G.3

MLPA Science Advisory Team
17 March 2009
Ecotrust Survey Methods and Summary Statistics for the SCSR Fishery Uses and Values Project

Survey Methods and Summary Statistics
for Ecotrust's South Coast Study Region Fishery Uses and Values Project
Draft, 17 March 2009

Astrid Scholz, ajscholz@ecotrust.org, Sarah Kruse, Charles Steinback, Jon Bonkoski,
Mike Mertens and Leanne Weiss

1. BACKGROUND

In California, as elsewhere on the Pacific Coast, commercial and recreational fisheries support coastal communities and economies. Fisheries are prosecuted by vessels of all shapes and sizes, using a variety of gear types and fishing strategies and covering a large part of the coastal ocean. In general, this spatial component of fishing activities is poorly understood.

While a variety of data are collected by state and federal agencies to monitor and enforce fishery regulations and set harvest allocations, the thematic, temporal and spatial resolution of these data vary considerably. Data types include agency observer data, voluntary reports, mandatory daily logbooks with detailed location information, and landing receipts using large statistical reporting blocks, among others. With marine and fisheries management becoming more focused on ecosystem-based approaches and the use of tools such as time and area closures, accurate spatial information about coastal fisheries is central to informing policy decisions.

Clearly, basing management decisions on the spatial information contained in these existing data sources is problematic. The alternative is to collect new information on the spatial extent of fishing activities and the fishermen who are actively engaged in these fisheries. In the absence of comprehensive observer coverage, vessel monitoring systems or other fishery-independent data collection devices, by far the best source of information about the fishing grounds is the fleet itself.

In this project, therefore, we built on existing approaches to collect fishermen's expert knowledge about the fishing grounds. The goal was to develop maps of the fishing grounds and characterize their relative importance for various fisheries.

In order to conduct an analysis of the relative effects of MPA proposals on commercial and recreational fisheries that are conducted in the waters in the South Coast Study Region (SCSR), we use data layers characterizing the spatial extent and relative stated importance of fishing grounds for target commercial and recreational fisheries. This information was collected during interviews with commercial and recreational fishermen from the SCSR whose individual responses regarding the relative importance of ocean areas for each fishery were standardized using a 100-point scale and normalized to the reported fishing grounds for each fishery.

The following sections contain detailed descriptions of the survey methods used to redress the spatial information gaps in commercial fisheries in the context of the Marine Life Protection Act (MLPA), and its implementation in the SCSR.

2. METHODS

In May 2008, before commencing interviews, Ecotrust staff conducted a series of outreach meetings with members of the fishing community to provide a project overview, answer questions, raise general awareness and solicit potential interview participants and port liaisons. In addition, Ecotrust staff made follow-up phone calls, met with port liaisons, provided information (i.e. handouts, Frequently Asked Questions (FAQs) and power points) for fishing organizations/associations to use at meetings and/or on blogs, websites and discussion boards. The project was also described on a web page, at http://www.ecotrust.org/mlpa, which included an on-line form for submitting questions and a (FAQ) page where submitted questions were answered by Ecotrust staff.

Commercial fishermen were identified based on California Department of Fish and Game (CDFG) data. More specifically, we used CDFG landing statistics to identify fishermen to interview about the fishing grounds for each of the target commercial fisheries. Given the expert nature of the information we were interested in for this project, the use of a random sample was not the most desirable sampling method. Instead, we constructed a purposive, proportional quota sample that was designed to be representative of the fisheries overall. CDFG staff generated a list of fishermen by landings and we inspected this list to identify participants such that, based on the population within the fishery groupings and port-groups, the sample would represent:

-   At least 50% of the total landings and/or ex-vessel revenue from 2000–07; and
-   At least five fishermen, except in cases where the sample population is fewer then five.

After commercial fishermen were identified, port liaisons and Ecotrust staff initiated contact with individuals to ask for their participation in the process and to schedule a time for the interview. During the interview process, commercial fishermen were asked if they knew other commercial fishermen who they felt either should be interviewed or would be interested in being interviewed.

In consultation with Marine Life Protection Act Initiative (MLPAI), CDFG staff and fishermen in the region, we selected key commercial fisheries on which to focus our efforts (see Appendix A). These are all fisheries that are at least partially conducted in state waters, are of economic importance in the study region, mostly involve fishing gear that is expected to have some benthic habitat interactions, and are not well captured spatially by existing fisheries-independent data sets. That is to say, the best fishery-independent spatial information available for them is contained in the statistical blocks reported in landing receipts. In the case of the SCSR, nine key fisheries were selected (i.e. coastal pelagic seine, live bait, lobster trap, nearshore rockfish hook and line, nearshore rockfish trap, rock crap trap, spot prawn trap, squid seine and urchin diving), although results also are reported here for 22 other SCSR commercial fisheries.

Recreational fishermen, with the exception of commercial passenger fishing vessel (CPFV) operators, were selected through a solicitation for volunteers. More specifically, Ecotrust staff conducted a series of outreach meetings, worked with key leaders in the recreational community, met with port and sector liaisons, etc. Outreach to CPFV operators was done through a sector liaison who worked with associations, owners and operators to identify and contact individuals participating in this sector. A number of factors, including the unknown overall size of the SCSR recreational fishing community by mode, geography, and demographics, and the time constraints imposed on the project, made the use of this sampling methodology the most practical. Recreational fishermen interested in participating in the interview process were asked to sign up using surveymonkey.com or by contacting an Ecotrust staff member.

The interview process varied by sector; commercial fishermen were interviewed in-person using a desktop version of custom-built GIS application known as Open OceanMap[1] as were the CPFV operators. Recreational interviews were done using a web-based version of Open OceanMap.

As mentioned above, recreational fishermen interested in participation were asked to sign up either on-line or by phone. Sign-up was open both before and during the survey process. An initial Email communication was sent in June to individuals already signed up to let them know about the process. This was followed by an Email containing account activation information (i.e. an individual username and password). Throughout the process, Ecotrust staff responded to questions by phone and Email and posted frequently asked questions to an FAQ page specific to the web-based tool. Reminder Emails were sent to individuals who had not activated or completed their survey by a set date and sector liaisons and key members of the recreational fishing community received periodic updates throughout the process on the number of responses received and the distribution of responses by user groups. Finally, at the request of the fishing community, the survey deadline was extended to accommodate additional participants.

Over the course of collecting data, we found that some participants felt the online survey was cumbersome or difficult to complete. Our staff responded quickly to requests for help and/or complaints about the survey. We realize, however, that some participants chose not to complete the survey for various reasons, including complications, connection speed, or the general difficulty of the software among others. Our decision to use the online version was to increase participation. Based on our experience in the North Central Coast Study Region, we felt we had two options—in-person or online interviews. In the North Central Coast Study Regions, the use of in-person resulted in a limited number of recreational respondents. Given the high number of recreational anglers in the SCSR, we felt the on-line interview option would allow us to reach a greater number of individuals and our results support this decision. We are using feedback received during the SCSR interview process to improve our methods and the online interview tool.

Data were entered into an Open Source GIS using Open OceanMap. Its interface allows field staff or the fisherman to enter fishing grounds directly into a spatially enabled database, and standardize this information across a number of respondents or fisheries. It is programmed to allow fishermen to draw shapes in their natural

---

[1] For more information on Open OceanMap, see http://www.ecotrust.org/ocean/OpenOceanMap.html

sizes (polygons) rather than confining responses to a statistical grid and/or political boundaries. Although data are later summarized to a variety of different raster outputs for the subsequent analysis, the raw data are entered in natural shapes and at whatever spatial scale makes sense to respondents.

All interviews follow a shared protocol:
1. Maximum extent: Using electronic and paper nautical charts of the area, fishermen are asked to identify, by fishery, the maximum extent north, south, east and west they would forage or target a specie(s).
2. Scaling: They are then asked to identify, within this maximum forage area, which areas are of critical economic importance, over their cumulative fishing experience, and to rank these using a weighted percentage—an imaginary "bag of 100 pennies" that they distribute over the fishing grounds.
3. Non-spatial information pertaining to demographics and basic operations was also collected.

The first step establishes the maximum extent of the fleet in each fishery. This differs for all fisheries, some of which range far along the entire West Coast, while others are confined to inshore waters. In the subsequent analysis this allows us to distinguish between fisheries that take place wholly in the MLPAI SCSR from others that take place both inside and outside. When respondents provide the extent of their fishing grounds they are not constrained to just state waters or any other political or management boundary, this allows for further analysis regarding which fisheries occur wholly or partially in a given area regardless of its designation.

The second step serves to scale respondents' reporting of the relative importance of the fishing grounds to a common scale. This is important for making inter and intra fishery comparisons. We chose 100 pennies as an intuitive common sum scale for scoring the relative importance of subareas identified within the larger fishing grounds. It also provides us with a convenient accounting unit for aggregating the stated importance per unit area in the intermediary steps of the various analyses performed.

The non-spatial information related to demographics and basic operations is helpful in creating summary statistics and estimating basic operating costs (a necessary component of the socioeconomic impact assessment).

Throughout the project we strove to protect the confidentiality of the information provided by fishermen. In addition to obtaining the explicit consent of individual participants, we undertook several additional steps for protecting sensitive information. These included training field staff on confidentiality protocols, masking all names and identifying characteristics of shapefiles; incorporating new security features into OceanMap; showing draft aggregated maps for each fishery to no one outside the fishing community for review; developing a mechanism for incorporating the information into the MarineMap at sufficiently aggregated levels; and devising a display format that maintains the information content without making it visible (individual fishermen information), for use in stakeholder group meetings. MarineMap is a web-based decision support tool developed to enable stakeholders to visualize geospatial data layers, draw prospective MPA boundaries with attributed information, assemble prospective MPA boundaries into arrays, share MPA boundaries and arrays with other users, and generate graphs and statistics to evaluate MPAs using science-based guidelines.

Quality assurance and quality control (QAQC) involved a four step process:
1) editing of shapes by Ecotrust staff based on notes from interviews and when required to standardize the data (e.g. clipping a shape to the shoreline);
2) review by each participant of his/her individual maps and information;
3) review by the fishing community, though multiple group meetings, to verify aggregated results; and
4) coordination with fishing community to ensure confidentiality of any publicly displayed information.

3. Summary Statistics
During the summer and fall months of 2008 (June through October), Ecotrust personnel and field staff interviewed 254 commercial and 119 commercial passenger fishing vessel (CPFV). Additionally, 504 recreational fishermen along the Southern California coast responded to the online version of the survey. The following sub-sections highlight survey findings.

3.1 Commercial
We encountered varying success in achieving a sample that met the criteria outlined above. Priority fisheries are highlighted in bold in the tables below (i.e. coastal pelagics – seine, lobster – trap, nearshore fishery – hook& line, nearshore fishery – trap, rock crab – trap, spot prawn – trap, and squid –seine) and the majority of them exceed the 50% goal (see Table 1). The live bait fishery is not included in Table 1 because landings are not tracked for this fishery. These commercial fisheries were considered priority fisheries (highlighted in bold in both Table 1 & 2)

in terms of our data collection effort because of their economic value to the study region and they primarily occur inside state waters.

Table 1 captures the percentage of ex-vessel revenue (2000-07) that our sample represents for each fishery in each port. Of the priority fisheries, the overall representation for the study region was highest for spot prawn – trap (88%), followed by lobster – trap (71%), then the nearshore trap fishery (65%), coastal pelagic – seine (58%), rock crab – trap (58%), urchin – dive (47%), squid – seine (43%), and the nearshore hook & line fishery (38%). The overall representation for the entire study region was 47% of ex-vessel revenue. By port the highest representation was in Oceanside (80%), followed by Dana Point (70%), Santa Barbara (52%), San Pedro (51%), San Diego (47%), Ventura (40%), and Port Hueneme (32%). The percentage representation varies across ports for each fishery, but the consistently high representation overall is a reflection of the number responses captured for the higher value fisheries in the study region (i.e. priority fisheries). It was easier to achieve a greater percentage of the ex-vessel landings in the smaller ports of Oceanside and Dana Point because there are fewer fishermen in these ports.

Table 2 summarizes the number of fishermen interviewed who landed greater than 10% of their catch per fishery (2000-07) in each port. For example, we interviewed six fishermen who landed lobster in Oceanside, which comprised 81% of the ex-vessel revenue (2000-07) for that fishery in Oceanside, compared to thirty fishermen who landed lobster in San Diego, which comprises 72% of the ex-vessel revenue for that same period. In both cases, we exceeded our sampling criteria, but because there are considerably more landings and fishermen in San Diego, it took a greater number of interviews to reach our target of 50%. In total, we interviewed 254 commercial fishermen. The following fisheries received the highest number of responses: lobster trap (101), urchin diving (76), rock crab trap (47), market squid seine (30), coastal pelagic seine (25) and nearshore fishery trap (25). These numbers and those in Table 2 are not mutually exclusive, in that a fisherman often participates in more than one fishery. In general, this breakdown of fishermen interviewed per fishery matches the overall distribution of fishermen and value of the fisheries in the SCSR, as shown in Appendix A.

Table 1: Percentage the sample represents based on ex-vessel revenue (2000-07)

Fishery	Santa Barbara	Ventura	Port Hueneme	San Pedro	Dana Point	Ocean-side	San Diego	SCSR
California Halibut (Hook & Line)	25%	19%	26%	1%	—	—	—	12%
California Halibut (Set Gillnet)	0%	0%	0%	10%	—	0%	0%	3%
California Halibut (Trawl)	9%	0%	0%	0%	—	—	—	4%
Coastal Pelagics (Seine)	**—**	**—**	**54%**	**59%**	**—**	**—**	**—**	**58%**
Coastal Pelagics (Brail)	—	—	—	54%	—	—	—	53%
Deep Nearshore Fishery (Hook & Line)	22%	12%	47%	17%	—	—	79%	32%
Hagfish (Trap)	0%	0%	0%	25%	—	—	—	10%
Lobster (Trap)	**71%**	**87%**	**77%**	**52%**	**78%**	**81%**	**72%**	**71%**
Nearshore Fishery (Hook & Line)	**49%**	**7%**	**17%**	**12%**	**—**	**—**	**70%**	**38%**
Nearshore Fishery (Trap)	**47%**	**84%**	**34%**	**53%**	**80%**	**68%**	**87%**	**65%**
Pacific Bonito (Seine)	—	—	0%	78%	—	—	—	69%
Rock Crab (Trap)	**62%**	**69%**	**45%**	**46%**	**67%**	**22%**	**58%**	**58%**
Sablefish (Longline)	—	—	0%	51%	20%	100%	41%	43%
Salmon (Troll)	19%	51%	0%	0%	—	—	—	20%
Sea Cucumber (Diving)	38%	17%	35%	35%	—	—	44%	33%
Sea Cucumber (Trawl)	3%	0%	0%	0%	—	—	—	2%
Shark (Drift Gillnet)	61%	2%	—	0%	—	—	0%	8%
Shark (Hook & Line)	1%	0%	—	0%	0%	—	19%	4%
Spider Crab (Trap)	1%	0%	3%	5%	0%	—	1%	4%
Spot Prawn (Trap)	**89%**	**83%**	**72%**	**95%**	**85%**	**100%**	**96%**	**88%**
Squid (Brail)	—	—	27%	35%	—	—	—	35%
Squid (Seine)	**11%**	**40%**	**24%**	**57%**	**—**	**—**	**—**	**43%**
Swordfish (Drift Gillnet)	60%	0%	—	4%	—	—	2%	3%
Swordfish (Harpoon or Spear)	—	—	—	9%	52%	14%	18%	23%
Thornyhead (Longline)	—	—	0%	74%	63%	99%	89%	64%
Tuna (Seine)	—	—	—	2%	—	—	—	2%
Urchin (Diving)	**50%**	**—**	**41%**	**44%**	**66%**	**97%**	**53%**	**47%**
Whelk (Trap)	0%	—	—	4%	0%	—	93%	21%
White Seabass (Gillnet) - both types	53%	8%	0%	14%	—	0%	4%	18%
White Seabass (Hook & Line)	0%	0%	67%	0%	—	—	11%	25%
Total (Based on just the above fisheries)	52%	40%	32%	51%	70%	80%	47%	47%

Table 2: Summary of the number of fishermen interviewed by landing port

Fishery	Santa Barbara	Ventura	Port Hueneme	San Pedro	Dana Point	Ocean-side	San Diego	SCSR	SCSRU
California Halibut (Hook & Line)	6	2	4	0	—	—	—	9	8
California Halibut (Set Gillnet)	0	0	0	1	—	0	0	1	1
California Halibut (Trawl)	3	0	0	0	—	—	—	3	3
Coastal Pelagics (Seine)	—	—	5	22	—	—	—	25	22
Coastal Pelagics (Brail)	—	—	—	2	—	—	—	4	2
Deep Nearshore Fishery (Hook & Line)	4	0	1	1	—	—	1	7	7
Hagfish (Trap)	0	0	0	2	—	—	—	5	2
Lobster (Trap)	22	7	8	12	23	6	30	101	96
Nearshore Fishery (Hook & Line)	8	0	3	1	—	—	2	14	12
Nearshore Fishery (Trap)	4	3	2	3	3	2	10	25	21
Pacific Bonito (Seine)	—	—	0	6	—	—	—	7	6
Rock Crab (Trap)	18	5	3	7	5	3	11	47	45
Sablefish (Longline)	—	—	0	4	3	4	0	4	4
Salmon (Troll)	3	1	0	0	—	—	—	5	5
Sea Cucumber (Diving)	6	2	8	5	—	—	2	22	17
Sea Cucumber (Trawl)	3	0	0	0	—	—	—	4	3
Shark (Drift Gillnet)	2	0	—	0	—	—	0	2	2
Shark (Hook & Line)	1	0	—	0	0	—	2	3	3
Spider Crab (Trap)	1	0	1	2	0	—	1	4	4
Spot Prawn (Trap)	1	1	1	6	4	3	3	16	13
Squid (Brail)	—	—	0	17	—	—	—	22	17
Squid (Seine)	0	16	14	29	—	—	—	30	30
Swordfish (Drift Gillnet)	1	0	—	1	—	—	2	4	3
Swordfish (Harpoon or Spear)	—	—	—	0	2	0	1	3	3
Thornyhead (Longline)	—	—	0	3	3	4	0	4	4
Tuna (Seine)	—	—	—	2	—	—	—	3	2
Urchin (Diving)	31	—	14	29	3	1	10	76	74
Whelk (Trap)	0	—	—	2	0	—	4	6	4
White Seabass (Gillnet) - both types	3	1	0	3	—	0	1	7	7
White Seabass (Hook & Line)	0	0	1	0	—	—	1	2	2
Live Bait - Coastal Pelagics	0	0	0	5	1	1	4	11	11
Total	63	28	47	103	31	12	52	254	

For analytical purposes we chose to group fishermen by their port(s) of landing (Table 2) versus their homeport (Table 3). We did this because the landings information is limited to where fishermen land their catch, thus making it difficult to estimate the total number of fishermen per home port. We can estimate, however, the total number of fishermen and ex-vessel revenue for each fishery based on landing port, which is what we use to derive our sample. Additionally, when fishermen provide their fishing grounds during the interview, their response not restricted to where they land or what they consider as a homeport, but rather, it is based on the entire extent of their fishing grounds and cumulative fishing experience. During the interview process we ask each fisherman to identify his/her homeport, which is summarized in Table 3. For example, when comparing the number fishermen per homeport versus landing port, out of the 254 fishermen whose information we used, 23 considered Dana Point to be their homeport, but according to the landings receipts, 31 of the 254 fishermen landed in Dana Point in the 2000-07 period across all fisheries considered.

It should also be noted that not all of the information collected from the 254 respondents was used. There are cases where a fisherman provided information for a particular fishery, but was not detected when compared to the CDFG landing receipts (2000-07). Since ex-vessel value from the CDFG landing receipts form the basis for weighing an individual fisherman's fishing grounds in the aggregated fishing grounds analysis, those without landings information would effectively decrease the value of the aggregated grounds. This difference in total

number of fishermen interviewed and those actually used is reflected in Table 2, Columns SCSR and SCSRU. For example, we interviewed 101 fishermen that provided information for the lobster – trap fishery, but we only consider 96 of them in our analysis due to lack of landings information for five fishermen who provided shapes for this fishery[2].

By port group, San Pedro had the highest number of respondents, with 77 respondents citing it as their homeport. The average respondent was a 50 year old male with 27 years of fishing experience. The majority of respondents (75%) reported 100% of their income comes from fishing. Table 2 shows a breakdown of respondents by homeport and Table 4 shows survey responses broken out by gear type and by fishery.

Table 3: Survey representation by port grouping

	Number responding	Age		Years experience		Income from fishing (%)	
		Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Santa Barbara	56	52	52	28	30	91%	100%
Ventura	12	48	46	28	25	99%	100%
Port Hueneme	19	53	52	30	30	93%	100%
San Pedro	77	49	49	25	25	89%	100%
Dana Point	23	51	50	27	21	88%	100%
Oceanside	8	49	51	26	30	75%	100%
San Diego	50	49	48	24	26	86%	100%
Outside Study Region	4	49	46	33	31	98%	100%
No Homeport Given	5	—	—	—	—	—	—
SCSR	254	50	50	26	27	90%	100%

---

[2] Exact cause or reason for a given fisherman's information not present in the CDFG landing receipts is unknown. Possible reasons among others, may include: they are retired or haven't made landings in the time period we considered, they do not target and/or make landings for a fishery they provided information for, information is misreported in CDFG landings receipts.

Table 4: Survey results by gear type and fishery

	Number Sampled	Age mean	Age median	Gender Male	Gender Female	Years experience fishing mean	Years experience fishing median	Income from fishing (%) mean	Income from fishing (%) median	Income from specific fishery (%) mean	Income from specific fishery (%) median	Vessel Length (ft) mean	Vessel Length (ft) median	Haul capacity (lbs) mean	Haul capacity (lbs) median
Dive	**76**	**52**	**52**	**99%**	**1%**	**28**	**29**	**94%**	**100%**	**—**	**—**	**31**	**32**	**7,220**	**5,000**
Sea Cucumber	22	51	53	100%	0%	26	28	91%	100%	31%	23%	34	36	9,193	6,000
Urchin	76	52	52	99%	1%	28	29	95%	100%	85%	100%	31	32	7,076	5,000
Trap	**115**	**49**	**49**	**99%**	**1%**	**24**	**22**	**88%**	**100%**	**—**	**—**	**31**	**30**	**8,055**	**2,000**
Hagfish	5	48	49	100%	0%	6	2	67%	100%	46%	40%	36	37	9,000	9,500
Lobster	101	48	49	99%	1%	25	24	88%	100%	—	—	29	29	5,457	2,000
Nearshore Fishery	25	44	46	100%	0%	24	22	96%	100%	17%	10%	33	32	8,729	2,361
Rock Crab	47	48	48	100%	0%	24	22	96%	100%	26%	18%	32	32	7,550	2,132
Spider Crab	4	40	40	100%	0%	19	17	100%	100%	19%	18%	25	25	2,090	1,954
Spot Prawn	16	49	47	100%	0%	27	25	99%	100%	66%	66%	43	42	22,803	7,268
Whelk	6	42	35	100%	0%	15	13	100%	100%	25%	8%	28	25	1,946	1,361
Seine	**43**	**51**	**51**	**100%**	**0%**	**32**	**30**	**97%**	**100%**	**—**	**—**	**68**	**69**	**120,072**	**100,000**
Coastal Pelagics	25	52	50	100%	0%	32	30	100%	100%	43%	30%	71	70	155,102	140,000
Pacific Bonito	7	55	54	100%	0%	35	30	100%	100%	—	—	79	81	210,000	195,000
Squid	30	51	50	100%	0%	31	29	98%	100%	63%	70%	67	70	151,655	140,000
Tuna	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Live Bait	11	48	53	100%	0%	32	40	92%	100%	76%	100%	69	60	46,364	40,000
Brail	**24**	**44**	**43**	**100%**	**0%**	**22**	**22**	**70%**	**90%**	**—**	**—**	**45**	**44**	**39,636**	**38,000**
Coastal Pelagics	4	40	37	100%	0%	17	20	65%	63%	15%	15%	34	33	21,500	22,000
Squid	22	44	43	100%	0%	22	22	69%	90%	49%	60%	47	47	43,300	40,000
Hook & Line	**32**	**39**	**44**	**100%**	**0%**	**21**	**23**	**94%**	**100%**	**—**	**—**	**32**	**32**	**7,413**	**2,066**
California Halibut	9	47	46	100%	0%	26	25	89%	100%	32%	5%	30	27	8,794	1,567
Deep Nearshore Fishery	7	48	48	100%	0%	28	28	100%	100%	18%	10%	36	35	10,995	6,000
Nearshore Fishery	14	43	44	100%	0%	23	24	98%	100%	23%	15%	32	33	5,298	3,768
Sablefish	4	—	—	100%	0%	—	—	100%	100%	25%	25%	—	—	—	—
Shark	3	45	36	100%	0%	26	15	63%	75%	7%	5%	26	26	1,021	1,021
Thornyhead	4	—	—	100%	0%	—	—	100%	100%	75%	75%	—	—	—	—
White Seabass	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trawl	**5**	**62**	**62**	**100%**	**0%**	**40**	**38**	**97%**	**100%**	**—**	**—**	**51**	**52**	**20,800**	**18,000**
California Halibut	3	67	69	100%	0%	45	44	95%	95%	32%	32%	52	52	13,499	18,000
Sea Cucumber	4	62	64	100%	0%	41	41	99%	100%	35%	32%	51	53	21,500	12,247
Gillnet	**10**	**56**	**57**	**100%**	**0%**	**31**	**35**	**87%**	**100%**	**—**	**—**	**46**	**45**	**19,398**	**16,000**
California Halibut	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Shark	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Swordfish	4	56	57	100%	0%	26	32	76%	95%	33%	40%	52	50	31,144	19,000
White Seabass	7	58	60	100%	0%	36	36	94%	100%	31%	30%	45	46	15,270	18,000
Troll - Salmon	**5**	**57**	**54**	**100%**	**0%**	**37**	**35**	**89%**	**98%**	**18%**	**20%**	**38**	**34**	**10,061**	**8,000**
Harpoon & Spear - Swordfish	**3**	**49**	**53**	**100%**	**0%**	**32**	**30**	**67%**	**50%**	**78%**	**100%**	**41**	**42**	**7,667**	**8,000**

By gear type, trap fishermen were the largest group of respondents (109) and represented hagfish, lobster, nearshore fishery, rock crab, spider crab, spot prawn, and whelk fisheries. The trap fishery with the most respondents was lobster, with 101 respondents. Divers are the next largest gear type represented, with a total of 76 divers responding. All dive respondents participate in the urchin fishery and 22 also fish sea cucumber. Trawl respondents have the most experience of any gear type, with an average of 40 years of fishing experience. Most respondents, across all gear types and fisheries reported their entire personal income comes from fishing, with averages between 80–99%. Urchin divers reported the highest average income from a specific fishery—an average of 85% of their fishing related income comes from urchin diving. Reponses from individuals in gear type/ fishery groupings with fewer than three respondents are not shown here, in order to maintain the confidentiality of respondents' information.

3.2 Commercial Passenger Fishing Vessel (CPFV)

A total of 119 CPFV operators were interviewed by field staff. When broken out by port, San Diego has the highest percentage of respondents (29%). Additional information on respondents by port is shown below in Table 5.

Table 5: CPFV respondents by port

	# of respondents	% of total respondents
Santa Barbara	3	3%
Port Hueneme / Channel Islands Harbor	15	13%
Santa Monica	9	8%
San Pedro (LA Harbor) / Long Beach	24	20%
Newport Beach	15	13%
Dana Point	9	8%
Oceanside	10	8%
San Diego	34	29%
SCSR	119	100%

The average respondent has 25 years of fishing experience, has been operating two vessels for 16 years and has owned two vessels for 15 years. Across the entire study region, respondents reported fishing an average of 192 days per year. Respondents have an average of 26 passengers per trip and 25% of these passengers, on average, are from out of state. Average responses, by port group, are shown in Table 6.

Table 6: Mean summary statistics for CPFV respondents

	Santa Barbara	Port Hueneme	Santa Monica	San Pedro	Newport Beach	Dana Point	Ocean-side	San Diego	SCSR
Age	51	45	49	39	45	38	47	40	42
Vessel Length (ft.)	43	55	60	66	70	61	70	72	66
Number of vessels operated	1	2	1	1	2	2	3	1	2
Number of years operating	20	17	17	15	17	15	17	15	16
Number of vessels owned	1	1	1	1	4	1	4	2	2
Number of years owned	12	14	14	9	17	29	26	14	15
Years of experience	33	31	21	25	25	26	24	24	25
Days fishing per year	145	185	221	199	178	228	212	177	192
Number of passengers	12	20	23	27	32	30	29	26	26
Out of state passengers (%)	33%	18%	18%	11%	16%	31%	32%	38%	25%
Number of crew	2	3	3	3	3	3	4	4	3

Respondents were asked what percentage of their income is CPFV related and of their gross revenue, goes towards crew or labor and what percentage goes towards fuel. The SCSR average percentage of income that is CPVF related is 85%; 71% of their gross revenue goes towards operating costs, of that 21% goes towards crew and 30% goes towards fuel. Also, 66% of the respondents reported that 100% of their income is related to their CPFV operations. Table 7 shows mean and median CPFV related income for the entire study region and for each port as well as information on operating costs as a percentage of gross revenue.

Table 7: CPFV related income and operating costs

		% income	Operating costs	Labor costs	Fuel costs
Santa Barbara	Mean	78%	67%	22%	31%
	Median	100%	60%	25%	35%
Port Hueneme / Channel Islands Harbor	Mean	79%	61%	21%	25%
	Median	100%	70%	20%	25%
Santa Monica	Mean	86%	74%	20%	27%
	Median	100%	70%	20%	28%
San Pedro (LA Harbor) / Long Beach	Mean	79%	65%	25%	32%
	Median	100%	70%	23%	25%
Newport Beach	Mean	80%	62%	18%	40%
	Median	90%	60%	20%	40%
Dana Point	Mean	94%	79%	22%	25%
	Median	100%	82%	20%	28%
Oceanside	Mean	80%	62%	18%	27%
	Median	100%	60%	14%	23%
San Diego	Mean	95%	82%	21%	32%
	Median	100%	80%	21%	30%
SCSR	Mean	85%	71%	21%	30%
	Median	100%	75%	20%	26%

Fishermen were also asked what percentage of their trips was associated with each of the following five fishing strategies: offshore tuna, coastal freelance, island freelance, rockfish and miscellaneous. Over the entire study region, costal freelance was the most popular strategy (see Table 8).

Table 8: Percentage of trips associated with major fishing strategies

Strategy	Santa Barbara	Port Hueneme	Santa Monica	San Pedro	Newport Beach	Dana Point	Ocean-side	San Diego	SCSR
Offshore Tuna	2%	5%	0%	6%	16%	15%	23%	40%	18%
Coastal Freelance	24%	18%	55%	38%	37%	54%	45%	23%	33%
Island Freelance	22%	37%	11%	26%	27%	11%	4%	14%	21%
Rockfish	39%	34%	31%	24%	11%	9%	14%	16%	21%
Miscellaneous	13%	6%	2%	6%	9%	11%	13%	7%	8%

Respondents were also asked to identify their primary trip type (charter or open party) and typical trip length. The majority of respondents in the SCSR (54%) operate open party trips. Within the SCSR, trip length is split fairly even between 1/2 day (27%), 3/4 day (24%), and overnight/multi-day trips (30%), although the overnight/multi-day trip length is more typically of San Diego CPFV fleet (62%) when compared with other ports in the region. The next closest is half of that, which is Oceanside at 30%. The other ports in the region as you head north up the coast seem to favor 1/2 day and 3/4 day trip length. Additional information on trip type and length is reported on Table 9.

Table 9: CPFV trip type and trip length

		Santa Barbara		Port Hueneme		Santa Monica		San Pedro		Newport Beach		Dana Point		Oceanside		San Diego		Total	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Trip Type	Charter	2	67%	9	60%	2	22%	6	25%	2	13%	1	11%	2	20%	13	38%	37	31%
	Open Party	0	0%	5	33%	7	78%	17	71%	8	53%	6	67%	6	60%	15	44%	64	54%
	No response	1	33%	1	7%	0	0%	1	4%	5	33%	2	22%	2	20%	6	18%	18	15%
	Total	3	100%	15	100%	9	100%	24	100%	15	100%	9	100%	10	100%	34	100%	119	100%
Trip Length	1/2 Day	0	0%	1	7%	5	56%	9	38%	6	40%	2	22%	2	20%	7	21%	32	27%
	3/4 Day	1	33%	4	27%	2	22%	7	29%	2	13%	5	56%	3	30%	5	15%	29	24%
	All Day	0	0%	6	40%	0	0%	1	4%	2	13%	1	11%	1	10%	1	3%	12	10%
	Overnight/ Multi-day	0	0%	1	7%	0	0%	6	25%	4	27%	1	11%	3	30%	21	62%	36	30%
	No Response	2	67%	3	20%	2	22%	1	4%	1	7%	0	0%	1	10%	0	0%	10	8%
	Total	3	100%	15	100%	9	100%	24	100%	15	100%	9	100%	10	100%	34	100%	119	100%

3.3 Recreational
As mentioned previously, recreational fishermen were asked to complete an on-line survey, which identified them by key user groups. The recreational fishing community was stratified into four key user groups:
- Private boat anglers;
- Kayak-based anglers;
- Dive/Spear anglers; and
- Pier/Shore anglers.

Recreational fishermen had the opportunity to register and complete the survey for multiple user groups (e.g. private vessel and dive), and the 504 respondents generated 806 survey responses. Table 10 shows the number of user groups completed by each fisherman. The majority of respondents (55%) completed a survey for a single fishery, while only 2% of respondents completed the survey for all four user groups.

Table 10: Number of user groups completed per respondent

#of user group surveys completed	# of respondents	% of respondents
1	279	55%
2	160	32%
3	53	11%
4	12	2%

Participants also were asked to estimate what percentage of their total fishing time they spend in each user group considered in the survey. For example, if someone participates in both kayak angling and dive angling, he might record that he spends 60% of his time kayaking angling and 40% of his time dive angling. The group assigned the largest percentage of each individuals time is considered his/her primary user group. Table 11 shows the number of completed surveys by user group.

Table 11: Response statistics

User group	Total surveys	Primary (%of total)[3]
Dive	168	23%
Kayak	170	22%
Pier/shore	174	8%
Private	294	47%
Total	504	—

Using the 504 fishermen who responded to the surveys, the average recreational fishermen is male, 43 years old, has 19 years of fishing experience and fishes 41 days per year per user group. On average, kayak respondents had the least amount of fishing experience (6 years) and pier/shore respondents had the most (29 years). Dive respondents were, on average, younger than those in other user groups (38 years old) and private vessel respondents were the oldest (46 years old). Pier/shore respondents fished the least number of days per year (an average of 20 days) while kayak respondents fished the most (an average of 36 days).

3.3.1 Dive
Based on responses provided by survey participants, the average dive angler is a 38 year old male, which is slightly younger than the average across all user groups (i.e. 43 years old), has 15 years experience and dives (to fish) 38 days per year. In addition, the majority of respondents stated that they are shore based free divers who use a private vessel as their primary access method. Additional information on dive respondents is provided in Table 12.

---

[3] Percentages do not add up to 100% because three respondents did not report a primary user group for one of their fisheries.

Table 12: Dive survey response statistics

Age:	Median	39
	Mean	38
Years experience:	Median	18
	Mean	15
Average annual number of days diving (to fish):	Median	43
	Mean	38
% time by dive type:	Shore based	70%
	Island based	30%
Primary mode of diving:	Free	80%
	Scuba	20%
Primary access method[4]	Swimming	38%
	Private boat	49%
	Kayak	11%
	CPFV	3%

Divers were also asked to qualitatively describe their level of experience. More specifically, they were asked to select one of the following choices: beginner, intermediate, advanced. No description of these choices was provided. Results show that the majority of respondents considered themselves advanced divers. In addition, the average years of experience stated by a diver considering himself/herself "advanced" was 25 years (see Table 13).

Table 13: Divers experience level and years of experience

Experience level	# of respondents	% of respondents	Average years experience
Beginner	9	5%	7
Intermediate	69	41%	9
Advanced	90	54%	25

3.3.2 Kayak

The average kayak respondent is a 43 year old male, who has six years of kayak angling experience, and fishes from a kayak 36 days per year. Additional information regarding these statistics is shown in Table 14.

Table 14: Kayak survey response statistics

Age:	Median	43
	Mean	42
Years experience:	Median	5
	Mean	6
Average annual number of days kayaking (to fish):	Median	41
	Mean	36

Survey participants were asked to list up to four launch ports or access points in order of primary usage. The most popular launch/access site among kayak user group respondents was La Jolla, with 121 respondents (~71%) citing it among their top four. In total, over 40 unique kayak launch/access sites were indicated by respondents. The top launch sites (by total) are shown below in Table 15. It should be noted that individuals were not required to list the four launch/access sites used most frequently but rather, were given the option of listing up to four. The number of individuals not reporting a second, third or fourth launch/access site is provided as "did not report". It should also be noted that the specific locations provided by respondents were grouped together when presented in Table 15. For example respondents who indicated, Coral Canyon Beach, Escondido Beach, or Dan Blocker

---

[4] Column may not sum to 100% due to rounding.

Beach were all grouped together as Malibu. Likewise, if not indicated in Table 15, the reference to the location is the beaches an shores at or near the location.

Table 15: Top kayak launch/access sites

Launch/access	1	2	3	4	Total
La Jolla	66	27	12	16	121
Malibu	18	19	21	15	73
Dana Point	17	12	13	7	49
San Diego Bay	5	15	12	6	38
Newport Beach	11	6	5	5	27
Mission Bay	2	8	9	6	25
Long Beach	4	6	3	6	19
Cabrillo Beach	11	3	1	3	18
Redondo Beach	2	5	5	5	17
San Onofre Beach	1	1	6	4	12
Ventura Los Angeles County Line	2	6	1	1	10
All others	31	39	42	28	140
Did not report	–	23	40	68	131

3.3.3   Pier/Shore

Based on responses provided by survey participants, the average pier/shore respondent is a 45 year old male, who has 29 years of fishing experience and annually pier/shore fishes 31 days per year (see Table 16).

Table 16: Pier/shore survey response statistics

Age:	Median	45
	Mean	46
Years experience:	Median	29
	Mean	30
Average annual number of days pier/shore fishing	Median	31
	Mean	20

3.3.4   Private Vessel

The average respondent for the private vessel user group is a 46 year old male, who has operated a vessel for 17 years and owned a vessel for 14 years. On average, private vessel users have 26 years of experience, and fish 41 days out of the year (as private vessel anglers). These statistics and additional information on private vessel respondents are found in Table 17.

Table 17: Private vessel survey response statistics

Age:	Median	46
	Mean	46
Years operating a vessel:	Median	17
	Mean	15
Years of vessel ownership:	Median	14
	Mean	10
Vessel length (ft.)	Median	25
	Mean	22
Years experience:	Median	26
	Mean	25
Average annual number of days fishing	Median	41
	Mean	30

Additionally, nearly all of private vessel respondents operate motor boats. Only two out of the 294 respondents reported using a sailboat. Of private vessel users, 203 reported storing their vessel on a trailer or at home, while 91 reported boat slip storage. The most popular home ports for private vessel owners reporting boat slip storage were San Diego (26), Dana Point (14), Long Beach (9), Newport (9), Huntington (7), Marina Del Rey (5), and Oceanside (4).

Private vessel respondents, like kayak user group respondents, were asked to list up to four launch sites. The most popular launch site among private vessel respondents is Mission Bay, with 145 individuals reporting it as one of their top launch sites. Other launch sites in San Diego, like Shelter Cove (87) and San Diego Bay (73) are also popular sites. Additional popular launch sites include Dana Point (76), Oceanside (50), Long Beach (49), Huntington Beach (27), and Newport Beach (27) In total, over 30 different launch sites were listed by private vessel users. A list of the top launch sites, by total, reported in the survey is found below in Table 18.

Table 18: Top private vessel launch sites

Launch/access	1	2	3	4	Total
Mission Bay (San Diego)	45	54	31	15	145
Shelter Island (San Diego)	40	27	15	5	87
Dana Point	22	20	20	14	76
San Diego Bay	19	28	18	8	73
Oceanside	19	7	17	7	50
Long Beach	24	15	6	4	49
Huntington Beach	16	6	4	1	27
Newport Beach	8	7	8	4	27
Marina Del Rey	13	4	3	3	23
Ventura	1	5	4	4	14
Channel Islands Harbor	4	5	4	0	13
Redondo Beach - King Harbor	6	3	1	0	10
Santa Barbara	7	1	1	1	10
All others	20	19	13	19	71
Did not report	50	93	149	209	501

APPENDIX A: Summary of South Coast Study Region commercial fisheries considered

Fishery	% of total SCSR fisheries revenues (2000–07 average)[5]	% of total CA statewide fisheries revenues (2000–07 average)	% of CA statewide fisheries revenues landed in SCSR (2000–07 average)
California Halibut (Hook & Line)	0%	0%	42%
California Halibut (Set Gillnet)	1%	1%	97%
California Halibut (Trawl)	1%	1%	34%
Coastal Pelagics Seine[6]	**11%**	**7%**	**74%**
Coastal Pelagics (Brail)	0%	0%	100%
Deep Nearshore Rockfish (Hook & Line)	0%	0%	24%
Hagfish (Trap)	0%	0%	45%
Lobster (Trap)	**12%**	**8%**	**100%**
Nearshore Fishery (Hook & Line)	**0%**	**0%**	**14%**
Nearshore Fishery (Trap)	**1%**	**0%**	**61%**
Pacific Bonito (Seine)	0%	0%	100%
Rock Crab (Trap)	**3%**	**2%**	90%
Sablefish (Longline)	1%	0%	19%
Salmon (Troll)	0%	0%	0%
Sea Cucumber (Diving)	1%	1%	99%
Sea Cucumber (Trawl)	0%	0%	100%
Shark (Drift Gillnet)	1%	0%	86%
Shark (Hook & Line)	0%	0%	70%
Spider Crab (Trap)	0%	0%	99%
Spot Prawn (Trap)	**3%**	**2%**	**71%**
Squid (Brail)	1%	1%	100%
Squid (Seine)	**41%**	**28%**	**86%**
Swordfish (Drift Gillnet)	3%	2%	77%
Swordfish (Harpoon or Spear)	1%	1%	100%
Thornyhead (Longline)	2%	1%	79%
Tuna (Seine)	1%	1%	96%
Urchin (Diving)	**14%**	**10%**	**78%**
Whelk (Trap)	0%	0%	99%
White Seabass (Gillnet) - both types	1%	1%	96%
White Seabass (Hook & Line)	0%	0%	54%

Example of how to interpret: From 2000–07, on average, the SCSR lobster trap fishery accounted for 12% of SCSR fishery related revenues and 8% of California (total) fishery related revenues. During that same time frame, on average, 100% (99.9%) of all lobster trap fishery related revenues for the entire state of California came from the SCSR. These percentages and figures are based only on the fisheries considered in the project. Examples of fisheries that occur in Southern California that are not being considered include: Tuna Hook & Line, Trawl (except the ones that are allowed in state waters), Shelf/Slope LE and Open Access Rockfish (mostly before permits were issued), Sablefish -Trap, Swordfish Hook & Line, and Shark Set Gillnet. The primary reason that these fisheries aren't included is that they mostly occur entirely outside of state waters and data wasn't collect

---

[5] Percentage of the key SCSR fisheries considered in this report.
[6] Fisheries highlighted in "bold" are considered priority fisheries for the SCSR.

APPENDIX B: List of SCSR commercial fishing maps available in MarineMap and hard copy

Fishery	Santa Barbara	Ventura	Port Hueneme	San Pedro	Dana Point	Ocean-side	San Diego	SCSR
California Halibut (Hook & Line)	Yes	Conf	Yes	—	—	—	—	Yes
California Halibut (Set Gillnet)	—	—	—	—	—	—	—	—
California Halibut (Trawl)	Yes	—	—	—	—	—	—	—
Coastal Pelagics (Seine)	—	—	Yes	Yes	—	—	—	Yes
Coastal Pelagics (Brail)	—	—	—	Conf	—	—	—	—
Deep Nearshore Fishery (Hook & Line)	Yes	—	Conf	Conf	—	—	Conf	Conf
Hagfish (Trap)	—	—	—	Conf	—	—	—	—
Lobster (Trap)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nearshore Fishery (Hook & Line)	Yes	—	Yes	Yes	—	—	Yes	Yes
Nearshore Fishery (Trap)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pacific Bonito (Seine)	—	—	—	Yes	—	—	—	Yes
Rock Crab (Trap)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sablefish (Longline)	—	—	—	Conf	Conf	Conf	—	Conf
Salmon (Troll)	Yes	Conf	—	—	—	—	—	Yes
Sea Cucumber (Diving)	Yes	Yes	Yes	Yes	—	—	Yes	Yes
Sea Cucumber (Trawl)	Yes	—	—	—	—	—	—	—
Shark (Drift Gillnet)	Conf	—	—	—	—	—	—	—
Shark (Hook & Line)	—	—	—	—	—	—	—	—
Spider Crab (Trap)	—	—	—	—	—	—	—	—
Spot Prawn (Trap)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Squid (Brail)	—	—	—	Yes	—	—	—	Yes
Squid (Seine)	—	Yes	Yes	Yes	—	—	—	Yes
Swordfish (Drift Gillnet)	—	—	—	—	—	—	—	—
Swordfish (Harpoon or Spear)	—	—	—	Yes	Conf	—	—	Yes
Thornyhead (Longline)	—	—	—	Conf	Conf	Conf	—	Conf
Tuna (Seine)	—	—	—	—	—	—	—	—
Urchin (Diving)	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes
Whelk (Trap)	—	—	—	—	—	—	—	—
White Seabass (Gillnet) - both types	Yes	—	—	Yes	—	—	—	Yes
White Seabass (Hook & Line)	—	—	Conf	—	—	—	Conf	—
Live Bait - Coastal Pelagics	—	—	—	Yes	Yes	Yes	Yes	Yes
Number of Datasets	13	6	10	14	6	6	8	16

Above is a list of maps available for each commercial fishery by port and for the SCSR. A "Yes" value indicates that the fishing grounds are available in MarineMap and printed hard copy and RSG meetings or CDFG offices. A "Conf" value indicates that the dataset exists, but is not available do to confidentially constraints. Most often the constraint is < 3 fishermen for a given fishery-port combination. In cases where there are fewer than three fishermen and the data is available, it is because it has been approved to be used and available to the RSG for their Marine Protected Area design process. A null or "—" value indicates that either the data was not collected or that what was collected doesn't adequately represent a given fishing grounds, which is largely based on the sampling criteria described in section 3.1 Commercial or the fishery does not exist in a specific port.

APPENDIX C: Number of CPFV respondents per port and species throughout the SCSR and datasets available in MarineMap and printed hard copy

	Santa Barbara	Port Hueneme	San Pedro	Santa Monica	Newport Beach	Dana Point	Oceanside	San Diego	SCSR
Barracuda	3	14	9	23	13	9	10	34	115
Ca. Halibut	3	14	9	24	13	9	10	28	110
Calico Bass	3	15	9	24	13	9	10	34	117
Lingcod	3	15	9	23	12	8	7	32	109
Rockfish	3	15	9	23	12	8	9	34	113
Ca. Scorpionfish	2	14	9	23	13	9	10	32	112
Ca. Sheephead	3	14	8	24	13	8	10	32	112
Sand Bass	1	15	9	20	12	7	10	33	107
Whitefish	3	15	8	23	12	8	8	33	110
White Seabass	3	14	9	22	13	8	9	31	109
Aggregate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Above is the list of all CPFV maps that are available for each port by species and for the SCSR. The number values indicate the number of CPFV captains or operators who provided information for each species in each port. Aggregate maps are also available for each species for the entire study region and across species for a given port.

APPENDIX D: Number of recreational dive respondents by county and species throughout the SCSR and datasets available in MarineMap and printed hard copy

	Santa Barbara County	Ventura County	Los Angeles County	Orange County	San Diego County	SCSR
Barracuda	—	—	—	—	11	14
Bonito	—	—	—	—	9	12
Ca. Halibut	9	8	15	19	32	83
Calico Bass	11	5	15	10	27	68
Croaker	—	—	—	3	8	15
Lobster	10	7	18	23	28	86
Rockfish/Lingcod	5	3	—	3	7	19
Scallops	—	4	3	6	7	21
Ca. Sheephead	—	—	5	5	12	25
Sand Bass	—	—	3	6	8	18
White Seabass	11	8	22	16	33	90
Yellowtail	3	7	15	14	44	83
Target Species Aggregated	Yes	Yes	Yes	Yes	Yes	Yes

Above is a list of the recreational dive fishing ground maps available for each county by species and for the SCSR. Study region maps are only provided for the following species: California halibut, lobster, white seabass, and yellowtail. The study region aggregated map is a composite or combination of the study region species maps previously mentioned. County level maps are provided for each of the species where we have indicated the number of respondents that provided information, in all cases the number of respondents is never less than three for confidentiality purposes. A null or "—" value indicates that either the data was not collected or that what was collected doesn't adequately represent a given fishing grounds.

Aggregate maps are also available at the county level, where we combine the top four species in terms of the numbers of responses. The following is a list of the species used in the aggregate maps for each county.

Santa Barbara County: white seabass, lobster, California halibut, and calico bass
Ventura County: white seabass, lobster, California halibut, and yellowtail
Los Angeles County: white seabass, lobster, California halibut, and yellowtail
Orange County: white seabass, lobster, California halibut, and yellowtail
San Diego County: white seabass, lobster, California halibut, and yellowtail

Also, note that across mode or sector (dive, kayak, and private vessel) maps are also available for each county. These maps are based on combining the individual aggregate mode maps for each county. In every instance of aggregation each dataset is considered equally, whether combining species for a county for a given mode, combining counties across the study region for a given mode, or across all modes for a given county.

APPENDIX F: Number of recreational private vessel anglers respondents by county and species throughout the SCSR and datasets available in MarineMap and printed hard copy

	Santa Barbara County	Ventura County	Los Angeles County	Orange County	San Diego County	SCSR
Barracuda	—	4	23	21	44	92
Bonito	—	—	8	20	34	62
Ca. Halibut	9	7	30	33	69	148
Calico Bass	7	6	42	47	91	193
Croaker	—	—	—	5	13	18
Lobster	—	—	16	20	34	70
Mackerel	—	—	5	9	18	32
Rockfish/Lingcod	5	4	13	20	45	87
Ca. Sheephead	—	—	8	—	12	20
Sand Bass	—	—	25	31	47	103
Surfperch	—	—	—	—	6	6
Thresher Shark	—	—	8	13	30	51
White Seabass	6	6	33	43	55	143
Yellowtail	—	5	34	41	83	163
Target Species Aggregated	Yes	Yes	Yes	Yes	Yes	

Above is a list of the recreational dive fishing ground maps available for each county by species and for the SCSR. Study region maps are only provided for the following species: California halibut, lobster, white seabass, and yellowtail. The study region aggregated map is a composite or combination of the study region species maps previously mentioned. County level maps are provided for each of the species where we have indicated the number of respondents that provided information, in all cases the number of respondents is never less than three for confidentiality purposes. A null or "—" value indicates that either the data was not collected or that what was collected doesn't adequately represent a given fishing grounds.

Aggregate maps are also available at the county level, where we combine the top four species in terms of the numbers of responses. The following is a list of the species used in the aggregate maps for each county.

Santa Barbara County: white seabass, rockfish/lingcod, California halibut, and calico bass
Ventura County: white seabass, rockfish/lingcod, California halibut, and calico bass
Los Angeles County: white seabass, sand bass, California halibut, and calico bass
Orange County: white seabass, sand bass, California halibut, and calico bass
San Diego County: white seabass, sand bass, California halibut, and calico bass

Also, note that across mode or sector (dive, kayak, and private vessel), maps are also available for each county. These maps are based on combining the individual aggregated mode maps for each county. In every instance of aggregation each dataset is considered equally, whether combining species for a county for a given mode, combining counties across the study region for a given mode, or across all modes for a given county.