

CALIFORNIA COASTAL COMMISSION

ENERGY, OCEAN RESOURCES AND FEDERAL CONSISTENCY
455 MARKET STREET, SUITE 300
SAN FRANCISCO, CA 94105-2421
VOICE (415) 904-5200
FAX (415) 904-5400



W7a

CD-0004-22 (BOEM)

JUNE 8, 2022

APPENDICES

Appendix A: Substantive File Documents

- [BOEM Appendix D: Typical Mitigation Measures for Protected Marine Mammal Species](#)
- [BOEM Consistency Determination](#)
- [BOEM Draft Environmental Assessment](#)
- [BOEM Outreach Summary Report Addendum](#)
- [CCC Sea Level Rise Policy Guidance](#)
- [Final California Commercial Landings](#)
- [Fish Business User Guide 2021 \(ca.gov\)](#) (Block data from CDFW)
- [Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations \(OREI\)](#) (pnnl.gov)
- [Maxwell et al., 2022](#)
- [Upwelling Modeling Study by Integral Consulting](#)
- [Meteorological Conditions Report](#) (also attached)
- [US Pacific Coast Seafloor Sediment](#)

Meteorological Conditions Report Morro Bay and Diablo Canyon Offshore Wind Energy Call Area

PREPARED FOR:

Kearns & West

233 Sansome Street, Suite 400
San Francisco CA 94104

PREPARED BY:

ESS Group, Inc.

10 Hemingway Drive, 2nd Floor
East Providence, Rhode Island 02915

ESS Project No. K136-000

June 26, 2019

**Meteorological Conditions Report
Morro Bay and Diablo Canyon Offshore Wind
Energy Call Area**

Prepared for:

Kearns & West

233 Sansome Street, Suite 400
San Francisco CA 94104

Prepared by:

ESS Group, Inc.

10 Hemingway Drive, 2nd Floor
East Providence, Rhode Island 02915

June 26, 2019

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
EXECUTIVE SUMMARY	
1.0 INTRODUCTION.....	1
2.0 DATA COLLECTION.....	1
3.0 METEOROLOGICAL CONDITIONS AND VISIBILITY ASSESSMENT	2
3.1 Definition of Data Parameters	2
4.0 METEOROLOGICAL CONDITIONS AND VISIBILITY RESULTS	3
4.1 Meteorological Conditions	3
4.2 Visibility.....	5
5.0 EFFECT OF HAZE ON VISIBILITY	8

TABLES

Table 1	Summary of Meteorological Conditions
Table 2	Summary of Visibility

FIGURES

Figure 1	Location of Meteorological Measurement Site
----------	---

1.0 INTRODUCTION

This report provides an analysis of the meteorological conditions associated with the Morro Bay and Diablo Canyon Offshore Wind Energy Call Areas, which BOEM is evaluating for possible offshore wind energy leasing. The call area is located off the coast of Central California in the general vicinity of the City of San Luis Obispo. Metrics associated with prevailing meteorology and with visibility that will influence views of the call area. The report will assist in understanding the meteorological conditions experienced in this area and how they may influence the visibility of a wind energy project. The analysis used existing meteorological information from a measurement site within the area where the call area is located. Data for visibility at the measurement site is reported to a distance of up to 10 nautical miles (nm) and therefore, visibility beyond 10 nm was calculated as described further below.

2.0 DATA COLLECTION

The meteorological assessment utilized hourly meteorological surface data collected at National Weather Service (NWS) measurement site located at the San Luis County Regional Airport in San Luis Obispo, California (Figure 1) over the 10-year period of January 1, 2009–December 31, 2018. Surface observations for the site were obtained from the National Climatic Data Center (now referred to as National Center for Environmental Information).

The hourly observations in the data sets include wind speed, wind direction, cloud cover, cloud ceiling height, visibility, weather codes denoting precipitation, ambient, dew point temperatures, and precipitation amounts.

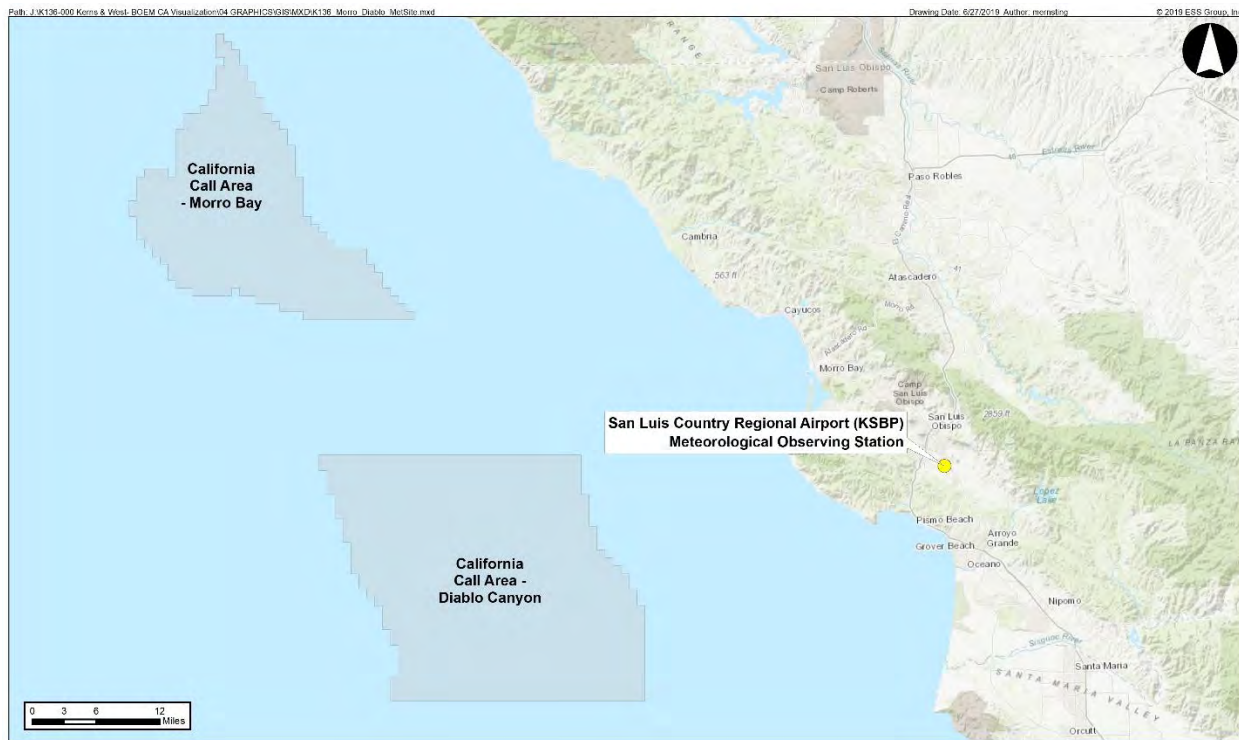


Figure 1: Location of Meteorological Measurement Site

3.0 METEOROLOGICAL CONDITIONS AND VISIBILITY ASSESSMENT

Hourly surface observations were evaluated to determine the following meteorological conditions and visibility.

Meteorological Condition

- Average number of days when it is clear, cloudy, foggy, rainy and hazy during daylight hours in each of the four seasons,
- Average number of days when it is clear, cloudy, foggy, rainy and hazy for 50% of the daylight hours in each of the four seasons,
- Average percent of daylight hours when it is clear, cloudy, foggy, rainy and hazy in each of the four seasons, and
- Average percent of nighttime hours when it is clear, cloudy, foggy, rainy and hazy in each of the four seasons (i.e. the average conditions for nighttime during each of the seasons).

Visibility

- The average number of days that there is visibility to 10 nm, 20 nm and 30 nm.
- The average number of days that have visibility to 10 nm, 20nm and 30nm for at least 50% of the day in each of the four seasons.
- The average number of days that there is visibility to 10 nm, 20nm and 30nm for at least 75% of the day in each of the four seasons.
- The average distance that visibility is reduced (from clear conditions) on each day that haze is reported in each of the 4 seasons.
- The average visibility distance in each of the four seasons.

3.1 Definition of Data Parameters

Since the analysis covers daylight and nighttime conditions, it was important to define what constitutes daylight, as it changes in duration over the year. Sunrise, sunset and civil twilight times were obtained from timeanddate.com. Civil twilight is period where there is sufficient light to start, or continue, outdoor activities without lighting. This corresponds to civil dusk, when the sun is 6 degrees, or less, below the horizon.

NWS stations provide excellent data capture; however, it is not 100% complete and missing data periods do occur. Only daylight and nighttime periods with data capture at or better than 50% for the 24-hour data period were included in the analysis, avoiding possible biases in considering periods of a few hours.

The data was evaluated for clear, cloudy, rainy, foggy and hazy conditions during daylight and nighttime hours based upon the following criteria:

- Clear conditions were defined as having an unlimited cloud ceiling height. Unlimited ceiling heights are associated with clear and scattered sky cover (up to 50% of the sky).
- Cloudy conditions were defined as broken or overcast sky cover, greater than 50% of the sky.
- Rainy conditions were defined as any “trace” or measurable precipitation (rain, snow, sleet, etc.) amount. The Integrated Surface Database (ISD) data set includes weather codes that define the type and intensity of different weather conditions. Examples of the codes are RA (rain), SN (snow), FZRA (freezing rain). A complete code list can be found in “Integrated Surface Database (ISD) Documentation” (ncdc.noaa.gov).

- Foggy and hazy conditions are defined only by weather codes. Fog has a weather code of FG. Haze has a weather code of HZ.

Each individual daylight period was characterized as being clear, cloudy, rainy, foggy or hazy. When examining the five meteorological conditions, it is possible to have multiple conditions occurring concurrently. For example, haze can occur when it is sunny. Fog and rain occur when it is cloudy or there can be light rain during fog events. In order to avoid 'double counting' any of the conditions and maintaining a 100% count, conditions were assigned based on the following:

1. An hour is either clear or cloudy.
2. If clear or cloudy conditions occur for 50% or more of the daylight hours, assign the day based on visibility restriction.
3. Clear conditions are based on unlimited ceiling height and can include haze. A day was counted as hazy before being counted as sunny.
4. Cloudy conditions are based on limited ceiling height and can also include rain and fog. The day classification order was foggy, rainy and finally cloudy.
5. If clear and cloudy conditions each account for 50% of the daylight hour, the clear condition (sunny, hazy) was assigned 0.5 day as was the cloudy condition (fog, rain, cloud).

This prioritization was also used for evaluating individual hours.

Seasons were defined as follows:

- Winter = December 22–March 21
- Spring = March 22–June 21
- Summer = June 22–September 21
- Autumn = September 22–December 21

4.0 METEOROLOGICAL CONDITIONS AND VISIBILITY RESULTS

4.1 Meteorological Conditions

Table 1 presents representative seasonal and annual meteorological conditions observed at the San Luis County Regional Airport and the frequency of occurrence and distribution of clear, foggy, rainy, hazy and cloudy conditions. The data has been rounded to a whole day value. The topmost data group presents the average number of days per season/year that each of the five conditions was observed to occur at least for one hour during the daylight period. These numbers are independent of each other and should not be summed as multiple tallies could occur in any single daylight period. For example, clouds and fog could occur in the early morning giving way to clear skies later in the morning. A thunderstorm could occur in the late afternoon. In that case, clear, cloudy, rainy and foggy conditions would all occur for at least one hour.

The second data grouping characterizes days where each day is clear, cloudy, rainy, foggy or hazy and only a single tally is made for any daylight period. This characterization is based on which of the five meteorological conditions occur for at least 50% of the hours in the daylight period. These numbers can be summed to equal to the number of valid daylight periods occurring during the year.

The third data group presents the distribution of the five meteorological conditions during daylight hours as a percentage. Each hour is characterized as clear, foggy, rainy, hazy or cloudy. The percentages of the five meteorological conditions can be summed to equal 100%.

The fourth data group presents the distribution of the five meteorological conditions during nighttime hours as a percentage. Each hour is characterized as clear, foggy, rainy, hazy or cloudy. The percentages of the five meteorological conditions can be summed to equal 100%.

Table 1 Summary of Meteorological Conditions

	Winter	Spring	Summer	Autumn	Annual
Days/Year with 1 or More Daylight Observations					
Clear	79	85	86	80	331
Foggy	11	9	9	14	40
Rainy	18	8	2	10	38
Hazy	2	4	7	2	16
Cloudy	49	64	76	49	237
Days/Year with 50% or More Daylight Observations					
Clear	60	52	41	61	214
Foggy	2	<1	<1	3	5
Rainy	6	<1	<1	2	9
Hazy	<1	<1	<1	<1	<1
Cloudy	22	36	36	20	125
Distribution of Hourly Daylight Observations (%)					
Clear	66	57	50	65	59
Foggy	3	2	1	4	3
Rainy	6	2	2	2	3
Hazy	<1	<1	1	<1	<1
Cloudy	25	38	46	28	35
Distribution of Hourly Nighttime Observations (%)					
Clear	70	78	86	78	77
Foggy	<1	<1	<1	<1	<1
Rainy	5	2	1	3	3
Hazy	<1	<1	<1	<1	<1
Cloudy	25	20	12	18	19

Clear conditions occur at least one hour during daylight 331 days per year with seasonal values ranging from 79 days during winter to 86 days during summer. Cloudy conditions occur 237 days per year, with seasonal values ranging from 49 days in autumn and winter to 76 days in summer. Fog occurred 40 days per year. Seasonal values range from 9 days in spring and summer to 18 days in winter. Rain, without associated fog, occurred 38 days per year. Seasonal values range from 2 days in summer to 18 days in winter. Haze occurred about 16 days per year, ranging from 2 days in winter and spring to 9 days in autumn.

Days were characterized as clear, cloudy, foggy, rainy or hazy based on an occurrence of the meteorological condition 50% or more of daylight hours. Clear days occurred 214 days per year, with seasonal values ranging from 41 days in summer to 61 days in autumn. Cloudy days occurred 125 days per year, ranging from 20 days in autumn to 46 days in summer. Foggy days occurred 5 days per year, with seasonal values ranging from less than one day in the spring and summer to 3 days in autumn. Rainy days occurred 9 days per year, ranging from less than one day in spring and summer to 9 days in winter. Haze occurred less than one day both annually and seasonally.

Clear conditions occurred 59% of the daylight hours over the course of the year, with seasonal values ranging from 57% in summer to 66% in winter. Fog occurred 3% of the time, with seasonal values ranging from 1% in summer to 3% in autumn. Rain, without associated fog, occurred 3% of the time, with seasonal values ranging from 2% in spring, summer and autumn to 6% in winter. Cloudy conditions, without

associated fog or rain, occurred 35% of the time, with seasonal values ranging from 25% in winter to 46% in summer. Haze occurred 1% of the time with seasonal values ranging from less than 1% in winter, spring and autumn to 1% in summer.

Clear conditions occurred 77% of the nighttime hours over the course of the year, with seasonal values ranging from 70% in winter to 86% in summer. Fog occurred less than 1% of the time, north annually and seasonally. Rain, without associated fog, occurred 3% of the time, with seasonal values ranging from 1% in summer to 5% in winter. Cloudy conditions, without associated fog or rain, occurred 19% of the time, with seasonal values ranging from 12% in summer to 25% in autumn. Haze occurred less than 1% of the time both annually and seasonally

4.2 Visibility

Visibility observations in the NWS surface data are limited to a maximum of 10 statute miles and therefore in order to evaluate visibility at the 20 nm and 30 nm distances, a methodology was developed using the observed visibility (out to 10 statute miles) and a relational algorithm. The algorithm was developed by Egan Environmental and has been used in other analysis and calculates the visibility distance based on relative humidity.

Hourly surface observations from San Luis County do not include calculated relative humidity values. Relative humidity is calculated from ambient and dew point temperatures, which were also included in the data record. Relative humidity is calculated from the following equation:

$$RH = 100 * ((112 - 0.1 * TA + DP) / (112 + 0.9 * TA)) ^8$$

Where,

RH = relative humidity

TA = ambient temperature (°C)

DP = dew point temperature (°C)

As previously stated, relative humidity values are not provided in the data record. These values are calculated using the temperature observations. There were some missing relative humidity values, however, in every case, this appears to be because there was insufficient temperature data to perform the relative humidity calculation.

The visible distance algorithm was developed from a regression analysis of Martha's Vineyard visibility and relative humidity observations¹. Visibility distance was calculated as:

$$VIS = 69.9 - 0.742 * RH$$

Where,

VIS = visibility distance (statute miles)

The calculated statute miles were then converted to nautical miles by applying a factor of 0.86839.

Visibility calculations were performed for each hour with a valid relative humidity. The calculated distance was compared to the observed distance to determine which value to carry forward in the analysis.

¹ The algorithm was developed under work conducted by ESS for BOEM and reported in "Visualization Simulations for Offshore Massachusetts and Rhode Island Wind Energy Area Meteorological Report" under Task Order M13PD00044, January 15, 2014

Observations up to 10 statute miles used the observed value. Observations at 10 statute miles used the greater of the observed or calculated values.

As mentioned above, there can be occurrences of multiple weather conditions within the same hour. Throughout all four seasons, there were reports of fog occurring within the same hour as a 10-mile visibility observation. Hours when these conditions occurred were not considered in the visibility analysis.

The following table presents representative estimated visibility distances and the frequency of occurrence of visibility greater than 10, 20 and 30 nautical miles, along with the average visibility for clear, foggy, rainy, hazy and cloudy conditions. The topmost data group presents the average number of days per season/year that there was at least one hour when visibility was at least 10, 20 and 30 nautical miles during a daylight period. The count for the 20 and 30 nm entries are also contained in the 10 nm entry. The count for the 30 nm entry is also contained in the 20 nm count.

The second and third data groups present the number of days per season/year that visibility exceeded 10, 20 and 30 nautical miles at least 50% and 75% of the daylight hours. As is the case with the topmost data group, the 20 nm and 30 nm values are subsets of the 10 nm values. The 30 nm values are subsets of the 20 nm values.

The last two data groups present the average seasonal and annual visibility distance for clear, foggy, rainy, hazy and cloudy conditions for daylight and nighttime hours. The annual and seasonal averages were determined by taking a weighted average of the five meteorological conditions.

Observations up to 10 statute miles used the observed value and observations reported as 10-statute mile in the data used the greater of the observed or calculated values, resulting in a conservative estimate of visibility. Table 2 presents a summary of the visibility results.

Table 2 Summary of Visibility

	Winter	Spring	Summer	Autumn	Annual
Days/Year with 1 or More Daylight Observations					
10 nm	70	89	88	70	317
20 nm	42	76	74	49	249
30 nm	21	36	29	28	114
Days/Year with 50% or More Daylight Observations					
10 nm	33	27	12	36	108
20 nm	14	7	3	17	41
30 nm	4	2	<1	8	15
Days/Year with 75% or More Daylight Observations					
10 nm	25	16	7	28	76
20 nm	9	4	1	13	28
30 nm	2	1	<1	6	10
Average Daylight Visibility (nm)					
Clear	15	17	15	18	16
Foggy	<1	<1	<1	<1	<1
Rainy	5	6	5	5	5
Hazy	8	4	5	7	5
Cloudy	10	9	8	9	9
Average	13	13	11	14	13
Average Nighttime Visibility (nm)					
Clear	25	23	23	27	25
Foggy	1	NA	NA	<1	<1
Rainy	6	7	14	5	6
Hazy	8	5	10	12	10
Cloudy	16	16	17	16	16
Average	22	21	22	24	22

NA - Due to fog occurring within the same hour as a 10-mile visibility as described in text above.

Visibility of at least 10 nm occurred for at least one hour during daylight 317 days per year, with seasonal values ranging from 70 days during winter and autumn to 89 days during spring. Visibility to 20 nm occurred 249 days per year, with seasonal values ranging from 42 days in winter to 76 days in spring. Visibility extended to 30 nm 114 days per year. Seasonal values range from 21 days in winter to 36 days in spring. Visibility extended to 10 nm for 50% or more of the daylight hours 108 days per year, with seasonal values ranging from 12 days in summer to 36 days in autumn. Visibility to 20 nm occurred 41 days per year, ranging from 3 days in summer to 17 days in autumn. Visibility to 30 nm occurred 15 days per year. Seasonal values ranged from less than one day in summer to 8 days in autumn.

Visibility extends to 10 nm for 75% or more of the daylight hours 76 days per year, with seasonal values ranging from 7 days in summer to 28 days in autumn. Visibility to 20 nm occurred 28 days per year, ranging from 1 day in summer to 13 days in autumn. Visibility to 30 nm occurred 10 days per year. Seasonal values ranged from less than one day in summer to 6 days in autumn.

The average daylight visibility for clear conditions was 16 nm, with seasonal values ranging from 15 nm in winter and summer to 18 nm in autumn. Cloudy conditions reduce the average visibility to 9 miles, ranging from 8 nm in summer to 10 nm in winter and autumn. Rainy, hazy and foggy conditions have an average visibility of 5, 5, and <1 nm, respectively. These visibilities are consistent through the year. The average

daylight visibility in winter, spring, summer and fall, regardless of meteorological condition, is 13, 13, 11, and 14 nm, respectively.

The average nighttime visibility for clear conditions is 25nm, with seasonal values ranging from 23 nm in spring and summer to 27 nm in fall. Cloudy conditions reduce the average visibility to 16 miles, with little seasonal variability. Visibility for rainy conditions is 6nm, with seasonal values ranging from 5 nm in winter to 14 nm in summer. Visibility for foggy conditions is less than 1 nm, with seasonal values consistent throughout the year. Visibility for hazy conditions is 10 nm, ranging from 5 nm in spring to 12 nm in autumn. The average nighttime visibility in winter, spring, summer and fall, regardless of meteorological condition, is 22, 21, 22 and 24 nm, respectively.

5.0 EFFECT OF HAZE ON VISIBILITY

As shown in the table above, haze can reduce visibility. Clear skies, on average, result in daytime visibilities of 15 to 18 nm, whereas hazy skies result in an average visibility of 4 to 8 nm. This represents approximately a 50% reduction in visibility.

Nighttime hazy skies result in average visibilities of 10 nm compared to 25 nm for clear conditions. In winter, clear skies have an average visibility of 25 nm compared to 8 nm for hazy skies. This represents approximately a 67% reduction in visibility. In spring, visibility decreases from 23 nm for clear conditions to 5 nm for hazy conditions, a reduction of approximately 78%. In summer, the average visibility for clear skies is 23 nm compared to 10 nm for hazy skies, representing a 57% reduction in visibility. In autumn, clear skies have an average visibility of 27 nm, compared to 12 nm for hazy conditions, an approximately 56% reduction in visibility.

Appendix B: List of Tables

Scope of Federal Consistency Review

- 1-1: Types of Surveys, Equipment/Methods, and Resource Surveyed
- 1-2: Projected Maximum Vessel Trips for Site Characterization

Marine Resources and Water Quality

- 2-1: Protected Marine Mammal and Sea Turtle Species Expected to Occur in the Project Area
- 2-2: Impulsive Acoustic Thresholds Identifying the Onset of PTS and TTS for Marine Mammals and Sea Turtle Species
- 2-3: Summary of PTS Exposure Distances for Protected Marine Mammal Species from Mobile HRG Sources Towed at a Speed of 4.5 knots
- 2-4: Summary of Maximum Disturbance Distances for Protected Marine Mammal Species from Mobile HRG Sources Towed at a Speed of 4.5 knots
- 2-5: Selected Seabird Species in and near the Morro Bay WEA
- 2-6: Predicted Density Ranges for Whales in the Morro Bay WEA

Environmental Justice

- 3-1: CES 4.0 Population Characteristics Indicators by Statewide Percentiles in Morro Bay
- 3-2: Race and Ethnicity in Morro Bay census tracts

Air Quality

- 4-1: Example Emissions from WEA Site Characterization and Site Assessment for the Atlantic OCS

Fill of Coastal Waters

- 5-1: Estimated Mooring Scenario

Appendix C: CDFW Fishing Data

Vessels in Central CA and WEA 1980-2020

Year	All Vessels in Central Cal	Vessels in WEA*	Vessels Landing Central Cal Ports	Percent in WEA**	Number of Vessels Home Port in Central Cal	Percent of Vessels Homeport Outside Central Cal	Vessels that Fished and Landed at Ports in Central Cal^	Vessels landing at ports outside of Central Cal	Vessels homeported in Central Cal and fished in WEA	Vessels homeported OUTSIDE Central Cal and fished in WEA
1980	1783	337	1247	19%			70%	30%		
1981	1527	261	1039	17%			68%	32%		
1982	1430	243	934	17%			65%	35%		
1983	1608	1227	1145	76%			71%	29%		
1984	1299	1007	871	78%			67%	33%		
1985	1289	923	828	72%			64%	36%		
1986	1359	978	912	72%			67%	33%		
1987	1335	1088	913	81%			68%	32%		
1988	1137	1114	896	98%			79%	21%		
1989	1249	1220	907	98%			73%	27%		
1990	1273	1249	990	98%			78%	22%		
1991	1188	1142	962	96%			81%	19%		
1992	1067	991	862	93%			81%	19%		
1993	1061	961	858	91%			81%	19%		
1994	1032	659	746	64%			72%	28%		
1995	1133	770	758	68%			67%	33%		
1996	1100	684	766	62%			70%	30%		
1997	949	607	656	64%			69%	31%		
1998	722	440	534	61%			74%	26%		
1999	693	404	441	58%			64%	36%		
2000	744	454	513	61%			69%	31%		
2001	716	371	514	52%			72%	28%		
2002	625	310	463	50%			74%	26%		
2003	568	274	425	48%			75%	25%		
2004	518	220	370	42%			71%	29%		
2005	430	244	315	57%			73%	27%		
2006	378	200	288	53%			76%	24%		
2007	389	160	302	41%			78%	22%		
2008	281	126	220	45%			78%	22%		
2009	312	157	235	50%			75%	25%		
2010	370	146	296	39%	168	55%	80%	20%	78	47%
2011	483	193	375	40%	222	54%	78%	22%	95	51%
2012	515	185	383	36%	238	54%	74%	26%	88	52%
2013	475	190	326	40%	219	54%	69%	31%	106	44%
2014	477	207	374	43%	248	48%	78%	22%	116	44%
2015	451	209	369	46%	252	44%	82%	18%	115	45%
2016	449	176	348	39%	227	49%	78%	22%	93	47%
2017	420	186	346	44%	217	48%	82%	18%	94	49%
2018	427	150	355	35%	222	48%	83%	17%	80	47%
2019	476	197	394	41%	230	52%	83%	17%	83	58%
2020	472	118	367	25%	220	53%	78%	22%	62	47%
			average	56%		average	average	average		average
						51%	74%	26%		48%
	*Greater WEA per CDFW provided image									
	**Of the vessels that fished in Central Cal, how many fished in the Greater WEA									
	^Of the vessels that fished in Central Cal, how many also landed in Central Cal									

Source: CDFW

Landings by Gear in WEA 1980-2020

Landings by Gear in greater WEA 1980-2020			Landings by Gear in greater WEA 2010-2020		
Gear Complex	Pounds	Value	Gear Complex	Pounds	Value
Trawl Nets	98,935,364	42,551,718	Trap	5,624,910	19,002,793
Hook and Line	20,592,730	36,406,714	Longline	4,103,690	10,103,283
Trap	17,048,105	30,575,931	Round Haul Nets	13,996,053	4,694,858
Entangling Nets	32,762,699	27,334,550	Trawl Nets	3,811,155	4,198,456
Longline	8,175,653	18,525,579	Hook and Line	813,229	3,621,932
Troll	11,295,965	18,464,013	Troll	504,085	3,266,657
Round Haul Nets	133,722,572	16,614,077	Entangling Nets	389,416	1,065,431
Unknown gears	39,511,092	11,532,307	Hand	73,786	95,605
Hand	1,124,367	613,524	Other Gears	39,067	81,301
Spear	49,563	143,108	Spear	1,436	12,005
Other Gears	262,162	121,989	Unknown gears	229	1,736
Hand Nets	394,840	73,164	Hand Nets	4,000	1,400
<p>Longline Note-The code for pelagic longline didn't exist until recently, so this longline is a mixture of both pelagic and set longline.</p>					

Source: CDFW

Central CA Landings by Fishery 1980-2020

CentralCalFishery (1980-2020)	Pounds	Ex-Vessel	Greater WEA_Fishery (1980-2020)	Pounds	Ex-Vessel
Market squid	695,394,911	141,416,931	Salmon	14,899,065	37,619,949
Salmon	22,289,069	59,797,855	Groundfish	80,143,881	34,382,268
Groundfish	119,383,239	56,871,076	Highly Migratory Species-Swordfish	8,505,482	20,850,680
Shrimp and Prawn	20,852,897	45,780,314	Groundfish-Sablefish	22,773,639	20,208,335
Groundfish-Sablefish	36,774,610	36,460,286	Highly Migratory Species	23,096,227	16,456,540
Groundfish-Rockfish	34,950,027	34,933,265	Market squid	118,193,276	15,657,656
Coastal Pelagic Finfish	732,194,942	33,945,035	Dungeness Crab	3,716,241	13,166,535
Dungeness Crab	8,237,576	30,059,579	Groundfish-Rockfish	14,942,871	12,674,876
Highly Migratory Species-Swordfish	12,514,174	29,444,653	Shrimp and Prawn	7,965,779	11,151,811
Highly Migratory Species	39,442,835	29,239,797	Halibut*	2,921,539	7,107,701
Other Fish	21,708,472	14,125,765	Other Fish	9,508,963	5,490,539
Halibut*	5,305,913	12,637,421	Crab	4,652,104	4,347,926
Crab	10,471,111	10,700,508	Coastal Pelagic Finfish	51,353,498	2,757,747
Other Invertebrate	19,796,646	5,366,243	Other Invertebrate	1,143,963	676,413
Lobster	182,358	1,130,080	Lobster	58,402	407,568
Kelp	248	206	Kelp	182	131
All Groundfish Total	191107876	128264627	All Groundfish Total	117860391	67265479
Grand Total	1779499028	541909014	Grand Total	363875112	202956675

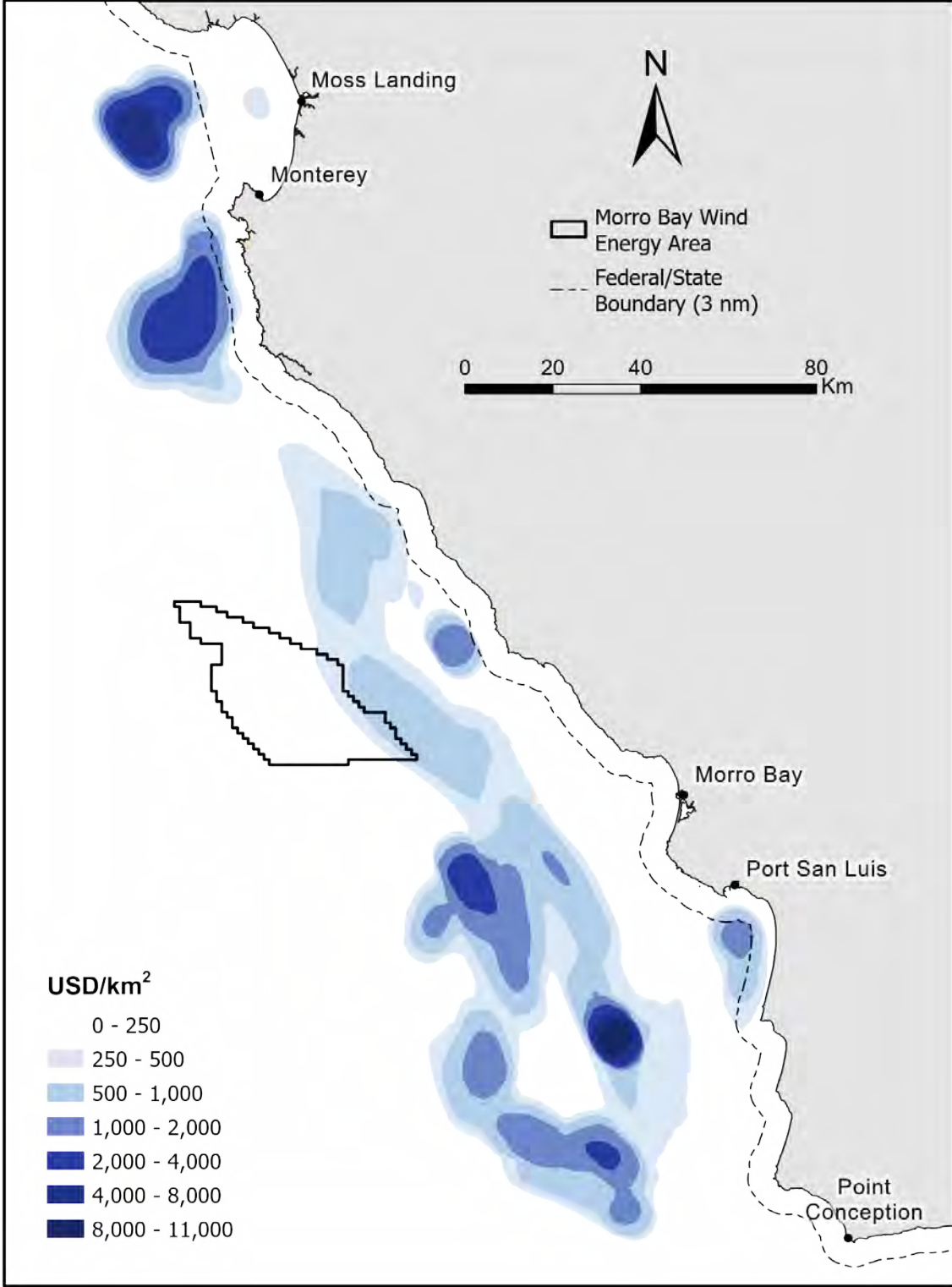
*Halibut is both California and Pacific combined. We recorded their values separately below because they are managed separately, one by the state and the other federally.

California Halibut	5,302,512	12,628,812	*California Halibut	2,919,297	7,101,484
Pacific Halibut	165	840	*Pacific Halibut	115	640

CentralCalFishery (2010-2020)	Pounds	Ex-Vessel	WEA_Fishery (2010-2020)	Pounds	Ex-Vessel
Market squid	260,834,753	91,448,755	Groundfish-Sablefish	5,041,431	11,873,233
Dungeness Crab	5,577,213	24,105,452	Dungeness Crab	2,385,214	10,525,146
Groundfish-Sablefish	9,899,254	22,202,079	Groundfish	3,046,273	5,595,278
Groundfish-Rockfish	3,361,711	13,898,932	Market squid	13,766,964	4,682,616
Salmon	1,942,258	13,531,667	Groundfish-Rockfish	1,104,267	3,449,444
Shrimp and Prawn	2,255,196	13,120,936	Salmon	417,075	3,150,414
Groundfish	7,360,966	12,068,511	Shrimp and Prawn	1,073,918	2,594,301
Coastal Pelagic Finfish	167,650,629	10,844,279	Other Fish	1,289,443	1,507,179
Other Fish	5,822,479	7,079,078	Highly Migratory Species-Swordfish	215,962	859,047
Halibut*	387,905	2,172,528	Halibut*	143,373	846,587
Crab	1,092,131	1,867,380	Highly Migratory Species	378,944	527,711
Highly Migratory Species-Swordfish	408,613	1,642,930	Crab	170,020	266,159
Highly Migratory Species	843,045	1,138,795	Lobster	10,695	146,113
Lobster	22,946	355,917	Other Invertebrate	79,498	105,514
Other Invertebrate	220,014	240,916	Coastal Pelagic Finfish	237,979	16,714
Kelp	5	44	Kelp	N/A	N/A
All Groundfish Total	20621931	48169522	All Groundfish Total	9191971	20917955
Grand Total	467679118	215718199	Grand Total	29361056	46145456

Source: CDFW

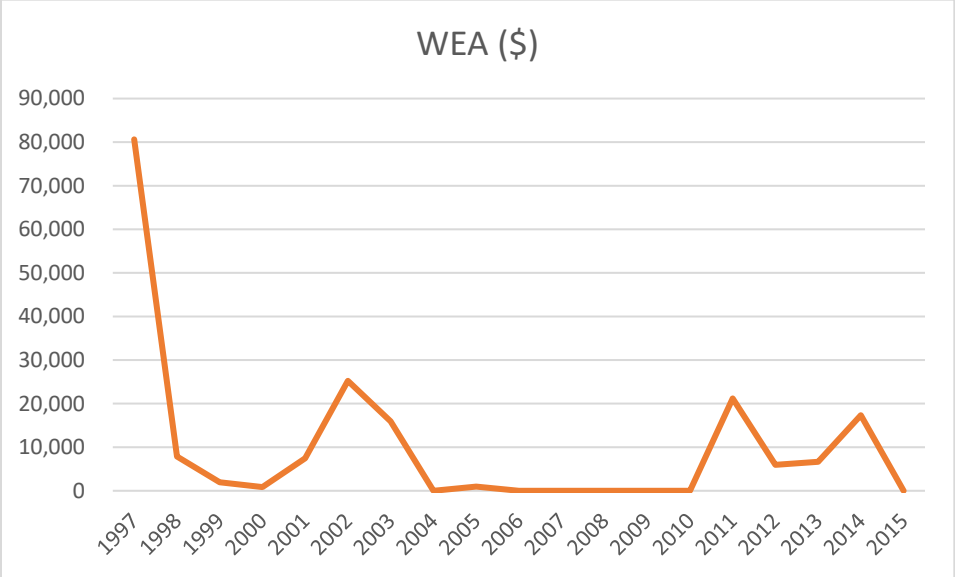
Trawl log values from 1997-2015 in USD/km²

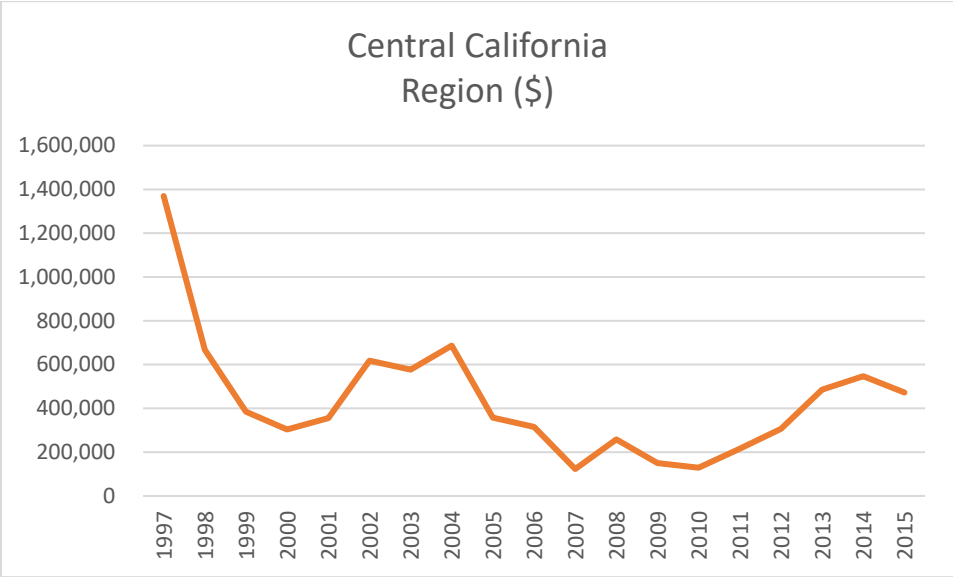
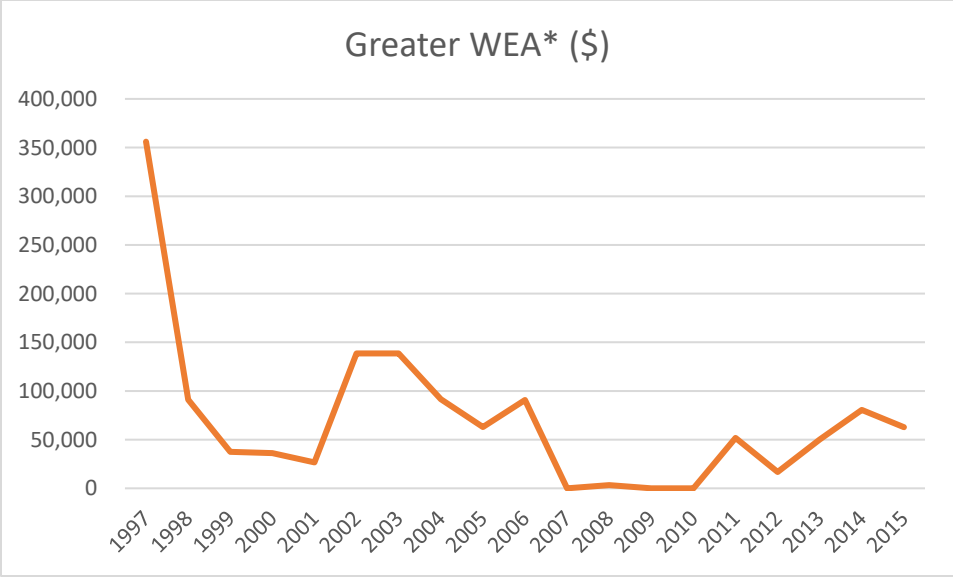


Source: CDFW

Year	WEA (\$)	Greater WEA* (\$)	Central California Region (\$)
1997	80,634	356,076	1,369,866
1998	7,864	91,118	667,330
1999	1,958	37,448	384,587
2000	848	36,110	303,777
2001	7,476	26,647	355,717
2002	25,216	138,521	617,650
2003	15,935	138,626	577,085
2004	0	91,595	686,894
2005	972	62,989	357,377
2006	0	90,695	315,558
2007	0	0	123,034
2008	0	3,261	258,528
2009	0	26	149,819
2010	0	0	128,964
2011	21,191	51,792	216,093
2012	5,948	16,767	306,709
2013	6,670	50,051	485,832
2014	17,322	80,529	547,217
2015	0	62,867	472,445
Total	192,035	1,335,119	8,324,481
Annual Average	10,107	70,269	438,131

*Fishing Blocks 560-567, 601-613, 649





Morro Bay Annual Trawl Values (Trawl Logs)

Trawl tracks less than 55km long and not intersecting with land were used to determine the dollar value of trawls intersecting the Morro Bay WEA, greater WEA, and the central coast area of analysis. The greater WEA included only 3-digit fishing blocks 560-567, 601-613, 649. Using blocks 1036 and 1037 would result in an area larger than the central coast area of analysis. The Central Coast area of analysis runs from the northern border of Monterey County to Point Conception and includes fishing blocks 516-650, 1036, 1037, and excludes block 545.

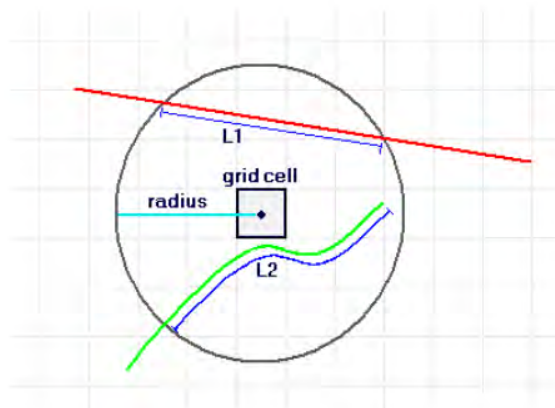
Morro Bay WEA Trawl Value Heat Map (coordinate system is NAD 83 UTM Zone 10N)

Data Source: CDFW Trawl Log Books

Map Description: Heat map of dollars per square kilometer in the Central Coast area of analysis using trawl log data from 1997-2015. The workflow for creating this map is below.

Workflow:

- a. Trawl log data (for years 1997-2015) joined to landing data using the landing receipt ID
- b. Trawl log coordinates were imported into ArcGIS Pro and converted to line data
- c. Any trawl tracks that intersected with land were removed
- d. Any trawl tracks that were longer than 55 km were removed
 - a. Assuming an average vessel speed of 2.5 knots and a maximum trip duration of 12 hours (12+ hour trips are plausible but unlikely)
- e. Any trawl tracks that both started and ended north of Moss Landing and south of Point Conception were removed
- f. Dollar values of trawl tracks were normalized by dividing the total dollar value of each track by the length of that track
- g. A density map of trawl value was created using the [Line Density](#) tool in ArcGIS Pro, which calculates the density of lines within a specified search radius (radius = 5000m) of each cell (cell size = 100m). The length of each trawl track within the circle defined by the radius was multiplied by the normalized dollar value of that track, which was then summed and divided by the area of the circle (see illustration and equation below). The tool then repeated this process for every cell within the extent of the trawl data.

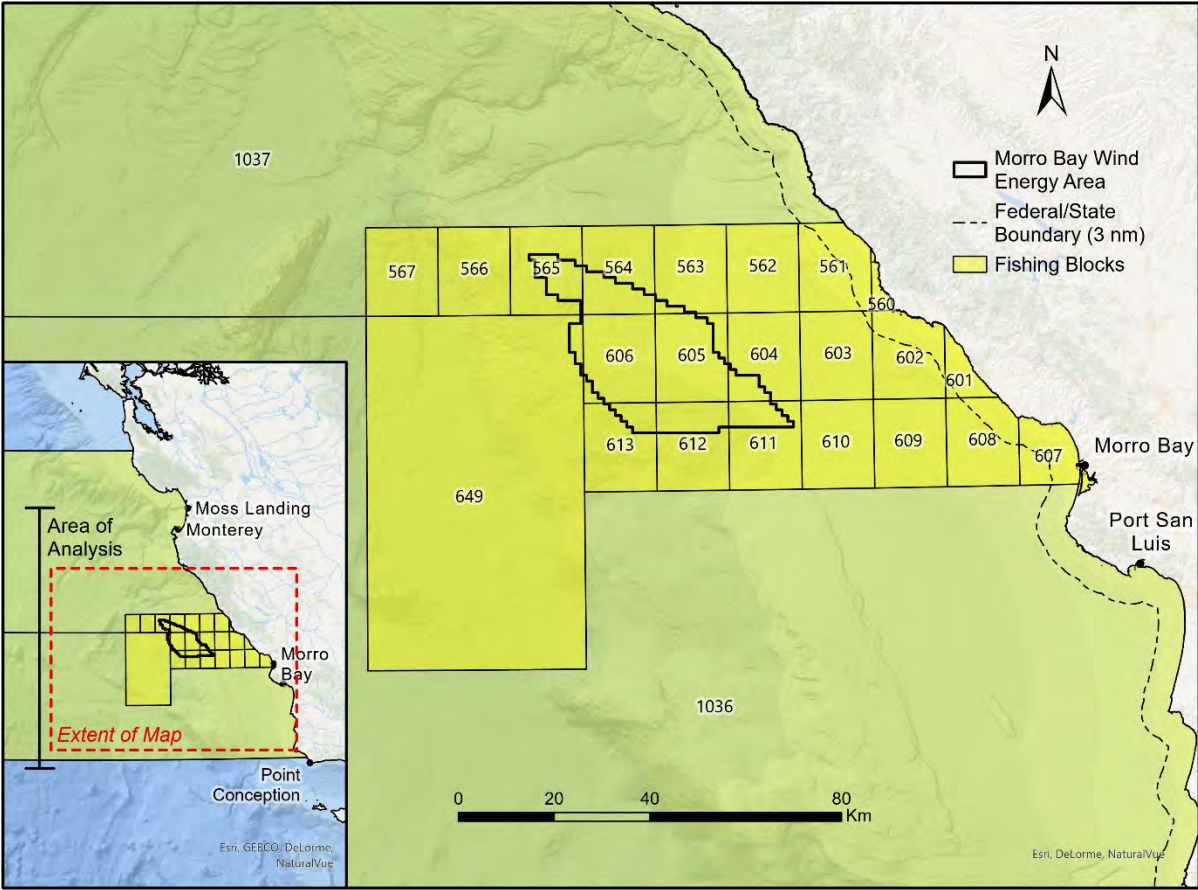


A raster cell and the circular neighborhood used to determine the length for the line density

In the illustration above, a raster cell is shown with its circular neighborhood. Lines L1 and L2 represent the length of the portion of each line that falls within the circle. The corresponding population field values are V1 and V2. Thus:

$$\text{Density} = ((L1 * V1) + (L2 * V2)) / (\text{area_of_circle})$$

Fishing Blocks in WEA



CDFW Species Grouping List

Species Code	Common Name	Large Management Groupings
700	Abalone	Other Invertebrate
701	Abalone, Black	Other Invertebrate
708	Abalone, Flat	Other Invertebrate
703	Abalone, Green	Other Invertebrate
704	Abalone, Pink	Other Invertebrate
707	Abalone, Pinto	Other Invertebrate
702	Abalone, Red	Other Invertebrate
706	Abalone, Threaded	Other Invertebrate
705	Abalone, White	Other Invertebrate
951	Agar	Kelp
917	Albacore Liver	Highly Migratory Species
953	Algae, Marine	Kelp

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
111	Anchovy, Deepbody	Coastal Pelagic Species
110	Anchovy, Northern	Coastal Pelagic Species
113	Anchovy, Slough	Coastal Pelagic Species
680	Anemones	Other Invertebrate
998	Bait	NA
826	Barnacle	Other Invertebrate
900	Barracuda Roe	Other Fish
130	Barracuda, California	Other Fish
278	Bass, Barred Sand	Other Fish
280	Bass, Giant Sea	Other Fish
277	Bass, Kelp	Other Fish
275	Bass, Rock	Other Fish
276	Bass, Spotted Sand	Other Fish
335	Bass, Striped	Other Fish
758	Bat Star	Other Invertebrate
459	Black Hagfish	Other Fish
349	Blackfish, Sacramento	Other Fish
479	Blacksmith	Other Fish
367	Bluegill	Other Fish
477	Bonefish	Other Fish
919	Bonito Liver	Other Fish
3	Bonito, Pacific	Other Fish
688	Bryozoan	Other Invertebrate
322	Bullhead, Brown	Other Fish
80	Butterfish (pacific Pompano)	Other Fish
243	C - O Turbot	Groundfish
261	Cabazon	Groundfish-Rockfish
431	Cabrilla, Spotted	Other Fish
336	Calico Bass	Other Fish
345	Carp	Crab
320	Catfish, Unspecified	Other Fish
860	Chiton, Unspecified	Other Invertebrate
401	Civache	Other Fish
728	Clam, California Jackknife	Other Invertebrate
721	Clam, Common Littleneck	Other Invertebrate
727	Clam, Common Washington	Other Invertebrate

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
733	Clam, Freshwater	Other Invertebrate
726	Clam, Gaper	Other Invertebrate
737	Clam, Northern Quahog	Other Invertebrate
725	Clam, Northern Razor	Other Invertebrate
722	Clam, Pismo	Other Invertebrate
734	Clam, Purple	Other Invertebrate
735	Clam, Rosy Razor	Other Invertebrate
723	Clam, Softshell	Other Invertebrate
720	Clam, Unspecified	Other Invertebrate
197	Cod, Pacific	Other Fish
426	Corbina, California	Other Fish
427	Corvina, Shortfin	Other Fish
823	Crab, Armed Box	Crab
809	Crab, Box	Crab
343	Crab, Brown Rock	Crab
802	Crab, Claws	Crab
800	Crab, Dungeness	Dungeness Crab
685	Crab, Hermit	Crab
804	Crab, King	Crab
807	Crab, Pelagic Red	Crab
341	Crab, Red Rock	Crab
801	Crab, Rock Unspecified	Crab
805	Crab, Sand	Crab
806	Crab, Shore	Crab
829	Crab, Southern Kelp	Crab
803	Crab, Spider	Crab
686	Crab, Spider/sheep Claws	Crab
808	Crab, Tanner	Crab
342	Crab, Yellow Rock	Crab
366	Crappie	Other Fish
827	Crayfish, Red Swamp	Other Invertebrate
825	Crayfish, Signal	Other Invertebrate
828	Crayfish, Unspecified	Other Invertebrate
421	Croaker, Black	Other Fish
422	Croaker, Spotfin	Other Fish
420	Croaker, Unspecified	Other Fish
435	Croaker, White	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
423	Croaker, Yellowfin	Other Fish
899	Crustacean, Unspecified	Other Invertebrate
241	Curlfin Turbot	Groundfish
312	Cutthroat Trout	Other Fish
242	Diamond Turbot	Groundfish
313	Dolly Varden Trout	Other Fish
481	Dolphin (fish)	Highly Migratory Species
314	Eastern Brook Trout	Other Fish
750	Echinoderm, Unspecified	Other Invertebrate
450	Eel	Other Fish
451	Eel, Blenny	Other Fish
452	Eel, California Moray	Other Fish
455	Eel, Spotted Cusk-	Other Fish
454	Eel, Wolf (wolf- Eel)	Other Fish
15	Escolar	Highly Migratory Species
188	Eulachon	Other Fish
999	Fish, Unspecified	Other Fish
689	Flatworm, Marine	Other Invertebrate
201	Flounder, Arrowtooth	Groundfish
231	Flounder, Starry	Groundfish
230	Flounder, Unspecified	Groundfish
445	Flyingfish	Other Fish
334	Freshwater Rock Bass	Other Fish
337	Freshwater Rock Bass	Other Fish
332	Freshwater Trout	Other Fish
920	Frog	NA
921	Frog, Bull	NA
482	Garibaldi	Other Fish
486	Goby, Bluebanded	Other Fish
487	Goby, Yellowfin	Other Fish
488	Goby, Zebra	Other Fish
317	Golden Trout	Other Fish
290	Greenling, Kelp	Groundfish
289	Greenling, Rock	Other Fish
198	Grenadier	Groundfish
430	Grouper	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
432	Grouper, Broomtail	Other Fish
181	Grunion, California	Other Fish
157	Guitar Fish	Other Fish
174	Guitarfish, Shovelnose	Other Fish
458	Hagfish, Pacific	Other Fish
457	Hagfish, Unspecified	Other Fish
914	Hake Liver	Groundfish
478	Halfmoon	Other Fish
907	Halibut Liver	Other Fish
222	Halibut, California	Halibut
221	Halibut, Pacific	Halibut
220	Halibut, Unspecified	Halibut
346	Hardhead (freshwater)	Other Fish
121	Herring, Pacific	Other Fish
122	Herring, Pacific - Roe	Other Fish
995	Herring, Pacific - Roe On Kelp	Other Fish
105	Herring, Round	Coastal Pelagic Species
348	Hitch	Other Fish
244	Horneyhead Turbot	Groundfish
690	Hornsnail	Other Invertebrate
699	Invertebrate Unspecified	Other Invertebrate
769	Invertebrates, Colonial	Other Invertebrate
43	Jack, Almaco (amberjack)	Other Fish
41	Jack, Pacific Crevalle	Other Fish
42	Jacks, Unspecified	Other Fish
184	Jacksmelt	Other Fish
681	Jellyfish	Other Invertebrate
601	Kahawai	Other Fish
950	Kelp, Giant	Kelp
501	Kelpfish, Giant	Other Fish
510	Kelpfishes	Other Fish
491	Killifish, California	Other Fish
744	Kumamoto Oyster	Other Invertebrate
453	Lamprey, Pacific	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
339	Large Mouthed Black Bass	Other Fish
683	Limpet, Keyhole	Other Invertebrate
709	Limpet, Unspecified	Other Invertebrate
195	Lingcod	Groundfish
473	Lizardfish, California	Other Fish
820	Lobster, California Spiny	Lobster
311	Loch Leven Brown Trout	Other Fish
191	Louvar	Other Fish
19	Mackerel, Bullet	Coastal Pelagic Species
55	Mackerel, Jack	Coastal Pelagic Species
51	Mackerel, Pacific	Coastal Pelagic Species
50	Mackerel, Unspecified	Coastal Pelagic Species
955	Marine Plants	Kelp
92	Marlin, Striped	Highly Migratory Species
485	Midshipman, Plainfin	Other Fish
908	Miscellaneous Livers	Other Fish
799	Mollusk, Unspecified	Other Invertebrate
483	Mudsucker, Longjaw	Other Fish
135	Mullet, Striped	Other Fish
730	Mussel	Other Invertebrate
476	Needlefish, California	Other Fish
58	New Zealand Mackerel	Other Fish
102	New Zealand Pilchard	Other Fish
712	Octopus, Unspecified	Other Invertebrate
17	Oilfish	Other Fish
467	Opah	Highly Migratory Species
475	Opaleye	Other Fish
742	Oyster, California Native	Other Invertebrate
741	Oyster, Eastern	Other Invertebrate
745	Oyster, European Flat	Other Invertebrate
743	Oyster, Giant Pacific	Other Invertebrate
740	Oyster, Unspecified	Other Invertebrate
922	Pacific Cultus Liver	Other Fish
285	Pelican Rockfish	Groundfish-Rockfish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
474	Perch- Like, Unspecified	Other Fish
81	Pomfret	Highly Migratory Species
816	Prawn, Golden	Shrimp and Prawn
813	Prawn, Ridgeback	Shrimp and Prawn
815	Prawn, Spot	Shrimp and Prawn
456	Prickleback, Monkeyface (eel)	Other Fish
771	Purple Coral	Other Invertebrate
440	Queenfish	Other Fish
166	Ratfish, Spotted	Other Fish
171	Ray, Bat	Other Fish
172	Ray, Pacific Electric	Other Fish
170	Ray, Unspecified	Other Fish
414	Robalos	Other Fish
924	Rockfish Liver	Groundfish-Rockfish
674	Rockfish, Aurora	Groundfish-Rockfish
663	Rockfish, Bank	Groundfish-Rockfish
252	Rockfish, Black	Groundfish-Rockfish
251	Rockfish, Black- And- Yellow	Groundfish-Rockfish
667	Rockfish, Blackgill	Groundfish-Rockfish
656	Rockfish, Blackspotted	Groundfish-Rockfish
665	Rockfish, Blue	Groundfish-Rockfish
253	Rockfish, Bocaccio	Groundfish-Rockfish
662	Rockfish, Bronzespotted	Groundfish-Rockfish
267	Rockfish, Brown	Groundfish-Rockfish
671	Rockfish, Calico	Groundfish-Rockfish
247	Rockfish, Canary	Groundfish-Rockfish
673	Rockfish, Chameleon	Groundfish-Rockfish
254	Rockfish, Chilipepper	Groundfish-Rockfish
258	Rockfish, China	Groundfish-Rockfish
655	Rockfish, Copper	Groundfish-Rockfish
246	Rockfish, Copper (whitebelly)	Groundfish-Rockfish
245	Rockfish, Cowcod	Groundfish-Rockfish
257	Rockfish, Darkblotched	Groundfish-Rockfish
657	Rockfish, Flag	Groundfish-Rockfish
263	Rockfish, Gopher	Groundfish-Rockfish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
652	Rockfish, Grass	Groundfish-Rockfish
661	Rockfish, Greenblotched	Groundfish-Rockfish
255	Rockfish, Greenspotted	Groundfish-Rockfish
654	Rockfish, Greenstriped	Groundfish-Rockfish
958	Rockfish, Group Deepwater Reds	Groundfish-Rockfish
974	Rockfish, Group Shelf	Groundfish-Rockfish
975	Rockfish, Group Slope	Groundfish-Rockfish
660	Rockfish, Honeycomb	Groundfish-Rockfish
659	Rockfish, Kelp	Groundfish-Rockfish
676	Rockfish, Mexican	Groundfish-Rockfish
651	Rockfish, Olive	Groundfish-Rockfish
271	Rockfish, Pacific Ocean Perch	Groundfish-Rockfish
653	Rockfish, Pink	Groundfish-Rockfish
264	Rockfish, Pinkrose	Groundfish-Rockfish
970	Rockfish, Quillback	Groundfish-Rockfish
675	Rockfish, Redbanded	Groundfish-Rockfish
664	Rockfish, Rosethorn	Groundfish-Rockfish
268	Rockfish, Rosy	Groundfish-Rockfish
650	Rockfish, Rougheyeye	Groundfish-Rockfish
672	Rockfish, Shortbelly	Groundfish-Rockfish
677	Rockfish, Shortraker	Groundfish-Rockfish
669	Rockfish, Speckled	Groundfish-Rockfish
270	Rockfish, Splitnose	Groundfish-Rockfish
666	Rockfish, Squarespot	Groundfish-Rockfish
256	Rockfish, Starry	Groundfish-Rockfish
668	Rockfish, Stripetail	Groundfish-Rockfish
670	Rockfish, Swordspine	Groundfish-Rockfish
658	Rockfish, Treefish	Groundfish-Rockfish
249	Rockfish, Vermilion	Groundfish-Rockfish
269	Rockfish, Widow	Groundfish-Rockfish
265	Rockfish, Yelloweye	Groundfish-Rockfish
259	Rockfish, Yellowtail	Groundfish-Rockfish
190	Sablefish	Groundfish-Sablefish
911	Sablefish Liver	Groundfish-Sablefish
351	Sacramento Perch	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
95	Sailfish	Highly Migratory Species
484	Salema	Other Fish
300	Salmon	Salmon
305	Salmon Roe	Salmon
904	Salmon Roe	Salmon
302	Salmon, Chinook	Salmon
301	Salmon, Chum	Salmon
304	Salmon, Coho	Salmon
303	Salmon, Pink	Salmon
306	Salmon, Roe (chinook, Coho)	Salmon
687	Sand Dollar	Other Invertebrate
225	Sanddab	Groundfish
226	Sanddab, Longfin	Groundfish
227	Sanddab, Pacific	Groundfish
228	Sanddab, Speckled	Groundfish
100	Sardine, Pacific	Coastal Pelagic Species
480	Sargo	Other Fish
446	Saury, Pacific	Other Fish
718	Scallop, Rock	Other Invertebrate
719	Scallop, Unspecified	Other Invertebrate
717	Scallop, Weathervane	Other Invertebrate
260	Scorpionfish, California	Groundfish-Rockfish
272	Sculpin, Staghorn	Groundfish
273	Sculpin, Yellowchin	Other Fish
754	Sea Cucumber, Giant Red	Other Invertebrate
755	Sea Cucumber, Unspecified	Other Invertebrate
757	Sea Cucumber, Warty	Other Invertebrate
981	Sea Elephant	NA
749	Sea Hare	Other Invertebrate
952	Sea Lettuce	Kelp
980	Sea Lion	NA
682	Sea Pansy	Other Invertebrate
729	Sea Slug	Other Invertebrate
751	Sea Stars	Other Invertebrate
759	Sea Urchin, Coronado	Other Invertebrate

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
753	Sea Urchin, Purple	Other Invertebrate
752	Sea Urchin, Red	Other Invertebrate
756	Sea Urchin, White	Other Invertebrate
410	Seabass, Totuava	Other Fish
400	Seabass, White	Other Fish
555	Seaperch, Striped	Other Fish
144	Senorita	Other Fish
901	Shad Roe	Other Fish
325	Shad, American	Other Fish
324	Shad, Threadfin	Other Fish
905	Shark Fin	Other Fish
906	Shark Liver	Other Fish
156	Shark, Basking	Highly Migratory Species
97	Shark, Bigeye Thresher	Highly Migratory Species
149	Shark, Blacktip	Other Fish
167	Shark, Blue	Highly Migratory Species
154	Shark, Brown Smoothhound	Other Fish
164	Shark, Dusky	Other Fish
179	Shark, Gray Smoothhound	Other Fish
169	Shark, Horn	Other Fish
153	Shark, Leopard	Other Fish
165	Shark, Pacific Angel	Other Fish
98	Shark, Pelagic Thresher	Highly Migratory Species
168	Shark, Salmon	Highly Migratory Species
162	Shark, Sevengill	Other Fish
151	Shark, Shortfin Mako	Highly Migratory Species
161	Shark, Sixgill	Other Fish
158	Shark, Smooth Hammerhead	Other Fish
159	Shark, Soupfin	Other Fish
152	Shark, Spiny Dogfish	Other Fish
163	Shark, Swell	Other Fish
155	Shark, Thresher	Highly Migratory Species
150	Shark, Unspecified	Other Fish
96	Shark, White	Highly Migratory Species
160	Sharks, Cow	Other Fish
145	Sheephead, California	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
810	Shrimp, Bay	Shrimp and Prawn
819	Shrimp, Brine	Shrimp and Prawn
817	Shrimp, Coonstriped	Shrimp and Prawn
811	Shrimp, Ghost	Shrimp and Prawn
821	Shrimp, Mantis	Shrimp and Prawn
812	Shrimp, Ocean (pink)	Shrimp and Prawn
818	Shrimp, Red Rock	Shrimp and Prawn
814	Shrimp, Unspecified	Shrimp and Prawn
189	Silversides	Other Fish
923	Skate Liver	Groundfish
909	Skate Wing	Other Fish
176	Skate, Big	Groundfish
177	Skate, California	Other Fish
147	Skate, Longnose	Groundfish
178	Skate, Thornback	Other Fish
175	Skate, Unspecified	Groundfish
338	Small Mouthed Black Bass	Other Fish
187	Smelt, Night	Other Fish
182	Smelt, Surf	Other Fish
185	Smelt, Whitebait	Other Fish
180	Smelts, True	Other Fish
945	Snail	Other Invertebrate
746	Snail, Bubble	Other Invertebrate
781	Snail, Freshwater	Other Invertebrate
732	Snail, Sea	Other Invertebrate
684	Snail, Tegula	Other Invertebrate
747	Snail, Top	Other Invertebrate
736	Snails, Moon	Other Invertebrate
415	Snapper - Mexico-	Other Fish
202	Sole, Bigmouth	Groundfish
208	Sole, Butter	Groundfish
237	Sole, C- O	Groundfish
235	Sole, Curlfin	Groundfish
211	Sole, Dover	Groundfish
206	Sole, English	Groundfish
204	Sole, Fantail	Other Fish
209	Sole, Petrale	Groundfish
207	Sole, Rex	Groundfish
203	Sole, Rock	Groundfish
205	Sole, Sand	Other Fish

CD-0004-22 (BOEM) APPENDICES

Species Code	Common Name	Large Management Groupings
210	Sole, Slender	Groundfish
212	Sole, Tongue	Groundfish
200	Sole, Unspecified	Groundfish
93	Spearfish, Shortbill	Highly Migratory Species
830	Spiders, Sea	Other Invertebrate
347	Splittail	Other Fish
760	Sponges	Other Invertebrate
365	Squawfish	Other Fish
710	Squid, Jumbo	Other Invertebrate
711	Squid, Market	Market squid
361	Stickleback, Threespine	Other Fish
173	Stingray	Other Fish
471	Sturgeon, Green	Other Fish
472	Sturgeon, White	Other Fish
470	Sturgeons	Other Fish
375	Sucker	Other Fish
292	Sunfish, Ocean	Other Fish
551	Surfperch, Barred	Other Fish
552	Surfperch, Black	Other Fish
560	Surfperch, Calico	Other Fish
561	Surfperch, Dwarf	Other Fish
559	Surfperch, Pile	Other Fish
563	Surfperch, Pink	Other Fish
562	Surfperch, Rainbow	Other Fish
553	Surfperch, Redtail	Other Fish
558	Surfperch, Rubberlip	Other Fish
554	Surfperch, Shiner	Other Fish
564	Surfperch, Silver	Other Fish
550	Surfperch, Unspecified	Other Fish
557	Surfperch, Walleye	Other Fish
556	Surfperch, White	Other Fish
91	Swordfish	Highly Migratory Species- Swordfish
912	Swordfish Liver	Highly Migratory Species- Swordfish
465	Tai	Other Fish
931	Terrapin	NA
851	Themiste	Other Invertebrate
678	Thornyhead, Longspine	Groundfish

Species Code	Common Name	Large Management Groupings
679	Thornyhead, Shortspine	Groundfish
340	Tilapia	Other Fish
196	Tomcod, Pacific	Other Fish
186	Topsmelt	Other Fish
918	Totuava Liver	Highly Migratory Species
992	Trawled Fish For Animal Food	Other Fish
997	Trawled Fish, Unspecified	Other Fish
291	Triggerfish	Other Fish
316	Trout, Rainbow	Other Fish
916	Tuna Liver	Highly Migratory Species
5	Tuna, Albacore	Highly Migratory Species
8	Tuna, Bigeye	Highly Migratory Species
4	Tuna, Bluefin	Highly Migratory Species
2	Tuna, Skipjack	Highly Migratory Species
9	Tuna, Skipjack, Black	Highly Migratory Species
6	Tuna, Unspecified	Highly Migratory Species
1	Tuna, Yellowfin	Highly Migratory Species
840	Tunicates	Other Invertebrate
240	Turbot	Groundfish
236	Turbot, Diamond	Groundfish
238	Turbot, Hornyhead	Groundfish
239	Turbot, Spotted	Groundfish
930	Turtle	NA
902	Unclassified Roe	Other Fish
310	Unclassified Trout	Other Fish
724	Venus Clam	Other Invertebrate
57	Wahoo	Highly Migratory Species
910	Whale	NA
903	Whate Sea Bass Roe	Other Fish
731	Whelk, Kellet's	Other Invertebrate
913	White Sea Bass Liver	Other Fish
490	Whitefish, Ocean	Other Fish
495	Whiting, Pacific	Groundfish
850	Worms, Marine	Other Invertebrate
146	Wrasse, Rock	Other Fish
40	Yellowtail	Other Fish
602	Zebraperch	Other Fish