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PROGRAM FOR WATER QUALITY
IN SAN FRANCISCO BAY

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2017 Margins Microplastics Cruise Report

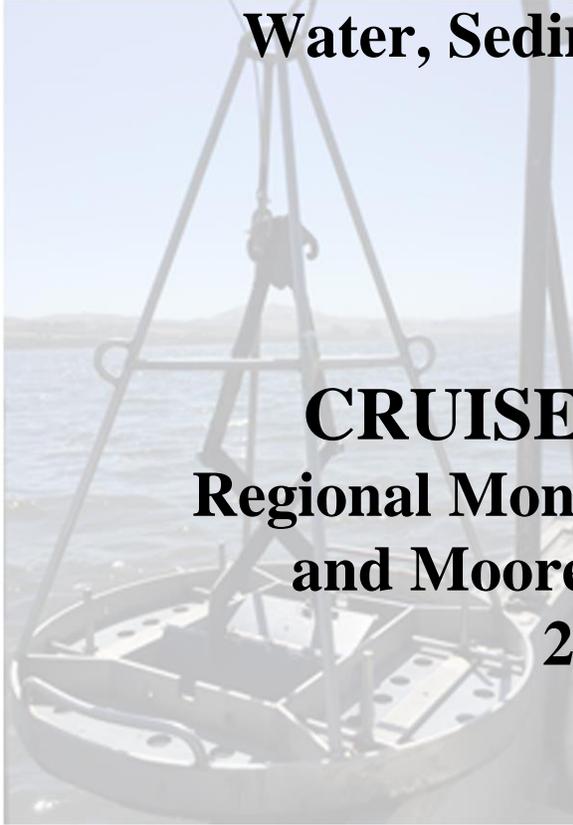
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CONTRIBUTION NO. 848 / October 2017

**Contaminant and Microplastic Concentrations
In San Francisco Bay and Tomales Bay
Water, Sediment, and Fish**



**CRUISE REPORT
Regional Monitoring Program
and Moore Foundation
2017**



**Prepared for the
San Francisco Estuary Institute**

**by
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Introduction

This report contains information on the summer field sampling efforts conducted by Coastal Conservation & Research (CC&R) in support of two Regional Monitoring Program (RMP) studies: South Bay Margins and Moore Microplastics. The South Bay Margins is the second round of a larger San Francisco Bay study collecting sediment and water in shallow margin areas of the bay. The first round was conducted in Central Bay in 2015. The Moore Microplastics study is a collaborative effort with the Moore Foundation to collect sediment and fish samples in San Francisco and Tomales Bays. The work for both studies was contracted through the San Francisco Estuary Institute (SFEI) to CC&R. Since overall project management and sampling locations were coordinated between the two projects, activities from both studies will be presented as they occurred.

This report includes sample collections over a seven week period (June 5th through July 20th) in 2017 encompassing four trips. A total of 40 sediment and 12 water sites were sampled for the South Bay Margins study (Appendix A) and 27 sediment and 12 fish sites were sampled for the Moore Microplastics study (Appendix B). Duplicate sediment samples were collected where identified by SFEI and some water samples required collection of extra bottles for matrix spike (MS) and matrix spike duplicate (MSD) analyses. Detailed sample counts and protocols can be found in these documents prepared by SFEI:

- 2017 Bay Margins Sediment Study Cruise Plan
- 2017 Cruise Plan for Microplastics in Sediment in San Francisco Bay (North)/Tomales Bay and Fish in San Francisco Bay.

At each Margins site, field measurements were recorded for sediment pH, ORP (Oxygen Reduction Potential; Eh), color, composition (e.g., sand, mud), and anoxic transition depth. The field pH meter was calibrated daily prior to sampling while the ORP meter was calibrated each week prior to sampling. At each Microplastics site where Margins sampling did not occur, habitat observations such as sediment color, odor, and composition were recorded.

Water samples were collected in a 1-liter amber glass jar by dunking the closed jar under water about 0.1 meters, uncapping the jar to fill it, and then re-capping the jar under water before pulling it out and onto the boat. Field blanks were collected at some sites by pouring trace-clean water supplied by USGS directly into an amber glass jar.

Sediment was collected using a stainless steel, Kynar-covered modified Van Veen grab (0.1 m² area) penetrating 8-10 cm into the sediment. For Margins sites, some analytical jars were filled directly by scraping the jar into the top sediment layer of the grab. Additional sediment (top 5 cm) was collected using a polyethylene scoop and then placed into either an analytical jar or a 2-liter trace-cleaned polycarbonate tub. A secondary 2-liter glass jar for Contaminants of Emerging Concern (CEC) analyses was filled at some sites using an acetone-cleaned stainless steel scoop. All jars filled on the boat were placed immediately on dry ice while sediment tubs and CEC jars were placed on wet ice. The CEC jar was picked up by SFEI staff each evening and taken to SFEI the following day for processing. For Microplastics sites, a stainless steel scoop was used to fill sediment directly into 1-liter amber glass jars and then jars were placed on wet ice during the week. Jars were stored in a -20°C freezer upon return to the laboratory.

Polycarbonate tubs were brought back to the lab at the end of each sampling trip and maintained at 4-6°C. Tubs were processed and aliquoted into analytical jars either the day after returning from sampling or the following Monday. Samples were stored in a -20°C freezer except for grain size, which was refrigerated and stored at 4-6°C, until shipment to the analytical laboratories.

Field and travel blanks were collected at specific sites depending on the analyte. In some cases, a blank required placing an open jar on the boat console while sampling was conducted or trace-clean sediment was scooped into an analytical jar. For Microplastics field blanks, trace-clean water supplied by SFEI was poured over the scoop and sediment grab and collected directly into the 1-liter amber glass jar.

Fish samples were collected using a cast net or mid-water otter trawl depending on the location and target fish. All fish samples were placed immediately on wet ice on the boat and then placed on dry ice after processing each day before storage in a -20°C freezer upon return to the laboratory.

Water samples were shipped daily using hard-copy Chain-of-Custody (COC) forms provided by USGS or CC&R depending on the receiving laboratory. Sediment grain size samples were shipped in two batches to the laboratory to avoid holding time conflicts. The remaining sediment samples were batched by analyte and shipped to the laboratory in early August. Hard- and soft-copy COCs were provided to the laboratories and SFEI staff.

This report details weekly synopses of sampling efforts and provides figures for sampling locations (see Figures 1-6). Target and actual latitude and longitude coordinates, sample dates, and type of collections are listed in Appendices A (Bay Margins) and B (Moore Microplastics).

Soft copies (pdf files) of field data sheets and CEDEN data templates for field, chemistry, and tissue collections were provided to SFEI.

Trip 1 - Sampling Dates: June 5-9, 2017

Sampling Crew: Rusty Fairey, Marco Sigala

The main objective of this cruise was to target sediment, water, and fish tissue sites using afternoon high tides to access shallow areas in the Lower and Extreme Lower South Bay portions of San Francisco Bay. Thirteen sites were successfully sampled for the standard Bay Margins sediment suite, eight sediment CEC sites, eight sediment Microplastics sites, six water sites, and two sites for fish collections.

Monday, June 5th

The sampling crew started the week driving from MLML to the Alviso Slough boat launch so the crew could access the Lower South Bay region. The crew began sampling site LSB11 at 10:45. The full suite of sediment including the standard Margins, CECs, and Microplastics plus water samples were collected at this site. The crew then moved to site LSB02 where the full suite of sediment and water samples were collected including sediment duplicates and water MS/MSD

samples. Two more sites (LSB10 and LSB03) were sampled for the standard sediment suite before the winds increased and it became unsafe to sample. Both sites had shell hash present in the sediment. All samples were collected and immediately placed on either dry or wet ice depending on the analyte. The crew pulled the boat out of the water around 14:00 and then prepped CEC jars for pick-up by SFEI staff and water samples for overnight delivery via FedEx to the labs.

Tuesday, June 6th

The sampling crew started the day at 07:30 launching the vessel out of the Alviso Slough boat launch and targeted fish using a cast net for a couple hours at SOSL40. No fish were caught. The crew then transited to site LSB01 and began collections at 11:50 in breezy conditions. The full suite of sediment and all water samples were collected. Site LSB04 was sampled next collecting the full suite of sediment jars. Wind speeds increased even more and the crew moved back to the more sheltered site SOSL40. Sediment for Microplastics and CECs but not Bay Margins was collected. Water samples were also collected including field blanks for musks analyses. All samples were collected and processed accordingly. Water samples were shipped via FedEx for overnight delivery to the labs. USGS staff notified SFEI staff that two 1-L water bottles needed to be collected rather than one 1-L bottle. SFEI staff and the field crew reviewed the number of available water bottles and adjusted the collection plan for the next day. More bottles were sent to MLML to cover future water collections.

Wednesday, June 7th

The sampling crew started the morning launching out of Alviso Slough again and throwing cast nets at site SOSL40. Sixteen topsmelt (110-280 mm TL) and eight anchovy (82-108 mm TL) were kept for gut content analyses, wrapped in aluminum foil, and placed on dry ice. The crew then sampled two sites (SOSL15 and SOSL16) for the full suite of sediment and water samples. Duplicate water (musks and pesticides) and microplastics samples were collected at site SOSL16. Samples were processed and placed on wet or dry ice. Sampling ended early so the crew could ship water samples via FedEx for overnight delivery.

Thursday, June 8th

The sampling crew launched the boat from Alviso Slough and transited to the area of LSB06 to look for fish. Mid-water otter trawls were run in the main channel and edge of the bay yielding no fish. The crew moved closer to shore near the Bayshore Sailing Park and threw cast nets catching three topsmelt (108-122 mm TL) and four anchovy (64-92 mm TL). Fish were processed and placed on dry ice before collecting sediment (standard, microplastics, CECs). Four more standard sediment sites (LSB07, LSB09, LSB08, LSB05) were collected and processed accordingly. The sediment at site LSB07 was a coarse sand and shell mixture with a lot of clams present. The ORP measurement was taken from Grab 2 rather than Grab 1. The crew finished the day back at site SOSL40 throwing cast nets to catch an additional 15 topsmelt (106-140 mm TL) and three anchovy (88-112 mm TL). The fish were wrapped in foil and placed on dry ice.

Friday, June 9th

No sediment was collected this day due to a small craft advisory beginning at 10 am. Instead, the crew drove to the Bayshore Sailing Park near site LSB06 and spent five hours throwing cast nets

off the dock into a small channel. Seven topsmelt (120-145 mm TL) and seven anchovy (80-98 mm TL) were caught, wrapped in foil, and placed on dry ice. The crew drove back to MLML where frozen samples were placed in the -20°C freezer.

Sediment tubs from this trip were processed in the lab on Monday, June 12th. Homogenized sediment for each site was aliquoted into analytical jars and then placed in a refrigerator (grain size/TOC) or in a -20°C freezer.

Trip 2 - Sampling Dates: June 19-23, 2017

Sampling Crew: Rusty Fairey, Marco Sigala

The main objective of this cruise was to sample northern San Francisco Bay (Central, San Pablo, Suisun) and Tomales Bay for the Microplastics study. Eleven sites were sampled for sediment Microplastics and four sites were targeted for fish collections. Meg Sedlak from SFEI joined the crew in Tomales Bay.

Monday, June 19th

The sampling crew drove to Oakland Inner Harbor to launch the boat and sample sites CB105 and CB106 for fish. Cast nets were thrown at the target location and surrounding edges of the bay at CB105. The open water without any structure to centralize the fish made it difficult to catch any fish and no target fish were caught. At site CB106, the crew netted 10 topsmelt (130-150 mm TL) and 13 anchovy (60-94 mm TL). Fish were wrapped in foil and stored on dry ice. The crew pulled the boat out of the water and drove to Benicia.

Tuesday, June 20th

Strong winds were forecasted this day so the crew launched the boat from the Petaluma River launch ramp to work the western edge of San Pablo Bay. Site SPB15 at the mouth of the Petaluma River as it drains into San Pablo Bay was sampled first around 09:20. A sediment duplicate was collected at this site. The crew headed south to site SPB126 to collect a regular microplastics sample as well as a field blank. The crew next moved to the nearby tissue site SPB104 and ran a mid-water trawl in the channel looking for target fish. No fish were caught so a cast net was tried further up the channel without any luck. The crew transited back to SPB15 and threw a cast net up and down the Petaluma River without catching any target fish, although a couple striped bass were caught and released. Sediment samples were processed immediately after collection and placed on wet ice.

Wednesday, June 21st

The wind forecast looked good this day and held surprisingly long enough to sample six sites. The crew first launched out of Martinez and sampled sites SUB53, SUB16, and SUB52. The boat was pulled out of the water and the crew drove to Vallejo to launch the boat closer to San Pablo Bay. Site CAR42 at the mouth of Mare Island was sampled first. This site was located behind a break wall and had an anoxic layer at about 5 cm deep. Site SPB128 was sampled next and then the crew made the long transit to the back northeastern end of San Pablo Bay where site SPB50 was located. Due to the dropping tide and increasing winds at this exposed site, the crew got as close as they could to the target location to sample. This site needs a really high tide with calm

conditions to reach the target. All samples were immediately processed after collection and placed on wet ice. The crew pulled the boat and drove to Tomales Bay.

Thursday, June 22nd

The crew began the day waiting for the incoming tide so the boat could be launched. Site TB109 was sampled around 09:15 for a regular microplastics sample as well as a field blank. The crew went back to the launch ramp to pick up Meg Sedlak from SFEI. The crew headed south to site TB102. The water depth was too shallow to reach the target location and Meg agreed to sample about 0.73 miles away. An anoxic layer was seen at about 3 cm depth and there was a lot of organic matter in the sediment grab. Cast nets were thrown in the vicinity of Millerton without any fish caught. The crew then transited northwest towards TB101 but could only get as close as 0.22 miles from the site due to shallow water. Meg approved and sediment was collected. The crew then searched the area for target fish catching 13 topsmelt (130-220 mm TL) in the vicinity of Hog Island. The crew then headed back to southern Tomales Bay and threw cast nets yielding a total of 28 topsmelt (122-224 mm TL). All sediment and fish samples were processed immediately and placed on wet (sediment) or dry (fish) ice.

Friday, June 23rd

Only anchovy were targeted in Tomales Bay this day. No sediment samples were collected. The crew started at 06:50 at site TB102 running mid-water trawls. Forty anchovy (49-58 mm TL) were caught. The crew then moved to site TB101 to run mid-water trawls and only 10 anchovy (50-92 mm TL) were caught. Fish were processed and placed on dry ice. The crew pulled the boat out of the water and drove back to MLML. Upon arrival, sediment and fish samples were placed in a -20°C freezer.

Trip 3 - Sampling Dates: July 5-7, 2017

Sampling Crew: Rusty Fairey, Marco Sigala

The main objective of this cruise was to focus on fish sampling in Central (Richmond and Oyster Point) and South Bays the first two days of the shortened sampling week and then finish in South Bay. Eleven sites were successfully sampled for the standard Bay Margins sediment suite, one sediment CEC site, one sediment Microplastics site, and four sites for fish collections. No water samples were collected.

Wednesday, July 5th

The crew travelled from MLML to Richmond to launch the boat and sample in the marina, inner harbor, and shipping channel. Cast nets were thrown along all shoreline edges and mid-water trawls were run in the main channel and inner harbor near site CB10. Only eight topsmelt (42-270 mm TL) and sixteen anchovy (58-72 mm TL) were caught. Fish were processed immediately and placed on dry ice. The crew pulled the boat out of the water around 16:00 and travelled to Oyster Point.

Thursday, July 6th

The crew launched out of Oyster Point and transited to site CB37. Mid-water trawls were run in three different areas around the site and nearby channel between Sierra and Oyster Points. Cast nets were also thrown near and around the Brisbane Marina wall. A total of twenty topsmelt were caught but two samples of ten were created. One sample had a regular size range caught at other sites (140-176 mm TL) while the other sample had a full size range of 2 large, 2 regular, and 6 small fish (50-308 mm TL). One of the trawls ran through a school of anchovy pulling in 60 fish. One regular sample of 10 fish (92-100 mm TL) and an archive sample of 50 fish (wrapped as five groups of 10 fish, 80-90 mm TL) were created. The crew transited south to the San Francisco airport (SFO) to sample sites SB051 and SB071. The standard sediment suite, CEC jar, and microplastics samples plus field blanks for microplastics, nanoplastics, and non-target pesticides were collected at site SB051. Site SB071 within the SFO security zone was sampled next for the standard suite of sediment. It was a very shallow site with a thin algae mat on the surface. All sediment samples were processed and placed on wet or dry ice accordingly. The crew pulled the boat, drove to Redwood City, launched the boat again, and ran three mid-water trawls in the afternoon at site SB074. Only one topsmelt (274 mm TL) and three anchovy (82-94 mm TL) were caught. The fish were processed, placed in foil, and then on dry ice after being caught.

Friday, July 7th

While waiting for the incoming tide after launching from Redwood City, the crew ran mid-water trawls at sites SB074 and SB077. Eleven anchovy (70-88 mm TL) were caught at site SB074 while twelve anchovy (80-116 mm TL) were caught at site SB077. The crew switched gears around 09:30 and began sediment collections along the northeastern edge of South Bay successfully sampling nine standard sediment sites. Seven of the sites (SB068, SB063, SB072, SB052, SB076, SB060, and SB070) had shell hash present in the sediment. The microplastics samples at site SB058 was not collected this day so the crew came back on the next trip. After the sediment collections, the crew went back to site SB074 in the afternoon to throw a cast net in the channel along the banks yielding twelve topsmelt (108-168 mm TL). All sediment and fish samples were processed and placed on wet or dry ice. The crew pulled the boat and returned to MLML. Samples on dry ice and the microplastics samples were placed in a -20°C freezer.

Sediment tubs from this trip were processed in the lab on Monday, July 10th. Homogenized sediment for each site was aliquoted into analytical jars and then placed in a refrigerator (grain size/TOC) or in a -20°C freezer.

Trip 4 - Sampling Dates: July 17-20, 2017

Sampling Crew: Rusty Fairey, Marco Sigala

The main objective of this cruise was to complete the remaining 16 sediment Margins, six CEC, seven Microplastics, and seven water sites in South Bay. The crew also threw cast nets at site SB077 to see if any topsmelt could be caught.

Sunday, July 16th

The crew travelled from MLML to Redwood City so they could sample during the early morning high tide on Monday.

Monday, July 17th

The crew launched out of Redwood City and began sampling site SB056 at 06:00. The full sediment suite plus water samples were collected including water duplicate, MS and MSD bottles. The crew then went to site SB058 to collect the microplastics samples not collected during the previous trip. Site SB054 was sampled next for the standard sediment suite. The pH 1 meter stopped working after the first grab so the crew calibrated the pH 2 meter and used it for the remainder of the trip. The full sediment suite plus water samples were collected next at site SB074. The sediment consisted of mostly large shell hash and there was a tide line of surface foam/scum present during the water collections. The crew did not open the water bottles until under the surface so there was minimal to no contact with the surface foam/scum. The crew finished the day collecting a standard sediment suite at site SB066. All samples were processed immediately after collection and placed on wet or dry ice. The crew pulled the boat and prepared water samples for overnight delivery via FedEx and sediment CEC samples for pick up by SFEI staff.

Tuesday, July 18th

The crew launched out of Oyster Point and started at 06:45 collecting the full sediment suite and water samples at site SB069. A lot of shell hash was present in the sediment making it hard to set the anchor. The crew then moved to site SB073 near the Oakland airport to collect the standard sediment suite and water samples. An additional water musk sample was collected since a bottle had broken at the lab. Two more sites (SB053 and SB065) were sampled and the crew ended the day due to the dropping tide. A dense mud and sand mixture was seen at site SB053 while site SB065 had a lot of shell hash present. The crew processed all samples immediately and shipped water samples via FedEx overnight delivery.

Wednesday, July 19th

The crew launched out of Redwood City and began collecting water and the full suite of sediment at 06:45 at site SB075. This site had a lot of worm tubes and the sediment consisted of a sticky mud with shell hash. The ORP read -63 mV but an anoxic zone was not visible. Site SB062 was sampled next for the full suite of sediment plus water samples including a field blank. The sediment was dense with mostly shell hash making it difficult to get pH readings. Two standard sediment sites (SB055 and SB059) were then sampled before finishing with sites SB077 and SB061. The full suite of sediment analyses and water samples were collected at site SB077. All samples were processed accordingly and placed on wet or dry ice. The crew packed and shipped water samples via FedEx overnight delivery.

Thursday, July 20th

The last two sediment sites (SB067 and SB057) were sampled mid-morning for the standard suite of sediment, which was good because the winds increased rapidly with a small craft advisory in the afternoon. While in the protected channel near site SB077, the crew threw a cast net near the electrical towers and along the bank without any topsmelt caught. Sediment samples were processed immediately after collection and placed on wet or dry ice. The crew pulled the boat and travelled back to MLML. Upon arrival, samples on dry ice and microplastics samples were placed in a -20°C freezer.

The sediment tubs from this trip were processed in the lab on Friday, July 21st. Homogenized sediment for each site was aliquoted into analytical jars and then placed in a refrigerator (grain size/TOC) or in a -20°C freezer.

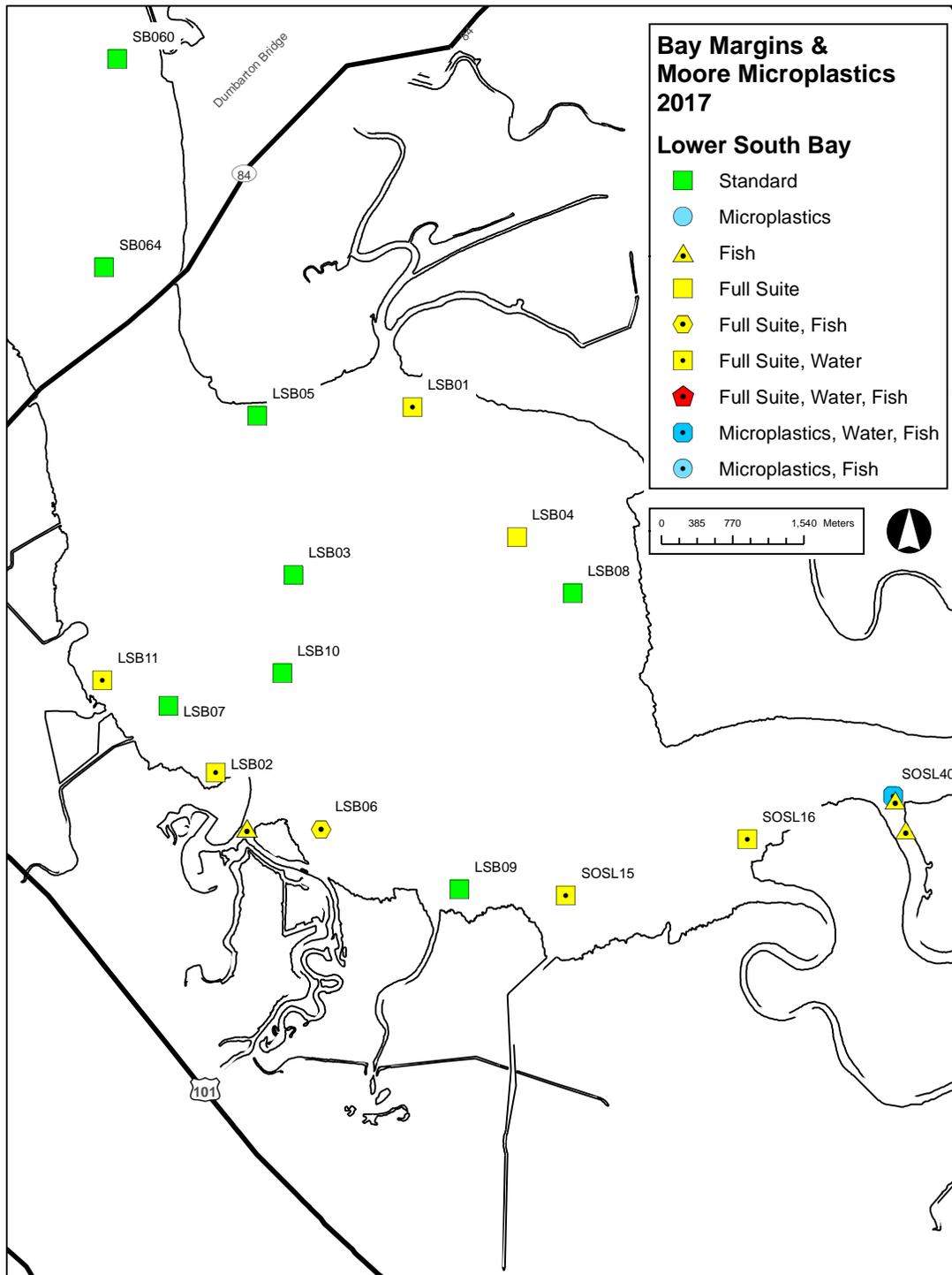


Figure 1: Locations of sediment, water, and/or fish samples visited in Lower South Bay in 2017. Full Suite generally represents Standard, CEC, and Microplastics samples.

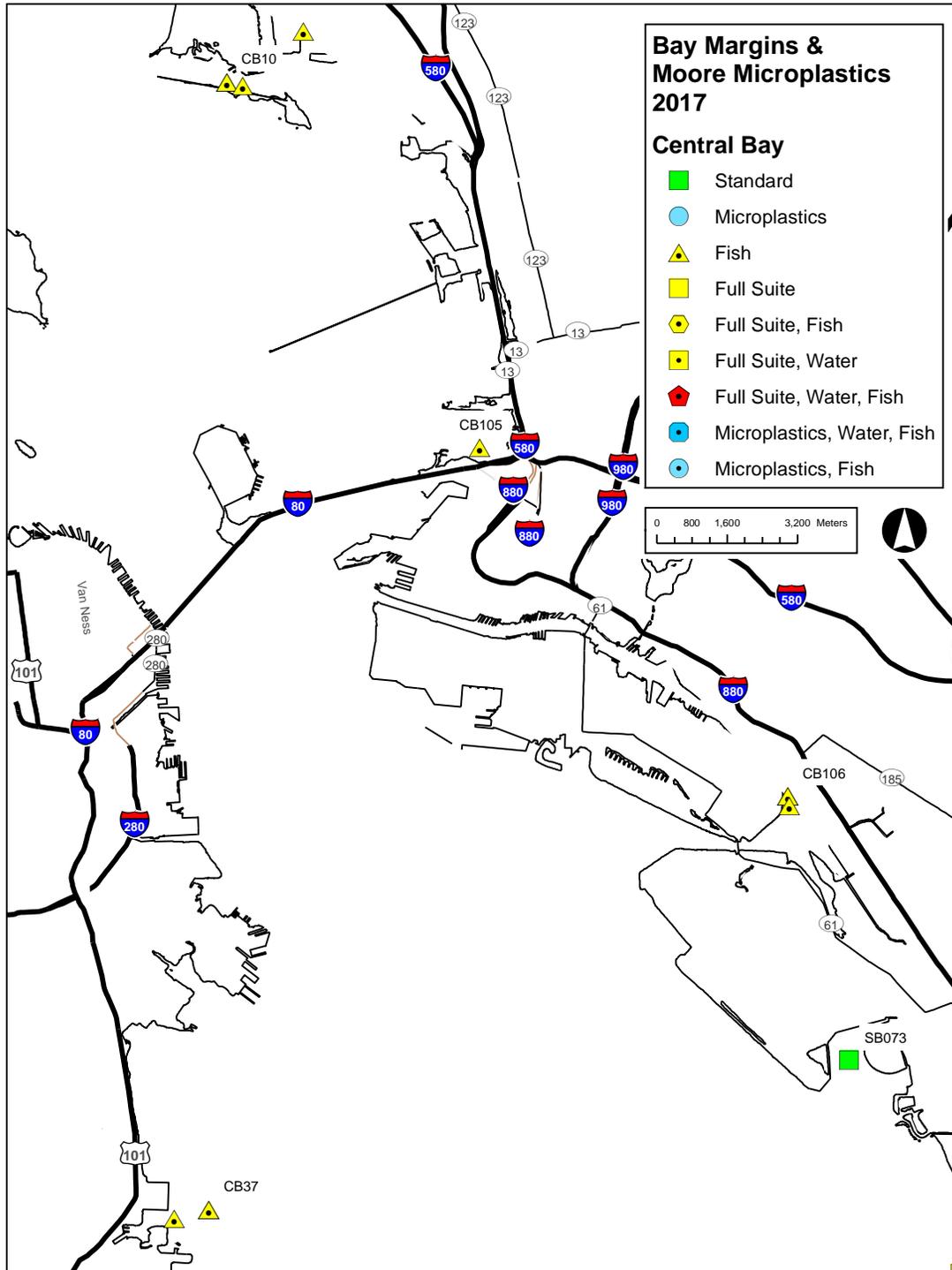


Figure 3: Locations of sediment, water, and/or fish samples visited in Central Bay in 2017. Full Suite generally represents Standard, CEC, and Microplastics samples.

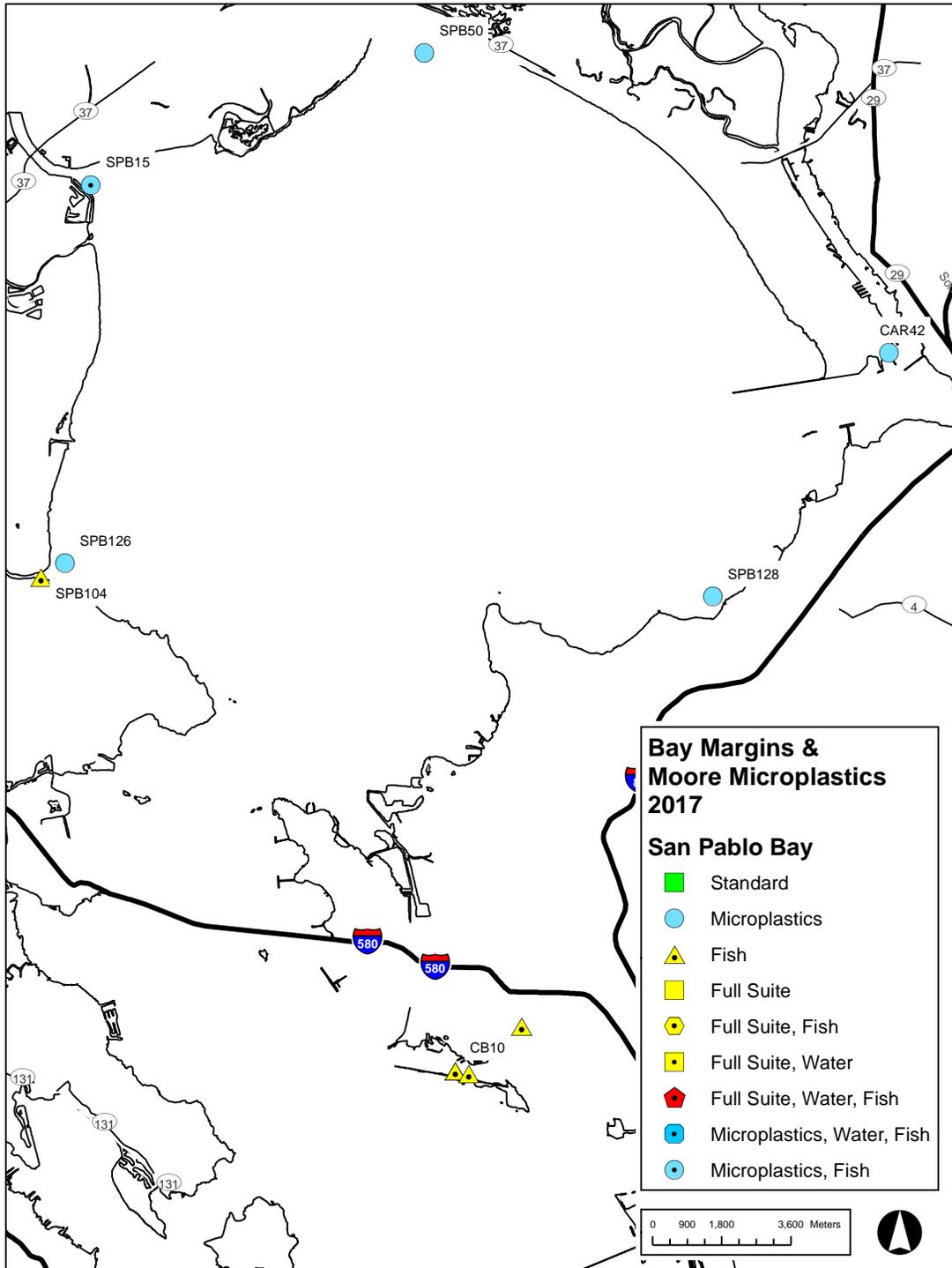


Figure 4: Locations of sediment, water, and/or fish samples visited in San Pablo Bay in 2017. Full Suite generally represents Standard, CEC, and Microplastics samples.

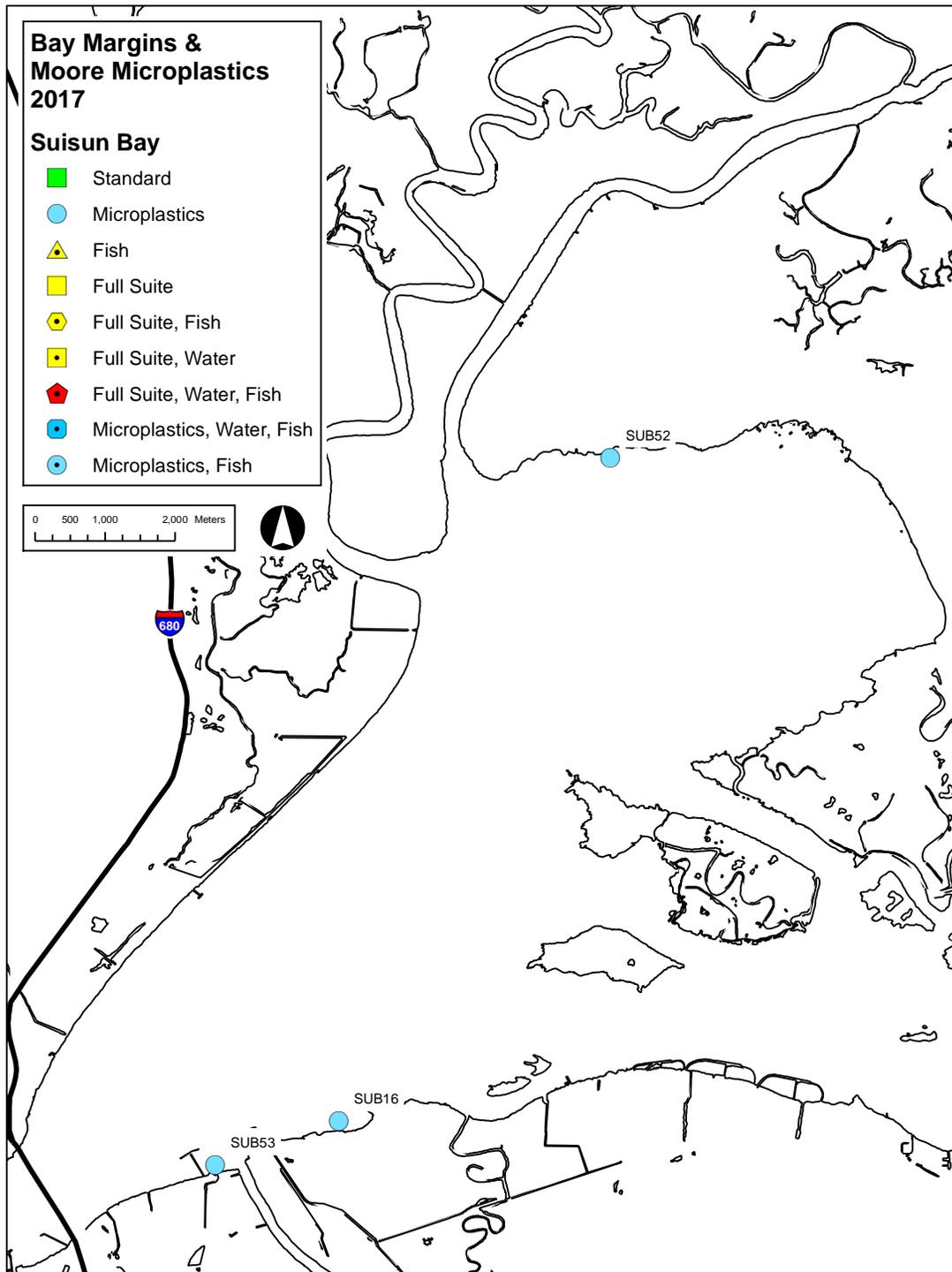


Figure 5: Locations of sediment, water, and/or fish samples visited in Suisun Bay in 2017. Full Suite generally represents Standard, CEC, and Microplastics samples.

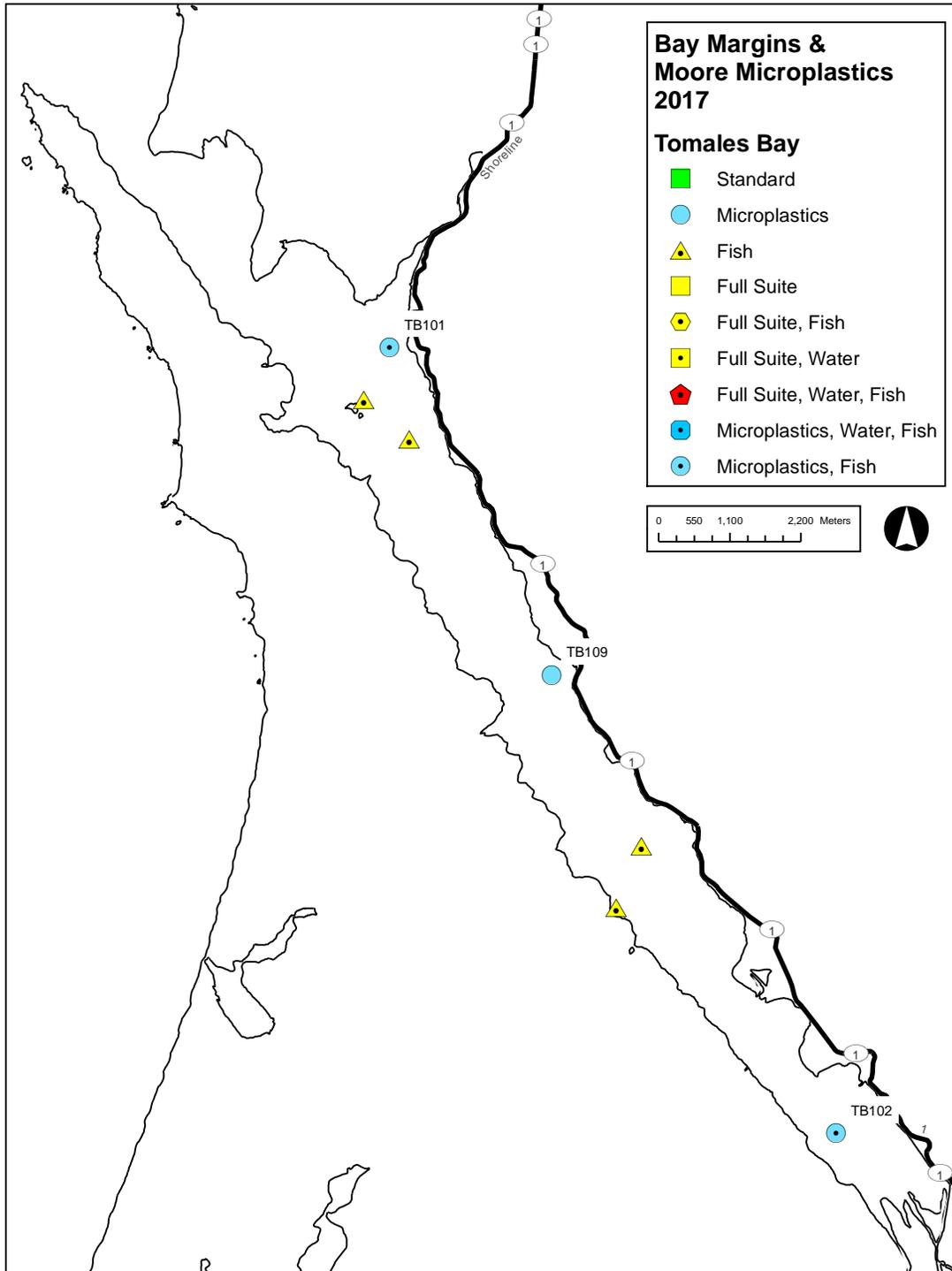


Figure 6: Locations of sediment, water, and/or fish samples visited in Tomales Bay in 2017. Full Suite generally represents Standard, CEC, and Microplastics samples.

Appendix A: Sample date, collection type, and coordinates (target and actual latitude and longitude) for sites visited in the Bay Margins Study focusing on South San Francisco Bay. S = sediment, W = water

Station Code	Station Name	Sample Date	Type	Target Latitude	Target Longitude	Actual Latitude	Actual Longitude
SB051	South Bay	7/6/2017	S	37.601750	-122.362000	37.601767	-122.362000
SB052	South Bay	7/7/2017	S	37.564830	-122.143000	37.564817	-122.142950
SB053	South Bay	7/18/2017	S	37.676410	-122.170000	37.676183	-122.169983
SB054	South Bay	7/17/2017	S	37.512800	-122.180000	37.512800	-122.179733
SB055	South Bay	7/19/2017	S	37.633220	-122.156000	37.633217	-122.155950
SB056	South Bay	7/17/2017	SW	37.560520	-122.131000	37.560516	-122.130917
SB057	South Bay	7/20/2017	S	37.554180	-122.245000	37.554167	-122.244883
SB058	South Bay	7/7/2017	S	37.498330	-122.161000	37.498400	-122.160950
SB059	South Bay	7/19/2017	S	37.624350	-122.152000	37.624417	-122.152033
SB060	South Bay	7/7/2017	S	37.531920	-122.119000	37.531883	-122.119017
SB061	South Bay	7/19/2017	S	37.548060	-122.216000	37.548067	-122.216183
SB062	South Bay	7/19/2017	SW	37.576390	-122.265000	37.576433	-122.265000
SB063	South Bay	7/7/2017	S	37.575210	-122.151000	37.575233	-122.150950
SB064	South Bay	7/7/2017	S	37.511720	-122.120000	37.511683	-122.120050
SB065	South Bay	7/18/2017	S	37.636270	-122.163000	37.636233	-122.162983
SB066	South Bay	7/17/2017	S	37.538220	-122.197000	37.538200	-122.197017
SB067	South Bay	7/20/2017	S	37.570430	-122.256000	37.570450	-122.255933
SB068	South Bay	7/4/2017	S	37.579560	-122.154000	37.579633	-122.154016
SB069	South Bay	7/18/2017	SW	37.662520	-122.176000	37.662500	-122.175967
SB070	South Bay	7/7/2017	S	37.507900	-122.154000	37.507917	-122.154000
SB071	South Bay	7/6/2017	S	37.612960	-122.373000	37.612767	-122.372833
SB072	South Bay	7/7/2017	S	37.572190	-122.146000	37.572183	-122.145967
SB073	South Bay	7/18/2017	S	37.705610	-122.206000	37.705683	-122.206017
SB074	South Bay	7/17/2017	SW	37.527710	-122.184000	37.527750	-122.184000

Station Code	Station Name	Sample Date	Type	Target Latitude	Target Longitude	Actual Latitude	Actual Longitude
SB075	South Bay	7/19/2017	SW	37.609930	-122.158000	37.609950	-122.158050
SB076	South Bay	7/7/2017	S	37.544300	-122.119000	37.544250	-122.118967
SB077	South Bay	7/19/2017	SW	37.545150	-122.222000	37.545117	-122.222117
LSB01	Lower South Bay	6/6/2017	SW	37.498780	-122.082000	37.498767	-122.082000
LSB02	Lower South Bay	6/5/2017	SW	37.462820	-122.105000	37.462900	-122.105033
LSB03	Lower South Bay	6/5/2017	S	37.482230	-122.096000	37.482233	-122.096083
LSB04	Lower South Bay	6/6/2017	S	37.486410	-122.069000	37.486383	-122.068883
LSB05	Lower South Bay	6/8/2017	S	37.497630	-122.101000	37.497617	-122.100950
LSB06	Lower South Bay	6/8/2017	S	37.457570	-122.092000	37.457617	-122.092033
LSB07	Lower South Bay	6/8/2017	S	37.469360	-122.111000	37.469300	-122.111000
LSB08	Lower South Bay	6/8/2017	S	37.481030	-122.062000	37.481100	-122.061950
LSB09	Lower South Bay	6/8/2017	S	37.452150	-122.075000	37.452150	-122.074950
LSB10	Lower South Bay	6/5/2017	S	37.472720	-122.097000	37.472700	-122.097167
LSB11	Lower South Bay	6/5/2017	SW	37.471640	-122.119000	37.471600	-122.119150
SOSL15	Extreme Lower South Bay	6/7/2017	SW	37.451780	-122.062000	37.451800	-122.061950
SOSL16	Extreme Lower South Bay	6/7/2017	SW	37.457580	-122.040000	37.457600	-122.039950
SOSL40	Extreme Lower South Bay	6/6/2017	W	37.462120	-122.022000	37.462083	-122.022217

Number of Sediment Sites Sampled 40

Number of Water Sites Sampled 12

Appendix B: Sample date, collection type, and coordinates (target and actual latitude and longitude) for sites visited in the Moore Microplastics Study. Fish were not collected at all sites sampled. S = sediment, F = fish

Station Code	Station Name	Sample Date	Type	Latitude	Longitude	Actual Latitude	Actual Longitude
TB101	Tomales Bay	6/22/2017	SF	38.209260	-122.929150	38.205700	-122.929033
TB102	Tomales Bay	6/22/2017	SF	38.090840	-122.835810	38.097983	-122.845700
TB109	Tomales Bay	6/22/2017	S	38.160730	-122.898500	38.160683	-122.898500
SUB16	Suisun Bay	6/21/2017	S	38.050240	-122.076930	38.050217	-122.076933
SUB52	Suisun Bay	6/21/2017	S	38.136210	-122.034990	38.136217	-122.034983
SUB53	Suisun Bay	6/21/2017	S	38.044090	-122.096900	38.044200	-122.096867
CAR42	San Pablo Bay	6/21/2017	S	38.073690	-122.249550	38.073700	-122.249567
SPB104	San Pablo Bay	6/20/2017	F	38.025080	-122.489690	38.016150	-122.499983
SPB126	San Pablo Bay	6/20/2017	S	38.019600	-122.492960	38.019650	-122.492933
SPB128	San Pablo Bay	6/21/2017	S	38.015650	-122.300240	38.015650	-122.300250
SPB15	San Pablo Bay	6/20/2017	SF	38.108350	-122.488140	38.108383	-122.488233
SPB50	San Pablo Bay	6/21/2017	S	38.141850	-122.389610	38.141350	-122.390017
CB10	Central Bay	7/5/2017	F	37.913650	-122.353800	37.902883	-122.373283
CB105	Central Bay	6/19/2017	F	37.829280	-122.305480	37.829280	-122.305480
CB106	Central Bay	6/19/2017	F	37.757870	-122.219000	37.759350	-122.223517
CB37	Central Bay	7/6/2017	F	37.671217	-122.379016	37.671800	-122.370617
SB051	South Bay	7/6/2017	S	37.601750	-122.362000	37.601767	-122.362000
SB056	South Bay	7/17/2017	S	37.560520	-122.131000	37.560516	-122.130917
SB058	South Bay	7/17/2017	S	37.498330	-122.161000	37.498400	-122.160950
SB062	South Bay	7/19/2017	S	37.576390	-122.265000	37.576433	-122.265000
SB069	South Bay	7/18/2017	S	37.662520	-122.176000	37.662500	-122.175967
SB074	South Bay	7/17/2017	SF	37.527710	-122.184000	37.527750	-122.184000
SB075	South Bay	7/19/2017	S	37.609930	-122.158000	37.609950	-122.158050
SB077	South Bay	7/19/2017	SF	37.545150	-122.222000	37.545117	-122.222117

Station Code	Station Name	Sample Date	Type	Latitude	Longitude	Actual Latitude	Actual Longitude
LSB01	Lower South Bay	6/6/2017	S	37.498780	-122.082000	37.498767	-122.082000
LSB02	Lower South Bay	6/5/2017	S	37.462820	-122.105000	37.462900	-122.105033
LSB04	Lower South Bay	6/6/2017	S	37.486410	-122.069000	37.486383	-122.068883
LSB06	Lower South Bay	6/8/2017	SF	37.457570	-122.092000	37.457617	-122.092033
LSB11	Lower South Bay	6/5/2017	S	37.471640	-122.119000	37.471600	-122.119150
SOSL15	Extreme Lower South Bay	6/7/2017	S	37.451780	-122.062000	37.451800	-122.061950
SOSL16	Extreme Lower South Bay	6/7/2017	S	37.457580	-122.040000	37.457600	-122.039950
SOSL40	Extreme Lower South Bay	6/6/2017	SF	37.462120	-122.022000	37.462083	-122.022217

Number of Sediment Sites Sampled 27

Number of Fish Sites Sampled 12