California Collaborative Fisheries Research Program (CCFRP) Hook-and-Line Surveys of Nearshore Fishes in and Near California Marine Protected Areas

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Project Abstract

Moss Landing Marine Laboratories (MLML) and Cal Poly San Luis Obispo (CP) worked with central California fishing communities to develop monitoring protocols for the use of hook-and-line fishing gear, and to collect baseline information for California Marine Protected Areas (MPAs). The program began by surveying the Año Nuevo, Point Lobos, Piedras Blancas, and Point Buchon MPAs, and in corresponding reference sites. Within these areas, we used a stratified random sampling design to determine sampling locations. At each location, volunteer anglers fished with standardized gear for a specified amount of time. Caught fishes were identified to species, measured, tagged with external T-bar anchor tags, and released at the location of capture. From 2007 to 2016, we have worked with a total of 15 Commercial Passenger Fishing Vessel (CPFV) captains and 896 volunteer anglers and caught a total of 83,110 fishes from 63 different species. Due to the success of CCFRP in monitoring central California MPAs, the program expanded statewide in 2017. The program now includes partners from Humboldt State University (HSU), Bodega Marine Laboratory (BML), MLML, CP, UC Santa Barbara (UCSB), and Scripps Institution of Oceanography (SIO). In combination with the MLML and CP databases dating back to 2007, we have now caught and released 194,917 fishes from 100 different species (65,112 of which were tagged prior to release) on 698 sampling trips inside and outside 15 MPAs. We have partnered with over 30 CPFVs and 50 skippers and welcomed over 1,800 individual anglers in 15 seasons.

Project Objectives

- ✓ Develop rigorous scientific protocols to monitor California MPAs
- ✓ Engage the fishing community in the monitoring of MPAs
- ✓ Evaluate differences between MPAs and reference sites at the time of closure
- ✓ Generate baseline data for future evaluation of changes in species and size composition and relative abundance of fishes associated with shallow rock habitats inside and outside MPAs
- ✓ Create a sampling design that can be used to collect data for state and federal stock assessments

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Study Area

Since 2007, CCFRP scientists and fishermen have conducted hook-and-line surveys within four Central Coast State Marine Reserves (Año Nuevo, Point Lobos, Piedras Blancas, Point Buchon) along with nearby reference sites (**Table 1; Figure 2**). The Año Nuevo, Point Lobos, Piedras Blancas, and Point Buchon MPAs encompass areas of 10.2 mi^2, 5.4 mi^2, 10.4 mi^2, and 6.7 mi^2 respectively. Reference sites were based on the criteria that they shared similar size, habitat, and oceanographic conditions with the nearby MPAs.

Within the boundaries of each MPA and reference site, 500 m x 500 m grid cells were created and used to randomly select sampling locations. The grid cells were positioned in nearshore rocky habitats, in water less than 40 meters deep (to limit fishing mortality from barotrauma), in areas that had been identified by fishermen as having suitable habitat for nearshore fishes. A total of 22 grid cells in Año Nuevo, 17 cells in Point Lobos, 57 cells in Piedras Blancas, and 22 cells in Point Buchon were generated (**Figure 2**). On a given survey day, four of these cells were selected at random and sampled.

In 2017, CCFRP expanded statewide to include the northern, central, and southern California MPA monitoring regions. As a statewide program, CCFRP partners with 6 institutions that now survey 12 MPAs (**Figures 1, 2, 3, 4; Table 1**). Laguna Beach SMCA was sampled in 2017, Point Conception SMR was sampled in 2018, SE Farallon Islands SMR was sampled from 2017-2018, and Trinidad REF was sampled from 2018-2019 before being dropped (**see Supplementary Figures; Table 1).** Grid cells within each MPA and reference location were selected using the same criteria as above.

All sampling occurred across California, USA. The overall boundaries of our study area are:

Northern Boundary: 41° 10’00’’ N Latitude
Southern Boundary: 32° 50’00’’ N Latitude
Western Boundary: 124° 30’00’’ W Longitude
Eastern Boundary: 117° 20’00’’ W Longitude

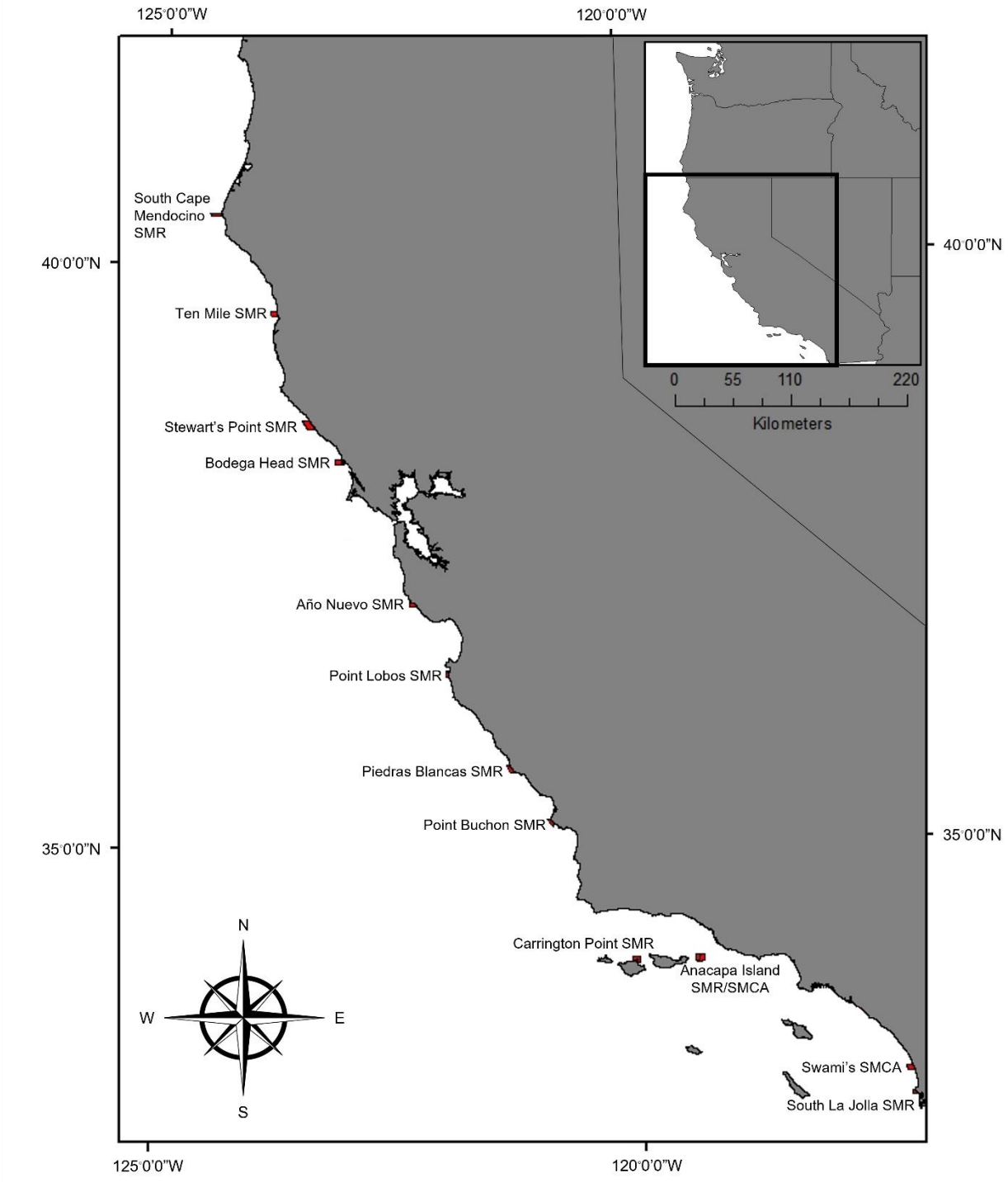


Figure 1: Map of the 12 core Marine Protected Area locations surveyed by CCFRP for long-term monitoring.

Table 1. Marine protected areas (MPAs) surveyed by CCFRP partner institutions, separated by MPA monitoring region and the years they were surveyed.

Region	Academic Institution	Marine Protected Area (MPA)/ Reference Sites	Years Surveyed														
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
North	Humboldt State University	Trinidad (REF ONLY)												X	X		
		South Cape Mendocino SMR											X	X	X	X	X
		Ten Mile SMR											X	X	X	X	X
	Bodega Marine Laboratory	Stewart's Point SMR											X	X	X	X	X
		Bodega Head SMR											X	X	X	X	X
Central	Moss Landing Marine Laboratories	SE Farallon Islands SMR											X	X			
		Año Nuevo SMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Point Lobos SMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Cal Poly, San Luis Obispo	Piedras Blancas SMR	X	X	X	X	X	X	X	X		X	X	X	X	X	X
		Point Buchon SMR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
South	UC Santa Barbara	Point Conception SMR												X			
		Carrington Point SMR											X	X	X	X	X
		Anacapa Island SMR/SMCA											X	X	X	X	X
	Scripps Institution of Oceanography	Laguna Beach SMR/MCA											X				
		Swami's SMCA											X	X	X	X	X
		South La Jolla SMR											X	X	X	X	X

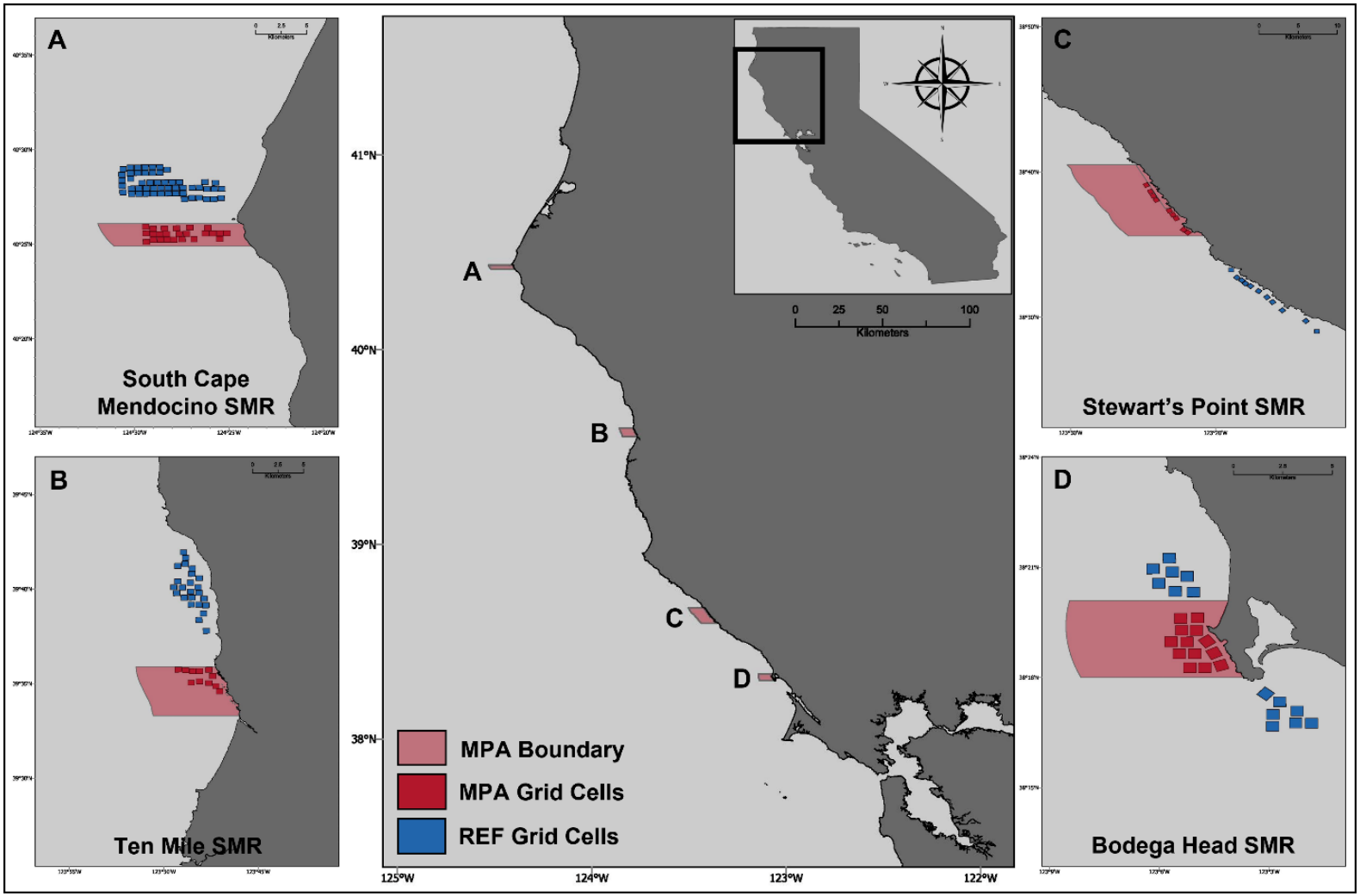


Figure 2: Map of MPA and Reference (REF) sampling grid cells for the core Northern California sampling locations: (A) South Cape Mendocino State Marine Reserve, (B) Ten Mile State Marine Reserve, (C) Stewart's Point State Marine Reserve, and (D) Bodega Head State Marine Reserves. Shaded red area indicates MPA boundaries. The 500 m x 500 m MPA grid cells are delineated in red. The 500 m x 500 m REF grid cells are delineated in blue.

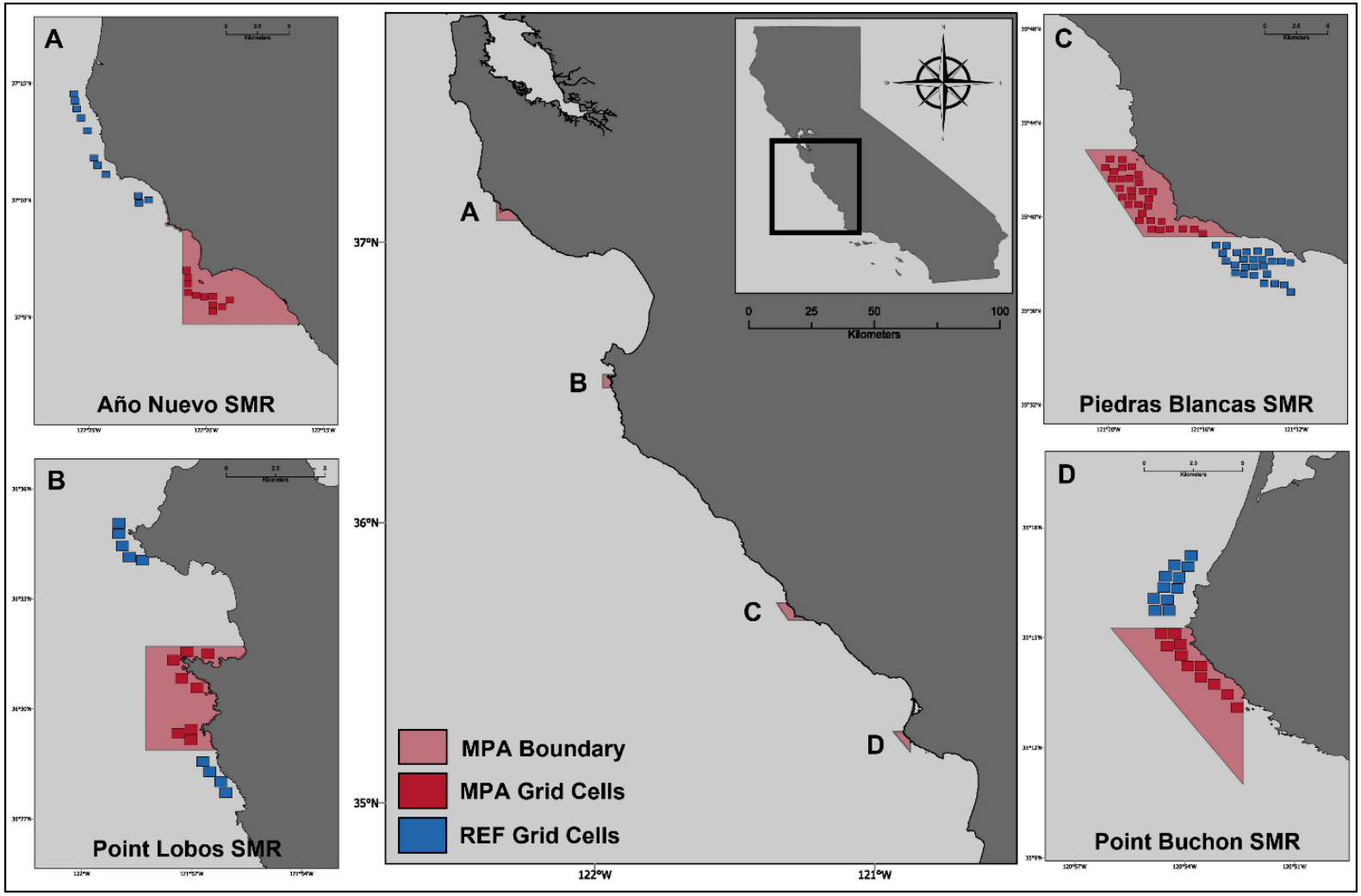


Figure 3: Map of MPA and Reference (REF) sampling grid cells for the core Central California sampling locations: (A) Año Nuevo State Marine Reserve, (B) Point Lobos State Marine Reserve, (C) Piedras Blancas State Marine Reserve, and (D) Point Buchon State Marine Reserves. Shaded red area indicates MPA boundaries. The 500 m x 500 m MPA grid cells are delineated in red. The 500 m x 500 m REF grid cells are delineated in blue.

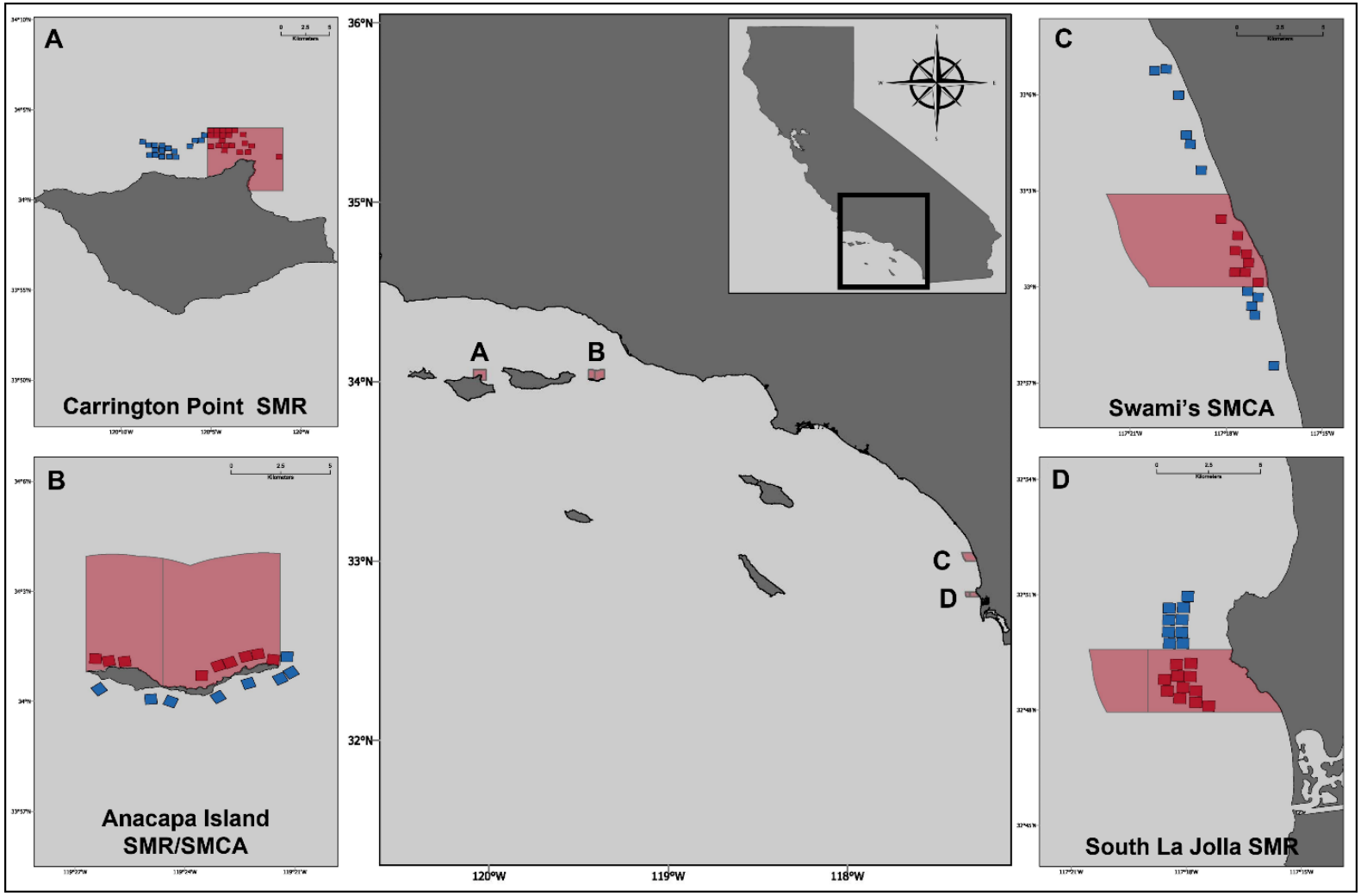


Figure 4: Map of MPA and Reference (REF) sampling grid cells for the core Central California sampling locations: (A) Carrington Point State Marine Reserve, (B) Anacapa Island State Marine Reserve/State Marine Conservation Area, (C) Swami's State Marine Conservation Area, and (D) South La Jolla State Marine Reserves. Shaded red area indicates MPA boundaries. The 500 m x 500 m MPA grid cells are delineated in red. The 500 m x 500 m REF grid cells are delineated in blue.

Database Information

Publish Date: February 1, 2021
Data Format: The database was created in Microsoft Office Access 2003 & updated to v2010 in February 2014.
Time Standard: Pacific Standard Time
Time Period: August 6, 2007 – November 17, 2021
Status: The database and metadata are complete
Updates: The database and metadata will be updated with each additional year of data
Access Restrictions: Contact Scott Hamilton (scott.hamilton@sjsu.edu) and Benjamin Ruttenberg (bruttenb@calpoly.edu) before these data are used for publication.
Contact Person: Rachel Brooks (Email: rachel.brooks@sjsu.edu, Phone: 831.771.4479, Address: 8272 Moss Landing Road, Moss Landing, CA 95039)
Key Words: Collaborative research, monitoring, Marine Protected Areas, central California, nearshore fishes, baseline data

Database Tables

The Microsoft Office Access database consists of seven tables:

- Trip Information
- Angler Information
- Drift Information
- Caught Fishes
- Fish Species
- Grid Cell Locations
- Monitoring Areas

1. **Trip Information**: The Trip Information table provides information about each completed sampling trip. Listed are a trip's unique Trip ID (see Explanations 3.H, below), the area (AI, AN, BH, BL, CM, CP, DR, FN, LB, LJ, PB, PC, PL, PR, SP, SW, and TM) and site (MPA or REF) in which the trip is completed, and the month (in text; e.g., "August"), day (in the form DD; e.g., 08), and year (in the form YYYY; e.g., 2007) during which the trip took place. Also listed are: the fishing vessel on which the trip took place, the name of the captain and deckhand, the number of volunteer anglers, the fishing tackle used by the anglers during the trip, and comments about the trip. The number of volunteer anglers includes the anglers who volunteered to fish on that day (this number may be different from the number of anglers fishing during a particular drift). This does not include people on the boat who are not fishing (e.g., reporters, photographers, interns, and people helping the science crew). These people are mentioned in the "Comments" field, with the exception of interns. "Fishing tackle" explains the color of shrimp flies, weights of the hard tackle and sinkers, type of bait, and any pertinent information regarding the terminal tackle used during that trip.

2. **Angler Information**: The Angler Information table provides information about all of the volunteer anglers who participate in this study. In this table, each volunteer angler is assigned a

discrete, identifying Angler ID. The letter preceding the Angler ID number corresponds to the primary monitoring region that angler is associated with (A = MLML, B = BML, C = CP, D = SIO, H = HSU, S = UCSB). Angler IDs currently range from A000-A835, B001-B171, C001-C270, D001-D195, H001-H082, S001-S143. Angler "A000" represents an "unknown angler," which is used when the identity of the angler is uncertain. "A020" is used when a science crew member associated with Moss Landing Marine Laboratories (MLML) is fishing at a given station, and "C243" for a science crew member associated with Cal Poly San Luis Obispo. Additional information about each volunteer angler associated with a specific Angler ID is also listed, including: their total amount of added or subtracted fishing time for every year they participated between 2007 and 2021 (added time may be the result of fishing before the drift commenced and subtracted time may be the result of a gear hang up which precluded the angler from fishing for a portion of the drift), and the number of days and the dates that s/he volunteered between 2007 and 2021. People that come out on the boat and do not fish (e.g., reporters, photographers, and people that assisted the science crew) are not given an Angler ID and are not entered in this table. These non-fishers are identified in the "Trip Information" table in the comments field. Note that personal contact information for each angler has been removed from the publicly accessible database.

3. Drift Information: The Drift Information table provides information about all of the completed survey drifts. Listed is a unique identifying code for each drift (Drift ID; see Explanations 3.C, below). For each drift, the following are listed: Trip ID, Cell ID, ID-Cell per Trip (see Explanations 3.H and D, below), Grid Cell ID, Site (MPA/REF), start and end time, total drift time, (+/-) fishing time for all gear types, total (+/-) time for anglers (hrs), Number of anglers fishing on each gear type, total angler hours (adjusted for +/- time), the latitude and longitude for the start and end of the drift (in decimal degrees, DD), the length of the drift (distance between the start and end locations, m), the number of anglers fishing, the initials of the data recorder and science tagging crew (see Explanations 3.I, below), the surface temperature and temperature at depth reading (°C) from a CTD or temperature sensor (see Explanations 2.L, below), surface water temperature (°F) as reported by the boat captain, amount of relief (coded 1-3; see Explanations 3.F, below), the start and end depths (ft), the weight of the lingcod bars, lead sinkers, and swim bait heads (oz), the length of the swimbaits used (in), the number of seals and sea lions present, total fishes caught, amount of cloud cover (coded 0-3; see Explanations 3.E, below), wind speed (knots) and direction (LV [light variable], N, S, W, etc.) and swell height (feet) from recorder observation (Obs), Secchi depth (meters), and comments. "Gear (BAR/FLY/BAT/DPR/SBT): +/- Fishing Time" is also included in this table. This is the amount of time to be subtracted or added from each individual gear type during a given drift. The amount of time is entered as fractions of a day (# minutes added or subtracted/60/24) for ease of calculations. In front of the subtracted time, a "-" sign is entered before the value. Time is only subtracted or added if the angler was not fishing or was fishing extra time for a minute or greater (see Explanations 2.A and 3.A, below). Note: Lingcod bar, lead sinker weight, and end depth were not recorded during the 2007 field season.

4. Caught Fishes: The Caught Fishes table provides information about each fish that is caught during the study. For each caught fish, the following information is listed: a unique Fish ID (an auto number generated by the database), the Drift ID (see Explanations 3.C, below) of the drift during which the fish was caught, a species code (see Explanations 3.B, below), Tag ID (the number printed on

the tag, if the fish was tagged), a total length (cm), the gear type (BAR, FLY, BAT, DPR, SBT, SFS, SFB; see Explanations 3.A, below) used to catch the fish, the fishing station (numbered 1-14) from which the angler caught the fish (see Explanations 3.A, below), the Angler ID of the angler who caught the fish, the bottom depth (feet) at the location where the fish was released (approximately where it was caught), the latitude and longitude where the fish was released (in decimal degrees, DD), the sex of the fish, the condition of the fish upon release (see Explanations 3.G, below), if it was retained or recaptured, comments, GPS waypoint, and a GPS waypoint link. If a fish does not exhibit any of the conditions, the number zero (0) is entered in the "All Conditions" field. Also included are comments about the fish and an indication of whether or not the fish was retained or was a recapture. A "recapture" is a fish that was previously tagged during a CCFRP survey and was re-caught during either the same or a different CCFRP survey trip. A checked box in the "Recapture" field indicates that the fish was a recapture. If the fish is a recapture, the fish is assigned a new Fish ID, its information at the time of recapture is entered into the database and the previously inserted Tag ID is typed into the "Comments" field of the Caught Fishes Table. If a CCFRP tagged fish is caught and reported by a fisherman or a diver at a time other than during a CCFRP survey, the information for this fish at the time of recapture is entered into the "Tag Returns" database. "Retained" fishes are those that are retained either dead or alive during a survey trip and are used scientific purposes. In addition to the fishes marked "retained" in the database, there were also 3 untagged Gopher Rockfish that were retained in the Point Lobos reference site (2 on August 6, 2007 and 1 on August 8, 2007), but were not marked in the database. There was also 1 untagged, retained gopher rockfish in the Point Buchon reference site (September 18, 2007) and 3 in the Point Buchon MPA (October 15, 2007). Note: In Piedras Blancas and Point Buchon, tag numbers are not unique for each color set of tags. For this reason, "Tag IDs" in these areas are listed as the tag number, followed by the first letter of the color of tag (e.g., "(Tag #)O" for Orange tags, "(Tag #)Y" for Yellow tags, or "(Tag #)W" for White tags). In Año Nuevo and Point Lobos, only the number is listed because all numbers were discrete regardless of color. Starting in 2021, fishes retained from Piedras Blancas and Point Buchon REF sites were tagged with tags starting with "SC".

5. Fish Species: The Fish Species table provides the species codes used in the database and their corresponding common and scientific names (by *Genus* and *species*). Also, a field indicates whether or not the fish, associated with the Species Code, is a Rockfish (in the Genus *Sebastes).* A checked box indicates that the species is a rockfish and an unchecked box indicates that it is not.

6. Grid Cell Locations: The Grid Cell Location table provides information about all of the 500 m x 500 m grid cells that were created for this study. The grid cells in each MPA are designated as follows: Anacapa Island (AI): AI01 – AI17, Año Nuevo (AN): AN01 - AN22, Bodega Head (BH): BH01 - BH27), Piedras Blancas (BL): BL01-BL57, South Cape Mendocino (CM): CM01 - CM77, Carrington Point (CP): CP01 - CP38, SE Farallon Islands (FN): FN01 - FN22, Laguna Beach (LB): LB01 - LB05, South La Jolla (LJ): LJ01 - LJ20, Point Buchon (PB): PB01-PB22, Point Conception (PC): PC01-PC23, Point Lobos (PL): PL01-PL17, Stewart's Point (SP): SP01 - SP20, Swami's (SW): SW01 - SW19, Trinidad REF (TD): TD091-TD11, and Ten Mile (TM): TM01 - TM35. If a grid cell is within a Marine Protected Area, "MPA" is listed in the "Site" field. If it is within a Reference site, "REF" is listed. The latitude and longitude (in decimal degrees) of the center point and the four corners of the polygon that bounds each grid cell are listed in the Grid Cell Location table. Lat/Lon1 is the Northwest corner of grid cell, Lat/Lon 2 is the Northeast corner,

Lat/Lon 3 the Southwest corner and Lat/Lon 4 is the Southeast corner. This table also indicates whether or not a given cell was sampled in a given year.

For the MPA grid cells in Point Lobos, an extra column was added to designate whether the grid cell is located in the "OLD" section of the Point Lobos MPA (the portion of the MPA that overlaps with the 1973 Point Lobos Ecological Reserve) or in the "NEW" section (no overlap).

Throughout the study, several drifts were completed or extended outside the boundaries of the grid cells. For this reason, grid cells "ANMM," "ANRR," "PLMO," "PLMN," "PLRR," "BLMM," "BLRR," "PBMM," and "PBRR," "TMMM," "TMRR," "CMMM," "CMRR," "SPMM," "SPRR," "BHMM," "BHRR," "AIMM," "AIRR," "CPMM," "CPRR," "FNMM," "FNRR," "LBMM," "LBRR," "LJMM," "LJRR," "PCMM," "PCRR," "SWMM," "SWRR" are in the database. The area is indicated by the first two letters. "RR" indicates that the drift was completed somewhere in the reference area. "MM" indicates that the drift was in the MPA area, "MN" indicates that the drift was in the "NEW" section of the Point Lobos MPA, and "MO" in the "OLD" section.

7. Monitoring Areas: The monitoring areas table provides information about the 14 MPAs surveyed across the state. For each MPA, the following information is listed: Area Code (unique two-letter code for each MPA, see "6. Grid Cell Locations" description above), full name of MPA, MPA Designation (State Marine Reserve (SMR) or State Marine Conservation Area (SMCA)), and the monitoring group responsible for surveying that MPA.

*Comments about Data Entry

- If two anglers rotated in to one station and it was uncertain who was fishing during a given drift, the person listed first on the sign-in sheet was given credit for the fishes caught.
- If the station number is listed incorrectly (e.g., Station #4 was listed, but there was no one fishing at that station that day) then no station number or gear type information is listed in the database and the fish is assigned to angler "A000," the "unknown angler."
- If no release latitude or longitude values are written down for a caught fish on the data sheet, the release latitude and longitude values of the previously caught fish in that drift are assigned to it. If none of the previously caught fishes had a release latitude and longitude, the first half of the caught fishes are assigned to the start coordinates, and the second half to the end coordinates. If there is an odd number of fishes caught, the "middle" fish can be assigned either the start or end coordinates. [Edit: 6/13/17. Cal Poly did not enter fish-specific Lat/Lon for 2016 data entry. Reason given: this information is available in a query that contains both Caught Fishes info along with Drift Information Start/End latitude and longitude. While technically correct, it will require more work if we need fish-specific Lat/Long information; Edit: 2/9/2021: same rationale applied to 2021 data entry]
- If no release depth is specified for a caught fish on the data sheet, the depth of the previously caught fish in that drift is assigned to it. If none of the previously caught fishes have a release depth, the start depth is used. However, if no depths are recorded for the fishes during a particular drift, the first half of the caught fishes are assigned to the start depth, and the second half to the end depth. If there is an odd number of fishes caught, the "middle" fish can be assigned either the start or end depth. (2007-2011: if there is less than a 10-foot difference between the start and end depth, all of the fishes are assigned the start depth). [Edit: 6/13/17. Cal Poly did not enter fish-specific depth for 2016 data entry. Reason given: this information is

available in a query that contains both Caught Fishes info along with Drift Information Start/End depths. While technically correct, it will require more work if we need fish-specific depth information; Edit: 2/9/2021: Same rationale applied to 2021 data entry]

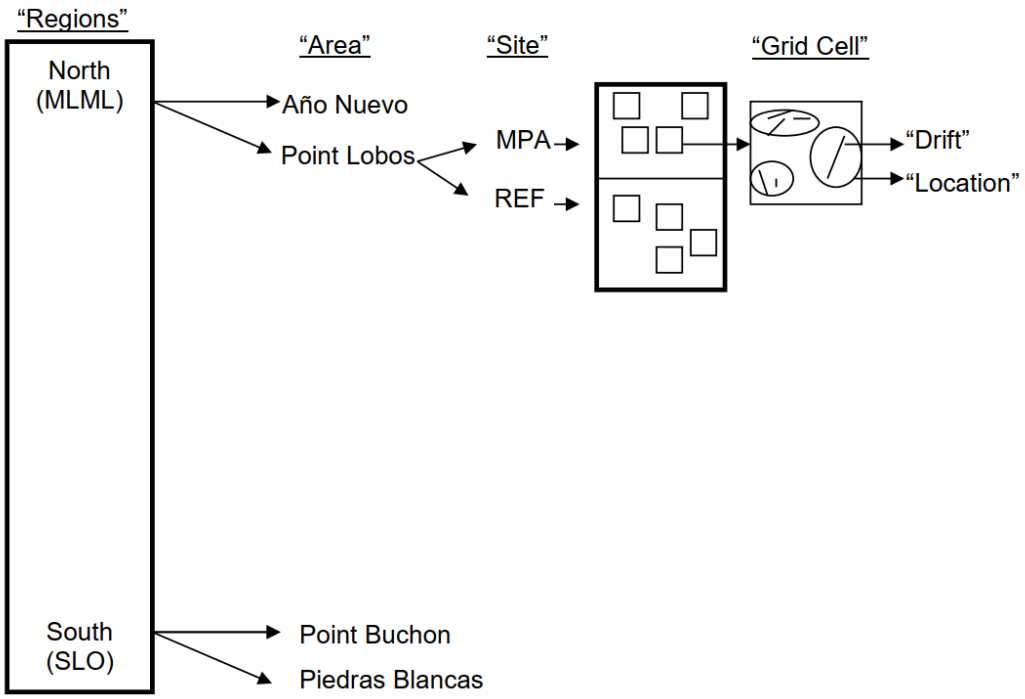
- If, in the comments section of the data sheet it says, "harbor seals (or sea lions) present," but no number expressing the quantity of seals (or sea lions) is listed, the number "2" is entered into the database under the "Number of Seals" (or "Number of Sea Lions) field in the "Drift Information" table because this is generally what it meant.
- If a tagged fish looked like it was in poor condition and may/would die or if it had died, its tag was pulled out. In this situation, the tag number is not entered into the "Tag ID" field of the "Caught Fishes" table and, if appropriate, the box for "Condition 7 or 8 (depending)" is checked.
- Any fish that is coded as a Condition 7 or 8 in the database does not have any of its other conditions entered into the database. For example, if the fish is a mortality, but also has hook damage, instead of listing it as having Conditions 4 and 8, only Condition 8 is listed and a comment is made in the "Comments" field about the hook damage.
- Enter condition codes in order of notation on the data sheet, unless "5" precedes any other condition code. For example, if a fish had hook damage and was descended, but the order of condition codes on the data sheet was written as "5,4", change the order to read "4,5". The only exception to this is if the fish also has condition code "6" for a floater with an uncertain mortality.
- Both the observed swell height and wind speed are averaged (i.e., if the wind speed is listed as being between 0-5 knots or less than 5 knots, "2.5" was entered into the database).
- In 2007, comments made on the data sheets regarding the weather during a drift were coded as various levels of "Cloud cover" (see Explanations 3.E, below).
- If comments are made that a fish was caught after the drift ended or before the drift began and no time is added in the comments for that angler, add a standard value of 1 minute to reflect this in the fishing time.

Explanations

1. Location Terminology:

The sampling is broken down into 16 "Areas." In the north coast, three areas were sampled by HSU: Trinidad (TD), South Cape Mendocino SMR (CM) and Ten Mile SMR (TM), two areas were sampled by BML: Bodega Head SMR (BH) and Stewart's Point SMR (SP), and one area was sampled by MLML: SE Farallon Islands SMR (FN). In the central coast, two areas were sampled by MLML: Año Nuevo SMR (AN) and Point Lobos SMR, two areas were sampled by CP: Piedras Blancas SMR (BL) and Point Buchon SMR (PB). In the south coast, three areas were sampled by UCSB: Point Conception (PC), Carrington Point SMR (CP) and Anacapa Islands SMR/SMCA (AI), two areas sampled by SIO: Laguna Beach SMR (LB), Swami's SMCA (SW), and South La Jolla SMR (LJ). Within each "Area," there are two different "Sites:" within the marine protected area (MPA) and in the corresponding reference site (REF). Within these sites are 500m x 500m "Grid Cells," which delineate the sampling boundaries. In each of the grid cells, non-overlapping, 15-minute drifts are completed in three discrete "locations" within the grid cell. If this is not possible (due to uncontrollable factors such as strong current or high fish

abundance), multiple drifts summing to 15 minutes are completed in each location (for a total of 30-45 minutes per grid cell).



2. Measurement Units and Descriptions:

A. *Added or Subtracted (+/-) Fishing Time*
- Added or subtracted fishing time in both the "Angler Information" and "Drift Information" tables is listed in fractions of a day (i.e., the number of minutes not fishing or fishing for extra time/60/24).

B. *Bottom Depth*
- Bottom depth measurements, reported by the vessel captain at the start and end of a drift and when fish are caught, are measured in feet (ft).

C. *Drift Length*
- Drift length, the straight-line distance between the start and end points of the drift, is measured in meters (m).

D. *Fish Length*
- Fish lengths, reported as Total Length, are measured to the nearest centimeter on wooden V-boards and on flat, plastic/metal boards.

E. *Latitude and Longitude*
- Latitude and longitude values are listed in decimal degrees (DD).

F. *Observed Swell Height*
- The swell height, as observed by the data recorder, is measured in feet (ft).

G. *Observed Wind Speed*
- The wind speed, as observed by the data recorder, is measured in knots (kt).

H. *Secchi Depth*

- Secchi depths are measured in meters (m). Readings are taken once in each grid cell and all drifts within that grid cell (on that day) are assigned the single Secchi depth reading. For Piedras Blancas and Point Buchon, readings were taken in the middle of the drifts in 2007 and 2008, and at the end of the drifts in 2009. For Año Nuevo, and Point Lobos, the readings were taken before the drifts in the first part of the 2007 field season and the readings were taken after the completion of the drifts for the remainder of the 2007 season and for all of 2008 and 2009. In the future, the Secchi readings in all areas will be taken after the completion of the drifts.

I. *Sex of the Fish*

- The sex of the caught fishes is designated as M: male or F: female if the sex is evident.

J. *Surface Water Temperature (Vessel)*

- The localized surface water temperature (SWT), as reported by the vessel captain, is measured in degrees Fahrenheit (^{o}F). In 2009, the F/V *Caroline* (Point Lobos surveys) SWT readings are likely 4 degrees higher than the true values.

K. *Surface and Depth Temperature (Instrument)*

- Temperature readings are taken at the surface and at depth from a scientific instrument (Seabird Temperature Sensor for Año Nuevo, and Point Lobos; Seabird CTD for Piedras Blancas and Point Buchon). In 2007, the Seabird Temperature Sensor was lowered to the seafloor or to the length of the rope. In order to standardize the measurements between grid cells, the temperature reading at 2.3 psi was considered the surface temperature for all of the recordings, and the temperature reading at 10 psi for Año Nuevo and 20 psi for Point Lobos were considered the temperature at depth. In 2008 and 2009, the Seabird was lowered to 10 feet above the seafloor. The temperature at this depth was considered the temperature at depth and the temperature reading at 2.3 psi was used for the surface temperature reading. In all years, the readings on the descent of the instrument were used, as opposed to the ascent. In 2008 and 2009, the Seabird CTD was lowered to the seafloor or to 22.5 m (the length of the rope). The temperature reading at 2.3 psi was considered the surface temperature in 2008, and at 1 m in 2009. The temperature at depth was the temperature reading at 17.5 m, a common depth among all readings.
- The Temperature Sensor and CTD are lowered in concurrently with the Secchi disc.

L. *Time*

- Start and end times for each drift in the "Drift Information" table are listed in the form: HH:MM:SS (AM/PM), Pacific Standard Time.

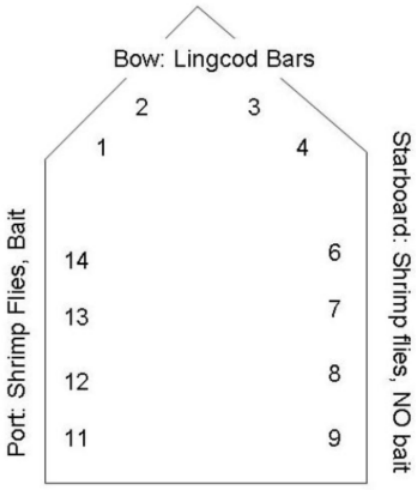
3. Codes used in the Database:

A. *Gear Type*

- BAR: Anglers on the bow of the vessel using hard tackle (lingcod bars) with a shrimp fly "teaser" (a smaller lure used in addition to the main tackle to entice and catch fish) as terminal tackle. The lingcod bars are a variety of colors and shapes (excluding long bars) and weigh 4, 6, 7, 8 or 10 ounces. The deckhand determines the weight of the bar used during a given drift. He/she is instructed to use the lightest bar that would get to the ocean bottom quickly and would be heavy enough to counteract the localized current (this protocol was

not always maintained by the deckhands). The shrimp fly teaser is either red or white and all hooks are single and barbless.

- FLY: Anglers on the starboard side of the vessel using shrimp flies (2 hooks per rig) without bait as terminal tackle. The shrimp flies are either red or white and all hooks are single and barbless.
- BAT: Anglers on the port side of the vessel using shrimp flies (2 hooks per rig) with bait as terminal tackle. The shrimp flies were either red or white and all hooks were single and barbless. The bait was defrosted frozen squid cut into pieces 2-4 inches long.
- SBT: Used by HSU, UCSB, and SIO monitoring groups only. Tackle consists of a lead head with hook and a swim bait tail. These are a variety of colors and weights, depending on weather conditions. All hooks are single and barbless. A shrimp fly "teaser" is tied above the swim bait only for HSU.
- DPR: Used in the south coast only. Dropper loops are two barbless hooks tied directly onto the main line (similar to shrimp flies, but no feathers or mylar). All hooks are single and barbless. These hooks are baited with defrosted squid cut into 2-4 inch long pieces.
- SFB: This gear code was implemented starting in 2021 and is only used by HSU. This is the shrimp fly "teaser" hook on the BAR gear type. Previous to 2021, catches on this hook were recorded under the FLY gear type.
- SFS: This gear code was implemented starting in 2021 and is only used by HSU. This is the shrimp fly "teaser" hook on the SBT gear type. Previous to 2021, catches on this hook were recorded under the FLY gear type.
- All shrimp flies are purchased from P-Line (contact: Thomas Kanemoto, thomas.kanemoto@p-line.com) under a VIP account, and are either red (with small amounts of yellow and white, and iridescence) or white (with small amounts of iridescence) and have the following configuration: Main line lb: 60, Hook line lb: 50, and Hook size: 5/0. The exception is Cal Poly, who purchases their flies from a local supplier. The size and colors of those flies are similar to the ones purchased from P-Line.
- The majority of the lingcod bars used from 2007-2017 were from Joe and were painted various colors and in various weights. 2018-2020 bars were poured and painted by Brian Cutting. 2021 bars were poured by Brian Cutting and painted by Josh Amaya.
- The protocol is as follows: BAR is fished at stations 1-4 on the bow, FLY at stations 6-9 on the starboard side on the vessel, and BAT at stations 11-14 on the port side. This was maintained for the most part, with the following exceptions: 1) In 2007 at Point Buchon, BAR was always on the bow, but FLY and BAT were not always at starboard and port respectively; 2) At Point Buchon on September 9, 2008, stations 6-9 were BAT at starboard and 11-14 were FLY at port. Note that this set-up only holds true for the central coast groups. HSU fishes on 6-pack boats and only have 4 anglers per trip. Groups in the south coast fish with different gear types and their set-up is varied slightly from the figure below.
- Below: The placement of anglers on the vessel by gear type and station number.



- Below: Gear types used in this study. Note that not all gear types are used in all locations. Left to Right: Lingcod bars in various sizes, shrimpflies (unbaited and baited with squid mantle), swimbaits, and dropper loops (baited with squid mantle).
-

B. Species Code

- Each caught species is assigned a unique, 3 letter (capitalized) code (e.g., "BLU" is the code for Blue Rockfish, *Sebastes mystinus*).
- "MKL" indicates that the fish was in the Genus *Scombridae*, but that it could not be identified to species; "SMT" indicates that it is in the family Osmeridae, but the Genus and species are unknown; and the code "OYT" is used when the science crew could not distinguish between an olive and yellowtail rockfish.

C. Drift ID

- The Drift ID is the unique identifier for each completed survey drift. It is made up of 5 parts:
  - Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.
  - Site: MPA (M) or Reference (R)
  - Date: MMDDYY

- Grid Cell (number)
- Drift (number)
- For example, the first drift in Grid Cell 16 in Point Lobos (which is a reference site) on the 6th of August 2007 would be: (PL)(R)(080607)(16)(01) entered as: PLR0806071601. Drift numbers and grid cells are entered as two-digit numbers (e.g., 01).

D. ID-Cell per Trip

- The ID Cell per Trip groups all drifts that are completed in a given cell on a particular day (i.e., the Drift ID without the "Drift (number)"). It is made up of 4 parts:
  - Area: Point Reyes (PR), North and South East Farallon Islands (FN), Duxbury Reef (DF), Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.
  - Site: MPA (M) or Reference (R)
  - Date: MMDDYY
  - Grid Cell (number)
  - For example, all drifts in Cell 16 in Point Lobos (which is a reference site) on the 6th of August 2007 would be: m(PL)(R)(080607)(16) entered as: PLR08060716. Grid cells are entered as two-digit numbers (e.g., 01).

E. Cloud Cover

- 0: Blue Sky to <25% high cloud cover
- 1: 25-75% high cloud cover
- 2: >75% high or low cloud cover
- 3: Foggy

F. Relief

- 1: Flat (< 1 m local relief on the echosounder or map)
- 2: Moderate relief (1-3 m local relief on the echosounder or map)
- 3: High relief (> 3 m local relief on the echosounder or map)

G. Fish Conditions

Condition	Description
0	Good condition/ No other condition code applies
1	The fish had eye damage due to barotrauma (crystallized eyes)
2	The fish was vented (swim bladder) with a hypodermic needle
3	The fish showed signs of marine mammal or fish predation, but was not a mortality
4	The fish showed signs of hook damage (including eye damage) or body cuts/scale loss, but was not a mortality
5	The fish was released using a fish descending device (either the Ace Calloway Barotrauma Reversing Fish Release or a weighted milk crate)
6	The fish was floating (did not swim down) upon release, but mortality was uncertain
7	The fish was a morality due to mammal or fish predation
8	The fish was a mortality due to causes other than mammal or fish predation (e.g., mortality due to barotrauma, handling injuries, etc.)

H. Trip IDs

- The Trip ID is the unique identifier for each survey trip that is completed. Trip IDs are:
    - Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.
    - The letter "T"
    - Sequential trip number_Year
    - For example, the first trip in Point Lobos in 2008 would have a Trip ID: PLT01_08, the sixth trip in Point Lobos in 2008 would have a Trip ID: PLT06_08.

I. Initials

- The following are the first and last name initials of the science crew.
    - AC: Allen Chin, F/V *Tigerfish* (captain)
    - AG: Ashley Greenley, Moss Landing Marine Laboratories (graduate student, Starr Lab)
    - AL: Andrea Launer, Moss Landing Marine Laboratories (graduate student, Starr Lab)
    - All: Cal Poly uses this terminology to designate that all of the remaining science crew
      with the exception of the initials in the recorder column
    - AP: Anna Peterson, Cal Poly SLO (high school volunteer)
    - AT: Anne Tagini, Moss Landing Marine Laboratories (graduate student, Starr Lab)
    - BB: Bonnie Brown, Moss Landing Marine Laboratories (graduate student, Starr Lab)
    - BH: Bernat Hereu, Moss Landing Marine Laboratories (post doctorate)
    - BP: Ben Perlman, Moss Landing Marine Laboratories (graduate student)
    - CB: Cassandra Brooks, Moss Landing Marine Laboratories (graduate student)
    - CD: Christian Denney, Moss Landing Marine Laboratories (grad student, Starr Lab)
    - CDD: Connor Dibble, Bodega Marine Lab (graduate student, Morgan Lab)
    - CE: Carolyn Ewers, Cal Poly SLO (graduate student, Wendt Lab)
    - CH: Corbin Hodges, Cal Poly SLO (graduate student, Wendt Lab)
    - CH: Chris Honeyman, UC Santa Barbara (Technician, Caselle Lab)
    - CL: Cathryn Lucas, Moss Landing Marine Laboratories (technician, Starr Lab)
    - CLB: Cheryl Barnes, Moss Landing Marine Laboratories (graduate student, Starr Lab)
    - CM: Corina Marks, Moss Landing Marine Laboratories (technician, Starr Lab)
    - CMB: Carly Banks, Cal Poly SLO (undergraduate student, Wendt Lab)
    - CSH: Chandler Skinner-Horne, Cal Poly SLO (undergraduate student, Wendt Lab)
    - CW: Cate Webster, Cal Poly SLO (undergraduate student, Wendt Lab)
    - DA: Daniel Adams, Moss Landing Marine Laboratories (CSUMB intern, Starr Lab)
    - DD: Danielle Duncan, Moss Landing Marine Laboratories (CU intern, Starr Lab)
    - DD: Dante Delany, Cal Poly SLO (undergraduate student, Wendt Lab)
    - DH: David Hernandez, Cal Poly SLO (undergraduate student, Wendt Lab)
    - DK: David Kammerer, volunteer
    - DN: David Nishijima, Moss Landing Marine Laboratories (CSUMB intern, Starr Lab)
    - DR: Dave Rasmussen, Cal Poly SLO (graduate student, Wendt Lab)
    - DW: Dean Wendt, Cal Poly SLO (principal investigator)
    - EA: Eric Anderson, Cal Poly SLO (graduate student, Wendt Lab)
    - EB: Ellie Brauer, Cal Poly SLO (undergraduate student, Wendt Lab)

- ED: Emily Donham, Moss Landing Marine Laboratories (graduate student, Ich Lab)
- EL: Erin Loury, Moss Landing Marine Laboratories (graduate student)
- EG: Eden Gonzalez, Moss Landing Marine Laboratories (CSUMB intern, Starr Lab)
- EM: Emily Lohman, Moss Landing Marine Laboratories (UCSC undergraduate, CCFRP intern)
- EN: Erin Nakada, Cal Poly SLO (technician, Wendt Lab)
- ES: Emily Stollmeyer, Moss Landing Marine Laboratories (UCSC undergraduate, CCFRP intern)
- ETM: Erica Mason, Scripps Institution of Oceanography (graduate student, Semmens Lab)
- EVS: Erin Satterthwaite, Bodega Marine Lab (Graduate student, Morgan Lab)
- GW: Grant Waltz, Cal Poly SLO (graduate student, Wendt Lab)
- HD: Helen Dickenson, Cal Poly SLO (undergraduate student, Wendt Lab)
- HK: Heather Kramp, Moss Landing Marine Laboratories (volunteer, Starr Lab)
- HP: Heather Price, Cal Poly SLO (graduate student, Wendt Lab)
- IK: Ian Kelmartin, Humboldt State University (graduate student, Mulligan Lab)
- JB: Joey Baba, Moss Landing Marine Laboratories (intern, Starr Lab)
- JC: Jen Chiu, Moss Landing Marine Laboratories (graduate student)
- JC: Jenn Caselle, UC Santa Barbara (principal investigator)
- JD: Jahnava Duryea, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- JG: Jenny Greene, Cal Poly SLO (undergraduate student, Wendt Lab)
- JI: Jimmy Williamson, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- JM: Janice Manabe, volunteer
- JM: Jackie Mohay (starting in 2017), Moss Landing Marine Laboratories (graduate student, Starr Lab)
- JP: Jaime Perrin, Cal Poly SLO
- JR: Jessica Rhodes, Cal Poly SLO (undergraduate student, Wendt Lab)
- JS: Joshua Smith, CSU Monterey Bay (undergraduate student, UROC program)
- JS: Jay Staton, Humboldt State University (graduate student, Mulligan Lab)
- JT: Jake Todd (starting in 2019), Moss Landing Marine Laboratories (graduate student, Starr Lab)
- JW: Jessica Watson, CSU Monterey Bay (graduate student, IfAME, Lindholm Lab)
- KA: Katie Schmidt, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- KC: Katie Cieri, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- KG: Kristen Green, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- KM: Kinsey Matthews, Moss Landing Marine Laboratories (grad student, Starr Lab)
- KP: Kyle Purdy, Cal Poly SLO
- KP: Konnor Payne, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- KS: Kristen Sanchez, Cal Poly SLO (graduate student, Wendt Lab)
- KT: Kristin Hunter-Thomson, Moss Landing Marine Laboratories (graduate student, Starr Lab)
- LB: Lenora Brewer, Cal Poly SLO (technician, Wendt Lab)

- LL: Leslie Longabach, Cal Poly SLO (graduate student, Wendt Lab)
- LO: Larissa Ormonde, Cal Poly SLO (undergraduate student, Wendt Lab)
- LS: Lesley Stein, Cal Poly SLO (graduate student, Wendt Lab)
- LT: Lauren Tobosa, CSU Monterey Bay (undergraduate student, UROC program)
- MA: Molly Alvino, Moss Landing Marine Laboratories (graduate student, volunteer)
- MB: Mariah Boyle, Moss Landing Marine Laboratories (graduate student, volunteer)
- MD: Melissa Daugherty, Cal Poly SLO (graduate student, Wendt Lab)
- MID: Morgan Ivens-Duran, Cal Poly SLO (graduate student, Wendt Lab)
- MS: Marty Schmidt, Moss Landing Marine Laboratories (intern, Starr Lab)
- MW: Megan Wilson, Cal Poly SLO (undergraduate student, Wendt Lab)
- NH: Nate Hall, Cal Poly SLO (graduate student, Wendt Lab)
- NMC: Natasha Meyers-Cherry, Cal Poly SLO (graduate student, Wendt Lab)
- NN: Nick Nesbitt, Cal Poly SLO (undergraduate student, Wendt Lab)
- NY: Noëlle Yochum, Moss Landing Marine Laboratories (technician, Starr Lab)
- OH: Owen Hackelman, Cal Poly SLO (undergraduate student, Wendt Lab)
- PC: Paul Carvalho, Cal Poly SLO (undergraduate student, Wendt Lab)
- PM: Paul Muehlenbeck, Moss Landing Marine Laboratories (CCFRP intern)
- RB: Rachel Brooks, Moss Landing Marine Laboratories (graduate student, technician, Ich Lab)
- RD: Rose Dodgen, Ca Poly SLO (graduate student, Wendt Lab)
- RF: Ryan Fields, Moss Landing Marine Laboratories (graduate student, Ich Lab)
- RR: Robert Rand, Moss Landing Marine Laboratories (CCFRP intern)
- RS: Rick Starr, Moss Landing Marine Laboratories (principal investigator)
- SA: Samantha Robinson, Moss Landing Marine Laboratories (CCFRP intern)
- SL: Scot Lucas, CA Department of Fish and Game (volunteer, Starr Lab)
- SM: Selena McMillan, Moss Landing Marine Laboratories (graduate student)
- SR: Steve Rienecke, Cal Poly SLO (former graduate student, volunteer)
- SZ: Samantha Mendez: Moss Landing Marine Laboratories (CSUMB undergraduate, CCFRP intern)
- WF: Hamilton “Will” Fennie, Moss Landing Marine Laboratories (graduate student, Ich Lab)
- ZK: Zachary Kusinski, Cal Poly SLO (undergraduate student, Wendt Lab)

Glossary of Database Fields

Below is a glossary of fields in the database sorted by table (order of fields within database subject to change):

Table	Field	Description
Trip Information	Trip ID	The unique identifier for each trip that was completed during this study. Trip IDs are: Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB) etc., T, sequential trip number_year. For example, the first trip in Point Lobos in 2007 would have a Trip ID: PLT01_07.
Trip Information	Area	The area in which sampling occurred during a trip, associated with a specific Trip ID. Sampling occurred in sixteen "areas." In the north coast, three areas were sampled by HSU: Trinidad (TD), South Cape Mendocino SMR (CM) and Ten Mile SMR (TM), two areas were sampled by BML: Bodega Head SMR (BH) and Stewart's Point SMR (SP), and one area was sampled by MLML: SE Farallon Islands SMR (FN). In the central coast, two areas were sampled by MLML: Año Nuevo SMR (AN) and Point Lobos SMR, two areas were sampled by CP: Piedras Blancas SMR (BL) and Point Buchon SMR (PB). In the south coast, three areas were sampled by UCSB: Point Conception (PC), Carrington Point SMR (CP) and Anacapa Islands SMR/SMCA (AI), two areas sampled by SIO: Laguna Beach SMR (LB), Swami's SMCA (SW), and South La Jolla SMR (LJ).
Trip Information	Site (MPA/REF)	The site in which sampling occurred during a trip, associated with a specific Trip ID. Within each area there are two different "sites:" Marine Protected Area (MPA) and Reference (REF).
Trip Information	Month	The month in which a trip, associated with a specific Trip ID, occurred
Trip Information	Day	The day on which a trip, associated with a specific Trip ID, occurred.
Trip Information	Year	The year in which a trip, associated with a specific Trip ID, occurred.
Trip Information	Vessel	The vessel on which a trip, associated with a specific Trip ID, occurred.
Trip Information	Captain	The person who served as captain of the vessel on which a trip, associated with a specific Trip ID, was taken.
Trip Information	Deckhand	The person who served as deckhand of the vessel on which a trip, associated with a specific Trip ID, was taken.
Trip Information	# Volunteer Anglers	The number of volunteer anglers that participated on a trip, associated with a specific Trip ID. This number counted only the anglers who fished that day (this number may be different from the number of anglers fishing during a given drift on that trip).
Trip Information	Fishing tackle used	This explains the color of shrimp flies, weights of the hard tackle and sinkers, type of bait, and any pertinent information related to the terminal tackle used during a given trip, associated with a specific Trip ID.
Trip Information	Comments	Information about a trip, associated with a specific Trip ID. This includes information about people that came out on the boat who did not fish (i.e., reporters, photographers, and people that assisted the science crew) and events of the day.

Angler Information	Angler ID	Each volunteer angler is assigned a discrete, identifying Angler ID. The letter preceding the Angler ID number corresponds to the primary monitoring region that angler is associated with (A = MLML, B = BML, C = CP, D = SIO, H = HSU, S = UCSB). Angler IDs currently range from A000-A835, B001-B171, C001-C270, D001-D195, H001-H082, S001-S143. Angler "A000" represents an "unknown angler," which is used when it is uncertain who caught a particular fish. "A020" is used when a science crew member associated with Moss Landing Marine Laboratories (MLML) is fishing at a given station, and "A175" for a science crew member associated with Cal Poly San Luis Obispo. [Edit 2016: MLML has been assigning angler numbers to individual science crew and does not use A020 very much anymore]
Angler Information	Total (+/-) Fishing Time (2007-2021)	The cumulative amount of added or subtracted fishing time for the volunteer angler, associated with a specific Angler ID. Added time may be the result of fishing before the drift commenced and subtracted time may be the result of a gear hang up which precluded the angler from fishing for a portion of the drift. Added or subtracted fishing time is in fractions of a day (i.e., (added or subtracted fishing time in minutes)/60/24) and is only noted if the value is equal to or greater than one minute. [There is a separate column for each year, 2007 - 2021]
Angler Information	# Volunteer Days (2007-2021)	The total number of days that a volunteer angler, associated with a specific Angler ID, volunteered for this study. [There is a separate column for each year, 2007 - 2021]
Angler Information	Dates Fished (2007-2021)	The specific dates that a volunteer angler, associated with a specific Angler ID, volunteered. It is entered as: Month (date(s)) (e.g., August (18,19), September (24,25,26), October (19,20)). [There is a separate column for each year, 2007 - 2021]
Drift Information	Drift ID	The unique label for each drift completed during this study. It is made up of 5 parts: Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.; Site: MPA (M) or Reference (R); Date:MMDDYY; Grid Cell (number); and Drift (number). For example, the first drift in Cell 16 in Point Lobos (which is a reference site) on the 6th of August 2008 would be: (PL)(R)(080608)(16)(01) entered as: PLR0806081601. Drift numbers and grid cells are entered as two-digit numbers (i.e.,01).
Drift Information	Trip ID	The trip during which a drift, associated with a specific Drift ID, was completed. Trip IDs are: Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc., T, sequential trip number_year. For example, the first trip in Point Lobos in 2007 would have a Trip ID: PLT01_07.
Drift Information	Cell ID	The cell in which a drift, associated with a specific Drift ID, is completed. The grid cells in the in Año Nuevo (AN) area are designated: Anacapa Island (AI): AI01 – AI17, Año Nuevo (AN): AN01 - AN22, Bodega Head (BH): BH01 - BH27), Piedras Blancas (BL): BL01-BL57, South Cape Mendocino (CM): CM01 - CM77, Carrington Point (CP): CP01 - CP38, SE Farallon Islands (FN): FN01 - FN22, Laguna Beach (LB): LB01 - LB05, South La Jolla (LJ): LJ01 - LJ20, Point Buchon (PB): PB01-PB22, Point Conception (PC): PC01-PC23, Point Lobos (PL): PL01-PL17, Stewart's Point (SP): SP01 - SP20, Swami's (SW): SW01 - SW19, Trinidad REF (TD): TD091-TD11, and Ten Mile (TM): TM01 - TM35. Some of the drifts were completed outside any of the designated grid cells. Therefore, grid cells "ANMM," "ANRR," "PLMO," "PLMN," "PLRR," "BLMM," "BLRR," "PBMM," and "PBRR," "TMMM," "TMRR," "CMMM," "CMRR," "SPMM," "SPRR," "BHMM," "BHRR," "AIMM," "AIRR," "CPMM," "CPRR," "FNMM," "FNRR," "LBMM," "LBRR," "LJMM," "LJRR,"

		"PCMM," "PCRR," "SWMM," "SWRR" are in the database. The area is indicated by the first two letters. "RR" indicates that the drift was completed somewhere in the reference area. "MM" indicates that the drift was in the MPA area, "MN" indicates that the drift was in the "NEW" section of the Point Lobos MPA, and "MO" in the "OLD" section.
Drift Information	ID-Cell per Trip	Groups together all drifts that are completed in a given cell during a specific trip. It is written as the Drift ID without the drift number included. The ID-Cell per Trip is made up of 4 parts: Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.; Site: MPA (M) or Reference (R); Date:MMDDYY; and Grid Cell (number). For example, all drifts in Cell 16 in Point Lobos (which is a reference site) on the 6th of August 2007 would be: (PL)(R)(080607)(16) entered as: PLR08060716. Grid cells are entered as two-digit numbers (i.e., 01).
Drift Information	Start Time	The time at which the drift, associated with a specific Drift ID, commenced. The time is entered as: HH:MM:SS (AM/PM).
Drift Information	End Time	The time at which the drift, associated with a specific Drift ID, ended. The time is entered as: HH:MM:SS (AM/PM).
Drift Information	Drift Time (hrs)	The time at which the drift, associated with a specific Drift ID, ended. The time is entered as: HH:MM:SS (AM/PM).
Drift Information	BAR (+/- mins) Fishing Time	The amount of time during a drift, associated with a specific Drift ID, that anglers fishing with "BAR" (see Explanations 2.A and 3.A) were not fishing due to various reasons (e.g., hung up gear) or were fishing for extra time (e.g., started before the drift commenced). Added or subtracted fishing time is in minutes (as noted on fieldwork datasheets) and was only noted if the value was equal to or greater than one minute. If time was subtracted it was entered with a "-" before the number.
Drift Information	FLY (+/- mins) Fishing Time	The amount of time during a drift, associated with a specific Drift ID, that anglers fishing with "FLY" (see Explanations 2.A and 3.A) were not fishing due to various reasons (e.g., hung up gear) or were fishing for extra time (e.g., started before the drift commenced). Added or subtracted fishing time is in minutes (as noted on fieldwork datasheets) and was only noted if the value was equal to or greater than one minute. If time was subtracted it was entered with a "-" before the number.
Drift Information	BAT (+/- mins) Fishing Time	The amount of time during a drift, associated with a specific Drift ID, that anglers fishing with "BAT" (see Explanations 2.A and 3.A) were not fishing due to various reasons (e.g., hung up gear) or were fishing for extra time (e.g., started before the drift commenced). Added or subtracted fishing time is in minutes (as noted on fieldwork datasheets) and was only noted if the value was equal to or greater than one minute. If time was subtracted it was entered with a "-" before the number.
Drift Information	SBT (+/- mins) Fishing Time	The amount of time during a drift, associated with a specific Drift ID, that anglers fishing with "SBT" (see Explanations 2.A and 3.A) were not fishing due to various reasons (e.g., hung up gear) or were fishing for extra time (e.g., started before the drift commenced). Added or subtracted fishing time is in minutes (as noted on fieldwork datasheets) and was only noted if the value was equal to or greater than one minute. If time was subtracted it was entered with a "-" before the number.
Drift Information	DPR (+/- mins) Fishing Time	The amount of time during a drift, associated with a specific Drift ID, that anglers fishing with "DPR" (see Explanations 2.A and 3.A) were not fishing due to various reasons (e.g., hung up gear) or were fishing for extra time (e.g., started before the drift commenced). Added or subtracted fishing

		time is in minutes (as noted on fieldwork datasheets) and was only noted if the value was equal to or greater than one minute. If time was subtracted it was entered with a "-" before the number.
Drift Information	Total off time (hrs)	A calculated field of the sum of the BAR, FLY, BAT, SBT, and DPR off times. Multiplied by 24 to convert the angler off time to hours.
Drift Information	Total adjusted angler hours	A calculated field with the equation: drift time*# anglers-Total off time. Used to calculate CPUE by species and for the drift.
Drift Information	Start Lat (DD)	The latitude, in decimal degrees (DD), where the drift, associated with a specific Drift ID, began.
Drift Information	Start Long (DD)	The longitude, in decimal degrees (DD), where the drift, associated with a specific Drift ID, began.
Drift Information	End Lat (DD)	The latitude, in decimal degrees (DD), where the drift, associated with a specific Drift ID, ended.
Drift Information	End Long (DD)	The longitude, in decimal degrees (DD), where the drift, associated with a specific Drift ID, ended.
Drift Information	Drift Length (m)	The straight-line distance between the start and end location of the drift, associated with a specific Drift ID, measured in meters (m).
Drift Information	# Anglers Fishing	The number of anglers fishing during a drift, associated with a specific Drift ID. An equal number of anglers fished each gear type at all times.
Drift Information	Recorder	The first and last name initials of the person recording information on the data sheets during a drift associated with a specific Drift ID. The names associated with all initials are listed in Explanations 3.I.
Drift Information	Tag Crew	The first and last name initials of the person/people tagging and processing fishes during a drift, associated with a specific Drift ID. The names associated with all initials are listed in Explanations 3.I.
Drift Information	Surface T (instrument, ^{o}C)	The surface temperature reading from a Seabird temperature sensor (Año Nuevo, and Point Lobos) or a CTD (Piedras Blancas or Point Buchon) taken in the grid cell in which the drift, associated with a specific Drift ID, occurred (see Explanations 2.L).
Drift Information	Depth T (instrument, ^{o}C)	The temperature reading taken at depth from a Seabird temperature sensor (Año Nuevo, and Point Lobos) or a CTD (Piedras Blancas or Point Buchon) taken in the grid cell in which the drift, associated with a specific Drift ID, occurred (see Explanations 2.L).
Drift Information	SWT (vessel, ^{o}F)	The localized surface water temperature, measured in degrees Fahrenheit (°F), as reported by the vessel captain during a drift, associated with a specific Drift ID.
Drift Information	Relief (1-3)	The degree of sea floor relief at the location of a drift, associated with a specific Drift ID, as reported by the vessel captain. The values are coded 1-3. Descriptions of these codes are in Explanations 3.F.
Drift Information	Start Depth (ft)	The bottom depth, measured in feet (ft), as reported by the vessel captain at the start of a drift, associated with a specific Drift ID.
Drift Information	End Depth (ft)	The bottom depth, measured in feet (ft), as reported by the vessel captain at the end of a drift, associated with a specific Drift ID.
Drift Information	Lingcod Bar Weight (oz)	The weight (oz) of the lingcod bars (hard tackle) used during a drift, associated with a specific Drift ID.
Drift Information	Lead Weight (oz)	The weight of the lead sinkers used with the shrimp fly terminal tackle (bait and no bait) used during a drift, associated with a specific Drift ID.

Drift Information	SBT Tail Length (in)	The length of the plastic tail used with the swim bait terminal tackle (not baited), associated with a specific Drift ID.
Drift Information	SBT Head Weight (oz)	The weight of the lead swim bait heads used with the swim bait terminal tackle (not baited), associated with a specific Drift ID.
Drift Information	# Seals	The number of harbor seals observed during a drift, associated with a specific Drift ID.
Drift Information	# Sea Lions	The number of sea lions observed during a drift, associated with a specific Drift ID.
Drift Information	Total Fishes Caught	The total number of fishes caught during a drift, associated with a specific Drift ID.
Drift Information	Cloud Cover	The amount of cloud cover at the location of a drift, associated with a specific Drift ID. The values are coded 0-3. Descriptions of these codes are in Explanations 3.E.
Drift Information	Obs Wind Speed (kt)	The wind speed, measured in knots (kt), observed by the data recorder during a drift, associated with a specific Drift ID. When entered into the database the values are averaged (i.e., if the wind speed is listed as being between 0-5 knots or less than 5 knots, "2.5" is entered into the database).
Drift Information	Obs Wind Direction	The wind direction observed by the data recorder during a drift, associated with a specific Drift ID (e.g., N, NW, E). BML also uses LV (light and variable).
Drift Information	Obs Swell Height (ft)	The swell height, measured in feet (ft), observed by the data recorder during a drift, associated with a specific Drift ID. When entered into the database the values are averaged (i.e., if the swell height is listed as being between 6-10 feet, "8" is entered into the database).
Drift Information	Secchi Depth (m)	The Secchi depth reading, measured in meters (m), taken in the grid cell in which the drift, associated with a specific Drift ID, occurred. In each cell on each day a Secchi depth reading is taken. All drifts completed in a grid cell on a given day share a Secchi depth value.
Drift Information	Comments	Additional information about a drift, associated with a specific Drift ID. Comments were listed regarding the weather and water condition and events that took place during the drift.
Caught Fishes	Fish ID	The unique, sequential auto number given to each caught fish that is entered in the database.
Caught Fishes	Tag ID	The number printed on the tag attached to the fish, associated with a specific Fish ID. In Piedras Blancas and Point Buchon, tag numbers are not unique for each color set of tags. For this reason, "Tag IDs" in these areas are listed as the tag number, followed by the first letter of the color of tag (e.g., "(Tag #)O" for Orange, "(Tag #)Y" for Yellow, or "(Tag #)W" for White). In Año Nuevo and Point Lobos, only the number is listed because all numbers were discrete regardless of color. A letter precedes the tag number for fishes tagged with HSU (H), BML (B), UCSB (S), and SIO (D). These preceding letters correspond to the letter preceding Angler ID numbers. Starting in 2021, fishes retained from Piedras Blancas and Point Buchon REF sites were tagged with tags starting with "SC."
Caught Fishes	Drift ID	The unique identifier for the drift during which the fish, associated with a specific Fish ID, was caught. The Drift ID is made up of 5 parts: Area: Año Nuevo (AN), Point Lobos (PL), Piedras Blancas (BL), Point Buchon (PB), etc.; Site: MPA (M) or Reference (R); Date: MMDDYY; Grid Cell (number); and Drift (number). For example, the first drift in Cell 16 in Point Lobos (which is a reference site) on the 6th of August 2008 would be:

		(PL)(R)(080608)(16)(01) entered as: PLR0806081601. Drift numbers and grid cells are entered as two-digit numbers (i.e., 01).
Caught Fishes	Species Code	The unique, 3 letter (capitalized) code that identifies the species of the fish, associated with a specific Fish ID (see Explanations 3.B).
Caught Fishes	Length (cm)	The total length, measured to the nearest centimeter (cm), of the caught fish, associated with a specific Fish ID.
Caught Fishes	Gear Type	The type of terminal tackle (BAR, FLY, BAT, SBT, DPR, SFS, SFB; see Explanations 3.A) used to catch the fish, associated with a specific Fish ID.
Caught Fishes	Station #	The fishing station (the location where an angler fished) from which the fish, associated with a specific Fish ID, was caught. Stations are numbered 1-14.
Caught Fishes	Angler ID	The Angler ID of the angler who caught the fish associated with a specific Fish ID. The letter preceding the Angler ID number corresponds to the primary monitoring region that angler is associated with (A = MLML, B = BML, C = CP, D = SIO, H = HSU, S = UCSB). Angler IDs currently range from A000- A803, B001-B121, C001-C250, D001-D142, H001-H045, S001-S103. Angler "A000" represents the "unknown angler." This code was used when it was uncertain who caught the fish.
Caught Fishes	Depth Released (ft)	The bottom depth (measured in feet (ft)) at the location at which the fish, associated with a specific Fish ID, was released (approximately the same as where it was caught).
Caught Fishes	Lat Released (DD)	The latitude, in decimal degrees (DD), where the fish, associated with a specific Fish ID, was released.
Caught Fishes	Long Released (DD)	The longitude, in decimal degrees (DD), where the fish, associated with a specific Fish ID, was released.
Caught Fishes	Sex	The sex of the fish, associated with a specific Fish ID. Sex is designated as either "M": male or "F": female.
Caught Fishes	Condition 0	A checked box indicates that the fish is in good condition, and no other condition codes apply.
Caught Fishes	Condition 1	A checked box indicates that the fish, associated with a specific Fish ID, had eye damage due to barotrauma (crystallized eyes).
Caught Fishes	Condition 2	A checked box indicates that the fish, associated with a specific Fish ID, was vented (swim bladder) with a hypodermic needle.
Caught Fishes	Condition 3	A checked box indicates that the fish, associated with a specific Fish ID, showed signs of marine mammal or fish predation, but was not a mortality.
Caught Fishes	Condition 4	A checked box indicates that the fish, associated with a specific Fish ID, showed signs of hook damage (including eye damage) or body cuts/scale loss but was not a mortality.
Caught Fishes	Condition 5	A checked box indicates that the fish, associated with a specific Fish ID, was released using a fish descending device (either the Ace Calloway Barotrauma Reversing Fish Release or a weighted milk crate).
Caught Fishes	Condition 6	A checked box indicates that the fish, associated with a specific Fish ID, was floating (did not swim down) upon release, but mortality was uncertain.
Caught Fishes	Condition 7	A checked box indicates that the fish, associated with a specific Fish ID, was a morality due to mammal or fish predation.
Caught Fishes	Condition 8	A checked box indicates that the fish, associated with a specific Fish ID, was a mortality due to causes other than mammal or fish predation; including mortality due to barotrauma, being on the boat too long, handling injuries, being eaten by a bird, etc.

Caught Fishes	All Condition	A list of all the recorded conditions of the fish, associated with a specific Fish ID (e.g., 2,5,8). If the fish does not exhibit conditions, the number zero ('0') is entered.
Caught Fishes	Retained	Indicates whether or not the fish, associated with a specific Fish ID, was retained. A checked box means that it was retained and an unchecked box means that it was released.
Caught Fishes	Recapture	Indicates whether or not the fish, associated with a specific Fish ID, was a recapture (a fish that was caught and tagged previously during a CCFRP survey). A checked box means that it was a recapture and an unchecked box means that it was not. The Tag ID of the tag already in the fish is recorded in the "comments" section of the Caught Fishes Table.
Caught Fishes	Comments	Additional information about a fish, associated with a specific Fish ID. In this column, notes are made about the state of the fish and if the fish's tag is pulled out after being tagged (because the fish died or looked like it would die). Also, if the fish was a recapture its tag number is entered in this section.
Fish Species	Species Code	The unique, 3 letter (capitalized) identifying code for each species of fish that was caught during this study.
Fish Species	Rockfish	Indicates whether or not the fish, associated with the Species Code, is a Rockfish (in the Genus Sebastes). A checked box indicates that the species is a rockfish and an unchecked box indicates that it is not.
Fish Species	Common Name	The common name of the fish, associated with the Species Code.
Fish Species	Genus	The Genus of the fish, associated with the Species Code.
Fish Species	Species	The species name of the fish, associated with the Species Code.
Grid Cell Locations	Cell ID	The cell in which a drift, associated with a specific Drift ID, is completed. The grid cells in the in Año Nuevo (AN) area are designated: Anacapa Island (AI): AI01 – AI17, Año Nuevo (AN): AN01 - AN22, Bodega Head (BH): BH01 - BH27), Piedras Blancas (BL): BL01-BL57, South Cape Mendocino (CM): CM01 - CM77, Carrington Point (CP): CP01 - CP38, SE Farallon Islands (FN): FN01 - FN22, Laguna Beach (LB): LB01 - LB05, South La Jolla (LJ): LJ01 - LJ20, Point Buchon (PB): PB01-PB22, Point Conception (PC): PC01-PC23, Point Lobos (PL): PL01-PL17, Stewart's Point (SP): SP01 - SP20, Swami's (SW): SW01 - SW19, Trinidad REF (TD): TD091-TD11, and Ten Mile (TM): TM01 - TM35. Some of the drifts were completed outside any of the designated grid cells. Therefore, grid cells "ANMM," "ANRR," "PLMO," "PLMN," "PLRR," "BLMM," "BLRR," "PBMM," and "PBRR," "TMMM," "TMRR," "CMMM," "CMRR," "SPMM," "SPRR," "BHMM," "BHRR," "AIMM," "AIRR," "CPMM," "CPRR," "FNMM," "FNRR," "LBMM," "LBRR," "LJMM," "LJRR," "PCMM," "PCRR," "SWMM," "SWRR" are in the database. The area is indicated by the first two letters. "RR" indicates that the drift was completed somewhere in the reference area. "MM" indicates that the drift was in the MPA area, "MN" indicates that the drift was in the "NEW" section of the Point Lobos MPA, and "MO" in the "OLD" section.
Grid Cell Locations	Area	The area in which sampling occurred during a trip, associated with a specific Trip ID. Sampling occurred in sixteen "areas." In the north coast, three areas were sampled by HSU: Trinidad (TD), South Cape Mendocino SMR (CM) and Ten Mile SMR (TM), two areas were sampled by BML:

		Bodega Head SMR (BH) and Stewart's Point SMR (SP), and one area was sampled by MLML: SE Farallon Islands SMR (FN). In the central coast, two areas were sampled by MLML: Año Nuevo SMR (AN) and Point Lobos SMR, two areas were sampled by CP: Piedras Blancas SMR (BL) and Point Buchon SMR (PB). In the south coast, three areas were sampled by UCSB: Point Conception (PC), Carrington Point SMR (CP) and Anacapa Islands SMR/SMCA (AI), two areas sampled by SIO: Laguna Beach SMR (LB), Swami's SMCA (SW), and South La Jolla SMR (LJ).
Grid Cell Locations	Site (MPA/REF)	The site in which the grid cell, associated with a specific Cell ID, is located. Within each area there are two different "sites": Marine Protected Area (MPA) and Reference (REF).
Grid Cell Locations	PL Old/New	If the grid cell that is associated with a specific Cell ID is in the Point Lobos Marine Protected Area it is designated as either "OLD" or "NEW." "OLD" indicates the portion of the MPA that overlaps with the 1973 Point Lobos Ecological Reserve and "NEW" is the portion that does not overlap.
Grid Cell Locations	Lat Center Point	The latitude, in decimal degrees, of the center point of the grid cell, associated with a specific Cell ID.
Grid Cell Locations	Lon Center Point	The longitude, in decimal degrees, of the center point of the grid cell, associated with a specific Cell ID.
Grid Cell Locations	Lat 1	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lat 1 is the latitude, measured in decimal degrees, of the Northwest corner.
Grid Cell Locations	Lon 1	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lon 1 is the longitude, measured in decimal degrees, of the Northwest corner.
Grid Cell Locations	Lat 2	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lat 2 is the latitude, measured in decimal degrees, of the Northeast corner.
Grid Cell Locations	Lon 2	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lon 2 is the longitude, measured in decimal degrees, of the Northeast corner.
Grid Cell Locations	Lat 3	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lat 3 is the latitude, measured in decimal degrees, of the Southwest corner.
Grid Cell Locations	Lon 3	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lon 3 is the longitude, measured in decimal degrees, of the Southwest corner.
Grid Cell Locations	Lat 4	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lat 4 is the latitude, measured in decimal degrees, of the Southeast corner.
Grid Cell Locations	Lon 4	Each 500m x 500m grid cell, associated with a specific Cell ID, has four corners. Lon 4 is the longitude, measured in decimal degrees, of the Southeast corner.

Database and Metadata Updates

[Comments on data entry and the database]

NOTE: Angler names are blacked out to maintain angler anonymity

2012 Data Update: Provided by Andrea Launer

- Ensure that each fish has an angler number, even if the angler is not known (use code A000). It was discovered that if fishes were not assigned an angler number they would not appear in queries no matter the category.
- A document was created in the metadata section with the published maximum lengths of the species we catch on our surveys (Caught_fishes_max_size_check.xlsx). In Access, you can use filters to see the largest sizes by species. If they exceed the sizes in the other document (most of the data taken from Love or Miller and Lea), verify the size and species on physical data sheets. Some fishes were found to have the wrong sizes or wrong species code even though the data were checked after they had been entered, mistakes happen. These can also be examined by exporting the caught fishes into an excel file and creating a pivot table that shows you the max size of the fish by species.
- 2008 Angler off time and Drift off time by gear type does not match well. We did an audit and for time sake only updated the drift off times. Make sure to check compare angler off times with drift off times and talk to Rick to determine an acceptable amount of error. We found it easiest to create an excel with our anglers and dates so we could calculate their angler off time and it was more accurate than other methods. (See CCFRP data entry items 010313 AL checked.xlsx for an example).

2013 Data Update: Provided by Andrea Launer

- CalPoly utilized a few different abbreviations in the comment section for caught fishes.
    - SIM: Stomach in mouth
    - BE: Bulging eyes

2016 Data Update: Provided by Ryan Fields

- Problem Drifts: Ran out of Bait
    - During several drifts this season, anglers stationed to fish with bait (BAT) did not use bait as directed, or the boat ran out of squid bait. These anglers were therefore effectively fishing with shrimp flies only (FLY). For our overall, annual summary statistics, this is a minor problem because we consider total Catch/angler*hour. Or the total number of fish in a drift divided by (# total anglers fishing *total time fished). This calculation does not consider gear type.
    - Similarly, our gear type ratio analysis (typically the pie chart showing ~33% of fishes caught by each gear type) does not consider angler station, but only what gear type caught each fish, and so we can simply change the entered gear type for anglers #11-14 to FLY during the drifts they did not use bait.
    - Fields for station number and gear type are independent of each other in Access Database [no control rules in Access preventing combinations of station number and gear type]. We can change the gear type for these anglers during the drifts that they did not use bait from 'BAT' to 'FLY'. All of their fish will count towards our FLY effort.

- Problem:
    - A problem could arise if one were to try and calculate gear-type specific CPUE. Because effort is no longer evenly spread around each of three gear types, one would have to consider the number of anglers for each gear type by drift first— then average to ID Drift per Cell. (E.g. During drifts where 11-13 did not use bait we have 0 BAT anglers and 6 FLY anglers.)
    - !!! This is a problem that has always existed every time we do not have the full number of anglers fishing during a drift (or day). We end up with uneven angler numbers per gear type that would make gear-specific CPUE calculations tricky.
    - There is nothing in the database beyond comments of who fished and total number of anglers to correct for this.
    - To do Gear-Specific CPUE calculation, one would have to filter out all the drifts that did not have either 9 or 12 anglers fishing, then manually go through the notes and figure out which gear types were fished/ not fished, each drift, for all 10+ years. A tedious endeavor…
- Solutions
    - For drifts where BAT anglers did not use bait, change their gear type to FLY. I also added an new column 'Exclude Gear specific CPUE' with a box to check. See above explanation for the scope of the problem and why this new column probably is unnecessary.
    - PLT04_16 (Aug 12th) #Anglers ran out of bait part way through drift 2 in cell 6- Believe solution can be to switch gear type for fish caught after this point
        - PLM0812160602 #Anglers 11-13 ran out of bait part way through drift- gear type entered as FLY for these anglers at point of drift when bait rant out.
        - PLM0812160603 #Anglers 11-13 still fishing no bait- for entire drift; Gear type entered as FLY for these anglers.
    - PLT10_16 (Sept 7th) #Here at least entire cells were either fished with or without bait, and so the entire ID Drift pe rCell unit can be divided by appropriate number of anglers. Enter gear type as FLY.

        PLM0907161201 #Anglers 11-12 not using bait
        PLM0907161202 #Anglers 11-12 not using bait
        PLM0907161203 #Anglers 11-12 not using bait
        PLM0907161101 #Anglers 11-12 not using bait
        PLM0907161102 #Anglers 11-12 not using bait
        PLM0907161103 #Anglers 11-12 not using bait
        PLM0907160901 #Anglers 11-12 not using bait
        PLM0907160902 #Anglers 11-12 not using bait
        PLM0907160903 #Anglers 11-12 not using bait
- Extra Cell fished in MPA one day: PLT03_16
    - We fished two drifts in the MPA for Ocean Protection Council folks even though this was overall a reference day. We will enter the data so that we have all tag numbers/lengths etc. but we want to set it aside so that it does not get included in the CPUE calculations.
    - We can use the Cell ID 'PLMO"
    - And drift ID's:

        PLR081116MO01
        PLR081116MO02

- Angler Information:
    - Using the recommended check of angler numbers, I found that 4 numbers had been skipped: A159, A489, A530 and A678. As per the SOP recommendations, I assigned these numbers to four new anglers this season: [redacted], [redacted], [redacted] and [redacted] respectively
    - I also discovered using the 'find duplicates in Angler Information' Query in Access- that [redacted] is listed twice with angler numbers A031 and A589. This is possibly the same person but will leave it for now since the contact information is different between the two entries.
    - When merging CalPoly data, two anglers started fishing in 2016 in both locations. I chose to use the MLML angler numbers for both anglers. [redacted] [all C181 were converted to A688]; [redacted] [All C180 were converted to A683]
- Species ID:
    - Calpoly added 'PSD' for Pacific Sanddab, I converted all of our 'SDB' to 'PSD' as the code is more intuitive. I have left 'SDB' for Sanddab spp., if we do not know for sure whether the sanddab was Pacific or Speckled. In 2016, MLML started recording type II Blue Rockfish as 'Deacon Rockfish' rather than Northern Blue Rockfish. 'DEA' was used as a code, and all 'NBL' in the database were converted to 'DEA'.
- Other:
    - Noticed that IDCellperDrift PLR08131502 was duplicated in query- traced it back to the third drift in this cell being mislabeled as PL03. I changed it to be cell PL02. This fixed issues with merging Access queries by IDCellperDrift.

2017 Data Update: Provided by Jen Chiu

The program expanded statewide this season. We provided an Access database template for all groups to fill in with their data, and then merged these separate databases into one 2017 statewide database. In order to query data from the central coast (MLML and Cal Poly) between 2007 and 2016, in addition to the data collected in 2017, we merged both of these databases together. The 2007-2016 central coast database had a slightly different column structure so this was edited to match the 2017 version. Original versions of the "old" 2007- 2016 database with all column intact can be found in the Dropbox folder. '

2018 Data Update: Provided by Jen Chiu

Once again, an Access database template was provided for all groups to fill in with their data, and then merged into one cohesive database that includes data from 2007 to 2018. In 2018, Laguna Beach SMR was excluded from sampling (by SIO), and Point Conception SMR was added (by UCSB).

2019 Data Update: Provided by Rachel Brooks

An Access Database template was provided by Jen Chiu for all groups to fill in with their data, and then merged into a cohesive database that includes data from 2007 to 2019. In 2019, Point Conception SMR was excluded from sampling (by UCSB), and SE Farallon Islands was excluded from sampling (by MLML).

- Angler Information:
    - Using the 'find duplicates in Angler Information' Query in Access- I discovered 9 duplicate names (First and Last), 6 of which were duplicated angler information under another

Angler ID. The following anglers were duplicated: [redacted] (S059→**D001**), [redacted] (S052→**C127**), [redacted] (S051→**C216**), [redacted] (S074→**A488**), [redacted] (B069→**C225**), and [redacted] (S072→**A441**). Non-bolded Angler ID was replaced by original bolded Angler ID in caught fishes table and the angler information table sampling year, dates, angler off-time was merged. The un-bolded duplicated angler ID was deleted from database as outlined in SOP.

- Species Table:
    - 4 new species added to Fish Species Table: (1) BMS – Bigmouth Sole, (2) LSD – Longfin Sanddab, (3) PHL – Pacific Halibut, (3) PSR – Pelagic Stingray

2020 Data Update: Provided by Rachel Brooks

An Access Database template was provided by Rachel Brooks for all groups to fill in with their data, and then merged into a cohesive database that includes data from 2007 to 2020. Each vessel worked with reduced loads this season as a result of the COVID-19 pandemic. Details are outlined below:

- COVID-19 Restrictions:
    - HSU Restrictions:
        - Volunteer angles were NOT permitted, interns and deckhands served as anglers
        - Decreased crew from 6-5, eliminating 1 angler, 2 science crew
        - 1 BAR, 1 FLY, 1 BAT (did not use SBT gear type)
    - BML Restrictions:
        - Volunteer anglers were permitted
        - Decreased volunteer anglers from 12-6
        - 2 BAR, 2 FLY, 2 BAT
    - MLML Restrictions:
        - Volunteer anglers were permitted
        - Decreased volunteer anglers 12-6 and science crew 6-4
        - 2 BAR, 2 FLY, 2 BAT
    - Cal Poly Restrictions:
        - Volunteer anglers were permitted
        - Decreased volunteer anglers 12-6 and science crew 5-3
        - 2 BAR, 2 FLY, 2 BAT
    - UCSB Restrictions:
        - Volunteer anglers were permitted
        - 6-10 volunteer anglers/deckhands and 4-5 science crew
    - SIO Restrictions:
        - Volunteer angles were NOT permitted, UCSD students served as anglers
        - Decreased volunteer anglers from 15-6 and crew from 6-3
- Species Table:
    - 4 new species added to 'Fish Species Table':
        1. BSK – Big Skate
        2. GSB – Giant Sea Bass
        3. SRG – Sargo
        4. STS – Starry Skate

- Drift Information Table:
    - Added new column, 'SBT Tail Length (in)' to keep track of SBT tail lengths used in each drift
    - Updated format in column 'SBT Head Weight (oz)' to include 2 decimal places as oppose to none. SBT head weight was most likely rounded to whole number in previous years.
- General Gear Type Updates:
    - SIO updated their shrimp fly hook size from 4/0 to 5/0
    - SIO and UCSB now use the same SBT head/hook manufacturer
    - BML changed their 4/0 Shrimp flies to 5/0 this year (only used 4/0 in 2019)

2021 Data Update: Provided by Rachel Brooks

An Access Database template was provided by Rachel Brooks for all groups to fill in with their data, and then merged into a cohesive database that includes data from 2007 to 2021. Each vessel worked with reduced loads this season as a result of the ongoing COVID-19 pandemic. Details are outlined below:

- COVID-19 Restrictions:
    - HSU - Volunteer anglers permitted. Fished with full crew.
    - BML - Volunteer anglers permitted. Continued to run trips at reduced loads. Increased angler count slightly to 5-9 anglers per trip.
    - MLML - Volunteer anglers permitted. Continued to run trips at reduced loads. Increased angler count slightly to 8-9 anglers per trip.
    - Cal Poly - Volunteer anglers permitted. Continued to run trips at reduced loads. Increased angler count slightly to 5-9 anglers per trip.
    - UCSB - Volunteer anglers permitted. Continued to run trips at reduced loads. Increased angler count slightly to 9-14 anglers per trip.
    - SIO - Volunteer angles were NOT permitted; UCSD students, staff, and faculty served as anglers. Angler count slightly increased to 6-9 anglers per trip.
- 2 New species added to 'Fish Species' Table:
    - FST - Finescale triggerfish (*Balistes polyepis*)
    - SUN - Ocean Sunfish (*Mola mola*)
- BML had difficulty securing red/red and red/white shrimp flies for the 2021 season and had to supplement their supply with green and purple flies. Hook size remained the same (5/0).
- Previous to 2021, HSU has been recording their shrimp fly teaser catches from both the swimbait gear type (SPT) and lead bar gear type (BAR) under the FLY gear type, thus inflating the catches under the FLY gear type. In 2021, we decided to introduce two different new gear type categories in the 'Caught Fishes' Table, so that HSU can continue to record these teasers separately from the fishes caught solely by the FLY station. These new gear categories include: SFS (shrimpfly swimbait) and SFB (shrimpfly bar) and are only used by HSU. This new designation allows us to group SFB and BAR caught fishes from HSU and makes them comparable with other monitoring groups that don't differentiate the hooks on the BAR gear type.

Supplementary Figures:

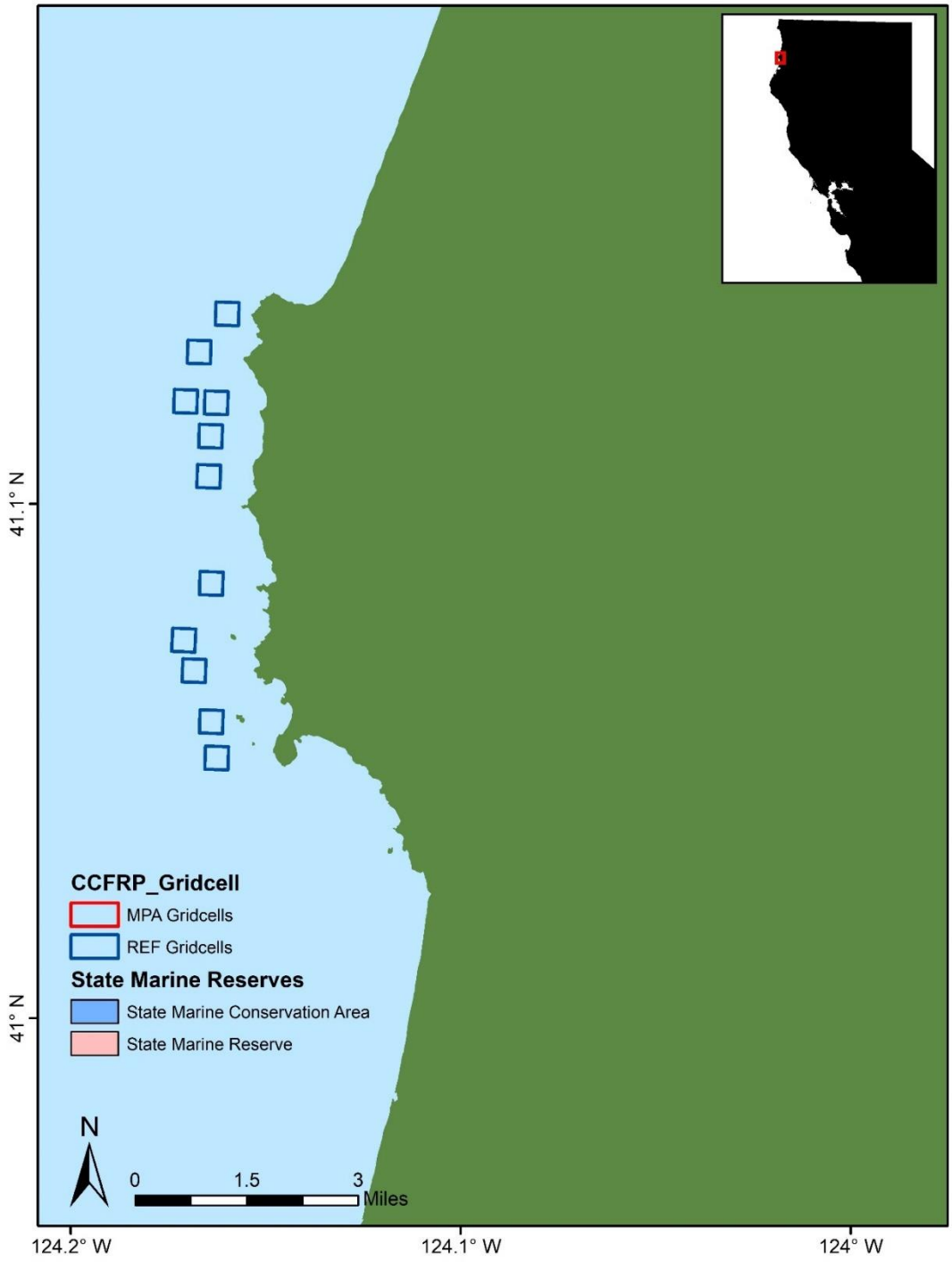


Figure S1: The 500 m x 500 m survey grid cells, which delineate the reference sites for Trinidad reference area.

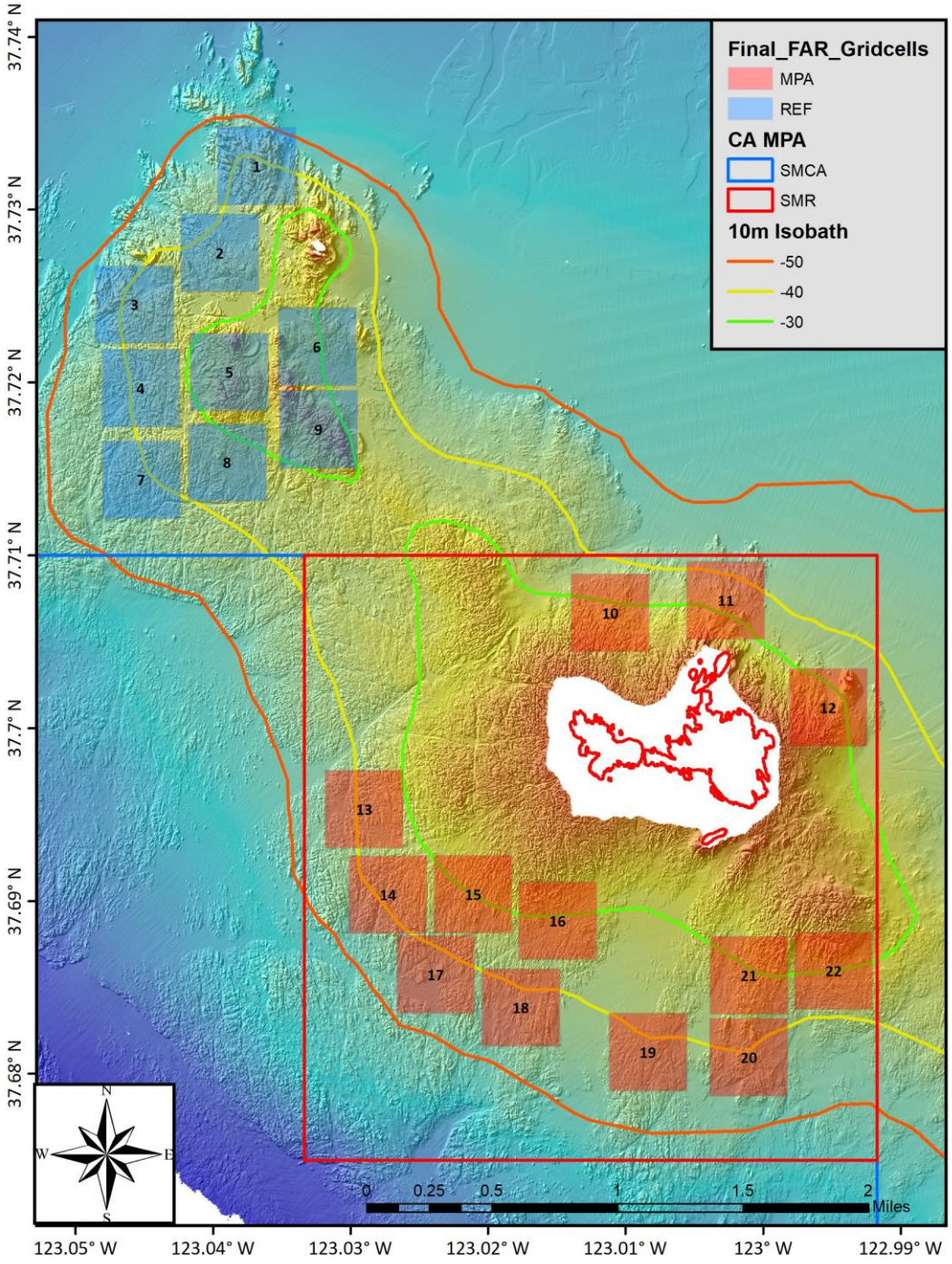


Figure S2: The 500 m x 500 m survey grid cells, which delineate the marine protected area and corresponding reference sites for SE Farallon Islands State Marine Reserve.

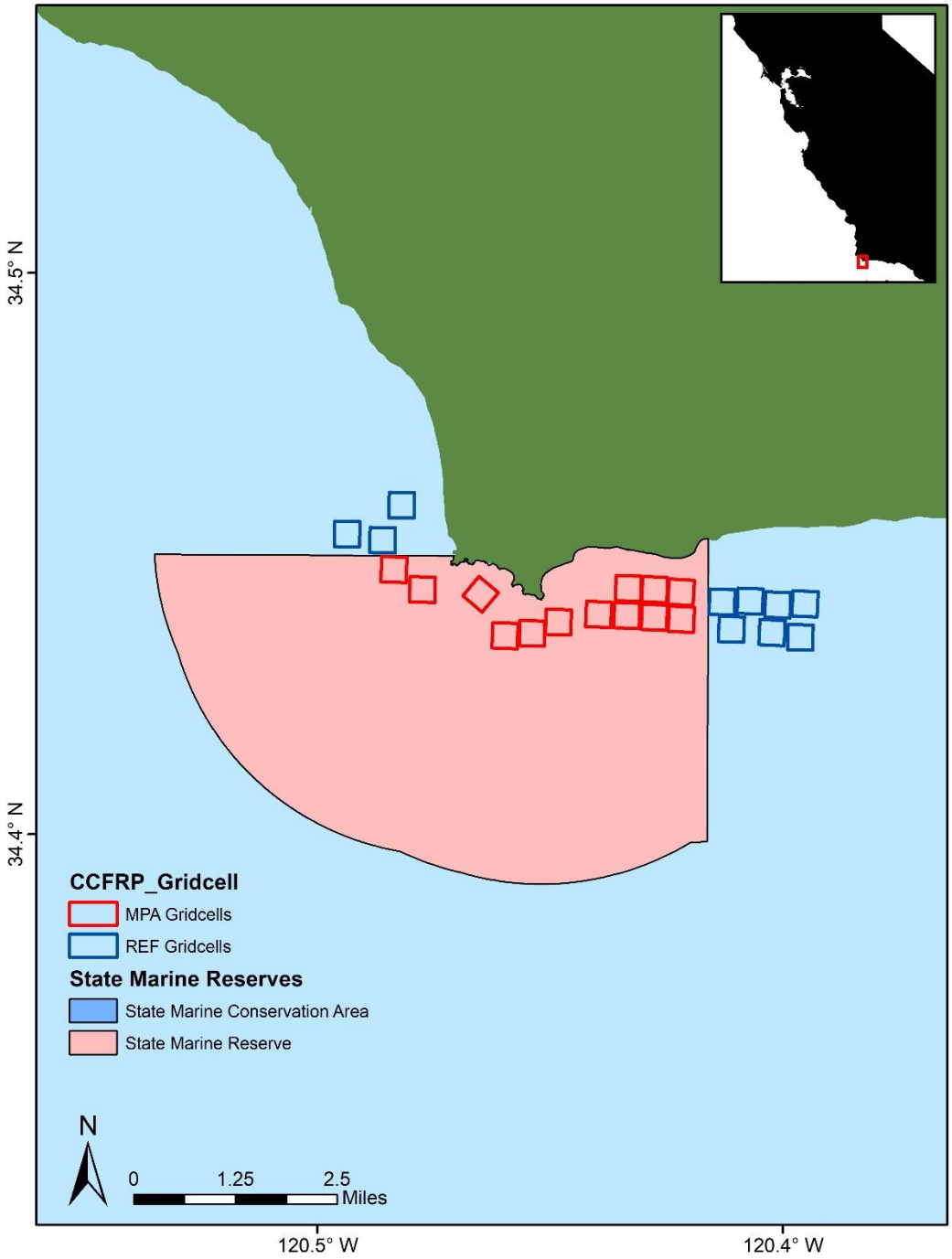


Figure S3: The 500 m x 500 m survey grid cells, which delineate the marine protected area and corresponding reference sites for Point Conception State Marine Reserve.

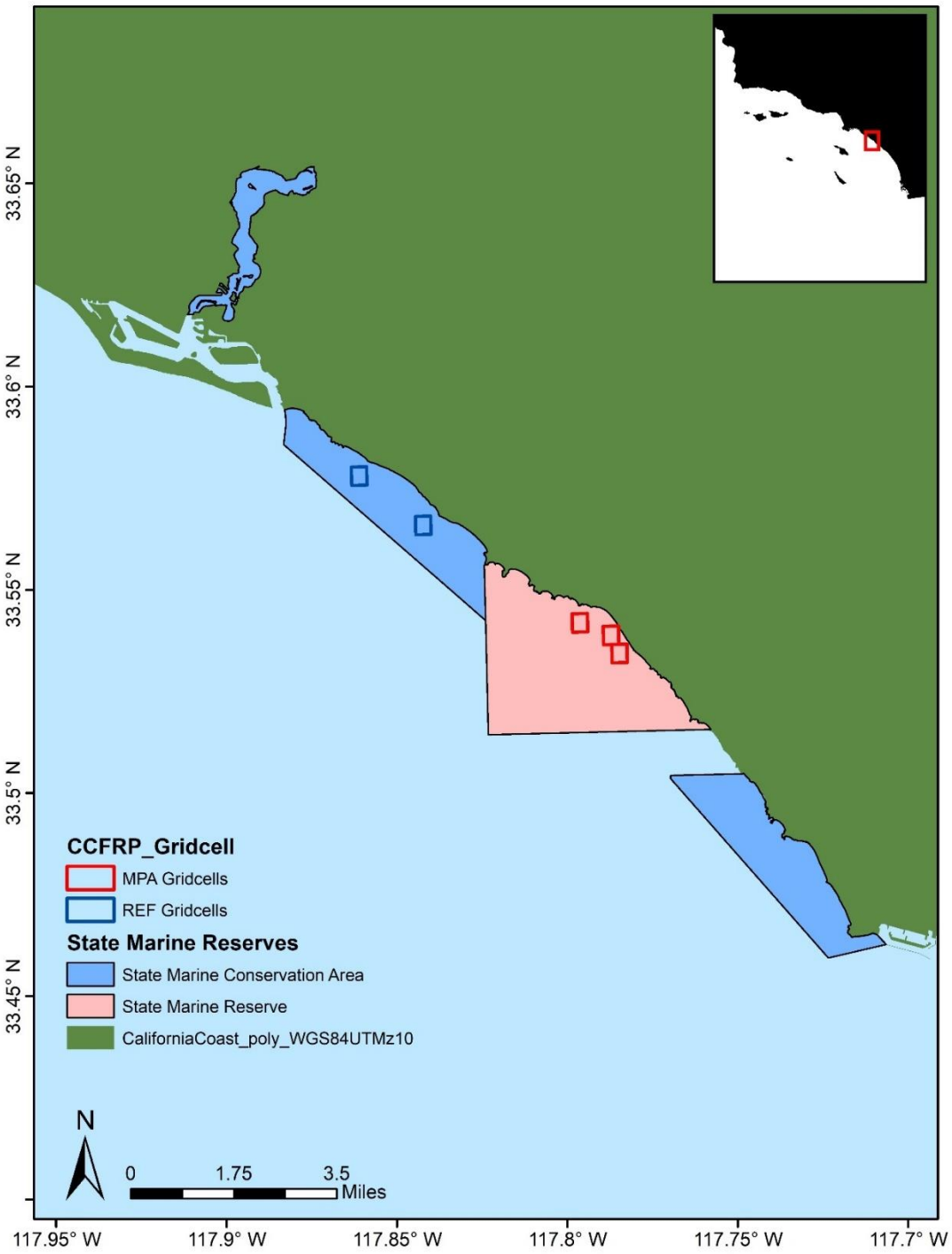


Figure S4: The 500 m x 500 m survey grid cells, which delineate the marine protected area and corresponding reference sites for Laguna Beach State Marine Reserve and State Marine Conservation Area.