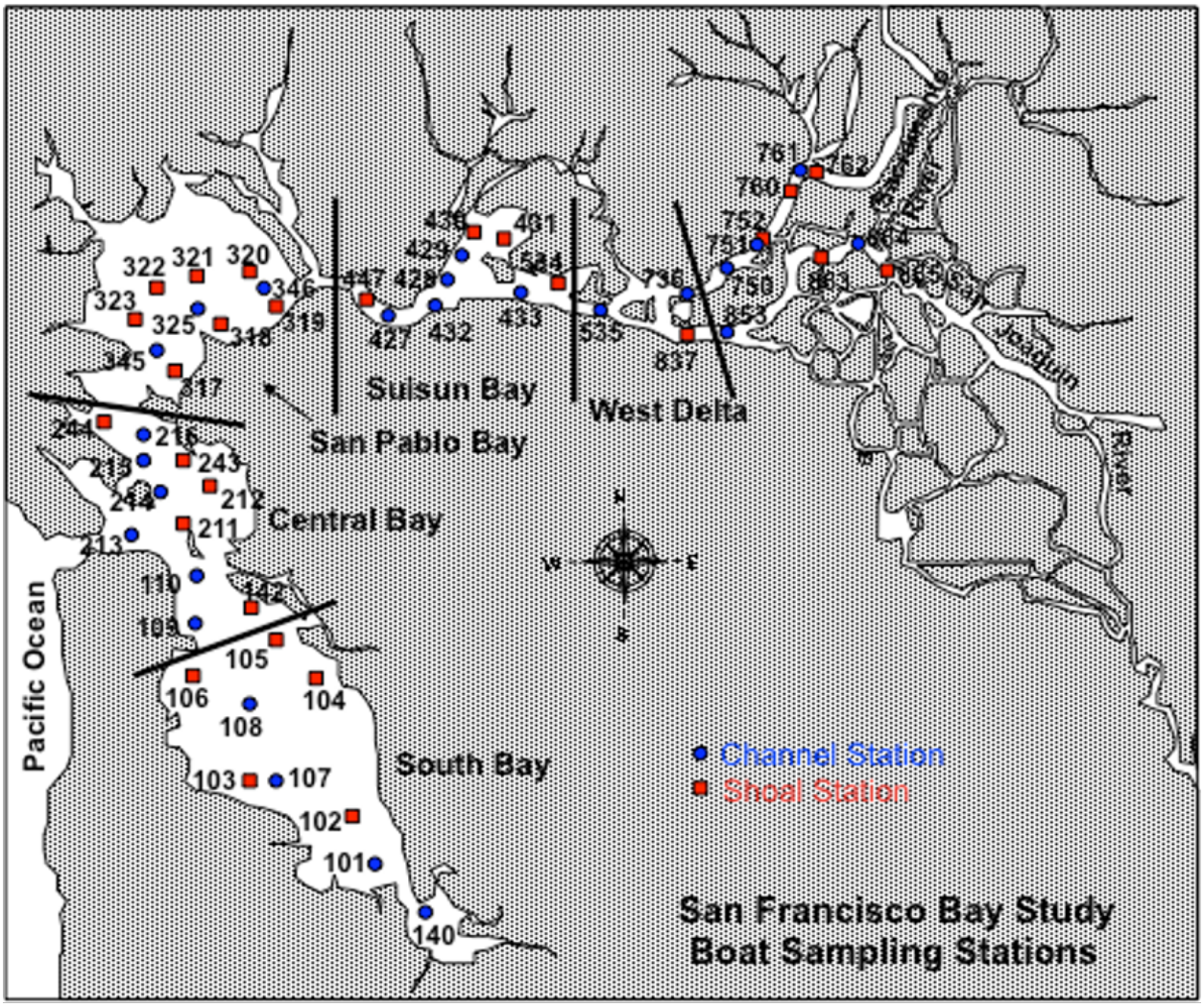
APPENDIX G. BIOLOGICAL RESOURCES SUPPLEMENTAL INFORMATION

Relative location of IEP trawling stations.
Graphic courtesy of Kathy Hieb (CDFW).



Pelagic fish community composition for Central Bay from midwater trawl data (IEP 2024) at stations 211 & 213-215.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp.
Engraulis mordax	Northern anchovy	29798	31056	2	428	32144	18310	10673	8618	16378	95.6
Clupea pallasii	Pacific herring	14	396	0	0	42	1840	157	1595	506	3.0
Atherinops californiensis	Jacksmelt	136	80	0	0	350	222	101	46	117	0.7
Sardinops sagaz	Pacific sardine	8	221	0	0	1	1	168	1	50	0.3
Leuresethes tenuis	California grunion	1	1	0	0	236	16	10	0	33	0.2
Peprilus simillimus	Pacific pompano	0	0	0	0	25	3	63	16	13	0.1
Spirinchus thaleichthys	Longfin smelt	4	9	0	0	8	20	42	9	12	0.1
Alosa sapidissima	American shad	1	6	21	5	2	2	4	7	6	0.0
Atherinops affinis	Topsmelt	2	5	0	0	14	10	5	8	6	0.0

Notes: Additional species collected in the IEP Bay Study midwater trawl between 2016 and 2023 include: bay goby, plainfin midshipman, Chinook salmon, shiner perch, English sole, white croaker, speckled sanddab, night smelt, brown rockfish, whitebait smelt, California lizardfish, walleye surfperch, striped bass, cheekspot goby, bat ray, leopard shark, starry flounder, threadfin shad, threespine stickleback, Pacific tomcod, thresher shark, sand sole, Pacific chub mackerel, kelp greenling, diamond turbot, and unidentified flatfish.

Pelagic fish community composition for West Delta from midwater trawl data (IEP 2024) at stations 428, 429, 432, 433, & 534.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp.
Engraulis mordax	Northern anchovy	316	254	0	37	448	1759	1165	338	540	61.2
Alosa sapidissima	American shad	63	527	10	58	188	72	71	355	168	19.1
Morone saxatilis	Striped bass	72	144	41	20	50	25	97	104	69	7.8
Clupea pallasii	Pacific herring	9	0	0	1	2	169	16	58	32	3.6
Spirinchus thaleichthys	Longfin smelt	2	26	2	1	7	32	81	53	26	2.9
Dorosoma petenense	Threadfin shad	26	69	2	3	4	16	11	68	25	2.8
Oncorhynchus tshawytscha	Chinook salmon	15	18	0	0	1	16	2	15	8	0.9
Porichthys notatus	Plainfin midshipman	0	1	0	0	3	11	14	0	4	0.4
Gasterosteus aculeatus	Threespine stickleback	2	2	0	0	0	0	18	0	3	0.3
Acanthogobius flavimanus	Yellowfin goby	1	4	1	0	0	0	3	6	2	0.2
Platichthys stellatus	Starry flounder	2	3	0	0	0	0	1	7	2	0.2

Notes: Additional species collected in the IEP Bay Study midwater trawl between 2016 and 2023 include: Shimofuri goby, splittail, jacksmelt, Shokihaze goby, delta smelt, Pacific staghorn sculpin, common carp, largemouth bass, rainwater killifish, river lamprey, and topsmelt.

Pelagic fish community composition for West Delta from midwater trawl data (IEP 2024) at stations 535, 736, & 837.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp.
Alosa sapidissima	American shad	76	1000	23	40	333	51	95	1399	377	67.4
Dorosoma petenense	Threadfin shad	39	64	3	12	21	64	139	332	84	15.1
Morone saxatilis	Striped bass	81	44	4	18	5	11	51	125	42	7.6
Clupea pallasii	Pacifc herring	1	0	0	0	0	106	8	1	15	2.6
Spirinchus thaleichthys	Longfin smelt	1	8	4	3	6	13	28	44	13	2.4
Engraulis mordax	Northern anchovy	2	0	0	0	1	86	16	0	13	2.3
Oncorhynchus tshawytscha	Chinook salmon	7	27	4	1	0	5	3	13	8	1.3
Acanthogobius flavimanus	Yellowfin goby	0	0	0	0	0	7	2	2	1	0.2
Tridentiger barbatus	Shokihaze goby	1	0	0	0	1	0	5	2	1	0.2
Tridentiger bifasciatus	Shimofuri goby	2	2	1	0	0	2	0	2	1	0.2
Pogonichthys macrolepidotus	Splittail	1	4	0	0	0	0	1	2	1	0.2

Notes: Additional species collected in the IEP Bay Study midwater trawl between 2016 and 2023 include: starry flounder, Pacific staghorn sculpin, bluefin killifish, threespine stickleback, steelhead trout, topsmelt, Sacramento pikeminnow, largemouth bass, hitch, delta smelt, and bluegill.

Demersal fish community composition for Central Bay from otter trawl data (IEP 2024) at stations 211 & 213-215.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp
Parophrys vetulus	English sole	295	1036	1734	767	584	4530	4891	16578	3802	49.8
Citharichthys stigmaeus	Speckled sanddab	1052	5631	954	620	970	1732.5	2789	2935	2085	27.3
Lepidogobius Lepidus	Bay goby	82	90	476	214	506	790	827	1433	552	7.2
Porichthys notatus	Plainfin midshipman	54	329	501	522	282	934	508	397	441	5.8
Leptocottus armatus	Pacific staghorn sculpin	14	65	178	91	239	523	314	374	225	2.9
Symphurus atricaudus	California tonguefish	510	95	3	83	5	1	2	4	88	1.2
Spirinchus thaleichthys	Longfin smelt	9	17	54	101	60	135	130	143	81	1.1
Cymatogaster aggregate	Shiner perch	18	30	6	7	28	110	139	185	65	0.9
Microgadus proximus	Pacific tomcod	0	0	1	0	0	15	213	221	56	0.7
Sebastes auriculatus	Brown rockfish	69	19	8	2	74	8	2	88	34	0.4
Paralichthys californicus	California halibut	62	53	15	56	26	20	15	5	32	0.4
Acanthogobius flavimanus	Yellowfin goby	1	3	4	6	7	48	75	84	29	0.4
Genyonemus lineatus	White croaker	15	15	48	13	11	73	26	17	27	0.4
Ilypnus gilberti	Cheekspot goby	0	6	16	7	28	72	30	5	21	0.3
Ophiodon elongatus	Lingcod	1	12	6	3	0	67	14	47	19	0.2
Synodus lucioceps	California lizardfish	38	16	0	0	0	0	0	86	18	0.2
Syngnathus leptorhynchus	Bay pipefish	12	6	8	16	17	18	36	18	16	0.2

Demersal fish community composition for Central Bay from otter trawl data (IEP 2024) at stations 211 & 213-215.

Notes: Additional species collected in IEP Bay Study otter trawls between 2016 and 2023 include: sand sole, Pacific sanddab, bonyhead sculpin, spotted cusk-eel, showy snailfish, curlfin sole, brown smooth-hound, bat ray, Pacific herring, diamond turbot, kelp greenling, starry flounder, saddleback gunnel, river lamprey, Pacific sardine, Dover sole, big skate, Pacific sand lance, walleye surfperch, pygmy poacher, chameleon goby, yellowtail rockfish, shovelnose guitarfish, Shokihaze goby, unidentified rockfish, brown Irish lord, black perch, arrow goby, American shad, white sturgeon, whitebait smelt, tubesnout, threadfin shad, striped ronquil, pile perch, Pacific lamprey, onespot fringehead, ocean whitefish, leopard shark, green sturgeon, California grunion, cabezon

Demersal fish community composition for West Delta from otter trawl data (IEP 2024) at stations 428, 429, 432, 433, & 534.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp
Tridentiger barbatus	Shokihaze goby	91	92	88	125	158	157	216	65	124	36.2
Morone saxatilis	Striped bass	65	129	48	100	64	35	40	161	80	23.4
Acanthogobius flavimanus	Yellowfin goby	11	31	4	15	7	119	44	44	34	10.0
Platichthys stellatus	Starry flounder	9	60	11	2	3	5	24	79	24	7.0
Leptocottus armatus	Pacific staghorn sculpin	1	7	11	6	7	71	14	31	19	5.4
Spirinchus thaleichthys	Longfin smelt	0	12	5	5	2	5	21	71	15	4.4
Porichthys notatus	Plainfin midshipman	2	2	16	0	8	44	19	11	13	3.7
Tridentiger bifasciatus	Shimofuri goby	11	18	5	6	2	23	7	24	12	3.5
Parophrys vetulus	English sole	0	0	3	0	0	18	3	7	4	1.1
Ilypnus gilberti	Cheekspot goby	1	0	2	4	2	5	1	3	2	0.7
Lampetra ayresii	River lamprey	3	0	1	1	0	3	3	5	2	0.6
Clupea pallasii	Pacific herring	0	0	0	0	0	6	0	9	2	0.5
Paralichthys californicus	California halibut	7	1	1	0	0	4	1	0	2	0.5
Lepidogobius lepidus	Bay goby	1	0	0	0	0	9	1	2	2	0.5
Pogonichthys macrolepidotus	Splittail	0	8	0	1	0	0	0	0	1	0.3
Citharichthys stigmaeus	Speckled sanddab	6	0	0	0	0	2	0	0	1	0.3
Cottus asper	Prickly sculpin	0	3	0	1	0	0	0	4	1	0.3

Demersal fish community composition for West Delta from otter trawl data (IEP 2024) at stations 428, 429, 432, 433, & 534.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp
Acipenser transmontanus	White sturgeon	0	1	1	1	0	1	0	2	1	0.2
Gasterosteus aculeatus	Threespine stickleback	0	0	0	0	0	2	3	1	1	0.2
Dorosoma petenense	Threadfin shad	0	1	0	5	0	0	0	0	1	0.2

Notes: Additional species collected in IEP Bay Study otter trawls between 2016 and 2023 include: tule perch, sand sole, diamond turbot, rainwater killifish, Pacific tomcod, white catfish, chameleon goby, California tonguefish, bay pipefish, and arrow goby.

Demersal fish community composition for West Delta from otter trawl data (IEP 2024) at stations 535, 736, & 837.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp
Tridentiger barbatus	Shokihaze goby	90	45	64	77	41	99	123	41	73	39.2
Morone saxatilis	Striped bass	59	42	27	59	63	83	55	65	57	30.6
Tridentiger bifasciatus	Shimofuri goby	10	12	1	1	3	5	14	43	11	6.0
Platichthys stellatus	Starry flounder	10	14	5	2	0	5	12	30	10	5.3
Ameiurus catus	White catfish	2	7	8	11	0	0	1	12	5	2.8
Acanthogobius flavimanus	Yellowfin goby	2	3	2	5	1	12	7	6	5	2.6
Spirinchus thaleichthys	Longfin smelt	0	2	0	0	0	9	17	7	4	2.4
Ictalurus punctatus	Channel catfish	0	6	4	7	10	4	0	3	4	2.3
Acipenser transmontanus	White sturgeon	2	15	1	4	0	0	0	10	4	2.2
Cottus asper	Prickly sculpin	1	18	0	0	1	0	1	4	3	1.7
Pogonichthys macrolepidotus	Splittail	2	1	0	5	2	2	0	2	2	0.9
Percina macrolepida	Bigscale logperch	6	1	0	0	1	0	1	1	1	0.7
Leptocottus armatus	Pacific staghorn sculpin	0	2	0	0	0	4	1	2	1	0.6
Alosa sapidissima	American shad	0	0	0	2	0	1	6	0	1	0.6
Porichthys notatus	Plainfin midshipman	0	0	0	0	0	3	3	0	1	0.4
Lampetra tridentata	Pacific lamprey	0	1	2	0	0	0	2	0	1	0.3
Lampetra ayresii	River lamprey	0	0	0	0	0	2	0	2	1	0.3

Demersal fish community composition for West Delta from otter trawl data (IEP 2024) at stations 535, 736, & 837.

Species	Common Name	2016	2017	2018	2019	2020	2021	2022	2023	Mean	% Comp
Gasterosteus aculeatus	Threespine stickleback	2	0	0	0	0	0	1	0	0	0.2
Dorosoma petenense	Threadfin shad	1	0	0	0	0	2	0	0	0	0.2

Notes: Additional species collected in the IEP Bay Study otter trawls between 2016 and 2023 include: tule perch, rainwater killifish, green sturgeon, Chinook salmon, Pacific herring, unidentified lamprey, California halibut, and bluefin killifish.

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
FMP: Coastal Pelagic			
Jack mackerel	*Trachurus symmetricus*	E, L, J, A	Uncommon
Krill or Euphausiids	*Euphausia pacifica, Thysanoessa spinifera, Nyctiphanes simplex, Nematocelis difficilis, T. gregaria, E. recurva, E. gibboides, E. eximia*	E, L, J, A	Uncommon
Market squid	*Doryteuthis opalescens*	E, L, J, A	Common
Northern anchovy	*Engraulis mordax*	E, L, J, A	Present
Pacific (chub) mackerel	*Scomber japonicus*	E, L, J, A	Uncommon
Pacific sardine	*Sardinops sagax*	E, L, J, A	Uncommon
Pacific herring*	*Clupea pallasii*	E, L, J, A	Present
Jacksmelt*	*Atherinops californiensis*	E, L, J, A	Uncommon
FMP: Pacific Groundfish			
Roundfish			
Cabezon	*Scorpaenichthys marmoratus*	E, L, J, A	Common
Kelp greenling	*Hexagrammos decagrammus*	E, L, J, A	Present
Lingcod	*Ophiodon elongatus*	E, L, J, A	Common
Pacific cod	*Gadus macrocephalus*	E, L, J, A	Uncommon
Pacific whiting (Hake)	*Merluccius productus*	E, L, J, A	Uncommon
Sablefish	*Anoplopoma fimbria*	E, L, J, A	Common

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Rockfish			
Aurora rockfish	*Sebastes aurora*	E, L, J, A	Uncommon
Bank rockfish	*Sebastes rufus*	E, L, J, A	Uncommon
Black rockfish	*Sebastes melanops*	E, L, J, A	Common
Black-and-yellow rockfish	*Sebastes chrysomelas*	E, L, J, A	Present
Blackgill rockfish	*Sebastes melanostomus*	E, L, J, A	Uncommon
Blackspotted rockfish	*Sebastes melanostictus*	E, L, J, A	Uncommon
Blue rockfish	*Sebastes mystinus*	E, L, J, A	Common
Bocaccio	*Sebastes paucispinis*	E, L, J, A	Common
Bronzespotted rockfish	*Sebastes gilli*		Absent
Brown rockfish	*Sebastes auriculatus*	E, L, J, A	Common
Calico rockfish	*Sebastes dalli*	E, L, J, A	Uncommon
California scorpionfish	*Scorpaena gutatta*		Absent
Canary rockfish	*Sebastes pinniger*	E, L, J, A	Common
Chameleon rockfish	*Sebastes phillipsi*		Absent
Chilipepper rockfish	*Sebastes goodei*	E, L, J, A	Common
China rockfish	*Sebastes nebulosus*	E, L, J, A	Present
Copper rockfish	*Sebastes caurinus*	E, L, J, A	Common
Cowcod	*Sebastes levis*	E, L, J, A	Uncommon
Darkblotched rockfish	*Sebastes crameri*	E, L, J, A	Uncommon

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Deacon rockfish	*Sebastes diaconus*	E, L, J, A	Uncommon
Dusky rockfish	*Sebastes ciliates*		Absent
Dwarf-red rockfish	*Sebastes rufinanus*		Absent
Flag rockfish	*Sebastes rubrivinctus*	E, L, J, A	Uncommon
Freckled rockfish	*Sebastes lentiginosus*		Absent
Gopher rockfish	*Sebastes carnatus*	E, L, J, A	Common
Grass rockfish	*Sebastes rastrelliger*	E, L, J, A	Uncommon
Greenblotched rockfish	*Sebastes rosenblatti*	E, L, J, A	Uncommon
Greenspotted rockfish	*Sebastes chlorostictus*	E, L, J, A	Present
Greenstriped rockfish	*Sebastes elongatus*	E, L, J, A	Uncommon
Halfbanded rockfish	*Sebastes semicinctus*		Absent
Harlequin rockfish	*Sebastes variegatus*		Absent
Honeycomb rockfish	*Sebastes umbrosus*		Absent
Kelp rockfish	*Sebastes atrovirens*	E, L, J, A	Uncommon
Longspine thornyhead	*Sebastolobus altivelis*	E, L, J, A	Uncommon
Mexican rockfish	*Sebastes macdonaldi*	E, L, J, A	Uncommon
Olive rockfish	*Sebastes serranoides*	E, L, J, A	Present
Pacific Ocean perch	*Sebastes alutus*	E, L, J, A	Uncommon
Pink rockfish	*Sebastes eos*		Absent
Pinkrose rockfish	*Sebastes simulator*		Absent

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Pygmy rockfish	*Sebastes wilsoni*	E, L, J, A	Uncommon
Quillback rockfish	*Sebastes maliger*		Present
Redbanded rockfish	*Sebastes babcocki*	E, L, J, A	Uncommon
Redstripe rockfish	*Sebastes proriger*	E, L, J, A	Uncommon
Rosethorn rockfish	*Sebastes helvomaculatus*	E, L, J, A	Uncommon
Rosy rockfish	*Sebastes rosaceus*	E, L, J, A	Present
Rougheye rockfish	*Sebastes aleutianus*	E, L, J, A	Uncommon
Sharpchin rockfish	*Sebastes zacentrus*	E, L, J, A	Uncommon
Shortraker rockfish	*Sebastes borealis*	E, L, J, A	Uncommon
Shortspine thornyhead	*Sebastolobus alascanus*	E, L, J, A	Uncommon
Silvergray rockfish	*Sebastes brevispinis*	E, L, J, A	Uncommon
Speckled rockfish	*Sebastes ovalis*	E, L, J, A	Uncommon
Splitnose rockfish	*Sebastes diploproa*	E, L, J, A	Uncommon
Squarespot rockfish	*Sebastes hopkinsi*	E, L, J, A	Uncommon
Sunset rockfish	*Sebastes crocotulus*	E, L, J, A	Uncommon
Starry rockfish	*Sebastes constellatus*	E, L, J, A	Present
Stripetail rockfish	*Sebastes saxicola*	E, L, J, A	Uncommon
Swordspine rockfish	*Sebastes ensifer*	E, L, J, A	Uncommon
Tiger rockfish	*Sebastes nigrocinctus*	E, L, J, A	Uncommon
Treefish	*Sebastes serriceps*	E, L, J, A	Uncommon

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Vermilion rockfish	*Sebastes miniatus*	E, L, J, A	Common
Widow rockfish	*Sebastes entomelas*	E, L, J, A	Common
Yelloweye rockfish	*Sebastes ruberrimus*	E, L, J, A	Uncommon
Yellowmouth rockfish	*Sebastes reedi*		Absent
Yellowtail rockfish	*Sebastes flavidus*	E, L, J, A	Common
Elasmobranchs			
Big skate	*Raja binoculata*	E, L, J, A	Uncommon
Leopard shark	*Triakis semifasciata*	E, L, J, A	Common
Longnose skate	*Raja rhina*	E, L, J, A	Present
Pacific spiny dogfish	*Squalus suckleyi*	E, L, J, A	Uncommon
Flatfish			
Arrowtooth flounder (turbot)	*Atheresthes stomias*	E, L, J, A	Uncommon
Butter sole	*Isopsetta isolepis*	E, L, J, A	Uncommon
Curlfin sole	*Pleuronichthys decurrens*	E, L, J, A	Uncommon
Dover sole	*Microstomus pacificus*	E, L, J, A	Present
English sole	*Parophrys vetulus*	E, L, J, A	Uncommon
Flathead sole	*Hippoglossoides elassodon*		Absent
Pacific sanddab	*Citharichthys sordidus*	E, L, J, A	Common
Petrale sole	*Eopsetta jordani*	E, L, J, A	Present

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Rex sole	*Glyptocephalus zachirus*	E, L, J, A	Uncommon
Rock sole	*Lepidopsetta bilineata*	E, L, J, A	Uncommon
Sand sole	*Psettichthys melanostictus*	E, L, J, A	Present
Starry flounder	*Platichthys stellatus*	E, L, J, A	Present
FMP: Salmon			
Chinook salmon	*Oncorhynchus tshawytscha*	J, A	Common
Coho salmon	*Oncorhynchus kisutch*	E, L, J, A	Uncommon
Pink salmon	*Oncorhynchus gorbuscha*	A	Uncommon
FMP: Highly Migratory			
Bigeye tuna	*Thunnus obesus*	A	Uncommon
Blue shark	*Prionace glauca*	A	Uncommon
Common thresher shark	*Alopias vulpinus*	A	Uncommon
Dorado (Mahi mahi, Dolphinfish)	*Coryphaena hippurus*	A	Uncommon
North Pacific albacore	*Thunnus alalunga*	A	Present
Pacific bluefin tuna	*Thunnis orientalis*	A	Uncommon
Shortfin mako (Bonito) shark	*Isurus oxyrinchus*	A	Uncommon
Skipjack tuna	*Katsuwonus pelamis*	A	Uncommon
Swordfish	*Xiphias gladius*	A	Uncommon
Striped marlin	*Tetrapturus audax*	A	Uncommon

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Yellowfin tuna	*Thunnus albacares*	A	Uncommon
Bigeye thresher shark*	*Alopias superciliosus*	A	Uncommon
Common mola*	*Mola mola*	A	Uncommon
Escolar*	*Lepidocybium flavobrunneum*	A	Uncommon
Lancetfishes*	Alepisauridae	A	Uncommon
Louvar*	*Lubarus imperialis*	A	Uncommon
Pelagic sting ray*	*Dasyetis violacea*	A	Uncommon
Pelagic thresher shark*	*Alopias pelagicus*	A	Uncommon
Wahoo*	*Acathocybium solandri*	A	Uncommon
All FMPs*			
Mesopelagic fishes*	Families: *Myctophidae, Bathyalgidae, Paralepididae, and Gonostomatidae*		Absent
Pacific sand lance*	*Ammodytes hexapterus*	E, L, J, A	Uncommon
Pacific saury*	*Cololabis saira*	A	Uncommon
Pelagic squids*	Families: *Cranchiidae, Gonatidae, Histioteuthidae, Octopoteuhidae, Ommastrephidae* except Humboldt squid (*Dosidicus gigas*), *Onychoteuthidae, and Thysanoteuthidae*	E, L, J, A	Uncommon
Round herring*	*Etrumeus teres*		Absent
Silversides*	*Atherinopsidae*	E, L, J, A	Uncommon

Magnuson-Stevens Act Managed Fish and Invertebrate Species

Common Name	Scientific Name	Life Stage[1]	Occurrence in Sand Mining Locations[2]
Smelts*	*Osmeridae*	E, L, J, A	Common
Thread herring* Middling thread herring*	*Opisthonema libertate, Opisthonema medirastre*		Absent

Notes:

Species not listed in landings data were assigned categories based on the factors of distribution, range, and life history.

* Ecosystem Component Species

1 **E** = Egg, **L** = Larvae, **J** = Juvenile, **A** = Adult

2 **Common** = Species that comprise the known top 90% of commercial and/or recreational landings in thousands of pounds between 2015-2021.
Present = Species that comprise next known 9% of commercial and/or recreational landings in thousands of pounds between 2015-2021
Uncommon = Species that comprise the bottom 1% of commercial and/or recreational landings in thousands of pounds between 2015-2021
Absent = Not found within Revised Project area

Sources: Dick et al. 2007; PFMC 2024a; PFMC 2024b; PFMC 2024c; PFMC 2024d; CDFW 2025; RecFIN 2025; Fishbase 2025

San Francisco Area Annual Commercial Landings (Thousand Pounds): CDFW 2020-2024.

Common Name	Scientific Name	2020	2021	2022	2023	2024	% Total Catch
Dungeness crab	*Metacarcinus magister*	1697.6	2376.7	1782.4	2419.6	6106.8	50.89
Market squid	*Doryteuthis opalescens*	5678.8	Confidential*	15.8	Confidential*	0.0	20.15
California halibut	*Paralichthys californicus*	346.0	Confidential*	631.4	613.7	Confidential*	5.63
Chinook salmon	*Oncorhynchus tshawytscha*	Conf*	592.1	838.6	0.0	Confidential*	5.06
Sablefish	*Anoplopoma fimbria*	415.2	313.8	412.7	Confidential*	Confidential*	4.04
Chilipepper rockfish	*Sebastes goodei*	147.3	342.3	170.0	123.0	120.0	3.19
Petrale sole	*Eopsetta jordani*	192.6	180.5	136.6	178.2	167.3	3.03
Northern anchovy	*Egraulis mordax*	509.7	1.7	0.0	Confidential*	0.0	1.81
Bocaccio	*Sebastes paucispinis*	86.5	132.2	49.3	65.4	80.8	1.47
Pacific sanddab	*Citharichthys sordidus*	9.8	70.4	11.1	73.6	48.9	0.76
Coonstriped shrimp	*Pandalus danae*	5.0	21.0	29.1	38.7	56.4	0.53
Red rock crab	*Cancer productus*	10.2	31.1	18.3	40.0	13.6	0.40
Yellowtail rockfish	*Sebastes flavidus*	Confidential*	23.8	26.2	22.4	3.4	0.27
Sand sole	*Psettichthys melanostictus*	10.5	Confidential*	16.8	17.3	11.8	0.20
Albacore tuna	*Thunnus alalunga*	Confidential*	Confidential*	27.8	3.2	20.0	0.18
Lingcod	*Ophiodon elongatus*	Confidential*	24.0	14.3	10.2	2.2	0.18
Starry flounder	*Platichthys stellatus*	13.5	Confidential*	10.7	14.3	9.6	0.17
Dover sole	*Microstomus pacificus*	14.3	28.7	0.7	0.4	0.3	0.16
Bay shrimp	*Crangon franciscorum*	8.1	12.1	8.8	8.0	4.6	0.15
Brown rockfish	*Sebastes auriculatus*	Confidential*	10.7	13.4	9.2	6.5	0.14

San Francisco Area Annual Commercial Landings (Thousand Pounds): CDFW 2020-2024.

Common Name	Scientific Name	2020	2021	2022	2023	2024	% Total Catch
Red sea urchin	*Strongyloctenrotus franciscanus*	9.6	4.9	7.1	7.0	8.3	0.13
Unspecified rock crab	*Cancer* spp.	1.4	33.6	0.2	0.0	0.6	0.13
Longnose skate	*Raja rhina*	6.0	7.8	5.6	10.3	6.1	0.13
White seabass	*Atractoscion nobilis*	11.5	6.4	8.6	2.4	1.9	0.11
Blackgill rockfish	*Sebastes melanostomus*	3.7	3.6	6.8	7.2	4.7	0.09

Note: *Confidential landing values were considered zeroes in the calculation of landings, but were noted as present.

Data Source: CDFW (San Francisco 2020-2024). Species shown in table account for 99% of known commercial landings in thousands of pounds in San Francisco Area. Fished species comprising the remaining 1% include: splitnose rockfish, canary rockfish, bluefin tuna, greenstriped rockfish, brown rock crab, rex sole, English sole, shelf rockfish, widow rockfish, blue rockfish, shortspine thornyhead, Pacific whiting, longspine thornyhead, swordfish, vermilion rockfish, cowcod, gopher rockfish, greenspotted rockfish, black surfperch, yellow rock crab, white croaker, black rockfish, jacksmelt, bank rockfish, unspecified octopus, big skate, thresher shark, curlfin sole, soupfin shark, copper rockfish, shortbelly rockfish, unspecified flounder, striped seaperch, salmon roe (Chinook, Coho), redbanded rockfish, Shark, leopard shark, olive rockfish, China rockfish, Pacific cod, spot prawn, starry rockfish, brown smooth-hound; rock sole, Pacific Halibut, monkeyface prickleback, (eel), American shad; brown bluehead, unspecified fish, rock greenling, stripetail rockfish, mackerel jack, spotted ratfish, cabezon, sanddab, rubberlip surfperch, rougheye rockfish, black-and-yellow rockfish, arrowtooth Flounder, Pacific bonito, unspecified skate, spiny dogfish, tanner crab, pile surfperch, rosy rockfish, quillback rockfish, speckled rockfish, Pacific (chub) mackerel, salmon, shiner surfperch, darkblotched rockfish, aurora rockfish, unspecified croaker, night smelt, greenblotched rockfish, unspecified halibut, totuava seabass, halfmoon, plainfin midshipman, unspecified mackerel, Pacific electric ray, yelloweye rockfish, flag rockfish, wolf-eel, unspecified sole, kelp greenling, walleye surfperch, treefish, California skate, unspecified surfperch, turbot, California barracuda, striped bass, butterfish (Pacific pompano), spotted cusk-eel, bluebanded goby, Grenadier, grouper, hardhead (freshwater), Pacific herring, oilfish, Opah, Pomfret, bat ray, blackspotted rockfish, slope rockfish, pinkrose rockfish, chum salmon, Pacific sardine, dusky shark, shortfin mako, salmon shark, sevengill shark, silversides, true smelts, stingray pink surfperch, rainbow surfperch, white surfperch, unidentified thornyheads, topsmelt, yellowfin tuna, ocean whitefish, king crab, ghost shrimp, jellyfish, tilapia.

Northern & Central California Annual Recreational Landings (Metric Tons): RecFin 2020- 2024.

Common Name	Scientific Name	2020	2021	2022	2023	2024	% Total Catch
California halibut	*Paralichthys californicus*	96.1	107.9	217.1	339.4	206.1	28.14
Lingcod	*Ophiodon elongatus*	85.4	106.9	104.4	86.5	88.8	13.74
Striped bass	*Morone saxatilis*	14.5	37.6	29.8	89.9	102.0	7.97
Brown rockfish	*Sebastes auriculatus*	26.5	58.9	85.4	33.3	61.3	7.73
Yellowtail rockfish	*Sebastes flavidus*	7.0	49.4	41.5	92.0	28.6	6.36
Vermilion rockfish	*Sebastes miniatus*	24.9	32.7	43.2	26.5	18.3	4.24
Jacksmelt	*Atherinopsis californiensis*	6.7	49.6	20.5	27.0	23.6	3.71
Canary rockfish	*Sebastes pinniger*	16.9	33.1	33.3	23.9	13.4	3.51
Black rockfish	*Sebastes melanops*	12.6	28.6	25.5	8.2	17.0	2.67
Blue rockfish	*Sebastes mystinus*	13.6	25.8	25.7	9.6	8.6	2.42
Copper rockfish	*Sebastes caurinus*	12.1	20.9	14.9	4.0	5.3	1.66
Pacific sanddab	*Citharichthys sordidus*	1.8	4.7	16.8	24.2	7.9	1.62
Leopard rockfish	*Triakis semifasciata*	5.4	16.9	10.1	13.1	7.3	1.54
Gopher rockfish	*Sebastes carnatus*	4.5	11.1	15.4	6.4	14.5	1.51
Bat ray	*Myliobatis californica*	4.3	18.6	14.8	4.7	5.0	1.38
Bocaccio	*Sebastes paucispinis*	2.5	6.1	7.4	25.1	4.3	1.32
Barred surfperch	*Amphistichus argenteus*	0.2	10.8	19.0	0.1	0.1	0.88
Greenspotted rockfish	*Sebastes chlorostictus*	0.3	2.0	1.9	20.2	4.6	0.85
Olive rockfish	*Sebastes chlorostictus*	10.7	8.8	7.3	0.9	1.2	0.84
Starry rockfish	*Sebastes constellatus*	1.7	7.7	8.8	6.7	2.8	0.81
Cabezon	*Scorpaenichthys marmoratus*	3.0	4.3	10.0	2.7	6.0	0.76
Chilipepper rockfish	*Sebastes goodei*	0.0	0.0	0.0	17.0	8.1	0.73

Northern & Central California Annual Recreational Landings (Metric Tons): RecFin 2020- 2024.

Common Name	Scientific Name	2020	2021	2022	2023	2024	% Total Catch
China rockfish	*Sebastes nebulosus*	3.3	5.4	8.2	2.2	4.2	0.68
White sturgeon	*Acipenser transmontanus*	4.6	5.3	3.3	4.5	0.5	0.53
Sablefish	*Anoplopoma fimbria*	0.0	0.0	0.5	14.7	1.2	0.48
Widow rockfish	*Sebastes entomelas*	0.1	1.8	3.5	4.1	1.2	0.31
Pacific herring	*Clupea pallasii*	0.5	0.1	2.3	6.7	0.0	0.28
Petrale sole	*Eopsetta jordani*	0.0	0.4	0.8	6.8	1.0	0.26
White croaker	*Genyonemus lineatus*	0.6	2.6	1.6	2.8	1.1	0.26
Quillback rockfish	*Sebastes maliger*	0.9	3.9	2.8	0.2	0.2	0.24
Redtail surfperch	*Amphistichus rhodoterus*	0.1	3.3	4.4	0.0	0.0	0.23
Black-and-yellow rockfish	*Sebastes chrysomelas*	0.6	1.2	2.0	1.5	2.5	0.23
Monkeyface prickleback	*Cebidichthys violaceus*	0.4	3.5	0.7	0.2	0.5	0.15
Black perch	*Embiotica jacksoni*	0.7	2.0	0.9	0.5	1.2	0.15
Walleye surfperch	*Hyperprosopon argenteum*	0.2	2.4	1.5	0.4	0.4	0.14
Calico surfperch	*Amphistichus koelzi*	0.1	2.7	1.7	0.0	0.0	0.13
Northern anchovy	*Engraulis mordax*	1.1	0.3	0.6	0.3	2.0	0.12
Kelp greenling	*Hexagrammos decagrammus*	0.3	1.6	1.0	0.7	0.5	0.12
Shiner perch	*Cymatogaster aggregata*	0.2	1.0	0.8	1.0	0.7	0.11
Brown smooth-hound	*Mustelus henlei*	0.2	1.0	1.4	0.1	0.3	0.09
Striped seaperch	*Embiotoca lateralis*	0.1	2.0	0.5	0.2	0.2	0.09

Data Source: RecFIN (San Francisco Bay Area 2020-2024). Species shown account for 99% of recreational landings in metric tons (mt) in the San Francisco Bay Area. Fished species comprising the remaining 1% include: rosy rockfish, Pacific sardine, grass rockfish, sevengill shark, spiny dogfish, silver surfperch, white seabass, jack mackerel, rubberlip seaperch, flag rockfish,

soupfin shark, speckled rockfish, greenstriped rockfish, rock sole, topsmelt, yelloweye rockfish, white seaperch, Pacific (chub) mackerel, pile perch, tiger rockfish, Pacific bonito, shovelnose guitarfish, starry flounder, sand sole, wolf-eel, rainbow seaperch, treefish, Pacific hake, gray smooth-hound, Pacific staghorn sculpin, spotfin surfperch, American shad, sharpnose seaperch, greenblotched rockfish, stripetai rockfish, cowcod, kelp rockfish, buffalo sculpin, bank rockfish, speckled sanddab, queenfish, ocean whitefish, rock greenling, rosethorn rockfish, squarespot rockfish, Pacific pompano, swordspine rockfish, calico rockfish, bull sculpin, dwarf perch.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Marine Mammals					
Baird's beaked whale	*Berardius bairdii*	P	Inhabit deep offshore waters in the North Pacific and are common along steep underwater geologic structures, like submarine canyons, seamounts, and continental slopes. In the U.S., they inhabit waters off the West Coast from California to Alaska.	Seasonal-sightings from late spring to early fall. Very rare	Not Expected. Sightings occur in deeper waters than the Revised Project area, mainly along continental shelf edges or in deep submarine canyons where they forage. National Marine Fisheries Service (NMFS) records indicate less than a dozen individuals have washed up along the West Coast of the U.S.
Blainville's beaked whale	*Mesoplodon densirostris*	P	Occupy tropical and temperate waters worldwide, but are mainly found over the continental shelf in deep offshore waters. Often associated with steep underwater geological structures, such as banks, submarine canyons, seamounts, and continental slopes. Groups have been regularly observed off Oahu, Hawaii and the Bahamas in 500-1000 m (1,640-3,281 ft) depth.	Rare	Not Expected. Unlikely to be observed in the Revised Project area due to their preference for deeper open ocean waters.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Blue whale	*Balaenoptera musculus*	FD, FE, P	Found worldwide but often occur near the edges of physical features where krill concentrate. Blue whales begin southern migrations in November.	Seasonal from June through November. Common	Not Expected. Relatively common offshore California, in waters 90-370 km (56-330 mi) from shore. North Pacific blue whales are believed to spend winters off Mexico and Central America and feed off the West Coast of the U.S. Blue whales feed outside of SF Bay in the Gulf of the Farallones and offshore Point Reyes, California.
Bottlenose dolphin	*Tursiops truncatus*	P	Found in temperate and tropical waters around the world. Inhabit nearshore and deep-water areas including, harbors, bays, gulfs, estuaries, and over the continental.	Year-round; Occasional	Delta: Not Expected-Rare. Central Bay: Moderate-High. Bottlenose dolphins are the most common dolphins in Southern and Central California, traveling along the coast in search of prey. Bottlenose dolphin sightings have been increasingly common in SF Bay, especially during warmer months. They are particularly common in the Central Bay between the Golden Gate and Alcatraz Island. Most dolphins are seen

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
					in waters within 0-5 km (0-3 mi) of the shore.
Bryde's whale	*Balaenoptera edeni*	P	Found in highly productive tropical, subtropical, and temperate waters worldwide, but are more common further from shore. Bryde's whales migrate with the seasons, moving away from the equator during the summer and toward it in winter. Other populations are residents and do not migrate.	Rare	Not Expected. Unlikely to be observed in the Revised Project area. Found primarily in pelagic waters.
California sea lion	*Zalophus californianus*	P	Reside in the coastal waters of the Eastern North Pacific Ocean. Commonly observed along the West Coast of North America from Southeast Alaska to the central coast of Mexico. California sea lions utilize sandy beaches or rocky coves for breeding and haul-out sites, as well as marina docks, jetties, and buoys.	Year-Round. Common	High. Commonly observed in Central SF Bay. Forage for prey east of Carquinez Strait and in the Sacramento-San Joaquin Delta.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Common dolphin – long-beaked	*Delphinus capensis*	P	Found from Baja California to Central California in shallow, tropical, subtropical, and warmer temperate waters within 50-100 nm (93-185 km) of the coast and along the continental shelf.	Year-round. Occasional	Not Expected. Long-beaked common dolphins range from Baja California, including the Gulf of California to Central California. Shipboard surveys have sighted them as far north as San Luis Obispo (NOAA 2021b). The distribution and population center for this species may change with varying oceanographic conditions.
Common dolphin – short-beaked	*Delphinus delphis*	P	A more pelagic species than the long-beaked common dolphin, but can be found up to 300 nm (556 km) from shore and often near underwater geologic features where upwelling occurs. Most populations are observed offshore California, especially in warm water months.	Year-round; Common	Not Expected. Generally found offshore of the Revised Project area. These dolphins are primarily associated with the California Current and are abundant off California year-round from nearshore to 300 nm (556 km) offshore. Abundance offshore California changes seasonally.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Cuvier's beaked whale	*Ziphius cavirostris*	P	Found in temperate, tropical, and subtropical waters. Associated with deep pelagic waters (usually greater than 1,000 m (3,281 ft) depth along the continental shelf and slope, and near underwater features. Seasonality and migration patterns are unknown.	Sightings in fall and winter; Rare	Not Expected. Generally, occur in deep pelagic waters west of the Revised Project area.
Dall's porpoise	*Phocoenoides dalli*	P	Found throughout the North Pacific Ocean and along the West Coast of the U.S. from Baja California to the Bering Sea. Most common in pelagic waters deeper than 180 m (591 ft) but can also be found closer to shore.	Winter and early spring; Rare	Not Expected. Most frequently observed offshore in deeper waters.
Dwarf sperm whale	*Kogia simus*	P	Dwarf sperm whales live in tropical and temperate waters worldwide occurring over the continental slope and open ocean. Found in the Western North Atlantic, Pacific Northwest, and California, but more common near Hawaii and the Gulf of Mexico. Their migration patterns are currently unknown.	Rare	Not Expected. Records of dwarf sperm whales are rare, and it is unknown whether low numbers are a consequence of their cryptic behavior or if they are not regular inhabitants offshore California.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
False killer whale	*Pseudorca crassidens*	FE*, P, FD*	Occur over the continental slope and open ocean (usually 1,000 m/3,281 ft depth) in tropical, subtropical, and warm temperate waters worldwide. *Listed as ESA Endangered and MMPA Depleted in the Hawaiian Islands.	Sightings in summer and early fall: Rare	Not Expected. Not likely to occur in the Revised Project area due to their preference for warmer and deeper waters than the Revised Project area. False killer whales have been observed off the West Coast of the U.S. during warmer periods.
Fin whale	*Balaenoptera physalus*	FE, FD, P	Fin whales occupy the deep, offshore waters of all major oceans, but are less common in the tropics.	Seasonal; Common	Not Expected. Relatively common offshore California, and most abundant in summer and fall. Due to their occurrence in deeper waters offshore, they are unlikely to occur in the Revised Project area.
Ginkgo-toothed beaked whale	*Mesoplodon ginkgodens*	P	Found mainly over the continental shelf and in the warm open ocean warm waters of the Pacific and Indian Oceans.	Rare	Not Expected. There are no documented sightings in the Revised Project area, as they typically live in deeper waters offshore.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Gray whale (Eastern North Pacific)	*Eschrichtus robustus*	FE, P	Predominantly occur within the nearshore coastal waters of the North Pacific Ocean, from the Gulf of Alaska to Baja California, Mexico. May be present close to shore, but more common 5-19 km (3-12 mi) offshore.	Seasonal February through May; Common	Rare-Low. Occur in coastal waters during late fall-winter for their southward migration and again late winter to early summer during their northward migration. There has been an increase in sightings of foraging gray whales in Central Bay near the Golden Gate.
Guadalupe (southern) fur seal	*Arctocephalus townsendi*	CT, FT, FD, P	Reside in tropical waters off Southern California and Mexico. Breed in rocky coastal habitats and caves mainly along the eastern coast of Guadalupe Island, roughly 200 km (0.6 mi) west of Baja California, Mexico. A small population resides on San Miguel Island, Channel Islands. They typically do not migrate but have been documented traveling great distances from their breeding grounds.	Year-round; Rare	Not Expected. Live offshore Southern California and in coastal rocky habitats and caves during the breeding season (May-August). There is a small population at San Miguel Island and increasing numbers have been seen in the Channel Islands. Only several individuals have been observed along the Central California coast in recent years.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Harbor porpoise	*Phocoena phocoena*	P	Live in northern temperate, subarctic, and arctic coastal and offshore waters. Commonly found in bays, estuaries, harbors, and fjords less than 200 m (656 ft) deep.	Year-round; Common	Delta: Low-Moderate. Central Bay: High. The harbor porpoise has recently reoccupied SF Bay after a 60-year absence (Stern et al. 2017) and can be found foraging for prey in the Central Bay. Harbor porpoises are one of the most common marine mammal species and the San Francisco Russian River population is estimated between 7,000 and 8,000 individuals (Forney et al. 2020).
Harbor seal	*Phoca vitulina*	P	Found from British Columbia, Canada to Baja California, Mexico, and are the most commonly observed pinniped along the California Coast. Harbor seals use offshore waters for foraging and beaches for resting. Often occur on offshore rocks, sand and mudflats in estuaries, bays, and isolated beaches.	Year-round; Common	High. Common throughout the California Coast in harbors and estuaries. Harbor seals use SF Bay year-round for foraging, pupping, and resting at haul-out sites. Haul-out sites are mainly located in South Bay/Mowry Slough and Central Bay. However, several sites have been identified in San Pablo Bay and Suisun Bay (Grigg et al. 2009).

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Hubb's beaked whale	*Mesoplodon carlhubbsi*	P	Endemic to the North Pacific Ocean. This species is not well documented but is assumed to occur mainly over the continental shelf and into open ocean waters. Sightings have occurred in the Eastern North Pacific from British Columbia, Canada to California.	Very Rare	Not Expected. May occur in deep waters offshore Central and Northern California, but very rare.
Humpback whale	*Megaptera novaeangeliae*	FE*, FT**, FD***, P	Humpback whales are found in all major oceans. The Central California population migrates from winter calving and mating areas off Mexico to summer and fall feeding areas off California typically in late April to early December. *Listed as Endangered in Cape Verde Island/Northwest Africa, the Western North Pacific, Central American, and the Arabian Sea. **Humpback whales are listed as Threatened in Mexico. ***Depleted populations include the Western North Pacific stock, Central America/Southern Mexico – California – Oregon – Washington-	Seasonal- May through November. Common	Delta: Not Expected-Low. Central Bay: Moderate- High. Frequently observed migrating along the California Coast between April and November, up to 90 km (56 mi) offshore. Recently, humpback whales have been observed more frequently feeding in the Central Bay. Occasionally humpback whales will swim into the Delta.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			stock, and Mainland Mexico – California – Oregon – Washington stock.		
Killer whale	*Orcinus orca*	FE*, FD**, P	Killer whales are found throughout all oceans but are most abundant in colder and temperate waters. Their presence and occurrence may be common but unpredictable offshore California. *The Southern DPS population is listed as Endangered. **The Southern Resident killer whale stock is also designated as depleted under MMPA.	Seasonal; Uncommon	Not Expected-Rare. Killer whales are most common between March and May as they feed on northbound migrating gray whales and are generally observed in deeper waters than the Revised Project area. Resident killer whales have also been observed offshore California.
Long-snouted spinner dolphin	*Stenella longirostris*	FD*, P	Found in all tropical and subtropical oceans over the continental shelf but are most common in the deep ocean where they hunt prey. They use a variety of bays and nearshore coastal waters throughout their range where they socialize, rest, and nurture young. These areas are typically clear, calm, and shallow waters over sandy bottoms.	Sightings in summer and early fall; Rare	Not expected. Long-snouted spinner dolphins usually prefer warm tropical waters south of the Revised Project area.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			*The Eastern stock is federally depleted.		
Minke whale	*Balaenoptera acutorostrata*	P	Distributed worldwide along coastlines and over the continental shelf in temperate (preferred), tropical, subtropical, boreal, and polar waters. Minke whales inhabiting the inland waters of the U.S. West Coast are considered "residents" because they have established home ranges.	Year-round; Uncommon	Not Expected-Rare. Minke whale sightings have occurred along the California Coast but are very rare.
North Pacific right whale	*Eubalaena japonica*	FE, FD, P	North Pacific right whales are found in the North Pacific Ocean. They feed in cold, far northern waters in the summer, and migrate to warmer waters, such as Southern California, for breeding and calving in the winter. North Pacific right whales feed far offshore and give birth in coastal areas.	Very Rare	Not Expected. Unlikely to be present in the Revised Project area because fewer than 50 individuals are believed to occupy U.S. waters.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Northern elephant seal	*Mirounga angustirostris*	P	Northern elephant seals are found from Alaska to Mexico. They are regularly sighted over shelf, shelf-break, and slope habitats, as well as the deep ocean seaward of the 2000 m (6,562 ft) isobaths. Rookeries are located in the Channel Islands and Año Nuevo State Park. They typically reside on offshore islands from December to March, returning to land in March through August to molt.	Seasonal Occasional	Delta: Not Expected. Central Bay: Low-Moderate. Northern elephant seals are widely distributed along the West Coast of North America and spend about nine months of the year at sea. Annual sightings in Central and North Bay are becoming increasingly common. Additionally, young-of-the-year have been observed hauling out or stranding on beaches within SF Bay (Caltrans 2015; Hernández 2019).
Northern fur seal	*Callorhinus ursinus*	FD*, P	Northern fur seals spend 300 or more days per year foraging in the open ocean of the North Pacific. They use rocky or sandy island beaches for resting, reproduction, and molting, but are unlikely to come to shore in California unless debilitated. However, several individuals have been observed on Año Nuevo Island.	Seasonal Rare	Not Expected-Rare. Usually, 18-28 km (11-17 mi) from shore in California. Some northern fur seals may spend all year in the waters around San Miguel Island, California, south of the Revised Project area. A small population breeds on South Farallon Island. Strandings of individuals have occurred in SF Bay during El Niño events.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			*Eastern Pacific population is federally depleted.		
Northern right whale dolphin	*Lissodelphis borealis*	P	Endemic to deep, cold and warm temperate waters of the North Pacific Ocean. Also occur over the continental shelf and slope in cool waters. Their West Coast range includes northern Baja California, Mexico to the Gulf of Alaska. They may also occur along submarine canyons and other features near the coast.	Year-round; Rare	Not Expected. Northern right whales are extremely rare in California waters and are not likely to occur in the Revised Project area.
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	P	Occupy temperate waters of the North Pacific from the continental shelf to the deep ocean offshore California, Oregon, Washington, and Alaska.	Year-round; Common	Rare. Likely to occur along the California Coast but further offshore.
Perrin's beaked whale	*Mesoplodon perrini*	P	Perrin's beaked whales have not been well documented but are believed to occupy the open ocean and continental shelves of the Pacific Ocean. All recorded strandings have occurred between Central and Southern California, which suggests that they are native to this area of the Pacific Ocean.	Very Rare	Not Expected. This whale is known from less than half a dozen strandings between San Diego and Monterey, California. It is highly unlikely that it will be observed within the Revised Project area, but the species' complete distribution is unknown.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Pygmy sperm whale	*Kogia breviceps*	P	Pygmy sperm whales prefer the tropical, subtropical, and temperate waters of the Pacific Ocean and occur over the continental slope and in the open ocean. They are mostly found offshore of Peru but also occur near Hawaii, the Pacific Northwest, and the northern Gulf of Mexico.	Rare	Not Expected. Unlikely to occur in the Revised Project area. Strandings have been documented off Mexico, once in New Zealand, and Monterey Bay, California. Overall, the species is rare and would likely occur south of the Revised Project area.
Risso's dolphin	*Grampus griseus*	P	Distributed throughout all major oceans. Generally found in mid-temperate waters deeper than 1,000 m (3,281 ft) and seaward of the continental shelf and slopes. Risso's dolphins are common around Santa Catalina Island but have also been observed in shallower coastal areas.	Year-round; Rare	Not Expected-Low. Risso's dolphins generally occur in deeper waters offshore of the Revised Project area. Strandings have occurred within the Revised Project area, but individuals were determined to be malnourished or calves separated from mothers. Less than a dozen sightings have occurred within SF Bay.
Rough-toothed dolphin	*Steno bredanensis*	P	Found in all tropical and subtropical oceans from the continental shelf to the open ocean. They prefer deeper tropical and warm temperate waters.	Seasonal-summer and early fall; Rare	Not Expected. Unlikely to occur in the relatively cold waters surrounding the Revised Project area.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Sei whale	*Balaenoptera borealis*	FE, FD, P	Found in subtropical, temperate, and subpolar waters around the world. Usually observed in deeper waters far from the coast.	Seasonal-spring and summer; Very Rare	Not Expected. Sei whales are uncommon offshore California, and are not likely to occur within the Revised Project area due to their preference for deeper waters far from shore.
Short-finned pilot whale	*Globicephala macrorhynchus*	P	Found in warm tropical and temperate waters along the coast and out to the continental shelf. They prefer to forage in areas with high densities of squid.	Year-round, Very Rare	Not Expected. Generally found in deeper and warmer waters than the Revised Project area.
Sperm whale	*Physeter macrocephalus*	FE, FD, P	Occur globally in the open ocean and are uncommon in waters less than 300 m (984 ft) deep. Sperm whales live at the surface but dive to great depths to catch giant squid.	Most probable in late spring and late fall; Rare	Not Expected. Sperm whales are present offshore California year-round. Peak abundance occurs in late spring and late summer, but sightings are rare due to their preference for deep offshore waters.
Southern (California) sea otter	*Enhydra lutris nereis*	FT, FD, P	Inhabit shallow coastal waters in the North Pacific Ocean. A top carnivore in its coastal range and a keystone species of the nearshore coastal zone. Frequent resident of kelp forests.	Year-round; Rare	Delta: Not Expected-Rare. Central Bay: Low. Southern sea otters occupy the nearshore waters of Central California from San Mateo County south to Santa Barbara County. The primary populations reside between Monterey Bay and

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
					Cayucas in San Luis Obispo County. Half Moon Bay is the northern most extent of their range. Individuals have rarely been spotted in Tomales Bay and Richardson Bay, as well as the waters between the Golden Gate and Alcatraz Island.
Pantropical spotted dolphin	*Stenella attenuata*	FD*, P	Typically found over the continental shelf and far from the coast in tropical and subtropical waters worldwide. They spend the majority of the day in waters 90-300 m (295-984 ft) deep then dive deeper at night to search for prey. *The spotted dolphin is considered depleted in the Pacific eastern offshore stock.	Rare	Not Expected. The eastern tropical Pacific Ocean population is typically observed far from the coast and is depleted in stock. Coastal spotted dolphins are found within 161 km (100 mi) of the coast.
Stejneger's beaked whale	*Mesoplodon stejnegeri*	P	Found in cold temperate and subarctic waters of the North Pacific Ocean, occupying deep, offshore waters between 762-1,524 m (2,500-5,000 ft) on or beyond the continental slope.	Rare	Not Expected. Typically found in deep, offshore waters on or beyond the continental shelf.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Steller (northern) sea lion	*Eumetopias jubatus*	FE*, FT**, FD***, P	Distributed around the coasts along the North Pacific Ocean rim. Common in coastal waters and onshore for resting. A small population breeds on Año Nuevo Island, north of Monterey Bay, California. *The Western DPS is listed as Endangered. **The Eastern DPS is Threatened. ***The Western DPS is depleted. *Critical Habitat: A zone that extends approximately 1,000 m (3,281 ft) seaward and landward of any Steller sea lion rookery in Washington, Oregon, and California, and includes any aquatic foraging habitat within the species geographic range.*	Seasonal; Occasional-Common	Delta: Not Expected-Rare. Central Bay: Not Expected - Low. Documented as relatively common in the coastal waters of Southern and Central California. Haul out and rookery sites consist of beaches, ledges, and rocky reefs.
Striped dolphin	*Stenella coeruleoalba*	P	Found along the continental shelf to open ocean waters worldwide, in areas of upwelling and around convergence zones. Prefer highly productive tropical to warm temperate waters that are oceanic and deep.	Sightings in summer and early fall; Rare	Not Expected. Unlikely to occur near the Revised Project area. Observations are typically farther offshore in deeper waters.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Sea Turtles					
Green sea turtle	*Chelonia mydas*	FE*, FT** P	Distributed globally, but primarily use three types of habitats: beaches for nesting, convergence zones in the open ocean, and benthic feeding grounds in coastal areas. *Endangered populations include: the Central South Pacific DPS, Central West Pacific DPS, and Mediterranean DPS. **Threatened populations include: Central North Pacific DPS, East Pacific DPS, North Atlantic DPS, South Atlantic DPS, East Indian-West Pacific DPS, North Indian DPS, Southwest Indian DPS, and Southwest Pacific DPS. *Critical Habitat; waters surrounding Puerto Rico.*	Seasonal; Rare	Not Expected-Rare. In the Eastern North Pacific, green sea turtles have been sighted from Baja California, Mexico to southern Alaska but most commonly occur from Southern California (e.g., San Diego) south to Northwestern Mexico. Green sea turtles have been sighted in SF Bay and in the San Joaquin River during El Niño years such as 2015.
Leatherback sea turtle	*Dermochelys coriacea*	FE, CE, P	Distributed globally and regularly seen off the U.S. West Coast with the greatest densities found off Central California. *Critical Habitat; U.S. Virgin Islands and offshore California, Oregon, and Washington. In California all coastal waters between the shore*	Seasonal; Occasional	Delta: Not Expected. C.Bay: Rare-Low. Leatherback sea turtles are most commonly seen between July and October, when the surface water temperature warms to 15-16°C (59-61°F) and large jellyfish, their primary prey, are

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			and 200 m (656 ft) water depth between Point Arena and Point Sur, California and out to 3,000 m (9,843 ft) between Point Arena and Point Arguello, California.		abundant offshore. Often sighted in the shipping lanes just outside SF Bay.
Loggerhead sea turtle	*Caretta caretta*	FE*, FT**, P	Distributed throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Occupy three different ecosystems during their lives: the terrestrial zone, the oceanic zone, and the neritic or nearshore coastal area. * Endangered populations include: North Pacific Ocean DPS, Mediterranean Sea DPS, Northeast Atlantic Ocean DPS, North Indian Ocean DPS, and South Pacific Ocean DPS. ** Threatened populations include: Northwest Atlantic Ocean DPS, South Atlantic Ocean DPS, Southeast Indo-Pacific Ocean DPS, and Southwest Indian Ocean DPS *Critical Habitat. The Northwest Atlantic DPS critical habitat includes waters throughout the Gulf of*	Seasonal; Very Rare	Not Expected-Rare. In the U.S. most recorded sightings are of juveniles off the coast of California, but occasional sightings are reported along the coasts of Washington and Oregon.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Mexico around the Florida Panhandle and up the East Coast of the U.S.		
Olive ridley sea turtle	*Lepidochelys olivacea*	FE*, FT**, P	Mainly a "pelagic" sea turtle in tropical/temperate regions of the Pacific, South Atlantic, and Indian Oceans but may inhabit coastal areas, including bays and estuaries. *Endangered populations include: Mexico's Pacific coast breeding population **All other populations are listed as Threatened	Seasonal; Very Rare	Not Expected-Rare. In the Eastern Pacific, olive ridley sea turtles extend from Southern California to Northern Chile. They have also been sighted north of the Revised Project area off Point Reyes during 2015 which was possibly due to the strong El Niño.
Sharks and Fishes					
Basking shark	*Cetorhinus maximus*	P	Usually sighted from British Columbia, Canada to Baja California, Mexico in the winter and spring. Basking sharks are pelagic animals occurring in both coastal and oceanic waters from 200-2000 m (656-6,562 ft) deep, but often stray inshore.	Seasonal; Very Rare	Not Expected. Basking shark populations were severely depleted by commercial fisheries in the 1950s, and they have never fully recovered due to slow growth and low fecundity. Basking sharks were observed in Monterey Bay south of the Revised Project area in 2015.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
California grunion	*Leuresthes tenuis*	CUC*	Usual range extends from Point Conception, California to Point Abreojos, Baja California, Mexico. They are occasionally found farther north to Monterey Bay, California and south to San Juanico Bay, Baja California, Mexico. They inhabit the nearshore waters from the surf to a depth of 18 m (60 ft). Females spawn in multiple events every year during their 3- to 4- year life span. *Have been identified as a key indicator species in Southern and Central California marine protected areas, and as an indicator species for climate change on beaches.	Occasional; Rare	Delta: Not Expected. Central Bay: Rare-Low. Typically, found in warm, shallow waters near the surface and along the coast of Southern California. Grunion leave the water at night to spawn on beaches for four consecutive nights during the spring and summer months. The northern spawning run range expansion into SF Bay was first observed in 2002 (Johnson et al. 2009). California grunion have been collected in CDFW mid-water trawls in the Central and South Bay near the Revised Project area. They do not migrate and are not abundant, despite local concentrations.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Chinook salmon (Central Valley fall/late fall-run ESU)	*Oncorhynchus tshawytscha*	FC, CSC	In North America, Chinook salmon range from the Chukchi Sea in Alaska to Monterey Bay, California. They migrate from the ocean through the SF Bay-Delta to spawning grounds in the Sacramento and San Joaquin rivers, Due to population size and hatchery influence Central Valley fall and late fall run chinook are listed as a species of special concern, both at the state and federal level.	Seasonal; Common	High. Fall-run adults migrate upstream July-December and spawn from October-December. Late-fall run adults migrate to rivers October-December and spawn in January-April. Adults and juveniles of Central Valley fall/ late-fall run Chinook would be present as they transit (inbound and outbound) through the Revised Project area. Fall-run Chinook are most abundant in the Central Valley races. Most late-fall run smolts spend 2-4 days in deep-channel areas during outmigration movements through the SF Bay-Delta (Hearn et al. 2013).
Chinook salmon (Central Valley spring-run ESU)	*Oncorhynchus tshawytscha*	FT, CT	In North America, Chinook salmon range from the Chukchi Sea in Alaska to Monterey Bay, California. They migrate from the ocean through the SF Bay-Delta to spawning grounds in the Sacramento and San Joaquin rivers,	Seasonal; Common	High. Spring-run adults enter the riverine system from late March-September and spawn August-October. Spring runs have diminished to a handful of Sacramento River tributaries. Both adults and juveniles of Central Valley spring-run

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Due to low population sizes, the Central Valley spring-run are listed as threatened at both the state and federal level. *Critical Habitat: Estuaries within SF-San Pablo-Suisun Bay as well as stream channels in Tehama, Butte, Glenn, Shasta, Yolo, Sacramento, Solano, Colusa, Yuba, Sutter, Trinity, Alameda, San Joaquin, and Contra Costa counties.*		Chinook would be present as they transit (inbound and outbound) through the Revised Project area. Some adults spend summer in cool water pools in the Sacramento-San Joaquin Delta system after passing through SF Bay.
Chinook salmon (Sacramento River winter-run ESU)	*Oncorhynchus tshawytscha*	FE, CE	In North America, Chinook salmon range from the Chukchi Sea in Alaska to Monterey Bay, California. They migrate from the ocean through the SF Bay-Delta to spawning in the Sacramento and San Joaquin rivers. *Critical Habitat: The Sacramento River from Keswick Dam, Shasta County to Chipps Island. All waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait. All waters of San Pablo Bay west*	Seasonal; Common	High. Adults and juveniles of Sacramento River winter-run Chinook would be present as they transit (inbound and outbound) through the Revised Project area. Winter-run adults enter through SF Bay under the Golden Gate Bridge between November and May, and reach the Sacramento River between December and August. Fry and smolts migrate downstream through the Sacramento River between

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			of the Carquinez Bridge, and all waters of SF Bay (north of the SF/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge.		July and August reaching the Delta between September and June.
Coho salmon (Central California coast ESU)	*Oncorhynchus kisutch*	FE, CE	Distributed widely across the Pacific Ocean, from Northern Japan to California. The only populations not threatened by extinction are those in the Lagunitas Creek (Marin County), Russian River (Sonoma County), and Santa Cruz County watersheds.	Seasonal; Very Rare	Not Expected. In the southern part of their range, Coho salmon are now absent from all tributaries of SF Bay and many streams south of SF Bay. This is likely due to the adverse effects of urbanization on watersheds and fish habitat.
Coho salmon (Southern Oregon and Northern California coasts ESU)	*Oncorhynchus kisutch*	FT, CT, P	Distributed widely across the Pacific Ocean, from Northern Japan to California. Spawning migrations in Northern California occur September-December, with a peak in October-November. Juveniles spend 1-3 years foraging in their native streams before migrating to sea in the fall or move to other streams or estuaries before returning to native streams in the winter. Spawning occurs in small streams with gravel substrates.	Seasonal; Very Rare	Not Expected. The Mattole River in Mendocino County, California is the southernmost part of their range.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Juveniles spend the first half of their lives in streams and small freshwater tributaries. The second half of the lifecycle is spent foraging in estuarine and marine waters.		
Delta smelt	*Hypomesus transpacificus*	FT, CE	Delta smelt are endemic to California, occurring only in the Sacramento-San Joaquin Delta within the SF Estuary. Delta smelt spawn in the spring in freshwater and migrate in the summer to areas of low salinity. They mature in the fall and have a winter migration upstream prior to spawning. Spawning occurs in tidally influenced backwater sloughs and channel edge waters.	Year-round; Common	Delta: Moderate. Central Bay: Low. Delta smelt have a historic habitat range within the Revised Project area (San Pablo Bay, Carquinez Strait, and Suisun Bay). However, declines in abundance and habitat degradation have limited their range, excluding most of the Central and Southern Delta.
Eulachon	*Thaleichthys pacificus*	FT*, P	Found between Northern California and the Southeastern Bering Sea in Alaska. Spawning and rearing occur in estuarine river habitats, then individuals migrate to saltwater where they spend three years before returning to river spawning locations. Spawning	Rare	Not Expected. The Mad River, California is the southern extent of their range.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			migrations occur between December and June. *The Southern DPS population is listed as Threatened.		
Longfin smelt	*Spirinchus thaleichthys*	FE*, CT	Found along the U.S. West Coast from Alaska to California. In California, they have historically been found in the SF Bay-Delta, Humboldt Bay, and the estuaries of the Eel and Klamath Rivers. Longfin smelt use nearshore waters, estuaries, and freshwater streams throughout their lifecycle.	Year-round; Common	Delta: High. Central Bay: Moderate-High. The largest self-sustaining population of longfin smelt exists within the Revised Project area of the SF Bay Estuary. This species is most abundant in deep-water channels but can be found in shoals. Longfin smelt are found throughout SF Bay but are most common in Central Bay and Suisun Bay during the summer months.
North American green sturgeon (Southern, DPS)	*Acipenser medirostris*	FT, P, CSC	The Southern DPS occupies coastal bays and estuaries from Monterey Bay, California to Puget Sound, Washington. Fish that spawn in the Sacramento, Feather, and Yuba rivers in California belong to the federally threatened Southern DPS.	Year-round; Common	Moderate-High. Adult green sturgeon spawn in early summer and either exit the Sacramento-San Joaquin Delta immediately after or over-summer migrating in winter. Juveniles have differing movement patterns which include: remaining in

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Individuals occasionally enter coastal estuaries to forage. *Critical Habitat; All waterways within the Sacramento-San Joaquin Delta up to mean high water elevation as well as SF Bay, San Pablo Bay, and Suisun Bay. All of Monterey Bay, California and ocean waters out to 60 fathoms (110 m/360 ft) depth from Monterey Bay north to the Canadian border.*		the Delta, moving in Carquinez Strait, into San Pablo Bay, moved but returned to Delta, or exited through the mouth of SF Bay (Thomas et al. 2022). They are expected to forage and travel through the study area.
Pacific herring	*Clupea pallasii*	P	Found throughout the coastal zone from Northern Baja California, Mexico around the North Pacific Basin to the Korean Peninsula. California's herring fisheries occur in SF Bay, Tomales Bay, Humboldt Bay, and Crescent City Harbor. Pacific herring can be found foraging offshore California during the spring and summer. SF Bay is a major spawning location for Pacific herring. They spawn in vegetated intertidal and shallow subtidal areas such as eelgrass beds, or around pier pilings or other rigid structures.	Seasonal; Year-round	Moderate-High. Schools of Pacific herring appear in the deep channels of SF Bay two weeks prior to spawning between October and April. Adults leave SF Bay right after spawning. Juveniles can be found in Central Bay and remain in the area until summer or early fall before migrating to the ocean.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Pacific lamprey	*Entosphenus tridentatus*	CSC	Found across the Pacific from Hokkaido Island, Japan through Alaska and south to Rio Santo Domingo in Baja California, Mexico. In California the main populations range from Los Angeles to Del Norte counties and the Central Valley rivers. Adult migrations usually occur between March and June. Ammocoetes remain upstream for seven years before migrating to saltwater between winter and spring.	Year-round; Common	Moderate-High. In the Sacramento-San Joaquin Delta Pacific lampreys are limited by dams, so ammocoetes have been observed along the edges of channels. Both downstream migrating juvenile lampreys and returning adults must pass through the entire SF Estuary (CDFW 2015a).
Sacramento perch	*Archoplites interruptus*	CSC	Historically, Sacramento perch have been found in the sloughs, slow-moving rivers, and lakes of the Central Valley including the Sacramento-San Joaquin River basin and the SF Estuary. Introduced populations to stock pods in California still exist but are in decline.	Year-round; Very Rare	Not Expected. Native range populations have been extirpated, and other remaining populations occur outside the Revised Project area.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Sacramento splittail	*Pogonichthys macrolepidotus*	CSC	Two distinct populations of Sacramento splittail exist: one located in the San Pablo Bay around the Petaluma and Napa rivers and the other centered around the Sacramento-San Joaquin Delta and Suisun Marsh. Splittail from the SF Bay tributaries (Walnut and Alameda Creeks) exists but genetic relationships are unknown.	Year-round; Common	Delta: Moderate-High. Central Bay: Low-Moderate. In the SF Bay-Delta, Sacramento splittail are confined to the Delta, Suisun Bay, Suisun Marsh, as well as the lower Napa and Petaluma rivers. They may also occur in the Central and South Bay during low salinity events. They migrate upstream to freshwater rivers and floodplains for spawning in the winter and return to the more brackish water of the SF Bay-Delta in the spring and summer.
Steelhead trout (Central California Coast, DPS)	*Onchorhynchus mykiss*	FT	Range from Kuskokwim River in Alaska to Baja California, Mexico. The Central California DPS includes individuals from the Russian River to Aptos Creek, and all drainages of SF and San Pablo Bays eastward to the confluence of the Sacramento and San Joaquin Rivers.	Adults-Seasonal Juveniles-Year-round; Common	High. Critical habitat is designated as SF Bay west to the Golden Gate Bridge. Adults migrate to spawn from December-March and spawn February-April. Juveniles migrate downstream in winter and spring. The Revised Project area is located within steelhead migration routes.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Critical Habitat: Estuaries in SF, San Pablo, and Suisun bays as well as streams and channels in Lake, Mendocino, Sonoma, Napa, Marin, SF, San Mateo, Santa Clara, Santa Cruz, Alameda, Contra Costa, and San Joaquin counties.		
Steelhead trout (Central Valley, DPS)	*Onchorhynchus mykiss*	FT	Range from Kuskokwim River in Alaska to Baja California, Mexico. The Central Valley DPS population inhabits the Sacramento and San Joaquin Rivers and their tributaries. *Critical Habitat: Estuaries in SF, San Pablo, and Suisun bays as well as the streams and channels in Tehama, Butte, Glenn, Shasta, Yolo, Sacramento, Solona, Yuba, Sutter, Placer, Calaveras, San Joaquin, Stanislaus, Tuolumne, Merced, Alameda, and Contra Costa counties.*	Adults-Seasonal Juveniles-Year-round; Common	High. Critical habitat designated as Central Valley rivers and their tributaries. Adults migrate to spawn from December-February, and spawn from February-April. Juveniles migrate from late December-March. The Revised Project area is located within steelhead migration routes.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Steelhead trout (South-Central California Coast Steelhead, DPS)	*Onchorhynchus mykiss*	FT, CSC, P	The watersheds that historically supported the largest populations of steelhead include the Pajaro, Salinas, Carmel, and Big Sur rivers. Anadromous individuals can spend up to seven years in freshwater prior to smoltification, and then spend up to three years in saltwater prior to first spawning. Individuals that spend their entire life in freshwater are called rainbow trout. *Critical Habitat: Essentially all major rivers and coastal stretches throughout California.*	Seasonal; Rare	Not Expected. Unlikely to be found as far north as the Revised Project area. Steelhead are typically found from the Pajaro River south to the southern edge of San Luis Obispo County.
Tidewater goby	*Eucycloglobius newberryi*	FE, CSC, P	The northernmost population of tidewater gobies is located in Tillas Slough at the mouth of the Smith River in Del Norte County. The southernmost population is located in Agua Hedionda Lagoon in San Diego County. Tidewater gobies inhabit lagoons formed by streams running into the ocean. They need highly oxygenated water that is fairly still but not stagnant. Tidewater	Year-round; Rare	Not Expected. Tidewater gobies are presumed to be extirpated from the SF Bay-Delta. However, there is critical habitat is in Golden Gate National Recreation Area and Bolinas Lagoon to the west and north of the Revised Project area.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			gobies prefer salinities less than 10 parts per thousand (ppt) and are therefore more often found near the lagoon inflow.		
Western brook lamprey	*Lamptera richardsoni*	CSC	Occur in coastal streams from Southeast Alaska to California, including inland areas such as the Columbia and Sacramento-San Joaquin River drainages.	Year-round; Common	Not Expected. Non-predatory brook lamprey are not known to migrate. Spawning and rearing sites should occur outside of the Revised Project area.
Western river lamprey	*Lampetra ayresi*	CSC	Can be found in coastal streams from Juneau, Alaska to just south of SF Bay. Adults migrate to freshwater in the fall and spawn during the winter or spring months in small tributaries. Ammocoetes stay in silt-sand backwaters upwards of five years before outward migration.	Year-round; Common	Rare - Low Migrating individuals will travel through the SF Estuary to the Sacramento-San Joaquin Delta, spawning in tributaries such as the Napa River, Sonoma Creek, Alameda Creek, Tuolumne River, Stanislaus River, and Cache Creek (CDFW 2015b). Individuals have also been caught in San Pablo Bay and the Carquinez Strait.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
White shark	*Carcharodon carcharias*	CSC, P	White sharks are often found in coastal and offshore waters along the continental shelf and near islands. White sharks often migrate seasonally between different habitats and preferred habitats shift with age. In California, important white shark habitat is present around Monterey Bay and the Greater San Miguel Island, California National Marine Sanctuary. White shark populations are impacted by purposeful and incidental capture by fisheries, marine pollution, and coastal habitat degradation	Year-round; Occasional to Common	Rare-Low. Present in coastal waters throughout California. Adult and sub-adult white sharks can be found offshore of the Revised Project area, hunting marine mammals around the Greater Farallones National Marine Sanctuary. Five tagged sharks over a two-year period were observed swimming under the Golden Gate, circling Alcatraz Island before leaving SF Bay (Jorgensen et al. 2009).
White Sturgeon	*Acipenser transmontanus*	CSC-CESA nominated	White sturgeon is an anadromous fish that ranges from the Gulf of Alaska to Baja California, Mexico, but primarily inhabit large coastal rivers and associated estuaries. White sturgeon in the San Francisco Bay-Delta represents the southernmost spawning population. White sturgeon migrate from the San Francisco	Year-round; Common	Moderate. Adult white sturgeon exit the Sacramento-San Joaquin Delta beginning in February until June to swim upstream to spawn. Newly hatched juveniles swim actively within the water column for several days before settling to the bottom. Juveniles rapidly move down-river taking up

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			Bay Estuary into the Sacramento-San Joaquin rivers to spawn and then return to the estuary after spawning. Adults periodically migrate into San Francisco Bay and out to the ocean. In June 2024, the CDF&W nominated the white sturgeon for consideration for protection under CESA. Recreational fishing for white sturgeon continues in the San Francisco Bay-Delta on a catch and release basis.		residence in the freshwater regions of the Delta. White sturgeons are expected to forage and travel through the study area.
Invertebrates					
Flat abalone	*Haliotis wallensii*	CSC, P	Flat abalone are found from British Columbia, Canada to La Jolla, California inhabiting intertidal and subtidal waters to 21 m (70 ft) depth. They are common in Northern California, and often mistaken for juvenile red abalone, but are rare south of Carmel, California.	Year-round; Very Rare	Not Expected. Their populations have declined from 32% to 8% of total abalone numbers inside a marine reserve and their distribution has declined such that they are only common in Southern Oregon (Rogers-Bennett 2007).

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
Green abalone	*Haliotis fulgens*	FSC, P	Found in coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Green abalone habitat ranges from Point Conception, California to Bahia de Magdalena, Mexico.	Year-round; Very Rare	Not Expected. Only observed south of Point Conception, California.
Pink abalone	*Haliotis corrugate*	FSC, CSC, P	Found in coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. Distributed from Point Conception, California to Bahia de Santa Maria in Baja California Sur, Mexico.	Year-round; Very Rare	Not Expected. Only observed south of Point Conception, California.
Pinto abalone	*Haliotis kamtschatkana*	FSC, CSC, P*	Found from Southeast Alaska to Baja California, Mexico in kelp beds along exposed coastlines. They occur from the low intertidal zone to 40 m (131 ft) depth. The typical depth range varies by location, with shallower depths in the northern part of the range and deeper depths in the southern part of the range. They	Year-round; Rare	Not Expected. Pinto abalone are referred to as "northern" abalone, because they are the only abalone species found from Washington State to Alaska. In California, most Pinto abalone are found north of Point Conception but can be found in low densities to the south. Higher density

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
			are often associated with complex rocky reef habitats. *Pinto abalone are protected in some areas. They are listed as Endangered in Washington State and British Columbia, Canada.		populations can be found along the coasts of Mendocino and Sonoma counties.
Black abalone	*Haliotis cracherodii*	FE, P	Live on rocky substates in intertidal and shallow subtidal reefs to about 5.5 m (18 ft) depth along the coast. They occur in habitats with complex surfaces and deep crevices that provide shelter for juveniles and adults. Black abalone range from Point Arena, California, to Bahia Tortugas and Isla Guadalupe, Mexico.	Year-round; Very Rare	Not Expected. Black abalone are rarely found north of SF. While Central and North-Central coast populations are healthy, they persist at low densities. They have been observed on the Golden Gate National Recreation Area as well as Point Reyes National Seashore coastlines.
Red abalone	*Haliotis rufescens*	CSC	Live on rocky substrates in intertidal and shallow subtidal reefs between Bahia Tortugas, Baja California, Mexico and Oregon. Their depth range varies by location but have been found as deep as 150 ft (46 m) in the Channel Islands. Red abalone have historically occurred statewide, but at present they are predominantly found North of SF	Year-round; Very Rare	Not expected. Red abalone are found predominantly north of SF.

Special Status Species in San Francisco Bay and Delta (Prepared: July 2025)

Common Name	Scientific Name	Listing Status	General Habitat, *Critical Habitat (if established)*	Regional Occurrence	Potential to Occur in Study Area
White abalone	*Haliotis sorenseni*	FE, P	Found in coastal and offshore island intertidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter. White abalone are found at depths of 15-55 m (50-180 ft), making them the deepest living abalone species. They range from Point Conception, California to Punta Abreojos, Baja California, Mexico.	Year-round; Very Rare	Not Expected. The white abalone range does not extend as far north as the Revised Project area. They have been found in extremely low numbers along the coast of Southern California, and at a few of the offshore islands and banks.
Sunflower sea star	*Pycnopodia helianthoides*	FC*	Found in intertidal and subtidal coastal waters of the Northeast Pacific Ocean from the Aleutian Islands, Alaska to at least northern Baja California, Mexico. They can be found to a depth of at least 435 m (1,427 ft) inhabiting rocky reefs, kelp forests, as well as sand and mud flats. (NOAA 2023d). *Proposed Threatened listing in 2023.	Year-round; Rare	Delta: Not Expected. Central Bay: Low. The sand mining sites in the Delta are likely outside the range of the sunflower sea star (NOAA 2023d). Sunflower sea stars have been observed in Central Bay, but their numbers have declined in recent years due to outbreaks of Sea Star Wasting Syndrome (NPS 2020).

NOTES:

FESA = Federal Endangered Species Act

MMPA = Marine Mammal Protection Act

CESA = California Endangered Species Act

Potential for Species Occurrence Rankings:

Not Expected - Suitable foraging or spawning habitat is not known to be present or rare, and the species has not been or is rarely documented to occur

Low - Suitable foraging or spawning habitat is present, but the species has either not been documented to be present or if present, the presence is uncommon and infrequent

Moderate - Suitable foraging or spawning habitat is present and the species is somewhat common or common for part of the year

High - Suitable foraging or spawning habitat is present and the species is common throughout the year and/or in substantial numbers

STATUS CODES:

Federal: National Oceanographic and Atmospheric Administration (NOAA); MMPA

FD = Depleted Population

P = Federally Protected

Federal: U.S. Fish and Wildlife Service (USFWS), NOAA National Marine Fisheries Service (NMFS); FESA

FDL = Delisted

FE = Listed as "Endangered" (in danger of extinction) under FESA

FT = Listed as "Threatened" (likely to become Endangered within the foreseeable future) under FESA

FC = Candidate Species to become listed

FSC = Former "federal species of concern". The USFWS no longer lists Species of Concern but recommends that species considered to be at potential risk by a number of organizations and agencies be addressed during Revised Project environmental review. *NMFS still lists "Species of Concern".

State: California Department of Fish and Game (CDFG); CESA

CE = Listed as "Endangered" under the CESA

CT = Listed as "Threatened" under the CESA

CSC = CDFW designated "Species of Special Concern"

CUC = CDFW designated "Species of Unique Concern"

* = Listing status in one or more Distinct Populations of the species

Sources: Allee et al. 1949; Miller & Shanks 2004; Bearzi 2004; USFWS 2005; Rogers-Bennett 2007; Love & Yoklavich 2008; Grigg et al. 2009; Johnson et al. 2009; Jorgensen et al 2009; Allen et al. 2010; EPA 2010; NOAA 2011; Hearn et al. 2013; Allen 2014; NOAA 2014; AMS 2015; CDFW 2015a; CDFW 2015b; Caltrans 2015; Mercury News 2016; NPS 2016; Stern et al. 2017; UC Davis 2017; MMC 2018; SCRFA 2018; Forney et al. 2020; Love & Passarelli 2020; NPS 2020; NOAA 2021b; USFWS 2021; ADFG 2022; California Trout Inc. 2022; Lowry et al. 2022; MMC 2022; Thomas et al. 2022; WDFW 2022; NOAA 2023d; PFMC 2024d; CNDDB 2025,; CDF&W 2025.