

FISHERIES INVENTORY AND UTILIZATION
OF SAN DIEGO BAY, SAN DIEGO, CALIFORNIA
FOR SURVEYS CONDUCTED IN APRIL AND JULY 2025



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A 56 cm TL Thornback Ray (*Platyrrhinoidis triseriata*) captured in the North Ecoregion, July 2025.

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1.0 EXECUTIVE SUMMARY

The Vantuna Research Group at Occidental College surveyed the estuarine fishes of San Diego Bay in April and July 2025 for the Port of San Diego. The goals of the current study were to update previous studies, as well as quantify spatial and temporal utilization of the fishery populations in San Diego Bay. A summary of the results is as follows:

Composition and Abundance

During this study, 26,422 fishes (56 species) weighing a total of 845.5 kilograms (kg) were recorded. The most numerous species comprising 23.4 percent (%) of the catch was Northern Anchovy (*Engraulis mordax*), followed by Slough Anchovy (*Anchoa delicatissima*, 16.7%), Pacific Sardine (*Sardinops sagax*, 13.0%), and Topsmelt (*Atherinops affinis*, 11.2%). In terms of biomass, Round Stingray (*Urobatis halleri*) and Pacific Sardine dominated the catch comprising 26.9% and 26.0% of the biomass, respectively, followed by Shortfin Corvina (*Cynoscion parvipinnis*, 11.2%). Except for Shortfin Corvina, these species are typically among the most dominant species in surveys of San Diego Bay.

Ecological Importance of Species

The principal fishes surveyed during these sampling periods as determined by the Ecological Index (E.I.) were the following species: Round Stingray, Northern Anchovy, Topsmelt, Slough Anchovy, and Shiner Perch (*Cymatogaster aggregata*). Round Stingray, Topsmelt, and Shiner Perch were all found ubiquitously throughout the bay during both sampling periods, while only three Northern Anchovy were caught during April and Slough Anchovy were not found in the northern half of the bay in April. Round Stingray was one of the dominant taxa in terms of biomass, and Northern Anchovy, Topsmelt, and Slough Anchovies were dominant in terms of numerical abundance.

Best Estimates of Density and Standing Stock

The stock size estimate for 2025 was 44.1 million (M) fishes. With an estimated surface area of 4,858 ha this gives an overall fish density 0.91 individuals/m². The highest estimates were of Northern Anchovy (12.1 M), Slough Anchovy (9.58 M), Pacific Sardine (6.80 M), Shiner Perch (3.04 M), Topsmelt (2.95 M), Jacksmelt (*Atherinopsis californiensis*, 2.41 M), Kelp Pipefish (2.30 M), and Giant Kelpfish (*Heterostichus rostratus*, 2.04 M). As is typical, schooling and forage fishes dominated the stock estimate for the bay. The total best estimate of biomass standing stock was about 1,267 metric tons (MT) or approximately 26.1 g/m², about 129% higher than the 2019 estimate and the highest estimate for any historical survey. The highest biomass estimates were of Pacific Sardine (434 MT), followed by Shortfin Corvina (185 MT), Bat Ray (148 MT), Jacksmelt (105 MT), Round Stingray (98.6 MT), Northern Anchovy (60.3 MT), and Spotted Sand Bass (*Paralabrax maculatofasciatus*, 53.3 MT). Round Stingray, Spotted Sand Bass and Topsmelt are typically in the top five biomass estimates from past surveys. Shortfin Corvina is a historically atypical top biomass species, and this standing stock estimate is likely skewed based upon a single unusually large haul in the South Ecoregion in April.

Avian Forage and Fisheries Species

Forage species are primarily surface-dwelling schooling fish that are accessible to diving avian predators, especially terns. Thirteen species of important forage fishes were captured during this study. The most abundant forage fishes were adult Pacific Sardine, Northern Anchovy, and Jacksmelt that are a good source of food for full-size birds, but too large for nesting birds in the area to feed their young. However, Shiner Perch, Slough Anchovy, and Topsmelt were all abundant at sizes small enough to be eaten by fledglings. The typical timing for the recruitment of fishes to San Diego Bay begins in the spring and continues through the summer which appears to be consistent in 2025. The biomass standing stock estimate for forage fish was 383MT. During this study, 17 important California recreational or commercial species were captured, the most abundant of which were Pacific Sardine, Northern Anchovy, Spotted Sand Bass, and Shortfin Corvina. The standing stock estimate of fisheries species totaled 573 MT.

San Diego Bay as a Unique Fish Habitat and Nursery Area

San Diego Bay is known for being the northern edge of the range for many southern fishes that are not normally distributed in the Southern California Bight. Eight species with primarily southern distributions were taken, including over 100 Shortfin Corvina. These fishes were found throughout the bay and during both sampling months.

As the largest estuary in southern California, San Diego Bay provides critical habitat for bay and estuary fishes and continues to function as a nursery area for nearly half (53.8%) of those fishes. The high productivity rate coupled with the abundance of juvenile fishes in the bay highlights the importance of the bay as a nursery habitat. The bay contains extensive shallow water eelgrass habitat that supports a unique assemblage of juvenile and adult fishes that, in turn, support surrounding nearshore ecosystems. Juvenile fishes emigrate from the bay to offshore habitats, and important or endangered avian species utilize forage fishes in the bay. Southern California indigenous bay and estuary fishes represented 34.6% of the total catch in this survey.

Trends and Comparisons

The 2025 surveys represent record or near-record high catches compared to historical surveys. Total abundance was heavily influenced by large schools of forage fishes, as is common in historical surveys. Estimates of biomass were about average among all surveys in every ecoregion except the North Ecoregion, which reported the highest biomass catch at that ecoregion out of any sampling year at 491.7 kg. The 2025 stock estimate was well above the average number of individuals while the biomass standing stock estimate was the highest ever estimated, largely due to singular catches of Northern Anchovy, Pacific Sardine, and Shortfin Corvina breeding aggregations.

Overall, 2025 diversity estimates were similar among ecoregions and each ranked high among historical values, but baywide diversity was the highest of all survey years. Baywide species richness was above average among historical surveys. Richness was above average for the North, North-Central, and South-Central Ecoregions, but slightly below average in the South Ecoregion. Community structure of fishes in April was less similar to that of nearly every other survey performed in the 21st Century, and July was most similar to the community structures found in the strong El Niño years of 2015-2016.

Noteworthy Catches, Events, Results, and Trends

- Biomass standing stock estimate was the highest of any historical survey
- Baywide diversity was also the highest of any historical survey
- We captured 128 Shortfin Corvina in 2025
 - 111 (weighing 89.6 kg) were captured in a single purse seine replicate
 - The majority were large individuals, approaching or exceeding published maximum lengths and were likely in a breeding aggregation when captured
 - Only 70 had been captured in all previous surveys combined
- We captured 3,447 Pacific Sardines in the North Ecoregion in April, weighing more than 220 kg
 - 96.4% were caught in a single purse seine replicate
- We captured 6,191 Northern Anchovy weighing 30.9 kg
 - 99.8% were caught in a single purse seine replicate
- We captured 249 Round Stingrays weighing 87.7 kg in a single beach seine replicate in July in the North Ecoregion, vegetated subhabitat
- We captured a few relatively rare species:
 - 4 Pacific Seahorses (*Hippocampus ingens*)
 - 4 Longtail Gobies (*Ctenogobius sagittula*)
- We captured many elasmobranchs:
 - 918 Round Stingrays
 - 12 Bay Rays (*Myliobatis californica*)
 - 4 Horn Sharks (*Heterodontus francisci*)
 - 4 Thornback Rays (*Platyrrhinoidis triseriata*)
 - 2 Banded Guitarfish (*Zapteryx exasperata*)
 - 2 Diamond Stingrays (*Dasyatis dipterura*)
 - 1 Gray Smoothhound (*Mustelus californicus*)
- No invasive species were captured
- We observed following trends:
 - Round Stingrays appear to be migrating to the north over the last three decades; they used to be rare in the North Ecoregion and that is where they are now most abundance
 - Pacific Sardines have only been caught during April since 2019, whereas they were almost exclusively caught in July during prior surveys
 - Spotted Sand Bass, a keystone of the San Diego Bay ecosystem, appear to be declining:
 - Lowest stock estimate and Ecological Index ranking since study inception
 - As in 2019 and 2022, few juveniles were present
 - Spotted Sand Bass appear to be amid a substantial, and possibly decade-long, period of recruitment failure in San Diego Bay

2.0 INTRODUCTION

The Vantuna Research Group at Occidental College surveyed the estuarine fishes of San Diego Bay in April and July 2025 for the Port of San Diego. The survey followed the protocols established from previous surveys (Allen 1999, Allen et al. 2002, Pondella et al. 2006, Pondella and Williams 2009a, Williams and Pondella 2012, Williams et al. 2015, Williams et al. 2016, Williams et al. 2019, Allen et al. 2022, Williams et al. 2022). The goals of the current study were to update the previous studies and address the following objectives:

- 1) Identify, determine, and quantify the utilization of the fishery populations in San Diego Bay
- 2) Identify habitats that support juvenile fish species and describe nursery utilization
- 3) Determine geographic and/or habitat areas of San Diego Bay that support significant populations of fish species utilized as forage by endangered avian species
- 4) Provide a comprehensive comparison of survey results to previous sampling years

To accomplish the objectives for these two sampling periods, we have documented the following parameters:

- ✓ Water quality parameters
- ✓ Fish species composition and abundance
 - Species diversity
 - Abundance by bay ecoregion
- ✓ Ecological importance of species
- ✓ Nursery area function
- ✓ Fish density and biomass estimates
 - Numerical and biomass density
 - Density and standing stock of avian forage species
 - Density and standing stock of fishery species
 - Panamic species unique to San Diego Bay
- ✓ Fish assemblage structure
- ✓ Historical comparisons
 - Diversity, Richness, Biomass, Abundance
 - Community structure



Jack Mackerel (*Trachurus symmetricus*) captured by Purse Seine in the North Ecoregion, April 2025

3.0 METHODS AND MATERIALS

3.1 Survey Locations

Four ecoregions of San Diego Bay were sampled and inventoried: North, North-Central, South-Central, and South (**Figure 1**; **Table 1**). These ecoregions were defined by Allen et al. (2002) and selected to adequately assess the status of all components of the ichthyofauna of the bay.

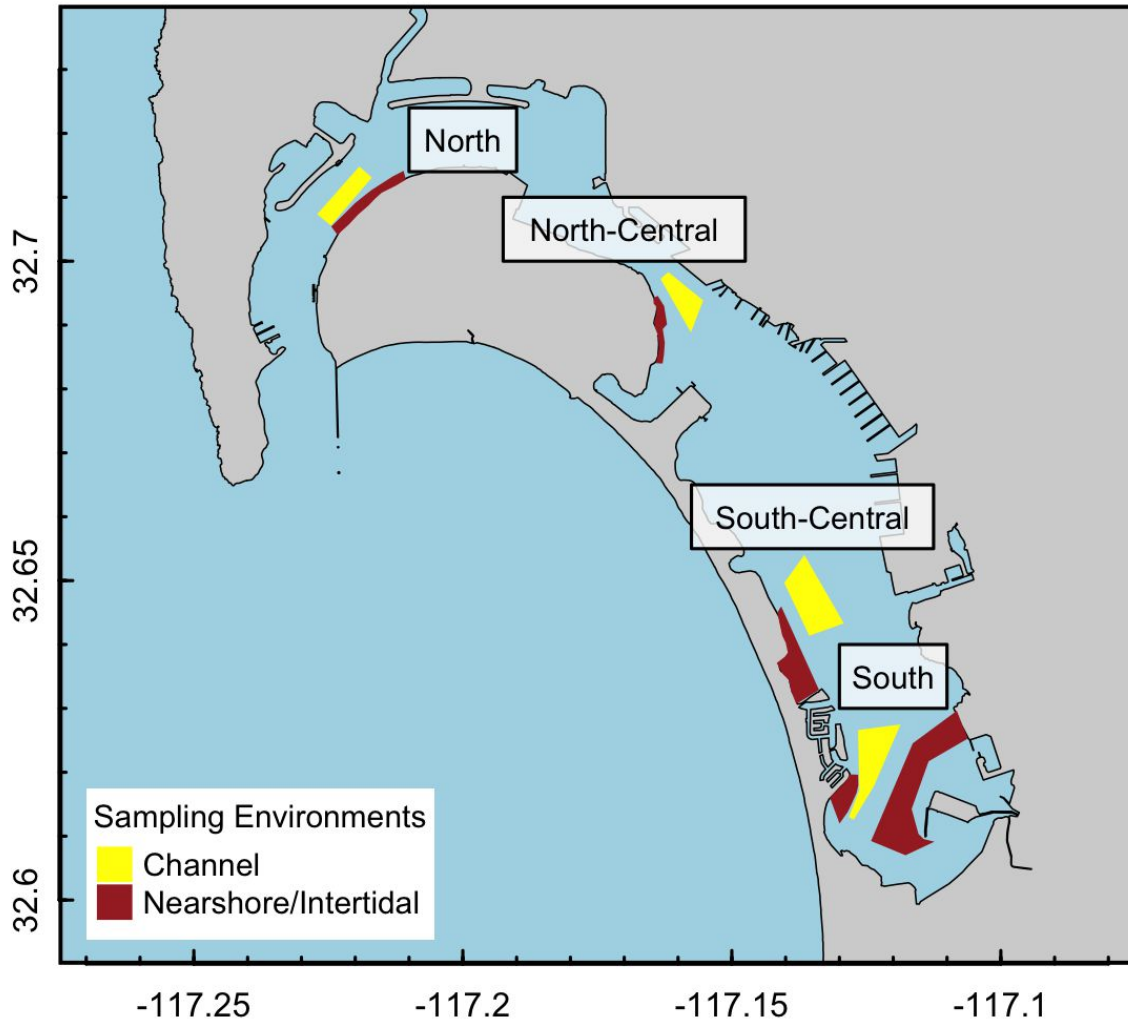


Figure 1. Sampling environment locations of the North, North-Central, South-Central, and South Ecoregions in San Diego Bay.

Table 1. Coordinates (Latitude, Longitude) for the San Diego Bay Fisheries Inventory and Utilization study, 2025.

Ecoregion	Site	Latitude	Longitude
North	Vegetated	32° 41' 50"	117° 13' 40"
	Non-Vegetated	32° 42' 45"	117° 12' 30"
North-Central	Vegetated	32° 41' 25"	117° 09' 50"
	Non-Vegetated	32° 41' 12"	117° 09' 45"
South-Central	Vegetated	32° 39' 05"	117° 08' 30"
	Non-Vegetated	32° 38' 48"	117° 08' 25"
South-Central	Vegetated	32° 37' 00"	117° 07' 45"
	Non-Vegetated	32° 36' 50"	117° 06' 45"

3.2 Ichthyofauna Sampling

Ichthyofauna sampling occurred during the spring and summer quarters of 2025 (April 4-5, April 11-12, and July 8-12, 2025). One ecoregion was sampled per day per sampling season. Collections were made off the 7.6-meter (m) *DV Obscurus* and the 6.5-m *Neoclinus*. At each ecoregion, the following five subhabitats were sampled: deep channel, nearshore non-vegetated, nearshore vegetated, intertidal non-vegetated, and intertidal vegetated.

Fish were sampled at each ecoregion using the following gear:

- 1) A 15.2 m x 1.8 m large seine equipped with a 1.8 m x 1.8 m x 1.8 m bag (1.2-centimeter [cm] mesh wings and 0.6 cm mesh in bag) was used to sample fishes in the intertidal subhabitat of each ecoregion at a depth of 0-2 m. The net was set 15 m offshore parallel to the shoreline and pulled in shore, sampling an area of about 220 square meters (m²) per haul. Three replicates per habitat were conducted for a total of six per ecoregion.



- 2) A 4.6 m x 1.2 m small seine with 3 mm mesh was utilized to collect fish in the shallow intertidal habitat of 0-0.5 m depths. The small seine was pulled 10 m along shore and pivoted towards the shore, sampling an area of approximately 62 m². Three replicates per subhabitat were conducted for a total of six per ecoregion.

- 3) A 1 m² square enclosure constructed of metal pipe and canvas was used to survey small, burrow-inhabiting fish in shallow intertidal areas of the bay. The enclosure was randomly set within each subhabitat in a depth of 0.25-0.75 m. One liter of 9:1 isopropanol-2-quinoline solution was added to the enclosed water and then searched for 10 minutes using a 1 mm mesh dipnet. Three replicates per subhabitat were conducted for a total of six per ecoregion.



- 4) A 1.6 m beam trawl (4 mm mesh wings and 2 mm knotless mesh in the codend) was used to sample nearshore fish species. Standardized 10 minute tows were conducted sampling an area of approximately 290 m² per replicate. Three replicates per subhabitat were conducted for a total of six per ecoregion.

- 5) A 66 m x 6 m purse seine (1.2 cm mesh wings and 0.6 cm mesh bag) was used to sample fish species in the nearshore and channel subhabitats, sampling a total area of approximately 296 m² per replicate. Three replicates per subhabitat were conducted for a total of nine per ecoregion.

- 6) An 8 m semi-balloon otter trawl (2 cm mesh wings and 0.8 cm mesh codend) was used to survey fishes from the deepest portions of the channel subhabitat. Standardized 10 minute tows were conducted sampling a total area of approximately 2,417 m² per each replicate. Three replicates were conducted per ecoregion.



All fishes were identified and measured to the nearest centimeter (standard length [SL]) and gram using measuring boards and hanging scales or a digital balance. Most individuals were measured aboard the research vessels and returned to the water, though large catches of small individuals were returned to the laboratory for identification and measurement. Coordinates of each sampling effort were recorded for all sampling events. For otter and beam trawls the start and finish of each tow were recorded. Sampling event locations are shown in **Figures 2-5**.

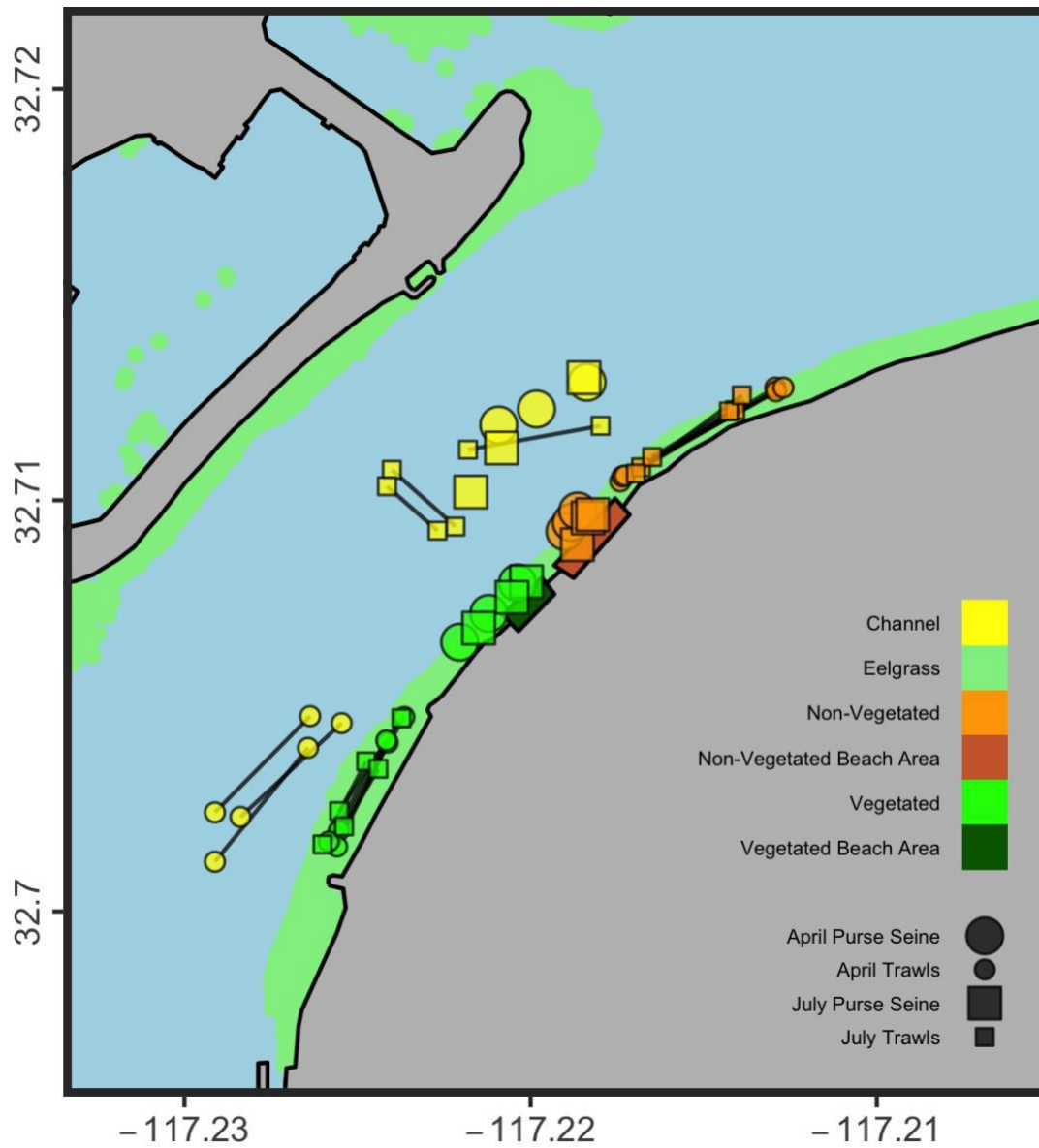


Figure 2. Sampling events for the North Ecoregion, 2025.



Queenfish (*Seriphus politus*) caught by purse seine in the North Ecoregion, April 2025

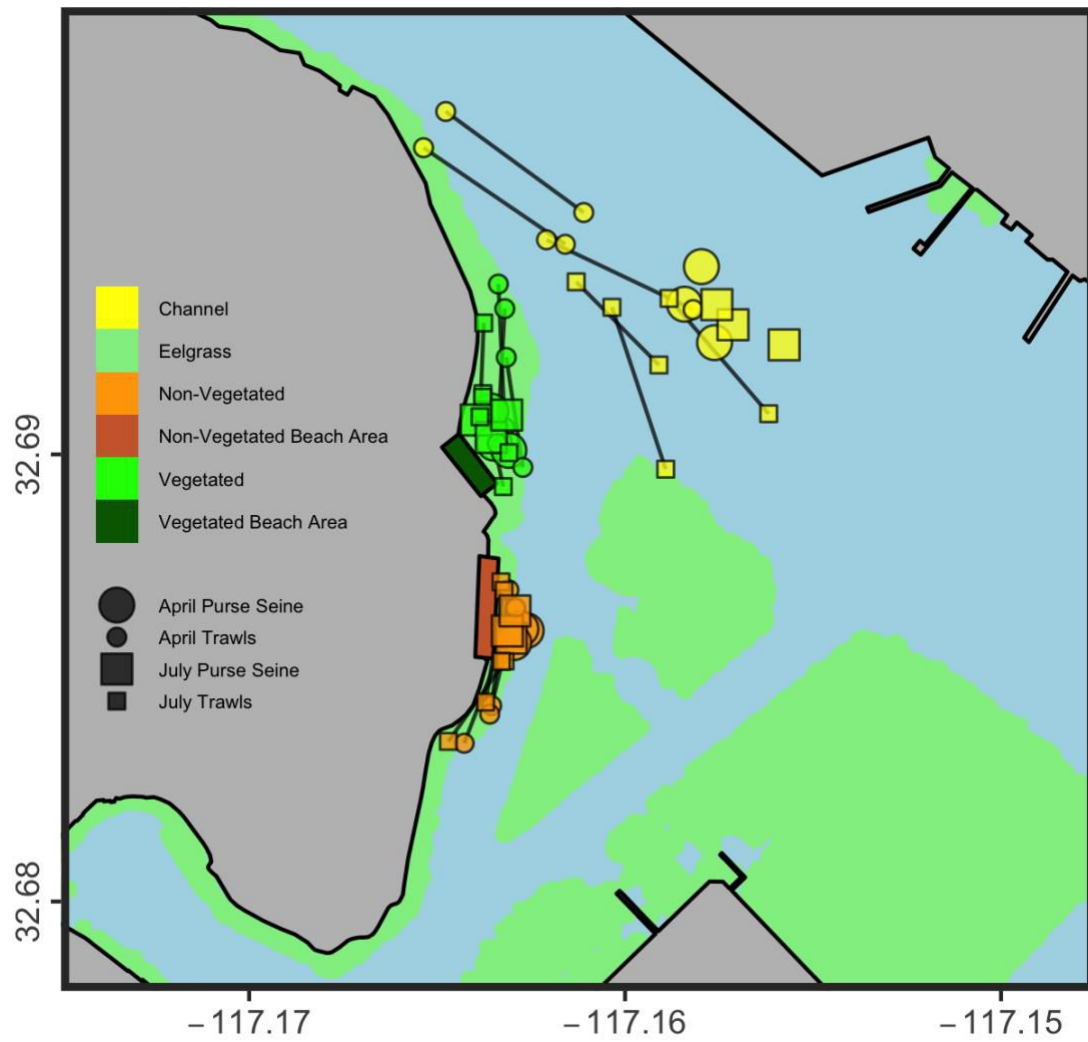


Figure 3. Sampling events for the North-Central Ecoregion, 2025.



Purse seine sampling in the North-Central Ecoregion, April 2025

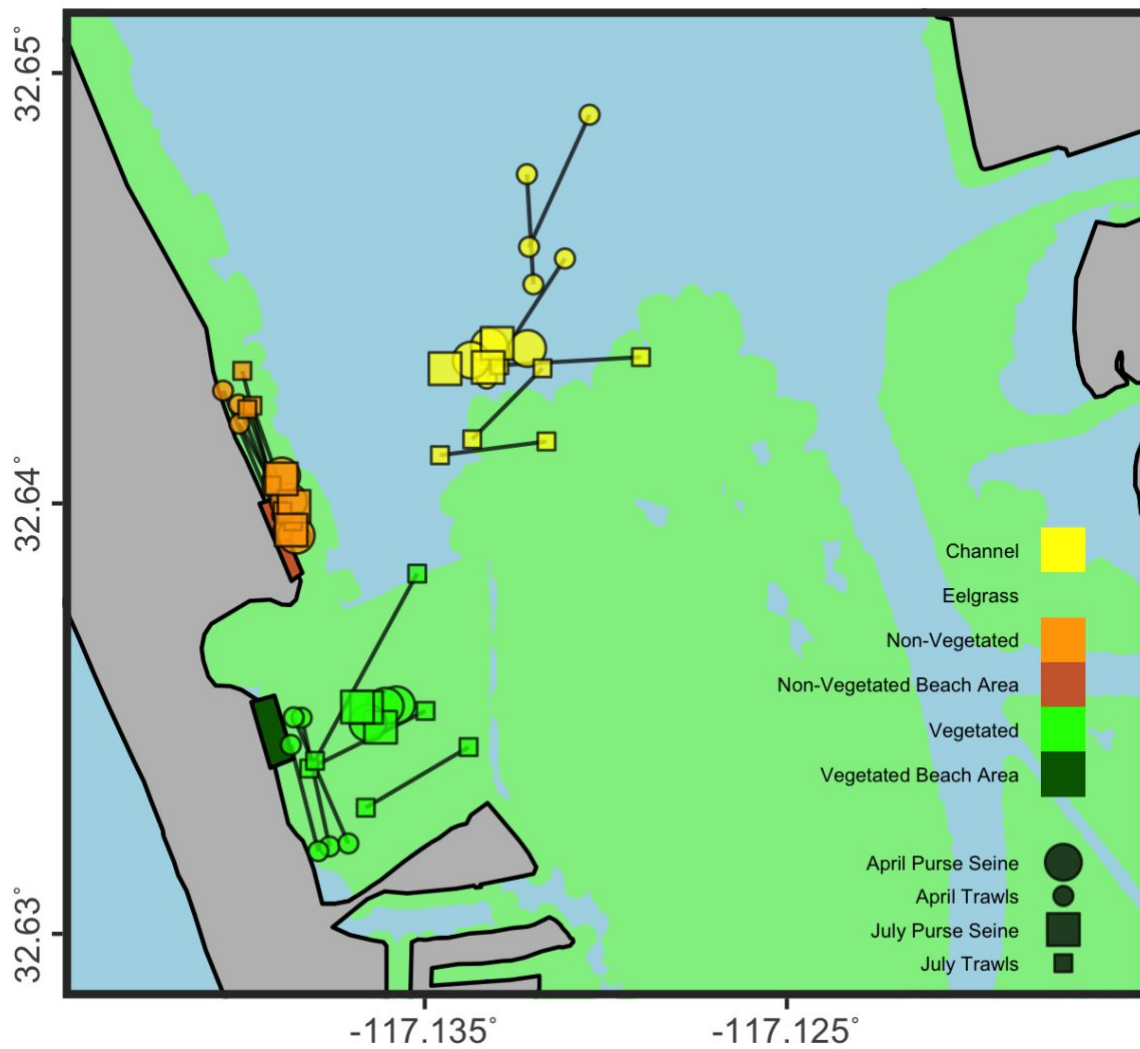


Figure 4. Sampling events for the South-Central Ecoregion, 2025.



Large beach seine being set in the South-Central Ecoregion, July 2025

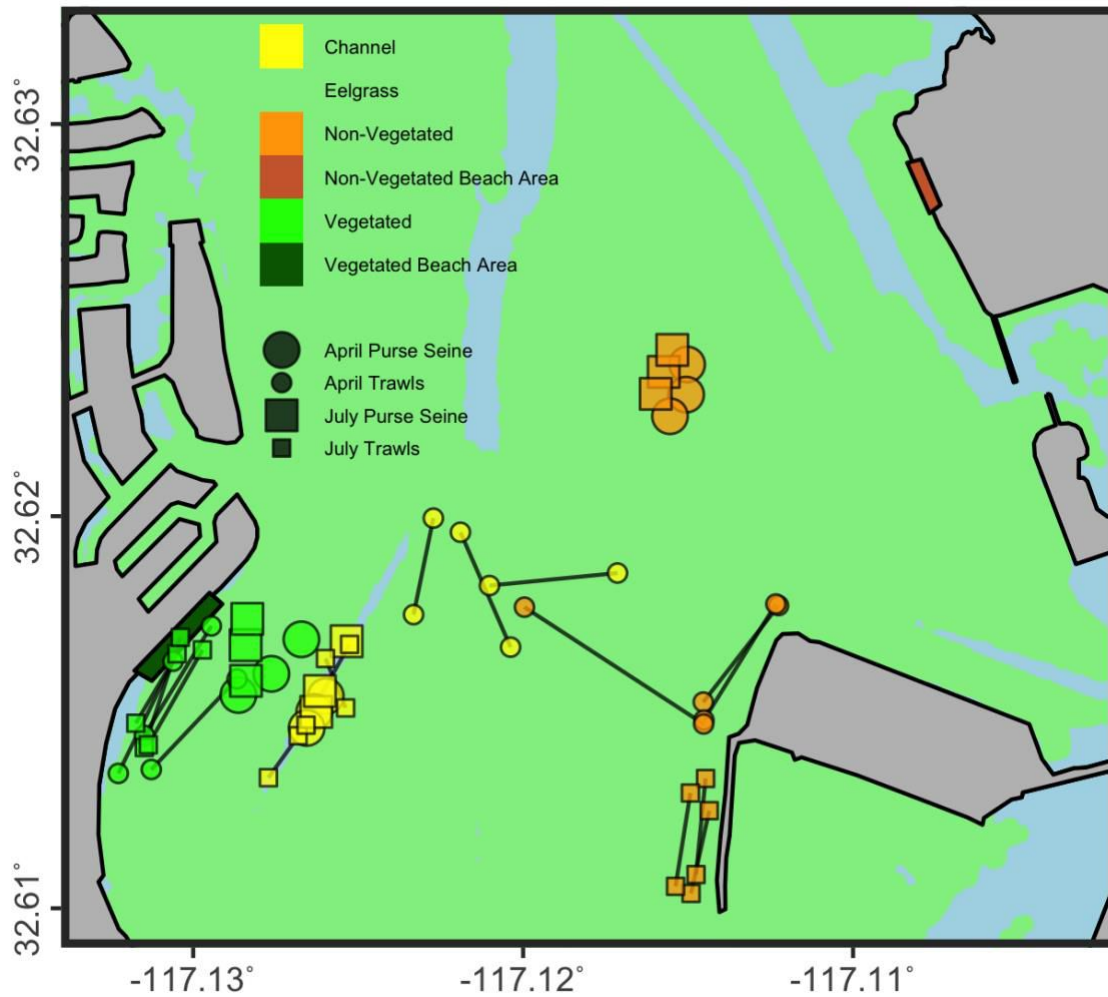


Figure 5. Sampling events for the South Ecoregion, 2025.



Young-of-the-year Shiner Perch (*Cymatogaster aggregate*) caught by purse seine in the South Ecoregion, April 2025

3.3 Water Quality Sampling

Water temperature (degrees Celsius [$^{\circ}\text{C}$]), salinity (parts per thousand [ppt]), dissolved oxygen (milligrams per liter [mg/l]), and pH were measured during each sampling period and at each ecoregion using a YSI ProDSS Multiparameter Digital Water Quality Meter from *DV Obscurus*. Downcast data from the 1 m surface bin were used to report these water quality values at the surface.

3.4 Data Analysis

3.4.1 Best Estimates of Density and Standing Stock

Density estimates used for the standing stock assessment were determined using the *Best Estimate of Density* within each Ecoregion. The best density and stock estimates were determined in the following manner:

- 1) Sample densities estimated by gear type for each species were averaged over all samples within the three depth strata (Intertidal, Nearshore, and Channel).
- 2) The maximum density for each species by gear type within each depth stratum was determined to be the *Best Estimate of Density* for that species within that depth stratum.
- 3) The proportional areal coverage of the three depth strata within the Ecoregion was determined previously by Allen et al. (2002) were used for the current study (**Table 2**). These areal proportions were then used to weight the *Best Estimate of Density* within the depth strata by species. A weighted average was then taken among these best estimates over the three depth strata for each species.
- 4) The sum of the weighted densities of all species represented *Best Estimate of Density* (numerical and biomass) for each depth stratum and Ecoregion was calculated.
- 5) Standing stock estimates were calculated by multiplying the best estimates by the total area of the individual Ecoregions and San Diego Bay as a whole.



Salema (*Haemulon californiense*) caught by purse seine in the North Ecoregion, April 2025

Table 2. Estimates of area coverage of depth strata within each Ecoregion of San Diego Bay. Proportions and areas were used to weigh density and estimate standing stocks of fisheries.

% Area					
Ecoregion	Intertidal	Nearshore	Channel		
North	6	33	60		
North-Central	5	38	57		
South-Central	3	61	36		
South	4	84	13		

Hectares/Habitat					
Ecoregion	Intertidal	Nearshore	Channel	TOTAL	% of Bay
North	61	327	593	982	20
North-Central	41	307	460	808	17
South-Central	51	1227	726	2005	41
South	40	890	133	1064	22
# Hectares	194	2751	1913	4858	
% Bay Area	4	57	39		
(Allen 2002)					

3.4.2 Community Structure

To characterize community-level temporal changes in fishes, we constructed a Bray-Curtis similarity matrix using the ‘vegdist’ function in the ‘vegan’ package (Oksanen et al. 2025) in R (R Core Team 2025). The matrix used fourth-root transformed taxon-specific abundance data summed across all replicates throughout the bay during each April and July. Significantly different fish community groups were determined using a cluster analysis with a SIMPROF test ($\alpha = 0.05$) performed with the ‘simprof’ function in the ‘clustsig’ package (Clarke et al. 2008; Whitaker and Christman 2014.)



California Barracuda (*Sphyræna argentea*) caught by purse seine in the North Ecoregion, April 2025

4.0 RESULTS AND DISCUSSION

4.1 Water Quality Parameters

Sea surface temperature generally increased from north to south in the bay during both sampling periods, though the temperature was about 2-5 °C warmer at each ecoregion during the July sampling period (**Figure 6**). Water temperature was slightly below average in both April and July in both ecoregions. Dissolved oxygen and pH were relatively consistent among ecoregions except for the South Ecoregion, where they were highest among ecoregions during April and lowest among ecoregions during July. Surface salinity increased slightly from north to south during both sampling periods. These physical-chemical results are typical of the bay and did not show effects of below average and relatively late winter rainfall.

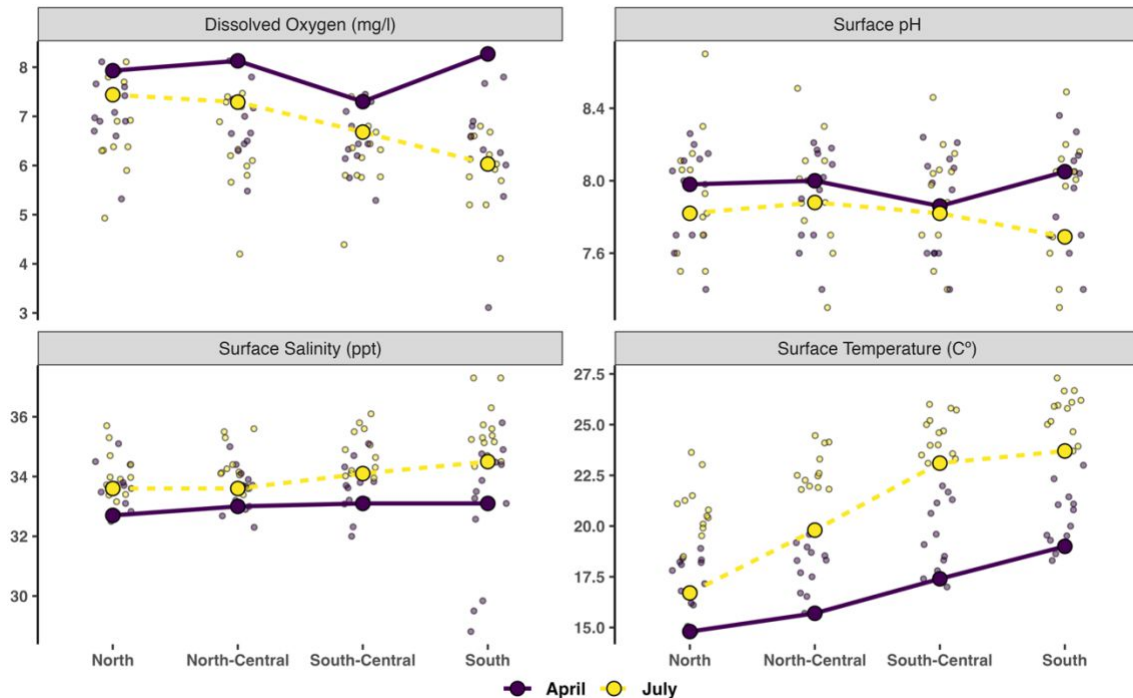


Figure 6. Summary of physical-chemical measurements by ecoregion in April and July 2025. To contextualize the 2025 results, values from previous surveys (1995-2022) are plotted as smaller, open points.

Salinity levels in San Diego Bay are subject to the effects of seasonal rainfall and evaporation. The bay is the receiving body of water for freshwater input from three watersheds (Pueblo San Diego, Sweetwater, and Otay) covering 1,150 square kilometers (km²) of land, plus over 200 storm drain outfalls (San Diego County MS4 Co-permittees 2008). The South Ecoregion, where the Sweetwater and Otay Rivers meet the bay, has weak tidal currents, low mixing, and a small tidal prism compared to the other ecoregions (Wang et al. 1998) resulting in longer retention of freshwater signatures. However, most of the observed decreases in salinity in the South Ecoregion during the April surveys (e.g., 1998, 2012, 2015; Figure 6) were not during years where there is above average rainfall during Winter and early-Spring (e.g., 1995, 1998, 2005, 2019; **Figure 7**). This decoupling is due in part to the regulation of the Sweetwater and Otay Rivers by reservoirs that result in only rare releases of water into the rivers. By July, evaporation rates are typically higher than freshwater inflow creating hypersaline conditions regardless of winter precipitation levels (Peeling 1975).

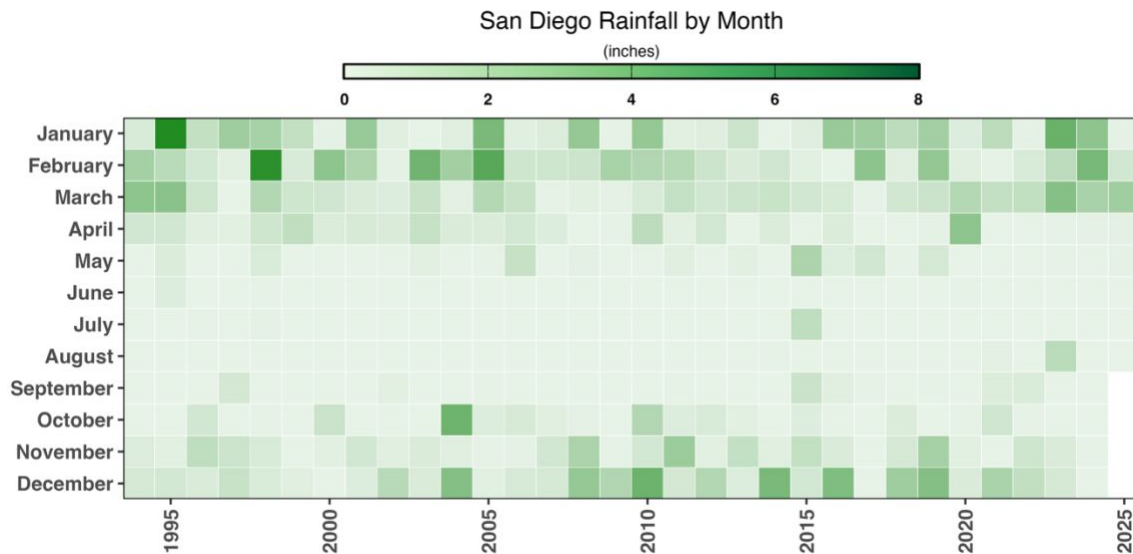


Figure 7. Monthly rainfall in San Diego from 1994-2025. Data are typically collected from National Weather Service rain gauges at San Diego International Airport (Lindbergh Field). Monthly totals were compiled by John S. Stokes III.



Giant Kelpfish (*Heterostichus rostratus*) caught by large beach seine in the North Ecoregion, July 2025

4.2 Abundance and Biomass

During this study, 26,422 fishes (56 species) weighing a total of 845.5 kilograms (kg) were recorded during April and July 2025. The most numerous species comprising 23.4 percent (%) of the catch was Northern Anchovy (*Engraulis mordax*), followed by Slough Anchovy (*Anchoa delicatissima*, 16.7%), Pacific Sardine (*Sardinops sagax*, 13.0%), and Topsmelt (*Atherinops affinis*, 11.2%; **Tables 3 and 5**). In terms of biomass, Round Stingray (*Urobatis halleri*) and Pacific Sardine dominated the catch comprising 26.9% and 26.0% of the biomass, respectively, followed by Shortfin Corvina (*Cynoscion parvipinnis*, 11.2%; **Tables 4 and 6**). Except for Shortfin Corvina, these species are typically among the most dominant species in surveys of San Diego Bay.

4.2.1 Abundance and Biomass by Sampling Month

Total abundance was generally consistent across sampling months, but biomass decreased greatly from April to July. In April 2025, 12,119 individuals comprised of 49 species of fishes were captured (**Figure 8, Table 3**). In July, the catch increased slightly to 14,303 fish and species richness decreased slightly to 44. Total biomass was about 50% higher in April (566.1 kg) than July (279.4 kg) (**Figure 8, Table 4**).

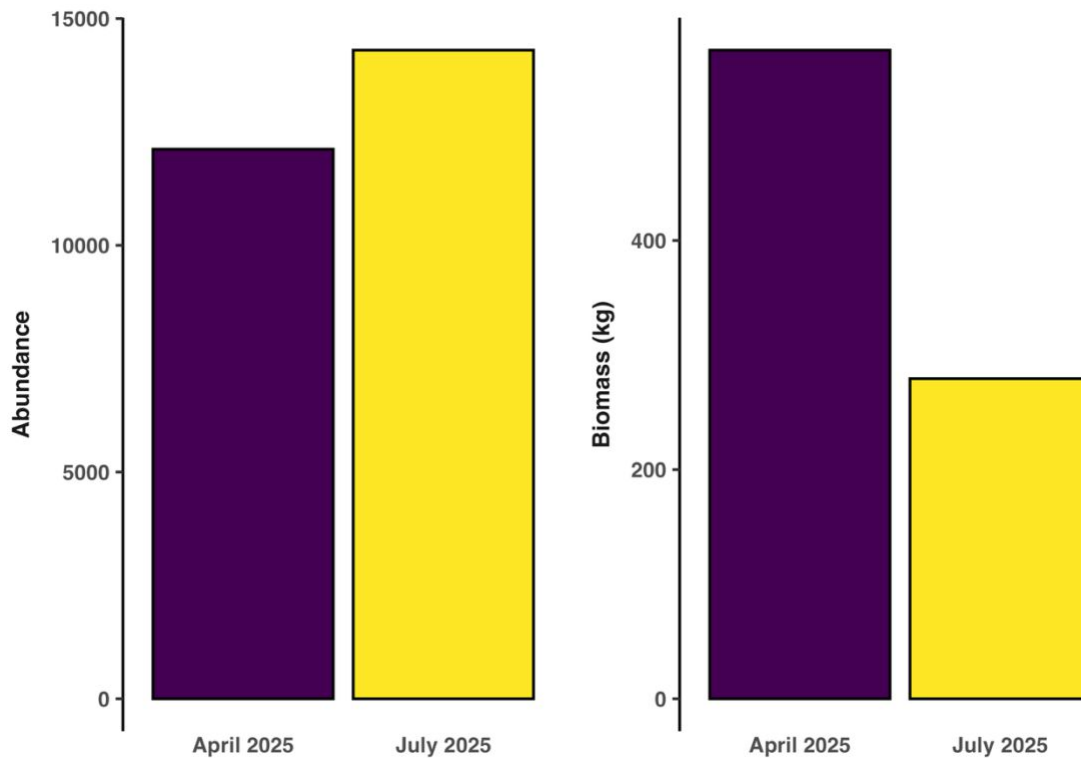


Figure 8. Abundance and biomass (kg) of San Diego Bay fishes taken by sampling month, 2025.

Table 3. Total abundance of fish species taken in San Diego Bay by sampling period, 2025.

Scientific Name	Common Name	2025		Total	%
		April	July		
<i>Engraulis mordax</i>	Northern Anchovy	3	6,188	6,191	23.43
<i>Anchoa delicatissima</i>	Slough Anchovy	775	3,628	4,403	16.66
<i>Sardinops sagax</i>	Pacific Sardine	3,447		3,447	13.05
<i>Atherinops affinis</i>	Topsmelt	1,630	1,331	2,961	11.21
<i>Cymatogaster aggregata</i>	Shiner Perch	2,322	215	2,537	9.60
<i>Syngnathus californiensis</i>	Kelp Pipefish	802	626	1,428	5.40
<i>Heterostichus rostratus</i>	Giant Kelpfish	272	874	1,146	4.34
<i>Atherinopsis californiensis</i>	Jacksmelt	1,129		1,129	4.27
<i>Urobatis halleri</i>	Round Stingray	455	463	918	3.47
<i>Clevelandia ios</i>	Arrow Goby	143	390	533	2.02
<i>Leuresthes tenuis</i>	California Grunion	428		428	1.62
<i>Micrometrus minimus</i>	Dwarf Perch	82	137	219	0.83
<i>Ilypnus gilberti</i>	Cheekspot Goby	37	111	148	0.56
<i>Fundulus parvipinnis</i>	California Killifish	99	46	145	0.55
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	124	4	128	0.48
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	73	31	104	0.39
<i>Paralabrax clathratus</i>	Kelp Bass	82	9	91	0.34
<i>Paralichthys californicus</i>	California Halibut	34	51	85	0.32
<i>Seriphus politus</i>	Queenfish	2	41	43	0.16
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	30	10	40	0.15
<i>Paralabrax nebulifer</i>	Barred Sand Bass	10	25	35	0.13
<i>Hypsoblennius gentilis</i>	Bay Blenny	24	5	29	0.11
<i>Pleuronichthys ritteri</i>	Spotted Turbot	12	17	29	0.11
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	24	1	25	0.09
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	8	16	24	0.09
<i>Albula gilberti</i>	Cortez Bonefish		21	21	0.08
<i>Cheilotrema saturnum</i>	Black Croaker	2	10	12	0.05
<i>Myliobatis californica</i>	Bat Ray	9	3	12	0.05
<i>Gibbonsia elegans</i>	Spotted Kelpfish	9	1	10	0.04
<i>Scomber japonicus</i>	Pacific Chub Mackerel		10	10	0.04
<i>Hyporhamphus rosae</i>	California Halfbeak	6	3	9	0.03
<i>Haemulon californiensis</i>	Salema	7	1	8	0.03
<i>Synodus lucioceps</i>	California Lizardfish		8	8	0.03
<i>Porichthys myriaster</i>	Specklefin Midshipman	3	4	7	0.03
<i>Sphyræna argentea</i>	Pacific Barracuda	5	1	6	0.02
<i>Ctenogobius sagittula</i>	Longtail Goby	4		4	0.02
<i>Embiotoca jacksoni</i>	Black Perch	1	3	4	0.02
<i>Heterodontus francisci</i>	Horn Shark	2	2	4	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse	3	1	4	0.02
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	3	4	0.02
<i>Platyrrhinoidis triseriata</i>	Thornback		4	4	0.02
<i>Sebastes miniatus</i>	Vermilion Rockfish	4		4	0.02
<i>Quietula y-cauda</i>	Shadow Goby	2	1	3	0.01
<i>Roncador stearnsii</i>	Spotfin Croaker	1	2	3	0.01
<i>Anisotremus davidsonii</i>	Sargo	2		2	0.01
<i>Atractoscion nobilis</i>	White Seabass	2		2	0.01
<i>Dasyatis dipterura</i>	Diamond Stingray	2		2	0.01
<i>Gymnura marmorata</i>	California Butterfly Ray	1	1	2	0.01
<i>Sarda chiliensis</i>	Pacific Bonito		2	2	0.01
<i>Trachurus symmetricus</i>	Jack Mackerel	2		2	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	1	1	2	0.01
<i>Medialuna californiensis</i>	Halfmoon		1	1	< 0.01
<i>Mustelus californicus</i>	Gray Smoothhound	1		1	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot	1		1	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	1		1	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		1	1	< 0.01
Total:		12,119	14,303	26,422	
# of Species:		49	44		

Table 4. Total biomass (g) of fish species taken in San Diego Bay by sampling period, 2025.

Scientific Name	Common Name	2025		Total	%
		April	July		
<i>Urobatis halleri</i>	Round Stingray	77,982	149,522	227,504	26.91
<i>Sardinops sagax</i>	Pacific Sardine	220,030		220,030	26.02
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	92,583	2,394	94,977	11.23
<i>Myliobatis californica</i>	Bat Ray	46,652	28,965	75,617	8.94
<i>Atherinopsis californiensis</i>	Jacksmelt	52,066		52,066	6.16
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	25,745	10,036	35,781	4.23
<i>Engraulis mordax</i>	Northern Anchovy	13	30,913	30,926	3.66
<i>Atherinops affinis</i>	Topsmelt	19,176	7,797	26,973	3.19
<i>Gymnura marmorata</i>	California Butterfly Ray	1,000	13,954	14,954	1.77
<i>Cymatogaster aggregata</i>	Shiner Perch	7,912	1,552	9,464	1.12
<i>Anchoa delicatissima</i>	Slough Anchovy	1,071	7,360	8,431	1.00
<i>Platyrrhinoidis triseriata</i>	Thornback		5,300	5,300	0.63
<i>Paralichthys californicus</i>	California Halibut	2,806	2,482	5,288	0.63
<i>Albula gilberti</i>	Cortez Bonefish		3,517	3,517	0.42
<i>Sphyræna argentea</i>	Pacific Barracuda	2,864	350	3,214	0.38
<i>Heterostichus rostratus</i>	Giant Kelpfish	721	2,324	3,045	0.36
<i>Dasyatis dipterura</i>	Diamond Stingray	2,950		2,950	0.35
<i>Leuresthes tenuis</i>	California Grunion	2,664		2,664	0.32
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	859	1,757	2,616	0.31
<i>Roncador stearnsii</i>	Spotfin Croaker	1,300	1,300	2,600	0.31
<i>Paralabrax nebulifer</i>	Barred Sand Bass	53	1,914	1,967	0.23
<i>Scomber japonicus</i>	Pacific Chub Mackerel		1,750	1,750	0.21
<i>Micrometrus minimus</i>	Dwarf Perch	1,241	502	1,743	0.21
<i>Sarda chiliensis</i>	Pacific Bonito		1,400	1,400	0.17
<i>Pleuronichthys ritteri</i>	Spotted Turbot	468	721	1,189	0.14
<i>Cheilotrema saturnum</i>	Black Croaker	510	434	944	0.11
<i>Heterodontus francisci</i>	Horn Shark	566	345	911	0.11
<i>Fundulus parvipinnis</i>	California Killifish	639	224	863	0.10
<i>Haemulon californiensis</i>	Salema	827	34	861	0.10
<i>Syngnathus californiensis</i>	Kelp Pipefish	472	357	829	0.10
<i>Paralabrax clathratus</i>	Kelp Bass	414	346	760	0.09
<i>Porichthys myriaster</i>	Specklefin Midshipman	137	531	668	0.08
<i>Medialuna californiensis</i>	Halfmoon		600	600	0.07
<i>Atractoscion nobilis</i>	White Seabass	550		550	0.07
<i>Mustelus californicus</i>	Gray Smoothhound	550		550	0.07
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	242	1	243	0.03
<i>Embiotoca jacksoni</i>	Black Perch	150	88	238	0.03
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	148	78	226	0.03
<i>Synodus lucioceps</i>	California Lizardfish		218	218	0.03
<i>Seriphus politus</i>	Queenfish	200	5	205	0.02
<i>Trachurus symmetricus</i>	Jack Mackerel	200		200	0.02
<i>Hypsoblennius gentilis</i>	Bay Blenny	91	47	138	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse	86	35	121	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	36	85	121	0.01
<i>Clevelandia ios</i>	Arrow Goby	27	56	83	0.01
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	5	40	45	0.01
<i>Ilypnus gilberti</i>	Cheekspot Goby	27	18	45	0.01
<i>Hyporhamphus rosae</i>	California Halfbeak	18	21	39	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		28	28	< 0.01
<i>Sebastes miniatus</i>	Vermillion Rockfish	19		19	< 0.01
<i>Gibbonsia elegans</i>	Spotted Kelpfish	8	2	10	< 0.01
<i>Anisotremus davidsonii</i>	Sargo	8		8	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot	4		4	< 0.01
<i>Quietula y-cauda</i>	Shadow Goby	2	1	3	< 0.01
<i>Ctenogobius sagittula</i>	Longtail Goby	2		2	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	2		2	< 0.01
Total:		566,096	279,404	845,500	
# of Species:		49	44		

4.2.2 Abundance and Biomass by Ecoregion

Abundance was highest in the North Ecoregion in both survey months (**Figure 9**) where catch totals were heavily influenced by Northern Anchovy and Pacific Sardine. Abundance was greatest at the North Ecoregion, followed by the South-Central Ecoregion, North-Central Ecoregion, and South Ecoregion (**Tables 5, 7-10**). The numerically dominant fishes had similar patterns over the three southernmost ecoregions. Shiner Perch (*Cymatogaster aggregata*), Slough Anchovy, and Topsmelt were all relatively common in each of the four ecoregions. However, few Northern Anchovy and no Pacific Sardine were encountered outside of the North Ecoregion. Northern Anchovy, Pacific Sardine, and Jacksmelt (*Atherinopsis californiensis*) dominated catches in the North while Slough Anchovy was the dominant species in the North-Central and South-Central Ecoregions. Shiner Perch dominated the catch in the South Ecoregion.

As with abundance, biomass was highest in the North Ecoregion in both survey months (**Figure 10**). Biomass was greatest at the North Ecoregion, followed by the South Ecoregion, South-Central Ecoregion, and North-Central Ecoregion (**Tables 6-10**). Round Stingrays had the highest catch in terms of biomass in the North-Central Ecoregion and was second in biomass in the other three ecoregions to Pacific Sardine, Bat Ray (*Myliobatis californica*), and Shortfin Corvina. As is typical, Spotted Sand Bass (*Paralabrax maculatofasciatus*) was also a dominant species in terms of biomass in all ecoregions. Jacksmelt and Northern Anchovy were also biomass-dominant species in the North Ecoregion. Topsmelt was biomass-dominant most notably in the North-Central Ecoregion. A single 14.0 kg individual made California Butterfly Ray (*Gymnura marmorata*) a biomass-dominant species in the South Ecoregion.

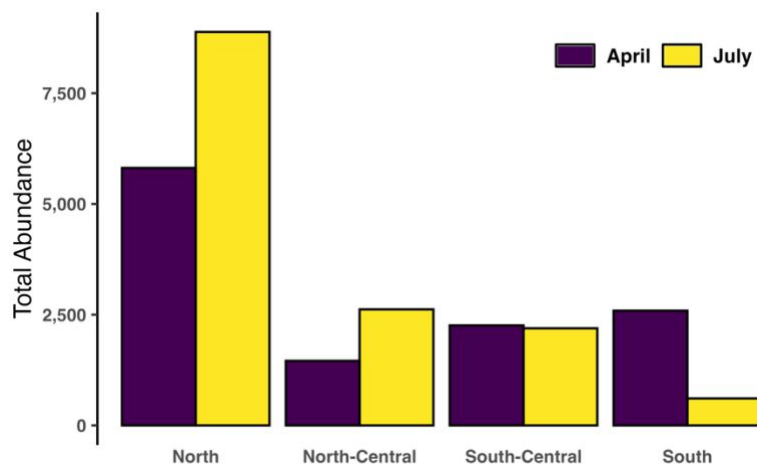


Figure 9. Total abundance of San Diego Bay fishes taken by ecoregion, April and July 2025.

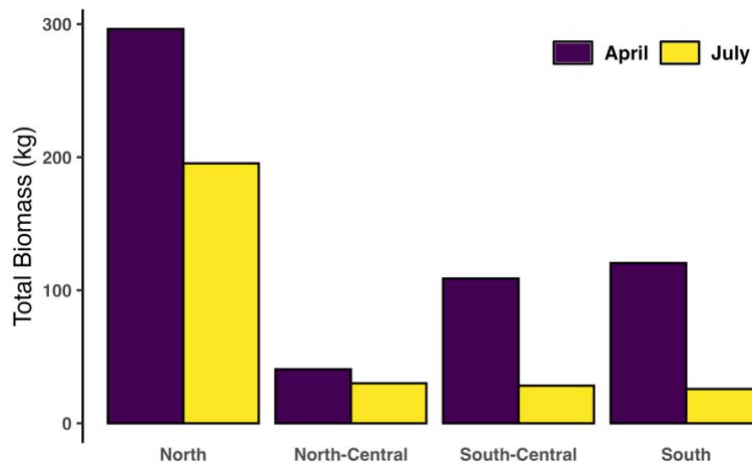


Figure 10. Biomass (kg) of San Diego Bay fishes taken by ecoregion, April and July 2025.

North Ecoregion – A total of 14,696 fishes belonging to 41 species and weighing 491.7 kg was collected in the North Ecoregion over two sampling periods in 2025 (**Table 7**). Northern Anchovy were the most frequently caught species (42.1%), followed by Pacific Sardine (23.5%), Jacksmelt (7.60%), Giant Kelpfish (*Heterostichus rostratus*; 6.72%), and Topsmelt (6.21%). Pacific Sardine led in total biomass (44.8%), followed by Round Stingray (27.4%), Jacksmelt (10.4%), Northern Anchovy (6.29%), and Bat Ray (2.89%)

North-Central Ecoregion - A total of 4,077 fishes belonging to 32 species and weighing 70.6 kg was collected in the North-Central Ecoregion in April and July, 2025 (**Table 8**). Slough Anchovy was the most abundant species (42.1%), followed by Topsmelt (28.3%), Shiner Perch (9.39%), California Grunion (*Leuresthes tenuis*; 3.97%), and Giant Kelpfish (3.78%). Round Stingray led in total biomass (37.7%), followed by Topsmelt (22.3%), Spotted Sand Bass (16.5%), and Slough Anchovy (5.36%).

South-Central Ecoregion - A total of 4,450 fishes belonging to 29 species and weighing 137.0 kg was collected in the South-Central Ecoregion over the two sampling periods in 2025 (**Table 9**). Slough Anchovy was the most abundant species (44.5%), followed by Kelp Pipefish (*Syngnathus californiensis*; 14.9%), Shiner Perch (13.4%), Topsmelt (7.91%), and Round Stingray (6.61%). Bat Ray led in total biomass (44.8%) in spite of only having caught 11 individuals. They were followed by Round Stingray (33.2%), Spotted Sand Bass (8.37%), Topsmelt (2.72%), and Shortfin Corvina (1.81%).

South Ecoregion - A total of 3,199 fishes belonging to 26 species and weighing 146.2 kg was collected in the South Ecoregion in April and July 2025 (**Table 10**). Shiner Perch was the most abundant species (43.4%), followed by Topsmelt (16.9%), Kelp Pipefish (13.5%), Arrow Goby (*Clevelandia ios*; 9.13%), and Round Stingray (3.91%). Shortfin Corvina dominated the total biomass (61.8 %), followed by Round Stingrays (14.3%), California Butterfly Ray (9.55%), Spotted Sand Bass (5.28%), and Shiner Perch (3.11%).

Table 5. Total abundance of fishes collected in San Diego Bay during 2025 by ecoregion.

Scientific Name	Common Name	Ecoregions				Total	%
		North	North-Central	South-Central	South		
<i>Engraulis mordax</i>	Northern Anchovy	6,181	5	3	2	6,191	23.43
<i>Anchoa delicatissima</i>	Slough Anchovy	588	1,717	1,982	116	4,403	16.66
<i>Sardinops sagax</i>	Pacific Sardine	3,447				3,447	13.05
<i>Atherinops affinis</i>	Topsmelt	913	1,155	352	541	2,961	11.21
<i>Cymatogaster aggregata</i>	Shiner Perch	169	383	596	1,389	2,537	9.60
<i>Syngnathus californiensis</i>	Kelp Pipefish	179	152	664	433	1,428	5.40
<i>Heterostichus rostratus</i>	Giant Kelpfish	987	154	5		1,146	4.34
<i>Atherinopsis californiensis</i>	Jacksmelt	1,117	2	10		1,129	4.27
<i>Urobatis halleri</i>	Round Stingray	375	124	294	125	918	3.47
<i>Clevelandia ios</i>	Arrow Goby	3	9	229	292	533	2.02
<i>Leuresthes tenuis</i>	California Grunion	266	162			428	1.62
<i>Micrometrus minimus</i>	Dwarf Perch	189	30			219	0.83
<i>Ilypnus gilberti</i>	Cheekspot Goby	8		131	9.0	148	0.56
<i>Fundulus parvipinnis</i>	California Killifish		1	50	94	145	0.55
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	1	2	7	118	128	0.48
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	10	35	34	25	104	0.39
<i>Paralabrax clathratus</i>	Kelp Bass	86	5			91	0.34
<i>Paralichthys californicus</i>	California Halibut	23	24	32	6	85	0.32
<i>Seriphus politus</i>	Queenfish	41		2		43	0.16
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	9	12	13	6	40	0.15
<i>Paralabrax nebulifer</i>	Barred Sand Bass	2	28	5		35	0.13
<i>Hypsoblennius gentilis</i>	Bay Blenny	11	16	2		29	0.11
<i>Pleuronichthys ritteri</i>	Spotted Turbot	8	21			29	0.11
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	23	2			25	0.09
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	9	6	8	1	24	0.09
<i>Albula gilberti</i>	Cortez Bonefish			2	19	21	0.08
<i>Cheilotrema saturnum</i>	Black Croaker	1	7	4		12	0.05
<i>Myliobatis californica</i>	Bat Ray	1		11		12	0.05
<i>Gibbonsia elegans</i>	Spotted Kelpfish	10				10	0.04
<i>Scomber japonicus</i>	Pacific Chub Mackerel		10			10	0.04
<i>Hyporhamphus rosae</i>	California Halfbeak			1	8	9	0.03
<i>Haemulon californiensis</i>	Salema		3	5		8	0.03
<i>Synodus lucioceps</i>	California Lizardfish	7	1			8	0.03
<i>Porichthys myriaster</i>	Specklefin Midshipman	3		4		7	0.03
<i>Sphyræna argentea</i>	Pacific Barracuda	2	1	1	2	6	0.02
<i>Ctenogobius sagittula</i>	Longtail Goby			1	3	4	0.02
<i>Embiotoca jacksoni</i>	Black Perch	4				4	0.02
<i>Heterodontus francisci</i>	Horn Shark	4				4	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		3		1	4	0.02
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	2		1	4	0.02
<i>Platyrrhinoidis triseriata</i>	Thornback	4				4	0.02
<i>Sebastes miniatus</i>	Vermilion Rockfish	4				4	0.02
<i>Quietula y-cauda</i>	Shadow Goby		2		1	3	0.01
<i>Roncador stearnsii</i>	Spotfin Croaker	2		1		3	0.01
<i>Anisotremus davidsonii</i>	Sargo		2			2	0.01
<i>Atractoscion nobilis</i>	White Seabass				2	2	0.01
<i>Dasyatis dipterura</i>	Diamond Stingray	2				2	0.01
<i>Gymnura marmorata</i>	California Butterfly Ray			1	1	2	0.01
<i>Sarda chiliensis</i>	Pacific Bonito	2				2	0.01
<i>Trachurus symmetricus</i>	Jack Mackerel				2	2	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	2				2	0.01
<i>Medialuna californiensis</i>	Halfmoon	1				1	< 0.01
<i>Mustelus californicus</i>	Gray Smoothhound				1	1	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		1			1	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	1				1	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker				1	1	< 0.01
# of Species: 56		14,696	4,077	4,450	3,199	26,422	

Table 6. Total biomass (grams [g]) of fishes collected in San Diego Bay during 2025 by ecoregion.

		Ecoregions					
Scientific Name	Common Name	North	North-Central	South-Central	South	Total (g)	%
<i>Urobatis halleri</i>	Round Stingray	134,510	26,666	45,446	20,882	227,504	26.91
<i>Sardinops sagax</i>	Pacific Sardine	220,030				220,030	26.02
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	1,500	700	2,484	90,293	94,977	11.23
<i>Myliobatis californica</i>	Bat Ray	14,200		61,417		75,617	8.94
<i>Atherinopsis californiensis</i>	Jacksnelt	50,916	400	750		52,066	6.16
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	4,955	11,637	11,471	7,718	35,781	4.23
<i>Engraulis mordax</i>	Northern Anchovy	30,912	8	3	3	30,926	3.66
<i>Atherinops affinis</i>	Topsnelt	6,080	15,780	3,723	1,390	26,973	3.19
<i>Gymnura marmorata</i>	California Butterfly Ray			1,000	13,954	14,954	1.77
<i>Cymatogaster aggregata</i>	Shiner Perch	1,059	1,906	1,951	4,548	9,464	1.12
<i>Anchoa delicatissima</i>	Slough Anchovy	2,010	3,783	2,451	187	8,431	1.00
<i>Platyrrhinoidis triseriata</i>	Thornback	5,300				5,300	0.63
<i>Paralichthys californicus</i>	California Halibut	1,681	2,522	638	447	5,288	0.63
<i>Albula gilberti</i>	Cortez Bonefish			385	3,132	3,517	0.42
<i>Sphyrna argentea</i>	Pacific Barracuda	664	700	500	1,350	3,214	0.38
<i>Heterostichus rostratus</i>	Giant Kelpfish	2,408	624	13		3,045	0.36
<i>Dasyatis diptera</i>	Diamond Stingray	2,950				2,950	0.35
<i>Leuresthes tenuis</i>	California Grunion	2,600	64			2,664	0.32
<i>Pleuronichthys guttulus</i>	Diamond Turbot	835	889	890	2	2,616	0.31
<i>Roncador stearnsii</i>	Spotfin Croaker	1,300		1,300		2,600	0.31
<i>Paralabrax nebulifer</i>	Barred Sand Bass	602	1,232	133		1,967	0.23
<i>Scomber japonicus</i>	Pacific Chub Mackerel		1,750			1,750	0.21
<i>Micrometrus minimus</i>	Dwarf Perch	1,621	122			1,743	0.21
<i>Sarda chiliensis</i>	Pacific Bonito	1,400				1,400	0.17
<i>Pleuronichthys ritteri</i>	Spotted Turbot	402	787			1,189	0.14
<i>Cheilotrema saturnum</i>	Black Croaker	10	351	583		944	0.11
<i>Heterodontus francisci</i>	Horn Shark	911				911	0.11
<i>Fundulus parvipinnis</i>	California Killifish		11	287	565	863	0.10
<i>Haemulon californiensis</i>	Salema		41	820		861	0.10
<i>Syngnathus californiensis</i>	Kelp Pipefish	240	54	332	203	829	0.10
<i>Paralabrax clathratus</i>	Kelp Bass	545	215			760	0.09
<i>Porichthys myriaster</i>	Specklefin Midshipman	530		138		668	0.08
<i>Medialuna californiensis</i>	Halfmoon	600				600	0.07
<i>Atractoscion nobilis</i>	White Seabass				550	550	0.07
<i>Mustelus californicus</i>	Gray Smoothhound				550	550	0.07
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	239	4			243	0.03
<i>Embiotoca jacksoni</i>	Black Perch	238				238	0.03
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	48	102	51	25	226	0.03
<i>Synodus lucioceps</i>	California Lizardfish	145	73			218	0.03
<i>Seriphus politus</i>	Queenfish	5		200		205	0.02
<i>Trachurus symmetricus</i>	Jack Mackerel				200	200	0.02
<i>Hypsoblennius gentilis</i>	Bay Blenny	82	53	3		138	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		86		35	121	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	121				121	0.01
<i>Clevelandia ios</i>	Arrow Goby	3	7	24	49	83	0.01
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	5	39		1	45	0.01
<i>Ilypnus gilberti</i>	Cheekspot Goby	3		37	5	45	0.01
<i>Hyporhamphus rosae</i>	California Halfbeak			1	38	39	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker				28	28	< 0.01
<i>Sebastes miniatus</i>	Vermilion Rockfish	19				19	< 0.01
<i>Gibbonsia elegans</i>	Spotted Kelpfish	10				10	< 0.01
<i>Anisotremus davidsonii</i>	Sargo		8			8	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		4			4	< 0.01
<i>Quietula y-cauda</i>	Shadow Goby		2		1	3	< 0.01
<i>Ctenogobius sagittula</i>	Longtail Goby			1	1	2	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	2				2	< 0.01
# of Species: 56		491,691	70,620	137,032	146,157	845,500	

Table 7. Total number of individuals and biomass (g) of fish species captured in the North Ecoregion, 2025.

Scientific Name	Common Name	Abundance		Biomass	
		#	%	grams	%
<i>Engraulis mordax</i>	Northern Anchovy	6,181	42.06	30,912	6.29
<i>Sardinops sagax</i>	Pacific Sardine	3,447	23.46	220,030	44.75
<i>Atherinopsis californiensis</i>	Jacksnelt	1,117	7.60	50,916	10.36
<i>Heterostichus rostratus</i>	Giant Kelpfish	987	6.72	2,408	0.49
<i>Atherinops affinis</i>	Topsmelt	913	6.21	6,080	1.24
<i>Anchoa delicatissima</i>	Slough Anchovy	588	4.00	2,010	0.41
<i>Urobatis halleri</i>	Round Stingray	375	2.55	134,510	27.36
<i>Leuresthes tenuis</i>	California Grunion	266	1.81	2,600	0.53
<i>Micrometrus minimus</i>	Dwarf Perch	189	1.29	1,621	0.33
<i>Syngnathus californiensis</i>	Kelp Pipefish	179	1.22	240	0.05
<i>Cymatogaster aggregata</i>	Shiner Perch	169	1.15	1,059	0.22
<i>Paralabrax clathratus</i>	Kelp Bass	86	0.59	545	0.11
<i>Seriphus politus</i>	Queenfish	41	0.28	5	< 0.01
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	23	0.16	239	0.05
<i>Paralichthys californicus</i>	California Halibut	23	0.16	1,681	0.34
<i>Hypsoblennius gentilis</i>	Bay Blenny	11	0.07	82	0.02
<i>Gibbonsia elegans</i>	Spotted Kelpfish	10	0.07	10	< 0.01
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	10	0.07	4,955	1.01
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	9	0.06	48	0.01
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	9	0.06	835	0.17
<i>Ilypnus gilberti</i>	Cheekspot Goby	8	0.05	3	< 0.01
<i>Pleuronichthys ritteri</i>	Spotted Turbot	8	0.05	402	0.08
<i>Synodus lucioceps</i>	California Lizardfish	7	0.05	145	0.03
<i>Embiotoca jacksoni</i>	Black Perch	4	0.03	238	0.05
<i>Heterodontus francisci</i>	Horn Shark	4	0.03	911	0.19
<i>Platyrrhinoidis triseriata</i>	Thornback	4	0.03	5,300	1.08
<i>Sebastes miniatus</i>	Vermilion Rockfish	4	0.03	19	< 0.01
<i>Clevelandia ios</i>	Arrow Goby	3	0.02	3	< 0.01
<i>Porichthys myriaster</i>	Specklefin Midshipman	3	0.02	530	0.11
<i>Dasyatis dipterura</i>	Diamond Stingray	2	0.01	2,950	0.60
<i>Paralabrax nebulifer</i>	Barred Sand Bass	2	0.01	602	0.12
<i>Roncador stearnsii</i>	Spotfin Croaker	2	0.01	1,300	0.26
<i>Sarda chiliensis</i>	Pacific Bonito	2	0.01	1,400	0.28
<i>Sphyrna argentea</i>	Pacific Barracuda	2	0.01	664	0.14
<i>Zapteryx exasperata</i>	Banded Guitarfish	2	0.01	121	0.02
<i>Cheilotrema saturnum</i>	Black Croaker	1	0.01	10	< 0.01
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	1	0.01	1,500	0.31
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	0.01	5	< 0.01
<i>Medialuna californiensis</i>	Halfmoon	1	0.01	600	0.12
<i>Myliobatis californica</i>	Bat Ray	1	0.01	14,200	2.89
<i>Symphurus atricaudus</i>	California Tonguefish	1	0.01	2	< 0.01
# of Species: 41		14,696		491,691	

Table 8. Total number of individuals and biomass (g) of fish species captured in the North-Central Ecoregion, 2025.

Scientific Name	Common Name	Abundance		Biomass	
		#	%	grams	%
<i>Anchoa delicatissima</i>	Slough Anchovy	1,717	42.11	3,783	5.36
<i>Atherinops affinis</i>	Topsmelt	1,155	28.33	15,780	22.34
<i>Cymatogaster aggregata</i>	Shiner Perch	383	9.39	1,906	2.70
<i>Leuresthes tenuis</i>	California Grunion	162	3.97	64	0.09
<i>Heterostichus rostratus</i>	Giant Kelpfish	154	3.78	624	0.88
<i>Syngnathus californiensis</i>	Kelp Pipefish	152	3.73	54	0.08
<i>Urobatis halleri</i>	Round Stingray	124	3.04	26,666	37.76
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	35	0.86	11,637	16.48
<i>Micrometrus minimus</i>	Dwarf Perch	30	0.74	122	0.17
<i>Paralabrax nebulifer</i>	Barred Sand Bass	28	0.69	1,232	1.74
<i>Paralichthys californicus</i>	California Halibut	24	0.59	2,522	3.57
<i>Pleuronichthys ritteri</i>	Spotted Turbot	21	0.52	787	1.11
<i>Hypsoblennius gentilis</i>	Bay Blenny	16	0.39	53	0.08
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	12	0.29	102	0.14
<i>Scomber japonicus</i>	Pacific Chub Mackerel	10	0.25	1,750	2.48
<i>Clevelandia ios</i>	Arrow Goby	9	0.22	7	0.01
<i>Cheilotrema saturnum</i>	Black Croaker	7	0.17	351	0.50
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	6	0.15	889	1.26
<i>Engraulis mordax</i>	Northern Anchovy	5	0.12	8	0.01
<i>Paralabrax clathratus</i>	Kelp Bass	5	0.12	215	0.30
<i>Haemulon californiensis</i>	Salema	3	0.07	41	0.06
<i>Hippocampus ingens</i>	Pacific Seahorse	3	0.07	86	0.12
<i>Anisotremus davidsonii</i>	Sargo	2	0.05	8	0.01
<i>Atherinopsis californiensis</i>	Jacksmelt	2	0.05	400	0.57
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	2	0.05	4	0.01
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	2	0.05	700	0.99
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	2	0.05	39	0.06
<i>Quietula y-cauda</i>	Shadow Goby	2	0.05	2	< 0.01
<i>Fundulus parvipinnis</i>	California Killifish	1	0.02	11	0.02
<i>Paraclinus integripinnis</i>	Reef Finspot	1	0.02	4	0.01
<i>Sphyrna argentea</i>	Pacific Barracuda	1	0.02	700	0.99
<i>Synodus lucioceps</i>	California Lizardfish	1	0.02	73	0.10
# of Species: 32		4,077		70,620	

Table 9. Total number of individuals and biomass (g) of fish species captured in the South-Central Ecoregion, 2025.

Scientific Name	Common Name	Abundance		Biomass	
		#	%	grams	%
<i>Anchoa delicatissima</i>	Slough Anchovy	1,982	44.54	2,451	1.79
<i>Syngnathus californiensis</i>	Kelp Pipefish	664	14.92	332	0.24
<i>Cymatogaster aggregata</i>	Shiner Perch	596	13.39	1,951	1.42
<i>Atherinops affinis</i>	Topsmelt	352	7.91	3,723	2.72
<i>Urobatis halleri</i>	Round Stingray	294	6.61	45,446	33.16
<i>Clevelandia ios</i>	Arrow Goby	229	5.15	24	0.02
<i>Ilypnus gilberti</i>	Cheekspot Goby	131	2.94	37	0.03
<i>Fundulus parvipinnis</i>	California Killifish	50	1.12	287	0.21
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	34	0.76	11,471	8.37
<i>Paralichthys californicus</i>	California Halibut	32	0.72	638	0.47
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	13	0.29	51	0.04
<i>Myliobatis californica</i>	Bat Ray	11	0.25	61,417	44.82
<i>Atherinopsis californiensis</i>	Jacksmelt	10	0.22	750	0.55
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	8	0.18	890	0.65
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	7	0.16	2,484	1.81
<i>Haemulon californiensis</i>	Salema	5	0.11	820	0.60
<i>Heterostichus rostratus</i>	Giant Kelpfish	5	0.11	13	0.01
<i>Paralabrax nebulifer</i>	Barred Sand Bass	5	0.11	133	0.10
<i>Cheilotrema saturnum</i>	Black Croaker	4	0.09	583	0.43
<i>Porichthys myriaster</i>	Specklefin Midshipman	4	0.09	138	0.10
<i>Engraulis mordax</i>	Northern Anchovy	3	0.07	3	< 0.01
<i>Albula gilberti</i>	Cortez Bonefish	2	0.04	385	0.28
<i>Hypsoblennius gentilis</i>	Bay Blenny	2	0.04	3	0.00
<i>Seriphus politus</i>	Queenfish	2	0.04	200	0.15
<i>Ctenogobius sagittula</i>	Longtail Goby	1	0.02	1	< 0.01
<i>Gymnura marmorata</i>	California Butterfly Ray	1	0.02	1,000.0	0.73
<i>Hyporhamphus rosae</i>	California Halfbeak	1	0.02	1	< 0.01
<i>Roncador stearnsii</i>	Spotfin Croaker	1	0.02	1,300	0.95
<i>Sphyrna argentea</i>	Pacific Barracuda	1	0.02	500	0.36
# of Species: 29		4,450		137,032	

Table 10. Total number of individuals and biomass (g) of fish species captured in the South Ecoregion, 2025.

Scientific Name	Common Name	Abundance		Biomass	
		#	%	grams	%
<i>Cymatogaster aggregata</i>	Shiner Perch	1,389	43.42	4,548	3.11
<i>Atherinops affinis</i>	Topsmelt	541	16.91	1,390	0.95
<i>Syngnathus californiensis</i>	Kelp Pipefish	433	13.54	203	0.14
<i>Clevelandia ios</i>	Arrow Goby	292	9.13	49	0.03
<i>Urobatis halleri</i>	Round Stingray	125	3.91	20,882	14.29
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	118	3.69	90,293	61.78
<i>Anchoa delicatissima</i>	Slough Anchovy	116	3.63	187	0.13
<i>Fundulus parvipinnis</i>	California Killifish	94	2.94	565	0.39
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	25	0.78	7,718	5.28
<i>Albula gilberti</i>	Cortez Bonefish	19	0.59	3,132	2.14
<i>Ilypnus gilberti</i>	Cheekspot Goby	9	0.28	5	< 0.01
<i>Hyporhamphus rosae</i>	California Halfbeak	8	0.25	38	0.03
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	6	0.19	25	0.02
<i>Paralichthys californicus</i>	California Halibut	6	0.19	447	0.31
<i>Ctenogobius sagittula</i>	Longtail Goby	3	0.09	1	< 0.01
<i>Atractoscion nobilis</i>	White Seabass	2	0.06	550	0.38
<i>Engraulis mordax</i>	Northern Anchovy	2	0.06	3	< 0.01
<i>Sphyrna argentea</i>	Pacific Barracuda	2	0.06	1,350	0.92
<i>Trachurus symmetricus</i>	Jack Mackerel	2	0.06	200	0.14
<i>Gymnura marmorata</i>	California Butterfly Ray	1	0.03	13,954	9.55
<i>Hippocampus ingens</i>	Pacific Seahorse	1	0.03	35	0.02
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	0.03	1	< 0.01
<i>Mustelus californicus</i>	Gray Smoothhound	1	0.03	550	0.38
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	1	0.03	2	< 0.01
<i>Quietula y-cauda</i>	Shadow Goby	1	0.03	1	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker	1	0.03	28	0.02
# of Species: 26		3,199		146,157	

4.2.3 Abundance and Biomass by Depth Strata and Subhabitats

Of the three bay depth strata (intertidal, nearshore, and channel) the greatest catch of fishes was in the nearshore strata (19,500 individuals from 47 species weighing 597.9 kg; **Tables 11** and **12**). 3,783 fishes from 26 species weighing 140.6 kg were captured in the intertidal, and 3,139 fishes from 24 species weighing 107.0 kg were captured in the channel. A total of 12,642 fishes weighing 246.0 kg was taken in non-vegetated areas of the nearshore and intertidal (**Tables 13** and **14**) comprised of 47 species, and 10,641 fishes from 39 species weighing 492.5 kg were caught in the nearshore and intertidal vegetated areas.



A small Gray Smoothhound (*Mustelus californicus*) caught by purse seine in the South Ecoregion, April 2025

Table 11. Total abundance of fish species taken from San Diego Bay by depth strata, 2025.

Scientific Name	Common Name	Depth Strata			Total	%
		Channel	Intertidal	Nearshore		
<i>Engraulis mordax</i>	Northern Anchovy	4		6,187	6,191	23.43
<i>Anchoa delicatissima</i>	Slough Anchovy	1,495	45	2,863	4,403	16.66
<i>Sardinops sagax</i>	Pacific Sardine	121		3,326	3,447	13.05
<i>Atherinops affinis</i>	Topsmelt	354	1,721	886	2,961	11.21
<i>Cymatogaster aggregata</i>	Shiner Perch	266	118	2,153	2,537	9.60
<i>Syngnathus californiensis</i>	Kelp Pipefish	27	320	1,081	1,428	5.40
<i>Heterostichus rostratus</i>	Giant Kelpfish		127	1,019	1,146	4.34
<i>Atherinopsis californiensis</i>	Jacksmelt	290		839	1,129	4.27
<i>Urobatis halleri</i>	Round Stingray	378	353	187	918	3.47
<i>Clevelandia ios</i>	Arrow Goby		478	55	533	2.02
<i>Leuresthes tenuis</i>	California Grunion		162	266	428	1.62
<i>Micrometrus minimus</i>	Dwarf Perch		102	117	219	0.83
<i>Ilypnus gilberti</i>	Cheekspot Goby	25	115	8	148	0.56
<i>Fundulus parvipinnis</i>	California Killifish		145		145	0.55
<i>Cynoscion parvipinnis</i>	Shortfin Corvina			128	128	0.48
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	17	5	82	104	0.39
<i>Paralabrax clathratus</i>	Kelp Bass			91	91	0.34
<i>Paralichthys californicus</i>	California Halibut	63	8	14	85	0.32
<i>Serphus politus</i>	Queenfish			43	43	0.16
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		39	1	40	0.15
<i>Paralabrax nebulifer</i>	Barred Sand Bass	6	4	25	35	0.13
<i>Hypsoblennius gentilis</i>	Bay Blenny		14	15	29	0.11
<i>Pleuronichthys ritteri</i>	Spotted Turbot	28		1	29	0.11
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	19	1	5	25	0.09
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	13	7	4	24	0.09
<i>Albula gilberti</i>	Cortez Bonefish			21	21	0.08
<i>Cheilotrema saturnum</i>	Black Croaker	8		4	12	0.05
<i>Myliobatis californica</i>	Bat Ray	2		10	12	0.05
<i>Gibbonsia elegans</i>	Spotted Kelpfish			10	10	0.04
<i>Scomber japonicus</i>	Pacific Chub Mackerel	10			10	0.04
<i>Hyporhamphus rosae</i>	California Halfbeak		9		9	0.03
<i>Haemulon californiensis</i>	Salema			8	8	0.03
<i>Synodus lucioceph</i>	California Lizardfish	1		7	8	0.03
<i>Porichthys myriaster</i>	Specklefin Midshipman	7			7	0.03
<i>Sphyræna argentea</i>	Pacific Barracuda			6	6	0.02
<i>Ctenogobius sagittula</i>	Longtail Goby		1	3	4	0.02
<i>Embiotoca jacksoni</i>	Black Perch			4	4	0.02
<i>Heterodontus francisci</i>	Horn Shark	1		3	4	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		1	3	4	0.02
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		1	3	4	0.02
<i>Platyrrhinoidis triseriata</i>	Thornback		2	2	4	0.02
<i>Sebastes miniatus</i>	Vermilion Rockfish			4	4	0.02
<i>Quietula y-cauda</i>	Shadow Goby		3		3	0.01
<i>Roncador stearnsii</i>	Spotfin Croaker			3	3	0.01
<i>Anisotremus davidsonii</i>	Sargo			2	2	0.01
<i>Atractoscion nobilis</i>	White Seabass			2	2	0.01
<i>Dasyatis dipterura</i>	Diamond Stingray			2	2	0.01
<i>Gymnura marmorata</i>	California Butterfly Ray	2			2	0.01
<i>Sarda chiliensis</i>	Pacific Bonito			2	2	0.01
<i>Trachurus symmetricus</i>	Jack Mackerel			2	2	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	1		1	2	0.01
<i>Medialuna californiensis</i>	Halfmoon			1	1	< 0.01
<i>Mustelus californicus</i>	Gray Smoothhound			1	1	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		1		1	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	1			1	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		1		1	< 0.01
Total:		3,139	3,783	19,500	26,422	
# of Species:		24	26	47		

Table 12. Total biomass of fish species taken from San Diego Bay by depth strata, 2025.

Scientific Name	Common Name	Depth Strata			Total (g)	%
		Channel	Intertidal	Nearshore		
<i>Urobatis halleri</i>	Round Stingray	58,585	127,241	41,678	227,504	26.91
<i>Sardinops sagax</i>	Pacific Sardine	7,100		212,930	220,030	26.02
<i>Cynoscion parvipinnis</i>	Shortfin Corvina			94,977	94,977	11.23
<i>Myliobatis californica</i>	Bat Ray	1,150		74,467	75,617	8.94
<i>Atherinopsis californiensis</i>	Jacksnelt	5,206		46,860	52,066	6.16
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	4,516	402	30,863	35,781	4.23
<i>Engraulis mordax</i>	Northern Anchovy	4		30,922	30,926	3.66
<i>Atherinops affinis</i>	Topsnelt	4,076	6,041	16,856	26,973	3.19
<i>Gymnura marmorata</i>	California Butterfly Ray	14,954			14,954	1.77
<i>Cymatogaster aggregata</i>	Shiner Perch	417	1,191	7,856	9,464	1.12
<i>Anchoa delicatissima</i>	Slough Anchovy	1,863	71	6,497	8,431	1.00
<i>Platyrrhinoidis triseriata</i>	Thornback		2,250	3,050	5,300	0.63
<i>Paralichthys californicus</i>	California Halibut	2,601	176	2,511	5,288	0.63
<i>Albula gilberti</i>	Cortez Bonefish			3,517	3,517	0.42
<i>Sphyrna argentea</i>	Pacific Barracuda			3,214	3,214	0.38
<i>Heterostichus rostratus</i>	Giant Kelpfish		805	2,240	3,045	0.36
<i>Dasyatis diptera</i>	Diamond Stingray			2,950	2,950	0.35
<i>Leuresthes tenuis</i>	California Grunion		64	2,600	2,664	0.32
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	1,711	55	850	2,616	0.31
<i>Roncador stearnsii</i>	Spotfin Croaker			2,600	2,600	0.31
<i>Paralabrax nebulifer</i>	Barred Sand Bass	119	82	1,766	1,967	0.23
<i>Scomber japonicus</i>	Pacific Chub Mackerel	1,750			1,750	0.21
<i>Micrometrus minimus</i>	Dwarf Perch		628	1,115	1,743	0.21
<i>Sarda chiliensis</i>	Pacific Bonito			1,400	1,400	0.17
<i>Pleuronichthys ritteri</i>	Spotted Turbot	989		200	1,189	0.14
<i>Cheilotrema saturnum</i>	Black Croaker	860		84	944	0.11
<i>Heterodontus francisci</i>	Horn Shark	46		865	911	0.11
<i>Fundulus parvipinnis</i>	California Killifish		863		863	0.10
<i>Haemulon californiensis</i>	Salema			861	861	0.10
<i>Syngnathus californiensis</i>	Kelp Pipefish	34	190	605	829	0.10
<i>Paralabrax clathratus</i>	Kelp Bass			760	760	0.09
<i>Porichthys myriaster</i>	Specklefin Midshipman	668			668	0.08
<i>Medialuna californiensis</i>	Halfmoon			600	600	0.07
<i>Atractoscion nobilis</i>	White Seabass			550	550	0.07
<i>Mustelus californicus</i>	Gray Smoothhound			550	550	0.07
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	188	28	27	243	0.03
<i>Embiotoca jacksoni</i>	Black Perch			238	238	0.03
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		224	2	226	0.03
<i>Synodus lucioceps</i>	California Lizardfish	73		145	218	0.03
<i>Serphus politus</i>	Queenfish			205	205	0.02
<i>Trachurus symmetricus</i>	Jack Mackerel			200	200	0.02
<i>Hypsoblennius gentilis</i>	Bay Blenny		78	60	138	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		40	81	121	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	85		36	121	0.01
<i>Clevelandia ios</i>	Arrow Goby		64	19	83	0.01
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		5	40	45	0.01
<i>Ilypnus gilberti</i>	Cheekspot Goby	24	18	3	45	0.01
<i>Hyporhamphus rosae</i>	California Halfbeak		39		39	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		28		28	< 0.01
<i>Sebastes miniatus</i>	Vermilion Rockfish			19	19	< 0.01
<i>Gibbonsia elegans</i>	Spotted Kelpfish			10	10	< 0.01
<i>Anisotremus davidsonii</i>	Sargo			8	8	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		4		4	< 0.01
<i>Quiatula y-cauda</i>	Shadow Goby		3		3	< 0.01
<i>Ctenogobius sagittula</i>	Longtail Goby		1	1	2	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	2			2	< 0.01
Total:		107,021	140,591	597,888	845,500	
# of Species:		24	26	47		

Table 13. Total abundance of fish species taken from San Diego Bay by subhabitat, 2025.

Scientific Name	Common Name	Subhabitat			Total	%
		Channel	Non-Vegetated	Vegetated		
<i>Engraulis mordax</i>	Northern Anchovy	4	6,186	1	6,191	23.43
<i>Anchoa delicatissima</i>	Slough Anchovy	1,495	1,687	1,221	4,403	16.66
<i>Sardinops sagax</i>	Pacific Sardine	121	3	3,323	3,447	13.05
<i>Atherinops affinis</i>	Topsmelt	354	738	1,869	2,961	11.21
<i>Cymatogaster aggregata</i>	Shiner Perch	266	1,287	984	2,537	9.60
<i>Syngnathus californiensis</i>	Kelp Pipefish	27	804	597	1,428	5.40
<i>Heterostichus rostratus</i>	Giant Kelpfish		456	690	1,146	4.34
<i>Atherinopsis californiensis</i>	Jacksmelt	290	477	362	1,129	4.27
<i>Urobatis halleri</i>	Round Stingray	378	155	385	918	3.47
<i>Clevelandia ios</i>	Arrow Goby		8	525	533	2.02
<i>Leuresthes tenuis</i>	California Grunion		427	1	428	1.62
<i>Micrometrus minimus</i>	Dwarf Perch		38	181	219	0.83
<i>Ilypnus gilberti</i>	Cheekspot Goby	25	9	114	148	0.56
<i>Fundulus parvipinnis</i>	California Killifish		8	137	145	0.55
<i>Cynoscion parvipinnis</i>	Shortfin Corvina		118	10	128	0.48
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	17	42	45	104	0.39
<i>Paralabrax clathratus</i>	Kelp Bass		44	47	91	0.34
<i>Paralichthys californicus</i>	California Halibut	63	14	8	85	0.32
<i>Seriphus politus</i>	Queenfish		43		43	0.16
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		8	32	40	0.15
<i>Paralabrax nebulifer</i>	Barred Sand Bass	6	9	20	35	0.13
<i>Hypsoblennius gentilis</i>	Bay Blenny		14	15	29	0.11
<i>Pleuronichthys ritteri</i>	Spotted Turbot	28	1		29	0.11
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	19	6		25	0.09
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	13	4	7	24	0.09
<i>Albula gilberti</i>	Cortez Bonefish		5	16	21	0.08
<i>Cheilotrema saturnum</i>	Black Croaker	8	2	2	12	0.05
<i>Myliobatis californica</i>	Bat Ray	2	1	9	12	0.05
<i>Gibbonsia elegans</i>	Spotted Kelpfish		6	4	10	0.04
<i>Scomber japonicus</i>	Pacific Chub Mackerel	10			10	0.04
<i>Hyporhamphus rosae</i>	California Halfbeak		3	6	9	0.03
<i>Haemulon californiensis</i>	Salema		1	7	8	0.03
<i>Synodus lucioceps</i>	California Lizardfish	1	7		8	0.03
<i>Porichthys myriaster</i>	Specklefin Midshipman	7			7	0.03
<i>Sphyrnaea argentea</i>	Pacific Barracuda		5	1	6	0.02
<i>Ctenogobius sagittula</i>	Longtail Goby			4	4	0.02
<i>Embiotoca jacksoni</i>	Black Perch		1	3	4	0.02
<i>Heterodontus francisci</i>	Horn Shark	1	2	1	4	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		2	2	4	0.02
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		2	2	4	0.02
<i>Platyrrhinoidis triseriata</i>	Thornback		2	2	4	0.02
<i>Sebastes miniatus</i>	Vermilion Rockfish		4		4	0.02
<i>Quietula y-cauda</i>	Shadow Goby			3	3	0.01
<i>Roncador stearnsii</i>	Spotfin Croaker		3		3	0.01
<i>Anisotremus davidsonii</i>	Sargo			2	2	0.01
<i>Atractoscion nobilis</i>	White Seabass		2		2	0.01
<i>Dasyatis dipterura</i>	Diamond Stingray		2		2	0.01
<i>Gymnura marmorata</i>	California Butterfly Ray	2			2	0.01
<i>Sarda chiliensis</i>	Pacific Bonito			2	2	0.01
<i>Trachurus symmetricus</i>	Jack Mackerel		2		2	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	1	1		2	0.01
<i>Medialuna californiensis</i>	Halfmoon		1		1	< 0.01
<i>Mustelus californicus</i>	Gray Smoothhound			1	1	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		1		1	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	1			1	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		1		1	< 0.01
Total:		3,139	12,642	10,641	26,422	
# of Species:		24	47	39		

Table 14. Total biomass of fish species taken from San Diego Bay by subhabitat, 2025.

Scientific Name	Common Name	Subhabitat			Total (g)	%
		Channel	Non-Vegetated	Vegetated		
<i>Urobatis halleri</i>	Round Stingray	58,585	48,230	120,689	227,504	26.91
<i>Sardinops sagax</i>	Pacific Sardine	7,100	190	212,740	220,030	26.02
<i>Cynoscion parvipinnis</i>	Shortfin Corvina		90,890	4,087	94,977	11.23
<i>Myliobatis californica</i>	Bat Ray	1,150	14,015	60,452	75,617	8.94
<i>Atherinopsis californiensis</i>	Jacksmelt	5,206	8,410	38,450	52,066	6.16
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	4,516	15,120	16,145	35,781	4.23
<i>Engraulis mordax</i>	Northern Anchovy	4	30,921	1	30,926	3.66
<i>Atherinops affinis</i>	Topsmelt	4,076	5,990	16,907	26,973	3.19
<i>Gymnura marmorata</i>	California Butterfly Ray	14,954			14,954	1.77
<i>Cymatogaster aggregata</i>	Shiner Perch	417	4,765	4,282	9,464	1.12
<i>Anchoa delicatissima</i>	Slough Anchovy	1,863	3,561	3,007	8,431	1.00
<i>Platyrrhinoidis triseriata</i>	Thornback		3,050	2,250	5,300	0.63
<i>Paralichthys californicus</i>	California Halibut	2,601	2,535	152	5,288	0.63
<i>Albula gilberti</i>	Cortez Bonefish		925	2,592	3,517	0.42
<i>Sphyræna argentea</i>	Pacific Barracuda		2,864	350	3,214	0.38
<i>Heterostichus rostratus</i>	Giant Kelpfish		1,018	2,027	3,045	0.36
<i>Dasyatis dipterura</i>	Diamond Stingray		2,950		2,950	0.35
<i>Leuresthes tenuis</i>	California Grunion		2,663	1	2,664	0.32
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	1,711	76	829	2,616	0.31
<i>Roncador stearnsii</i>	Spotfin Croaker		2,600		2,600	0.31
<i>Paralabrax nebulifer</i>	Barred Sand Bass	119	1,341	507	1,967	0.23
<i>Scomber japonicus</i>	Pacific Chub Mackerel	1,750			1,750	0.21
<i>Micrometrus minimus</i>	Dwarf Perch		185	1,558	1,743	0.21
<i>Sarda chiliensis</i>	Pacific Bonito			1,400	1,400	0.17
<i>Pleuronichthys ritteri</i>	Spotted Turbot	989	200		1,189	0.14
<i>Cheilotrema saturnum</i>	Black Croaker	860	11	73	944	0.11
<i>Heterodontus francisci</i>	Horn Shark	46	345	520	911	0.11
<i>Fundulus parvipinnis</i>	California Killifish		41	822	863	0.10
<i>Haemulon californiensis</i>	Salema		300	561	861	0.10
<i>Syngnathus californiensis</i>	Kelp Pipefish	34	370	425	829	0.10
<i>Paralabrax clathratus</i>	Kelp Bass		319	441	760	0.09
<i>Porichthys myriaster</i>	Specklefin Midshipman	668			668	0.08
<i>Medialuna californiensis</i>	Halfmoon		600		600	0.07
<i>Atractoscion nobilis</i>	White Seabass		550		550	0.07
<i>Mustelus californicus</i>	Gray Smoothhound			550	550	0.07
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	188	55		243	0.03
<i>Embiotoca jacksoni</i>	Black Perch		45	193	238	0.03
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		64	162	226	0.03
<i>Synodus lucioceps</i>	California Lizardfish	73	145		218	0.03
<i>Serphus politus</i>	Queenfish		205		205	0.02
<i>Trachurus symmetricus</i>	Jack Mackerel		200		200	0.02
<i>Hypsoblennius gentilis</i>	Bay Blenny		67	71	138	0.02
<i>Hippocampus ingens</i>	Pacific Seahorse		70	51	121	0.01
<i>Zapteryx exasperata</i>	Banded Guitarfish	85	36		121	0.01
<i>Clevelandia ios</i>	Arrow Goby		7	76	83	0.01
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		6	39	45	0.01
<i>Ilypnus gilberti</i>	Cheekspot Goby	24	4	17	45	0.01
<i>Hyporhamphus rosae</i>	California Halfbeak		6	33	39	< 0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		28		28	< 0.01
<i>Sebastes miniatus</i>	Vermilion Rockfish		19		19	< 0.01
<i>Gibbonsia elegans</i>	Spotted Kelpfish		5	5	10	< 0.01
<i>Anisotremus davidsonii</i>	Sargo			8	8	< 0.01
<i>Paraclinus integripinnis</i>	Reef Finspot		4		4	< 0.01
<i>Quietula y-cauda</i>	Shadow Goby			3	3	< 0.01
<i>Ctenogobius sagittula</i>	Longtail Goby			2	2	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	2			2	< 0.01
Total:		107,021	246,001	492,478	845,500	
# of Species:		24	47	39		

4.2.4 Abundance and Biomass by Sampling Method

The greatest number of species were collected in the purse seines (37 species), followed by beam trawl (27), large seine (24), otter trawl (18), small seine (12), and square enclosure (3; **Tables 15** and **16**). The purse seine captured the greatest number of fish, catching a total of 10,103, a number greatly influenced by large schools of Slough Anchovies and Topsmelt. There was an unusually large catch in the purse seine (18,647), most of which were adult forage fish. There were moderate catches in the beam trawl (3,145) and large seine (2,695), and relatively low catches in the small seine (1,077) and in the otter trawl (847), and only 11 fish in the square enclosure (**Table 15**). The greatest amount of biomass was also captured in the purse seine (606.5 kg), with high biomass also captured in the large seine (139.9 kg), otter trawl (68.8 kg), and beam trawl (29.7 kg). The small seine (696 g) captured a low amount of biomass and the square enclosure captured only 10 g of fishes (**Table 16**).

The highest density of fishes was captured in the purse seine (87.5 individuals/100m²; **Table 17**) which was most effective at sampling the schooling fishes (Pacific Sardine, Northern Anchovy, Slough Anchovy, Topsmelt, Jacksmelt, Shiner Perch). The small seine (36.2 ind./100m²) and large seine (25.5 ind./100m²) were most effective at catching juvenile schooling fishes and Arrow Gobies, but the large seine also captured a large number of Round Stingrays. The square enclosure (22.9 ind./100m²) was not effective for catching any particular species, including the burrowing gobies it is designed to capture. The beam trawl (22.6 ind./100m²) was most effective for catching benthic nearshore and eelgrass fishes (Kelp Pipefish, Giant Kelpfish, Shiner Perch, Dwarf Perch). The otter trawl was the least efficient gear (1.46 ind./100m²), but effective at catching Round Stingrays and Shiner Perch. The purse seine and large seine produced, by far, the highest biomass density values (2,845 g/100 m² and 1,324 g/m², respectively). The beam trawl and otter trawl produced a lesser, but typical, amount (213.0 g/100 m² and 118.6 g/m², respectively), and the small seine and square enclosures captured the smallest amount of biomass (23.4 g/100 m² and 20.8 g/m², respectively).



Young-of-the-year Salema (*Haemulon californiensis*) caught by purse seine in the North-Central Ecoregion, April 2025

Table 15. Total catch (number of individuals) of fish species taken in San Diego Bay in 2025 by sampling method.

PURSE SEINE				BEAM TRAWL			
Scientific Name	Common Name	Abundance	%	Scientific Name	Common Name	Abundance	%
<i>Engraulis mordax</i>	Northern Anchovy	6,186	33.2	<i>Syngnathus californiensis</i>	Kelp Pipefish	1,072	34.1
<i>Anchoa delicatissima</i>	Slough Anchovy	4,358	23.4	<i>Heterostichus rostratus</i>	Giant Kelpfish	1,015	32.3
<i>Sardinops sagax</i>	Pacific Sardine	3,447	18.5	<i>Cymatogaster aggregata</i>	Shiner Perch	647	20.6
<i>Cymatogaster aggregata</i>	Shiner Perch	1,509	8.09	<i>Micrometrus minimus</i>	Dwarf Perch	117	3.72
<i>Atherinops affinis</i>	Topsmelt	1,240	6.65	<i>Clevelandia ios</i>	Arrow Goby	55	1.75
<i>Atherinopsis californiensis</i>	Jacksmelt	1,129	6.05	<i>Urobatis halleri</i>	Round Stingray	55	1.75
<i>Leuresthes tenuis</i>	California Grunion	266	1.43	<i>Paralabrax clathratus</i>	Kelp Bass	52	1.65
<i>Urobatis halleri</i>	Round Stingray	146	0.78	<i>Seriphus politus</i>	Queenfish	41	1.30
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	128	0.69	<i>Hypsoblennius gentilis</i>	Bay Blenny	13	0.41
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	72	0.39	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	11	0.35
<i>Paralabrax clathratus</i>	Kelp Bass	39	0.21	<i>Gibbonsia elegans</i>	Spotted Kelpfish	10	0.32
<i>Albula gilberti</i>	Cortez Bonefish	21	0.11	<i>Paralabrax nebulifer</i>	Barred Sand Bass	9	0.29
<i>Paralabrax nebulifer</i>	Barred Sand Bass	17	0.09	<i>Ilypnus gilberti</i>	Cheekspot Goby	8	0.25
<i>Myliobatis californica</i>	Bat Ray	12	0.06	<i>Paralichthys californicus</i>	California Halibut	7	0.22
<i>Scomber japonicus</i>	Pacific Chub Mackerel	10	0.05	<i>Synodus lucioceps</i>	California Lizardfish	7	0.22
<i>Syngnathus californiensis</i>	Kelp Pipefish	9	0.05	<i>Embiotoca jacksoni</i>	Black Perch	4	0.13
<i>Haemulon californiensis</i>	Salema	8	0.04	<i>Cheilotrema satunum</i>	Black Croaker	3	0.10
<i>Paralichthys californicus</i>	California Halibut	7	0.04	<i>Citharichthys stigmatæus</i>	Speckled Sanddab	3	0.10
<i>Sphyræna argentea</i>	Pacific Barracuda	6	0.03	<i>Ctenogobius sagittula</i>	Longtail Goby	3	0.10
<i>Heterostichus rostratus</i>	Giant Kelpfish	4	0.02	<i>Heterodontus francisci</i>	Horn Shark	3	0.10
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	4	0.02	<i>Hippocampus ingens</i>	Pacific Seahorse	3	0.10
<i>Sebastes miniatus</i>	Vermilion Rockfish	4	0.02	<i>Platyrrhinoidis triseriata</i>	Thornback	2	0.06
<i>Roncador stearnsii</i>	Spotfin Croaker	3	0.02	<i>Dasyatis dipterura</i>	Diamond Stingray	1	0.03
<i>Anisotremus davidsonii</i>	Sargo	2	0.01	<i>Engraulis mordax</i>	Northern Anchovy	1	0.03
<i>Atractoscion nobilis</i>	White Seabass	2	0.01	<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	0.03
<i>Citharichthys stigmatæus</i>	Speckled Sanddab	2	0.01	<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	1	0.03
<i>Hypsoblennius gentilis</i>	Bay Blenny	2	0.01	<i>Zapteryx exasperata</i>	Banded Guitarfish	1	0.03
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	2	0.01				
<i>Sarda chiliensis</i>	Pacific Bonito	2	0.01				
<i>Seriphus politus</i>	Queenfish	2	0.01				
<i>Trachurus symmetricus</i>	Jack Mackerel	2	0.01				
<i>Cheilotrema satunum</i>	Black Croaker	1	0.01				
<i>Dasyatis dipterura</i>	Diamond Stingray	1	0.01				
<i>Gymnura marmorata</i>	California Butterfly Ray	1	0.01				
<i>Medialuna californiensis</i>	Halfmoon	1	0.01				
<i>Mustelus californicus</i>	Gray Smoothhound	1	0.01				
<i>Pleuronichthys ritteri</i>	Spotted Turbot	1	0.01				
# of Species: 37		18,647		# of Species: 27		3,145	

Table 15 (continued).

Scientific Name	LARGE SEINE Common Name	Abundance	%
<i>Atherinops affinis</i>	Topsmelt	1,498	55.6
<i>Urobatis halleri</i>	Round Stingray	352	13.1
<i>Fundulus parvipinnis</i>	California Killifish	145	5.38
<i>Leuresthes tenuis</i>	California Grunion	120	4.45
<i>Heterostichus rostratus</i>	Giant Kelpfish	97	3.60
<i>Micrometrus minimus</i>	Dwarf Perch	97	3.60
<i>Cymatogaster aggregata</i>	Shiner Perch	95	3.53
<i>Syngnathus californiensis</i>	Kelp Pipefish	74	2.75
<i>Clevelandia ios</i>	Arrow Goby	61	2.26
<i>Anchoa delicatissima</i>	Slough Anchovy	45	1.67
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	39	1.45
<i>Ilypnus gilberti</i>	Cheekspot Goby	19	0.71
<i>Hypsoblennius gentilis</i>	Bay Blenny	14	0.52
<i>Hyporhamphus rosae</i>	California Halfbeak	8	0.30
<i>Paralichthys californicus</i>	California Halibut	8	0.30
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	7	0.26
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	5	0.19
<i>Paralabrax nebulifer</i>	Barred Sand Bass	4	0.15
<i>Platyrrhinoidis triseriata</i>	Thornback	2	0.07
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	1	0.04
<i>Hippocampus ingens</i>	Pacific Seahorse	1	0.04
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1	0.04
<i>Quietula y-cauda</i>	Shadow Goby	1	0.04
<i>Umbrina roncadore</i>	Yellowfin Croaker	1	0.04
# of Species: 24		2,695	

Scientific Name	SMALL SEINE Common Name	Abundance	%
<i>Clevelandia ios</i>	Arrow Goby	412	38.3
<i>Syngnathus californiensis</i>	Kelp Pipefish	246	22.8
<i>Atherinops affinis</i>	Topsmelt	223	20.7
<i>Ilypnus gilberti</i>	Cheekspot Goby	92	8.54
<i>Leuresthes tenuis</i>	California Grunion	42	3.90
<i>Heterostichus rostratus</i>	Giant Kelpfish	30	2.79
<i>Cymatogaster aggregata</i>	Shiner Perch	23	2.14
<i>Micrometrus minimus</i>	Dwarf Perch	5	0.46
<i>Ctenogobius sagittula</i>	Longtail Goby	1	0.09
<i>Hyporhamphus rosae</i>	California Halfbeak	1	0.09
<i>Quietula y-cauda</i>	Shadow Goby	1	0.09
<i>Urobatis halleri</i>	Round Stingray	1	0.09
# of Species: 12		1,077	

Table 15 (continued).

OTTER TRAWL			
Scientific Name	Common Name	Abundance	%
<i>Urobatis halleri</i>	Round Stingray	364	43.0
<i>Cymatogaster aggregata</i>	Shiner Perch	263	31.1
<i>Paralichthys californicus</i>	California Halibut	63	7.44
<i>Pleuronichthys ritteri</i>	Spotted Turbot	28	3.31
<i>Syngnathus californiensis</i>	Kelp Pipefish	27	3.19
<i>Ilypnus gilberti</i>	Cheekspot Goby	25	2.95
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	19	2.24
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	16	1.89
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	13	1.53
<i>Cheilotrema saturnum</i>	Black Croaker	8	0.94
<i>Porichthys myriaster</i>	Specklefin Midshipman	7	0.83
<i>Paralabrax nebulifer</i>	Barred Sand Bass	5	0.59
<i>Engraulis mordax</i>	Northern Anchovy	4	0.47
<i>Gymnura marmorata</i>	California Butterfly Ray	1	0.12
<i>Heterodontus francisci</i>	Horn Shark	1	0.12
<i>Symphurus atricaudus</i>	California Tonguefish	1	0.12
<i>Synodus luciocephalus</i>	California Lizardfish	1	0.12
<i>Zaptryx exasperata</i>	Banded Guitarfish	1	0.12
# of Species: 18		847	

SQUARE ENCLOSURE			
Scientific Name	Common Name	Abundance	%
<i>Clevelandia ios</i>	Arrow Goby	5	45.5
<i>Ilypnus gilberti</i>	Cheekspot Goby	4	36.4
<i>Paraclinus integripinnis</i>	Reef Finspot	1	9.1
<i>Quietula y-cauda</i>	Shadow Goby	1	9.1
# of Species: 4		11	

Table 16. Total biomass (g) of fish species taken from San Diego Bay in 2025 by sampling method.

PURSE SEINE				BEAM TRAWL			
Scientific Name	Common Name	Biomass (g)	%	Scientific Name	Common Name	Biomass (g)	%
<i>Sardinops sagax</i>	Pacific Sardine	220,030	36.3	<i>Urobatis halleri</i>	Round Stingray	12,438	41.9
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	94,977	15.7	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	4,242	14.3
<i>Myliobatis californica</i>	Bat Ray	75,617	12.5	<i>Platyrrhinoidis triseriata</i>	Thornback	3,050	10.3
<i>Atherinopsis californiensis</i>	Jacksmelt	52,066	8.59	<i>Heterostichus rostratus</i>	Giant Kelpfish	2,232	7.53
<i>Urobatis halleri</i>	Round Stingray	32,050	5.28	<i>Cymatogaster aggregata</i>	Shiner Perch	1,877	6.33
<i>Engraulis mordax</i>	Northern Anchovy	30,920	5.10	<i>Dasyatis dipterura</i>	Diamond Stingray	1,750	5.90
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	26,911	4.44	<i>Micrometrus minimus</i>	Dwarf Perch	1,115	3.76
<i>Atherinops affinis</i>	Topsmelt	20,932	3.45	<i>Heterodontus francisci</i>	Horn Shark	865	2.92
<i>Gymnura marmorata</i>	California Butterfly Ray	13,954	2.30	<i>Syngnathus californiensis</i>	Kelp Pipefish	598	2.02
<i>Anchoa delicatissima</i>	Slough Anchovy	8,360	1.38	<i>Paralichthys californicus</i>	California Halibut	442	1.49
<i>Cymatogaster aggregata</i>	Shiner Perch	5,985	0.99	<i>Paralabrax clathratus</i>	Kelp Bass	339	1.14
<i>Albula gilberti</i>	Cortez Bonefish	3,517	0.58	<i>Embiotoca jacksoni</i>	Black Perch	238	0.80
<i>Sphyrna argentea</i>	Pacific Barracuda	3,214	0.53	<i>Synodus lucioceps</i>	California Lizardfish	145	0.49
<i>Leuresthes tenuis</i>	California Grunion	2,600	0.43	<i>Paralabrax nebulifer</i>	Barred Sand Bass	94	0.32
<i>Roncador stearnsii</i>	Spotfin Croaker	2,600	0.43	<i>Hippocampus ingens</i>	Pacific Seahorse	81	0.27
<i>Paralichthys californicus</i>	California Halibut	2,069	0.34	<i>Hypsoblennius gentilis</i>	Bay Blenny	55	0.19
<i>Scomber japonicus</i>	Pacific Chub Mackerel	1,750	0.29	<i>Zapteryx exasperata</i>	Banded Guitartfish	36	0.12
<i>Paralabrax nebulifer</i>	Barred Sand Bass	1,696	0.28	<i>Clevelandia ios</i>	Arrow Goby	19	0.06
<i>Sarda chiliensis</i>	Pacific Bonito	1,400	0.23	<i>Cheilotrema saturnum</i>	Black Croaker	12	0.04
<i>Dasyatis dipterura</i>	Diamond Stingray	1,200	0.20	<i>Gibbonsia elegans</i>	Spotted Kelpfish	10	0.03
<i>Haemulon californiensis</i>	Salema	861	0.14	<i>Seriphus politus</i>	Queenfish	5	0.02
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	850	0.14	<i>Ilypnus gilberti</i>	Cheekspot Goby	3	0.01
<i>Medialuna californiensis</i>	Halfmoon	600	0.10	<i>Citharichthys stigmatæus</i>	Speckled Sanddab	2	0.01
<i>Atractoscion nobilis</i>	White Seabass	550	0.09	<i>Engraulis mordax</i>	Northern Anchovy	2.0	0.01
<i>Mustelus californicus</i>	Gray Smoothhound	550	0.09	<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	2.0	0.01
<i>Paralabrax clathratus</i>	Kelp Bass	421	0.07	<i>Ctenogobius sagittula</i>	Longtail Goby	1.0	< 0.01
<i>Pleuronichthys ritleri</i>	Spotted Turbot	200	0.03	<i>Hypsoblennius gilberti</i>	Rockpool Blenny	1.0	< 0.01
<i>Seriphus politus</i>	Queenfish	200	0.03				
<i>Trachurus symmetricus</i>	Jack Mackerel	200	0.03				
<i>Cheilotrema saturnum</i>	Black Croaker	72	0.01				
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	39	0.01				
<i>Citharichthys stigmatæus</i>	Speckled Sanddab	25	< 0.01				
<i>Sebastes miniatus</i>	Vermilion Rockfish	19	< 0.01				
<i>Anisotremus davidsonii</i>	Sargo	8	< 0.01				
<i>Heterostichus rostratus</i>	Giant Kelpfish	8	< 0.01				
<i>Syngnathus californiensis</i>	Kelp Pipefish	7	< 0.01				
<i>Hypsoblennius gentilis</i>	Bay Blenny	5	< 0.01				
# of Species:	37	606,463		# of Species:	27	29,654	

Table 16 (continued).

LARGE SEINE		Biomass	
Scientific Name	Common Name	(g)	%
<i>Urobatis halleri</i>	Round Stingray	126,941	90.7
<i>Atherinops affinis</i>	Topsmelt	6,018	4.30
<i>Platyrrhinoidis triseriata</i>	Thornback	2,250	1.61
<i>Cymatogaster aggregata</i>	Shiner Perch	1,120	0.80
<i>Fundulus parvipinnis</i>	California Killifish	863	0.62
<i>Heterostichus rostratus</i>	Giant Kelpfish	729	0.52
<i>Micrometrus minimus</i>	Dwarf Perch	569	0.41
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	402	0.29
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	224	0.16
<i>Paralichthys californicus</i>	California Halibut	176	0.13
<i>Syngnathus californiensis</i>	Kelp Pipefish	88	0.06
<i>Paralabrax nebulifer</i>	Barred Sand Bass	82	0.06
<i>Hypsoblennius gentilis</i>	Bay Blenny	78	0.06
<i>Anchoa delicatissima</i>	Slough Anchovy	71	0.05
<i>Leuresthes tenuis</i>	California Grunion	59	0.04
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	55	0.04
<i>Hippocampus ingens</i>	Pacific Seahorse	40	0.03
<i>Hyporhamphus rosae</i>	California Halfbeak	38	0.03
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	28	0.02
<i>Umbrina roncadore</i>	Yellowfin Croaker	28	0.02
<i>Clevelandia ios</i>	Arrow Goby	15	0.01
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	5	< 0.01
<i>Ilypnus gilberti</i>	Cheekspot Goby	5	< 0.01
<i>Quietula y-cauda</i>	Shadow Goby	1	< 0.01
# of Species: 24		139,885	

SMALL SEINE			
Scientific Name	Common Name	Biomass (g)	%
<i>Urobatis halleri</i>	Round Stingray	300	43.1
<i>Syngnathus californiensis</i>	Kelp Pipefish	102	14.7
<i>Heterostichus rostratus</i>	Giant Kelpfish	76	10.9
<i>Cymatogaster aggregata</i>	Shiner Perch	71	10.2
<i>Micrometrus minimus</i>	Dwarf Perch	59	8.48
<i>Clevelandia ios</i>	Arrow Goby	45	6.47
<i>Atherinops affinis</i>	Topsmelt	23	3.30
<i>Ilypnus gilberti</i>	Cheekspot Goby	12	1.72
<i>Leuresthes tenuis</i>	California Grunion	5	0.72
<i>Ctenogobius sagittula</i>	Longtail Goby	1	0.14
<i>Hyporhamphus rosae</i>	California Halfbeak	1	0.14
<i>Quietula y-cauda</i>	Shadow Goby	1	0.14
# of Species: 12		696	

Table 16 (continued).

OTTER TRAWL			
Scientific Name	Common Name	Biomass (g)	%
<i>Urobatis halleri</i>	Round Stingray	55,775	81.1
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	4,226	6.14
<i>Paralichthys californicus</i>	California Halibut	2,601	3.78
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	1,711	2.49
<i>Gymnura marmorata</i>	California Butterfly Ray	1,000	1.45
<i>Pleuronichthys ritteri</i>	Spotted Turbot	989	1.44
<i>Cheilotrema saturnum</i>	Black Croaker	860	1.25
<i>Porichthys myriaster</i>	Specklefin Midshipman	668	0.97
<i>Cymatogaster aggregata</i>	Shiner Perch	411	0.60
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	188	0.27
<i>Paralabrax nebulifer</i>	Barred Sand Bass	95	0.14
<i>Zapteryx exasperata</i>	Banded Guitarfish	85	0.12
<i>Synodus lucioceps</i>	California Lizardfish	73	0.11
<i>Heterodontus francisci</i>	Horn Shark	46	0.07
<i>Syngnathus californiensis</i>	Kelp Pipefish	34	0.05
<i>Ilypnus gilberti</i>	Cheekspot Goby	24	0.03
<i>Engraulis mordax</i>	Northern Anchovy	4	0.01
<i>Symphurus atricaudus</i>	California Tonguefish	2	< 0.01
# of Species: 18		68,792	

SQUARE ENCLOSURE			
Scientific Name	Common Name	Biomass (g)	%
<i>Clevelandia ios</i>	Arrow Goby	4	40.0
<i>Paraclinus integripinnis</i>	Reef Finspot	4	40.0
<i>Ilypnus gilberti</i>	Cheekspot Goby	1.0	10.0
<i>Quietula y-cauda</i>	Shadow Goby	1.0	10.0
# of Species: 4		10.0	

Table 17. Comparison of mean densities and biomass densities by gear type and sampling year for San Diego Bay. Values were calculated for years that were sampled in April and July and only includes data from those sampling months.

	Year	Beam Trawl	Otter Trawl	Purse Seine	Large Seine	Small Seine	Square Enclosure		Year	Beam Trawl	Otter Trawl	Purse Seine	Large Seine	Small Seine	Square Enclosure
Density (#/100m²)	1995	18.8	2.13	393.7	58.9	403.7	364.6	Biomass Density (g/100m²)	1995	324.3	222.9	1044	81.6	52.7	168.1
	1996	17.0	0.91	820.5	65.8	869.9	639.6		1996	243.3	124.0	1692	88.7	117.2	43.3
	1997	10.6	1.30	84.4	53.2	236.9	420.8		1997	117.0	184.4	619.5	150.4	30.0	40.9
	1998	3.7	0.28	199.5	42.7	40.3	400.0		1998	161.0	59.1	708.3	101.3	5.9	60.4
	2005	14.5	3.17	59.3	67.6	43.9	70.8		2005	513.7	142.6	549.0	168.4	21.7	19.6
	2008	22.3	0.62	39.0	17.1	70.2	54.2		2008	357.2	62.4	391.0	131.4	25.6	1232
	2012	38.6	0.79	12.2	36.6	165.9	70.8		2012	719.9	102.6	794.9	150.2	104.4	206.5
	2015	18.4	2.84	70.5	21.9	86.9	14.6		2015	257.8	158.3	1101	136.7	46.2	1.0
	2016	18.9	0.86	49.5	17.7	187.3	14.6		2016	218.8	128.8	635.6	76.4	39.0	1.9
	2019	10.7	0.44	28.0	15.2	157.8	20.8		2019	212.6	62.8	915.1	86.6	43.6	42.7
	2022	25.1	0.99	47.4	27.7	84.2	77.1		2022	287.6	115.4	1142	198.0	59.5	43.8
	2025	22.6	1.46	87.5	25.5	36.2	22.9		2025	213.0	118.6	2846	1325	23.4	20.8

4.3 Best Estimates of Density and Standing Stock

The best estimate for the total stock size was greater than 44.0 million (M) fishes (**Table 18**). With an estimated surface area of 4,858 ha (**Table 2**) this gives an overall fish density 90.7 ind./100 m² (**Table 18**). The highest estimates were of Northern Anchovy (12.1 M), Slough Anchovy (9.58 M), and Pacific Sardine (6.81 M), followed by Shiner Perch (3.04 M), Topsmelt (2.95 M), Jacksmelt (2.41 M), Kelp Pipefish (2.30 M), and Giant Kelpfish (2.04 M). As is typical, schooling and forage fishes dominated the stock estimate for the bay.

The total best estimate of biomass standing stock was about 1,267 metric tons (MT) (**Table 19**). This gives an overall estimate of 2.61 kg/100 m², about 130% higher than the 2022 estimate, which is the highest value for all historical surveys (Williams et al. 2022). The highest biomass estimates were of Pacific Sardine (433.9 MT), followed by Shortfin Corvina (185.1 MT), Bat Ray (148.2 MT), Jacksmelt (105.2 MT), Round Stingray (98.6 MT), Northern Anchovy (60.3 MT), Spotted Sand Bass (98.6 MT), and Topsmelt (98.6 MT). Round Stingray, Spotted Sand Bass and Topsmelt are typically in the top five biomass estimates in past surveys, but Pacific Sardine and Shortfin Corvina are historically atypical top biomass species. Both species were caught in large numbers in single purse seine replicates and likely represent spawning aggregations. Caution should be taken when considering the stock estimates of either species and all species combined, as they account for nearly 50% of the total standing stock estimate.

Table 18. Best estimate of densities (#/m²) and stock estimates, April and July 2025.

		Best Estimate of Density (#/m ²)				
		Depth Strata				
Scientific Name	Common Name	Channel	Intertidal	Nearshore	Weighted Mean	Stock Estimate (#)
<i>Engraulis mordax</i>	Northern Anchovy	0.00007		0.43539	0.24820	12,057,476
<i>Anchoa delicatissima</i>	Slough Anchovy	0.21044	0.00426	0.20151	0.19710	9,575,238
<i>Sardinops sagax</i>	Pacific Sardine	0.01703		0.23409	0.14008	6,804,893
<i>Cymatogaster aggregata</i>	Shiner Perch	0.00453	0.00900	0.10600	0.06255	3,038,491
<i>Atherinops affinis</i>	Topsmelt	0.04983	0.14186	0.06236	0.06065	2,946,529
<i>Atherinopsis californiensis</i>	Jacksnelt	0.04082		0.05905	0.04958	2,408,587
<i>Syngnathus californiensis</i>	Kelp Pipefish	0.00047	0.08266	0.07701	0.04738	2,301,940
<i>Heterostichus rostratus</i>	Giant Kelpfish		0.01008	0.07292	0.04197	2,038,695
<i>Leuresthes tenuis</i>	California Grunion		0.01411	0.01872	0.01124	545,843
<i>Urobatis halleri</i>	Round Stingray	0.00627	0.03333	0.00929	0.00908	440,921
<i>Clevelandia ios</i>	Arrow Goby		0.13844	0.00395	0.00779	378,428
<i>Micrometrus minimus</i>	Dwarf Perch		0.00919	0.00841	0.00516	250,594
<i>Cynoscion parvipinnis</i>	Shortfin Corvina			0.00901	0.00514	249,465
<i>Ilypnus gilberti</i>	Cheekspot Goby	0.00043	0.08333	0.00057	0.00383	186,013
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.00028	0.00047	0.00500	0.00297	144,521
<i>Paralabrax clathratus</i>	Kelp Bass			0.00374	0.00213	103,442
<i>Seriphus politus</i>	Queenfish			0.00295	0.00168	81,560
<i>Albula gilberti</i>	Cortez Bonefish			0.00148	0.00084	40,928
<i>Paraclinus integripinnis</i>	Reef Finspot		0.02083		0.00083	40,483
<i>Quietula y-cauda</i>	Shadow Goby		0.02083		0.00083	40,483
<i>Paralichthys californicus</i>	California Halibut	0.00109	0.00076	0.00050	0.00074	35,974
<i>Paralabrax nebulifer</i>	Barred Sand Bass	0.00014	0.00038	0.00113	0.00071	34,586
<i>Hypsoblennius gentilis</i>	Bay Blenny		0.00133	0.00093	0.00059	28,437
<i>Fundulus parvipinnis</i>	California Killifish		0.01373		0.00055	26,682
<i>Scomber japonicus</i>	Pacific Chub Mackerel	0.00141			0.00055	26,670
<i>Myliobatis californica</i>	Bat Ray	0.00028		0.00070	0.00051	24,823
<i>Gibbonsia elegans</i>	Spotted Kelpfish			0.00072	0.00041	19,893
<i>Haemulon californiensis</i>	Salema			0.00056	0.00032	15,592
<i>Synodus lucioceps</i>	California Lizardfish	0.00002		0.00050	0.00029	14,251
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	0.00022	0.00066	0.00028	0.00027	13,330
<i>Citharichthys stigmatæus</i>	Speckled Sanddab	0.00033	0.00009	0.00022	0.00025	12,357
<i>Sphyraena argentea</i>	Pacific Barracuda			0.00042	0.00024	11,694
<i>Pleuronichthys ritteri</i>	Spotted Turbot	0.00048		0.00007	0.00023	11,094
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		0.00369	0.00007	0.00019	9,166
<i>Cheilotrema saturnum</i>	Black Croaker	0.00014		0.00022	0.00018	8,581
<i>Embiotoca jacksoni</i>	Black Perch			0.00029	0.00016	7,957
<i>Sebastes miniatus</i>	Vermilion Rockfish			0.00028	0.00016	7,796
<i>Ctenogobius sagittula</i>	Longtail Goby		0.00034	0.00022	0.00014	6,621
<i>Heterodontus francisci</i>	Horn Shark	0.00002		0.00022	0.00013	6,294
<i>Hippocampus ingens</i>	Pacific Seahorse		0.00009	0.00022	0.00013	6,152
<i>Roncador stearnsii</i>	Spotfin Croaker			0.00021	0.00012	5,847
<i>Platyrrhinoidis triseriata</i>	Thornback		0.00019	0.00014	0.00009	4,347
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		0.00009	0.00014	0.00008	4,082
<i>Anisotremus davidsonii</i>	Sargo			0.00014	0.00008	3,898
<i>Atractoscion nobilis</i>	White Seabass			0.00014	0.00008	3,898
<i>Sarda chiliensis</i>	Pacific Bonito			0.00014	0.00008	3,898
<i>Trachurus symmetricus</i>	Jack Mackerel			0.00014	0.00008	3,898
<i>Gymnura marmorata</i>	California Butterfly Ray	0.00014			0.00005	2,667
<i>Zapteryx exasperata</i>	Banded Guitarfish	0.00002		0.00007	0.00005	2,316
<i>Porichthys myriaster</i>	Specklefin Midshipman	0.00012			0.00005	2,286
<i>Dasyatis dipterura</i>	Diamond Stingray			0.00007	0.00004	1,989
<i>Medialuna californiensis</i>	Halfmoon			0.00007	0.00004	1,949
<i>Mustelus californicus</i>	Gray Smoothhound			0.00007	0.00004	1,949
<i>Hyporhamphus rosae</i>	California Halfbeak		0.00076		0.00003	1,472
<i>Symphurus atricaudus</i>	California Tonguefish	0.00002			0.00001	327
<i>Umbrina roncador</i>	Yellowfin Croaker		0.00009		< 0.00001	184
Grand Totals:		0.33460	0.59061	1.32032	0.90670	44,047,485

Table 19. Best estimate of biomass densities (g/m²) and standing stock, April and July 2025.

		Best Estimate of Density (g/m ²)					
		Depth Strata			Weighted Mean	Stock Estimate (kg)	Stock Estimate (MT)
Scientific Name	Common Name	Channel	Intertidal	Nearshore			
<i>Sardinops sagax</i>	Pacific Sardine	0.99944		14.98663	8.93216	433,924	433.9
<i>Cynoscion parvipinnis</i>	Shortfin Corvina			6.68476	3.81031	185,105	185.1
<i>Myliobatis californica</i>	Bat Ray	0.16188		5.24120	3.05062	148,199	148.2
<i>Atherinopsis californiensis</i>	Jacksnelt	0.73283		3.29814	2.16574	105,212	105.2
<i>Urobatis halleri</i>	Round Stingray	0.96151	12.02093	2.05800	2.02888	98,563	98.6
<i>Engraulis mordax</i>	Northern Anchovy	0.00007		2.17624	1.24048	60,263	60.3
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.07285	0.03807	1.87366	1.09792	53,337	53.3
<i>Atherinops affinis</i>	Topsnelt	0.57376	0.56989	1.18637	0.92280	44,829	44.8
<i>Gymnura marmorata</i>	California Butterfly Ray	1.96425			0.76606	37,215	37.2
<i>Anchoa delicatissima</i>	Slough Anchovy	0.26225	0.00672	0.45728	0.36319	17,644	17.6
<i>Cymatogaster aggregata</i>	Shiner Perch	0.00709	0.10606	0.42082	0.24687	11,993	12.0
<i>Albula gilberti</i>	Cortez Bonefish			0.24754	0.14110	6,854	6.85
<i>Platyrrhinoidis triseriata</i>	Thornback		0.21307	0.21911	0.13341	6,481	6.48
<i>Sphyrna argentea</i>	Pacific Barracuda			0.22621	0.12894	6,264	6.26
<i>Leuresthes tenuis</i>	California Grunion		0.00559	0.18300	0.10453	5,078	5.08
<i>Roncadore stearnsii</i>	Spotfin Croaker			0.18300	0.10431	5,067	5.07
<i>Paralichthys californicus</i>	California Halibut	0.04484	0.01667	0.14562	0.10116	4,914	4.91
<i>Scomber japonicus</i>	Pacific Chub Mackerel	0.24634			0.09607	4,667	4.67
<i>Heterostichus rostratus</i>	Giant Kelpfish		0.06903	0.16034	0.09416	4,574	4.57
<i>Dasyatis diptera</i>	Diamond Stingray			0.12572	0.07166	3,481	3.48
<i>Paralabrax nebulifer</i>	Barred Sand Bass	0.00338	0.00777	0.11768	0.06871	3,338	3.34
<i>Sarda chiliensis</i>	Pacific Bonito			0.09854	0.05617	2,729	2.73
<i>Micrometrus minimus</i>	Dwarf Perch		0.05388	0.08010	0.04781	2,323	2.32
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	0.02950	0.00521	0.05983	0.04581	2,226	2.23
<i>Heterodontus francisci</i>	Horn Shark	0.00079		0.06214	0.03573	1,736	1.74
<i>Haemulon californiensis</i>	Salema			0.06060	0.03454	1,678	1.68
<i>Syngnathus californiensis</i>	Kelp Pipefish	0.00059	0.03427	0.04296	0.02609	1,267	1.27
<i>Medialuna californiensis</i>	Halfmoon			0.04223	0.02407	1,169	1.17
<i>Atractoscion nobilis</i>	White Seabass			0.03871	0.02207	1,072	1.07
<i>Mustelus californicus</i>	Gray Smoothhound			0.03871	0.02207	1,072	1.07
<i>Paralabrax clathratus</i>	Kelp Bass			0.02963	0.01689	821	0.82
<i>Pleuronichthys ritteri</i>	Spotted Turbot	0.01705		0.01408	0.01467	713	0.71
<i>Embiotoca jacksoni</i>	Black Perch			0.01710	0.00975	473	0.47
<i>Cheilodactylus satunum</i>	Black Croaker	0.01483		0.00507	0.00867	421	0.42
<i>Serphus politus</i>	Queenfish			0.01408	0.00802	390	0.39
<i>Trachurus symmetricus</i>	Jack Mackerel			0.01408	0.00802	390	0.39
<i>Synodus lucioceps</i>	California Lizardfish	0.00126		0.01042	0.00643	312	0.31
<i>Porichthys myriaster</i>	Specklefin Midshipman	0.01152			0.00449	218	0.22
<i>Clevelandia ios</i>	Arrow Goby		0.08333	0.00136	0.00411	200	0.20
<i>Hippocampus ingens</i>	Pacific Seahorse		0.00379	0.00582	0.00347	168	0.17
<i>Paraclinus integripinnis</i>	Reef Finspot		0.08333		0.00333	162	0.16
<i>Fundulus parvipinnis</i>	California Killifish		0.08172		0.00327	159	0.16
<i>Hypsoblennius gentilis</i>	Bay Blenny		0.00739	0.00395	0.00255	124	0.12
<i>Citharichthys stigmatæus</i>	Speckled Sanddab	0.00324	0.00265	0.00176	0.00237	115	0.12
<i>Zapteryx exasperata</i>	Banded Guitarfish	0.00147		0.00259	0.00205	99	0.10
<i>Hypsoblennius gilberti</i>	Rockpool Blenny		0.00047	0.00274	0.00158	77	0.08
<i>Ilypnus gilberti</i>	Cheekspot Goby	0.00041	0.02083	0.00022	0.00112	54	0.05
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin		0.02121	0.00014	0.00093	45	0.05
<i>Quietus y-cauda</i>	Shadow Goby		0.02083		0.00083	40	0.04
<i>Sebastes miniatus</i>	Vermilion Rockfish			0.00134	0.00076	37	0.04
<i>Gibbonsia elegans</i>	Spotted Kelpfish			0.00072	0.00041	20	0.02
<i>Anisotremus davidsonii</i>	Sargo			0.00056	0.00032	16	0.02
<i>Hyporhamphus rosae</i>	California Halfbeak		0.00360		0.00014	7	0.01
<i>Umbrina roncadore</i>	Yellowfin Croaker		0.00265		0.00011	5	0.01
<i>Ctenogobius sagittula</i>	Longtail Goby		0.00034	0.00007	0.00005	3	< 0.01
<i>Symphurus atricaudus</i>	California Tonguefish	0.00003			0.00001	1	< 0.01
Grand Totals:		6.11114	13.47931	40.64084	26.08780	1,267,345	1,267.3

4.4 Shannon Diversity and Species Richness

The Shannon Diversity index (H' ; Shannon 1948) was used to estimate diversity in San Diego Bay and provide a basis for comparison among ecoregions within the bay. Diversity was calculated for total catches by ecoregion and by sampling month. Diversity was above average and relatively consistent among ecoregions (Range: 1.73-1.83) with higher diversity in April versus July (2.22 and 1.74, respectively; **Figure 11**). Species richness was also above average (Range: 26-41) in 2025, followed the typical spatial pattern of decreasing from north to south, and decreased from April (49) to July (44; **Figure 12**).

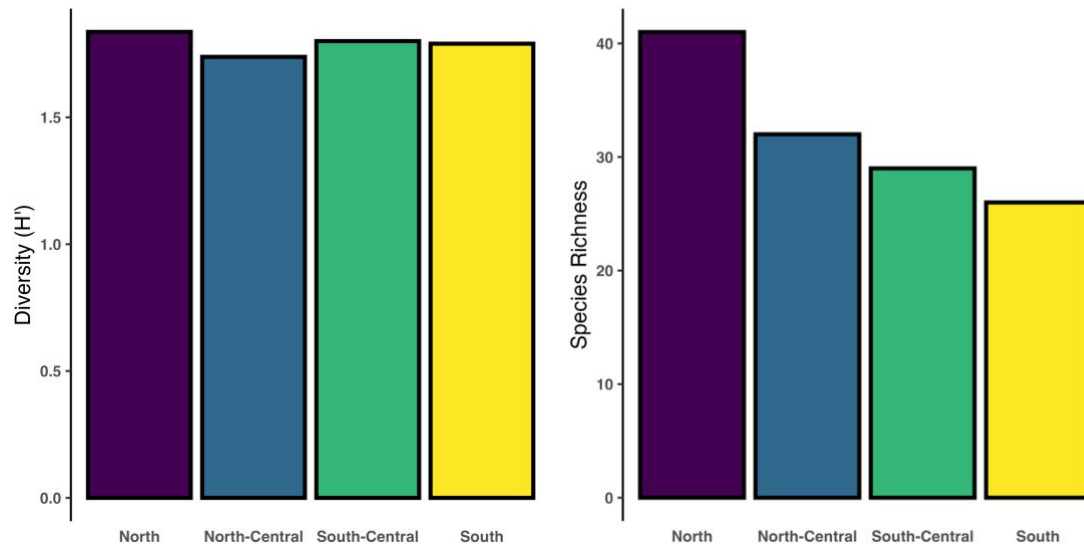


Figure 11. Shannon Diversity (H') and number of species (richness) of fishes taken in each San Diego Bay ecoregion, 2025.

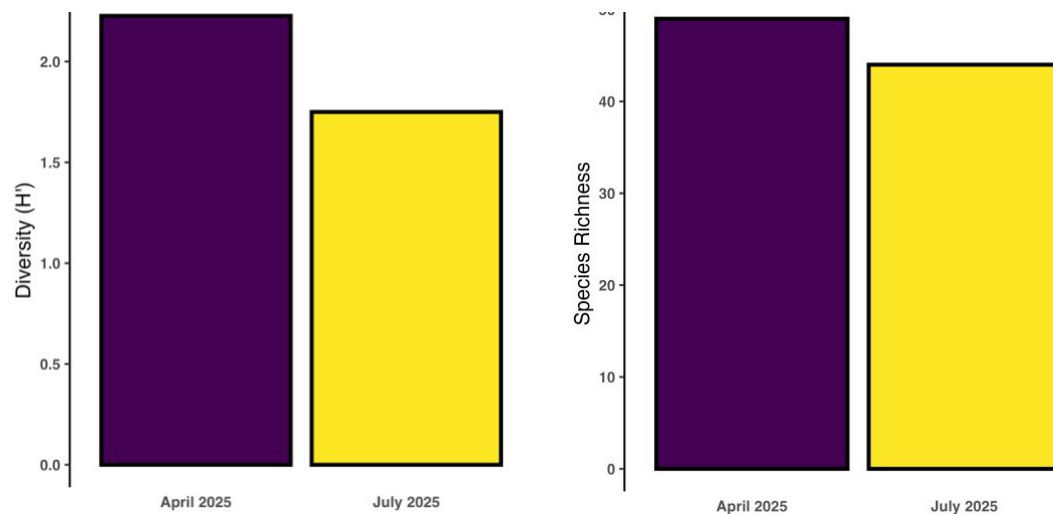


Figure 12. Shannon Diversity (H') and number of species (richness) of fishes taken in San Diego Bay by sampling month, 2025.

4.5 Nursery Area Function

San Diego Bay continues to be a nursery area for more than half of the fishes found there. Approximately 54% of all fishes sampled in San Diego Bay were juveniles. The most abundant juveniles, including Northern Anchovy, Queenfish, Topsmelt, Giant Kelpfish, and Shiner Perch, are all critical commercial and/or forage fish species (**Table 20**). The high catch of juvenile fishes in the bay highlights the continued importance of San Diego Bay as a nursery area for bay, estuarine, and nearshore species.

Table 20. Percent of juveniles taken of the top 20 species of fish from San Diego Bay, 2025.

Scientific Name	Common Name	Juveniles	Total Abundance	% Juvenile
<i>Engraulis mordax</i>	Northern Anchovy	6,190	6,191	99.98
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	39	40	97.50
<i>Serphus politus</i>	Queenfish	41	43	95.35
<i>Ilypnus gilberti</i>	Cheekspot Goby	140	148	94.59
<i>Clevelandia ios</i>	Arrow Goby	503	533	94.37
<i>Heterostichus rostratus</i>	Giant Kelpfish	1,077	1,146	93.98
<i>Paralabrax clathratus</i>	Kelp Bass	83	91	91.21
<i>Leuresthes tenuis</i>	California Grunion	389	428	90.89
<i>Cymatogaster aggregata</i>	Shiner Perch	2,036	2,537	80.25
<i>Atherinops affinis</i>	Topsmelt	2,067	2,961	69.81
<i>Syngnathus californiensis</i>	Kelp Pipefish	759	1,428	53.15
<i>Paralichthys californicus</i>	California Halibut	42	85	49.41
<i>Atherinopsis californiensis</i>	Jacksmelt	546	1,129	48.36
<i>Micrometrus minimus</i>	Dwarf Perch	75	219	34.25
<i>Fundulus parvipinnis</i>	California Killifish	30	145	20.69
<i>Urobatis halleri</i>	Round Stingray	80	918	8.71
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	3	104	2.88
<i>Anchoa delicatissima</i>	Slough Anchovy	0	4,403	0.00
<i>Sardinops sagax</i>	Pacific Sardine	0	3,447	0.00
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	0	128	0.00
		14,100	26,124	53.97



A juvenile Kelp Bass (*Paralabrax clathratus*) caught by purse seine in the North-Central Ecoregion, April 2025

4.6 Ecological Importance of Species and the Ecological Index

An index of ecological importance was also calculated to estimate the relative importance of each species within the bay assemblage. An Ecological Index (E.I.) was determined using the total catch for each species during this study and incorporated three significant ecological variables: % Number, % Weight, and % Frequency of Occurrence, by ecoregion and month ($E.I. = (\% \text{ Number} + \% \text{ Weight}) * \% \text{ Frequency of Occurrence}$; **Table 21; Figure 13**). This index is indicative of the importance of each species to the energy flow within the San Diego Bay ecosystem. Round Stingray ranked first (E.I. 3,038), Northern Anchovy ranked second (2032), Topsmelt ranked third (1,440), Slough Anchovy ranked fourth (1,325), and Shiner Perch ranked fifth (1,072). Round Stingray, Topsmelt, and Shiner Perch were all found ubiquitously throughout the bay during both sampling periods, while Slough Anchovy were limited to the southern half of the bay in April and only a few Northern Anchovy were caught during that month. Round Stingrays were dominant in terms of biomass, and Northern Anchovy, Topsmelt, and Slough Anchovies were dominant in terms of numerical abundance.

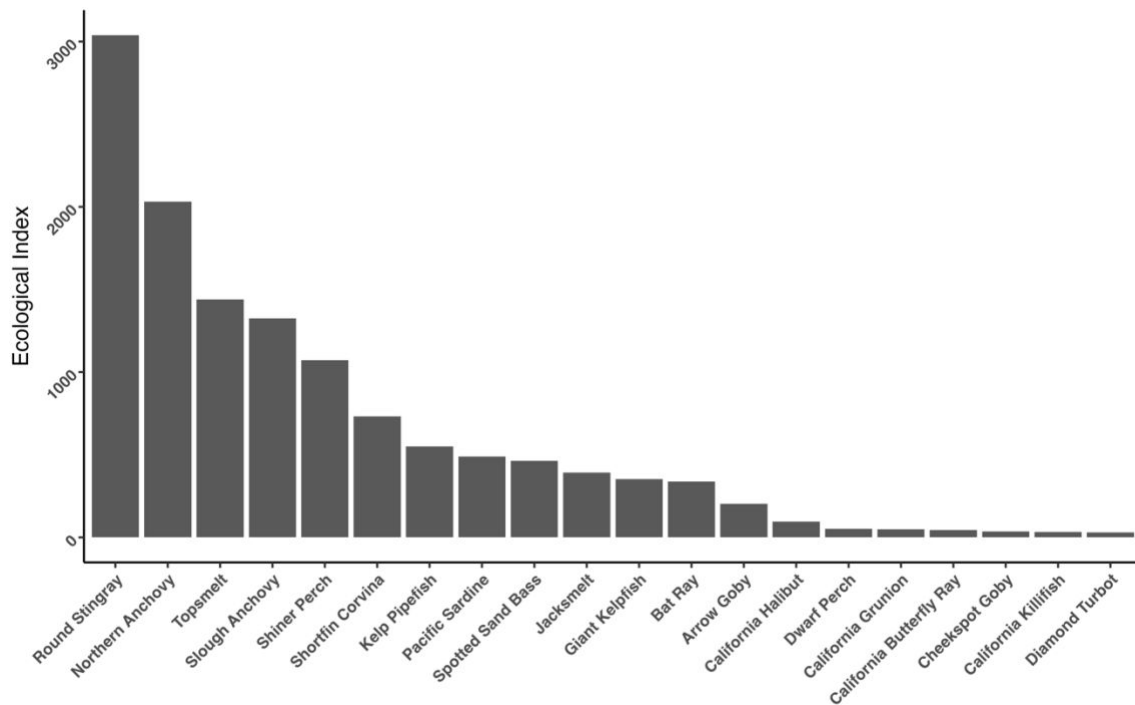


Figure 13. Top 20 species of San Diego Bay fishes ranked by Ecological Index, 2025.

Table 21. Relative abundance, relative biomass, frequency of occurrence, and Ecological Index (E.I.) of San Diego Bay fishes, 2025.

Scientific Name	Common Name	Abundance %	Biomass %	Frequency of Occurrence	Ecological Index
<i>Urobatis halleri</i>	Round Stingray	3.47	26.9	100	3038
<i>Engraulis mordax</i>	Northern Anchovy	23.4	3.66	75.0	2032
<i>Atherinops affinis</i>	Topsmelt	11.2	3.19	100	1440
<i>Anchoa delicatissima</i>	Slough Anchovy	16.7	1.00	75.0	1325
<i>Cymatogaster aggregata</i>	Shiner Perch	9.60	1.12	100	1072
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	0.48	11.2	62.5	732
<i>Syngnathus californiensis</i>	Kelp Pipefish	5.40	0.10	100	550
<i>Sardinops sagax</i>	Pacific Sardine	13.1	26.0	12.5	488
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.39	4.23	100	463
<i>Atherinopsis californiensis</i>	Jacksnelt	4.27	6.16	37.5	391
<i>Heterostichus rostratus</i>	Giant Kelpfish	4.34	0.36	75.0	352
<i>Myliobatis californica</i>	Bat Ray	0.05	8.94	37.5	337
<i>Clevelandia ios</i>	Arrow Goby	2.02	0.01	100	203
<i>Paralichthys californicus</i>	California Halibut	0.32	0.63	100	94.7
<i>Micrometrus minimus</i>	Dwarf Perch	0.83	0.21	50.0	51.8
<i>Leuresthes tenuis</i>	California Grunion	1.62	0.32	25.0	48.4
<i>Gymnura marmorata</i>	California Butterfly Ray	0.01	1.77	25.0	44.4
<i>Ilypnus gilberti</i>	Cheekspot Goby	0.56	0.01	62.5	35.3
<i>Fundulus parvipinnis</i>	California Killifish	0.55	0.10	50.0	32.5
<i>Pleuronichthys guttulatus</i>	Diamond Turbot	0.09	0.31	75.0	30.0
<i>Paralabrax nebulifer</i>	Barred Sand Bass	0.13	0.23	75.0	27.4
<i>Sphyrna argentea</i>	Pacific Barracuda	0.02	0.38	62.5	25.2
<i>Paralabrax clathratus</i>	Kelp Bass	0.34	0.09	50.0	21.7
<i>Leptocottus armatus</i>	Pacific Staghorn Sculpin	0.15	0.03	75.0	13.4
<i>Pleuronichthys ritteri</i>	Spotted Turbot	0.11	0.14	50.0	12.5
<i>Albula gilberti</i>	Cortez Bonefish	0.08	0.42	25.0	12.4
<i>Platyrrhinoidis triseriata</i>	Thornback	0.02	0.63	12.5	8.02
<i>Roncador stearnsii</i>	Spotfin Croaker	0.01	0.31	25.0	7.97
<i>Hypsoblennius gentilis</i>	Bay Blenny	0.11	0.02	62.5	7.88
<i>Cheilotrema saturnum</i>	Black Croaker	0.05	0.11	50.0	7.85
<i>Haemulon californiensis</i>	Salema	0.03	0.10	37.5	4.95
<i>Seriphus politus</i>	Queenfish	0.16	0.02	25.0	4.67
<i>Citharichthys stigmaeus</i>	Speckled Sanddab	0.09	0.03	37.5	4.63
<i>Dasyatis diptera</i>	Diamond Stingray	0.01	0.35	12.5	4.46
<i>Porichthys myriaster</i>	Specklefin Midshipman	0.03	0.08	37.5	3.96
<i>Heterodontus francisci</i>	Horn Shark	0.02	0.11	25.0	3.07
<i>Scomber japonicus</i>	Pacific Chub Mackerel	0.04	0.21	12.5	3.06
<i>Sarda chiliensis</i>	Pacific Bonito	0.01	0.17	12.5	2.16
<i>Hyporhamphus rosae</i>	California Halfbeak	0.03	< 0.01	37.5	1.45
<i>Synodus lucioceps</i>	California Lizardfish	0.03	0.03	25.0	1.40
<i>Embiotoca jacksoni</i>	Black Perch	0.02	0.03	25.0	1.08
<i>Gibbonsia elegans</i>	Spotted Kelpfish	0.04	< 0.01	25.0	0.98
<i>Medialuna californiensis</i>	Halfmoon	< 0.01	0.07	12.5	0.93
<i>Atractoscion nobilis</i>	White Seabass	0.01	0.07	12.5	0.91
<i>Mustelus californicus</i>	Gray Smoothhound	< 0.01	0.07	12.5	0.86
<i>Hypsoblennius gilberti</i>	Rockpool Blenny	0.02	0.01	37.5	0.77
<i>Hippocampus ingens</i>	Pacific Seahorse	0.02	0.01	25.0	0.74
<i>Zapteryx exasperata</i>	Banded Guitarfish	0.01	0.01	25.0	0.55
<i>Trachurus symmetricus</i>	Jack Mackerel	0.01	0.02	12.5	0.39
<i>Ctenogobius sagittula</i>	Longtail Goby	0.02	< 0.01	25.0	0.38
<i>Quietula y-cauda</i>	Shadow Goby	0.01	< 0.01	25.0	0.29
<i>Sebastes miniatus</i>	Vermilion Rockfish	0.02	< 0.01	12.5	0.22
<i>Anisotremus davidsonii</i>	Sargo	0.01	< 0.01	12.5	0.11
<i>Umbrina roncadore</i>	Yellowfin Croaker	< 0.01	< 0.01	12.5	0.09
<i>Paraclinus integripinnis</i>	Reef Finspot	< 0.01	< 0.01	12.5	0.05
<i>Symphurus atricaudus</i>	California Tonguefish	< 0.01	< 0.01	12.5	0.05

4.7 Principal Species



4.7.1 Round Stingray (*Urobatis halleri*)

The highest ranked species in terms of ecological index in 2025 was the Round Stingray. This species is commonly ranked in the top three (**Figure 14**) and was ubiquitous throughout the bay during these surveys, and were found in all sampling periods, ecoregions, depth strata and subhabitats (**Table 22**). While only consisting of 3.47% of the total individuals captured in the 2025 surveys, those individuals accounted for 26.9% of the biomass. Unusually, Round Stingrays were caught in large numbers in the intertidal where catch numbers are typically sparse. While they were observed in all four ecoregions, the highest catches were in the North and

South-Central Ecoregion (**Figure 15**), a continuation of their apparent northward migration in these surveys. Stock estimates for 2025 were typical of historical surveys (**Figure 16**). The sizes of captured Round Stingrays were widely stratified, representative of its entire size range, and showed growth of juveniles and sub-adults between the April and July sampling periods (**Figure 17**).

Table 22. Summary of abundance and biomass for Round Stingrays in 2025.

Common Name	Round Stingray
Scientific Name	<i>Urobatis halleri</i>
Ecological Index	3038.20
Freq. of Occurance	100.0%
% Juvenile	8.71%

		Abundance	Biomass (kg)
2025	Total	918	228
	% of Catch	3.47%	26.9%
	Stock Estimate	440,921	98.6 MT
Month	April	455	78.0
	July	463	149.5
Ecoregion	North	375	134.5
	North-Central	124	26.7
	South-Central	294	45.4
	South	125	20.9
Sub-habitat	Channel	378	58.6
	Non-Vegetated	155	48.2
	Vegetated	385	120.7
Depth Stratum	Channel	378	58.6
	Intertidal	353	127.2
	Nearshore	187	41.7

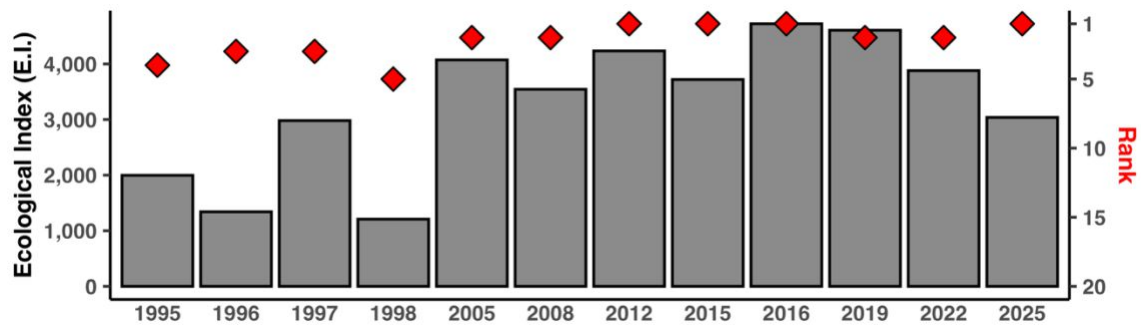


Figure 14. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Round Stingrays by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

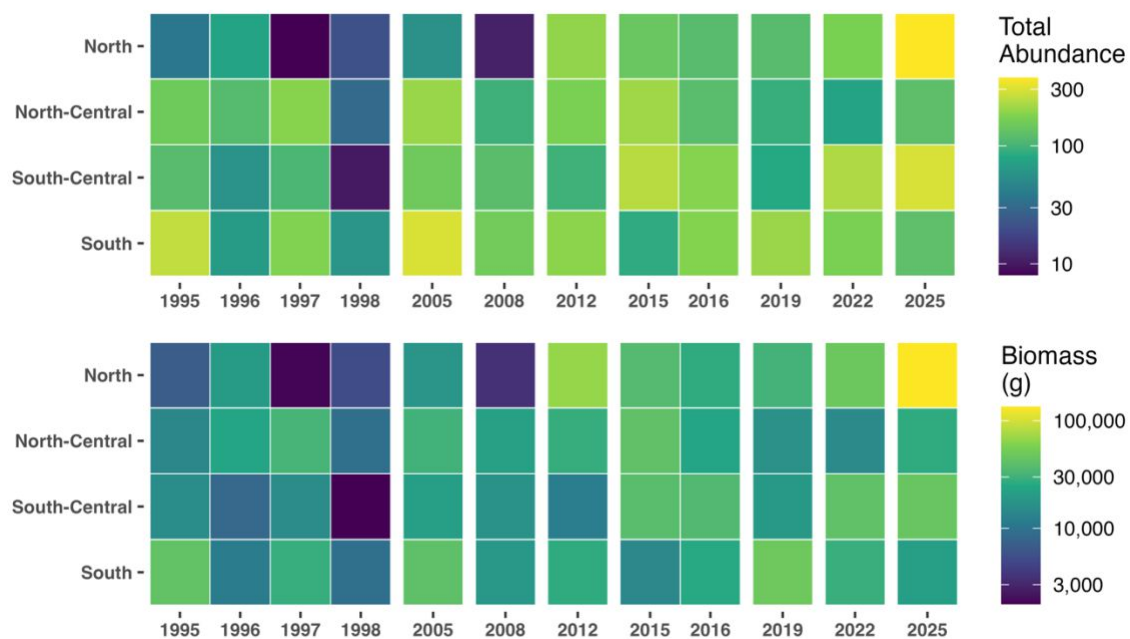


Figure 15. Total abundance (top) and biomass (bottom) of Round Stingrays caught in April and July by ecoregion and year, 1995-2025.

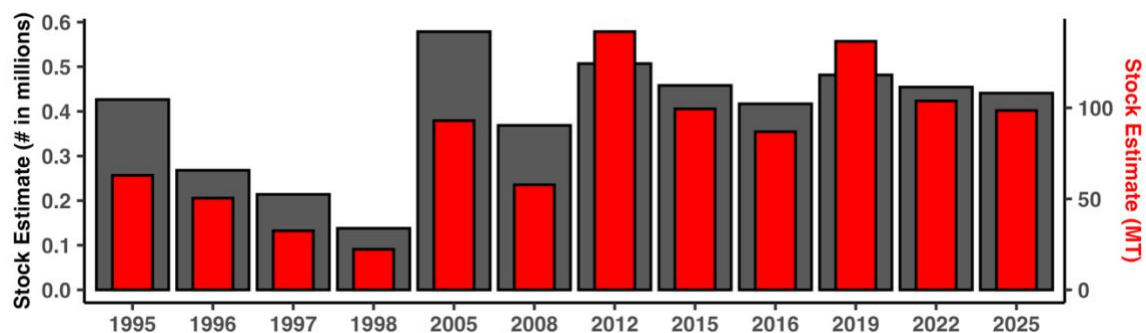


Figure 16. Annual stock estimates for Round Stingray based upon April and July sampling, 1995-2025.

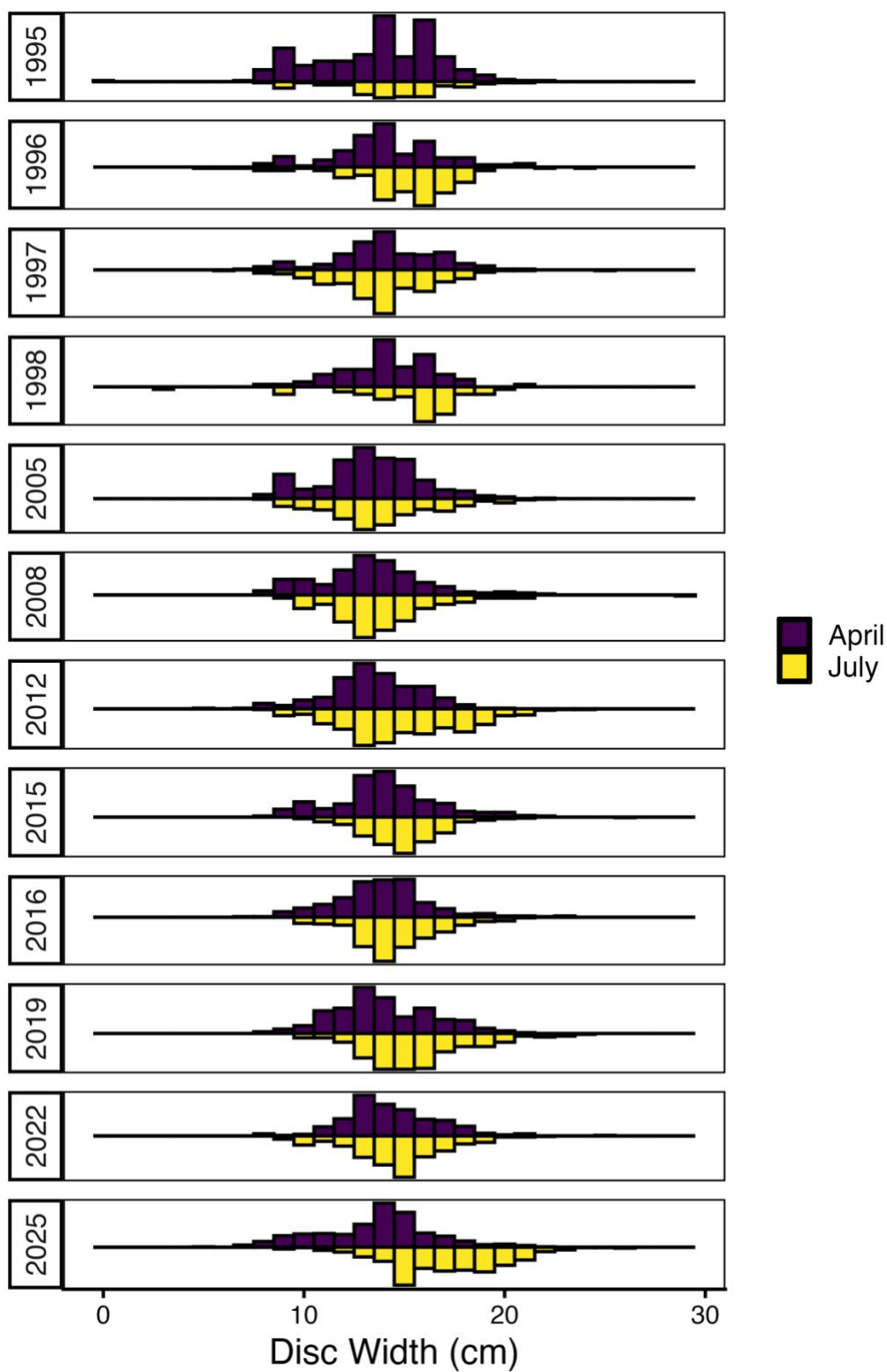


Figure 17. Length frequency of Round Stingray caught in San Diego Bay during April and July by year, 1995-2025.

4.7.2 Northern Anchovy (*Engraulis mordax*)

Northern Anchovy, an occasional entrant into the ecological index top ten (**Figure 18**), ranked second in 2025, but were found in small numbers in all ecoregions, all subhabitats, during both



months, and in every depth stratum except for the intertidal (**Table 23**). However, 99.8% of these fish were caught in a single purse seine replicate in the nearshore, non-vegetated part of the North Ecoregion during the July sampling period (**Figure 19**). These mostly juvenile fish (99.96%) were the most abundant fish in the survey comprising 23.4% of the catch, but only 3.66% of the biomass due to their relatively small size. Northern Anchovy stock estimates vary widely over time but were near their historical average in 2025 (**Figure 20**). Their size frequency was limited to a narrow band between 6 and 9 cm SL (**Figure 21**).

Table 23. Summary of abundance and biomass for Northern Anchovy in 2025.

Common Name	Northern Anchovy
Scientific Name	<i>Engraulis mordax</i>
Ecological Index	2031.67
Freq. of Occurance	75.0%
% Juvenile	99.98%

		Abundance	Biomass (kg)
2025	Total	6,191	31
	% of Catch	23.40%	3.7%
	Stock Estimate	12,057,476	60.3 MT
Month	April	3	0.0
	July	6,188	30.9
Ecoregion	North	6,181	30.9
	North-Central	5	0.0
	South-Central	3	0.0
	South	2	0.0
Sub-habitat	Channel	4	0.0
	Non-Vegetated	6,186	30.9
	Vegetated	1	0.0
Depth Stratum	Channel	4	0.0
	Intertidal	0	0.0
	Nearshore	6,187	30.9

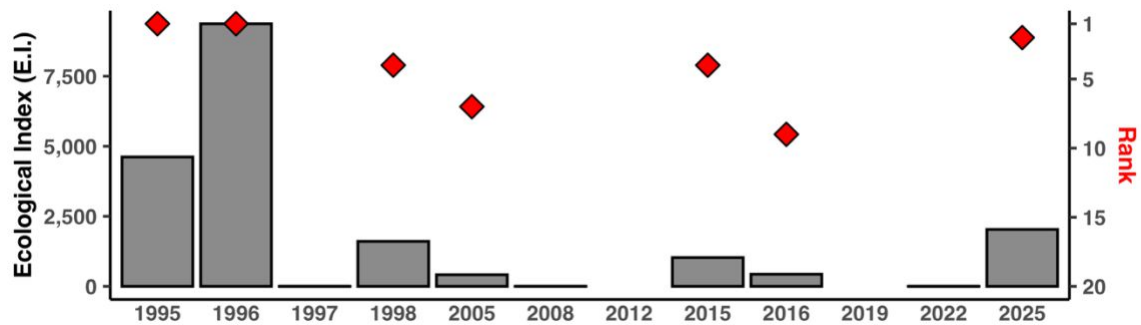


Figure 18. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Northern Anchovy by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

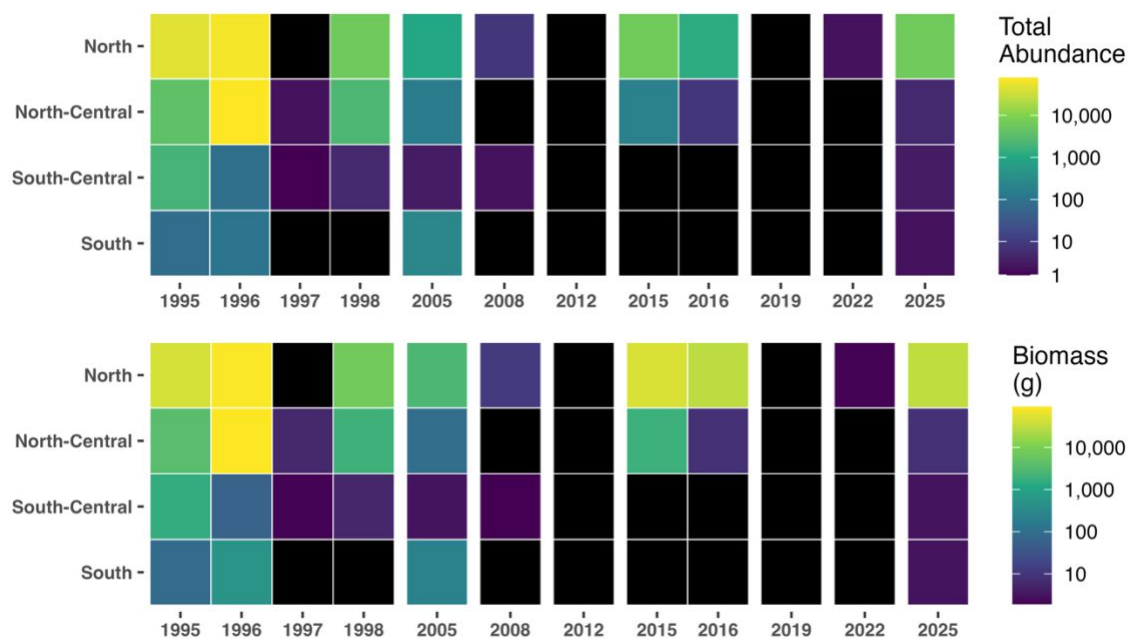


Figure 19. Total abundance (top) and biomass (bottom) of Northern Anchovy caught in April and July by ecoregion and year, 1995-2025.

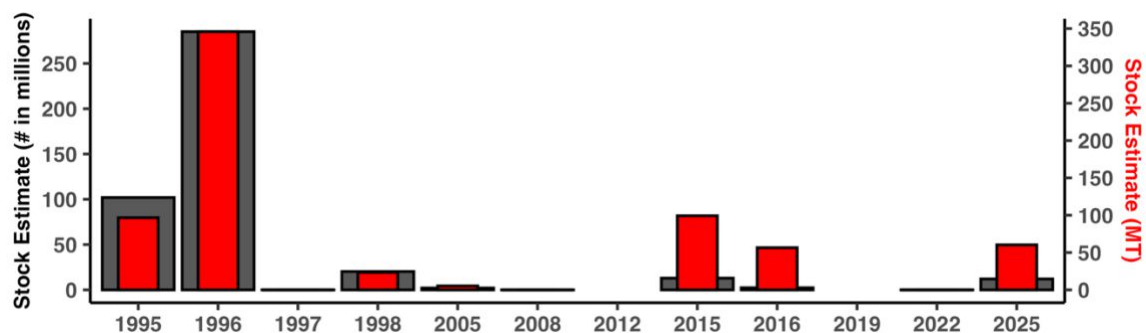


Figure 20. Annual stock estimates for Northern Anchovy based upon April and July sampling, 1995-2025.

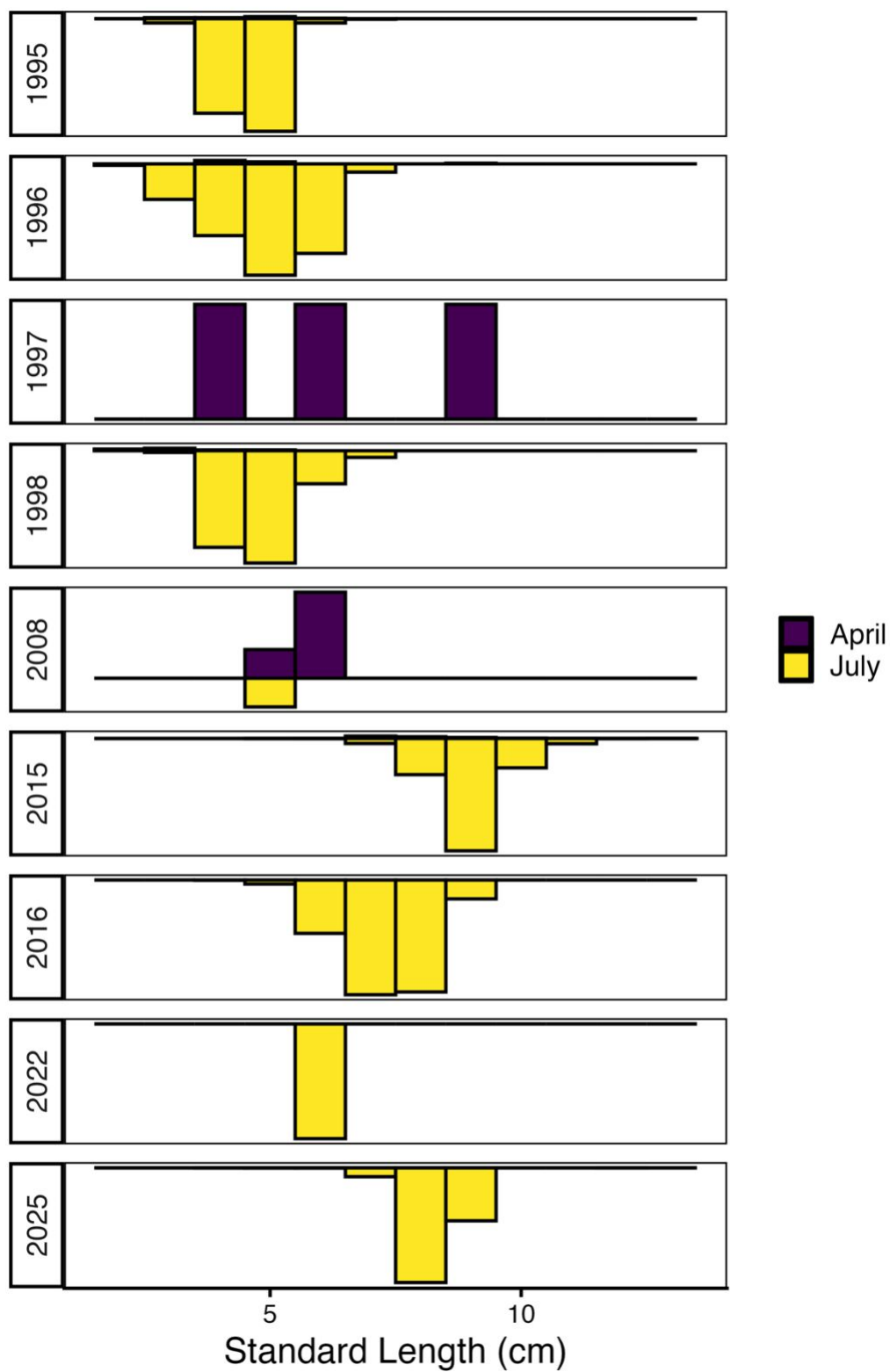


Figure 21. Length frequency of Northern Anchovy caught in San Diego Bay during April and July by year, 1995-2025. Most small individuals were not measured in 2005, therefore that year was excluded.

4.7.3 Topsmelt (*Atherinops affinis*)

Topsmelt are also consistently ranked in the top ten by the ecological index (**Figure 22**). They ranked third in 2025 and were found during both



sampling periods and at all ecoregions, depth strata and subhabitats, though the majority were caught in the intertidal depth strata (**Table 24, Figure 23**). These mostly juvenile fish (69.8%) were two times as abundant in the vegetated (1,869) versus non-vegetated (738 subhabitats. They were the fourth most abundant fish in the survey comprising 11.2% of the catch, but only 3.19% of the biomass due to their relatively small size. Due to the larger size of individuals caught this year, stock estimates of Topsmelt biomass were above average, but numerical estimates were below average – though on par with 21st Century values (**Figure 24**). Their size frequency distribution (**Figure 25**) was bimodal in both April and July with larger individuals being more common in April and smaller being more common in July.

Table 24. Summary of abundance and biomass for Topsmelt in 2025.

Common Name	Topsmelt
Scientific Name	<i>Atherinops affinis</i>
Ecological Index	1439.68
Freq. of Occurance	100.0%
% Juvenile	69.81%

		Abundance	Biomass (kg)
2025	Total	2,961	27
	% of Catch	11.2%	3.2%
	Stock Estimate	2,946,529	44.8 MT
Month	April	1,630	19.2
	July	1,331	7.8
Ecoregion	North	913	6.1
	North-Central	1,155	15.8
	South-Central	352	3.7
	South	541	1.4
Sub-habitat	Channel	354	4.1
	Non-Vegetated	738	6.0
	Vegetated	1,869	16.9
Depth Stratum	Channel	354	4.1
	Intertidal	1,721	6.0
	Nearshore	886	16.9

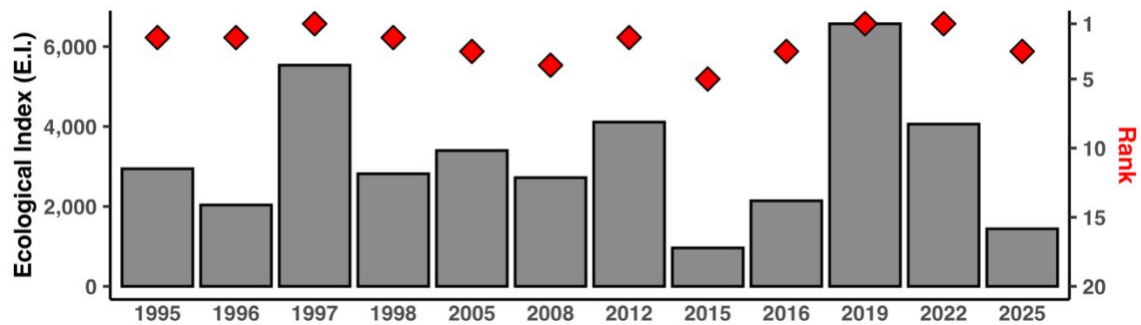


Figure 22. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Topsmelt by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

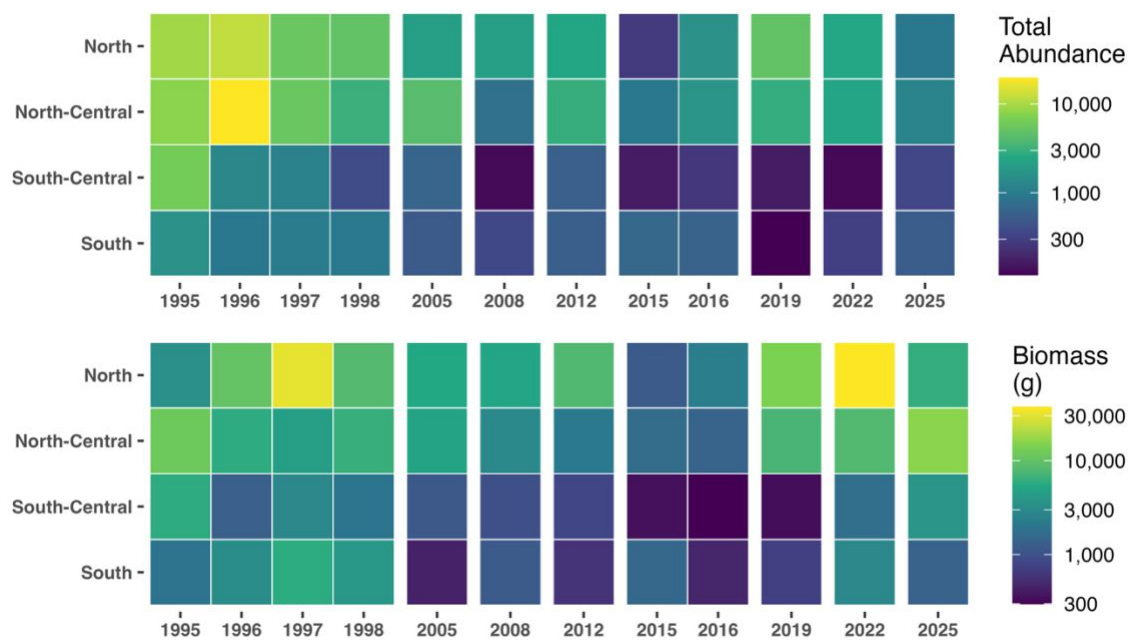


Figure 23. Total abundance (top) and biomass (bottom) of Topsmelt caught in April and July by ecoregion and year, 1995-2025.

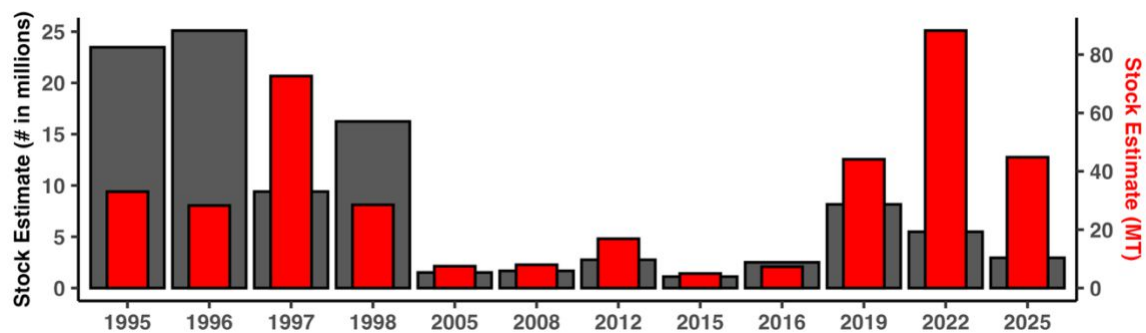


Figure 24. Annual stock estimates for Topsmelt based upon April and July sampling, 1995-2025.

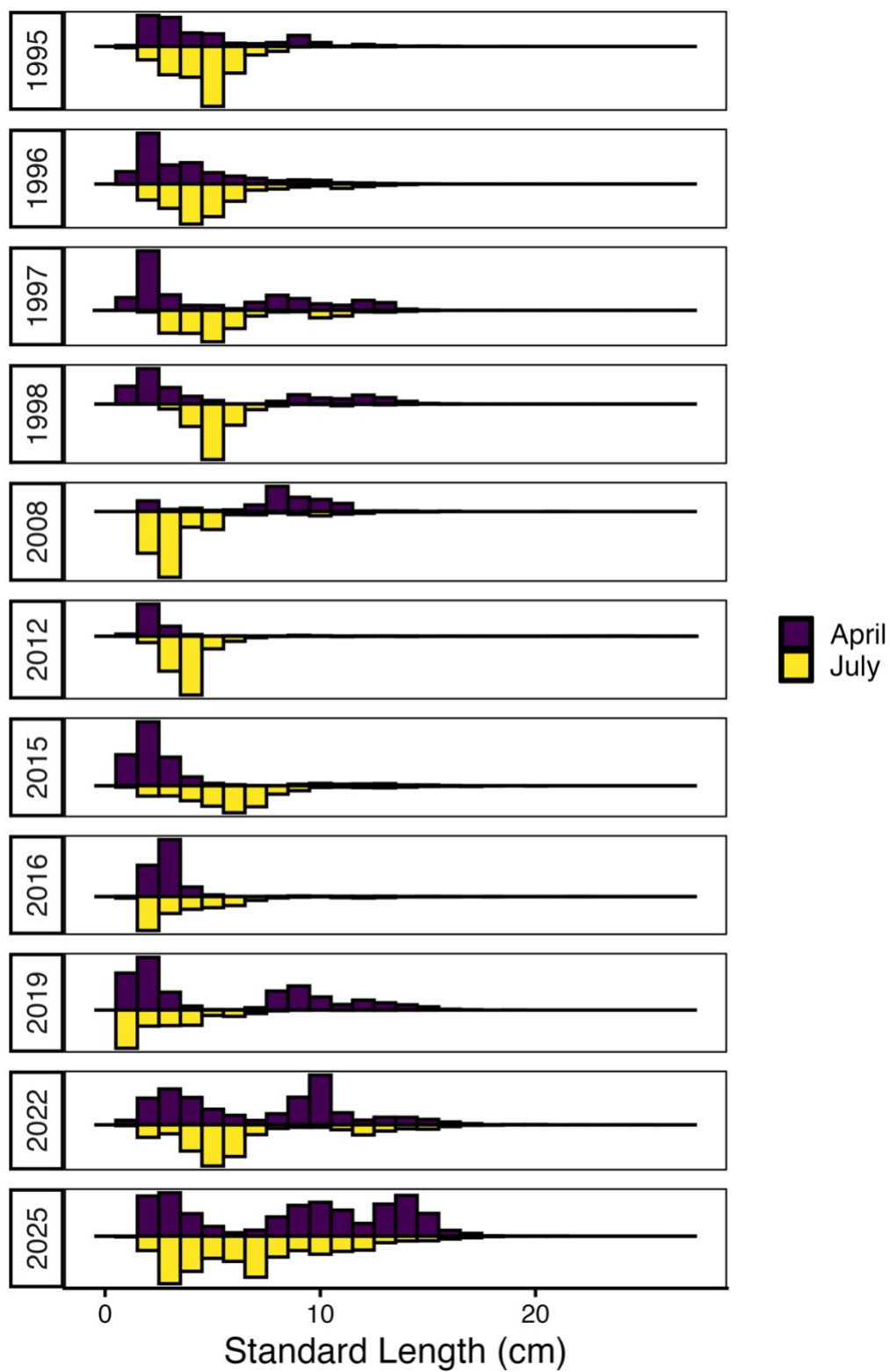


Figure 25. Length frequency of Topsmelt caught in San Diego Bay during April and July by year, 1995-2025. Most small individuals were not measured in 2005, therefore that year was excluded.

4.7.4 Slough Anchovy (*Anchoa delicatissima*)



Slough Anchovy are also consistently ranked among the most ecologically important fish species in San Diego Bay, and in 2025 they had the fourth highest ecological index (**Figure 26**). This species was

ubiquitous throughout the bay. They were found in all depth strata and subhabitats, though less frequently in the intertidal (**Table 25**). They had the second highest abundance of all fishes captured in 2025 but made up only 1.00% of the total biomass (**Figure 27**). Even though none of these fish were juveniles, their small profile provides little biomass per fish. Stock estimates were slightly below average in 2025 (**Figure 28**). The bay is a well-known nursery area for this critical forage species and there is no doubt that a significant number of juveniles of this species utilizing the bay (**Figure 29**), however juvenile Slough Anchovy are exceptionally narrow-bodied and are unlikely to be captured through most sampling methods employed in this study.

Table 25. Summary of abundance and biomass for Slough Anchovy in 2025.

Common Name	Slough Anchovy
Scientific Name	<i>Anchoa delicatissima</i>
Ecological Index	1324.60
Freq. of Occurrence	75.0%
% Juvenile	0.00%

		Abundance	Biomass (kg)
2025	Total	4,403	8
	% of Catch	16.7%	1.0%
	Stock Estimate	9,575,238	17.6 MT
Month	April	775	1.1
	July	3,628	7.4
Ecoregion	North	588	2.0
	North-Central	1,717	3.8
	South-Central	1,982	2.5
	South	116	0.2
Sub-habitat	Channel	1,495	1.9
	Non-Vegetated	1,687	3.6
	Vegetated	1,221	3.0
Depth Stratum	Channel	1,495	1.9
	Intertidal	45	0.1
	Nearshore	2,863	6.5

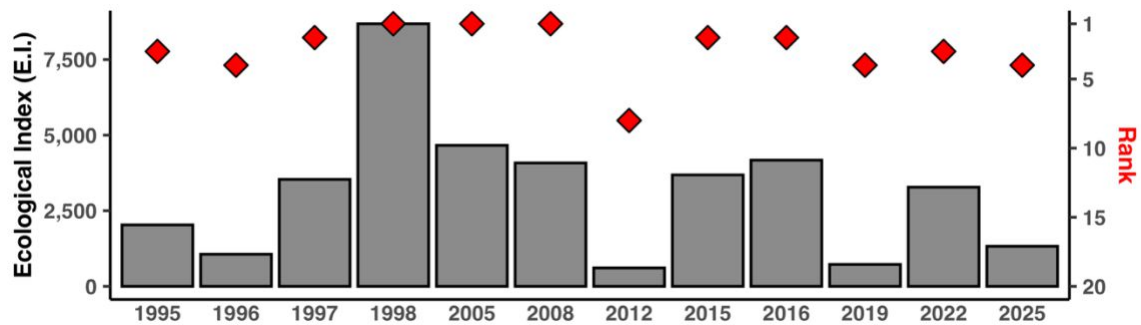


Figure 26. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Slough Anchovy by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

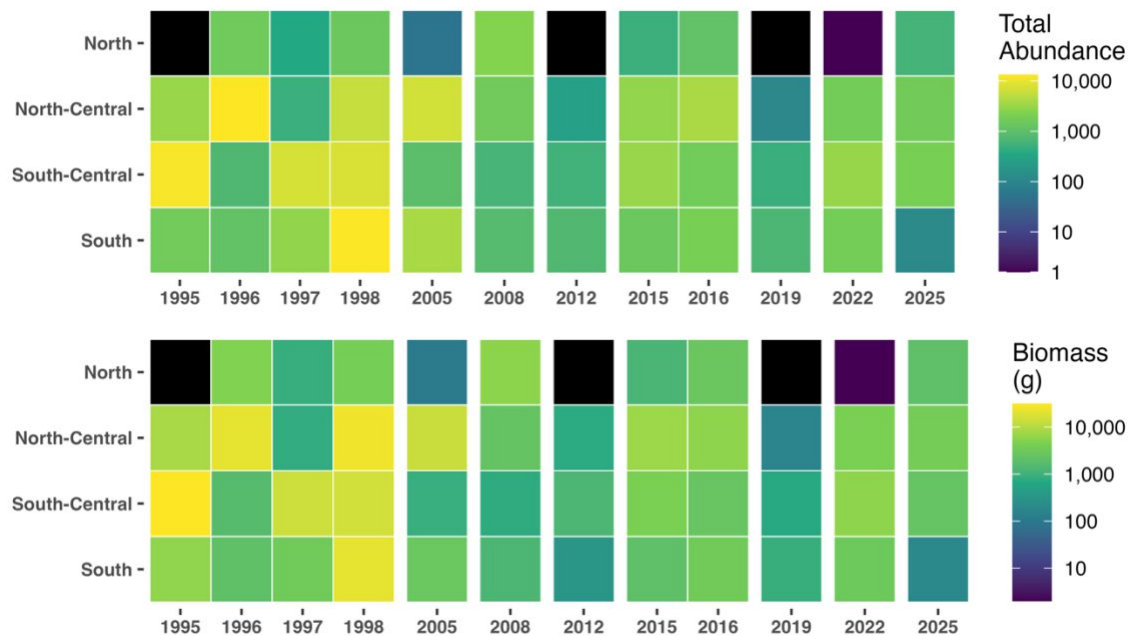


Figure 27. Total abundance (top) and biomass (bottom) of Slough Anchovy caught in April and July by ecoregion and year, 1995-2025.

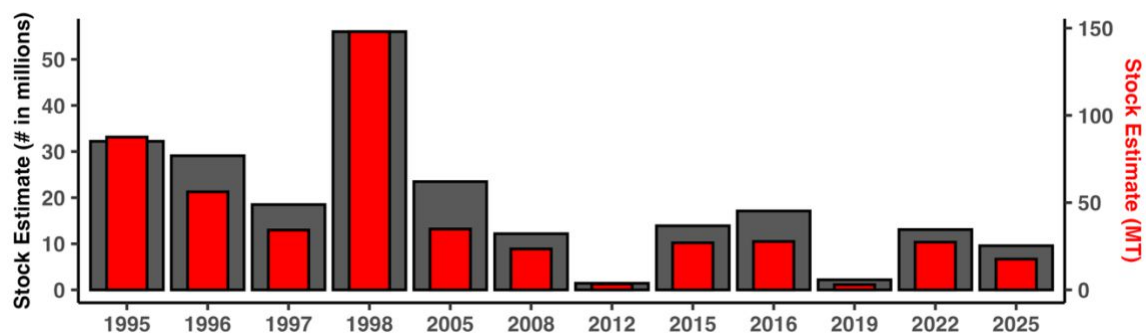


Figure 28. Annual stock estimates for Slough Anchovy based upon April and July sampling, 1995-2025.

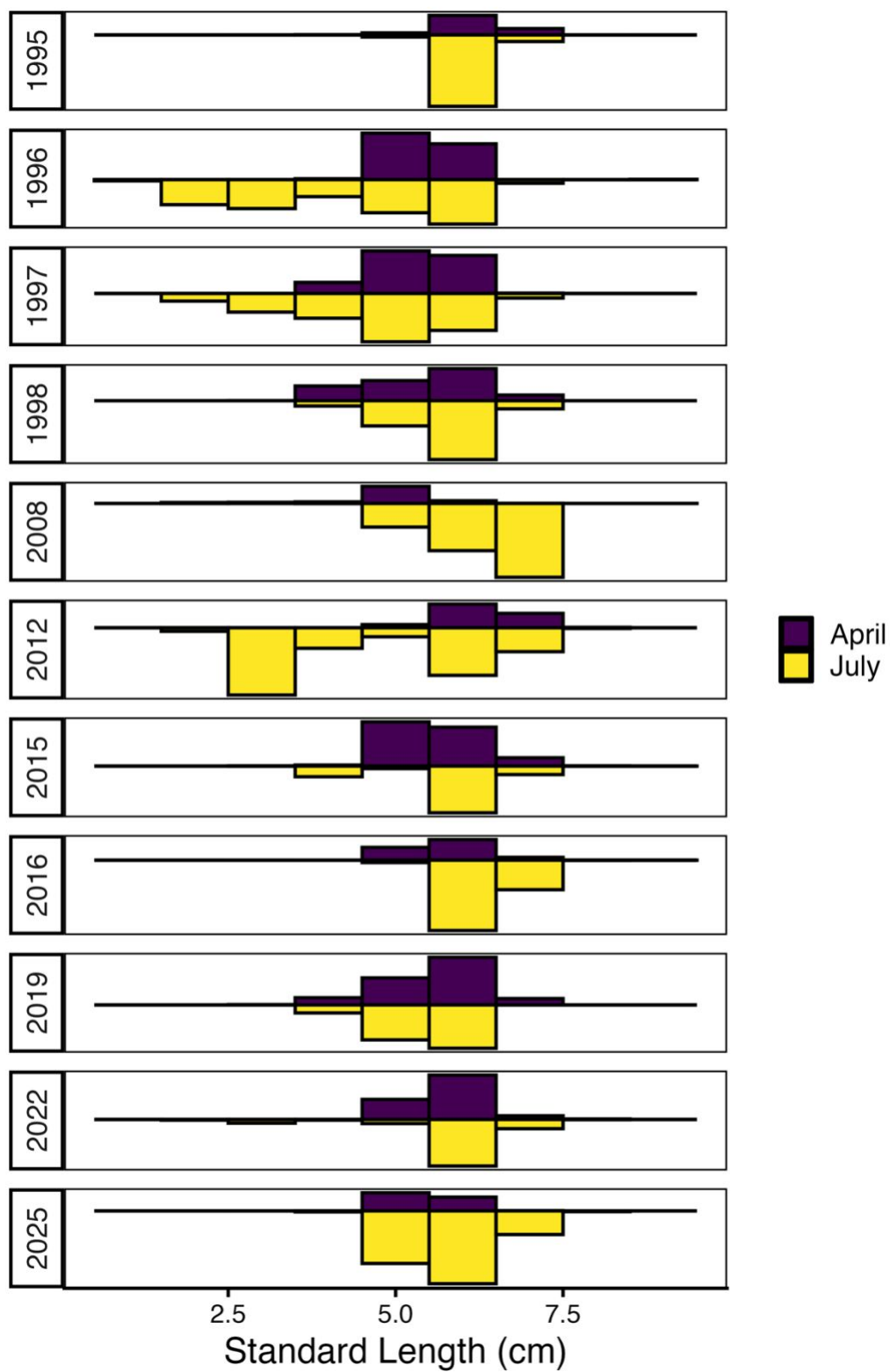


Figure 29. Length frequency of Slough Anchovy caught in San Diego Bay during April and July by year, 1995-2025. Most small individuals were not measured in 2005, therefore that year was excluded.

4.7.5 Shiner Perch (*Cymatogaster aggregata*)

Shiner Perch often rank between fifth and fifteenth by ecological index and ranked fifth in 2025 (**Figure 30**). They were found during both sampling periods and at all ecoregions, depths, and subhabitats (**Table 26**). These mostly juvenile fish (80.3%) were the fifth most abundant fish in the survey comprising 9.60% of the catch, but only 1.12% of the biomass due to their small size. Abundance and biomass were highest in the South Ecoregion where it is typically the lowest (**Figure 31**). Stock



estimates were above average but comparable to all other estimates from the 21st Century (**Figure 32**). Their size frequency distributions (**Figure 33**) suggested a recruitment event prior to the April sampling efforts, and heavy natural mortality with growth between April and July. This distribution pattern is similar to most other survey years.

Table 26. Summary of abundance and biomass for Shiner Perch in 2025.

Common Name	Shiner Perch
Scientific Name	<i>Cymatogaster aggregata</i>
Ecological Index	1072.12
Freq. of Occurance	100.0%
% Juvenile	80.25%

		Abundance	Biomass (kg)
2025	Total	2,537	9
	% of Catch	9.60%	1.1%
	Stock Estimate	3,038,491	12 MT
Month	April	2,322	7.9
	July	215	1.6
Ecoregion	North	169	1.1
	North-Central	383	1.9
	South-Central	596	2.0
	South	1,389	4.5
Sub-habitat	Channel	266	0.4
	Non-Vegetated	1,287	4.8
	Vegetated	984	4.3
Depth Stratum	Channel	266	0.4
	Intertidal	118	1.2
	Nearshore	2,153	7.9

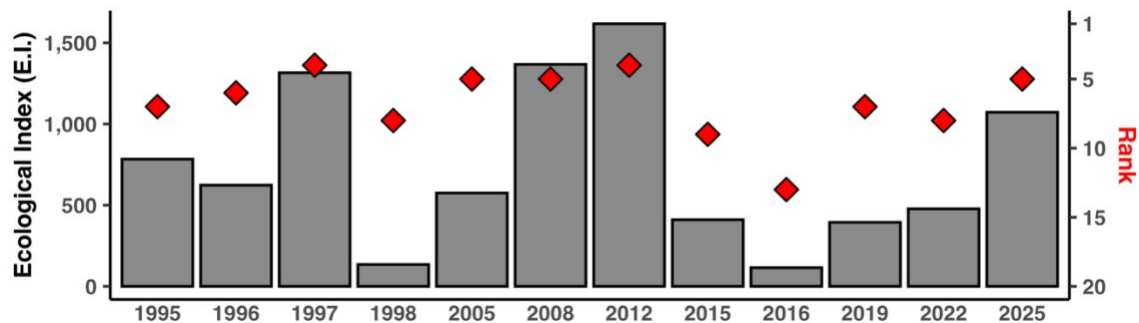


Figure 30. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Shiner Perch by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

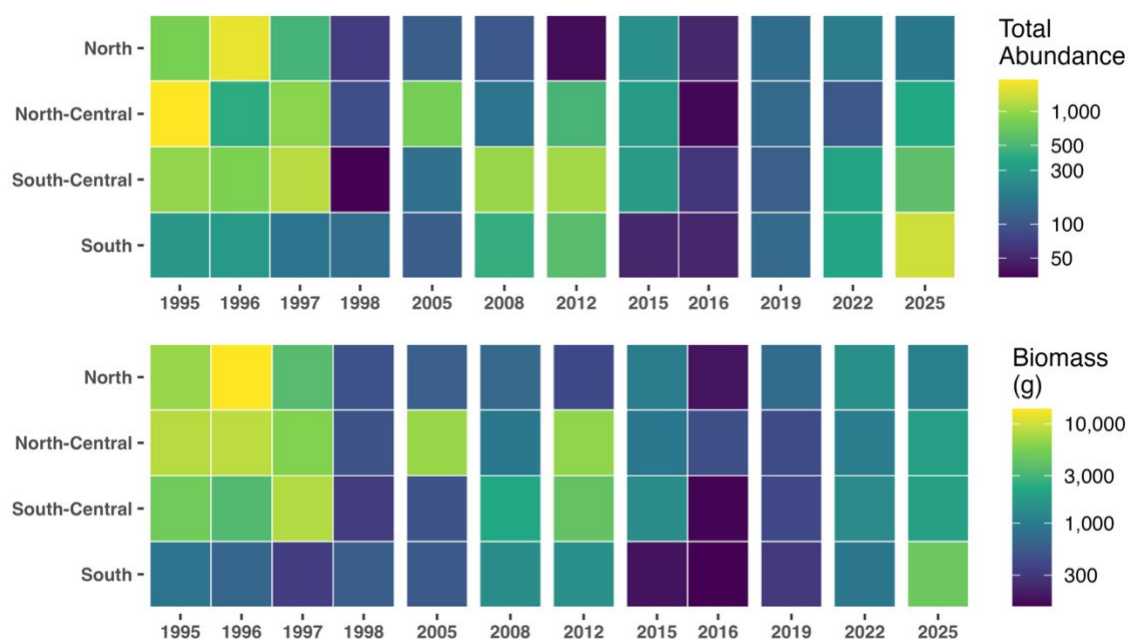


Figure 31. Total abundance (top) and biomass (bottom) of Shiner Perch caught in April and July by ecoregion and year, 1995-2025.

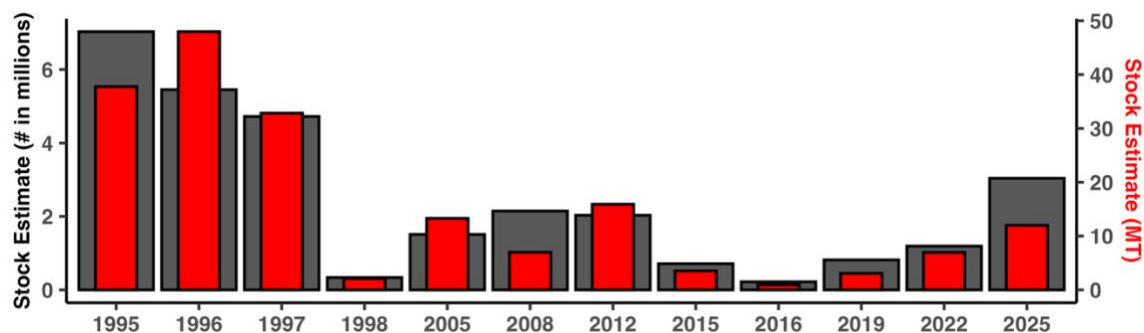


Figure 32. Annual stock estimates for Shiner Perch based upon April and July sampling, 1995-2025.

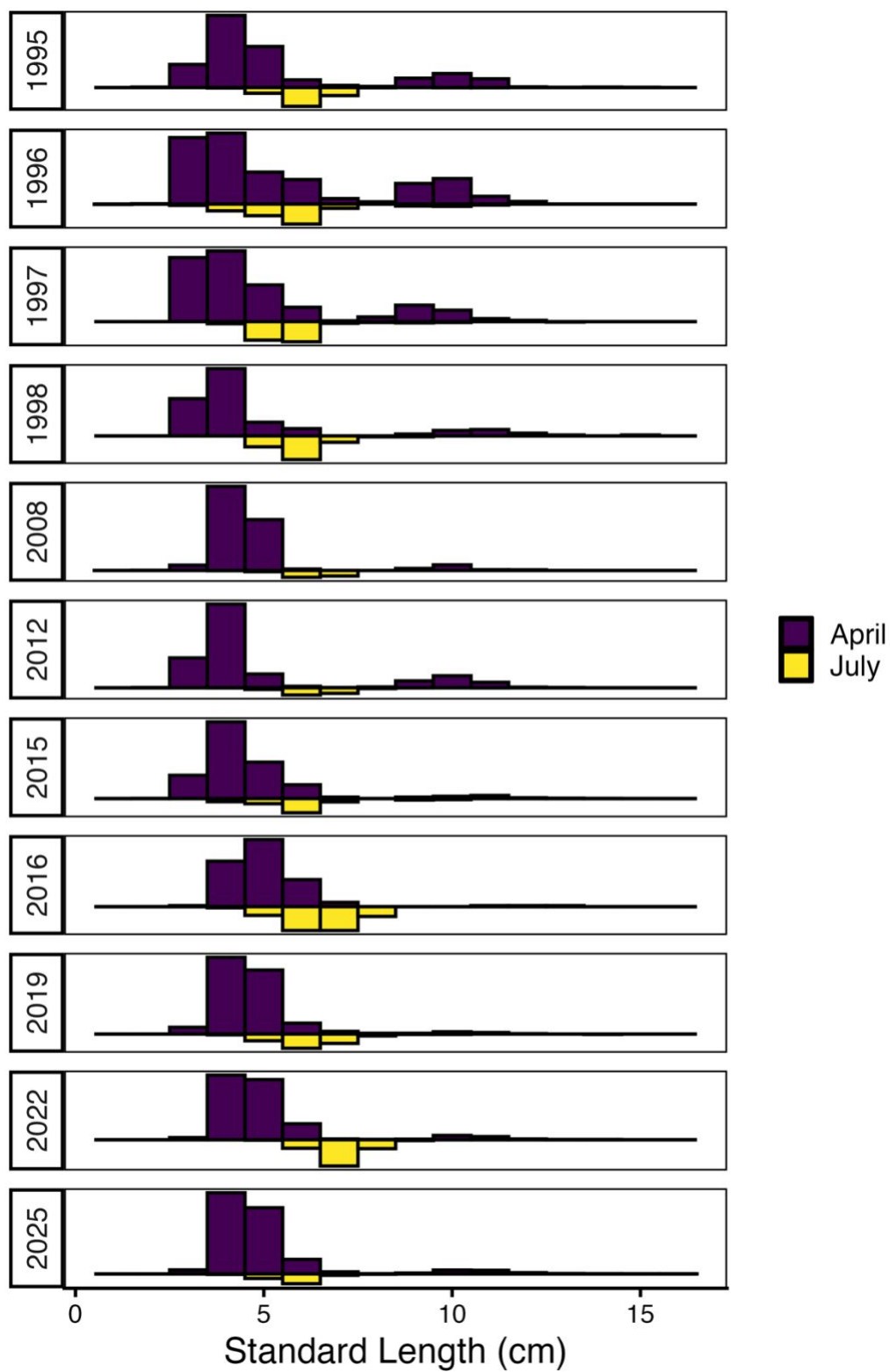


Figure 33. Length frequency of Shiner Perch caught in San Diego Bay during April and July by year, 1995-2025. Most small individuals were not measured in 2005, therefore that year was excluded.

4.7.6 Shortfin Corvina (*Cynoscion parvipinnis*)



Shortfin Corvina is a Panamic species that is relatively rare in San Diego Bay, however, it has been ranked in the top fifteen for ecological index in each of the last few surveys. This year they are ranked sixth – the highest of all historical surveys (**Figure 34**). In 2025, they only accounted for 0.48% of the

total catch, but 11.2% of the biomass (**Table 27**). They were captured in all Ecoregions, but entirely in the nearshore depth strata and mostly in the South Ecoregion (**Figure 35**). In fact, 111 of the 128 individuals captured (86.7%) were from a single purse seine replicate in April. Stock estimates for 2025 were the highest by a substantial amount owing mostly to that single replicate, therefore, stock estimates for this species should be treated with caution (**Figure 36**). The majority were large individuals, approaching or exceeding published maximum lengths (**Figure 37**), and were likely in a breeding aggregation when captured.

Table 27. Summary of abundance and biomass for Shortfin Corvina in 2025.

Common Name	Shortfin Corvina
Scientific Name	<i>Cynoscion parvipinnis</i>
Ecological Index	732.35
Freq. of Occurance	62.5%
% Juvenile	0.00%

		Abundance	Biomass (kg)
2025	Total	128	95
	% of Catch	0.48%	11.2%
	Stock Estimate	249,465	185.1 MT
Month	April	124	92.6
	July	4	2.4
Ecoregion	North	1	1.5
	North-Central	2	0.7
	South-Central	7	2.5
	South	118	90.3
Sub-habitat	Channel	0	0.0
	Non-Vegetated	118	90.9
	Vegetated	10	4.1
Depth Stratum	Channel	0	0.0
	Intertidal	0	0.0
	Nearshore	128	95.0

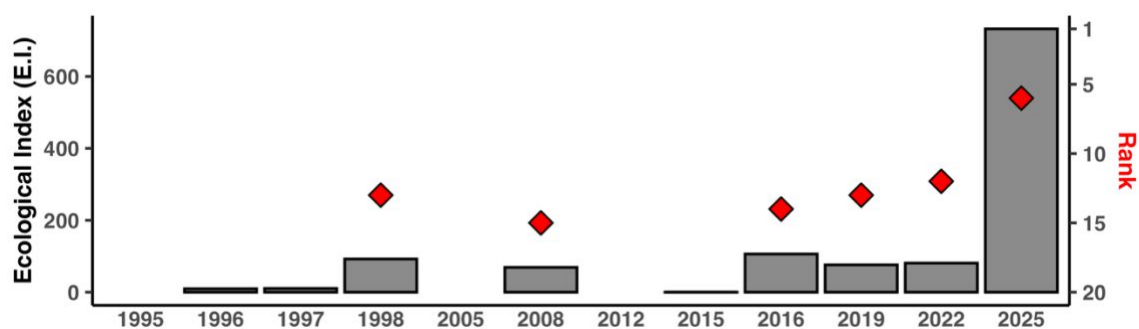


Figure 34. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Shortfin Corvina by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

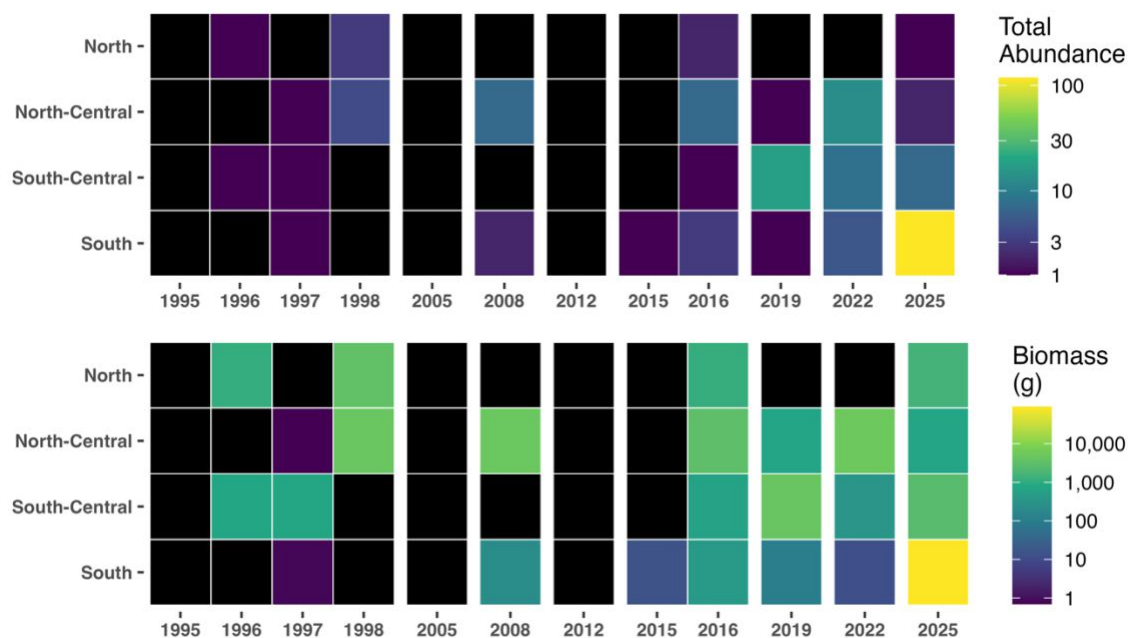


Figure 35. Total abundance (top) and biomass (bottom) of Shortfin Corvina caught in April and July by ecoregion and year, 1995-2025.

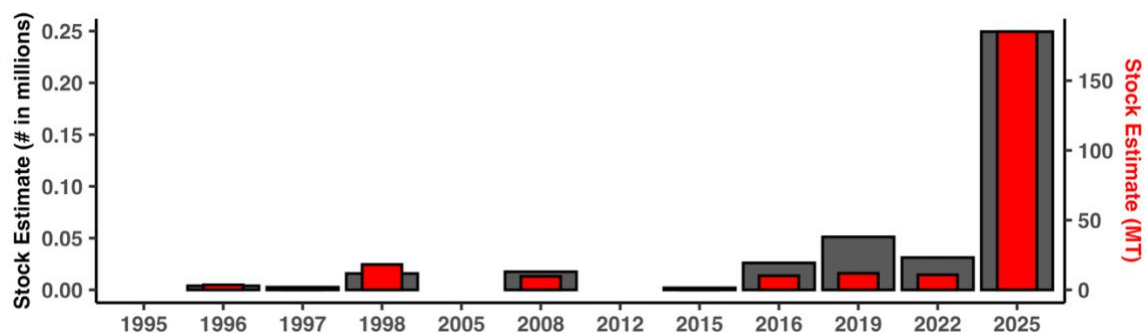


Figure 36. Annual stock estimates for Shortfin Corvina based upon April and July sampling, 1995-2025.

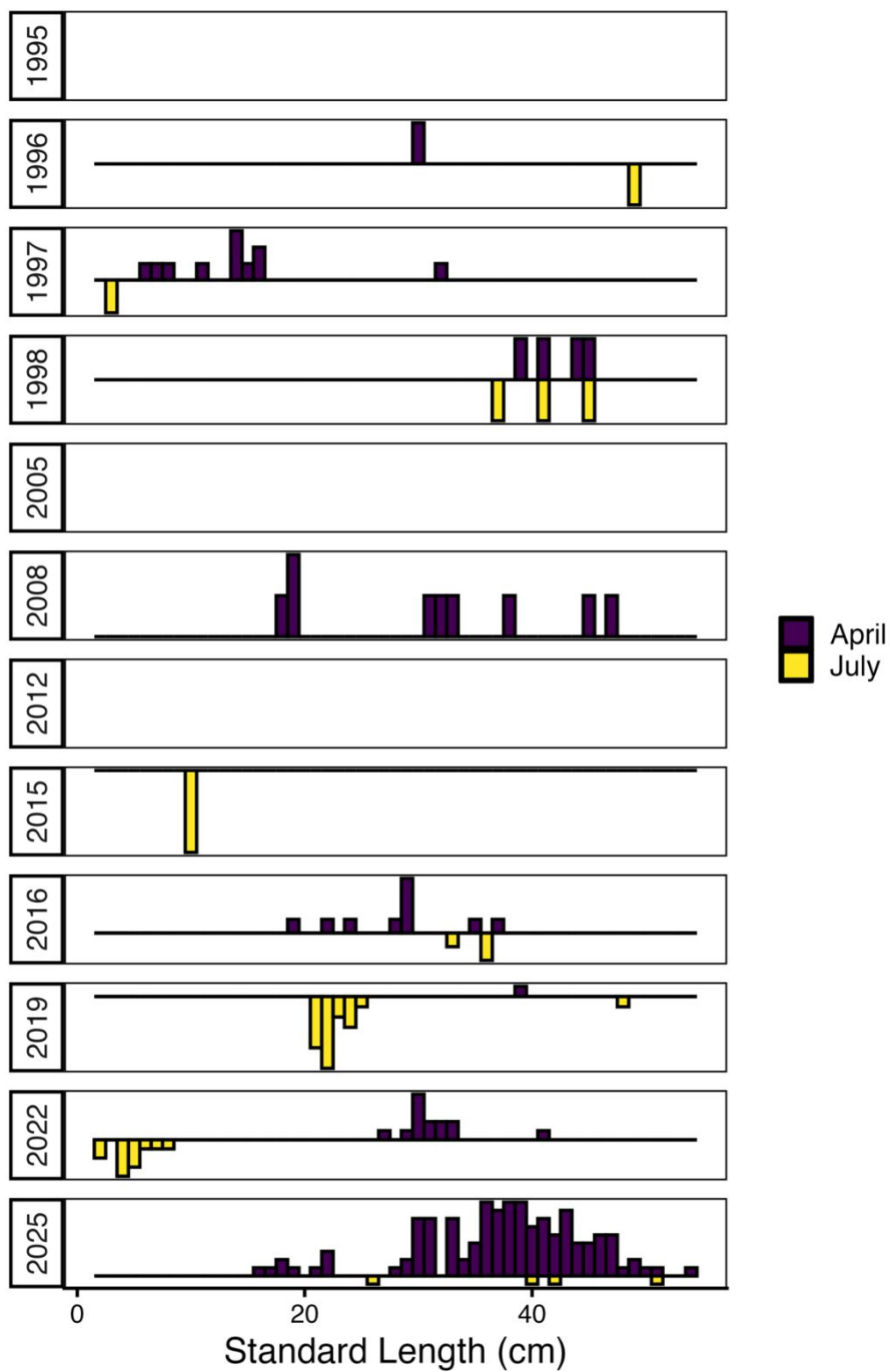


Figure 37. Length frequency of Shortfin Corvina caught in San Diego Bay during April and July by year, 1995-2025.

4.7.7 Kelp Pipefish (*Syngnathus californiensis*)



Kelp Pipefish are commonly among the top ten in ecological index, especially in the 21st Century (**Figure 38**). Though these long,

narrow fishes only accounted for 0.10% of the biomass captured, they ranked seventh in 2025 by accounting for 5.40% of the total abundance and being caught in all ecoregions during both survey periods, with abundance and biomass values nearly identical to the previous survey (**Figure 39**). They were caught in all depth strata and habitats, although they were significantly less common in the channel (**Table 28**). More than 75% of the individuals were captured in the nearshore subhabitat and showed a slight preference for vegetated versus non-vegetated habitat. Stock estimates for this fish were the second highest among historical data (**Figure 40**). A uniform size distribution belied the fact that just over half (53%) of the individuals captured were juveniles (**Figure 41**), but the increase in mean size from April to July indicates that this species grew quickly.

Table 28. Summary of abundance and biomass for Kelp Pipefish in 2025.

Common Name	Kelp Pipefish
Scientific Name	<i>Syngnathus californiensis</i>
Ecological Index	550.26
Freq. of Occurance	100.0%
% Juvenile	53.15%

		Abundance	Biomass (kg)
2025	Total	1,428	1
	% of Catch	5.40%	0.1%
	Stock Estimate	2,301,940	1.3 MT
Month	April	802	0.5
	July	626	0.4
Ecoregion	North	179	0.2
	North-Central	152	0.1
	South-Central	664	0.3
	South	433	0.2
Sub-habitat	Channel	27	0.0
	Non-Vegetated	804	0.4
	Vegetated	597	0.4
Depth Stratum	Channel	27	0.0
	Intertidal	320	0.2
	Nearshore	1,081	0.6

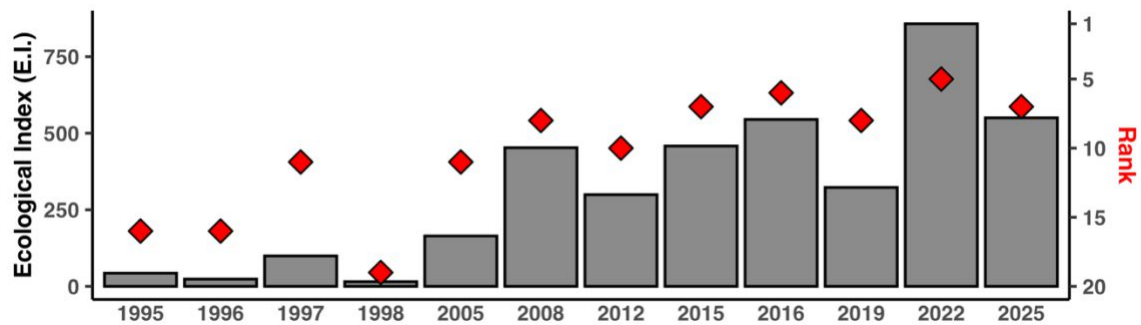


Figure 38. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Kelp Pipefish by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

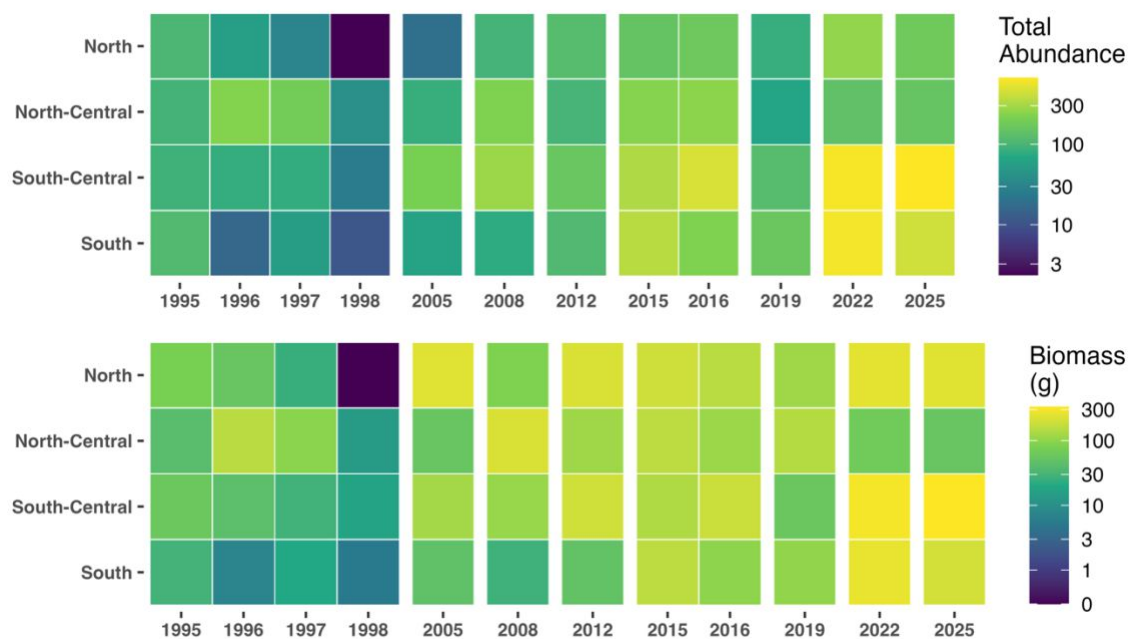


Figure 39. Total abundance (top) and biomass (bottom) of Kelp Pipefish caught in April and July by ecoregion and year, 1995-2025.

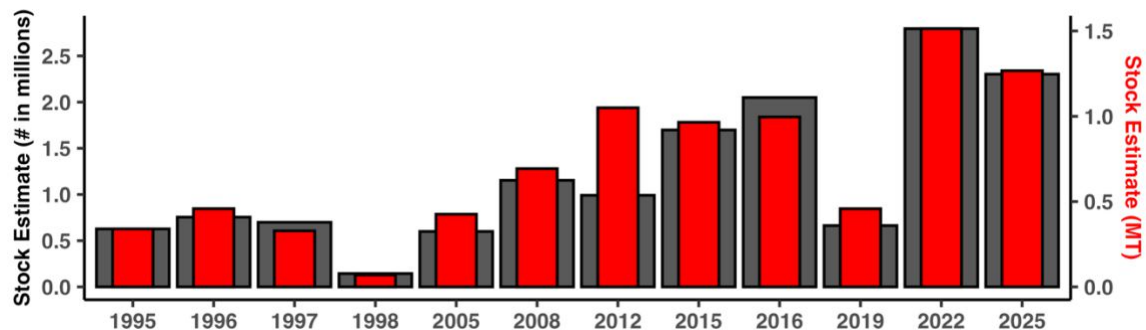


Figure 40. Annual stock estimates for Kelp Pipefish based upon April and July sampling, 1995-2025.

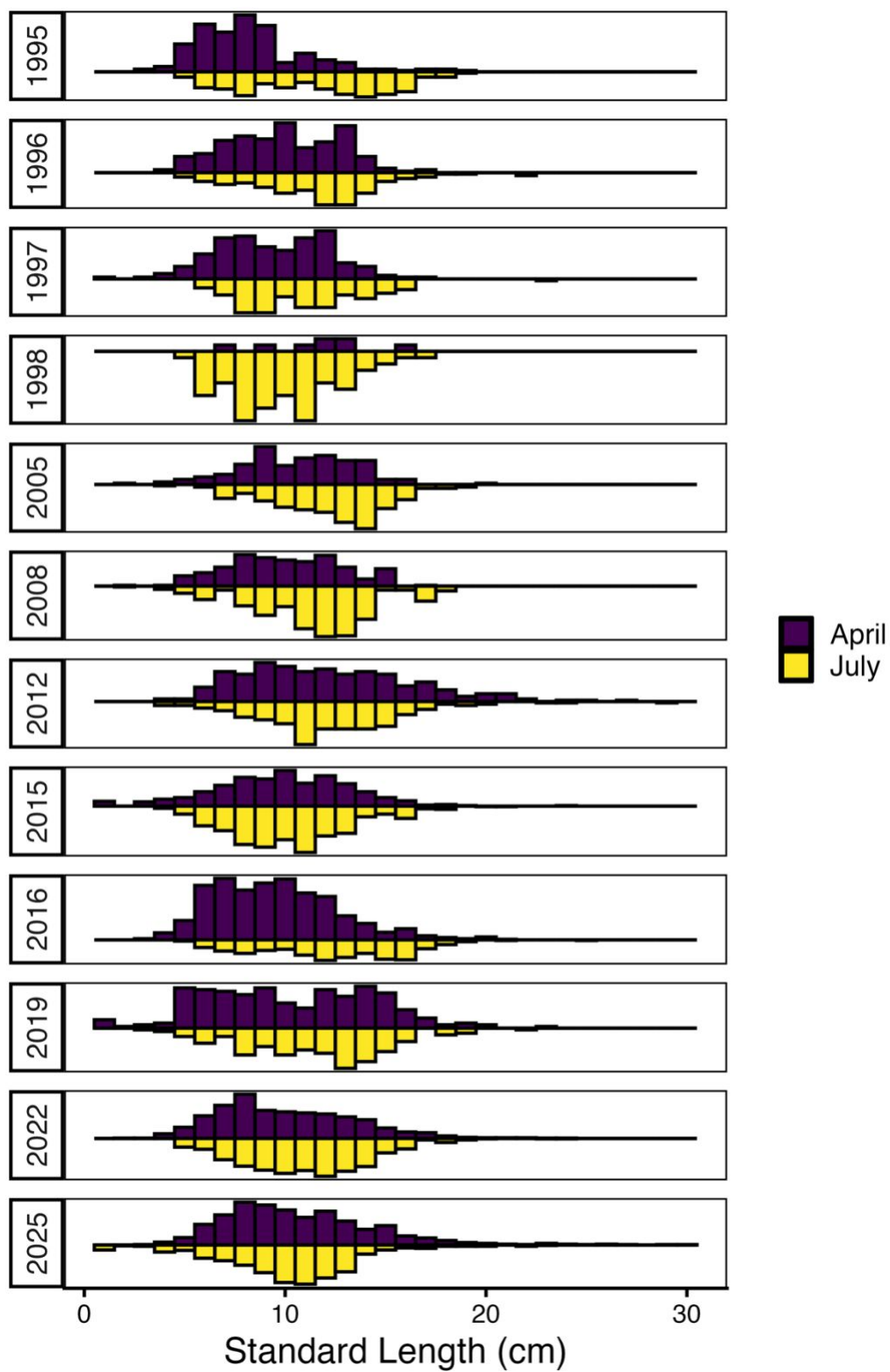


Figure 41. Length frequency of Kelp Pipefish caught in San Diego Bay during April and July by year, 1995-2025.

4.7.8 Pacific Sardine (*Sardinops sagax*)

Prior to 2025, Pacific Sardines have only ranked among the top 20 in ecological index once this century, but ranked eighth this year – the highest ranking among historical surveys (Figure 42). They had the second highest biomass and third highest numerical abundance (3,447; Table 29). Interestingly, Pacific Sardines have only been caught during April since



2019, whereas they were almost exclusively caught in July during prior surveys. This species is not a typical bay and estuary inhabitant, and only 110 individuals have been captured in this sampling program during this century, though large numbers were captured in the 1990s. Like the Shortfin Corvina, the bulk of Pacific Sardines (96.4%) were caught in a single purse seine replicate in the vegetated area of the North Ecoregion (Figure 43) causing their stock estimates to skyrocket (Figure 44). In fact, every Pacific Sardine captured in 2025 was an adult and captured by purse seine in the North Ecoregion in April (Figure 45). The commercial fishery for this species has been closed since 2015 due to low population sizes, but this catch at the entrance to the bay suggests that this may have been a breeding aggregation – a positive sign for the fishery.

Table 29. Summary of abundance and biomass for Pacific Sardine in 2025.

Common Name	Pacific Sardine
Scientific Name	<i>Sardinops sagax</i>
Ecological Index	488.37
Freq. of Occurance	12.5%
% Juvenile	0.00%

		Abundance	Biomass (kg)
2025	Total	3,447	220
	% of Catch	13.0%	26.0%
	Stock Estimate	6,804,893	433.9 MT
Month	April	3,447	220.0
	July	0	0.0
Ecoregion	North	3,447	220.0
	North-Central	0	0.0
	South-Central	0	0.0
	South	0	0.0
Sub-habitat	Channel	121	7.1
	Non-Vegetated	3	0.2
	Vegetated	3,323	212.7
Depth Stratum	Channel	121	7.1
	Intertidal	0	0.0
	Nearshore	3,326	212.9

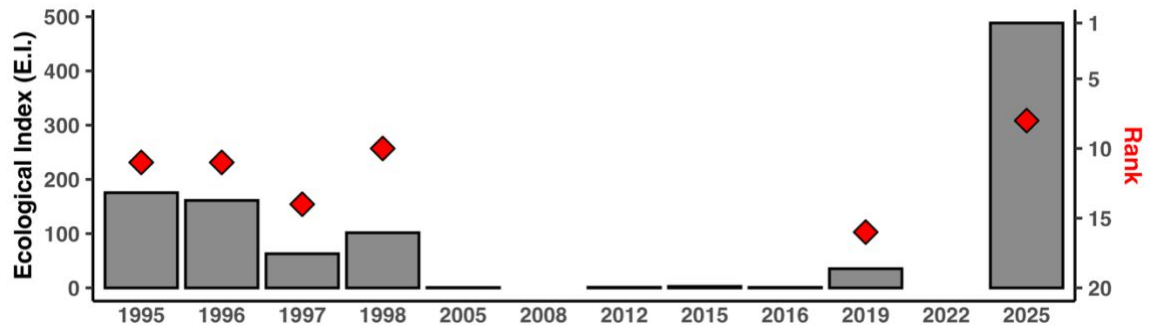


Figure 42. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Pacific Sardine by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

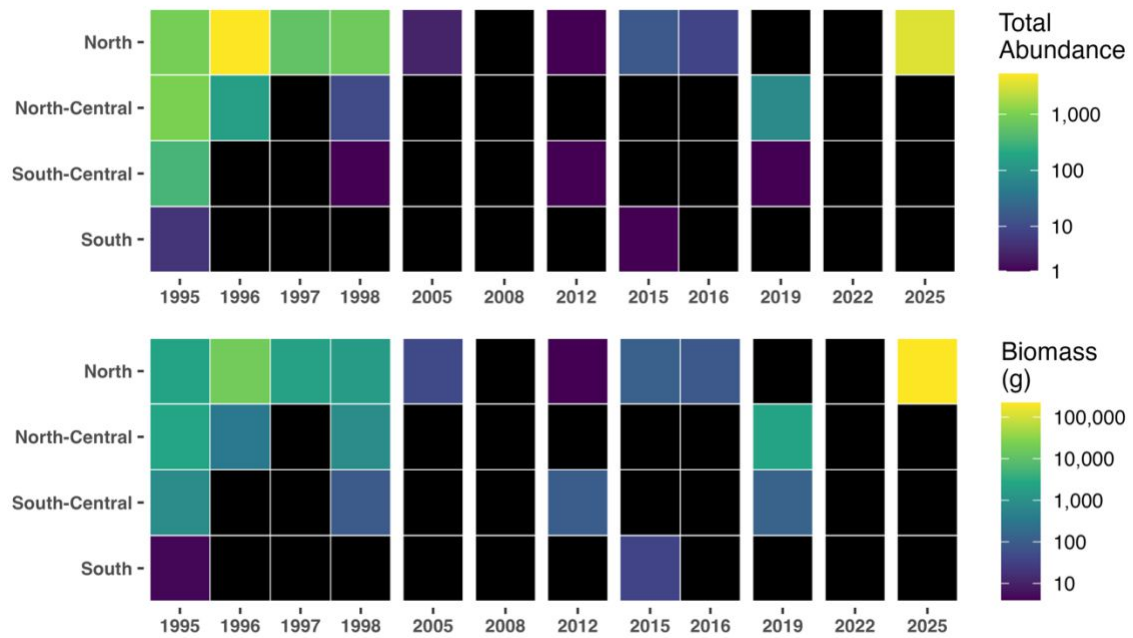


Figure 43. Total abundance (top) and biomass (bottom) of Pacific Sardine caught in April and July by ecoregion and year, 1995-2025.

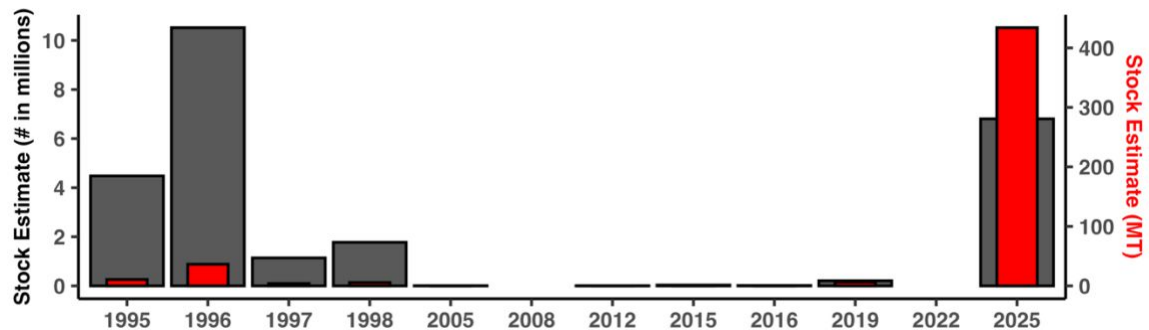


Figure 44. Annual stock estimates for Pacific Sardine based upon April and July sampling, 1995-2025.

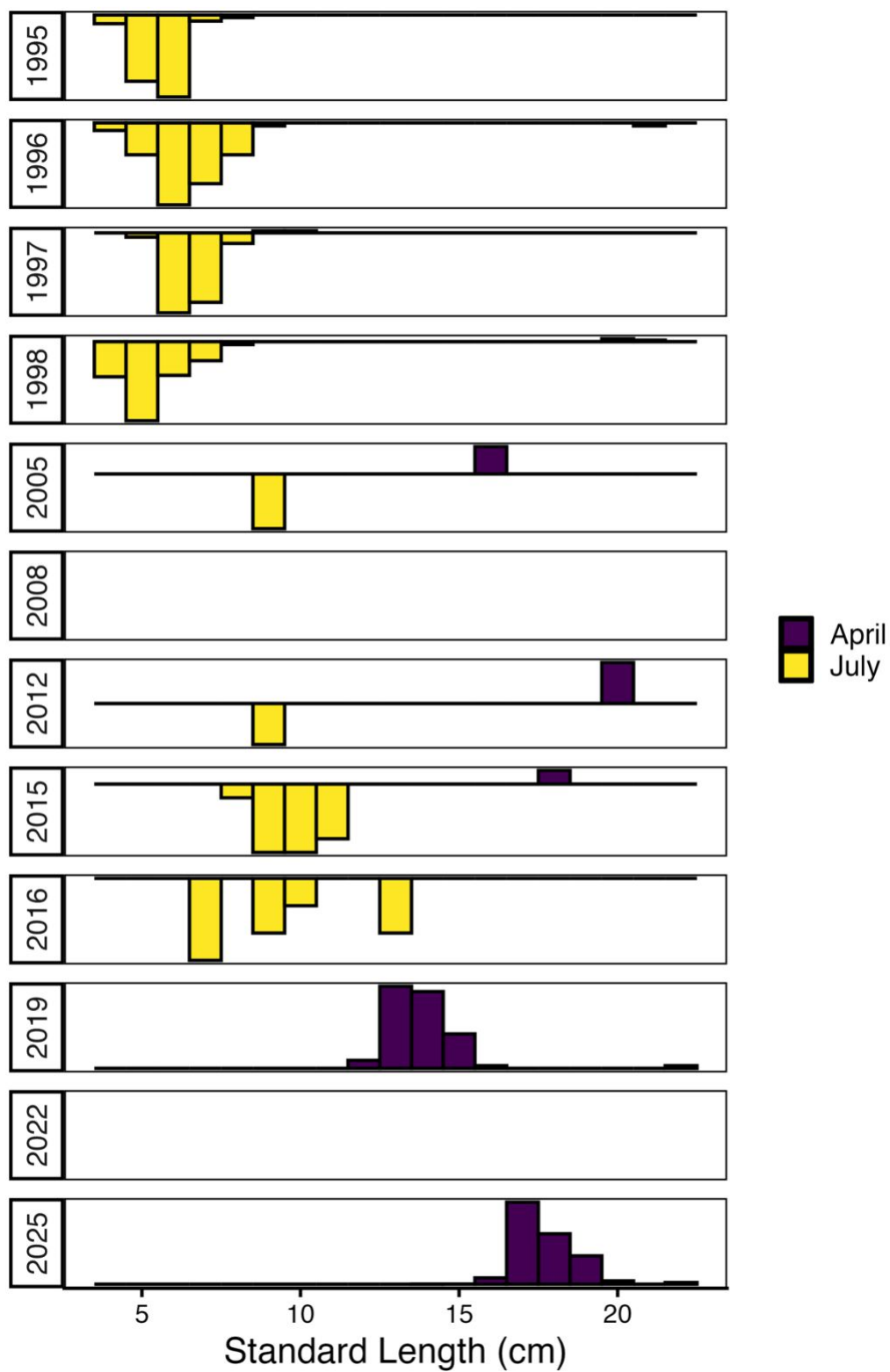


Figure 45. Length frequency of Pacific Sardine caught in San Diego Bay during April and July by year, 1995-2025.

4.7.9 Spotted Sand Bass (*Paralabrax maculatofasciatus*)

Spotted Sand Bass are the ubiquitous mesocarnivore in San Diego Bay and consistently rank in the top five for ecological index (Figure 46). In 2025, however, they ranked ninth having the sixth highest biomass but with only 104 individuals being captured (Table 30).



This species was ubiquitous throughout the bay during these surveys, and were found in all sampling periods, ecoregions, depth strata and subhabitats (Figure 47). The biomass standing stock estimate for the bay was average, but the numerical stock estimate was the lowest on record (Figure 48). Similar to 2019 and 2022, but unlike prior years, there was no bimodal size distribution (Figure 49) during either sampling period and very few juveniles were present. In short, Spotted Sand Bass appear to be amid a substantial, and possibly decade-long, period of recruitment failure in San Diego Bay.

Table 30. Summary of abundance and biomass for Spotted Sand Bass in 2025.

Common Name	Spotted Sand Bass
Scientific Name	<i>Paralabrax maculatofasciatus</i>
Ecological Index	462.55
Freq. of Occurance	100.0%
% Juvenile	2.88%

		Abundance	Biomass (kg)
2025	Total	104	36
	% of Catch	0.39%	4.2%
	Stock Estimate	144,521	53.3 MT
Month	April	73	25.7
	July	31	10.0
Ecoregion	North	10	5.0
	North-Central	35	11.6
	South-Central	34	11.5
	South	25	7.7
Sub-habitat	Channel	17	4.5
	Non-Vegetated	42	15.1
	Vegetated	45	16.1
Depth Stratum	Channel	17	4.5
	Intertidal	5	0.4
	Nearshore	82	30.9

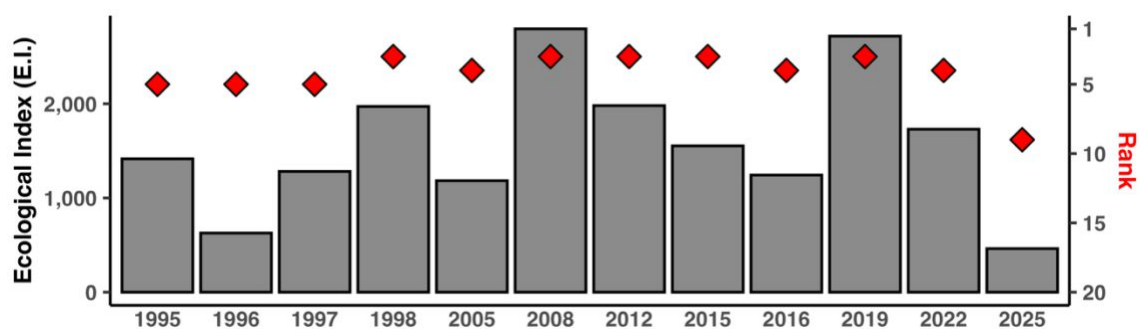


Figure 46. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Spotted Sand Bass by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

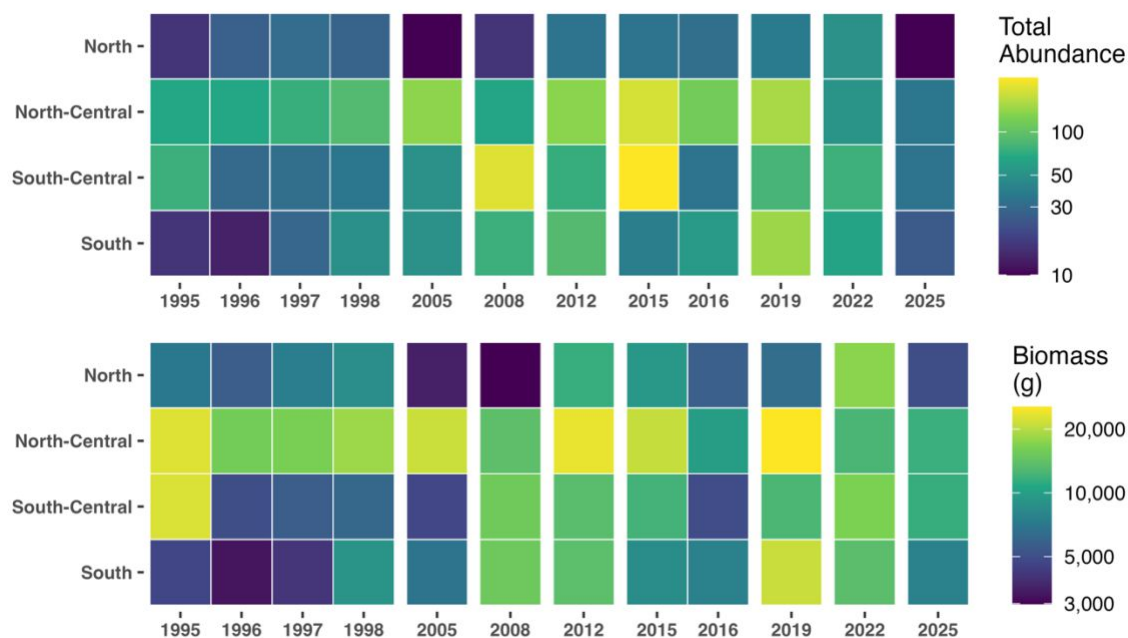


Figure 47. Total abundance (top) and biomass (bottom) of Spotted Sand Bass caught in April and July by ecoregion and year, 1995-2025.

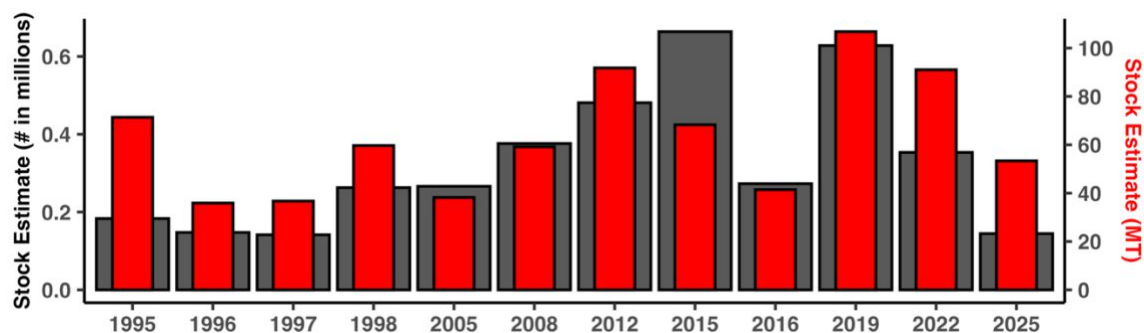


Figure 48. Annual stock estimates for Spotted Sand Bass based upon April and July sampling, 1995-2025.

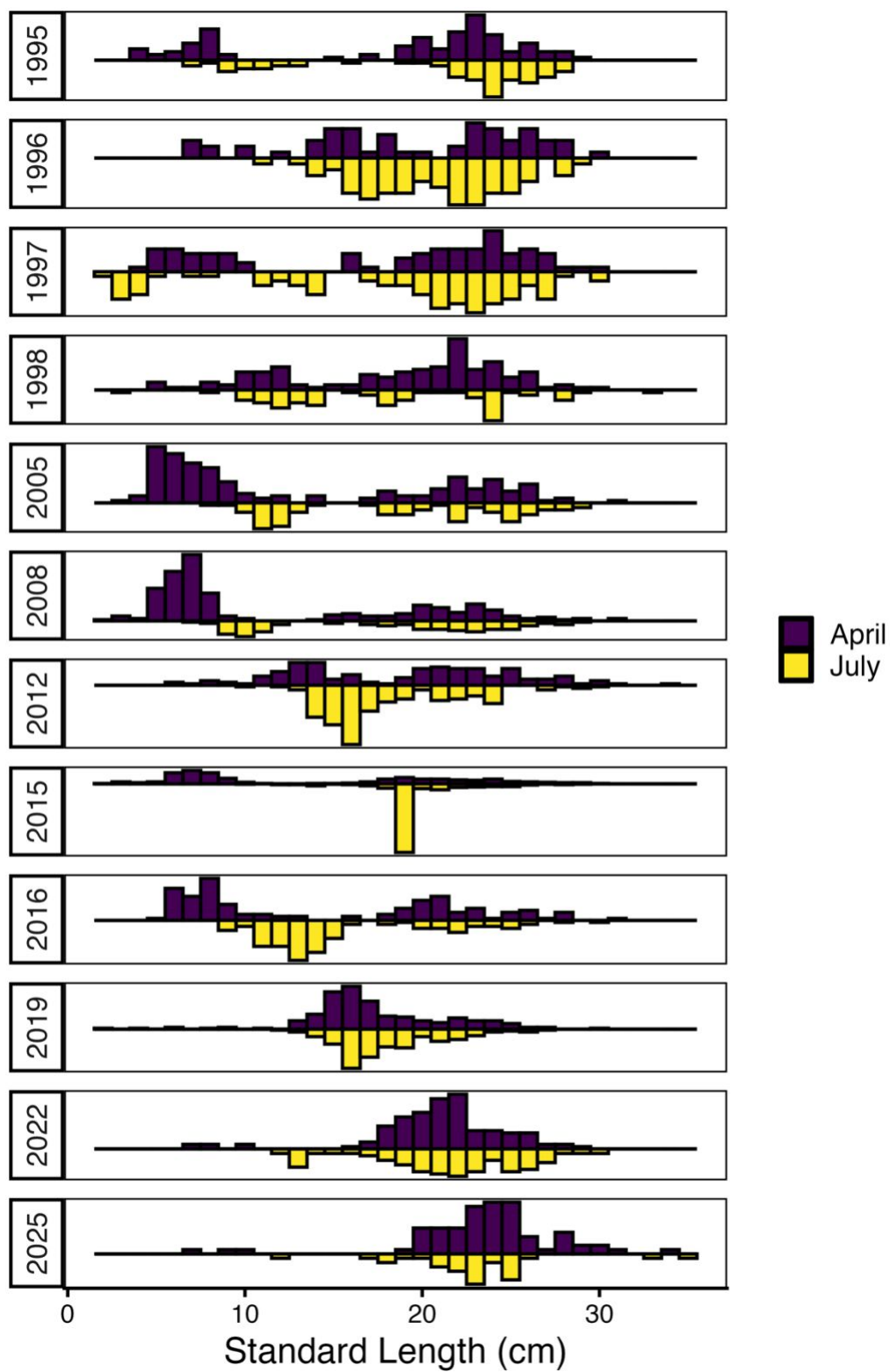


Figure 49. Length frequency of Spotted Sand Bass caught in San Diego Bay during April and July by year, 1995-2025.

4.7.10 Jacksmelt (*Atherinopsis californiensis*)



Jacksmelt rarely rank among the top twenty in ecological index, but in 2025 they ranked tenth (**Figure 50**) – a product of having the eighth highest abundance and fifth highest biomass (**Table 31**). This

species was caught in all subhabitats, but only in April, only by purse seine, mainly in the North Ecoregion, and not in the intertidal (**Figure 51**). This important forage fish species utilizes bays, estuaries, and nearshore ecosystems along the southern California coastline and stock estimates in 2025 were more than ten times the historical average (**Figure 52**). This year's multi-modal size distribution (**Figure 53**) has large peaks at young-of-the-year and adults sizes, suggesting that these fish are utilizing San Diego Bay as both a nursery and a spawning ground.

Table 31. Summary of abundance and biomass for Jacksmelt in 2025.

Common Name	Jacksmelt
Scientific Name	<i>Atherinopsis californiensis</i>
Ecological Index	391.16
Freq. of Occurrence	37.5%
% Juvenile	48.36%

		Abundance	Biomass (kg)
		Total	
2025	Total	1,129	52
	% of Catch	4.27%	6.2%
	Stock Estimate	2,408,587	105.2 MT
Month	April	1,129	52.1
	July	0	0.0
Ecoregion	North	1,117	50.9
	North-Central	2	0.4
	South-Central	10	0.8
	South	0	0.0
Sub-habitat	Channel	290	5.2
	Non-Vegetated	477	8.4
	Vegetated	362	38.5
Depth Stratatum	Channel	290	5.2
	Intertidal	0	0.0
	Nearshore	839	46.9

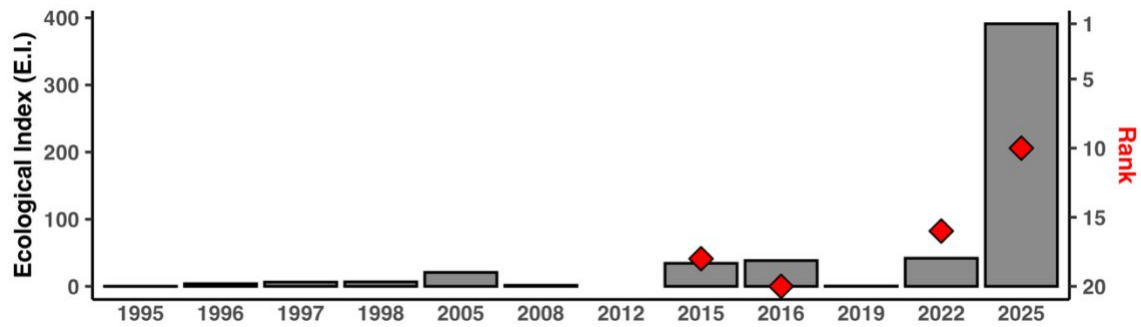


Figure 50. Ecological importance (E.I.; gray bars) and E.I. rank (red diamonds) of Jacksmelt by year, 1995-2025. Missing red diamonds indicate that the species was not in the top 20 species for E.I. in that year.

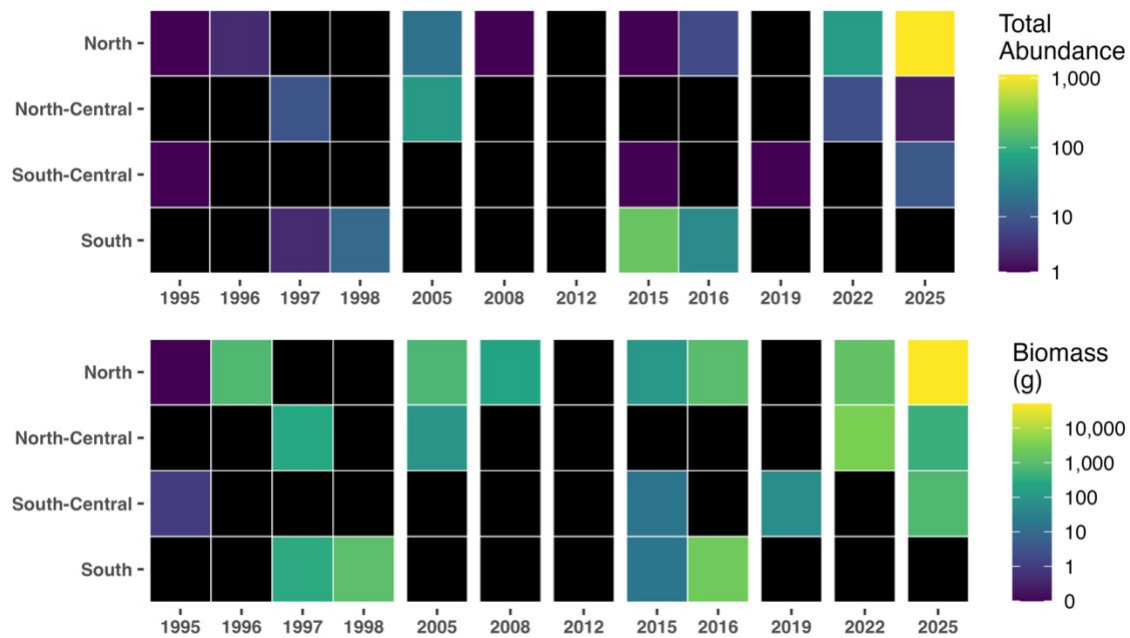


Figure 51. Total abundance (top) and biomass (bottom) of Jacksmelt caught in April and July by ecoregion and year, 1995-2025.

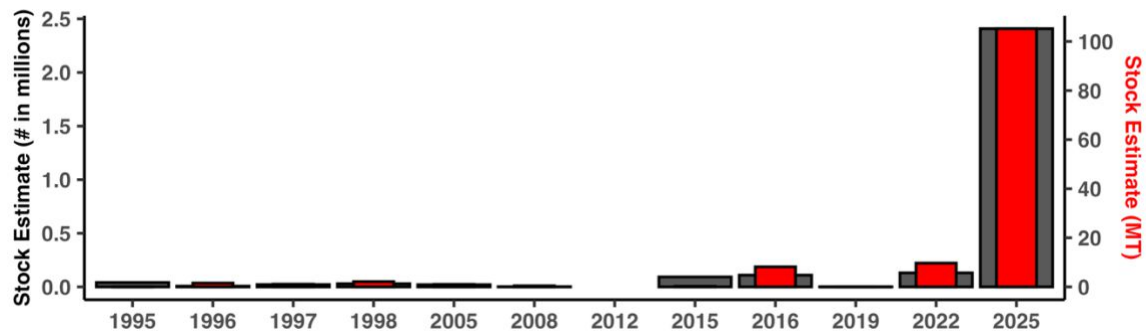


Figure 52. Annual stock estimates for Jacksmelt based upon April and July sampling, 1995-2025.

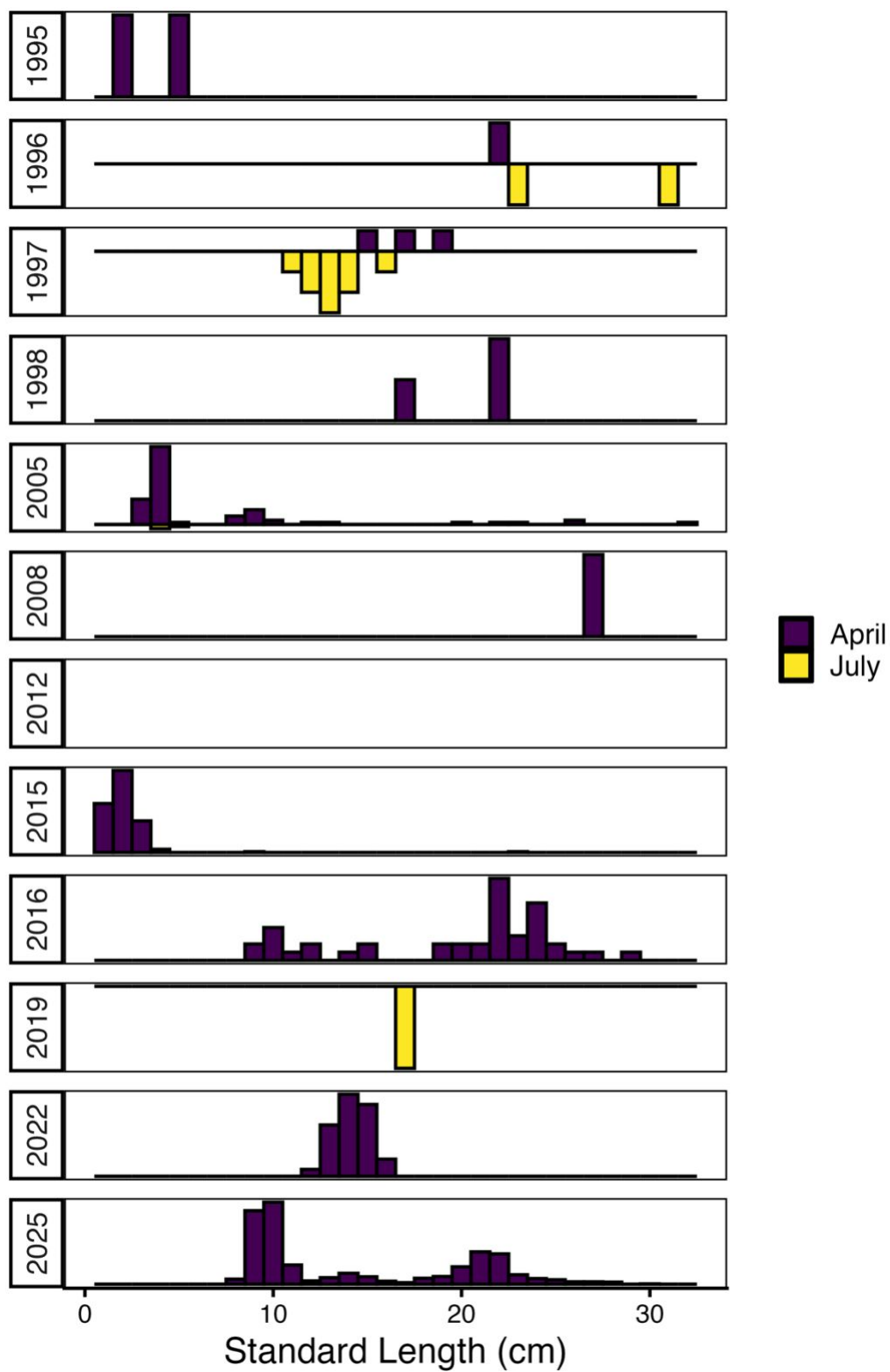


Figure 53. Length frequency of Jacksmelt caught in San Diego Bay during April and July by year, 1995-2025.

4.8 Groups of Interest

4.8.1 Avian Forage Species

Forage species are primarily surface-dwelling schooling fish that are accessible to diving avian predators, especially terns. Generally, forage fishes are small silvery-sided fishes that are found in large schools. These schooling fishes are generally not habitat specific and move throughout the bay's ecosystem. Thirteen species of important forage fishes (as defined in Pondella and Williams 2011) were captured during this study. The most abundant forage fishes were adult Pacific Sardine, Northern Anchovy, and Jacksmelt that are a good source of food for full-size birds, but too large for nesting birds in the area to feed their young. However, Shiner Perch, Slough Anchovy, and Topsmelt were all abundant at sizes small enough to be eaten by fledglings. The typical timing for the recruitment of fishes to San Diego Bay begins in the spring and continues through the summer which appears to be consistent in 2025. The biomass standing stock estimate for forage fish was 382.7 MT, largely due to high estimates at the North Ecoregion (323.1 MT) which was driven by Pacific Sardines, Northern Anchovy, and Jacksmelt. This was followed by the South-Central Ecoregion (24.4 MT), the North-Central Ecoregion (23.6 MT), and the South Ecoregion (11.6 MT; **Table 32**).



Slough Anchovy (*Anchoa delicatissima*) caught by purse seine in the South Ecoregion, April 2025

Table 32. Best estimate of biomass standing stock for forage fish species by ecoregion, 2025.

Ecoregion	Depth Strata					Weighted Mean	Stock Estimate (kg)	Stock Estimate (MT)
	Scientific Name	Common Name	Channel	Intertidal	Nearshore			
North	<i>Sardinops sagax</i>	Pacific Sardine	3.99775		59.94651	22.22097	218,210	218.2
	<i>Atherinopsis californiensis</i>	Jacksnelt	2.50901		13.07995	5.84688	57,416	57.42
	<i>Engraulis mordax</i>	Northern Anchovy			8.70270	2.87189	28,202	28.20
	<i>Atherinops affinis</i>	Topsmelt	1.66667	0.80303	0.27984	1.15720	11,364	11.36
	<i>Leuresthes tenuis</i>	California Grunion			0.73198	0.24155	2,372	2.37
	<i>Anchoa delicatissima</i>	Slough Anchovy			0.56588	0.18674	1,834	1.83
	<i>Heterostichus rostratus</i>	Giant Kelpfish		0.21894	0.50546	0.17994	1,767	1.77
	<i>Micrometrus minimus</i>	Dwarf Perch		0.16932	0.32040	0.11589	1,138	1.14
	<i>Cymatogaster aggregata</i>	Shiner Perch		0.09543	0.24023	0.08500	835	0.83
	<i>Clevelandia ios</i>	Arrow Goby		0.00134	0.00029	0.00018	2	< 0.01
	Grand Total:			1.28806	84.37325	32.90624	323,139	323.1
North-Central	<i>Atherinops affinis</i>	Topsmelt	0.45045	0.53106	3.82264	1.73591	14,026	14.03
	<i>Scomber japonicus</i>	Pacific Chub Mackerel	0.98536			0.56166	4,538	4.54
	<i>Anchoa delicatissima</i>	Slough Anchovy			1.06503	0.40471	3,270	3.27
	<i>Cymatogaster aggregata</i>	Shiner Perch		0.38106	0.24803	0.11330	915	0.92
	<i>Heterostichus rostratus</i>	Giant Kelpfish		0.05720	0.13218	0.05309	429	0.43
	<i>Atherinopsis californiensis</i>	Jacksnelt			0.11261	0.04279	346	0.35
	<i>Clevelandia ios</i>	Arrow Goby		0.08333	0.00086	0.00449	36	0.04
	<i>Micrometrus minimus</i>	Dwarf Perch		0.04621		0.00231	19	0.02
	<i>Leuresthes tenuis</i>	California Grunion		0.02235		0.00112	9	0.01
	<i>Engraulis mordax</i>	Northern Anchovy			0.00225	0.00086	7	0.01
	<i>Fundulus parvipinnis</i>	California Killifish		0.00417		0.00021	2	< 0.01
	Grand Total:		1.43581	1.12538	5.38361	2.92045	23,597	23.6
South-Central	<i>Anchoa delicatissima</i>	Slough Anchovy	1.03209	0.00606	0.16948	0.47512	9,526	9.53
	<i>Atherinops affinis</i>	Topsmelt	0.13007	0.62879	0.51380	0.37910	7,601	7.60
	<i>Cymatogaster aggregata</i>	Shiner Perch			0.32855	0.20041	4,018	4.02
	<i>Atherinopsis californiensis</i>	Jacksnelt	0.42230			0.15203	3,048	3.05
	<i>Fundulus parvipinnis</i>	California Killifish		0.10871		0.00326	65	0.07
	<i>Clevelandia ios</i>	Arrow Goby		0.08333	0.00057	0.00285	57	0.06
	<i>Heterostichus rostratus</i>	Giant Kelpfish			0.00374	0.00228	46	0.05
	<i>Engraulis mordax</i>	Northern Anchovy	0.00007		0.00057	0.00038	8	0.01
	<i>Hyporhamphus rosae</i>	California Halfbeak		0.00038		0.00001	< 1	< 0.01
	Grand Total:		1.58453	0.82727	1.01671	1.21544	24,369	24.4
South	<i>Cymatogaster aggregata</i>	Shiner Perch	0.02834		1.09600	0.91337	9,718	9.72
	<i>Atherinops affinis</i>	Topsmelt	0.04786	0.31667	0.12922	0.12614	1,342	1.34
	<i>Anchoa delicatissima</i>	Slough Anchovy	0.01689	0.02083	0.02872	0.02686	286	0.29
	<i>Clevelandia ios</i>	Arrow Goby		0.16667	0.00374	0.00977	104	0.10
	<i>Fundulus parvipinnis</i>	California Killifish		0.21402		0.00856	91	0.09
	<i>Hyporhamphus rosae</i>	California Halfbeak		0.01402		0.00056	6	0.01
	<i>Engraulis mordax</i>	Northern Anchovy	0.00021			0.00003	< 1	< 0.01
	Grand Total:		0.09330	0.73220	1.25768	1.08529	11,547	11.5

4.8.2 Fisheries Species

During this study, 17 species were captured that have importance in either the recreational or commercial fisheries in California. The most abundant fisheries species were Pacific Sardine, Northern Anchovy, Spotted Sand Bass, and Shortfin Corvina. Including all ecoregions, standing stock estimates of fisheries species totaled 572.9 MT. When estimating by ecoregion values were greatest at the North Ecoregion (256.5 MT), again driven by Pacific Sardines and Northern Anchovy. Stock estimates were next highest in the South Ecoregion (245.0 MT) which was driven by a large catch of Shortfin Corvina. The South-Central Ecoregion (54.3 MT) and North-Central Ecoregion (17.1 MT) estimates were both driven by Spotted Sand Bass (**Table 33**).



A 48 cm SL California Halibut (*Paralichthys californicus*) caught by purse seine in the North-Central Ecoregion, April 2025

Table 33. Best estimate of biomass standing stock for fisheries species by ecoregion, 2025.

Ecoregion	Depth Strata					Weighted Mean	Stock Estimate (kg)	Stock Estimate (MT)
	Scientific Name	Common Name	Channel	Intertidal	Nearshore			
North	<i>Sardinops sagax</i>	Pacific Sardine	3.99775		59.94651	22.22097	218,210	218.2
	<i>Engraulis mordax</i>	Northern Anchovy			8.70270	2.87189	28,202	28.20
	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.05206	0.12500	1.04167	0.38301	3,761	3.76
	<i>Cynoscion parvipinnis</i>	Shortfin Corvina			0.42230	0.13936	1,368	1.37
	<i>Sarda chiliensis</i>	Pacific Bonito			0.39414	0.13007	1,277	1.28
	<i>Roncador stearnsii</i>	Spotfin Croaker			0.36599	0.12078	1,186	1.19
	<i>Paralichthys californicus</i>	California Halibut	0.07827	0.06667	0.09770	0.08398	825	0.82
	<i>Sphyaena argentea</i>	Pacific Barracuda			0.18694	0.06169	606	0.61
	<i>Paralabrax nebulifer</i>	Barred Sand Bass			0.16892	0.05574	547	0.55
	<i>Paralabrax clathratus</i>	Kelp Bass			0.07902	0.02608	256	0.26
	<i>Embiotoca jacksoni</i>	Black Perch			0.06839	0.02257	222	0.22
	<i>Cheilotrema saturnum</i>	Black Croaker			0.00287	0.00095	9	0.01
	<i>Seriphus politus</i>	Queenfish			0.00144	0.00047	5	< 0.01
	Grand Total:		4.12807	0.19167	71.47859	26.11756	256,474	256.5
North-Central	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.03551	0.02727	2.62387	1.01868	8,231	8.23
	<i>Scomber japonicus</i>	Pacific Chub Mackerel	0.98536			0.56166	4,538	4.54
	<i>Paralichthys californicus</i>	California Halibut	0.03331		0.57404	0.23712	1,916	1.92
	<i>Paralabrax nebulifer</i>	Barred Sand Bass	0.00421	0.03106	0.29054	0.11436	924	0.92
	<i>Cynoscion parvipinnis</i>	Shortfin Corvina			0.19707	0.07489	605	0.61
	<i>Sphyaena argentea</i>	Pacific Barracuda			0.19707	0.07489	605	0.61
	<i>Paralabrax clathratus</i>	Kelp Bass			0.04251	0.01615	131	0.13
	<i>Cheilotrema saturnum</i>	Black Croaker	0.02413		0.00029	0.01387	112	0.11
	<i>Engraulis mordax</i>	Northern Anchovy			0.00225	0.00086	7	0.01
	Grand Total:		1.08252	0.05833	3.92765	2.11246	17,069	17.1
South-Central	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass			2.95777	1.80424	36,175	36.18
	<i>Cynoscion parvipinnis</i>	Shortfin Corvina			0.69932	0.42659	8,553	8.55
	<i>Roncador stearnsii</i>	Spotfin Croaker			0.36599	0.22325	4,476	4.48
	<i>Sphyaena argentea</i>	Pacific Barracuda			0.14077	0.08587	1,722	1.72
	<i>Albula gilberti</i>	Cortez Bonefish			0.10839	0.06612	1,326	1.33
	<i>Seriphus politus</i>	Queenfish			0.05631	0.03435	689	0.69
	<i>Paralichthys californicus</i>	California Halibut	0.03696		0.02931	0.03119	625	0.63
	<i>Cheilotrema saturnum</i>	Black Croaker	0.03517		0.02027	0.02503	502	0.50
	<i>Paralabrax nebulifer</i>	Barred Sand Bass	0.01351		0.01126	0.01173	235	0.24
	<i>Engraulis mordax</i>	Northern Anchovy	0.00007		0.00057	0.00038	8	0.01
	Grand Total:		0.08571	0.00000	4.38996	2.70873	54,310	54.3
South	<i>Cynoscion parvipinnis</i>	Shortfin Corvina			25.42033	21.09887	224,492	224.49
	<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	0.20383		0.87134	0.74971	7,977	7.98
	<i>Albula gilberti</i>	Cortez Bonefish			0.88176	0.73186	7,787	7.79
	<i>Sphyaena argentea</i>	Pacific Barracuda			0.38007	0.31546	3,356	3.36
	<i>Atractoscion nobilis</i>	White Seabass			0.15484	0.12852	1,367	1.37
	<i>Paralichthys californicus</i>	California Halibut	0.03082			0.00401	43	0.04
	<i>Umbrina roncadore</i>	Yellowfin Croaker		0.01061		0.00042	5	< 0.01
	<i>Engraulis mordax</i>	Northern Anchovy	0.00021			0.00003	< 1	< 0.01
	Grand Total:		0.23486	0.01061	27.70833	23.02887	245,027	245.0

4.8.3 Southern (Panamic) Species Found in San Diego Bay

San Diego Bay is known for being the northern edge of the range for many southern fishes that are not normally distributed in the Southern California Bight. As an example, at least 25 northern range extensions have been reported from the bay (**Table 34**). During this study, eight species [Cortez Bonefish, Longtail Goby (*Ctenogobius sagittula*), Shortfin Corvina (*Cynoscion parvipinnis*), Diamond Stingray (*Dasyatis dipterura*), California Butterfly Ray (*Gymnura marmorata*), Pacific Seahorse (*Hippocampus ingens*), California Halfbeak (*Hyporhamphus rosae*), and Banded Guitarfish (*Zapteryx exasperata*)] with primarily southern distributions were taken (**Table 35**). These fishes were found throughout the bay in both sampling months.

Table 34. Panamic species previously recorded in San Diego Bay.

Scientific Name	Common Name	First Recorded SDB Collection Date	Citation
<i>Albula gilberti</i>	Cortez Bonefish	prior to 1918	Starks (1918)
<i>Caranx caballus</i>	Green Jack	1857	Girard (1858)
<i>Caranx caninus</i>	Pacific Crevalle Jack	16 Mar 1972	Miller and Lea (1972)
<i>Caranx vinctus</i>	Cocinero	12 Aug 1997	Lea and Rosenblatt (2000)
<i>Caranx sexfasciatus</i>	Bigeye Trevally	Nov 1990	Lea and Walker (1995)
<i>Cetengraulis mysticetus</i>	Anchoveta	1980-1986	Duffy (1987)
<i>Chanos chanos</i>	Milkfish	22 Mar 1982	Duffy and Bernard (1985)
<i>Chaetodon humeralis</i>	Threebanded Butterflyfish	1857	Girard (1858)
<i>Ctenogobius sagittula</i>	Longtail Goby	1907	Lea and Rosenblatt (2000)
<i>Cynoscion parvipinnis</i>	Shortfin Corvina	common	Jordan and Gilbert (1880)
<i>Dasyatis dipterura</i>	Diamond Stingray	1880 (type locale)	Jordan and Gilbert (1880)
<i>Elops affinis</i>	Machete	30 Dec 1997	Lea and Rosenblatt (2000)
<i>Gymnura marmorata</i>	California Butterfly Ray	1864 (type locale)	Cooper (1864)
<i>Haemulon flaviguttatum</i>	Cortez Grunt	May 1991	Lea and Rosenblatt (1992)
<i>Hippocampus ingens</i>	Pacific Seahorse	1855 (type locale)	Girard (1858)
<i>Hyporhamphus rosae</i>	California Halfbeak	1880 (type locale)	Jordan and Gilbert (1880)
<i>Lobotes pacificus</i>	Pacific Tripletail	5 Nov 1997	Lea and Rosenblatt (2000)
<i>Mugil curema</i>	White Mullet	25 May 1985	Lea et al. (1988)
<i>Polydactylus approximans</i>	Blue Bobo	Dec 1997	Lea and Rosenblatt (2000)
<i>Pseudupeneus grandisquamis</i>	Bigscale Goatfish	15 Jul 1998	Lea and Rosenblatt (2000)
<i>Scomberomorus sierra</i>	Pacific Sierra	Dec 1995	Williams et al. (2011)
<i>Selene brevoortii</i>	Mexican Lookdown	Feb 1993	Lea and Walker (1995)
<i>Sphyrna lewini</i>	Scalloped Hammerhead	Apr 1997	Lea and Rosenblatt (2000)
<i>Strongylura exilis</i>	California Needlefish	common	Fitch and Lavenberg (1975)
<i>Zapteryx exasperata</i>	Banded Guitarfish	1880 (type locale)	Jordan and Gilbert (1880)



California Halfbeak (*Hyporhamphus rosae*) caught by large beach seine in the South Ecoregion, July 2025

Table 35. Abundance of Panamic species collected in San Diego Bay by ecoregion, April and July 2025.

Scientific Name Common Name		Ecoregions							
		North		North-Central		South-Central		South	
		April	July	April	July	April	July	April	July
<i>Albula gilberti</i>	Cortez Bonefish						2		19
<i>Ctenogobius sagittula</i>	Longtail Goby					1		3	
<i>Cynoscion parvipinnis</i>	Shortfin Corvina		1		2	6	1	118	
<i>Dasyatis dipterura</i>	Diamond Stingray	2							
<i>Gymnura marmorata</i>	California Butterfly Ray					1			1
<i>Hippocampus ingens</i>	Pacific Seahorse			3					1
<i>Hyporhamphus rosae</i>	California Halfbeak					1		5	3
<i>Zaperyx exasperata</i>	Banded Guitarfish	1	1						

4.8.4 Indigenous Bay and Estuary Fishes

As the largest estuary in southern California, San Diego Bay provides critical habitat for bay and estuary fishes and continues to function as a nursery area for just over half (53.8%) of those fishes. The high productivity rate coupled with the abundance of juvenile fishes in the bay highlights the importance of the bay as a nursery habitat. The bay contains extensive shallow water eelgrass habitat that supports a unique assemblage of juvenile and adult fishes that, in turn, support surrounding nearshore ecosystems. Juvenile fishes emigrate from the bay to offshore habitats, and important or endangered avian species utilize forage fishes in the bay. Southern California indigenous bay and estuary fishes represented 34.6% of the total catch in this survey (**Table 36**).

Table 36. Indigenous bay/estuarine species taken in San Diego Bay by ecoregion in 2025.

Scientific Name Common Name		Ecoregions				Total %	
		North	North-Central	South-Central	South		
<i>Anchoa delicatissima</i>	Slough Anchovy	588	1,717	1,982	116	4,403	64.82
<i>Syngnathus californiensis</i>	Kelp Pipefish	179	152	664	433	1,428	21.02
<i>Clevelandia ios</i>	Arrow Goby	3	9	229	292	533	7.85
<i>Ilypnus gilberti</i>	Cheekspot Goby	8		131	9	148	2.18
<i>Fundulus parvipinnis</i>	California Killifish		1	50	94	145	2.13
<i>Paralabrax maculatofasciatus</i>	Spotted Sand Bass	10	35	34	25	104	1.53
<i>Hypsoblennius gentilis</i>	Bay Blenny	11	16	2		29	0.43
<i>Quietula y-cauda</i>	Shadow Goby		2		1	3	0.04
Total % of catch:		16.8%	35.7%	57.6%	23.7%		34.6%



A pregnant Shiner Perch (*Cymatogaster aggregata*) caught by purse seine in the South-Central Ecoregion, April 2025

4.8.5 Invasive Species

In addition to being a warm-water refuge for southern species, San Diego Bay is also a major port-of-entry and commercial shipping hub. Releases of ballast water and trans-Pacific transportation of hull fouling organisms and their associated hitchhikers into historically disturbed habitat provides ideal opportunities for invasive species, such as Yellowfin Goby (*Acanthogobius flavimanus*) and Chameleon Goby (*Tridentiger trigonocephalus*) to establish themselves in the bay. Though ballast water exchange in the bay has been regulated to help reduce the threat since 2000, these species were established prior to the implementation of these regulations. The Yellowfin Goby was first described inside tidal marshes of the South Ecoregion by Williams et al. (1998) and has been reported in many brackish and freshwater areas in California where they pose a threat to native fish species as predators. Although the low-salinity requirements of this species appear to limit its expansion potential, no eradication or control efforts for this invasive have been successful (Molnar et al. 2008). Williams et al. (1998) recommended management actions that reduce off-season freshwater inflows and return tidal action to impounded saltmarsh areas to favor native species and prevent further spread of exotics.

The Chameleon Goby was first captured in San Diego Bay in January 1995 during the Allen et al. (2002) survey, and subsequently described with additional records by Pondella and Chinn (2005). Despite the possibility of competing with native species for habitat, this invader has not become enough of a problem to require management action, and there are no known natural controls in California's marine environment (Molnar et al. 2008). Ironically, the Chameleon Goby may be controlled by Yellowfin Goby predation (Meng et al. 1994).

During the 2012 survey, sampling yielded both of those species: three Yellowfin Gobies and 18 Chameleon Gobies. Given the widespread nature of Chameleon Goby throughout the bay during those surveys (captured in the channel, nearshore vegetated, and nearshore non-vegetated areas, in all ecoregions but the North), we reported that there may be a sustained invasion and self-recruiting population of Chameleon Goby within the bay (Williams and Pondella 2012). However, no Chameleon Gobies were caught in 2015, 2016, 2019, 2022, or 2025 (Williams et al. 2015, Williams et al. 2016, Williams et al. 2019, Williams et al. 2022). The only Yellowfin Goby encountered in 2015 was a single partially digested individual that was regurgitated by a Spotted Sand Bass in the South Ecoregion. Two Yellowfin Gobies were caught in the South Ecoregion in 2016, one was captured in 2019 in the North Ecoregion, two were caught in the South Ecoregion in 2022, and none in 2025. The paucity of Yellowfin and Chameleon Gobies may be a product of heavy predation, low reproductive success, or simply more effective filtering of ballast water. Both species thrive in fresh to brackish water environments. The winter of 2024-2025 did not produce heavy rainfall, and the prolonged drought period in southern California from 2012-2016 and subsequent years of minimal winter rainfall could also explain the infrequent capture of either species over the last decade.

4.9 Comparison of the Current and Historical April and July Surveys

4.9.1 Abundance, Biomass, and Stock Estimates

Total catch and biomass from the April and July 2025 sampling periods were also compared to values from 1995-1998, 2005, 2008, 2012, 2015, 2016, 2019, and 2022. The 2025 surveys represent the highest abundance for this century and the biomass captured was nearly twice as high as any other historical survey (**Tables 37-40; Figures 54-57**). Total abundance was heavily influenced by large schools of forage fishes, as is common in historical surveys. Estimates of biomass were about average among all surveys in every ecoregion except the North Ecoregion which reported more biomass caught at that ecoregion (491.7 kg) in 2025 than at all ecoregions combined in any other year. The 2025 stock estimate was well above the average number of individuals while the biomass standing stock estimate was the highest ever estimated (**Table 41**), largely due to singular catches of Northern Anchovy, Pacific Sardine, and Shortfin Corvina breeding aggregations.



Dozens of Round Stingrays (*Urobatis halleri*) caught by large beach seine in the North Ecoregion, July 2025

Table 37. Total abundance by sampling year. Results were calculated for years that were sampled in April and July and only includes data from those sampling months.

Ecoregion	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
North	59,178	91,176	8,978	14,486	4,169	7,233	4,244	10,240	5,158	6,238	4,759	14,696
North-Central	19,523	112,964	8,718	11,603	13,127	3,354	5,645	5,874	7,932	4,005	5,408	4,077
South-Central	22,403	3,623	10,659	8,267	2,346	2,666	3,422	4,789	3,001	2,233	5,365	4,450
South	5,063	3,153	4,735	14,738	5,337	2,438	3,952	3,240	5,036	1,548	4,098	3,199
Total:	106,167	210,916	33,090	49,094	24,979	15,691	17,263	24,143	21,127	14,024	19,630	26,422

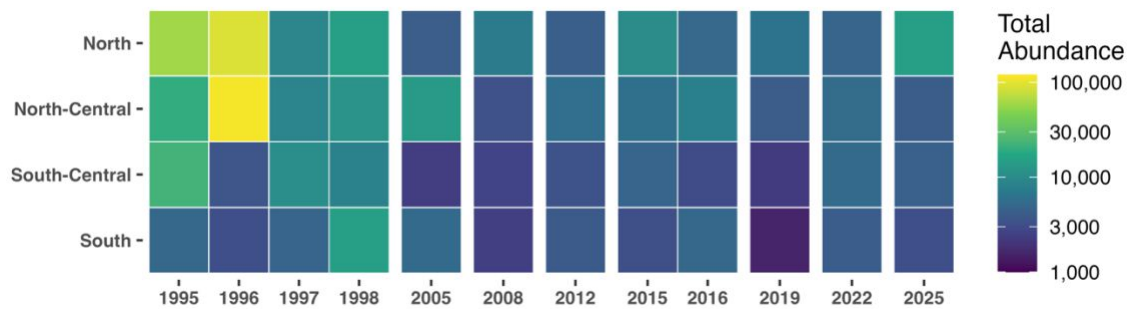


Figure 54. Total abundance by ecoregion and sampling year. Results were calculated for years that were sampled in April and July and only includes data from those sampling months.



A young Banded Guitarfish (*Zapteryx exasperate*) caught by beam trawl in the North Ecoregion, April 2025

Table 38. Total abundance of the most frequently caught species by sampling year. Results were calculated for years that were sampled in April and July and only includes data from those sampling months.

Common Name	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
Northern Anchovy	52,389	147,173	3	8,373	1,397	10		6,666	1,205	0	2	6,191
Topsmelt	25,272	33,915	12,917	9,232	7,448	3,393	6,529	2,024	4,136	8,044	5,330	2,961
Slough Anchovy	16,821	16,616	11,029	27,790	11,807	5,538	1,566	7,957	8,825	1,266	6,651	4,403
Shiner Perch	3,998	3,222	2,794	336	1,180	1,700	2,174	915	199	536	1,005	2,537
Pacific Sardine	2,300	5,391	585	784	3		2	16	8	78		3,447
Arrow Goby	401	339	104	73	62	927	2,438	629	1,749	52	1,272	533
Kelp Pipefish	402	384	355	77	371	673	488	1,065	1,105	431	1,637	1,428
California Grunion		739	3,136	1,123	118	0	0	1,608	965	32	49	428
Deepbody Anchovy	69	221	29	5	2	72	17	80	30	1,033	61	
Other	4,515	2,916	2,138	1,301	2,591	3,378	4,049	3,183	2,905	2,552	3,623	4,494

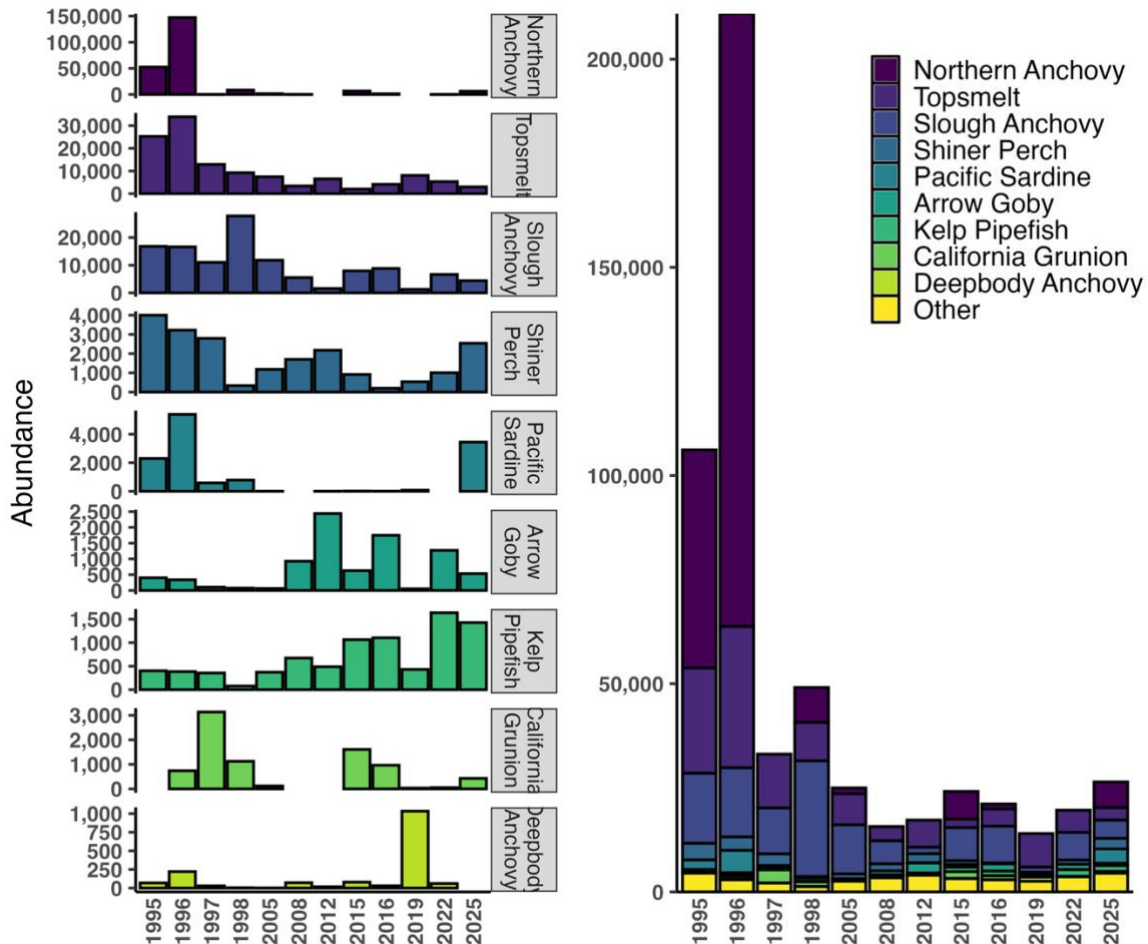


Figure 55. Total abundance of the most frequently caught species by sampling year. Results were calculated for years that were sampled in April and July and only includes data from those sampling months.

Table 39. Total biomass (kg) of fishes captured during April and July surveys by ecoregion.

Ecoregion	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
North	108.9	195.4	70.1	58.7	57.0	36.5	119.7	112.8	83.2	69.0	116.0	491.7
North-Central	97.2	192.3	88.4	74.4	121.0	55.3	83.0	120.9	65.3	55.1	58.1	70.6
South-Central	111.8	46.6	65.4	33.2	34.2	43.7	70.7	69.2	49.2	59.7	89.2	137.0
South	89.2	44.9	48.2	52.3	77.4	49.0	74.8	75.3	52.2	87.7	109.8	146.2
Total:	407.1	479.2	272.1	218.6	289.7	184.5	348.2	378.2	249.9	271.5	373.1	845.5

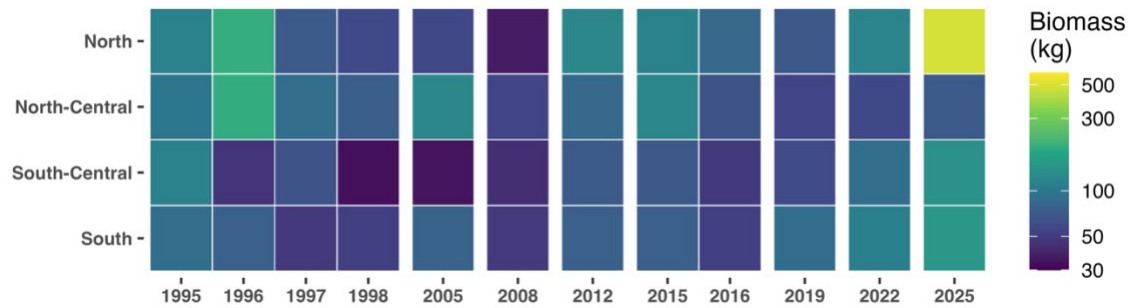


Figure 56. Total biomass (kg) of fishes captured during April and July surveys by ecoregion.



A Round Stingray (*Urobatis halleri*) being measured on the beach in the North Ecoregion, July 2025

Table 40. Total biomass (kg) of the highest biomass fishes captured during April and July surveys by species and sampling year.

Common Name	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
Round Stingray	79.1	63.5	77.2	25.9	109.8	60.9	134.2	129.9	110.9	115.5	132.3	227.5
Spotted Sand Bass	57.0	29.7	33.5	42.2	36.3	47.3	62.3	50.8	28.2	65.7	60.0	35.8
Northern Anchovy	49.7	178.9	< 0.1	9.5	3.0	< 0.1		50.9	29.0		< 0.1	30.9
Pacific Sardine	5.5	18.6	2.0	2.4	< 0.1		0.1	0.2	0.1	2.3		220.0
Topsmelt	22.9	20.5	44.4	20.5	12.1	10.3	11.4	4.7	4.6	22.7	50.2	27.0
Bat Ray	26.3	37.2		0.5	36.5		31.3	26.2	4.6	8.7		75.6
Slough Anchovy	45.7	30.1	19.3	66.0	17.4	10.2	2.4	14.7	14.8	1.7	13.3	8.4
Shortfin Corvina		1.8	0.7	8.0		5.0		< 0.1	5.1	5.1	5.5	95.0
California Butterfly Ray				8.6	2.1	5.1	15.5	51.2	2.4	2.1		15.0
Other	121.0	98.7	94.9	35.0	72.4	45.8	91.0	49.5	50.2	47.7	111.7	110.3

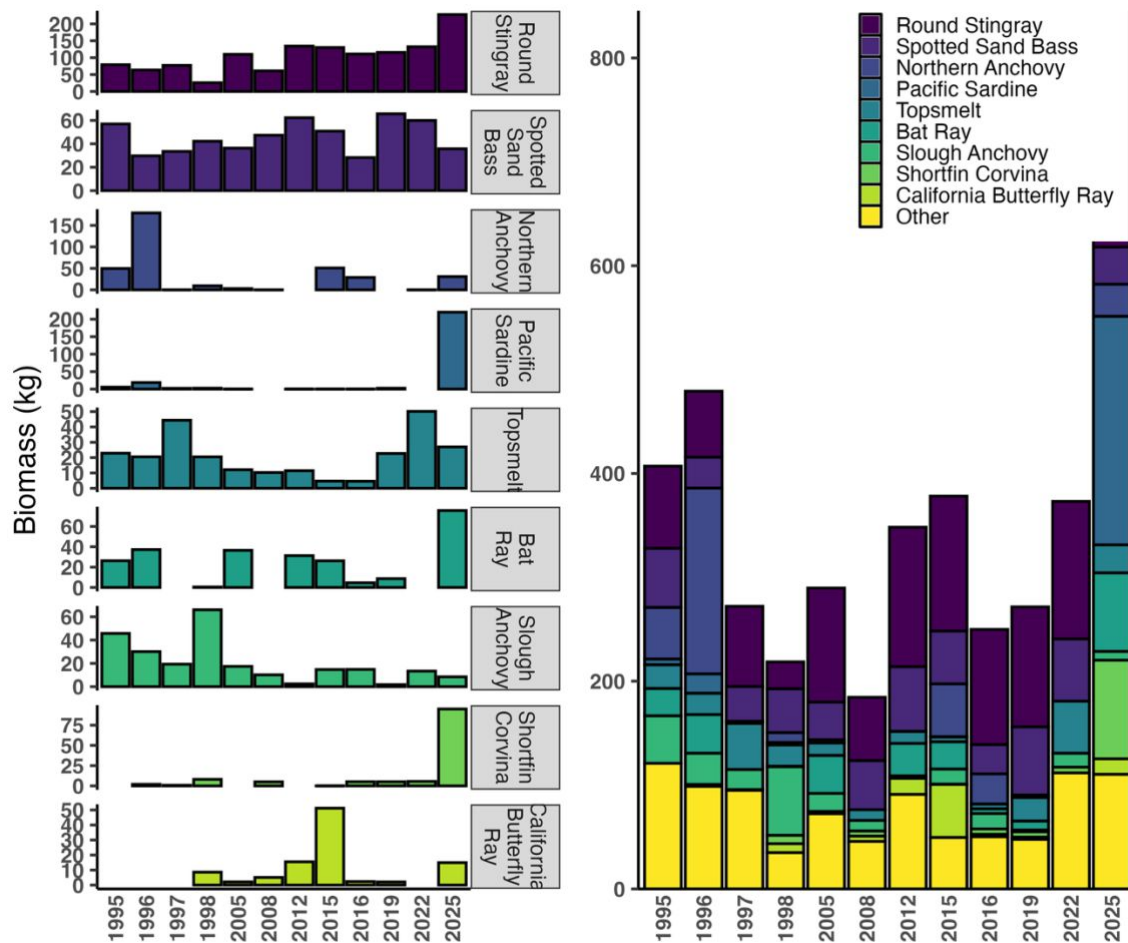


Figure 57. Total biomass (kg) of the highest biomass fishes captured during April and July surveys, shown by species over time (left) and as a proportion of the annual catch (right).

Table 41. Stock estimates and biomass standing stock by sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.

Survey Year (source)	Stock Estimate (#)	Standing Stock (kg)
1995 (Allen et al. 2002)	178,106,064	513,340
1996 (Allen et al. 2002)	368,102,566	759,764
1997 (Allen et al. 2002)	49,326,442	302,962
1998 (Allen et al. 2002)	101,099,343	349,989
2005 (Pondella et al. 2006)	32,497,656	339,593
2008 (Pondella and Williams 2009a)	24,805,106	249,398
2012 (Williams and Pondella 2012)	16,180,679	465,376
2015 (Williams et al. 2015)	35,545,986	518,885
2016 (Williams et al. 2016)	30,173,603	311,227
2019 (Williams et al. 2019)	18,321,764	419,630
2022 (Williams et al. 2022)	28,727,027	551,680
2025 (Present Study)	44,047,485	1,267,345

4.9.2 Community Metrics

Shannon Diversity (H') and species richness values were determined for April and July from the previous surveys (Allen 1999, Pondella et al. 2006, Pondella and Williams 2009a, Williams and Pondella 2012, Williams et al. 2015, Williams et al. 2016, Williams et al. 2019, Williams et al. 2022) to allow direct comparisons of the data sets. The 1995-1998 survey years were used for the comparison because these were the only years from Allen et al. (2002) where both April and July were sampled. Overall, 2025 H' estimates were very similar among ecoregions and each ranked high among historical values (range: 1.74-1.84), but baywide diversity (2.35) was the highest of all survey years (**Table 42; Figure 58**. Baywide species richness was the same as in 2022 (56) and above average among historical surveys. Richness was above average for the North, North-Central, and South-Central Ecoregions, but slightly below average in the South Ecoregion (Table 42; Figure 59).



A large Dwarf Perch (*Micrometrus minimus*) caught by large beach seine in the North Ecoregion, April 2025

Table 42. Shannon diversity (H') values by sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.

Ecoregion	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
North	0.74	0.90	1.34	1.42	1.74	1.72	1.56	1.43	1.94	0.93	1.69	1.84
North-Central	1.75	0.93	1.50	1.25	1.33	1.62	1.63	1.81	1.61	1.18	1.43	1.74
South-Central	1.32	1.72	1.13	0.37	1.77	1.88	1.92	1.41	1.51	1.77	1.55	1.80
South	1.93	1.84	1.35	0.59	1.06	2.03	1.84	1.71	1.61	1.82	1.78	1.79
Total:	1.46	1.04	1.65	1.31	1.62	2.05	2.02	2.05	2.00	1.69	1.99	2.35

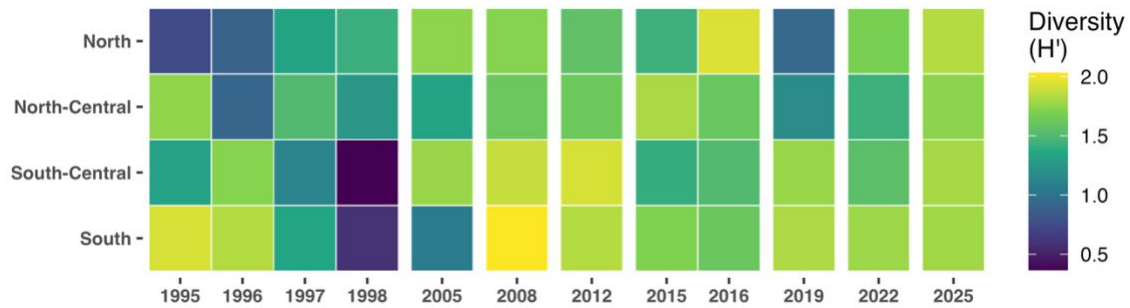


Figure 58. Shannon diversity (H') values by ecoregion and sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.



A Pacific Seahorse (*Hippocampus ingens*) caught by beam trawl in the North-Central Ecoregion, April 2025

Table 43. Species richness values by sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.

Ecoregion	Sampling Years											
	1995	1996	1997	1998	2005	2008	2012	2015	2016	2019	2022	2025
North	35	42	29	34	38	33	30	35	40	28	30	41
North-Central	32	33	31	26	38	27	37	35	33	23	31	32
South-Central	31	23	27	22	25	23	32	27	21	22	27	29
South	34	24	26	30	23	25	29	23	31	24	28	26
Total:	53	54	42	51	57	48	52	52	55	45	56	56

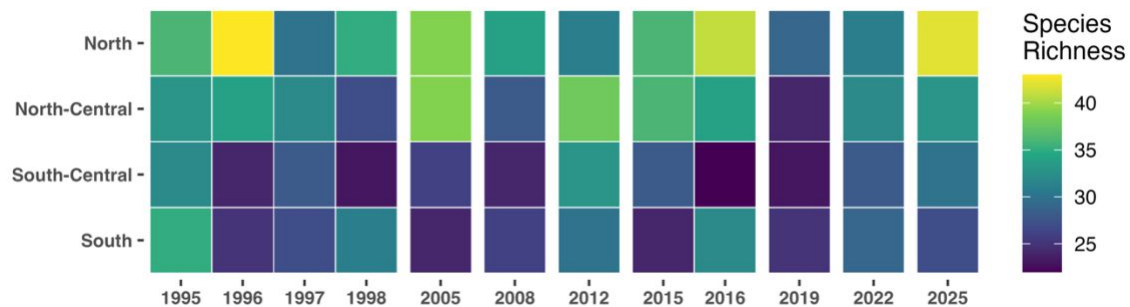


Figure 59. Species richness values by ecoregion and sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.



A juvenile Yellowfin Croaker (*Umbrina roncadore*) caught by large beach seine in the South Ecoregion, July 2025

4.9.3 Historical Nursery Area Function

Percent of juveniles from the April and July 2025 sampling periods were also compared to values from April and July 1995-1998, 2008, 2012, 2015, 2016, 2019, and 2022. Values from 2005 were excluded as many fish (> 11,000, or 44% of the total catch) were likely juveniles but not measured. Approximately 54% of fish were juveniles in 2025, which is below average among historical values but up 8% from the record low value in 2022 (**Table 44, Figure 60**). These juveniles are largely comprised of Topsmelt, Northern Anchovy, Slough Anchovy, and Shiner Perch, which are all critical commercial and/or forage fish species. San Diego Bay continues to function as a nursery area for more than one-third of the fishes found there. The high catch of juvenile fishes in the bay highlights the continued importance of San Diego Bay as a nursery area for bay, estuarine, and nearshore species.

Table 44. Percent of juveniles collected from San Diego Bay by sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.

Sampling Year	% Juvenile
1995	68.0
1996	69.6
1997	63.8
1998	57.3
2008	53.3
2012	78.3
2015	56.0
2016	47.9
2019	65.0
2022	45.8
2025	53.8
Average	59.9

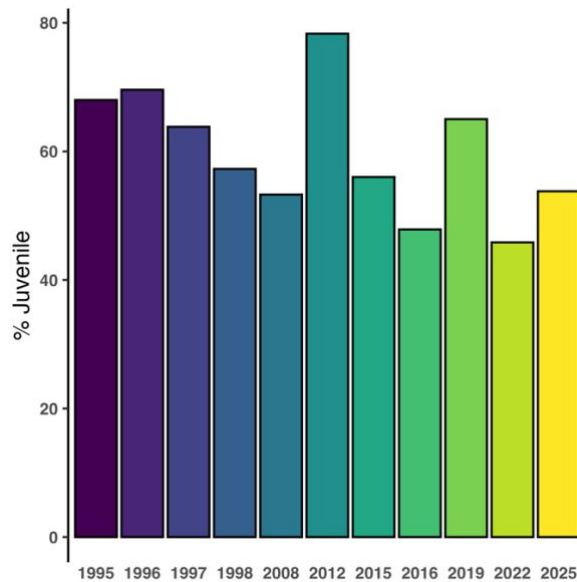


Figure 60. Percent of juveniles collected from San Diego Bay by sampling year. Estimates were calculated for years that were sampled in April and July and only includes data from those sampling months.

4.9.4 Community Structure

Seven significantly different groups (a-g) were determined by cluster analysis of fish communities for each survey period (**Figure 61**). The driving species behind each community group can be visualized in **Figure 62**, where circles are scaled to mean abundance of 19 typical San Diego Bay fish taxa by community group. Sampling periods prior to, during, and after the 1997-1998 El Niño event showed the strongest differentiation from most other surveys. The April and July 1997 sampling periods form their own distinct fish community (group ‘f’), driven by comparatively higher catch of Pacific Sardine and California Grunion. After substantial rainfall during the winter of 1997-1998, the catch in April 1998 (group ‘a’) was dominated by Topsmelt, but also had large catches of Striped Mullet (*Mugil cephalus*) and Cortez Bonefish, two estuarine residents that thrive in brackish water. Relatively little else was captured during that survey. By July 1998, the fish community returned to a typical mid-1990’s July pattern (group ‘c’) where Northern Anchovy (*Engraulis mordax*) dominated the catch.

Despite the intensity of the 2015-2016 El Niño event, all four sampling periods (April 2015-July 2016) clustered into the largest group (‘g’), as did every other survey performed in the 21st Century, except for July 2005. While still a member of group ‘g’, community structure of fishes in April 2025 was the least similar to all other members of that group. July 2025, however, was typical of group ‘g’, and most similar to the community structures found in 2015-2016.



A young-of-the-year Sargo (*Anisotremus davidsonii*) caught by purse seine in the North-Central Ecoregion, April 2025

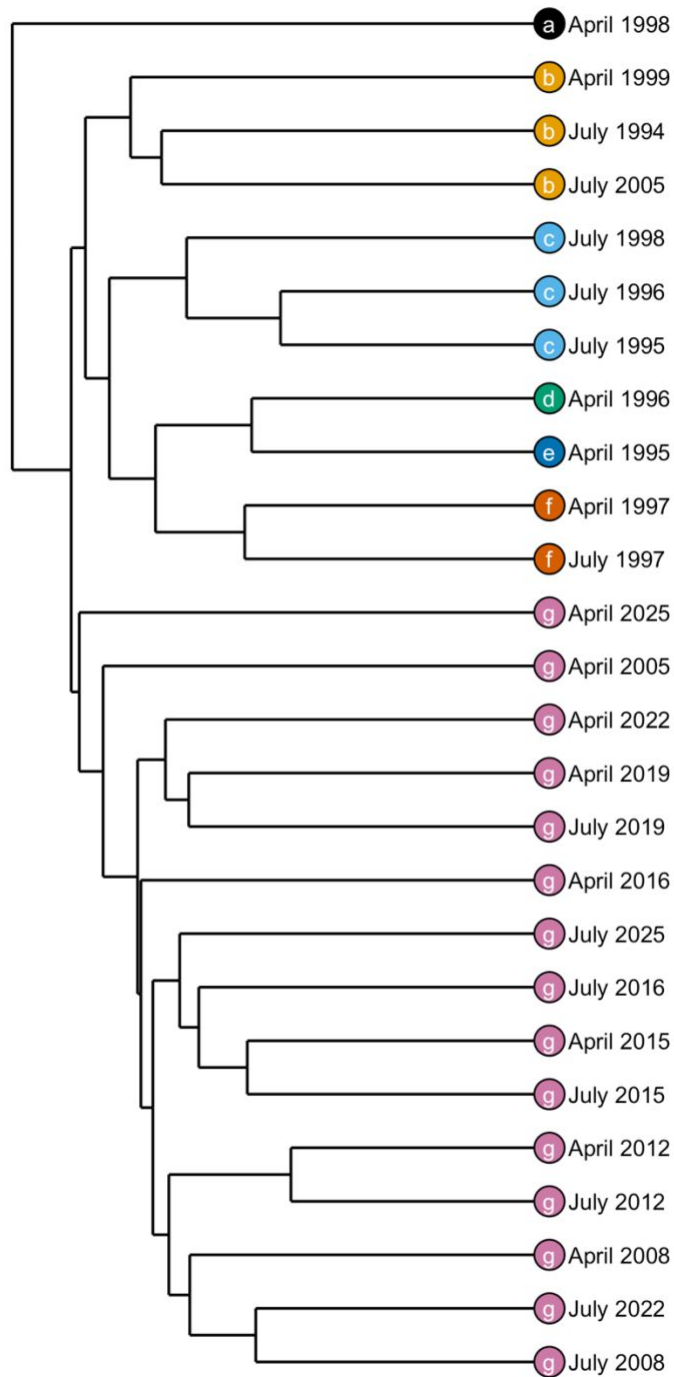


Figure 61. Fish communities for the twenty-four April and July surveys were clustered in this tree. Branch distances shown in this diagram represent the relative similarity of stations to each other using Bray-Curtis distances and group-average linkage. Significantly different (SIMPROF, $\alpha = 0.05$) fish communities are indicated by letters (a-f) and color groupings.

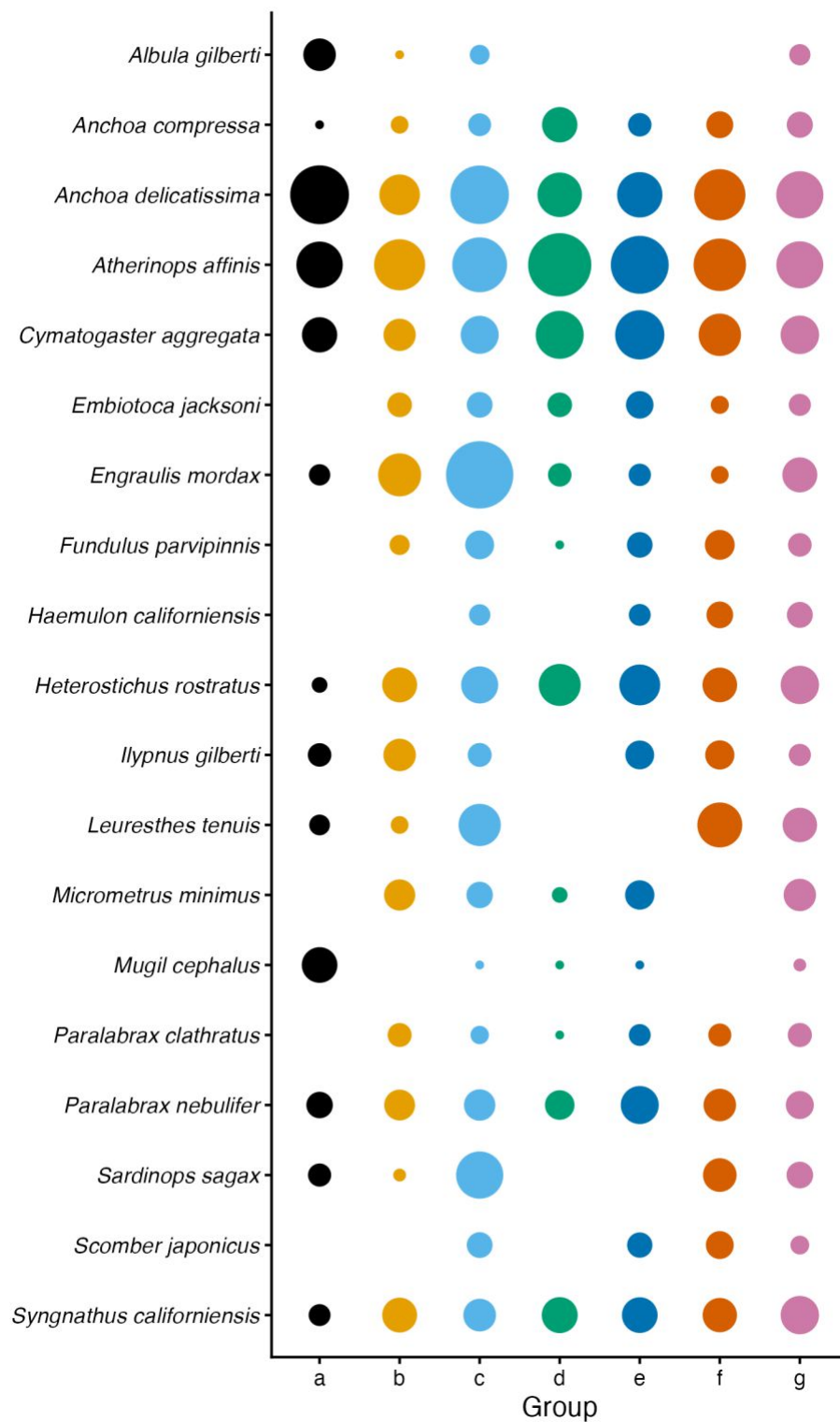


Figure 62. Relative mean abundance (circles scaled to value) per sampling period for select fish taxa in San Diego Bay by community group (as identified in Figure 61).

5.0 RECOMMENDATIONS TO IMPROVE FUTURE SURVEYS

Currently, fisheries utilization surveys are performed for the Port of San Diego every three years. This survey frequency is adequate for long-term studies (Allen et al. 2022) but often fails to capture fish population responses to marine heat waves (Gentemann et al. 2017) and other major oceanographic events (e.g., El Niño/Southern Oscillation). With the forecasted increase in frequency and intensity of severe weather events, increasing sampling frequency while maintaining historical methodology is advised. In addition, we recommend that the sampling effort within years remain consistent to allow for comparisons with the historical dataset.

Ideally, monitoring of San Diego Bay would occur annually, but with practicality in mind, we suggest surveys be performed on either a bi-annual basis or as two consecutive years of sampling with one year off. This will allow adequate temporal resolution for capturing variation in fish populations, particularly in the event of anomalous oceanographic or climatic conditions, without dramatically increasing the cost of monitoring. By sampling consecutive years, we would be more likely to identify recruitment failures or shifts in reproductive seasons, like we note with Spotted Sand Bass in this report (and the previous report), or the validity of sudden, large increases in stock estimates of important fisheries species (e.g. Shortfin Corvina and Pacific Sardine in this report). Increasing sampling frequency will also provide more information that may identify causes for high chick mortality of sensitive foraging species in the region, as has happened with the California least tern (Frost 2013). Annual sampling would accomplish both goals but at triple the cost and effort as is currently being employed.

Mortality due to sampling is very low in species other than forage fish (e.g., Topsmelt, Slough Anchovy) and small gobies (e.g., Arrow Goby), all of which are very abundant within the bay. We estimate that 95% of all non-forage fish are returned to the bay alive, making mortality around 60-65% numerically for all species collected, but only about 15% by biomass. This means that each year, if we assume that all forage fish and small gobies do not survive after release, mortality from our sampling is about 11,000 or 0.04% of individuals and 50 kg or 0.01% of biomass for the entire bay. Therefore, the sampling methods used in this study have a negligible effect on the standing stock of San Diego Bay. Additionally, the forage fish species experiencing high mortality rates in this survey do not have a significant commercial fishery and are listed by IUCN as being of least concern from a conservation standpoint. Lastly, deceased forage fish are returned back into the bay where they are consumed by birds, fish, and other marine animals.

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A young-of-the-year Diamond Turbot (*Pleuronichthys guttulatus*) caught by large beach seine in the North-Central Ecoregion, April 2025