

Contaminant Concentrations In San Francisco Bay Sportfish



CRUISE REPORT Regional Monitoring Program 2019



**Prepared for the
San Francisco Estuary Institute**



**by
Marine Pollution Studies Laboratory
Moss Landing Marine Laboratories**

Table of Contents

TABLE OF CONTENTS	I
LIST OF FIGURES	I
INTRODUCTION.....	1
TRIP 1 - SAMPLING DATES: MAY 27-30, 2019	2
TRIP 2 - SAMPLING DATES: JUNE 3-6, 2019.....	3
TRIP 3 - SAMPLING DATES: JUNE 10-14, 2019.....	4
TRIP 4 - SAMPLING DATES: JUNE 24-28, 2019.....	5
TRIP 5 - SAMPLING DATES: JULY 2, 2019.....	6
TRIP 6 - SAMPLING DATES: JULY 8-JULY 12, 2019.....	7
TRIP 7 - SAMPLING DATES: JULY 22-JULY 26, 2019.....	8
TRIP 8 - SAMPLING DATES: AUGUST 5-AUGUST 8, 2019	9
TRIP 9 - SAMPLING DATES: AUGUST 20-23, 2019	10
TRIP 10 - SAMPLING DATES: SEPTEMBER 2-6, 2019.....	11

List of Figures

FIGURE 1: FISHING EFFORT IN SOUTH BAY BRIDGES – SOUTH	13
FIGURE 2: FISHING EFFORT IN SOUTH BAY BRIDGES – NORTH AND STEINBERGER SLOUGH	14
FIGURE 3: FISHING EFFORT IN SAN FRANCISCO WATERFRONT.....	15
FIGURE 4: FISHING EFFORT IN SAN LEANDRO BAY	16
FIGURE 5: FISHING EFFORT IN OAKLAND INNER HARBOR	17
FIGURE 6: FISHING EFFORT IN EMERYVILLE CRESCENT	18
FIGURE 7: FISHING EFFORT IN BERKELEY.....	19
FIGURE 8: FISHING EFFORT IN RICHMOND INNER HARBOR	20
FIGURE 9: FISHING EFFORT IN CENTRAL BAY	21
FIGURE 10: FISHING EFFORT IN SAN PABLO BAY	22
FIGURE 11: FISHING EFFORT IN SUISUN BAY.....	23
FIGURE 12: FISH COLLECTIONS IN STEINBERGER SLOUGH	24
FIGURE 13: FISH COLLECTIONS IN SAN LEANDRO BAY	25
FIGURE 14: FISH COLLECTIONS IN EMERYVILLE CRESCENT	26
FIGURE 15: FISH COLLECTIONS IN RICHMOND INNER HARBOR	27
FIGURE 16: BAT RAY, COMMON CARP, LARGEMOUTH BASS, STRIPED BASS, AND WHITE STURGEON COLLECTIONS	28
FIGURE 17: BROWN ROCKFISH, JACKSMELT, MONKEYFACE PRICKLEBACK, NORTHERN ANCHOVY, AND PACIFIC HERRING COLLECTIONS	29
FIGURE 18: DIAMOND TURBOT, PACIFIC STAGHORN SCULPIN, SHINER SURFPERCH, STARRY FLOUNDER, AND WHITE SURFPERCH COLLECTIONS	30
FIGURE 19: CALIFORNIA HALIBUT AND WHITE CROAKER COLLECTIONS	31

Introduction

This report contains information on the spring and summer field sampling efforts conducted by the Marine Pollution Studies Laboratory at Moss Landing Marine Labs (MPSL-MLML). The purpose of this field effort was to collect sportfish for an eighth season of data (in support of 1994, 1997, 2000, 2003, 2006, 2009, and 2014 surveys) in the ongoing study of Contamination in San Francisco Bay Sportfish. The work was contracted through the San Francisco Estuary Institute (SFEI) for the Regional Monitoring Program (RMP) for Water Quality. We would like to thank Bob Mulhern from the Golden Gate Yacht Club, Stephen Bogner from the Berkeley Marina, and Ryan Mayfield from the City of San Jose for granting us access to their respective areas to conduct sampling.

This report includes sample collections over a 3.5 month period (May 27th through September 6th) encompassing ten trips. Coordination also occurred with the Department of Fish and Wildlife's Herring Project in which they provided herring caught in January 2019. The initial MPSL-MLML sampling trip began in May 2019 targeting white sturgeon in southern San Francisco Bay. Sampling then moved to the central San Francisco Bay areas of Oakland Inner Harbor, San Francisco Waterfront, and Berkeley. San Pablo and Suisun Bays were sampled during later trips. Additional sampling occurred in Priority Margin Units (PMUs; Steinberger Slough, San Leandro Bay, Emeryville Crescent, and Richmond Inner Harbor) to support focused research and assessment in these areas. Collection of core monitoring species occurred in all areas according to the study design. A total of 41 days were sampled with only one of these days unsuccessful in catching any fish. Field crews conducted or set 219 trawl, gill net, and hook and line events with 94 of these events successful in catching targeted fish. A total of 1,379 fish were caught and kept for potential chemical analyses, meeting or surpassing the study design objectives for most fish species (see below for details on species that did not meet the study design objectives).

Some general notes regarding the 2019 sampling effort:

- Many fishermen and online chat rooms noted this was the Year of the Halibut. The crew definitely saw this in full effect the first half of sampling throughout the Bay. However, the crew observed smaller halibut and less fishermen as the summer progressed with less legal size halibut caught in the trawls.
- Monkeyface prickleback were difficult to target due to limited days fishing at extreme low tides in unknown areas of the Bay. Rock walls were targeted but the numbers seem low throughout the Central Bay. The rocky intertidal area near the park next to the Golden Gate Yacht Club was the best spot to fish but the area is small and can be fished hard by local fishermen reducing numbers.
- Shiner surfperch were not caught in Steinberger Slough or Emeryville Crescent, which was expected based on previous experience sampling in these areas. Emeryville Crescent is a broad, shallow area without channels or structure to target. Steinberger Slough seems to be an anomaly since the channel and nearby wetlands should support shiner surfperch and other fish species. The shiner surfperch population in the main Redwood City channel seems healthy so it would be expected to find them in nearby Steinberger Slough.
- Shiner surfperch in San Pablo Bay and Loch Lomond had low population numbers and were smaller in size this year and last year as observed by the crew and noted by the manager of the Loch Lomond bait shop.
- Harbor seals ripped fish out of the nets creating holes and reducing efficiency in catching target species such as jacksmelt and striped bass. Harbor seals have not been such a nuisance throughout the Bay in previous efforts.

- Ospreys were seen in all areas sampled throughout SF Bay, which has not been observed in previous sampling efforts. The population seems healthy and increasing in number.

This report details weekly synopses of sampling efforts and provides figures for fishing locations and catch results. Eleven figures illustrate sampling effort at the 11 station locations (Figures 1-11), and an additional eight figures illustrate the locations where individual species were collected at PMUs and throughout the Bay (Figures 12-19).

Trip 1 - Sampling Dates: May 27-30, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rusty Fairey

The main objective of this cruise was to target white sturgeon from the South Bay Bridges area and shiner surfperch in San Leandro Bay and Oakland Inner Harbor. Other objectives of this cruise included collecting shiner surfperch, jacksmelt, staghorn sculpin, anchovies, and bat rays. Rusty Fairey has sampled on all RMP Fish studies to date, but he retired in May 2018. Rusty came out on the first two trips to help with training and knowledge transfer to Evan.

Monday, May 27th

The sampling crew started the week by launching the vessel out of Redwood City at 0800 and setting two gill nets (1” square monofilament) around the Redwood Channel area. Nine otter trawls were then run in the main Redwood Channel yielding shiner surfperch, staghorn sculpin, anchovies, and one white croaker. The gill nets were picked up with 10 jacksmelt. A work preparation area was set up on the vessel immediately after retrieving the fish. Precautions were taken to keep all preparations away from possible contamination such as vessel exhaust. Tissue samples were immediately preserved on dry ice after each sample was completed. The crew cleaned gill nets of debris and ended the day at 1630 hours.

Tuesday, May 28th

The sampling crew started the day launching the vessel out of Redwood City at 0645. The crew ran two otter trawls in the Redwood Creek channel for collection of target species and bait. One white croaker was caught. The crew transited south of Dumbarton Bridge and set two gill nets (4” square multifilament and 5” square nylon). Hook and line fishing was conducted in nearby locations for 6 hours while the gill nets were soaking. Two bat rays were caught via hook and line while one female white sturgeon (126” TL) was caught in the 4” gill net. A work preparation area was set up in the vessel immediately after catching the fish. Precautions were taken to keep all preparations away from possible contamination such as vessel exhaust. Tissue samples were immediately preserved on dry ice after the sample preparation was completed. The crew got off the water at 1730 hours.

Wednesday, May 29th

The sampling crew drove south to launch from Alviso Slough. Two gill nets (4” square multifilament and 5” square nylon) to target white sturgeon were set beginning at 0830. Hook and line fishing was conducted in four different areas for 6 hours. One female white sturgeon (117” TL) was caught in the 4” gill net. It was prepared for storage and put on dry ice. The crew ended the day at 1700.

Thursday, May 30th

The crew drove from Redwood City to Oakland to sample for shiner surfperch in Oakland Inner Harbor and San Leandro Bay. Seven trawls were run in the side channel next to Coast Guard Island (Oakland Inner Harbor) yielding a total of 60 shiner surfperch and 300 northern anchovy. Nine otter trawls were conducted in San Leandro Bay. A total of 39 shiner surfperch were caught but only three fish were in the 10-15 cm target size range. Tissue samples were immediately preserved on dry ice after the sample preparation was completed. The crew got off the water and drove back to Moss Landing to end the week early due to boat issues.

Trip 2 - Sampling Dates: June 3-6, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rusty Fairey

The main objective of this cruise was to search for monkeyface prickleback in the central San Francisco Bay area using the larger negative low tides to access deeper intertidal areas from the shore. After the morning low tide, the crew conducted typical sampling methods in Oakland Inner Harbor, San Francisco Waterfront, and Central Bay.

Monday, June 3rd

The crew drove from Moss Landing to Oakland so they could get an early start Tuesday morning due to the negative low tide.

Tuesday, June 4th

The sampling crew launched out of Oakland Inner Harbor at 0630 and set a 1” square gill net near Schnitzer steel. The crew then transited across to San Francisco Waterfront to set another 1” square gill net. Next, the crew transited to the Golden Gate Yacht Club where they docked the boat and walked to the shoreline at the nearby park. Poke poling was conducted for a couple hours. This was a new fishing method so the crew was comfortable with the method while also learning from a local fisherman who was also poke poling. One monkeyface prickleback was caught in the rocks. The crew picked up the 1” gill net and kept 10 jacksmelt. The crew then transited to McCovey Cove and hook and line fished for 36 minutes until the tidal current went slack. Four trawls were conducted yielding 60 shiner surfperch. When the crew transited back to Oakland to retrieve the gill net, one anchor had come loose and the net collapsed. The crew went back to McCovey Cove to trawl for halibut. In the Year of the Halibut, three legal halibut and two white croaker were caught in two trawls. A dissection area was set up in the vessel immediately after catching the fish. Precautions were taken to keep all dissections away from possible contamination such as vessel exhaust. Fish workups were completed and muscle tissues were preserved on dry ice immediately after the respective sample preparations were finished. The crew ended the productive day at 1730 hours.

Wednesday, June 5th

The sampling crew started the day launching the vessel out of Oakland Inner Harbor at 0700 and set the 1” square gill net to target jacksmelt. Poke poling was then conducted along the rockwalls on Treasure Island and Alameda. One monkeyface prickleback was caught along the Alameda rockwall, processed, and stored on dry ice. The crew then drifted hook and line for three hours and ran three otter trawls in Central Bay to target halibut, but none were caught. The jacksmelt net was picked up at 1600 with only two jacksmelt. The net had a lot of holes and pieces of jacksmelt stuck in the net indicating a harbor seal had ripped more than 10 jacksmelt (composite) out of the net. The fish were processed and stored on dry ice. The crew ended the day defeated at 1730 hours.

Thursday, June 6th

Once again, the sampling crew launched the vessel out of Oakland Inner Harbor and set the 1” square gill net to target jacksmelt. A couple trawls were run for bait in Central Bay just outside of Oakland Inner Harbor. The crew poke poled for monkeyface prickleback along the Oakland Inner Harbor rockwall but none were caught. The crew then transited back to Golden Gate Yacht Club to poke pole during the low tide. One monkeyface prickleback was caught, processed, and stored on dry ice. The crew then drifted hook and line for halibut in Central Bay outside of Oakland Inner Harbor but none were caught. The 1” net was retrieved with two jacksmelt. Three trawls were then run in the main shipping channel yielding 8 white croaker. The fish were processed and stored on dry ice. The crew pulled the boat out of Oakland Harbor and drove back to Moss Landing.

Trip 3 - Sampling Dates: June 10-14, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rachel Brooks

The main objective of this cruise was to target largemouth bass, carp, and striped bass in Artesian Slough, shiner surfperch in Steinberger Slough, white croaker in Oakland, and halibut in Central Bay.

Monday, June 10th

The crew started the week departing from Moss Landing at 0600 driving to the City of San Jose Regional Wastewater Treatment Plant to meet Ryan Mayfield so he could escort the crew to Artesian Slough through their property. Hook and line fishing was conducted from the weir yielding 5 largemouth bass and 1 carp. The fish were processed and placed on dry ice. The crew then drove to Alviso Slough to launch the boat. The 4” square multifilament gill net was set and then hook and line fishing was conducted. The gill net was checked at slack tide with one white sturgeon (121” TL) in it. Since this was the third and last white sturgeon needed for the composite, the crew pulled the gill net out of the water, processed the fish, and spent the rest of the afternoon hook and line fishing for bat rays. No additional fish were caught. The crew ended the day at 1700 hours and drove to the hotel in Redwood City.

Tuesday, June 11th

The crew met Ryan in the morning and drove into Artesian Slough to launch the boat from the dirt bottom launch. The crew transited the full length of Artesian Slough looking for areas to set the gill net. Due to the narrow width of the channel, the net was set at the mouth of Artesian Slough where it enters into Coyote Creek and South San Francisco Bay. The crew then hook and line fished by trolling from the mouth back towards the weir. A trawl was also conducted yielding a lot of mud but no fish. A lot of floating plant material made it difficult to fish and the gill net did not yield any fish either. The boat was pulled from Artesian Slough due to the dropping tide and the crew drove to Alviso Slough to launch the boat to access South San Francisco Bay. This had to be done due to the train trestle preventing the crew from transiting directly from Artesian Slough. A trawl was run for bait and bat rays. Hook and line fishing was conducted for 3.5 hours yielding three bat rays. Fish workup was completed on the vessel and preserved on dry ice immediately. Precautions were taken to keep all sample preparation away from possible contamination. The crew returned to the dock at 1800 hours.

Wednesday, June 12th

Once again, the crew met Ryan in the morning and drove into Artesian Slough. Fishing from the weir was conducted between 0715 and 1615 yielding 11 largemouth bass. Carp were extremely

tough to catch from the weir even though the crew could see them, and striped bass were not coming into Artesian Slough to feed. Fish workup was completed on the bank and preserved on dry ice. Precautions were taken to keep all sample preparation away from possible contamination. The crew left the site at 1700.

Thursday, June 13th

Sampling focused on Steinberger Slough this day. The crew launched out of Redwood City and conducted three trawls in the main channel. No target fish were kept. The crew then transited to Steinberger Slough to access during the incoming tide. Two 1” square monofilament gill nets were set in Steinberger Slough (one at the mouth and one in the back area). Ten trawls were then run along the full length of Steinberger Slough and into some of the side channels to search for shiner surfperch. Two striped bass, 23 anchovy, and 2 juvenile halibut were caught in Steinberger but no shiner surfperch. The crew transited back to the Redwood City channel where hook and line fishing was conducted. One bat ray and one striped bass were caught and kept. Two more trawls were run in the main channel yielding two white croaker. All fish were processed and stored on dry ice. Precautions were taken to keep all sample preparation away from possible contamination. The crew left the site at 1830.

Friday, June 14th

The crew drove from Redwood City to launch the boat from Oakland Inner Harbor. Two white croaker were caught via trawling in the main shipping channel, processed, and stored on dry ice. Bait was kept for halibut fishing in Central Bay. In three hours of hook and line fishing, one female halibut was caught, processed in a clean environment on the vessel, and stored on dry ice. The crew pulled the boat and drove back to Moss Landing to finish the week.

Trip 4 - Sampling Dates: June 24-28, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rachel Brooks

The objective of this week’s cruise was to target Oakland Inner Harbor (white croaker, jacksmelt), Central Bay (halibut), San Leandro Bay (shiner surfperch), Richmond Inner Harbor (shiner surfperch), and Berkeley marina (shiner surfperch, staghorn sculpin).

Monday, June 24th

The crew started the week departing Moss Landing at 0600 and traveled to Oakland. The crew launched the boat and set a 1” square gill net to target jacksmelt. Three trawls were run in the shipping channel yielding two white croaker. The crew then switched to hook and line fishing for halibut in Central Bay just outside of Oakland Inner Harbor and south of Treasure Island. Two female halibut were caught in a two hour period. While fishing, the port motor stopped working so the crew limped back into Oakland Inner Harbor using only the starboard motor. The gill net was retrieved with only one jacksmelt. All fish were processed on the vessel in a clean environment and then placed on dry ice. The crew drove back to Moss Landing to switch boats.

Tuesday, June 25th

The morning was spent preparing and packing the alternate boat for sampling. The crew drove to San Leandro Bay and began trawling at 1453. A total of six trawls were run in all of the main channels in San Leandro Bay with only two small shiner surfperch caught. The water was dark brown in the back channel suggesting the presence of a red tide. A lot of green filamentous algae clogged the trawl net. Fish workup was completed on the vessel and preserved on dry ice. Precautions were taken to keep

all sample preparation away from possible contamination. The crew ended the day at 1800 hours and drove to Oakland.

Wednesday, June 26th

The crew launched out of Oakland Inner Harbor and set the 1” square gill net to target jacksmelt. The crew then transited to Clipper Cove at Treasure Island where 1” square and 2.6” square gill nets were floated to target jacksmelt and striped bass. The crew anchored the boat nearby to hook and line fish for 1.5 hours while the nets soaked. One bat ray was caught hook and line fishing. The gill nets were then retrieved yielding 10 jacksmelt. The afternoon was spent trawling in the Oakland Inner Harbor shipping channel. Ten trawls produced seven white croaker. Sampling ended with the retrieval of the 1” gill net set in Oakland in which three jacksmelt were caught. All fish workups were completed and preserved on dry ice immediately after the sample collections. The crew ended the day at 1800 hours.

Thursday, June 27th

The crew drove from Oakland north to Richmond Harbor to launch the boat. A 2.6” square multifilament gill net to target striped bass was floated next to the shipping channel outside of Richmond Inner Harbor. The crew then transited inside the Inner Harbor to begin trawling. Eight trawls were run in Lauritzen channel. Trawls were limited due to the short length of the channel and snagging the net on five of eight trawls. The last trawl ripped the bottom of the net over half the circumference requiring 1.5 hours to mend. Five trawls were run in the back channel and eight trawls were conducted in the main channel. A total of 35 shiner surfperch, 18 staghorn sculpin, and 5 white croaker were caught in Lauritzen channel. Sixty shiner surfperch and 20 staghorn sculpin were collected in the back channel and in the main channel. Five white croaker were also caught in the main channel. Fish workup was completed on the vessel and preserved on dry ice immediately. Precautions were taken to keep all sample preparation away from possible contamination. As the crew transited to the gill net, the floats looked like the net had come loose. However, someone had cut the gill net over half the length from top to bottom destroying that section of the net. The crew had to cut off the destroyed section leaving about a third of the net for future fishing. It was not a good day for the sampling nets or crew.

Friday, June 28th

The crew launched out of Oakland Inner Harbor and set the 1” square gill net to target jacksmelt. The crew then transited out of the inner harbor north to Berkeley Marina. Ten trawls were conducted in the various channels yielding 40 target size and 30 small (5.5-9 cm TL) shiner surfperch and 10 staghorn sculpin. Upon return, the gill net was retrieved containing two jacksmelt. Fish workup was completed on the vessel and preserved on dry ice immediately after sample processing. Precautions were taken to keep all sample preparation away from possible contamination. The crew ended the day and headed back to Moss Landing arriving at 1800 hours.

Trip 5 - Sampling Dates: July 2, 2019

Sampling Crew: Marco Sigala

The objective of this trip was to sample for monkeyface prickleback during the largest negative tide of the month.

Tuesday, July 2nd

The crew left Moss Landing at 0400 to drive to San Francisco's Golden Gate park. Poke poling for monkeyface prickleback began at 0600 and ended at 0715 yielding one fish. The crew then drove across the Golden Gate Bridge to sample the Fort Baker rockwall. Poke poling was conducted for 2 hours with no monkeyface prickleback caught. The fish was processed and placed on wet ice while driving back to Moss Landing. The sample was placed on dry ice upon arrival.

Trip 6 - Sampling Dates: July 8-12, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rachel Brooks

The objective of this week's cruise was to begin fishing in San Pablo Bay and Paradise Cove (Central Bay). The crew ended the week in Berkeley to complete shiner surfperch collections.

Monday, July 8th

The crew drove to Loch Lomond marina and launched the boat. Trawling in the main channel began at 1023 and was conducted along the full length of the channel and along the channel slope. Nine trawls yielded 5 bat rays, 1 halibut, 1 white croaker, 1 shiner surfperch, and 4 staghorn sculpin. Fish workup was completed on the vessel and preserved on dry ice immediately after the fish were caught. Three gill nets (1" square, 2.25" square, and 4" square) were set next to and near the Sisters islands. The 1" net came loose and drifted so it did not fish properly while the 4" net was clogged with algae and rolled into a cylinder taking 2 hours to clean. One striped bass was retrieved in the 2.25" net, processed, and placed on dry ice. The crew ended the day at 2000 hours.

Tuesday, July 9th

The day began launching out of Loch Lomond running 16 trawls in the main channel, along the channel slope, and near the base of the Richmond bridge near the gun club. Five starry flounder, 4 diamond turbot, 1 striped bass, 3 staghorn sculpin, and 1 halibut were caught, processed on the vessel according to protocol, and stored on dry ice. The 1" square and 2.25" square gill nets were set in the afternoon to target jacksmelt and striped bass. While the nets were soaking, hook and line fishing for white sturgeon was conducted near McNears beach. Only 3 herring were caught in the 1" gill net, processed, and placed on dry ice. The crew ended the day at 1730 hours.

Wednesday, July 10th

The crew launched out of Loch Lomond marina and transited south to Paradise Cove (Central Bay). The 2.25" square, 4" square, and 5" square gill nets were set to target white sturgeon and striped bass. One striped bass and one bat ray were caught in the 2.25" gill net. The fish were processed on the vessel according to protocol and placed on dry ice. The crew transited back to San Pablo to conduct 7 trawls along the channel. Only 1 bat ray was caught, processed, and placed on dry ice. The crew ended the day at 1800 hours.

Thursday, July 11th

The day began launching out of Loch Lomond again. The crew floated a 1" square gill net near the gun club to target jacksmelt. Four trawls were conducted in the area producing one female halibut that was processed immediately and placed on dry ice. At slack tide, the 1" gill net was moved to the other side of the gun club pier and then the crew trolled for striped bass. At 1100, the crew began a sturgeon drift using the 4" square gill net. No fish were caught. At 1300, the 1" gill net was retrieved with 10 jacksmelt and 1 striped bass. The fish were processed on the vessel and placed on dry ice.

The 2.25" square gill net was set near the gun club pier to target striped bass but none were caught. The crew ended the day at 1730 hours.

Friday, July 12th

The crew drove from San Rafael south to Berkeley marina to launch the boat. Eleven trawls were run in the marina yielding only 2 target size shiner surfperch. The crew then transited outside of the marina and into the back area near Albany where two trawls were conducted producing three bat rays. Fish workup was completed on the vessel and preserved on dry ice immediately after the fish were retrieved. Precautions were taken to keep all sample preparation away from possible contamination. The crew returned to the launch ramp and drove back to Moss Landing.

Trip 7 - Sampling Dates: July 22-26, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rachel Brooks

The objective of this week's cruise was to target shiner surfperch in Emeryville Crescent and white sturgeon in Suisun Bay. Fishing was also conducted in Oakland, San Francisco, and Central Bay to fill in incomplete composites of fish.

Monday, July 22nd

The crew drove from Moss Landing to Oakland to launch the vessel and then transited outside of the Inner Harbor to Emeryville Crescent to set two 1" square gill nets to target shiner surfperch. The crew ran a trawl in Clipper Cove at Treasure Island but no fish were caught. Trawling moved over to San Francisco near McCovey Cove where 12 trawls were run yielding 3 white croaker to complete a composite. When the crew returned to Emeryville Crescent to pick up the gill nets, no shiner surfperch were caught. However, 2 striped bass, 1 herring, 10 jacksmelt, and 3 white surfperch were in the nets. Fish workup was completed on the vessel and preserved on dry ice immediately after the fish were retrieved. Precautions were taken to keep all sample preparation away from possible contamination. The crew ended the day and returned to the launch ramp at 1900 hours.

Tuesday, July 23rd

Sampling began in Emeryville Crescent in which 8 trawls were run throughout the area searching for shiner surfperch. Two 1" square gill nets were also set in the area and allowed to soak for 8 hours across incoming and outgoing tides. No shiner surfperch were caught but 9 jacksmelt and 2 striped bass were caught in the gill nets. At slack tide, the crew ran a couple trawls along the Treasure Island rockwall but the trawl door got caught on an old piling and broke. The crew transited back to the Oakland Inner Harbor launch ramp where they replaced the trawl door. Eight trawls were conducted in the Oakland Inner Harbor shipping channel yielding 9 white croaker. The fish were processed and stored on dry ice after capture. Precautions were taken to keep all sample preparation away from possible contamination. The crew ended the day setting the 2.6" square gill net along the Alameda Rockwall for an overnight soak. The day ended at 1830 hours.

Wednesday, July 24th

Once again, the crew launched out of Oakland Inner Harbor and then transited into the Central Bay near Alcatraz Island to target rockfish. Hook and line fishing was conducted at Shag rock and Harding rock yielding 15 brown rockfish and 0 blue rockfish. After this successful event, the crew transited to Treasure Island to run a trawl. No fish were caught. Two 1" square gill nets were set and three more trawls were run in Emeryville Crescent. No shiner surfperch were caught but 7 jacksmelt, 1 white perch, 2 striped bass, and 1 bat ray were. The 2.25" square gill net was floated and then hook

and line fishing was conducted near Treasure Island, but both methods were unsuccessful. The crew then transited to the Alameda Rockwall to retrieve the 2.6” gill net set the previous afternoon, but no target fish were caught. All fish were processed immediately after capture and put on dry ice. The day ended at 1700 hours for the crew.

Thursday, July 25th

The crew launched out of Oakland Inner Harbor and ran 9 trawls along the shipping channel wall. Seven white croaker were caught, processed, and placed on dry ice. The crew then transited to Emeryville Crescent to set 1” square and 2.25” square gill nets. While the nets were soaking, hook and line fishing was conducted nearby. After 6 hours of fishing, the nets were retrieved yielding only 1 herring, 4 jacksmelt, and 1 white perch. The crew noticed a harbor seal in the vicinity of the nets which probably meant the seal was ripping caught fish (especially jacksmelt) out of it. The crew ended the day at 1630 hours.

Friday, July 26th

The crew drove from Oakland to Martinez to launch the boat and then transited into Suisun Bay. The 4” square and 5” square gill nets were set to target white sturgeon. Hook and line fishing was conducted nearby without a fish being caught. The nets were picked up at slack tide mid-day with a white sturgeon (116” and 159.5” TL) retrieved from each net. The white sturgeon workup was completed on the vessel and preserved on dry ice immediately. Precautions were taken to keep all sample preparation away from possible contamination. The crew pulled the boat and returned to Moss Landing arriving at 1930 hours.

Trip 8 - Sampling Dates: August 5-8, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Kristin Saksa

The objective of this week’s cruise was to target San Leandro Bay, Artesian Slough, Steinberger Slough, and South Bay to fill in gaps for missing or incomplete fish composites.

Monday, August 5th

The crew drove from Moss Landing to San Leandro Bay to target shiner surfperch. A total of 14 trawls were conducted in the various channels throughout San Leandro Bay. The main back channel produced 22 target shiner surfperch plus 61 smaller (8-10 cm TL) shiners. It appeared another red tide was forming in the back channel due to the red and brown water color. A lot of trash and debris was also picked up in the trawls. The shiner surfperch were processed, including 10 for microplastics, according to protocol and placed on dry ice. The crew pulled the boat at 1600 hours and drove to Redwood City.

Tuesday, August 6th

The crew drove from Redwood City to meet Ryan Mayfield at the City of San Jose Regional Wastewater Treatment Plant so he could take us into Artesian Slough on their property. The crew fished for carp and striped bass near the weir but no fish were caught. The crew left and drove to San Leandro Bay to sample for shiner surfperch. Twelve trawls were run in the afternoon yielding 35 shiner surfperch. The shiner surfperch were processed and placed on dry ice. The crew ended the day at 1700 hours and drove back to Redwood City.

Wednesday, August 7th

The crew drove from Redwood City to Alviso Slough to launch the vessel. The crew transited out of Alviso Slough into the area where Coyote Creek enters into South San Francisco Bay near the train trestle crossing close to Artesian Slough. The 2.25” square and 2.6” square gill nets were floated to target striped bass. Nets were checked mid-day at slack tide and reset to fish the afternoon. While the nets were soaking, hook and line fishing was conducted. Seven striped bass were caught in the nets. Fish workup was completed on the vessel and preserved on dry ice immediately after the nets were checked mid-day or retrieved in the afternoon. Fish were kept whole body in case of microplastic analyses. Precautions were taken to keep all sample preparation away from possible contamination. The crew ended the day at 1800 hours and returned to Redwood City.

Thursday, August 8th

The crew launched out of Redwood City and transited to Steinberger Slough. Six trawls were conducted along the main channel and into side channels to search for shiner surfperch. The back area of Steinberger is characterized by fine mud while the mouth of Steinberger is mostly a sandy bottom with oyster and clam shells. No shiner surfperch or any other fish were caught in the trawls. The crew was surprised at the paucity of life found in Steinberger Slough after all of the trawls and net sets in the area. Since the tide was dropping, the crew left Steinberger Slough and ran two trawls in the main Redwood City channel to try to catch one white croaker to complete the composite, but they were unsuccessful. The crew pulled the boat out of the water and drove to Alviso Slough to launch the boat again. The 2.25” square and 2.6” square gill nets were floated to target striped bass to try to complete the target number of 10 fish. Five striped bass were caught and kept giving a total count of 12 striped bass from South Bay. Jay Davis authorized the extra catch. Fish workup was completed on the vessel and preserved on dry ice immediately after the nets were checked mid-day or retrieved in the afternoon. Fish were kept whole body in case of microplastic analyses. Precautions were taken to keep all sample preparation away from possible contamination. The crew pulled the boat and drove back to Moss Landing ending the day at 1930 hours.

Trip 9 - Sampling Dates: August 20-23, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Nina Buzby/Kristin Saksa

The objective of this week’s cruise was to target white sturgeon, striped bass, and shiner surfperch in San Pablo, Paradise Cove (Central Bay), and Suisun Bay. Sampling was to begin Monday but one of the crew members had a flight delay returning from New York and another crew member was sick. Nina Buzby from SFEI was scheduled to come on the boat with the crew to learn the protocol and she ended up being an active crew member Tuesday and Wednesday while Kristin was recovering from her cold. Kristin joined the crew Thursday and Friday and Nina returned to SFEI. The crew appreciated her help so sampling could continue uninterrupted.

Monday, August 19th

Marco and Evan drove from Moss Landing to San Rafael so they could get an early start Tuesday morning to set nets at slack tide.

Tuesday, August 20th

Nina Buzby from SFEI met the crew at 0700 at the Loch Lomond marina launch ramp. The crew began the morning running 5 trawls in the channel. No shiner surfperch or staghorn sculpin were caught. The 2.6” square gill net was set near the Sisters Islands to target striped bass during a 6 hour float. The crew then began a drift float with the 4” square gill net between the Sisters Islands and the

Pumphouse to target white sturgeon. During one of the drifts, the net got stuck and it took a while for the crew to free the net and begin the drift again. No white sturgeon or striped bass were caught in the gill nets marking this as the only day target fish were not caught. The crew ended the day at 1730 hours.

Wednesday, August 21st

Nina met the crew at the Loch Lomond marina launch ramp at 0700 and first set the 2.6” square gill net near the base of the Richmond Bridge near the gun club pier to target striped bass. The crew then ran 18 trawls yielding 3 shiner surfperch. The 2.6” net was checked mid-morning and moved to the north side of the gun club pier due to the switching tide direction. The 4” square gill net was also set near the gun club pier in the open area since sturgeon activity was seen. Only one striped bass was caught, processed, and stored on dry ice. The day ended for the crew at 1800 hours.

Thursday, August 22nd

The crew launched out of Loch Lomond marina and set the 2.6” square gill net on the north side of the gun club pier to target striped bass. The crew then transited south of the Richmond Bridge to Paradise Cove (Central Bay) to set the 2.25” square, 4” square, and 5” square gill nets to target striped bass and white sturgeon. Hook and line fishing was conducted while the nets soaked. The gill nets in Paradise Cove were checked mid-day yielding one white sturgeon. No other target fish were caught this day. The white sturgeon workup was completed on the vessel after retrieval and preserved on dry ice immediately. Precautions were taken to keep all sample preparation away from possible contamination. This particular fish was unique in that it only had one eye. It was unclear if the missing eye was due to a birth defect or an incident in which the eye was sliced off in an incident. The fat on the tissue was also a much brighter yellow color than typically observed in white sturgeon. The crew pulled the boat and ended the day at 1830 hours.

Friday, August 23rd

The crew drove from San Rafael to Martinez to launch the boat. The crew transited to Suisun Bay to set the 4” square and 5” square gill nets to target white sturgeon. Hook and line fishing was conducted while the nets soaked. The nets were retrieved mid-day, yielding four white sturgeon. Only one white sturgeon was kept to complete the composite since Jay Davis wanted the crew to continue targeting white sturgeon in Central and San Pablo bays. The white sturgeon was processed on the vessel and placed on dry ice. The crew pulled the boat and drove back to Moss Landing returning at 1830 hours.

Trip 10 - Sampling Dates: September 2-6, 2019

Sampling Crew: Marco Sigala, Evan Mattiasen, Rachel Brooks

The objective of this week’s cruise was to target white sturgeon, striped bass, and shiner surfperch in San Pablo and Paradise Cove (Central Bay).

Monday, September 2nd

The crew drove from Moss Landing to Loch Lomond marina to launch the boat. The crew transited to the Sisters Islands to float the 2.25” square and 2.6” square gill nets to target striped bass. The crew then ran five trawls in the channel yielding 1 diamond turbot, 1 shiner surfperch, and 6 anchovy. The fish were processed and stored on dry ice. The crew switched gears and floated the 5” gill net to target white sturgeon. One white sturgeon (144.5” TL) was caught, processed, and stored on dry ice. The smaller gill nets were retrieved in the late afternoon and it was apparent a harbor seal

had eaten fish out of the nets. One striped bass was retrieved with the head bitten off, processed, and stored on dry ice. Total length (493 mm) was measured from the tail to the end of the gill plate. The crew ended the day at 1800 hours.

Tuesday, September 3rd

The crew launched out of Loch Lomond and transited south to Paradise Cove (Central Bay). The 2.25" square, 2.6" square, 4" square, and 5" square gill nets were set to target white sturgeon and striped bass. After the nets were set, a couple trawls were run for bait and then hook and line fishing commenced. The nets were checked mid-day at slack tide and then retrieved in the late afternoon. One male white sturgeon (125.4" TL) was caught in the 4" gill net, processed on the vessel, and stored on dry ice. The crew ended the day at 1900 hours.

Wednesday, September 4th

The previous day efforts were repeated in which the crew launched out of Loch Lomond and transited to Paradise Cove to set four gill nets and hook and line fish. Nets were checked mid-day after the slack outgoing tide but no fish were caught. One male white sturgeon (152" TL) was caught in the 5" square gill net when retrieved in the late afternoon, which completed the sturgeon composite for Central Bay. The white sturgeon workup was completed on the vessel and preserved on dry ice immediately. Precautions were taken to keep all sample preparation away from possible contamination. The crew ended the day at 1900 hours.

Thursday, September 5th

The crew launched out of Loch Lomond and set two 1" square and the 2.25" square gill nets near the gun club pier on an outgoing tide. The crew then transited to the Pumphouse to run a sturgeon drift with the 4" and 5" gill nets connected. No white sturgeon were caught in the 2 hour period. The crew had to stop the drift so they could pull the nets at the gun club pier. No striped bass were caught but the nets were clogged with algae. After a disappointing morning, the crew switched to running trawls in the channel and a couple trawls in Loch Lomond Marina. A total of 12 trawls were run yielding 1 staghorn sculpin, 1 shiner surfperch, and 4 anchovy. The fish were processed and stored on dry ice. The crew returned to the launch ramp and ended the day at 1800 hours.

Friday, September 6th

This day was the last sampling day for the 2019 RMP sampling season. The crew launched out of Loch Lomond and ran a couple of trawls yielding no fish. While running the trawls, though, the crew saw a feeding frenzy of striped bass occurring near the Marin islands. The crew switched to hook and line fishing and worked through and around the fish hitting the water surface. One striped bass was caught and brought on board the boat. When Evan tried to remove the hook, the fish shook it's head and the hook stuck into Evan's finger. The hook was removed but it was deep enough to warrant stopping all fishing activities. The fish was processed and stored on dry ice. The crew then pulled the boat and drove to the nearest Urgent Care facility. The crew drove back to Moss Landing with the project completed.

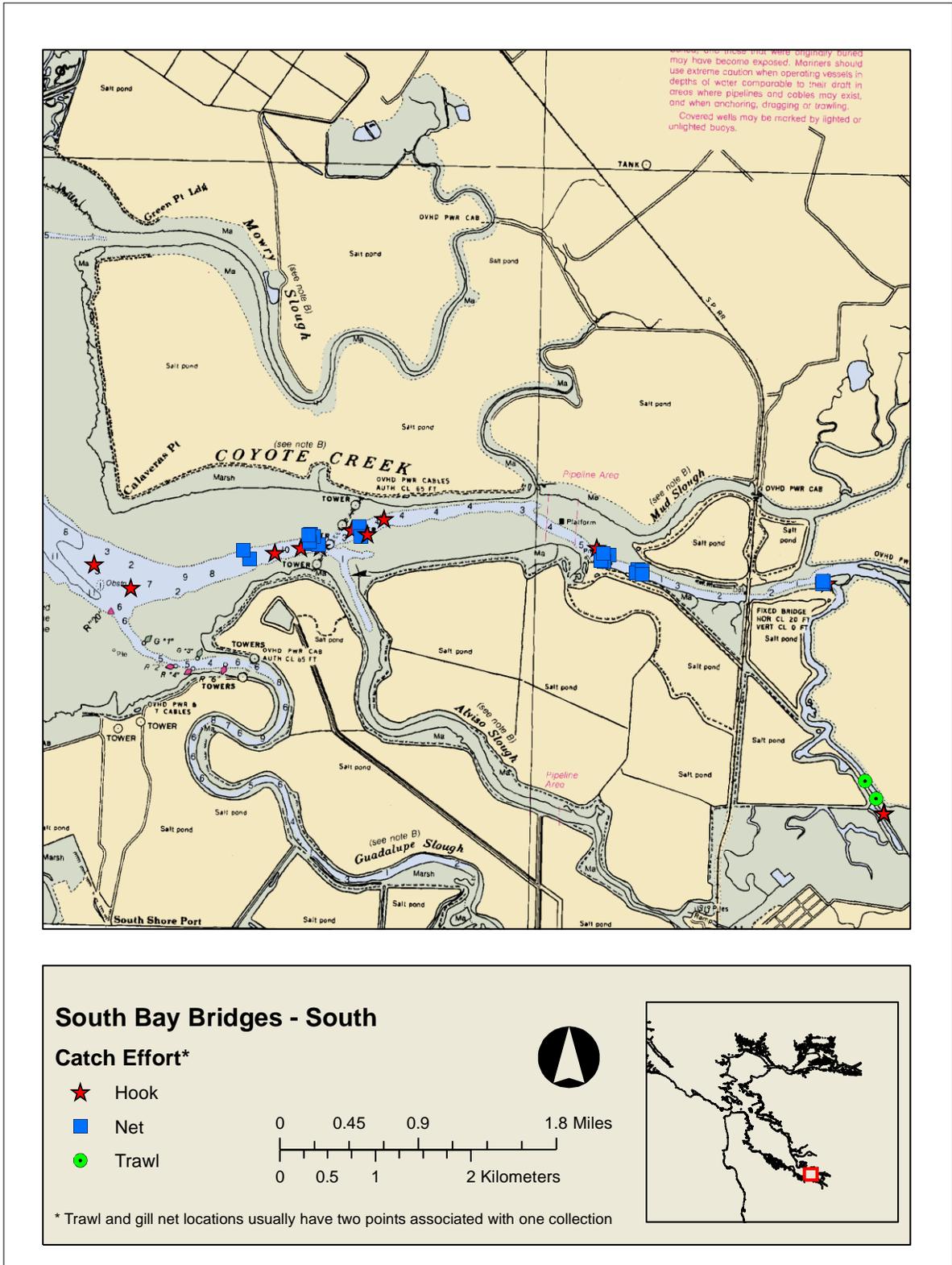


Figure 1: Fishing Effort in South Bay Bridges – South

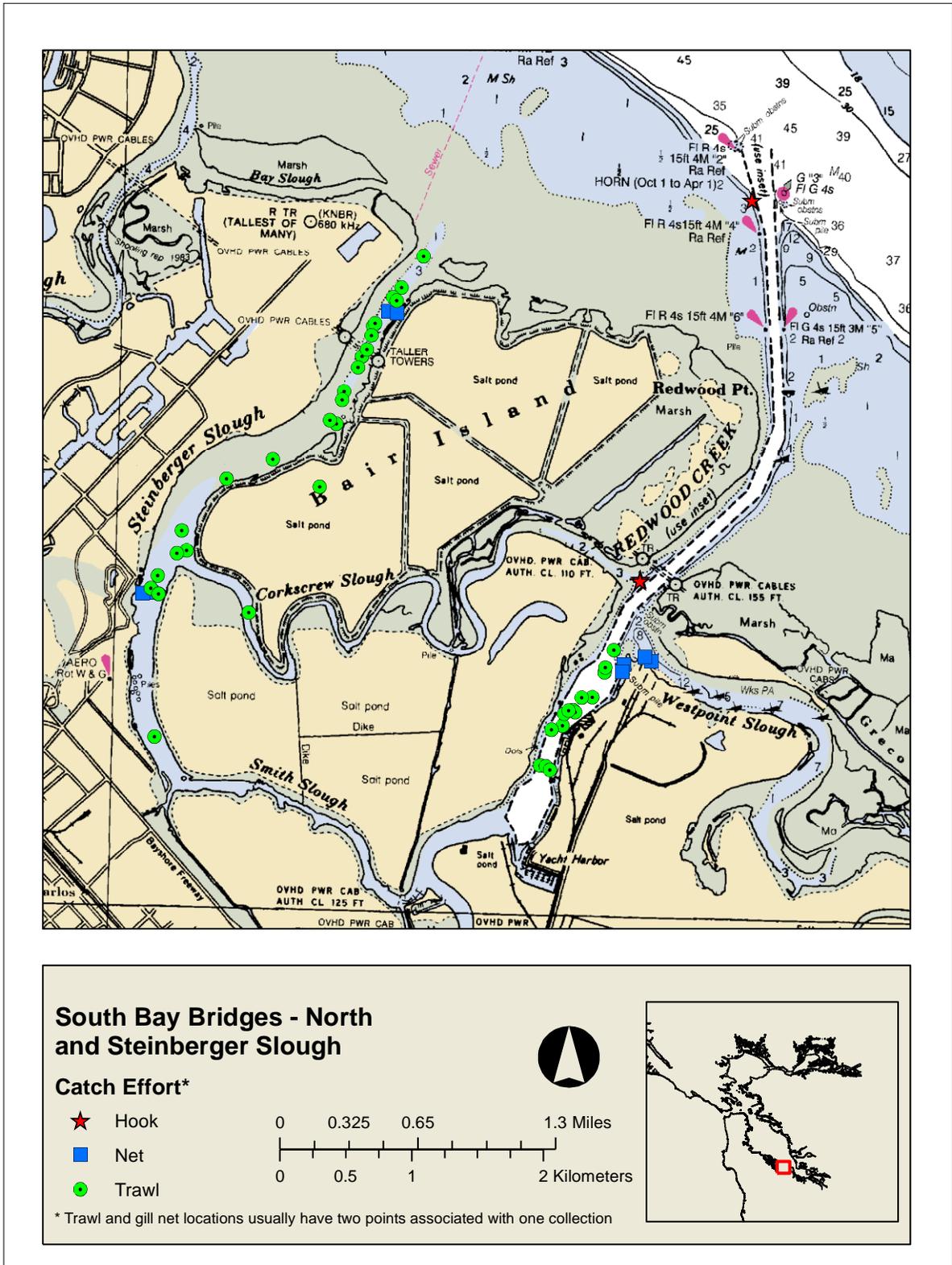


Figure 2: Fishing Effort in South Bay Bridges – North and Steinberger Slough

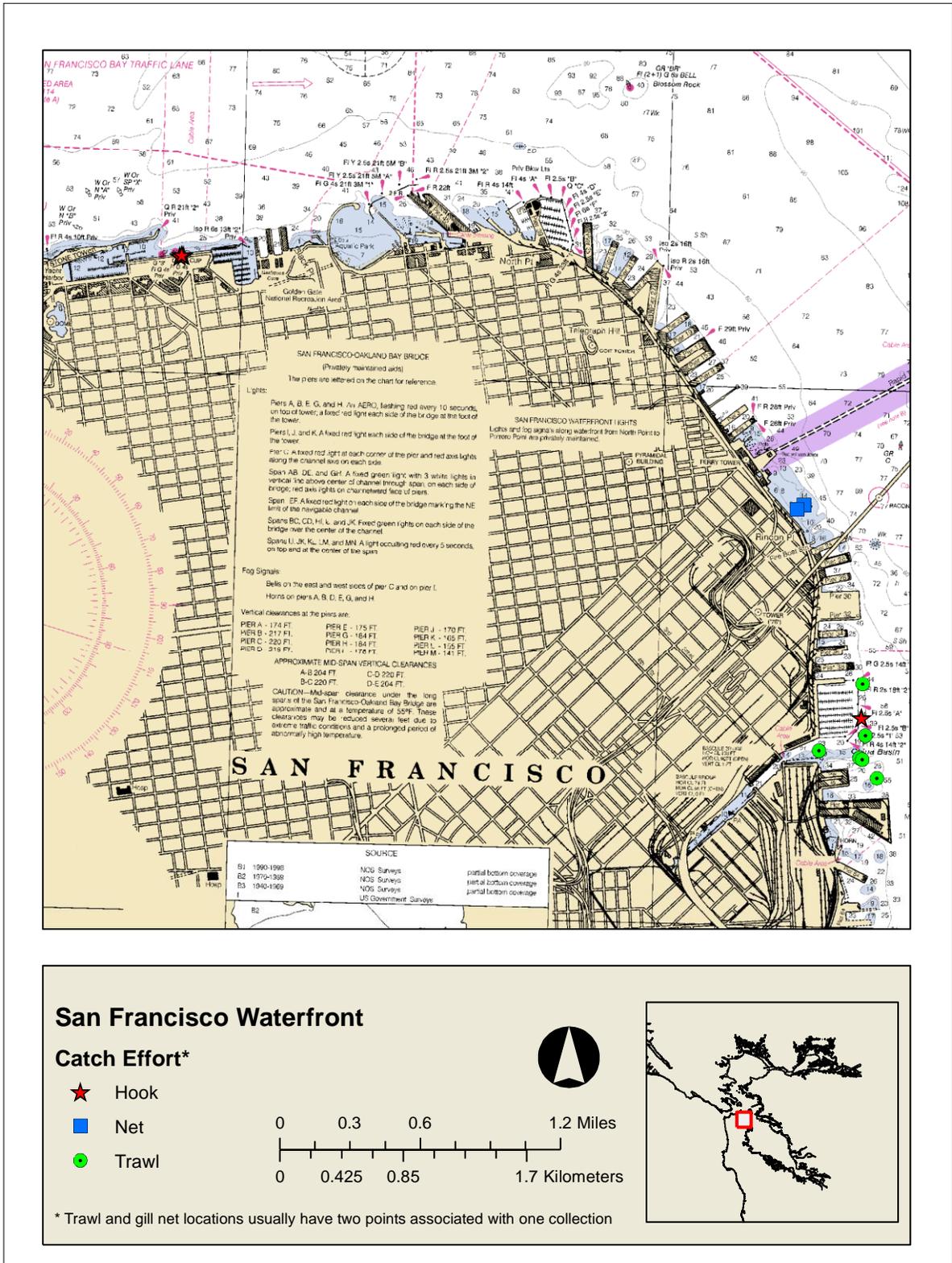


Figure 3: Fishing Effort in San Francisco Waterfront

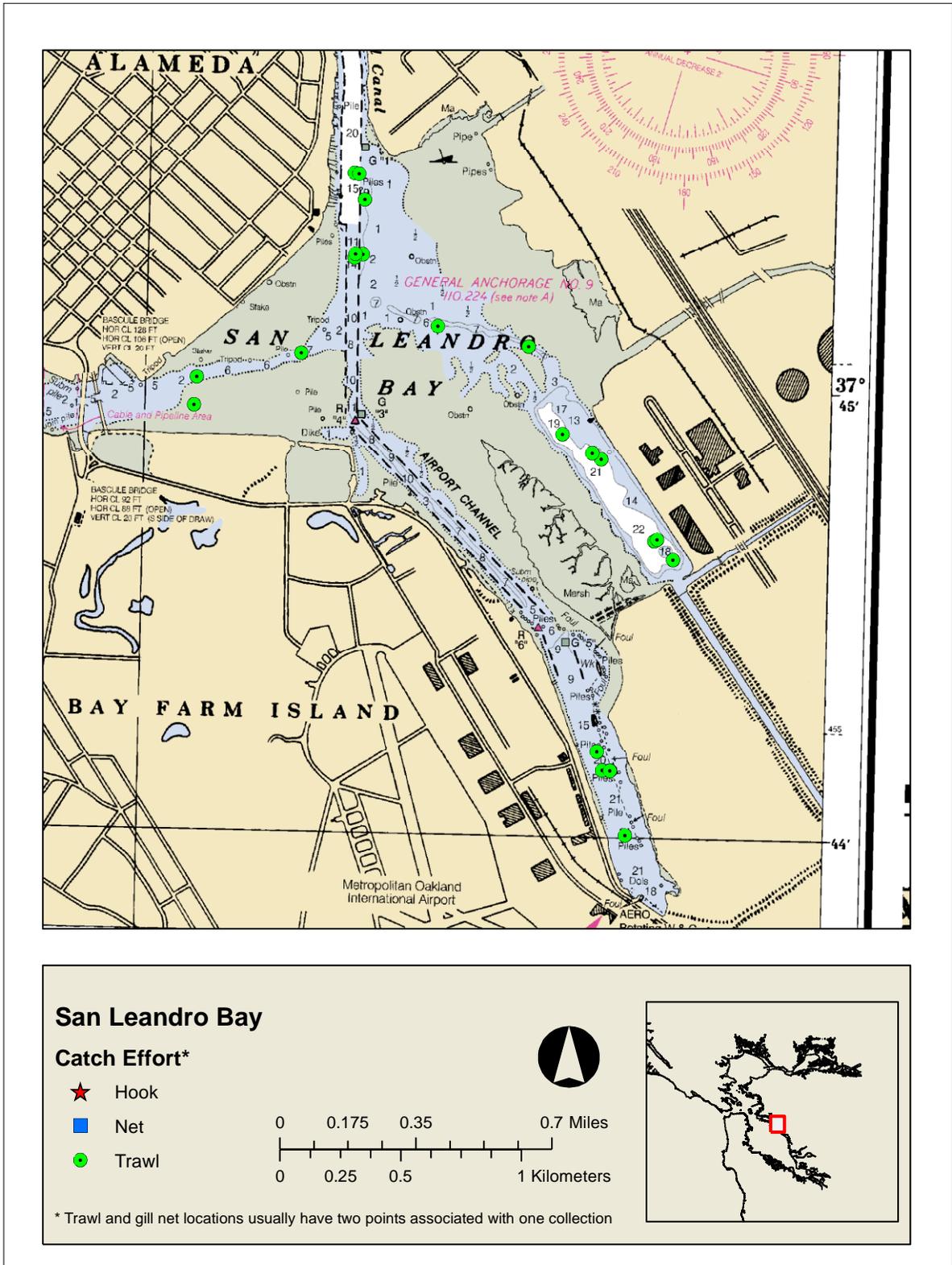


Figure 4: Fishing Effort in San Leandro Bay

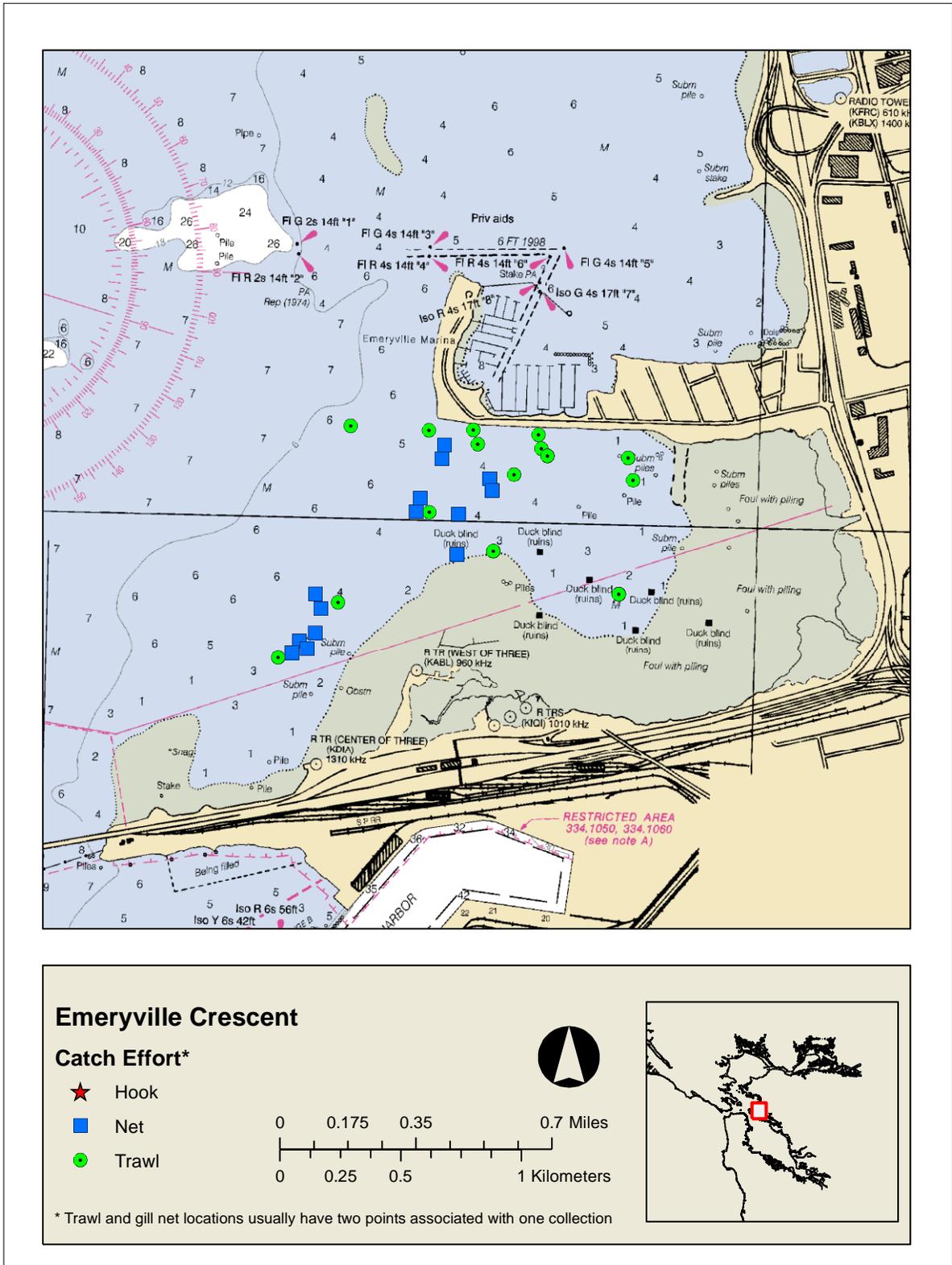


Figure 6: Fishing Effort in Emeryville Crescent

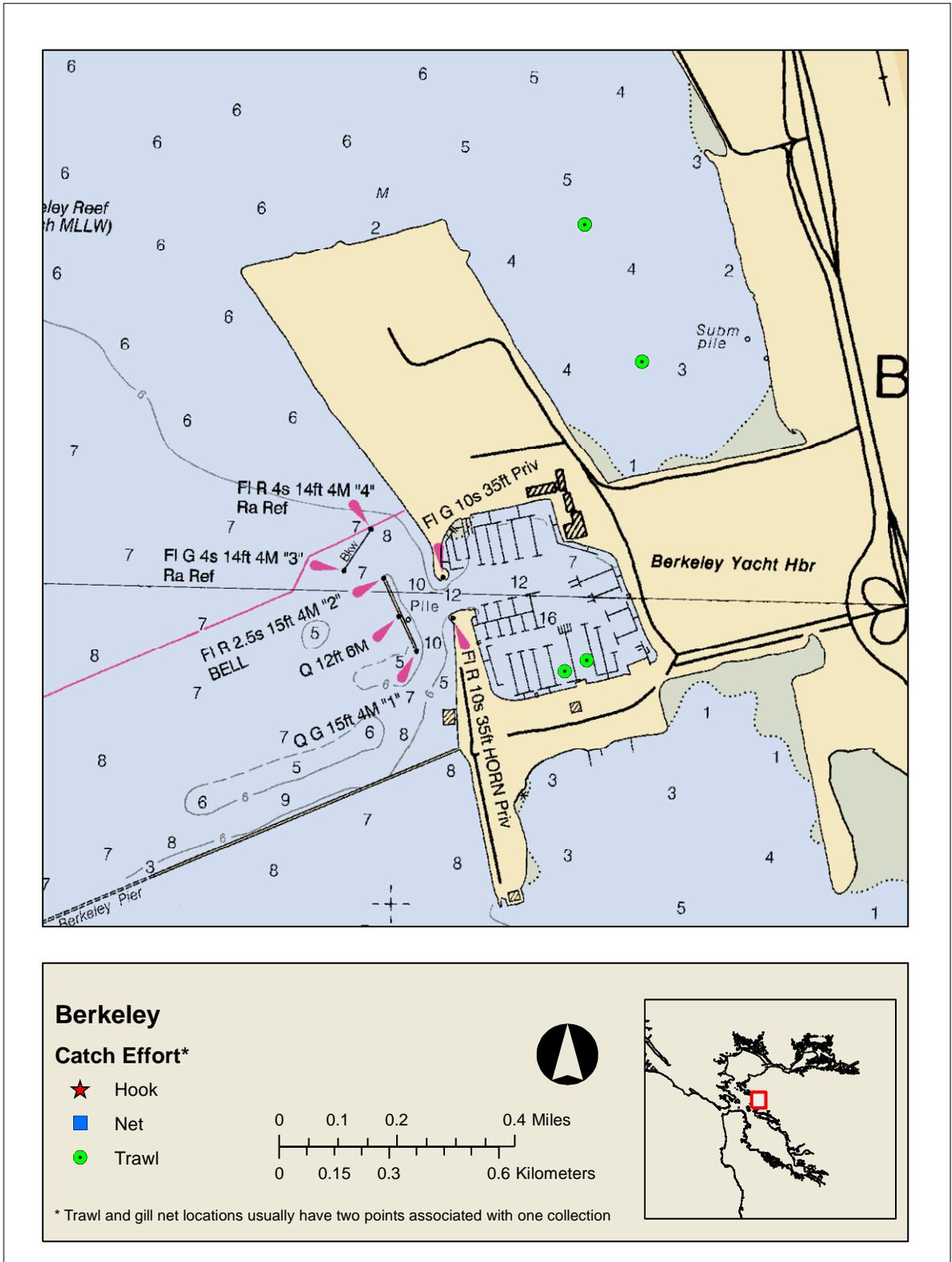


Figure 7: Fishing Effort in Berkeley

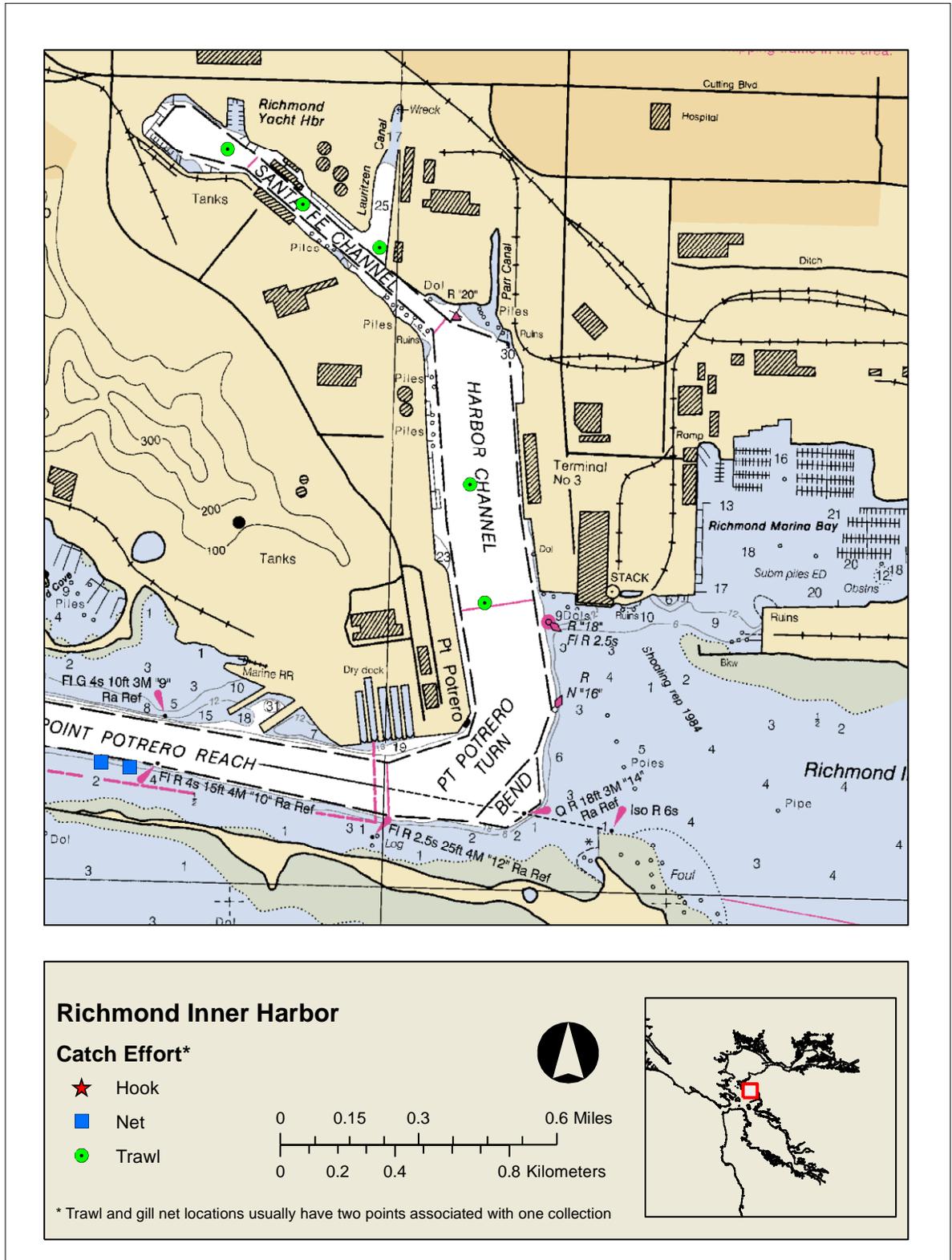


Figure 8: Fishing Effort in Richmond Inner Harbor

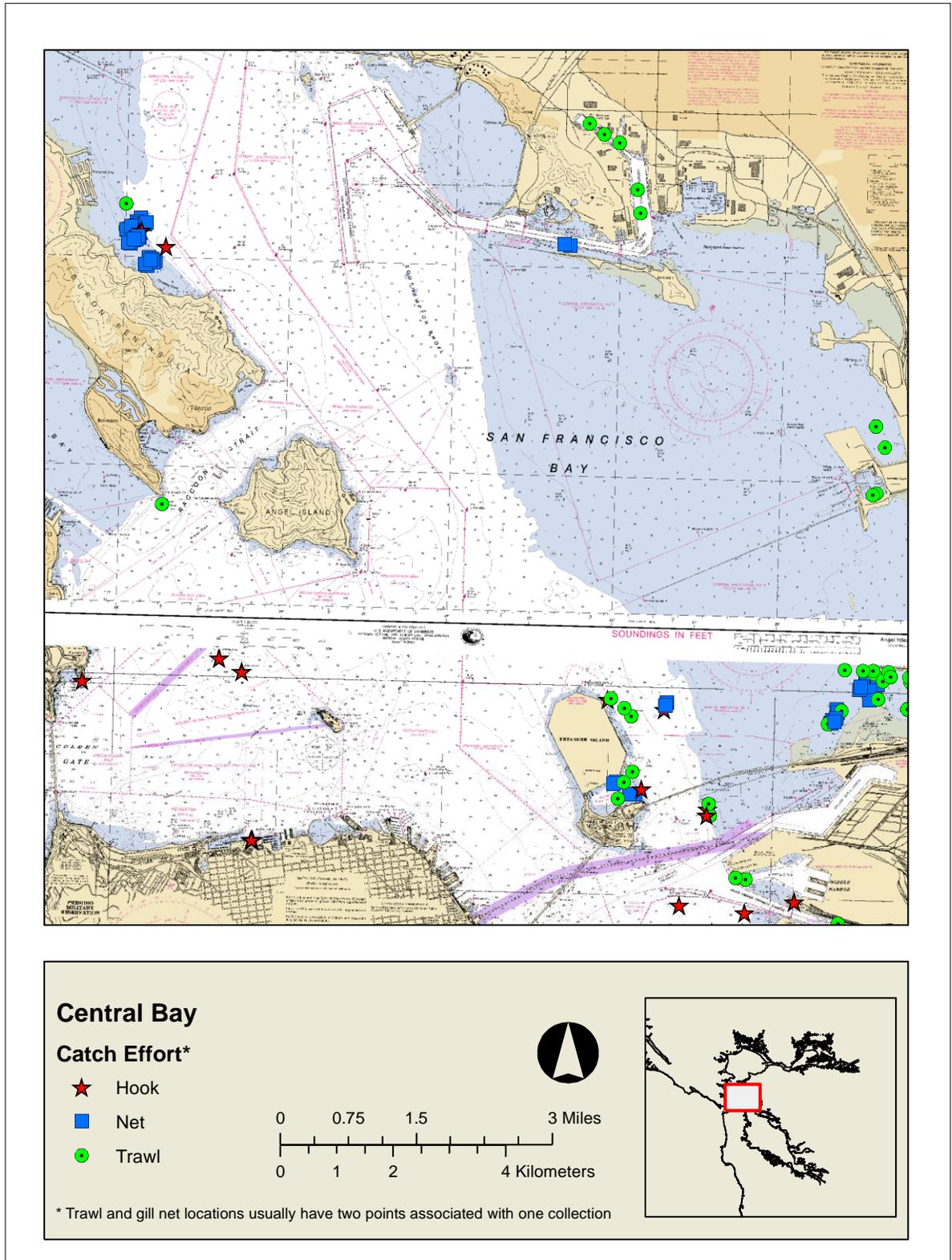


Figure 9: Fishing Effort in Central Bay

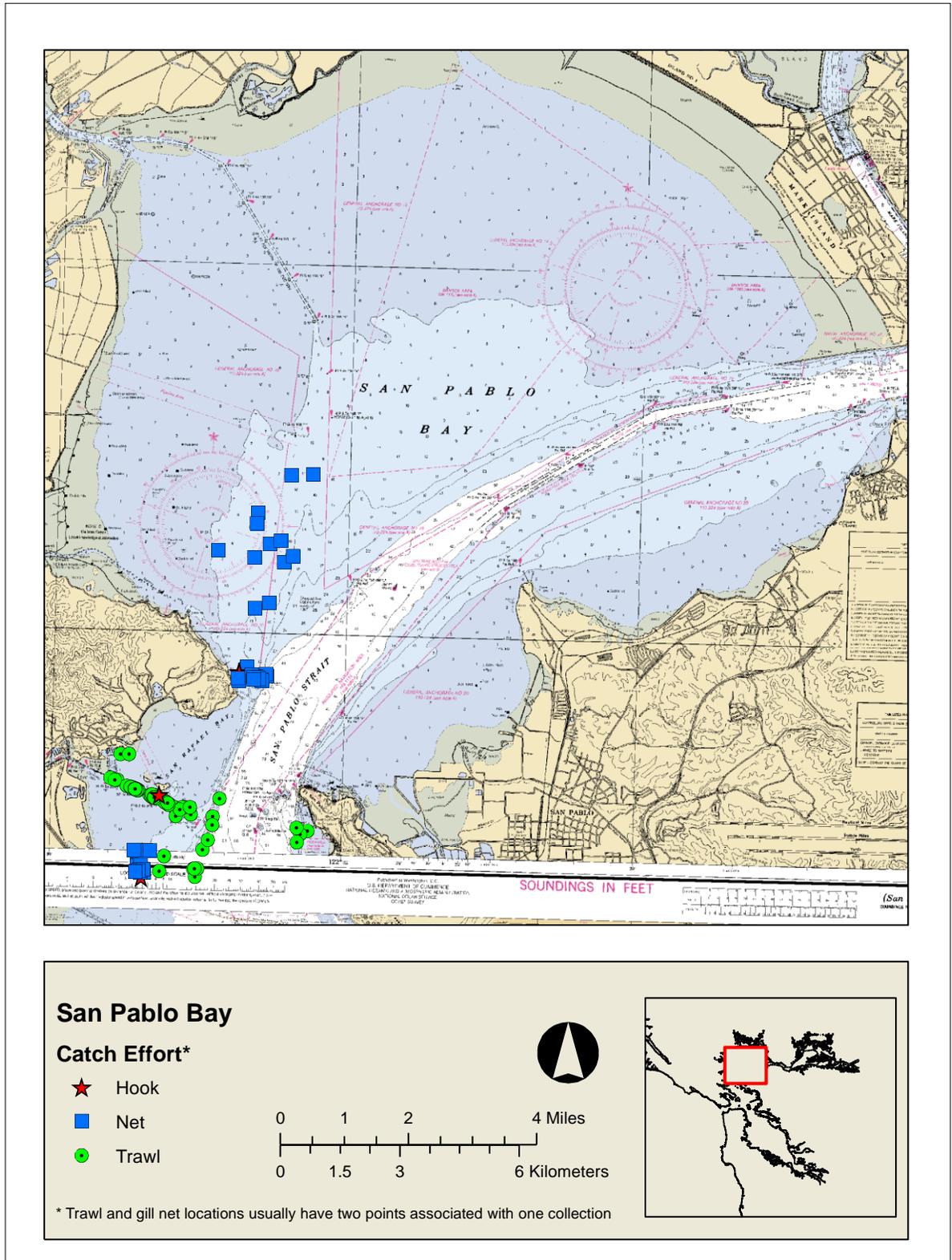


Figure 10: Fishing Effort in San Pablo Bay

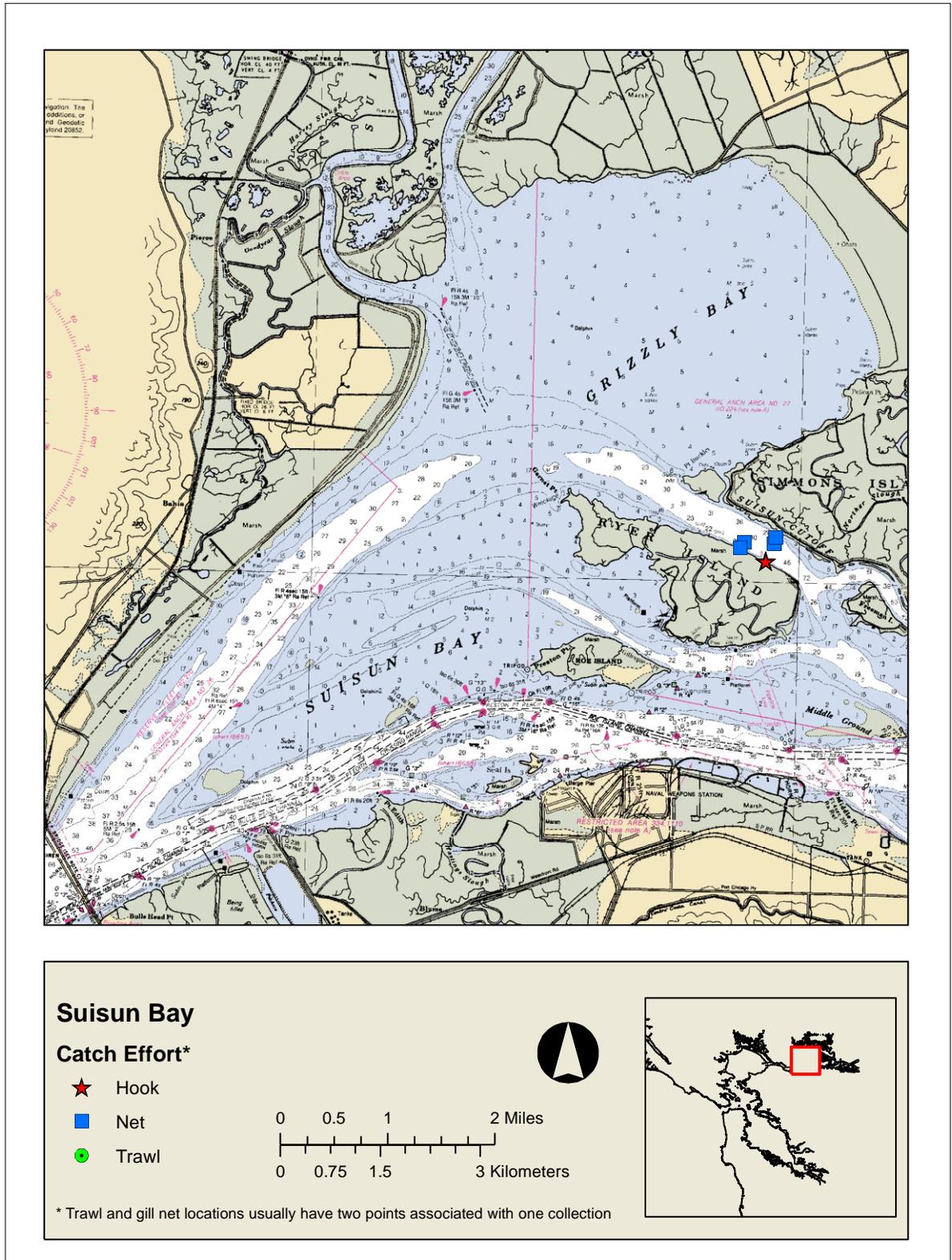


Figure 11: Fishing Effort in Suisun Bay

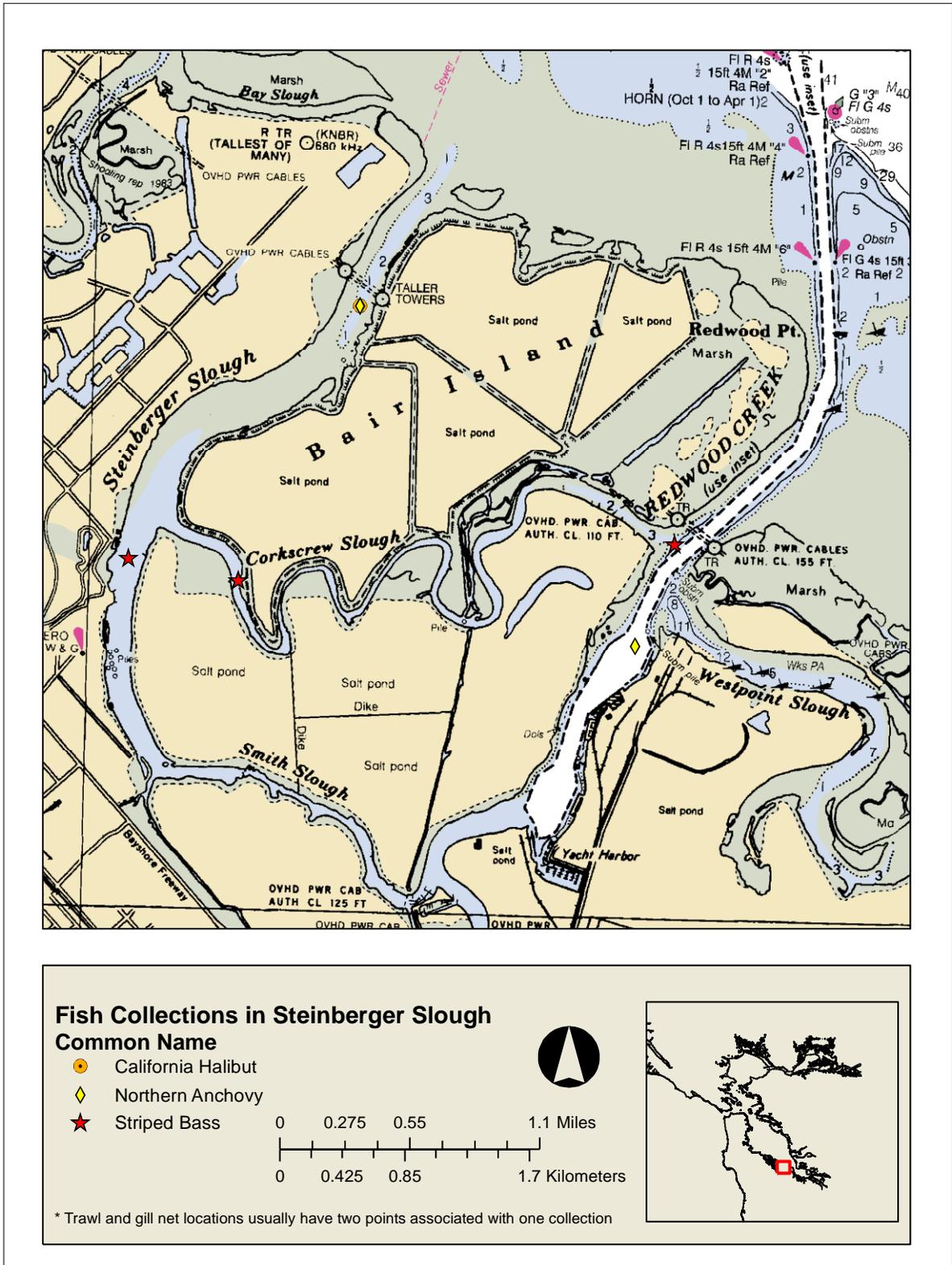


Figure 12: Fish Collections in Steinberger Slough

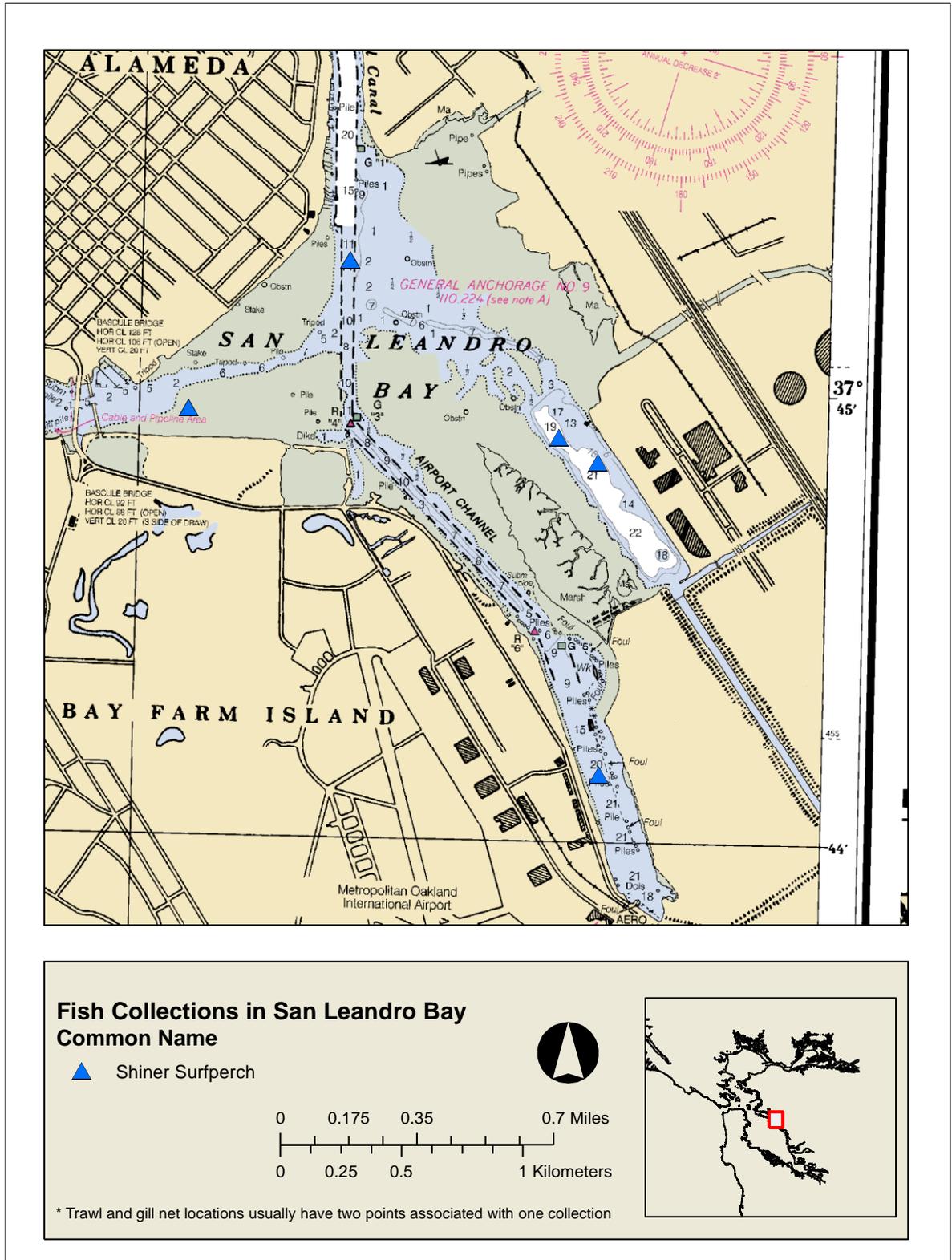


Figure 13: Fish Collections in San Leandro Bay

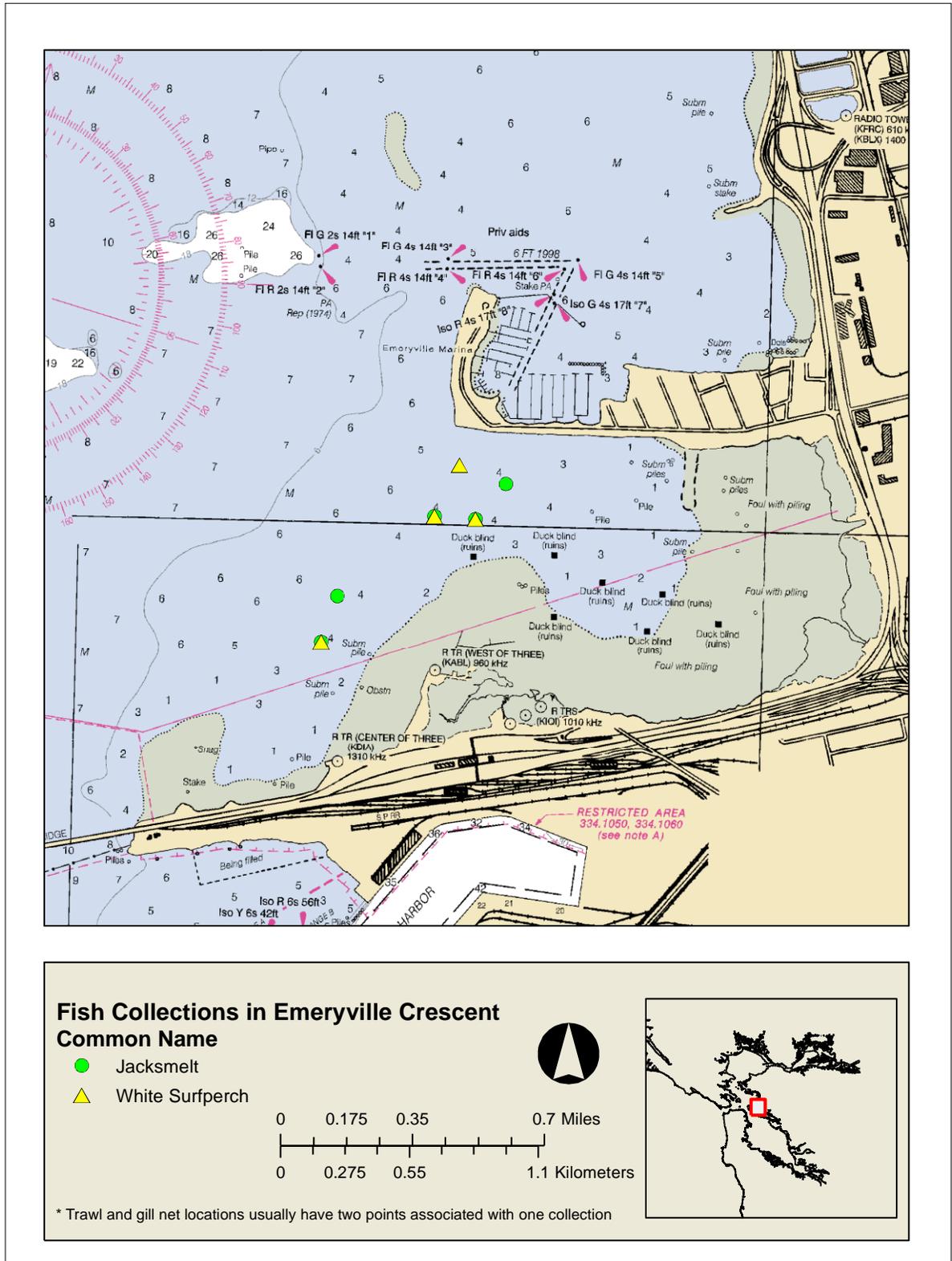


Figure 14: Fish Collections in Emeryville Crescent

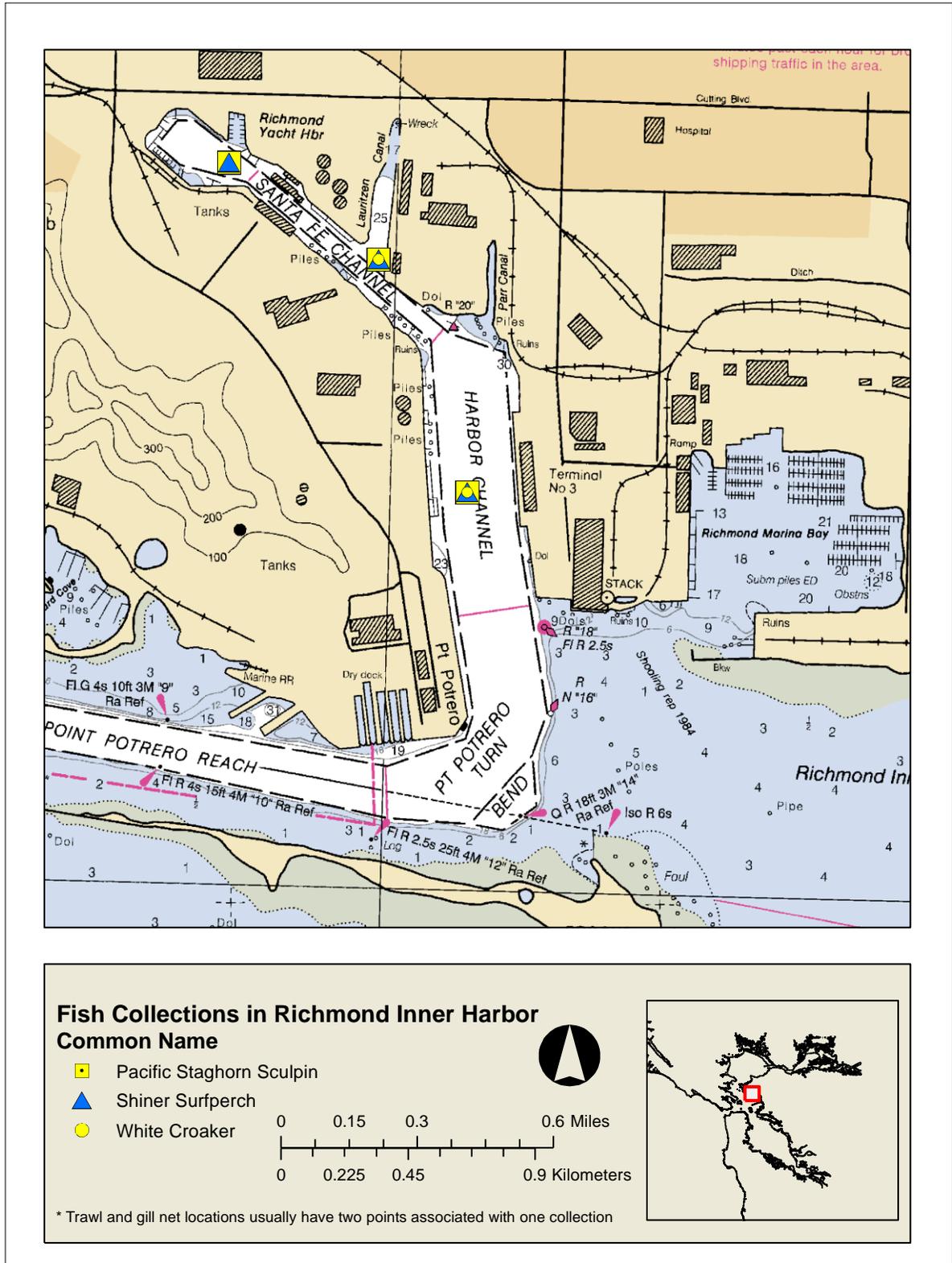


Figure 15: Fish Collections in Richmond Inner Harbor

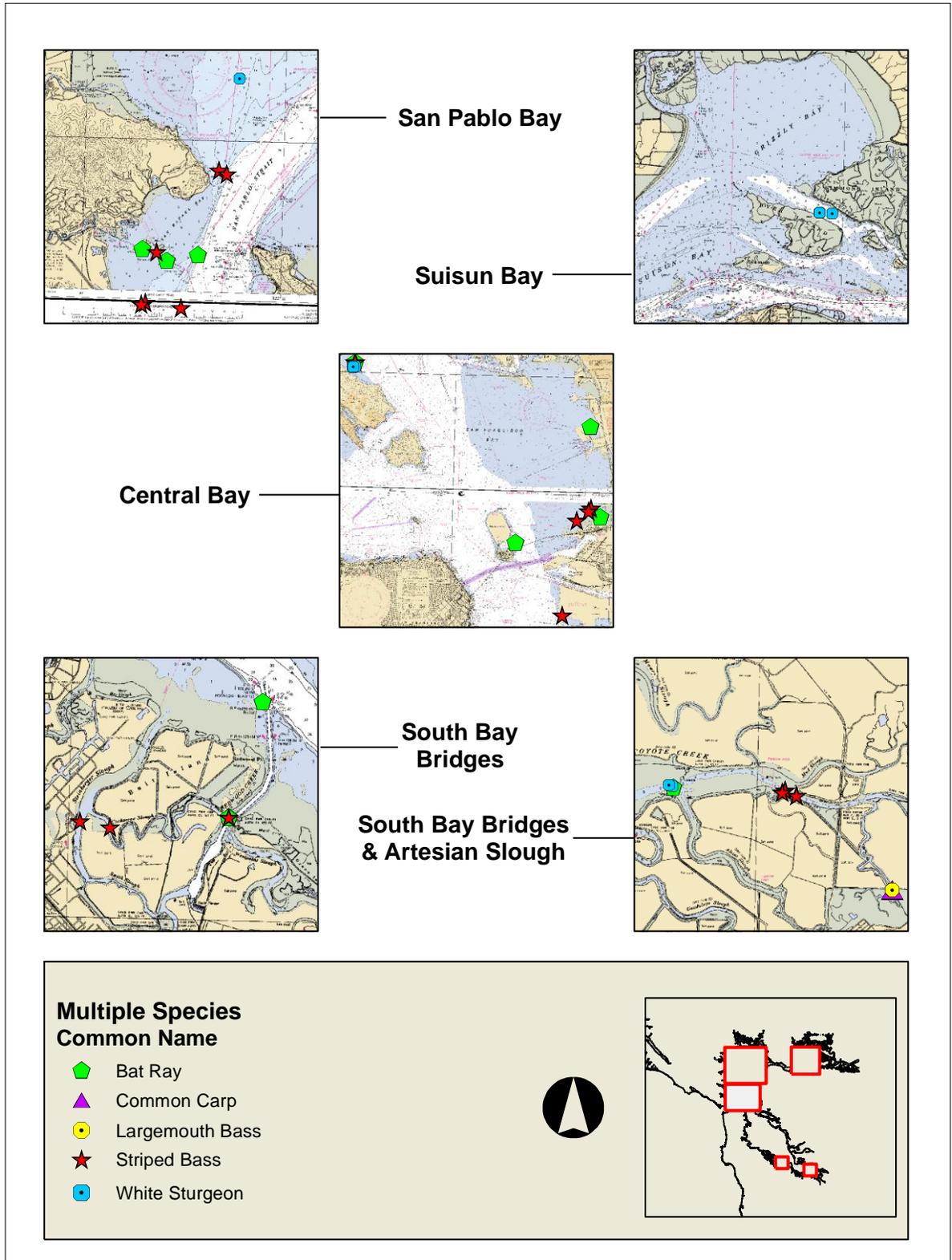


Figure 16: Bat ray, common carp, largemouth bass, striped bass, and white sturgeon collections

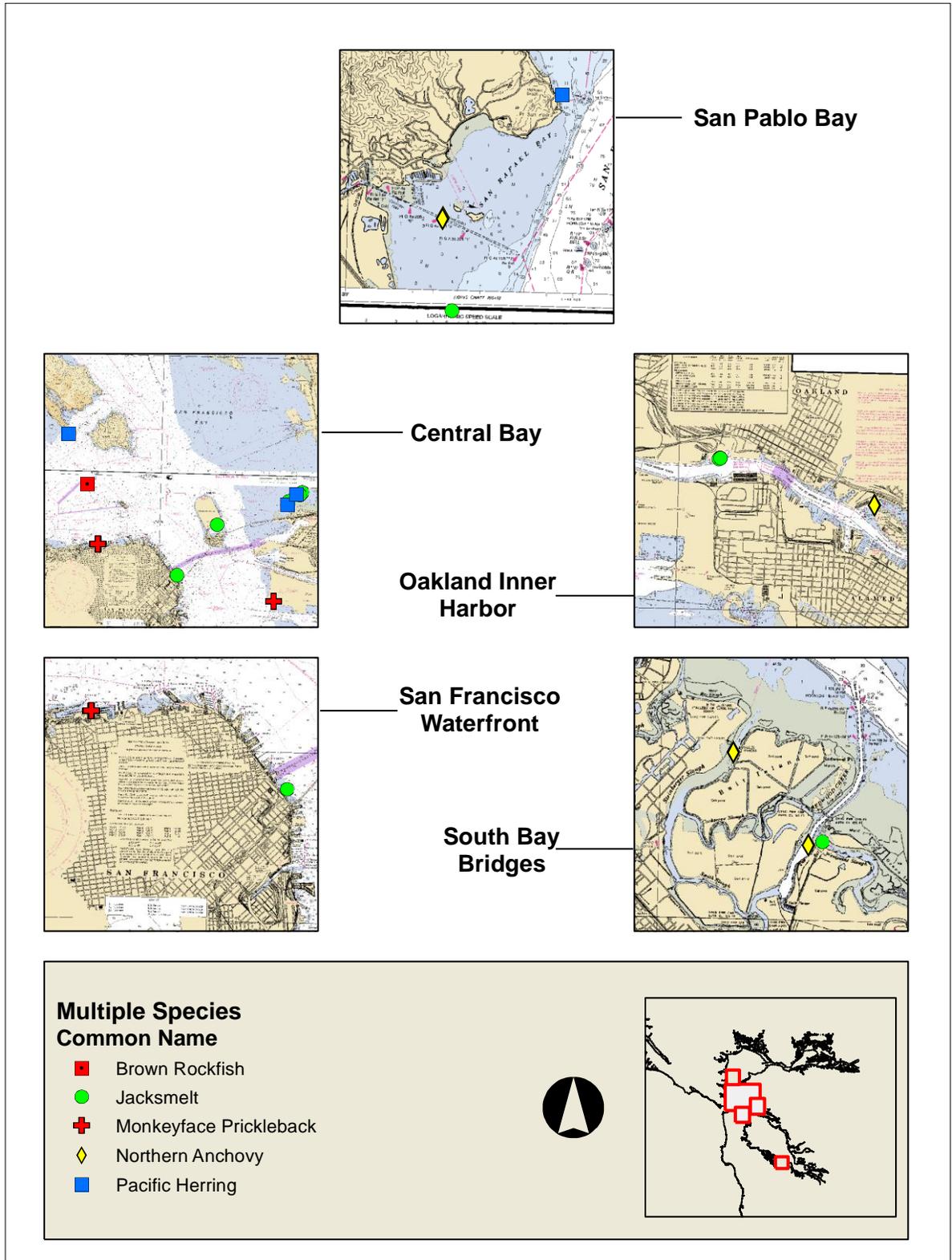


Figure 17: Brown Rockfish, Jacksmelt, Monkeyface Prickleback, Northern Anchovy, and Pacific Herring collections

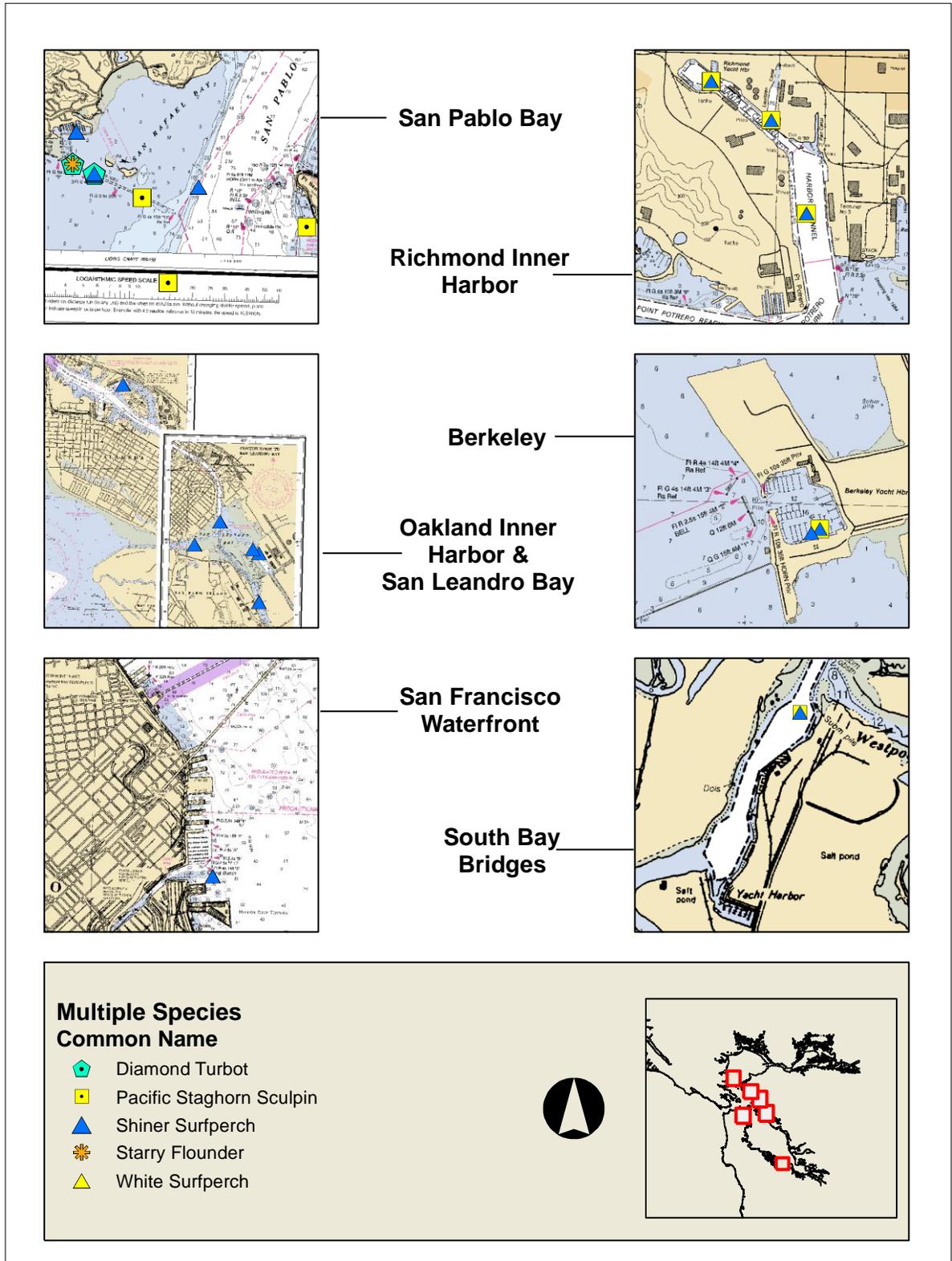


Figure 18: Diamond Turbot, Pacific Staghorn Sculpin, Shiner Surfperch, Starry Flounder, and White Surfperch collections

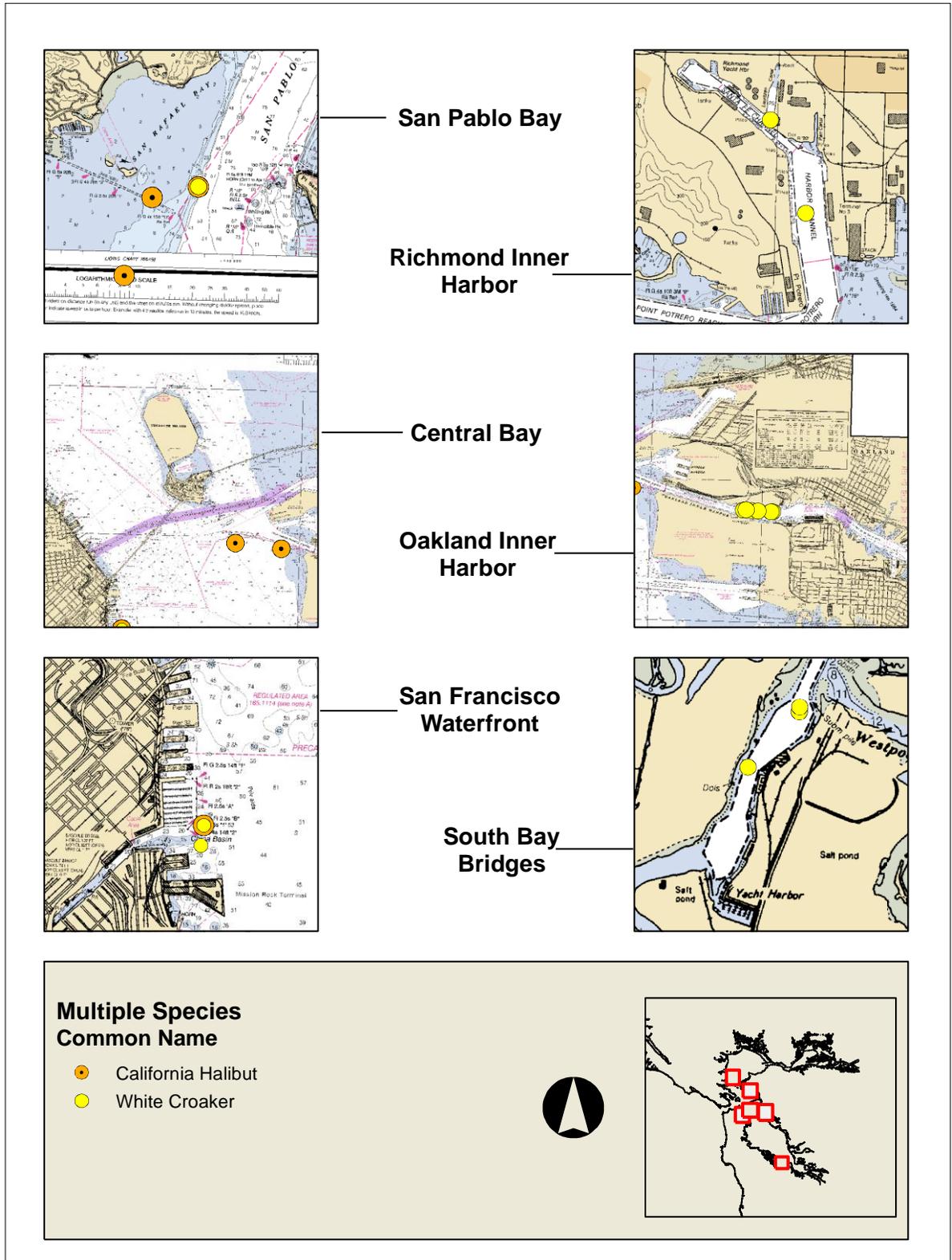


Figure 19: California Halibut and White Croaker collections