Appendix A

CALIFORNIA NORTH CENTRAL COAST COMMERCIAL FISHING 2011 BASELINE CHARACTERIZATION

The 2010 data set is presented in the main body of this report as the survey sample in this first year of data collection was significantly more robust and thus more representative and reliable as a baseline characterization of the North Central Coast region commercial fishing fleet. Reasons as to why the second year of data collection (2011 fishing year) did not yield as robust of a survey sample is explained in detail in our lessons learned section in the main body of the report.

Here we present the data collected in the second year of the project (collected in 2012 inquiring about the entire 2011 fishing year) summarized at the study regional level below. Additional port and fishery specific data can be found in the accompanying data workbooks, maps, and spatial data sets included in the deliverables package of this project which can be found on the OceanSpaces website: (http://oceanspaces.org).

For interviews conducted in the second year of data collection for this project, the Dungeness crab–trap fishery had the most respondents (64) across the region, while Urchin–dive had the fewest (4). The number of respondents for each port/fishery combination is shown below in Table 1.

Table 1. Number of commercial fishermen interviews conducted, 2011, non spatial survey, North Central Coast Region

Port	California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive	All target fisheries
Point Arena	—	3	1	3	3	5
Bodega Bay	3	24	1	17	1	26
Bolinas	2	1	—	1	—	2
San Francisco	5	10	1	6	—	14
Half Moon Bay	3	18	3	10	—	21
North of study region	—	6	—	3	—	6
South of study region	—	2	—	1	—	2
Total number of individuals	13	64	6	41	4	76

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

A total of 494 individual fishermen landed in at least one of the five target fisheries, generating 40.7 million dollars in ex-vessel revenue in the North Central Coast in 2011. Dungeness crab–trap was the largest revenue generator and made up nearly 95 percent of the regional revenue across target fisheries. Ex-vessel revenues from 2011 can be found for all target fisheries in Table 2.

Table 2. Number of commercial fishermen interviews conducted and fishery ex-vessel revenue value, 2011, non spatial survey, North Central Coast

Fishery	2011 ex-vessel revenue (2010$)	Total number of individuals in 2011 landings	Number interviewed
California halibut–hook & line	$357,908	86	13
Dungeness crab–trap	$38,552,188	292	64
Nearshore finfish–live–fixed gear	$228,984	28	6
Salmon–troll	$1,234,446	222	41
Urchin–dive	$347,837	15	4
All target fisheries (unique individuals)	$40,721,363	494	76

Source: California Department of Fish and Wildlife, Current study

Includes individuals from north and south of the study region

The average respondent we spoke to in 2012 was 52.6 years old and had 24.7 years experience as a commercial fisherman (Table 3). This average, for all target fisheries, is for unique individuals and includes each individual only once, regardless of how many fisheries they participated in. Those that participated in the California halibut–hook & line fisheries had slightly less experience commercial fishing (19.7 years) while those that participated in salmon–troll fishery had slightly more experience commercial fishing overall (26 years). It should be noted that this question inquired about the number of years experience an individual had commercial fishing as a whole, not the number of years experience they had in a specific fishery.

Table 3. Average age and years experience commercial fishing, 2011, North Central Coast

	Age			Years experience		
Fisheries	Number responding	Average	Standard deviation	Number responding	Average	Standard deviation
California halibut – hook & line	13	50.5	12.9	13	19.7	14.5
Dungeness crab – trap	63	53.1	10.8	64	25.5	13.7
Nearshore finfish–live–fixed gear	6	48.2	5.1	6	24.3	9.0
Salmon–troll	40	53.8	10.2	41	26.0	13.7
Urchin–dive	4	51.0	8.0	4	24.8	6.7
All target fisheries (unique individuals)	75	52.4	10.7	76	24.5	13.5

Source: Current study

Includes individuals from north and south of the study region

Respondents were asked what percent of their total personal income came from commercial fishing in 2011. Fishermen who participated in the urchin–dive fishery reported the largest percent of their personal income coming from commercial fishing (97.5 percent), while those in the California halibut–hook & line fishery reported that 57.3 percent of their total personal income came from commercial fishing (Table 4). Note that the percent of total income from overall commercial fishing is not necessarily related to the fishery indicated, but rather reflects the fisherman's commercial fishing income as a whole. Fishermen were then asked what factors they felt had impacted the percent of their income from fishing since 2010. Respondents were asked this as an open-ended question and notes were taken by the interviewer and then coded into the categories shown in Table 5.

Across all target fisheries three respondents indicated that they were making more revenue in 2011 than in 2010 because fishing was worse in 2010 and three respondents indicated they were making less revenue due to their increasing age and health problems. Respondents were then asked to identify any other sources of income other than commercial fishing that they had in 2011. The most frequent responses were retirement/social security/investments followed by construction/carpentry/industrial work and other fishing related work (such as building gear or running a CPFV vessel). Additional sources of revenue can be found in Table 6.

Table 4. Percent of overall income from fishing, 2011, North Central Coast

Fisheries	Number responding	Average	Standard deviation
California halibut – hook & line	13	57.3%	41.9%
Dungeness crab – trap	64	88.7%	20.2%
Nearshore finfish–live–fixed gear	6	68.3%	42.5%
Salmon–troll	41	88.0%	23.3%
Urchin–dive	4	97.5%	5.0%
All target fisheries (unique individuals)	76	83.4%	28.2%

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

** indicates data were collected but cannot be shown due to confidentiality constraints*

Includes individuals from north and south of the study region

Table 5. Cause in change in percent income from commercial fishing, 2010-2011, North Central Coast

		Number responding					
	Response	**California halibut–hook & line**	**Dungeness crab–trap**	**Nearshore finfish–live–fixed gear**	**Salmon–troll**	**Urchin–dive**	**All fisheries (unique individuals)**
Reason for increase	Relied more on other sources of income in 2010	—	1	—	1	—	1
	Natural fluctuation in fish abundance/presence (worse in 2010)	—	3	—	3	—	3
	Fishing less actively in 2010	1	1	—	1	—	2
	Prices are better in 2011 than 2010	1	1	—	1	—	1
Reason for decrease	Relied more on other sources of income in 2011	1	1	—	1	—	2
	Natural fluctuation in fish abundance/presence (worse in 2011)	1	1	1	1	—	2
	Fishing less actively in 2011	1	1	—	—	—	1
	Age health/worse in 2011	2	1	2	—	—	3
	Increased fishing related expenses in 2011	—	1	2	—	—	2
	Red tides in 2011	—	—	2	—	—	1
Number of individuals responding		4	9	3	7	—	12

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes individuals from north and south of the study region

Table 6. Other sources of income other than commercial fishing in 2011, North Central Coast

	Number responding					
Response	**California halibut–hook & line**	**Dungeness crab–trap**	**Nearshore finfish–live–fixed gear**	**Salmon–troll**	**Urchin–dive**	**All fisheries (unique individuals)**
Construction/Contractor/Industrial work	1	3	—	2	—	4
Farming/Ranching	—	2	—	1	—	2
Harbor/City job	—	1	—	1	—	1
Independent business	1	1	—	1	—	1
Oil spill settlement	1	—	—	—	—	1
Other fishing related work	2	2	1	1	—	4
Other specialized work	—	2	1	1	—	2
Property management	1	1	—	1	—	1
Retirement/Social Security/Investments	1	5	—	3	—	5
Skilled labor	2	3	1	3	—	4
Number of individuals responding	6	16	2	11	—	19

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

We asked respondents to estimate what percent of their gross economic revenue (GER) from commercial fishing went towards their overall commercial fishing related operating costs. Similar to the questions above, this was not asked in regards to a particular fishery, but rather about their commercial fishing as a whole. Those who participated in the California halibut – hook & line had the highest average, reporting that over 65 percent of commercial fishing GER went back into overall operating costs. Across all fisheries the average respondent in the North Central Coast reported spending 55.4 percent of their commercial fishing GER on operating costs (Table 7). As shown in Table 8, 49.2 percent of respondents felt that their 2010 operating costs were average compared to 2010, 42.6 percent felt operating costs were either somewhat or significantly higher in 2011 than 2010, and the remaining 8.2 percent felt they were operating costs in 2011 were somewhat lower than in 2010.

Table 7. Percent of gross economic revenue towards overall operating costs in 2011, North Central Coast

Fisheries	Number responding	Average	Standard deviation
California halibut – hook & line	13	65.6%	34.2%
Dungeness crab – trap	62	53.7%	19.9%
Nearshore finfish–live–fixed gear	6	54.8%	32.8%
Salmon–troll	39	50.2%	20.3%
Urchin–dive	4	58.3%	35.6%
All target fisheries (unique individuals)	74	55.4%	23.8%

Source: Current study

Includes respondents from north and south of the study region

Table 8. Perceived change in percent gross economic revenue towards overall operating costs, 2010 - 2011, North Central Coast

		Percent response				
Fisheries	Number responding	Significantly higher	Somewhat higher	Average	Somewhat lower	Significantly lower
California halibut–hook & line	13	23.1%	30.8%	38.5%	7.7%	—
Dungeness crab–trap	64	14.1%	28.1%	50.0%	7.8%	—
Nearshore finfish–live–fixed gear	5	20.0%	20.0%	60.0%	—	—
Salmon–troll	41	14.6%	29.3%	43.9%	12.2%	—
Urchin–dive	3	—	33.3%	66.7%	—	—
All fisheries (unique individuals)	61	13.1%	29.5%	49.2%	8.2%	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

Respondents were then asked to elaborate on what factors they felt had impacted the change in the percent of their gross economic revenue (GER) that went towards overall commercial fishing operating costs. Twenty-six out of 37 respondents indicated that they had experienced an increase in the price of fuel. Sixteen respondents indicated that there had been a general increase in the price of all operating costs. Additional reasons for the increase in costs can be found below in Table 9.

Table 9. Cause of change in percent gross economic revenue towards overall operating costs, 2010 - 2011, North Central Coast

	Response	California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive	All fisheries (unique individuals)
Reason for decrease	Making more revenue	1	4	—	4	—	4
Reason for increase	Making less revenue	1	2	—	2	—	3
	Increase in fuel price	6	21	2	15	1	26
	Large equipment (or vessel) purchase	1	8	—	3	—	8
	Overhaul/maintenance of vessel	—	5	—	3	—	5
	Have to travel further to fish	1	2	—	1	—	3
	Have more crew	—	2	—	1	—	2
	General price increase (gear, bait, insurance, berthing, etc.)	5	11	2	8	1	16
	Loss of fishing grounds	—	1	—	1	—	1
	Paying crew higher wage	1	1	—	—	1	1
Number of individuals responding		8	31	2	22	1	37

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

For each fishery they participated in, we asked each respondent the following questions; 1) how many years experience do you have; 2) how many days do you target this fishery; 3) on average how many crew do you use per trip; 4) what percent of your fishery specific gross revenue on average is paid to your crew; and, 5) what percent of your fishery specific gross revenue goes towards your fuel usage for that fishery? Salmon–troll fishermen reported the most experience (29.3 years) while California halibut–hook & line reported the least (16.1 years). Urchin divers reported spending 113.3 days per years targeting their fishery, the most of any of the target fisheries. Dungeness crab–trap fishermen reported using the most crew, (1.9 crew per trip on average) and subsequently reported the highest percentage of their fishery specific GER that went towards crew. Additionally, the lowest percent of GER going towards fuel was reported for the Dungeness crab fishery. These statistics for all target fisheries in the study region are shown below in Table 10 and Table 11.

Table 10. Years experience and number of days targeting specific fisheries in 2011, North Central Coast

	Years experience in fishery			Days spent targeting fishery		
Fisheries	**Number responding**	**Average**	**Standard deviation**	**Number responding**	**Average**	**Standard deviation**
California halibut – hook & line	13	16.1	10.3	12	79.7	60.2
Dungeness crab – trap	63	23.6	13.9	62	68.4	46.3
Nearshore finfish–live–fixed gear	6	19.0	8.4	6	54.0	44.8
Salmon–troll	40	29.3	15.5	39	39.3	29.8
Urchin–dive	4	26.8	2.4	3	113.3	75.7

Source: Current study

Includes respondents from north and south of the study region

Table 11. Number of crew and percent of fishery specific gross economic revenue towards crew and fuel, 2010, North Central Coast

	Number of crew per trip			Percent GER to crew			Percent GER to fuel		
Fisheries	**Number responding**	**Average**	**Standard deviation**	**Number responding**	**Average**	**Standard deviation**	**Number responding**	**Average**	**Standard deviation**
California halibut – hook & line	13	0.3	0.6	12	4.3%	14.4%	11	30.4%	23.6%
Dungeness crab – trap	63	1.9	0.8	63	29.2%	9.9%	57	12.8%	7.8%
Nearshore finfish–live–fixed gear	6	0.5	0.8	6	8.3%	13.3%	6	20.0%	16.4%
Salmon–troll	38	0.7	0.6	37	13.0%	10.9%	37	16.3%	11.1%
Urchin–dive	4	0.5	0.6	4	23.0%	38.4%	2	25.0%	21.2%

Source: Current study

Includes respondents from north and south of the study region

Fishermen were asked if they added or dropped fisheries since 2010 or if they did not fish a fishery in 2011. The reasoning behind this question was to investigate any underlying factor that may be driving socioeconomic change in specific fisheries. One respondent indicated he/she had added the Dungeness crab–trap fishery in 2011 (Table 12) and explained he/she did so in order to generate more revenue (Table 13). Additionally, four respondents added and one dropped the salmon–troll fishery in 2011, and two did not participate in the fishery in 2011.

Table 12. Commercial fisheries added/dropped since 2010 or not fished in 2011, North Central Coast

		Number responding		
Fisheries	**Number responding**	**Added**	**Dropped**	**Not fished in 2011**
California halibut–hook & line	13	—	—	—
Dungeness crab–trap	64	1	—	—
Nearshore finfish–live–fixed gear	6	—	—	—
Salmon–troll	41	4	1	2
Urchin–dive	4	—	—	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

Table 13. Reason for adding/dropping or not fishing a commercial fishery, North Central Coast

	Number responding				
Response	**California halibut–hook & line**	**Dungeness crab–trap**	**Nearshore finfish–live–fixed gear**	**Salmon–troll**	**Urchin–dive**
Purchased new boat	—	—	—	1	—
Wasn't worth it to fish in 2010	—	—	—	2	—
Needed more revenue	—	1	—	—	—
Respondent did not provide reason	—	—	—	4	—
Number responding	—	1	—	7	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

All respondents includes individuals from north and south of the study region

Fishermen were asked separately for each fishery they participated in to compare the success in his/her fishing in 2010 to the last five years. As shown in Table 14 below, respondents were given the option of responding in one of the following categories: 1) significantly better; 2) somewhat better; 3) the same; 3) somewhat worse; and 4) significantly worse. Respondents were then asked what factors they felt had contributed to the level of success in his/her fishery. This question was asked in an open ended manner and responses were later coded, categorize, and divided into four types of categories: regulatory, environmental, economic, and other, as seen in the tables below.

Most Dungeness crab–trap fishermen indicated they were doing better in 2011 than in the previous five years (Table 14). Most of the reasons to which they attributed this were environmental; many individuals noted there was a larger quantity of crab and that the season was the peak of a natural cycle of crab abundance (Table 15). Additionally, many crabbers noted that in 2011 there was a good market and they received good prices for their crab (Table 16). Additionally, a few fishermen indicated that the peak of the crab cycle had already passed and was beginning to decline (Table 15).

All urchin divers reported their success in the fishery was either significantly worse (75 percent) or somewhat worse (25 percent) than it had been in previous years (Table 13). The only factors urchin divers mentioned as the cause of this were MPAs (Table 17) and bad prices (Table 16). More information for other fisheries can be found in the tables below.

Table 14. Overall success in specific commercial fishery in 2011 compared to previous five years, North Central Coast

		Percent response					
Fisheries	**Number responding**	**Did not participate in previous seasons**	**Significantly better**	**Somewhat better**	**The same**	**Somewhat worse**	**Significantly worse**
California halibut–hook & line	13	—	—	7.7%	15.4%	46.2%	30.8%
Dungeness crab–trap	64	—	54.7%	26.6%	7.8%	7.8%	3.1%
Nearshore finfish–live–fixed gear	6	—	—	—	50.0%	—	50.0%
Salmon–troll	38	7.9%	13.2%	34.2%	15.8%	18.4%	10.5%
Urchin–dive	4	—	—	—	—	25.0%	75.0%

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

Table 15. Environmental changes/factors influencing success in a specific commercial fishery in 2010 as compared to previous five years, North Central Coast

		California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live– fixed gear	Salmon–troll	Urchin–dive
	Number responding	7	49	1	14	—
	Responses	**Count of responding**				
Better	Peak of natural cycle	—	28	—	2	—
	Improvement in water quality	—	7	—	1	—
	Large quantity of fish	—	14	—	2	—
	Good ocean conditions	—	3	—	1	—
	Good weather	—	1	—	—	—
	Lack of predators	—	4	—	—	—
Worse	Low (or declining) natural cycle	2	5	—	1	—
	Poor water quality	1	—	—	—	—
	Low quantity of fish	4	1	—	7	—
	Poor ocean conditions	2	—	1	1	—
	Loss of spawning grounds due to inland water management	—	—	—	4	—
	Red tides	—	—	1	1	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

Table 16. Economic changes/factors influencing success in a specific commercial fishery in 2010 as compared to previous five years, North Central Coast

		California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive
	Number responding	2	13	1	3	1
	Responses	**Count of responding**				
Better	Good/new market	—	9	—	—	—
	Good price	—	8	—	3	—
Worse	Bad price	—	—	—	—	1
	Increase in costs	2	—	1	—	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Table 17. Regulatory changes/factors influencing success in a specific commercial fishery in 2010 as compared to previous five years, North Central Coast

		California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive
	Number responding	2	2	2	16	3
	Responses	**Count of responding**				
Better	Allowed to fish (limited) number of days	—	—	—	9	—
	Less trawling	—	2	—	—	—
Worse	Season limited	—	—	—	4	—
	General poor management methods	1	—	—	—	—
	MPAs	1	—	2	2	3
	Rockfish conservation areas	—	—	1	—	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Table 18. Other changes/factors influencing success in a specific commercial fishery in 2010 as compared to previous five years, North Central Coast

		California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive
	Number responding	7	2	2	1	—
	Responses	**Count of responding**				
Better	Good crew	—	1	—	—	—
Worse	Used fewer traps	—	1	—	—	—
	Others changing fishery	5	—	1	—	—
	Overcrowding	—	—	—	1	—
	Boat problems/breakdowns	1	—	—	—	—
	Draggers overfishing/poaching	2	—	—	—	—
	Personal health	1	—	—	—	—
	Sport fishing hurting population	1	—	1	—	—

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

North Central Coast Region MPAs and Commercial Fishing

Determining and measuring the impact of MPAs upon commercial fishermen is challenging to quantify and unravel from the multitude of environmental, regulatory, and economic factors influencing systems of fishing. Despite this, we sought to capture information from fishermen as to how they perceive they have been impacted by MPAs and the specific MPAs which are impacting their fisheries. This section provides information at the region and port levels and summarizes the response from the following three questions which were asked for each fishery during interviews:

1) Has your fishery been directly impacted by the recently established MPAs?;
2) If so, how have you been impacted?; and,
3) What MPAs have impacted your specific fishery?

Question one was posed as a simple yes or no response and questions two and three were open-ended questions in which responses were later coded and categorized into the tables below. Additionally, fishermen were given a map of the MPAs in the North Central Coast to aid in identifying and naming the MPAs impacting them. The questions above were asked for every fishery an individual participated in.

Across all fisheries 75.3 percent of respondents indicated they had been impacted in some way by MPAs (Table 19). The urchin–dive fishery reported the highest impacts (100 percent) followed by nearshore finfish–live–fixed gear. One nearshore finfish–live–fixed gear fisherman reported they were not impacted and the rest (85.7 percent) reported they were. The most frequently reported type of impacts was the loss of traditional fishing grounds, followed by spending more time fishing or at times traveling to fishing grounds. Additional impacts can be found below in Table 19.

There are 31 MPAs in the North Central Coast and at least one individual indicated being impacted by one of these (Table 20). Additionally, some individuals noted being impacted by an MPA from the Central Coast region, specifically Año Nuevo. Stewarts Point SMR was indicated the most frequently across all fisheries for the entire study region followed by Point Reyes SMR. Many MPAs have an impact on fishermen from a specific port in the region and impacts on smaller or specific ports may not be well represented in this regional table. Please examine our port specific tables in the data workbook associated with this report for more information at the port level.

Table 19. Percent of individuals indicating specific direct impacts from MPAs in 2011 for each fishery, North Central Coast

	California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive	Unique individuals
Number responding	13	64	7	41	4	76
Percent indicating direct impacts from MPAs	46.2%	76.6%	85.7%	78.0%	100.0%	82.9%
Response	**Percent responding**					
Loss of traditional fishing grounds	38.5%	68.8%	71.4%	70.7%	100.0%	76.3%
Spending more time fishing/traveling for fishing	7.7%	21.9%	57.1%	29.3%	100.0%	35.5%
Increased fishing pressure/crowding in open areas	15.4%	23.4%	42.9%	9.8%	50.0%	30.3%
Fishing more in areas with worse/less predictable weather	15.4%	10.9%	42.9%	4.9%	25.0%	15.8%
Open areas harder to access	—	1.6%	42.9%	2.4%	—	5.3%
Distress regarding unintended fishing infractions	—	1.6%	—	9.8%	—	6.6%
Can't access live bait	7.7%	1.6%	—	—	—	1.3%
Loss of highly productive area	—	—	—	7.3%	—	3.9%
Shift of fishing effort into other fisheries	15.4%	—	—	—	—	2.6%
Loss of revenue	—	1.6%	—	4.9%	—	3.9%
Loss of gear	—	3.1%	—	—	—	2.6%
Takes time to pull up gear to transit through closed areas	—	—	—	4.9%	—	2.6%

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

** indicates data were collected but cannot be shown due to confidentiality constraints*

Includes respondents from north and south of the study region

Table 20. Percent of respondents indicating specific MPA impacting commercial fishery in 2011, North Central Coast

	Percent Responding					
MPAs	California halibut–hook & line	Dungeness crab–trap	Nearshore finfish–live–fixed gear	Salmon–troll	Urchin–dive	Unique individuals
Number responding	13	64	6	41	4	76
Bodega Head SMCA	7.7%	4.7%	—	4.9%	25.0%	6.6%
Bodega Head SMR	7.7%	23.4%	—	46.3%	25.0%	35.5%
Del Mar Landing SMR	7.7%	3.1%	33.3%	4.9%	25.0%	6.6%
Double Point/Stormy Stack SC	7.7%	3.1%	—	2.4%	—	2.6%
Drake's Estero SMCA	15.4%	3.1%	—	4.9%	—	3.9%
Duxbury Reef SMCA	30.8%	1.6%	—	4.9%	—	6.6%
Egg (Devil's Slide) Rock to Devil's Slide SC	15.4%	4.7%	—	2.4%	—	5.3%
Estero Americano SMRMA	15.4%	4.7%	—	2.4%	—	3.9%
Estero de Limantour SMR	15.4%	3.1%	—	2.4%	—	3.9%
Estero de San Antonio SMRMA	7.7%	3.1%	—	2.4%	—	2.6%
Gerstle Cove SMR	7.7%	6.3%	33.3%	7.3%	25.0%	9.2%
Montara SMR	15.4%	21.9%	33.3%	14.6%	—	23.7%
North Farallon Islands SC	7.7%	6.3%	16.7%	12.2%	50.0%	14.5%
North Farallon Islands SMR	7.7%	12.5%	16.7%	22.0%	50.0%	21.1%
Pillar Point SMCA	15.4%	7.8%	16.7%	2.4%	—	9.2%
Point Arena SMCA	7.7%	10.9%	16.7%	7.3%	50.0%	14.5%
Point Arena SMR	7.7%	12.5%	16.7%	26.8%	50.0%	23.7%
Point Resistance Rock SC	7.7%	1.6%	—	2.4%	—	1.3%
Point Reyes Headlands SC	15.4%	9.4%	—	7.3%	—	11.8%
Point Reyes SMCA	30.8%	7.8%	—	9.8%	—	13.2%
Point Reyes SMR	46.2%	39.1%	—	22.0%	—	43.4%
Russian River SMCA	7.7%	3.1%	—	2.4%	—	2.6%
Russian River SMRMA	7.7%	1.6%	—	2.4%	—	1.3%
Salt Point SMCA	7.7%	17.2%	50.0%	7.3%	100.0%	22.4%
Saunders Reef SMCA	7.7%	9.4%	16.7%	7.3%	25.0%	13.2%
Sea Lion Cove SMCA	7.7%	1.6%	—	4.9%	—	2.6%
Southeast Farallon Island SC	7.7%	3.1%	16.7%	7.3%	50.0%	9.2%
Southeast Farallon Island SMCA	7.7%	1.6%	16.7%	2.4%	50.0%	5.3%
Southeast Farallon Island SMR	7.7%	3.1%	16.7%	9.8%	50.0%	10.5%
Stewarts Point SMCA	7.7%	10.9%	50.0%	9.8%	100.0%	18.4%
Stewarts Point SMR	7.7%	28.1%	50.0%	56.1%	75.0%	46.1%
Other	—	4.7%	—	2.4%	—	3.9%
Total number of MPAs impacting fishery/region	31	32	15	32	15	32

Source: Current study

— indicates that the port/fishery was not sampled or a zero value data point

Includes respondents from north and south of the study region

North Central Coast Commercial Fishing 2011 Spatial Baseline

In the following section we provide maps of baseline data depicting the spatial fishing patterns of specific commercial fisheries at the port and region level. The full detailed methodology of how these data were collected, analyzed, and reviewed can be found in methods section in the main body of this report. The GIS data layers with associated metadata of these spatial data sets are also available and were included in the deliverables package of this project which can be found on the OceanSpaces website: (http://oceanspaces.org).

The following map products and spatial data sets for the North Central Coast region commercial fishing fleet for the full 2011 fishing year are provided in Table 21 below. The table below also provides the ex-vessel revenue for each port-fishery or region-fishery combination and indicates the percent of this ex-vessel represented by the fishermen who provided spatial fishing data to develop the map products listed. Only maps with 3 or more fishermen are available for use due to confidentiality protocols as indicated in the table below.

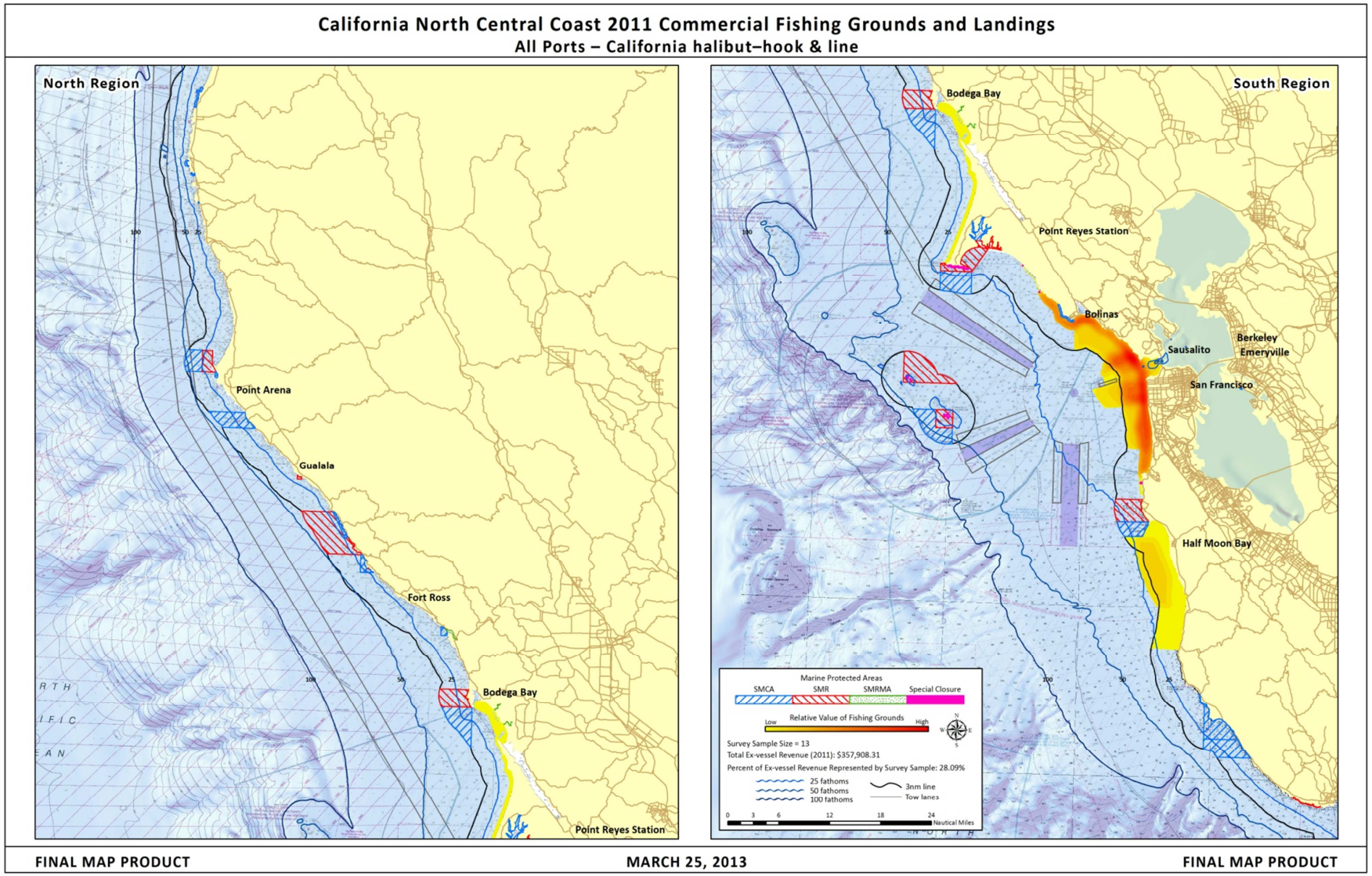
Table 21. Number of commercial fishermen interviews conducted and ex-vessel landings value represented in maps available to public, 2011, North Central Coast Region

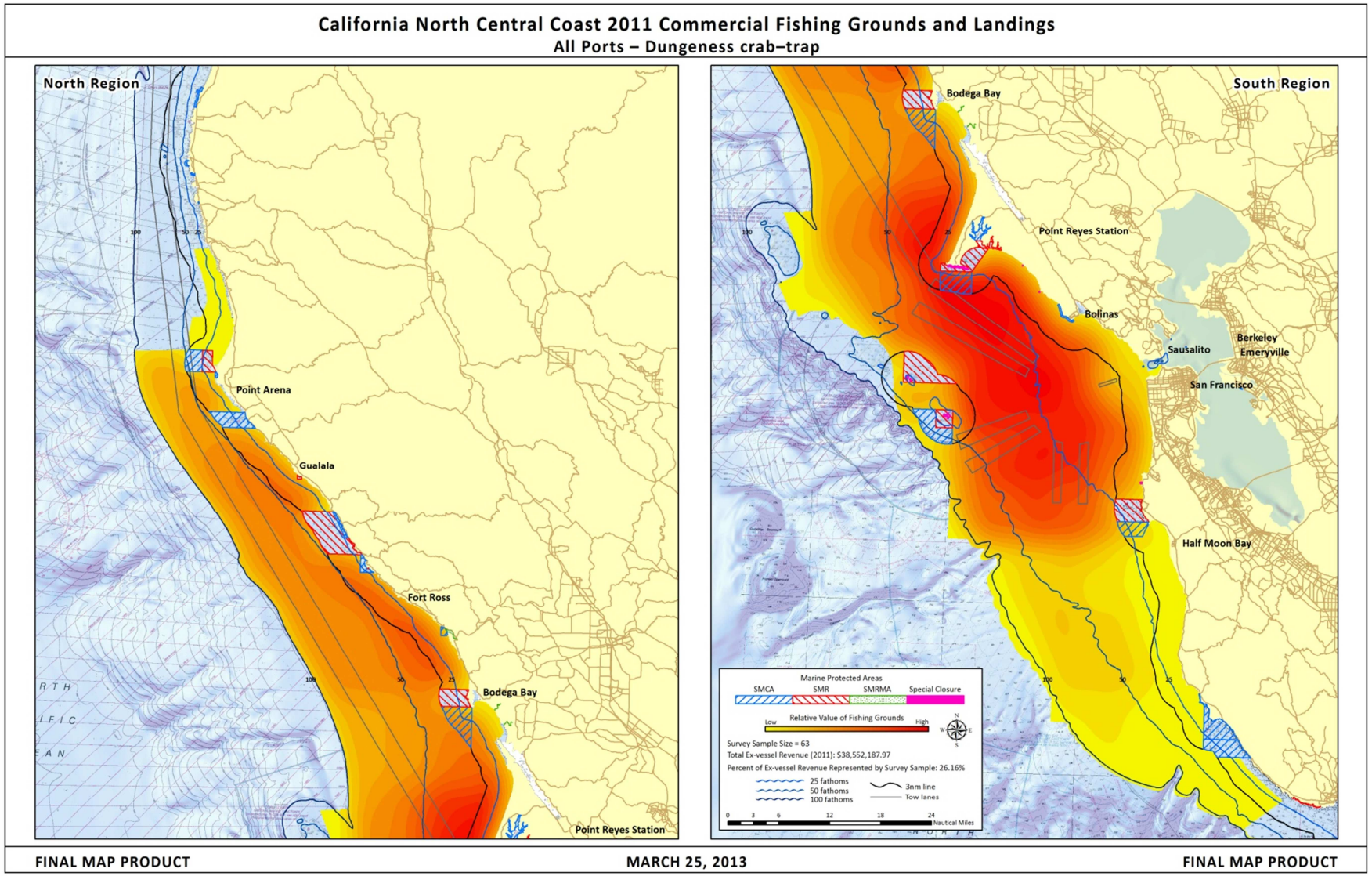
Port/Region	Fishery	2011 ex-vessel revenue (2010$)	Percent of ex-vessel revenue represented by interviews	Total number of individuals in 2011 landings	Number of fishermen who mapped	Map available
North Central Coast	California halibut – hook & line	$357,908	28%	86	13	YES
North Central Coast	Dungeness crab – trap	$38,552,188	26%	292	63	YES
North Central Coast	Nearshore finfish	$228,984	24%	28	6	YES
North Central Coast	Salmon–troll	$1,234,446	17%	222	30	YES
North Central Coast	Urchin–dive	$347,837	52%	15	4	YES
Point Arena	California halibut – hook & line	—	—	—	—	—
Point Arena	Dungeness crab – trap	$57,662	*	3	2	NO
Point Arena	Nearshore finfish	$105,420	*	3	1	NO
Point Arena	Salmon–troll	$47,570	*	6	2	NO
Point Arena	Urchin–dive	$311,852	47%	13	3	YES
Bodega Bay	California halibut – hook & line	$27,388	17%	18	4	YES
Bodega Bay	Dungeness crab – trap	$12,961,074	35%	100	29	YES
Bodega Bay	Nearshore finfish	$15,064	—	6	—	—
Bodega Bay	Salmon–troll	$557,055	17%	124	18	YES
Bodega Bay	Urchin–dive	$35,549	*	3	1	NO
Bolinas	California halibut – hook & line	$34,873	*	5	1	NO
Bolinas	Dungeness crab – trap	$209,300	*	6	1	NO
Bolinas	Nearshore finfish	19-Dec-02	*	2	—	—
Bolinas	Salmon–troll	$8,959	*	6	1	NO
Bolinas	Urchin–dive	—	—	—	—	—
San Francisco	California halibut – hook & line	$269,162	30%	61	8	YES
San Francisco	Dungeness crab – trap	$17,255,737	17%	116	14	YES
San Francisco	Nearshore finfish	$43,707	*	12	1	NO
San Francisco	Salmon–troll	$240,083	18%	67	8	YES
San Francisco	Urchin–dive	11-Mar-01	—	1	—	—
Half Moon Bay	California halibut – hook & line	$26,485	17%	16	3	YES
Half Moon Bay	Dungeness crab – trap	$8,068,415	31%	105	19	YES
Half Moon Bay	Nearshore finfish	$63,708	16%	12	3	YES
Half Moon Bay	Salmon–troll	$380,780	10%	85	7	YES
Half Moon Bay	Urchin–dive	—	—	—	—	—

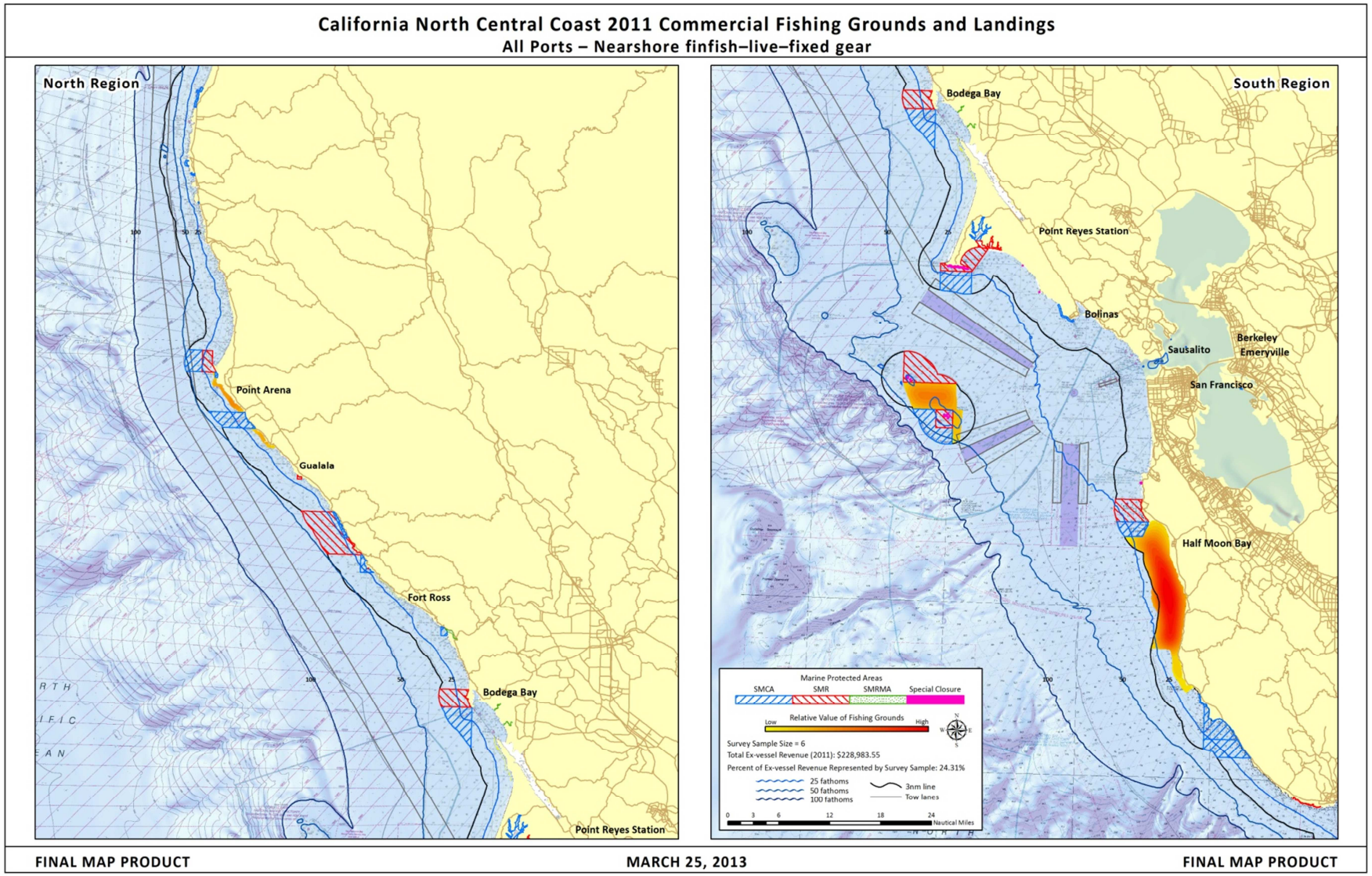
Source: California Department of Fish and Wildlife, Current study

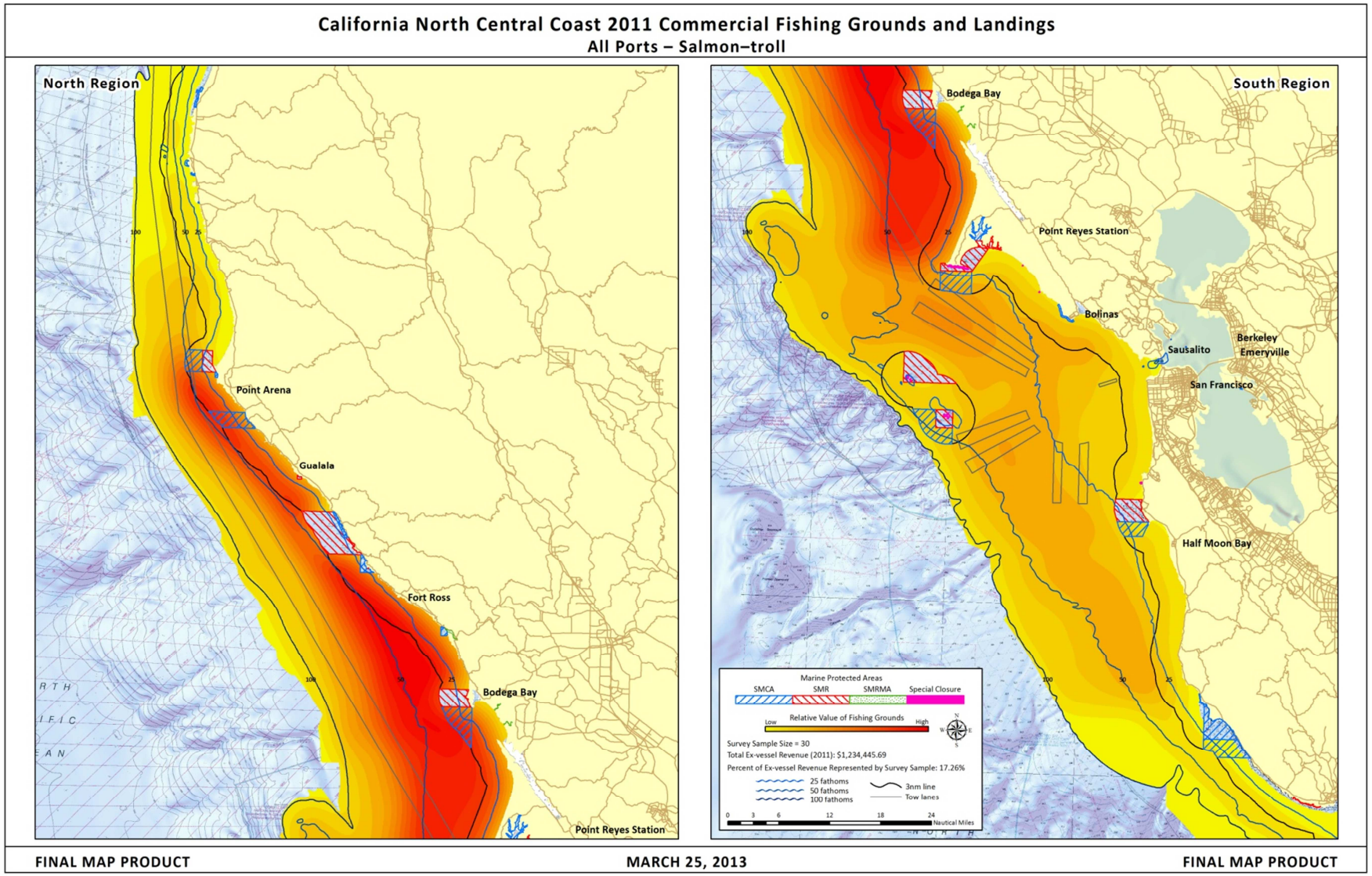
— indicates that the port/fishery was not sampled or a zero value data point

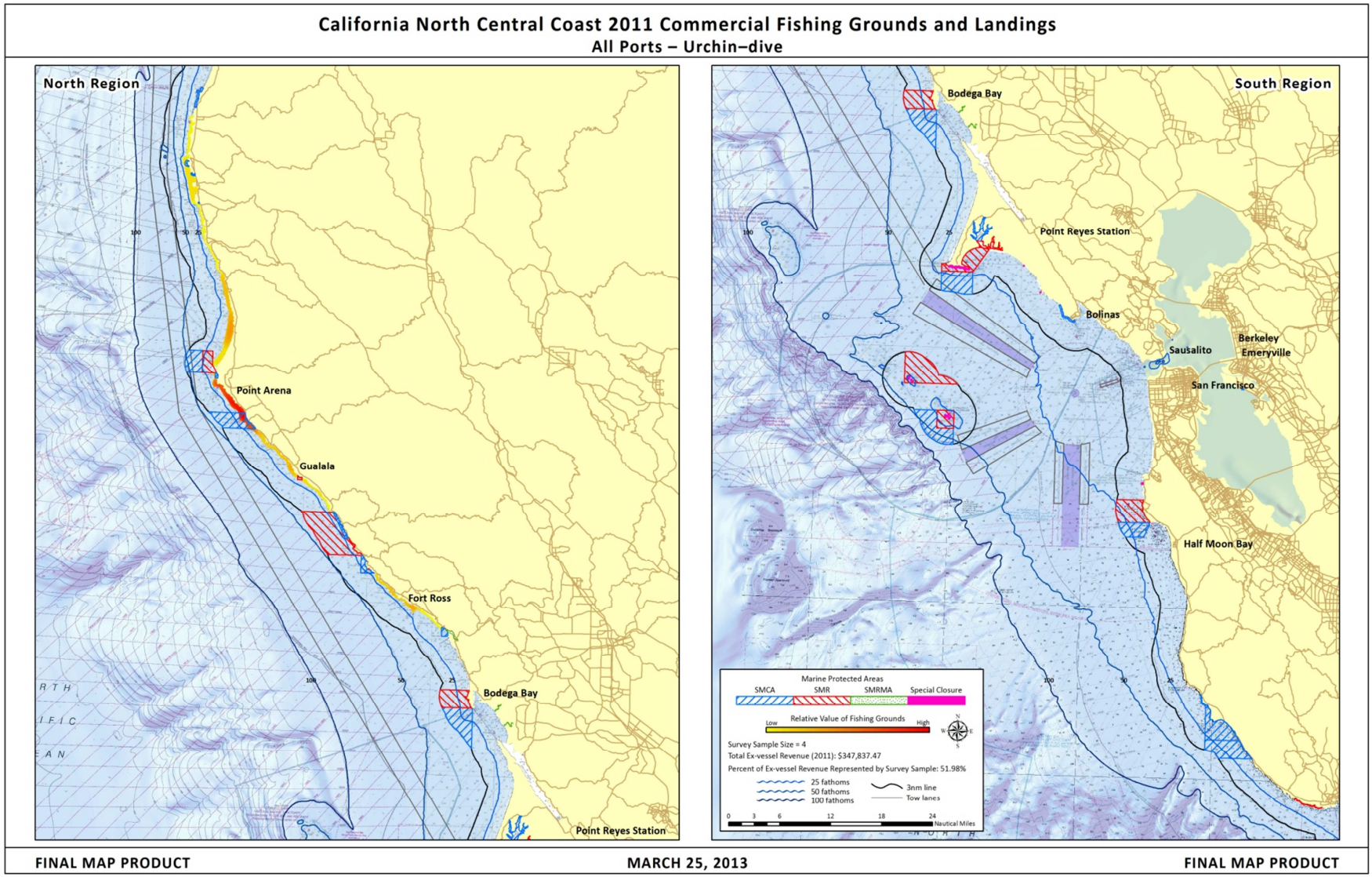
** indicates data were collected but cannot be shown due to confidentiality constraints*


California North Central Coast 2011 Commercial Fishing Grounds and Landings
All Ports – California halibut–hook & line
North Region
Point Arena
Gualala
Fort Ross
Bodega Bay
Point Reyes Station
South Region
Bodega Bay
Point Reyes Station
Bolinas
Sausalito
Berkeley
Emeryville
San Francisco
Half Moon Bay
Marine Protected Areas
SMCA
SMR
SMRMA
Special Closure
Relative Value of Fishing Grounds
Low
High
Survey Sample Size = 13
Total Ex-vessel Revenue (2011): $357,908.31
Percent of Ex-vessel Revenue Represented by Survey Sample: 28.09%
25 fathoms
50 fathoms
100 fathoms
3nm line
Tow lanes
Nautical Miles
FINAL MAP PRODUCT
MARCH 25, 2013
FINAL MAP PRODUCT


California North Central Coast 2011 Commercial Fishing Grounds and Landings
All Ports – Dungeness crab–trap
North Region
South Region
Point Arena
Gualala
Fort Ross
Bodega Bay
Point Reyes Station
Bolinas
Sausalito
Berkeley
Emeryville
San Francisco
Half Moon Bay
Marine Protected Areas
SMCA
SMR
SMRMA
Special Closure
Relative Value of Fishing Grounds
Low
High
Survey Sample Size = 63
Total Ex-vessel Revenue (2011): $38,552,187.97
Percent of Ex-vessel Revenue Represented by Survey Sample: 26.16%
25 fathoms
50 fathoms
100 fathoms
3nm line
Tow lanes
Nautical Miles
FINAL MAP PRODUCT
MARCH 25, 2013
FINAL MAP PRODUCT


California North Central Coast 2011 Commercial Fishing Grounds and Landings
All Ports – Nearshore finfish–live–fixed gear
North Region
South Region
Point Arena
Gualala
Fort Ross
Bodega Bay
Point Reyes Station
Bodega Bay
Point Reyes Station
Bolinas
Sausalito
Berkeley
Emeryville
San Francisco
Half Moon Bay
Marine Protected Areas
SMCA
SMR
SMRMA
Special Closure
Relative Value of Fishing Grounds
Low
High
Survey Sample Size = 6
Total Ex-vessel Revenue (2011): $228,983.55
Percent of Ex-vessel Revenue Represented by Survey Sample: 24.31%
25 fathoms
50 fathoms
100 fathoms
3nm line
Tow lanes
Nautical Miles
FINAL MAP PRODUCT
MARCH 25, 2013
FINAL MAP PRODUCT


California North Central Coast 2011 Commercial Fishing Grounds and Landings
All Ports – Salmon–troll
North Region
South Region
Point Arena
Gualala
Fort Ross
Bodega Bay
Point Reyes Station
Bolinas
Sausalito
Berkeley
Emeryville
San Francisco
Half Moon Bay
Marine Protected Areas
SMCA
SMR
SMRMA
Special Closure
Relative Value of Fishing Grounds
Low
High
Survey Sample Size = 30
Total Ex-vessel Revenue (2011): $1,234,445.69
Percent of Ex-vessel Revenue Represented by Survey Sample: 17.26%
25 fathoms
50 fathoms
100 fathoms
3nm line
Tow lanes
Nautical Miles
FINAL MAP PRODUCT
MARCH 25, 2013
FINAL MAP PRODUCT


California North Central Coast 2011 Commercial Fishing Grounds and Landings
All Ports – Urchin–dive
North Region
Point Arena
Gualala
Fort Ross
Bodega Bay
Point Reyes Station
South Region
Bodega Bay
Point Reyes Station
Bolinas
Sausalito
Berkeley
Emeryville
San Francisco
Half Moon Bay
Marine Protected Areas
SMCA
SMR
SMRMA
Special Closure
Relative Value of Fishing Grounds
Low
High
Survey Sample Size = 4
Total Ex-vessel Revenue (2011): $347,837.47
Percent of Ex-vessel Revenue Represented by Survey Sample: 51.98%
25 fathoms
50 fathoms
100 fathoms
3nm line
Tow lanes
Nautical Miles
FINAL MAP PRODUCT
MARCH 25, 2013
FINAL MAP PRODUCT