

2019-20 Risk Assessments: Available Data

Last updated: May 8, 2020

FACTOR: ENTANGLEMENTS

Data provided by: Lauren Saez and Dan Lawson (NMFS)

Commercial Dungeness Crab Gear

- There have been no confirmed entanglements with California commercial Dungeness crab gear during the 2019-20 fishing season

Other and Unknown Gear Types

- Totals for calendar year 2020: 7 confirmed (4 humpback, 3 gray whales), 3 unconfirmed (2 gray, 1 unidentified whale)
 - Humpback whales: 4 confirmed entanglements
 - April 15: calf entangled with unidentified gear (likely gillnet), reported off Orange County
 - April 13: entangled with spot prawn gear set, reported off Channel Islands, partially disentangled
 - February 28: entangled with unidentified gear (dark colored line), reported off Monterey
 - February 14: entangled with gillnet, reported off San Diego
 - Blue whales: 0 reported entanglements
 - Leatherback turtles: 0 reported entanglements
 - Gray whales: 3 confirmed, 2 unconfirmed
 - 1 confirmed entanglement with WA commercial Dungeness crab gear, reported in Washington (April 24)
 - 1 confirmed entanglement with gillnet reported off San Diego (January 20)
 - 1 confirmed entanglement with unidentified gear reported off Oxnard (January 12)
 - 1 unconfirmed entanglement with a mooring buoy, report in Washington (April 29) *has not been reviewed yet*
 - 1 unconfirmed entanglement with unidentified gear, reported as buoys (March 19)

- Unidentified whale: 1 unconfirmed entanglement (March 3)
- Appendix 1 in the [4/7 Data Compilation](#) includes a summary of early spring and summer entanglements from 2013-2019.

FACTOR: OCEAN AND FORAGE CONDITIONS

Data provided by: Jarrod Santora and Isaac Schroeder (NMFS SWFSC and UC Santa Cruz)

- The Oceanic Niño Index (ONI) is based on a 3-month running mean and data are currently available through February 2020. The ONI February 2020 value is slightly positive (Figure 1) and shows warm but neutral conditions in the Tropical Pacific. The latest prediction is for neutral ONI conditions in summer 2020 (60% chance).
- North Pacific sea-surface temperature is cooling down compared to the past 5 years. Data is available through March. The monthly Pacific Decadal Oscillation (PDO) series continues a negative (cool) trend through winter (Figure 1). A negative PDO value favors productive cool upwelling conditions in spring, related to increase likelihood of krill concentrations offshore (especially along the outer shelf break).
- March upwelling indices (Coastal Upwelling Transport Index; CUTI) were strong at 39°N, which is an important upwelling center (Figure 2). The March 2020 value was less than February, but overall winter upwelling is much higher than previous years. This above average positive value indicates productive cool upwelling conditions in spring and related to an increase of krill concentrations offshore (especially along the outer shelf break).
- The Habitat Compression Index (HCI) for April 2020 is above the long-term mean (Figure 3). The map of sea surface temperature indicates expansion of cooler waters to the north, but temperatures are still warmer in the south. The regional cool (north) and warm (south) has persisted the past several months. The above average positive winter values of the seasonal HCI (January-March averages), show an improvement in the amount of cool water compared to the previous 4 years.
- Collectively, these conditions (neutral ONI, negative PDO, above average upwelling, and above average and expanding HCI), strongly indicate above average ocean conditions and development of a cool and productive spring upwelling ecosystem. Based on historical observations and analyses, the thresholds and trends in these ocean variables continue to favor the expansion of cool habitat and increased concentration of krill abundance offshore through May-June 2020. The continued winter and spring ocean climate observations are

comparatively much improved over previous winters and indicate an overall lower risk of whale entanglement due to the likelihood of increased krill concentration offshore.

- However, maps of sea-surface temperature (Figure 4) and the boundary of the habitat compression index (Figure 3) indicate a persistent regional cool/warm pattern over the past few months. Temperatures within the southern California Bight are also higher than average and persistent over the past few months.
- Temperature patterns are known to influence regional distribution patterns of forage. Across California, this strong regionalization of temperature and upwelling conditions may reflect different regional feeding conditions for whales. Furthermore, anchovy abundance continues to remain high and patchy throughout the central California Current Ecosystem and aggregations of feeding whales associated with anchovy should be anticipated.

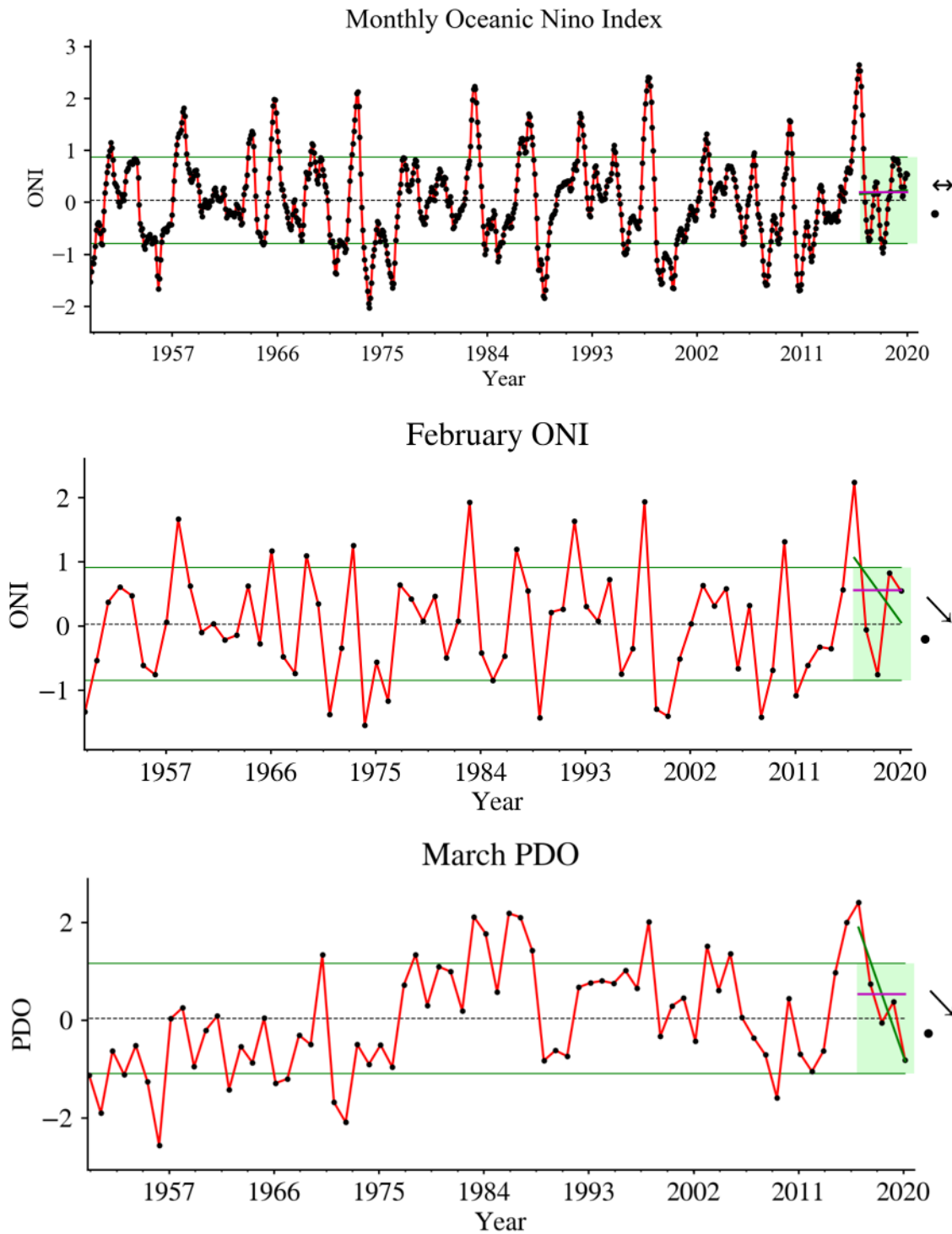


Figure 1. From top to bottom: monthly Oceanic Niño Index (ONI); February ONI time series; Pacific Decadal Oscillation (PDO) Index for March. The ONI indicates continuation of neutral conditions in spring and summer 2020. The PDO is climate state indicator and provides information on whether the ocean is likely to remain in a cool or warm state. The recent switch to negative values represents a trend towards cooler condition in the North Pacific Ocean. The dashed line is the long-term mean, green lines are +/- Standard Deviation, and arrows indicate presence of increasing, decreasing or no trend over past 5 years.

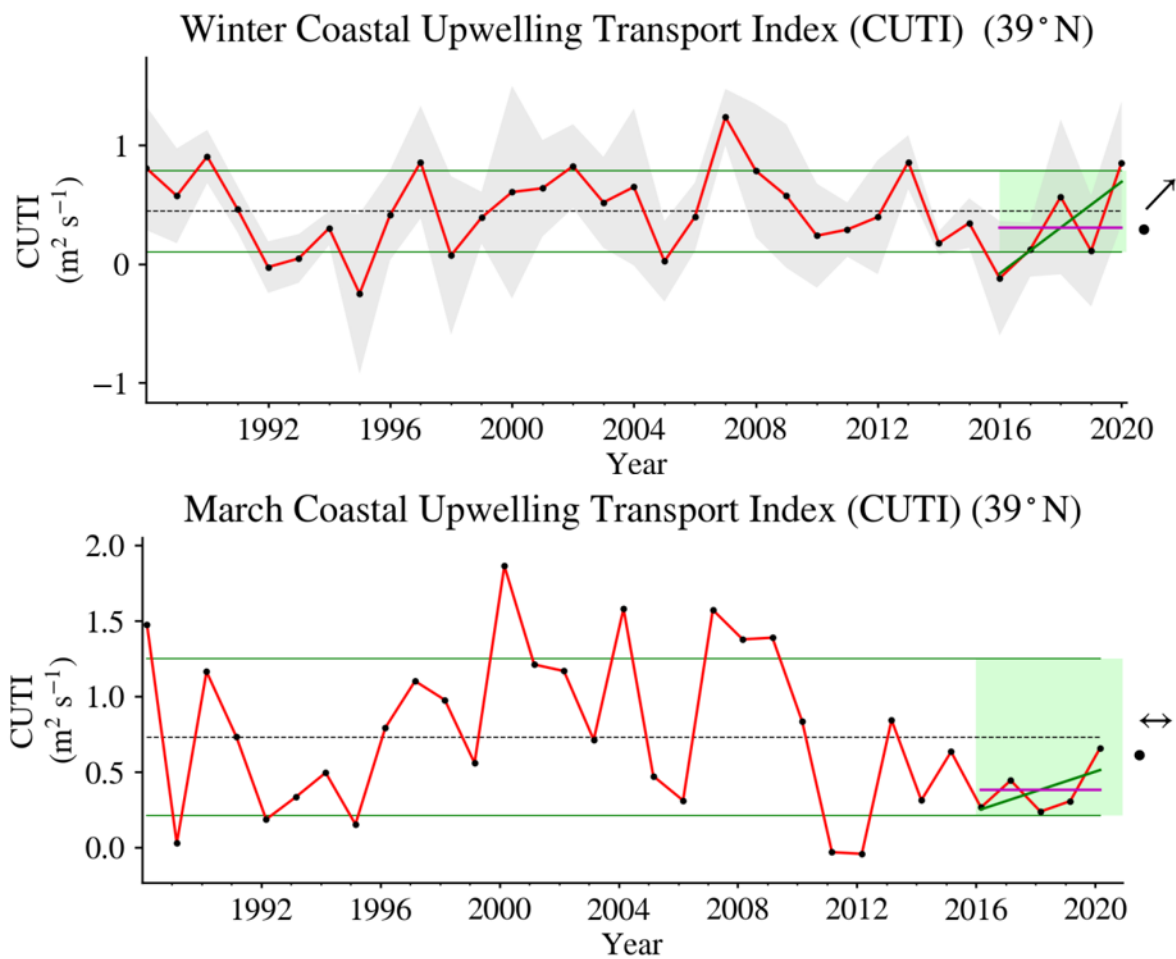


Figure 2. (top) Winter Coastal Upwelling Transport Index (CUTI; measurement of vertical velocity) at 39°N, and (bottom) March Coastal Upwelling Index. The dashed line is the long-term mean, green lines are +/- Standard Deviation, and arrows indicate presence of increasing, decreasing or no trend over past 5 years.

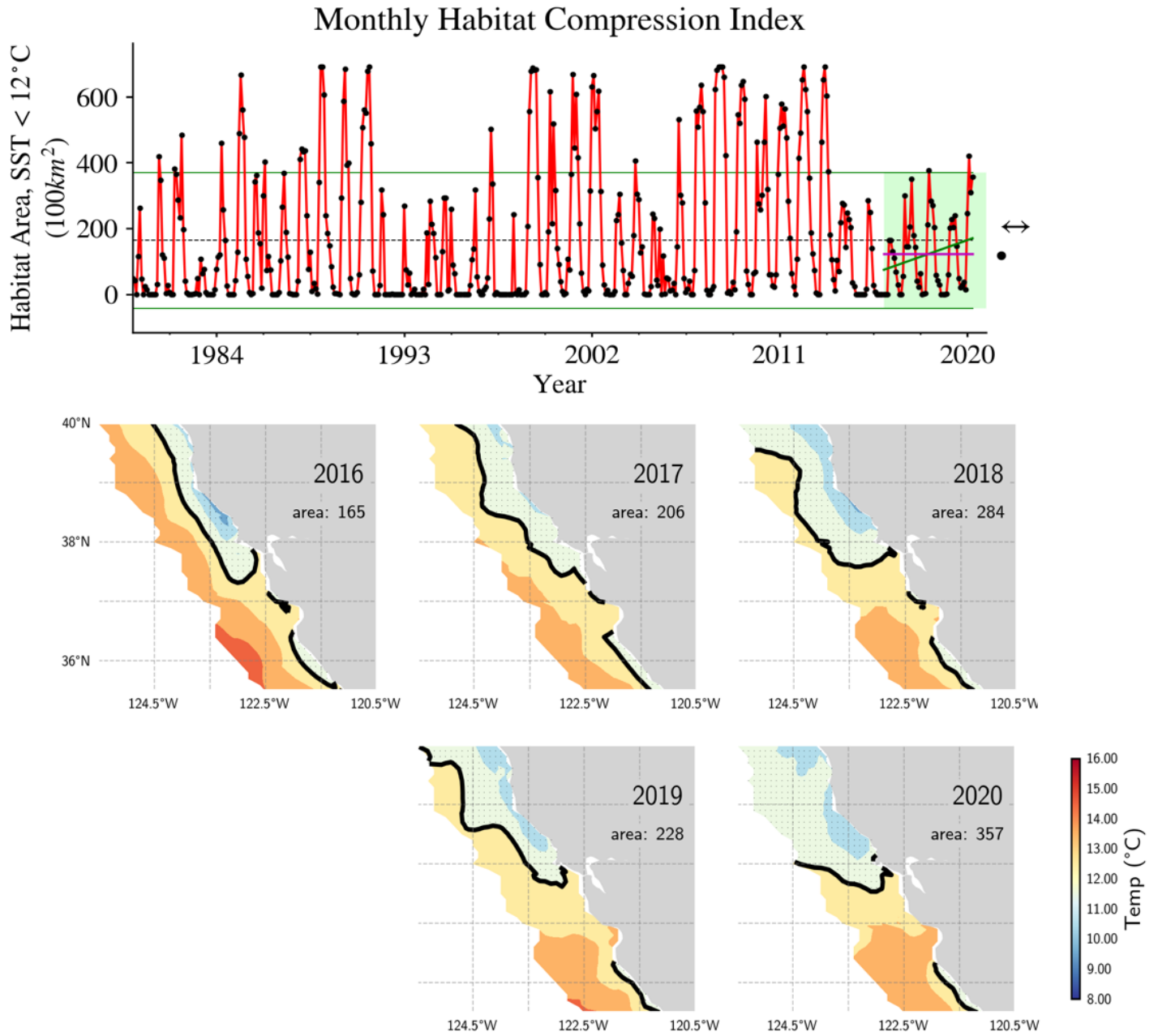


Figure 3. (top) Monthly Habitat Compression Index (HCI), and (bottom) maps of March sea surface temperature and location of HCI boundary (black thin line) indicate the relative amount of cooler surface water during the past 5 years. Positive values of HCI indicate increased area of cool water habitat.

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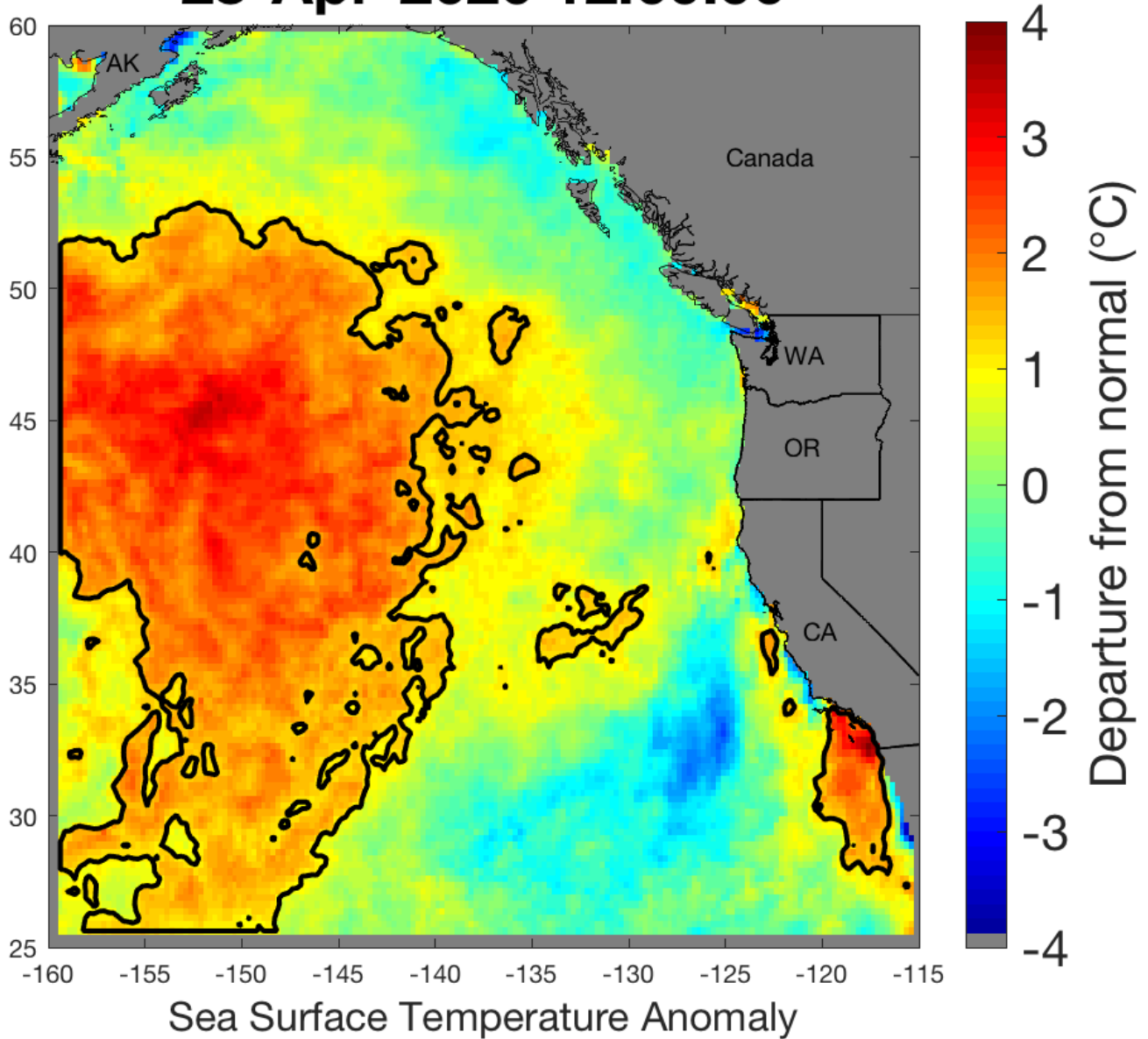


Figure 4. Provisional daily interpolated standardized sea surface temperature anomalies (SSTa) in the California Current ecosystem. Dark outline shows the current extent of the Northeast Pacific Marine Heatwave of 2019, or NEP19, off the US West Coast and Gulf of Alaska, as delineated by values of the normalized SSTa > 1.29 standard deviations from normal. SST data from NOAA's Coral Reef Watch program (<https://coralreefwatch.noaa.gov/satellite/index.php>), with the SST anomaly calculated using climatology from NOAA's OISST dataset. Note: this image is considered provisional and is subject to change, as it uses a different SST data source than the complete MHW reanalysis (see Figure 2 at <https://oceanview.pfeg.noaa.gov/projects/mhw/latest>).

FACTOR: FISHING DYNAMICS

Data provided by: California Department of Fish and Wildlife

Marine Landings Data System and Automated License Data System

- All analyses were conducted with landing receipt data available as of May 6, 2020. Submission requirements through the E-Tix platform and subsequent availability in the Marine Landings Data System means data are relatively complete through late-April; only landings through April 25, 2020 (Week 19) were included in the totals and figures below.
- During the 2019-20 season, there have been 6,550 landings of Dungeness crab (13,376,923 pounds and \$45,041,927 in Ex-Vessel Value) by 456 vessels.
- CDFW MacroBlocks (aggregated CDFW Fishing Blocks used to report catch location) are shown in Figure 5.
- Vessel activity is low in most ports, with recent increases in the number of vessels making landings into Crescent City and (to a lesser extent) Half Moon Bay (Figure 6).
- Total volume decreased during the week of April 12 and then increased to around 100,000 pounds during the week of April 19. During the week of April 19, the highest volume was landed into Crescent City, followed by Bodega Bay and Trinidad (Figure 7), and the highest harvest was from MacroBlock 1038, followed by 1041 (Figure 8).
- Number of deployed traps (referred to as “maximum potential traps” in earlier available data compilations and Working Group recommendations) is estimated by summing the number of allotted traps (i.e. trap tier) for each permitted vessel making a landing during the specified time period. Overestimation may occur if a vessel does not utilize their full trap allocation. Underestimation may occur if a vessel has traps deployed but does not make a landing during that time period or if a vessel number was incorrectly reported on a landing receipt (preventing assignment of the vessel’s trap allocation). Incorrectly reported catch locations (blocks) will also generate discrepancies. Within these constraints, the estimated number of deployed traps during the week of April 19 is at least 28,325 (Table 1). Summed across all MacroBlocks, the estimated number of deployed traps during this week is approximately 25% of those deployed during the first week when both management areas were open.

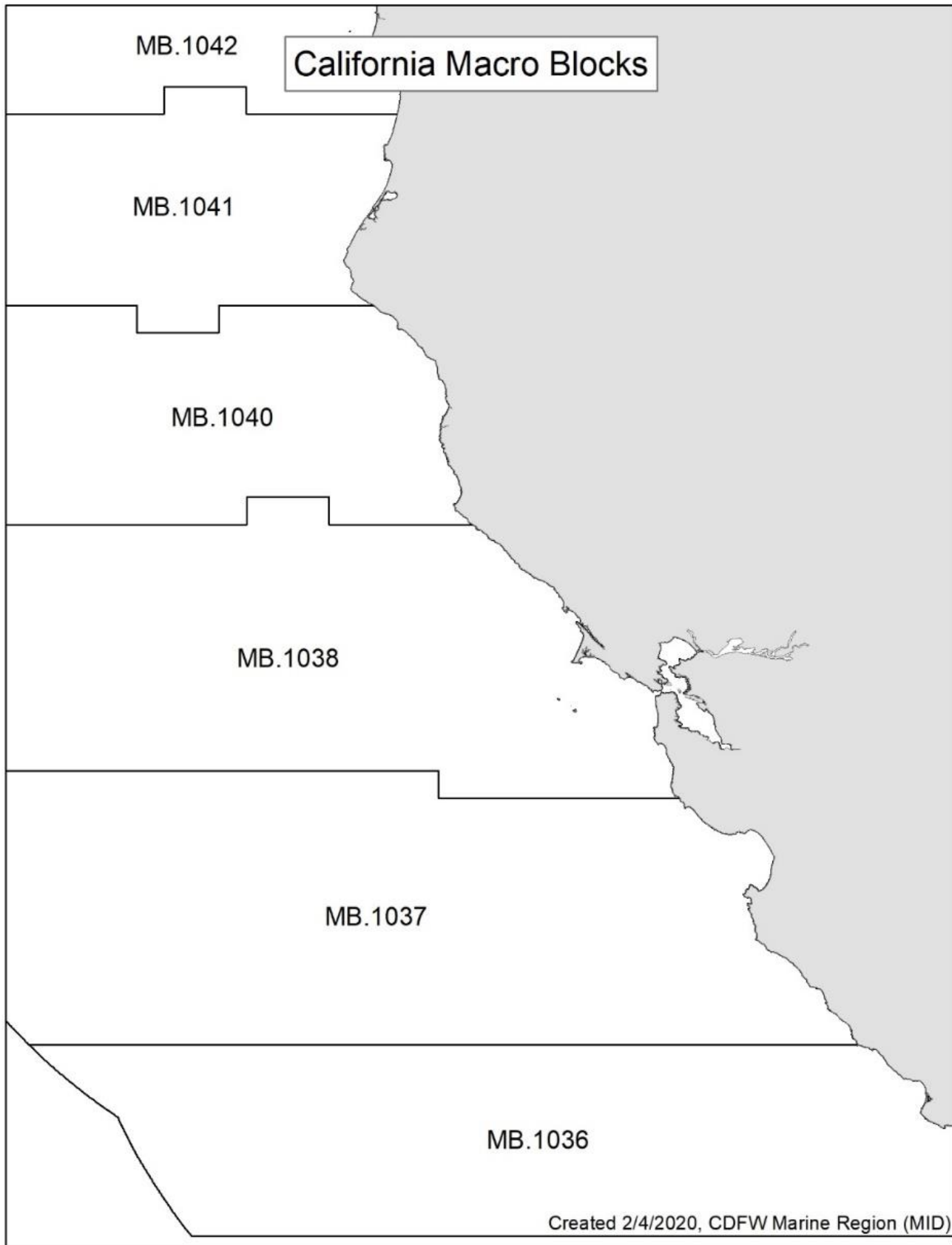


Figure 5. Map showing spatial extent of MacroBlocks used for summarizing landings analysis.

Number of Active Vessels, by Week and Port Complex, 2019-20 Season

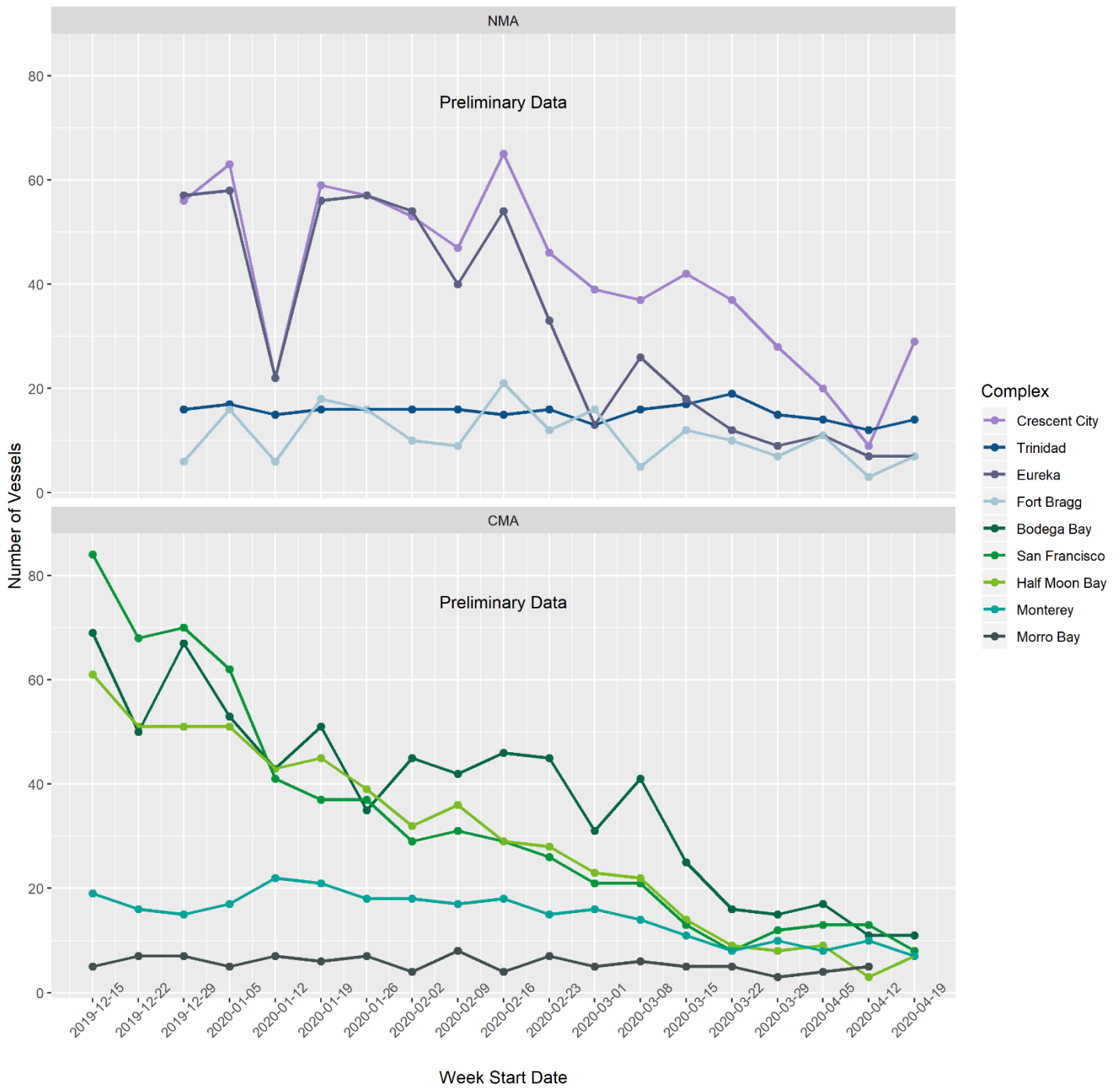


Figure 6. Number of vessels making Dungeness crab landings by week and port complex. Accessed from CDFW's Marine Landings Data System on May 6, 2020. All data is preliminary and subject to change.

Volume of Landings (Pounds), by Week and Port Complex, 2019-20 Season

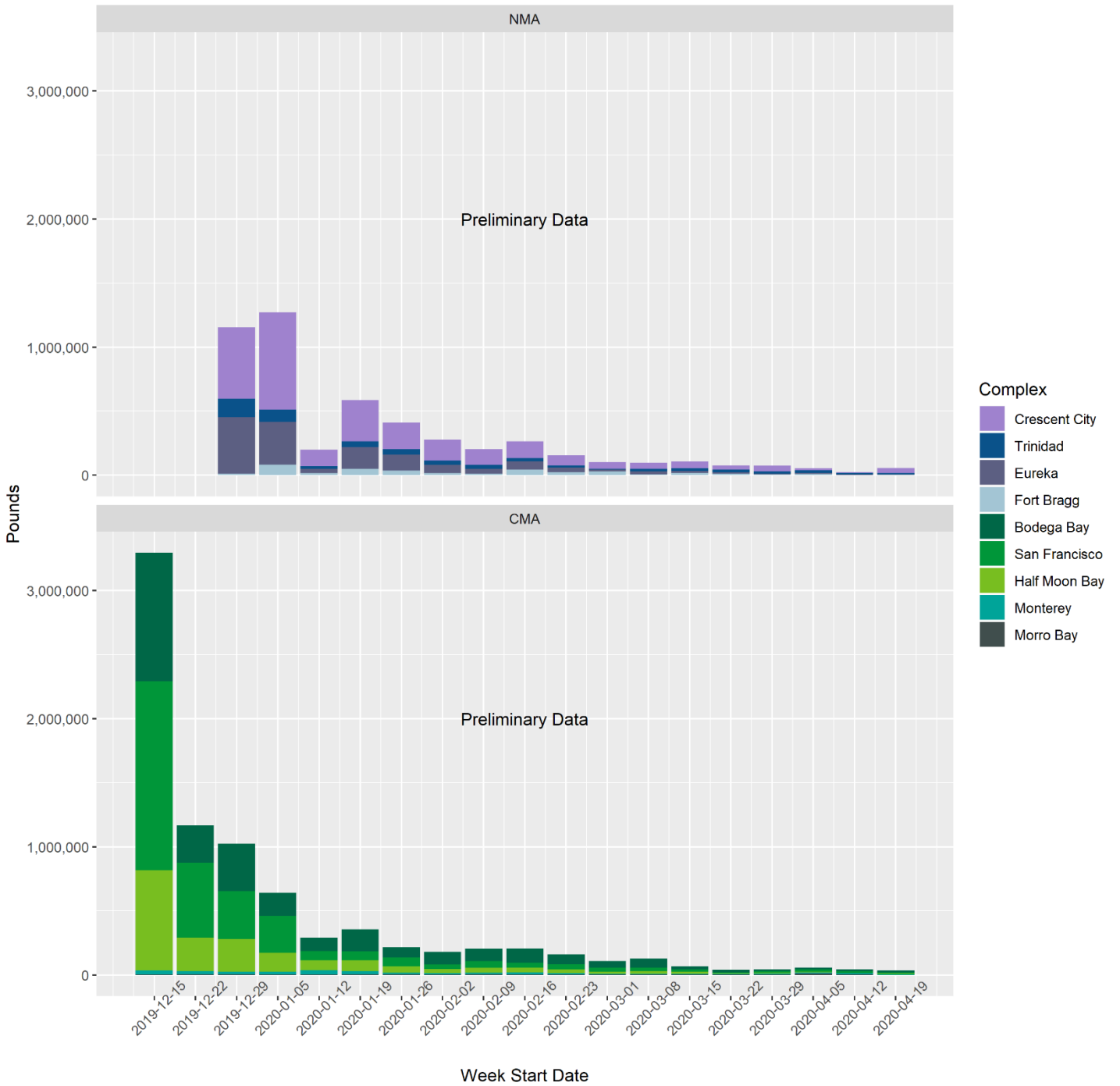


Figure 7. Dungeness crab landings (pounds) by week and port complex. Accessed from CDFW’s Marine Landings Data System on May 6, 2020. All data is preliminary and subject to change.

Volume of Landings (Pounds), by Week and MacroBlock, 2019-20 Season

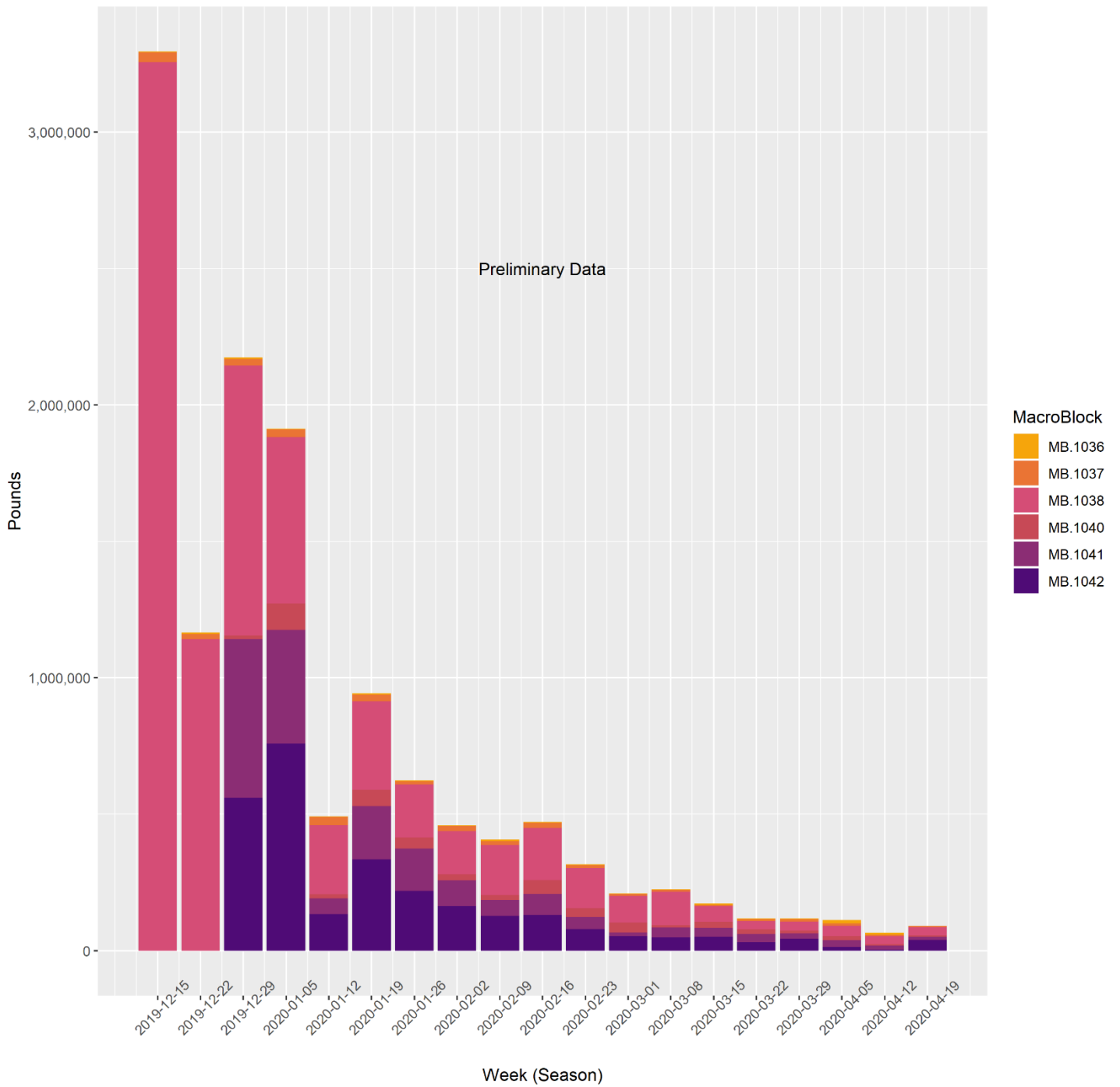


Figure 8. Dungeness crab landings (pounds) by week and MacroBlock. Accessed from CDFW's Marine Landings Data System on May 6, 2020. All data is preliminary and subject to change.

Table 1. Estimated number of Dungeness crab traps deployed in each MacroBlock based on trap allotments of vessels making landings each week. Accessed from CDFW's Marine Landings Data System and Automated License Data System on May 6, 2020. All data is preliminary and subject to change. Information from the week of 4/19 and MacroBlock 1036 is withheld for confidentiality (less than 3 vessels making landings).

Week of	MB.1036	MB.1037	MB.1038	MB.1040	MB.1041	MB.1042
12/15/2019	1,100	5,425	65,900	*season not open	*season not open	*season not open
12/22/2019	1,725	4,350	53,700	*season not open	*season not open	*season not open
12/29/2019	1,725	4,400	60,325	2,175	24,225	20,875
1/5/2020	1,300	5,100	52,075	5,175	23,875	24,175
1/12/2020	1,300	5,000	37,600	1,600	14,350	9,550
1/19/2020	1,550	5,300	39,900	5,425	22,600	23,400
1/26/2020	1,725	4,175	33,700	5,125	24,250	20,075
2/2/2020	1,050	5,150	31,875	3,675	22,300	19,325
2/9/2020	1,725	4,575	32,100	2,975	18,600	19,325
2/16/2020	1,050	5,400	31,600	6,075	22,350	23,500
2/23/2020	1,625	3,975	28,825	4,500	14,100	17,750
3/1/2020	1,475	3,850	21,550	4,500	8,400	14,775
3/8/2020	1,550	3,950	26,025	2,225	11,250	13,800
3/15/2020	1,375	2,625	14,300	3,800	10,700	16,100
3/22/2020	1,125	2,175	9,475	3,575	10,025	13,125
3/29/2020	675	2,350	10,175	3,175	7,225	11,075
4/5/2020	925	1,850	11,250	4,100	6,625	7,250
4/12/2020	1,100	2,625	7,450	2,100	5,825	3,225
4/19/2020	confidential	1,575	7,275	3,150	6,675	9,650

FACTOR: MARINE LIFE CONCENTRATIONS

Data provided by: Monterey Bay Whale Watch (compiled by Karin Forney, NOAA SWFSC), Scott Benson (NMFS SWFSC), Point Blue Conservation Science

Monterey Bay Whale Watch (MBWW)

- Commercial MBWW whale-watching trips remain suspended because of COVID-19, but Nancy Black has conducted research-only trips on all except 3 days during the last two week period (4/20 – 5/3). Karin Forney has standardized these research trips to the same ‘whales per half-day-trip’ unit used in previous summaries.
- The average number of humpback whales per half-day-trip (Figure 9) was 27.6 during the past week (4/27-5/3), with a daily range of 12-46 whales and trips on five days. This is an increase from previous weeks. Figure 10 is the same as Figure 9 except it only shows recent data to make current patterns more visible.

- The number of humpback whales documented in Monterey Bay since mid-April 2020 is at the upper range of historical (2003-2020) numbers during this time period (Figure 11).
- No blue whales have been observed since mid-December 2019, consistent with their southward winter migration.
- No gray whales have been seen since April 25, consistent with their northbound migration (from their winter breeding grounds in Mexico to their summer feeding areas in Alaska).

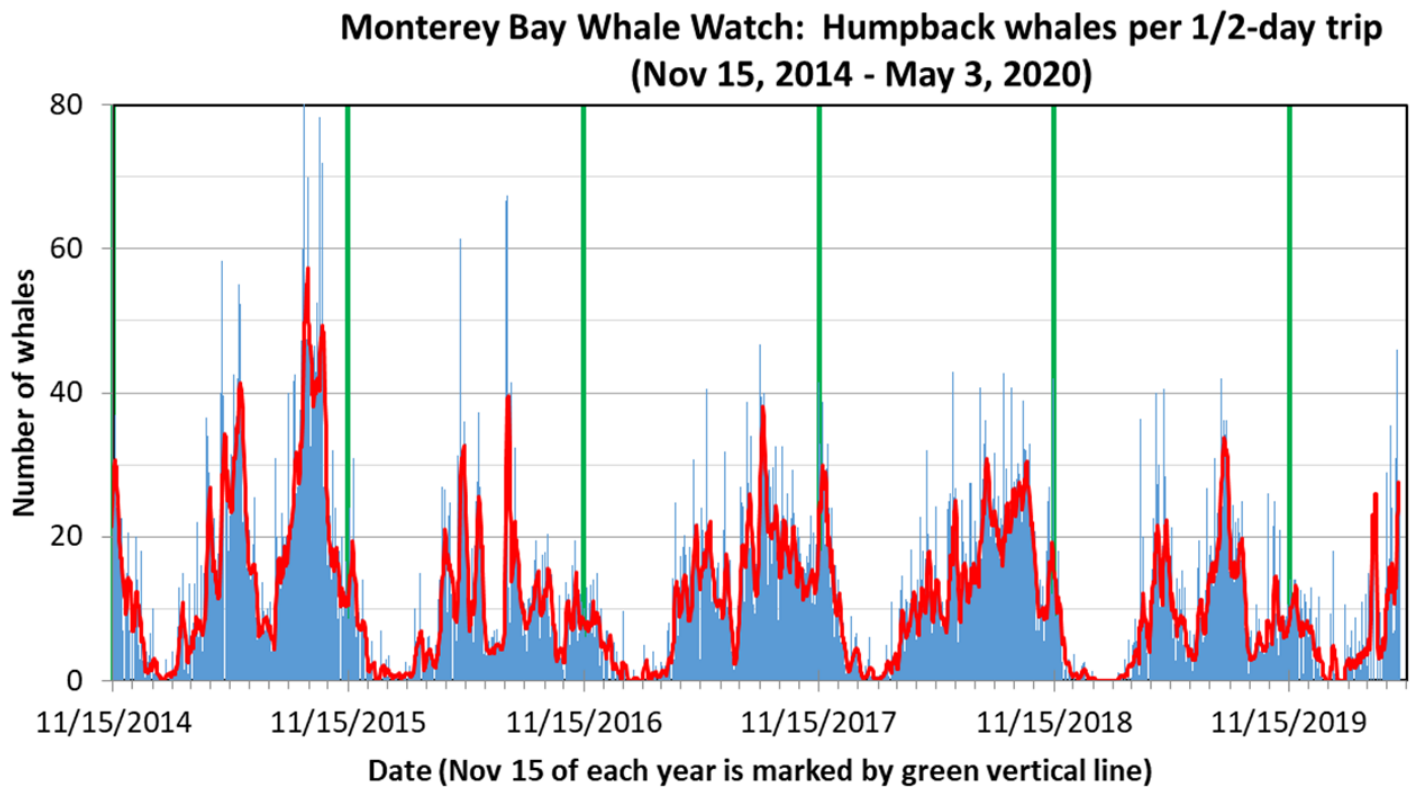


Figure 9. Standardized number of humpback whale sightings from 15 November 2014 – 3 May 2020 for Monterey Bay Whale Watch. After 3/17/2020 these trips are research trips rather because commercial whale-watching operations were suspended in response to COVID-19, but all were standardized to a consistent metric of ‘whales per half-day-trip’. The y-axis is the number of whales; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns a bit easier to see. A vertical green line has been added at November 15 of each year for reference. Each tick mark is one month.

Monterey Bay Whale Watch: Humpback whales per 1/2-day trip (Jan 15, 2019 - May 3, 2020)

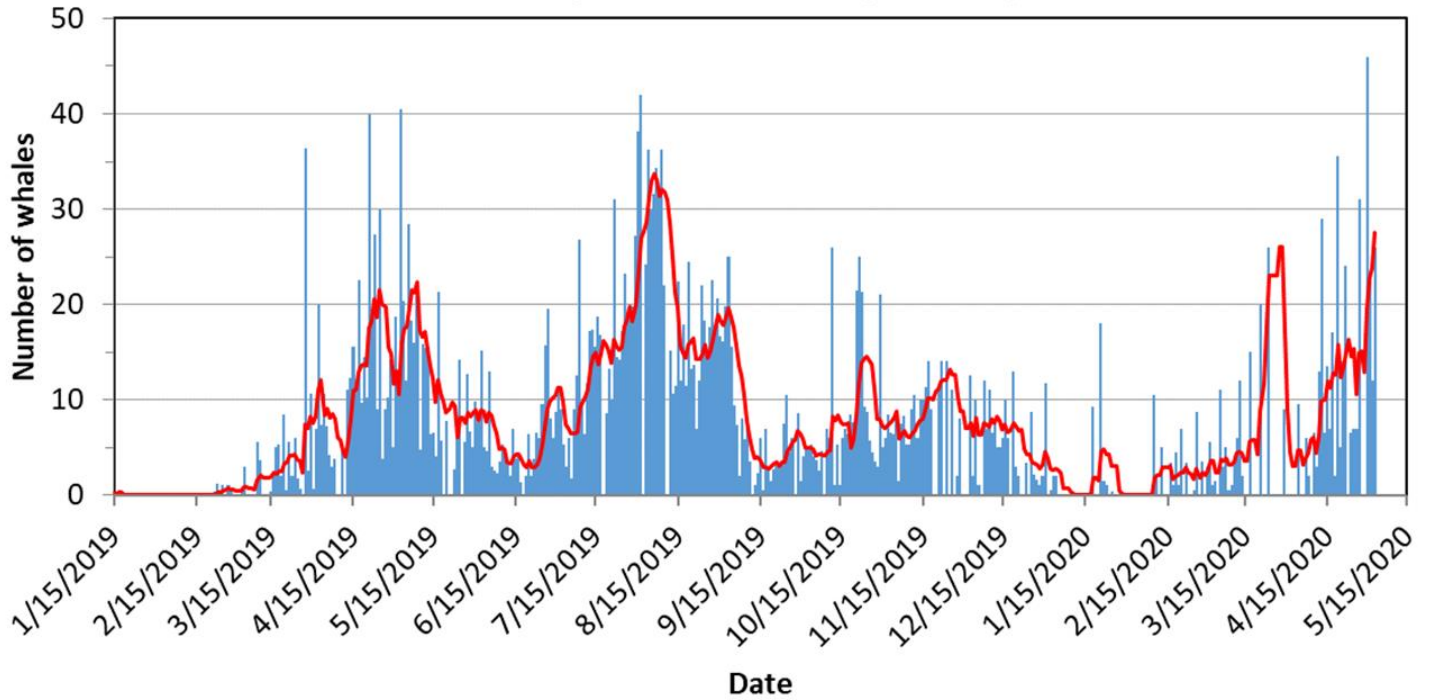


Figure 10. Standardized number of humpback whale sightings by Monterey Bay Whale Watch for 15 January 2019 – 3 May 2020. Data are the same as for Figure 9, standardized to ‘whales per half-day-trip’. The y-axis is the number of whales; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average.

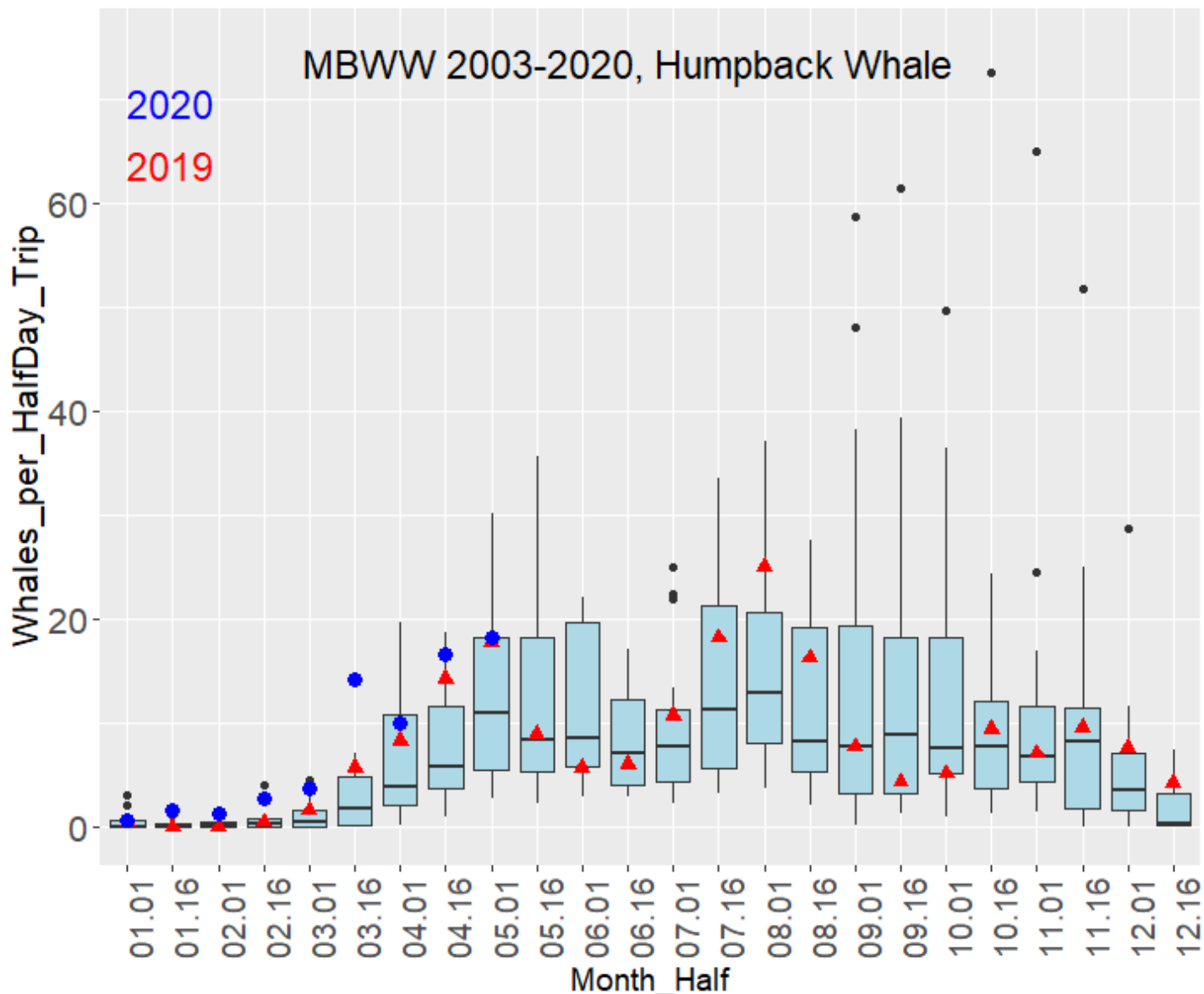


Figure 11. Historical Monterey Bay Whale Watch data for 2003-2020, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average number of whales; the blue box shows the 25th -75th percentiles (i.e., half of all past whale numbers are within the blue box); the vertical lines show the range of whale numbers excluding outliers, and outliers are shown as small black dots. Values for 2019 (red triangles) and 2020 (large blue dots) are provided for reference, placing recent whale numbers in a historical context.

Leatherback Sea Turtle Tagging Data

As of May 5, three of six transmitters that were attached to leatherback turtles during September/October 2019 remain active. One turtle is approaching California (32.67N, 122.10W), approximately 133 miles southwest of Point Conception and moving in a northeast direction. The two other turtles are near the Tropic of Cancer and continue to move in a northeast direction toward the North American continent.

- Observations by trained biologists at the Farallon Islands show 6 humpback whales reported through the Spotter/WhaleAlert app in the last 7 days (Figure 12). No blue whales were reported during this time period.
- Observations within Monterey Bay included 272 Humpback Whales reported through the WhaleAlert app over the last 7 days ending on May 6, 2020 (Figure 13). No blue whales were reported during this time period.
- No whale observations by trained naturalists from Channel Islands National Marine Sanctuary and the National Park Service were reported during this ‘shelter-at-home’ period.



Figure 12. Six humpback sightings in the Gulf of the Farallones from April 29 to May 6, 2020. Reporting locations are represented by white circles. A given report may represent multiple individuals. In the online data portal, clicking on a given report will display additional information (e.g. observation date, number of individuals by species).

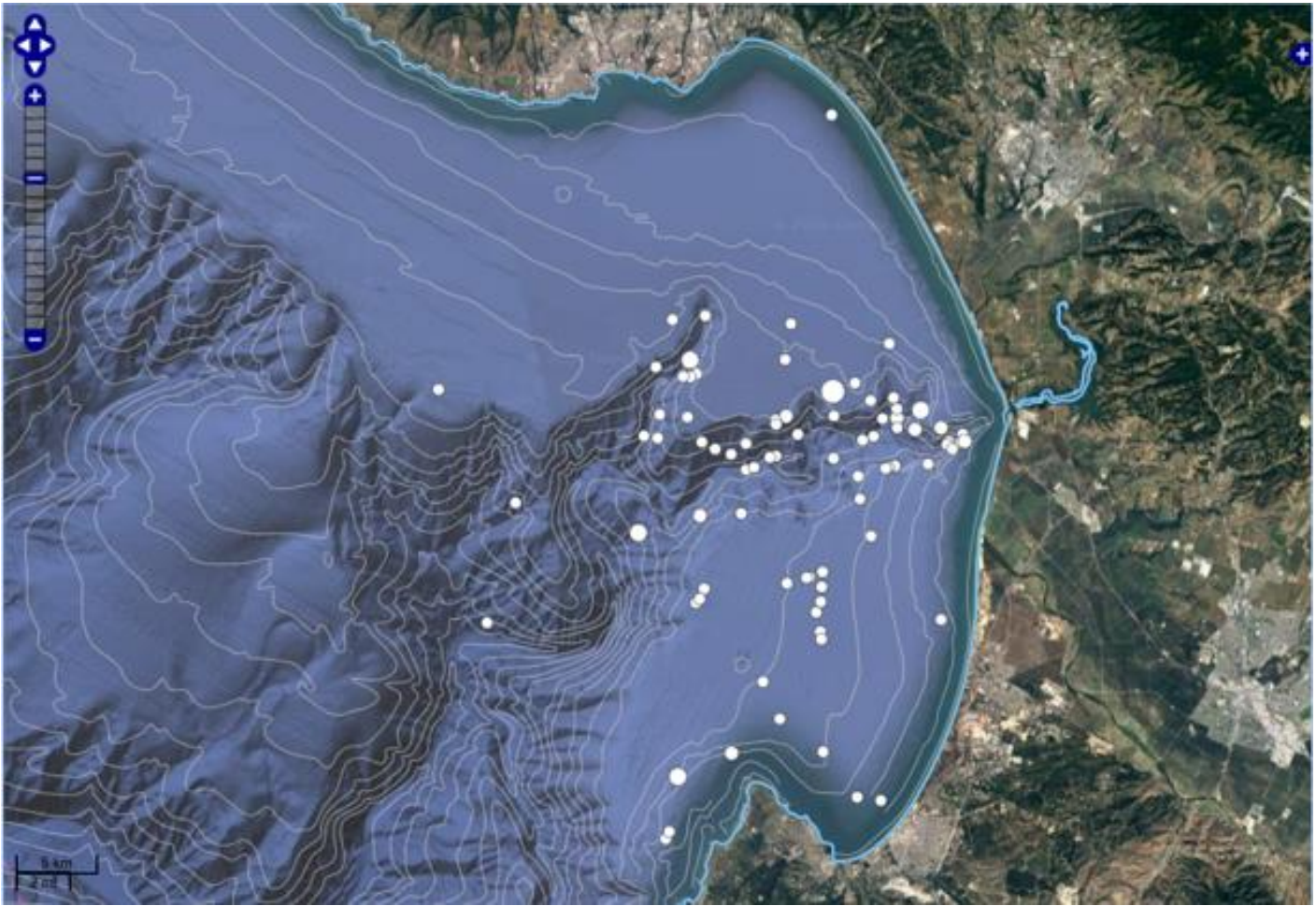


Figure 13. 272 humpback sightings in the Monterey Bay area from April 29 to May 6, 2020. Reporting locations are represented by white circles. A given report may represent multiple individuals, and the same individual may be included in multiple reports. Sightings were reported during research surveys by Nancy Black/Monterey Bay Whale Watch and Peggy Stap/Marine Life Studies. In the online data portal, clicking on a given report will display additional information (e.g. observation date, number of individuals by species).

CDFW Aerial Surveys

CDFW conducted a reconnaissance flight from Point Reyes to Eureka on Thursday May 7, 2020. A small group of Humpback whales were observed west of Point Reyes during the flight (Central Management Area). Observation conditions were impacted by heavy winds along some stretches of the coast, but no whales were observed in the Northern Management Area.