

## 2020-21 Risk Assessment Mitigation Program - Available Data

Last updated: April 29, 2021

### TRIGGERS REQUIRING MANAGEMENT ACTION

#### Section 132.8(c)(1): Confirmed Entanglements

*Data provided by: Lauren Saez and Dan Lawson, National Marine Fisheries Service (NMFS) and evaluated by the California Department of Fish and Wildlife (CDFW)*

#### **Summary of All West Coast Entanglements (by NMFS)**

Fishing Zone: *All Zones*

- Humpback whales: 1 confirmed entanglement, unidentified gear (Fishing Zone 6)
- Blue whales: 0 confirmed entanglements
- Leatherback sea turtles: 0 confirmed entanglements

Total entanglements for calendar year 2021: 1 confirmed. *All entanglement reports are subject to further review.*

Supplemental Information:

- A Humpback whale entanglement on April 3, 2021 was reported entangled off Ventura (Fishing Zone 6). A photograph of entanglement shows dark line near the dorsal fin and was used to confirm the entanglement. There is a video of the whale that suggests there has been recent chaffing on the dorsal fin area, but the gear is not visible. The entanglement is confirmed, but in unidentified gear.
- Confirmed Gray whale entanglement reported on April 14, 2021 near San Francisco (Fishing Zone 3) with line and a single half-red and half-white buoy.
- Confirmed Minke whale entanglement report on April 16, 2021 north of San Diego (Fishing Zone 6) entangled with a single Oregon commercial Dungeness crab gear set with three buoys. Whale was fully disentangled.
- Confirmed Gray whale entanglement reported on April 19, 2021 off Orange County (Fishing Zone 6). Gray whale calf was entangled with a thin yellow line and trailing a small buoy (donut-shaped). Multiple resights and rescue efforts with partial gear removal.

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## Evaluation of Entanglement Triggers (by CDFW)

Total number of Confirmed Entanglements in California Commercial Dungeness Crab Gear

- During the current Fishing Season: 0
- During the current calendar year: 0

Total number of Confirmed Entanglements in Unknown Fishing Gear reported from California

- During the current Fishing Season: 1
- During the current calendar year: 1

### Section 132.8(c)(2): Marine Life Concentrations

*Data provided by: Monterey Bay Whale Watch (MBWW) (processed by Karin Forney, NMFS), John Calambokidis (Cascadia Research, SR3, and The Marine Mammal Center)*

#### Monterey Bay Whale Watch (Fishing Zone 4)

- Monterey Bay Whale Watch (MBWW) was able to conduct trips on 13 of the last 14 days from April 11-24, 2021. A maximum of 15 Humpback whales was observed within a single trip on April 15, 2021. The 14-day average number of Humpback whales-per-half-day-trip (for April 11-24) was 1.8; the 7-day average (for April 18-24) was 1.0.
- No Blue whales have been observed by MBWW since December 24, when a single whale was seen.

#### Cascadia Research, SR3, and The Marine Mammal Center (Fishing Zones 3 and 4)

- Surveys covering transect lines along the 70-m and 200-m line were completed between April 12-16, 2021 from Monterey Bay to north of Point Reyes within Fishing Zones 3 and 4 (Figure 1) and on April 26, 2021 from Monterey Bay to Pigeon Point within Fishing Zone 4 (Figure 2).
- There was a high diversity of whale species with sightings of Humpback, Blue, Fin, and Gray whales on both sets of surveys.
- Four days of surveys conducted between April 12-16, 2021, sighted Humpback whales at low to medium densities with most of these along the 200-m line (only two sightings were on the 70-m line). A total of 16 sightings of 22 Humpback whales were observed across

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Fishing Zones 3 and 4. Similar to findings in March 2021, Fin whales continue to be sighted (seven sightings of 12 whales).

- April 26, 2021, Humpback whales were sighted at low densities (six sightings of nine whales). A concentration of Humpback whales and Fin whales, and a single Blue whale were seen just offshore of the 70-m line north of Monterey Bay feeding on krill.

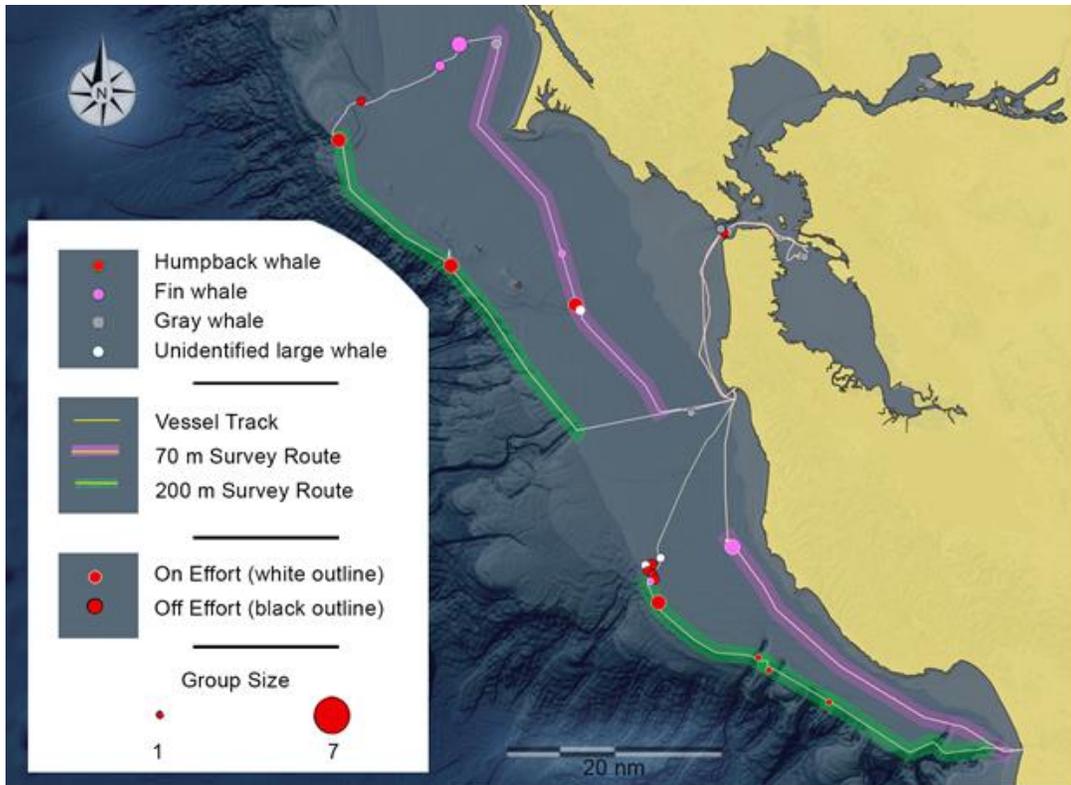


Figure 1. Vessel-based surveys from R/V Nova on April 12-16, 2021 showing vessel track and observations of large whales from Monterey Bay to north of Point Reyes.

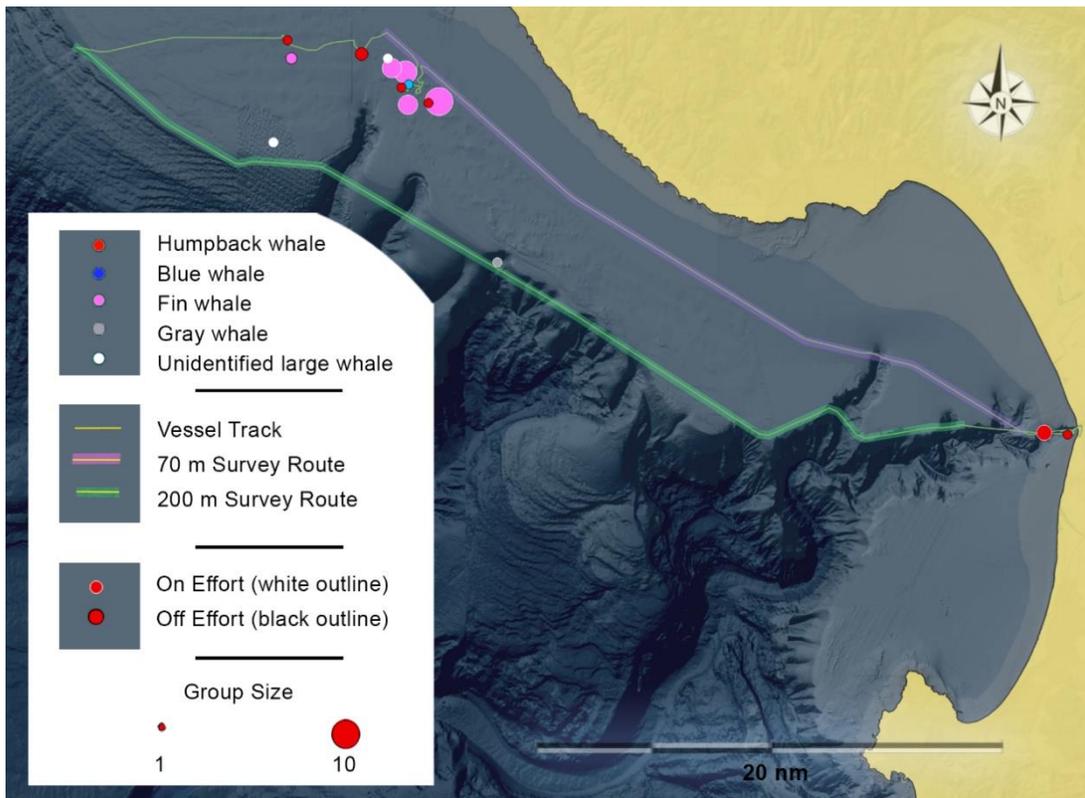


Figure 2. Vessel-based surveys from R/V Nova on April 26, 2021 showing vessel track and observations of large whales from Monterey Bay to Pigeon Point.

## MANAGEMENT CONSIDERATIONS

### Section 132.8(d)(2): Information from NOAA

No additional information was shared.

### Section 132.8(d)(4): Total economic impact to the fleet

- Economic analysis currently available is reflected in the landings data. See management consideration (d)(7) for available information on fishing activity to date during the 2020-21 fishing season.

### Section 132.8(d)(6): Known historic marine life migration patterns

Data provided by: Monterey Bay Whale Watch (processed by Karin Forney, NMFS), NOAA

### Monterey Bay Whale Watch (Fishing Zone 4)

- The 14-day average of 1.8 Humpback whales-per-half-day-trip is lower than the average historical patterns (Figure 3). Humpback whale abundance in the Monterey Bay region thus

appears to be lower than expected for this time of the year, when whale numbers typically are increasing as part of the seasonal migration pattern.

- The absence of Blue whales is consistent with their historical seasonal migration patterns (Figure 4).

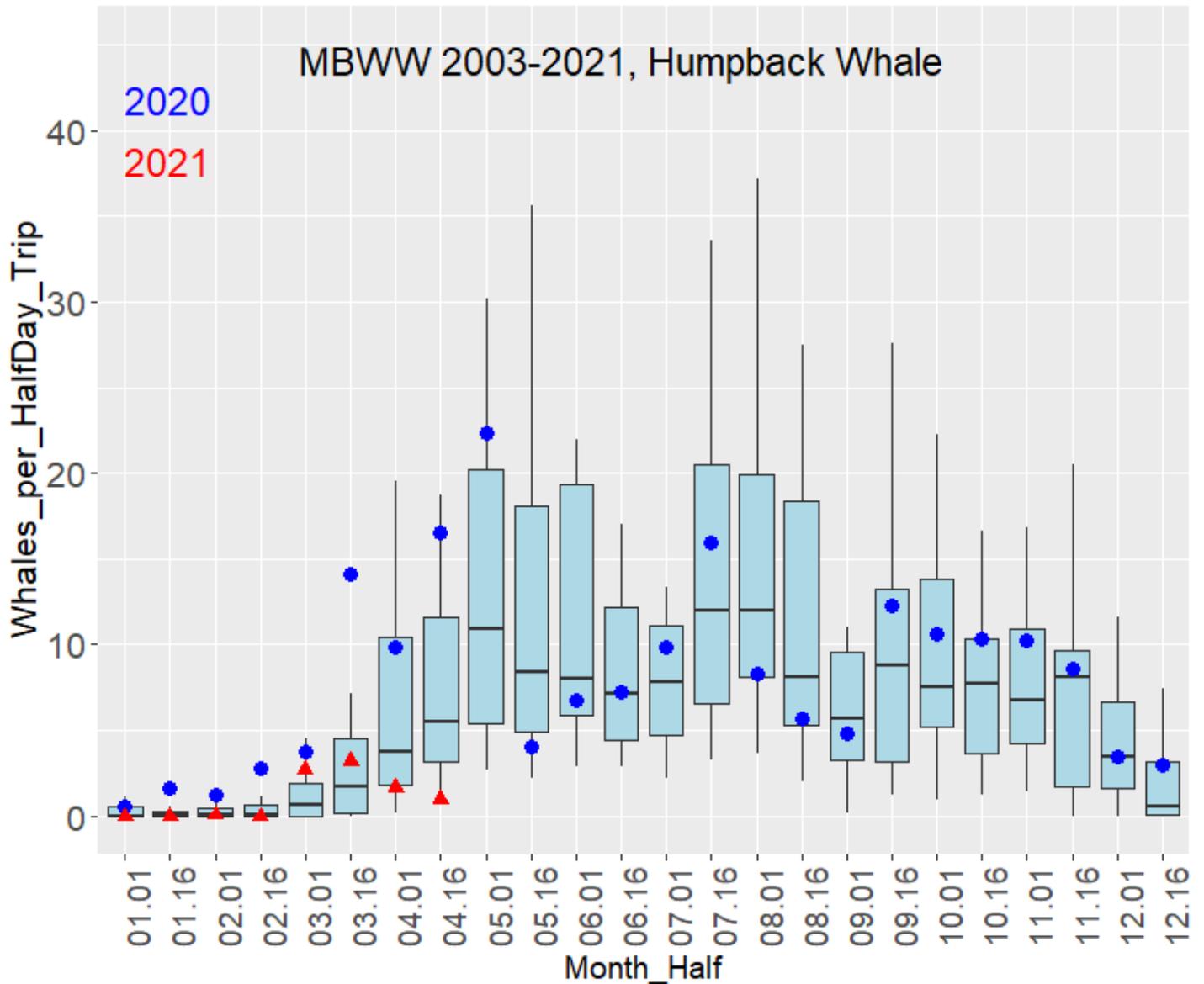


Figure 3. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Humpback whales per half-day trip on a semi-monthly basis (1<sup>st</sup>- 15<sup>th</sup>, 16<sup>th</sup>- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average number of whales; the blue box shows the 25<sup>th</sup> -75<sup>th</sup> 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 2020 (large blue dots) and 2021 (red triangles) are provided for reference, placing recent whale numbers in a historical context.

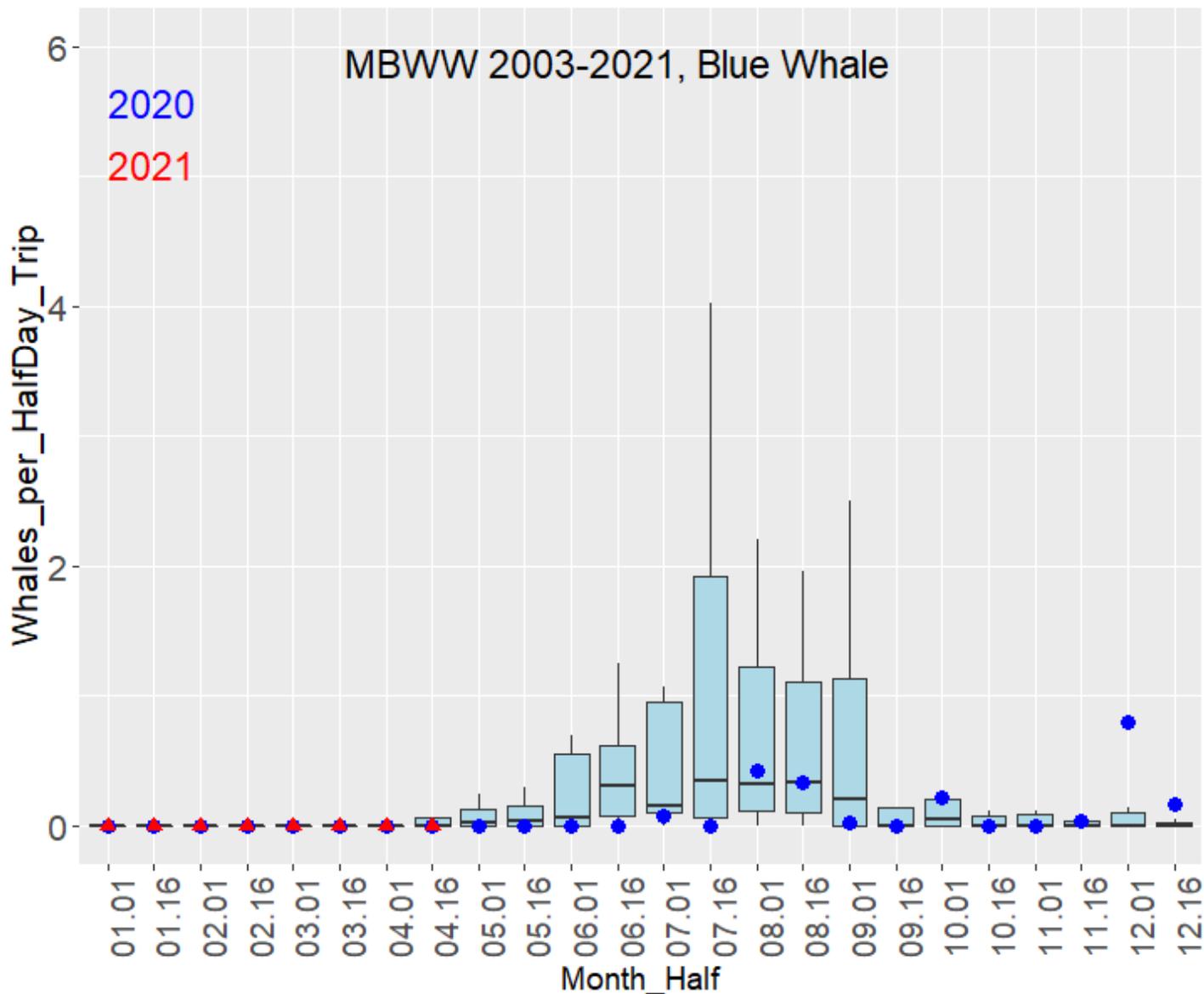


Figure 4. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average number of whales; the blue box shows the 25<sup>th</sup> -75<sup>th</sup> 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 2020 (large blue dots) and 2021 (red triangles) are provided for reference, placing recent whale numbers in a historical context.

#### NOAA Research Cruise (*Zone 1*)

- NOAA researchers observed 40-60 Humpback whales 5-7 miles SW of Crescent City in 90-100m (49-55 fathoms) of water and about 20 Humpback whales in 30-50m (16-27 fathoms) within areas of Dungeness crab gear on April 28, 2021.

## Section 132.8(d)(7): Fishing Season dynamics

*Data provided by: California Department of Fish and Wildlife; Accessed from CDFW's Marine Landings Data System (MLDS) on April 26, 2021, Automatic Licensing Data System (ALDS) on April 7, 2021, Bi-Weekly Reporting Database on April 26, 2021, and PowerBI landings report Database on April 5, 2021. Solar Logger Pilot Project provided by Kathi George (The Marine Mammal Center).*

### Marine Landings Data System (All Fishing Zones)

- **CDFW data presented in this section is preliminary and subject to revision.**
- The commercial Dungeness crab fishery opened statewide on December 23, 2020. Due to ongoing price negotiations, most vessels did not begin fishing until January 11, 2021.
- As of April 20, 2021, there have been 3,304 daily vessel landings of Dungeness crab with a total volume of 3,508,479 pounds and with a total Ex-Vessel Value of \$18,094,428. Average unit price for these landings was \$5.88 (excluding receipts with unit price of \$0 reported). A total of 358 vessels have made at least one landing during the 2020-21 season.
- Cumulative daily landings by vessel each week by CDFW Fishing Zones (aggregated CDFW Fishing Blocks used to report catch location) are shown in Figure 5 with 17 complete weeks of landings to summarize from the start date of December 23, 2020 to April 20, 2021. The highest number of daily landings statewide occurred in week 5. The highest weekly landings for Fishing Zone 3, where the most activity originated, occurred in week 4. By week 17, total statewide daily landings represent a 70% decline from the high daily landings in week 5.
- Of the 358 vessels, 356 could be tied to a Dungeness crab vessel permit and are organized in the trap tiers as follows and represent a total of 117,525 traps:
  - Tier 1: 45 vessels
  - Tier 2: 44 vessels
  - Tier 3: 44 vessels
  - Tier 4: 39 vessels
  - Tier 5: 36 vessels
  - Tier 6: 97 vessels
  - Tier 7: 51 vessels

- The maximum potential traps, represented by the number of vessels that made at least one landing each week and the overall traps in their vessel permit tier, is summarized each week by CDFW Fishing Zones (Figure 6). Week 5 shows the highest number of aggregated maximum potential traps, estimated at a total of 94,675 traps deployed. Fishing Zone 3 shows the highest proportion (47%) of total maximum potential traps, followed by Zone 1 (40%). By week 17, the total maximum potential trap numbers decreased to an estimated 28,975 traps.
- For the past 3 weeks (Weeks 13-15), average weekly price per pound by port complex range between \$5.00 and \$10.23 each week (Figure 7). There is a demarcation in average price between the two management areas for this time period, with higher average price at the central ports (\$7.12-\$10.23) and lower average price at the northern ports (\$5.00-\$8.48).
- Two figures of graphs showing number of vessels (Figure 8) and the maximum potential trap number they represent (Figure 9) between the years of 2014 and 2021 are being provided to compare with the current low Dungeness crab season (2021 panel). This information is being summarized by port complex over five bi-weekly periods between March 1 and April 30. Data are current as of April 23, 2021 and will be populated as the current season progresses.
- For all time periods shown for 2021, the maximum potential traps for the port of Bodega Bay remains above the 2014-2020 (removing 2016) average, while Half Moon Bay is below this average by the March 28-April 11 period and San Francisco is below average by the April 12-25 period. Monterey is near average for these two periods. This number remains below average for all other port complexes within Fishing Zones 1, 2, and 5. Data is still incomplete for the April 12-25 period and will be updated.
- For the current season (2021), the following maximum potential traps for the latest period of April 12-25 by port complex is as follows:
  - Crescent City: 2,875
  - Trinidad: 2,425
  - Eureka: 3,175
  - Fort Bragg: 3,025
  - Bodega Bay: 7,475
  - San Francisco: 4,025

- Half Moon Bay: 4,600
- Monterey: 4,500
- Morro Bay: 1,575

Daily Vessel Landings, by Week and RAMP Zone, 2020-21 Season

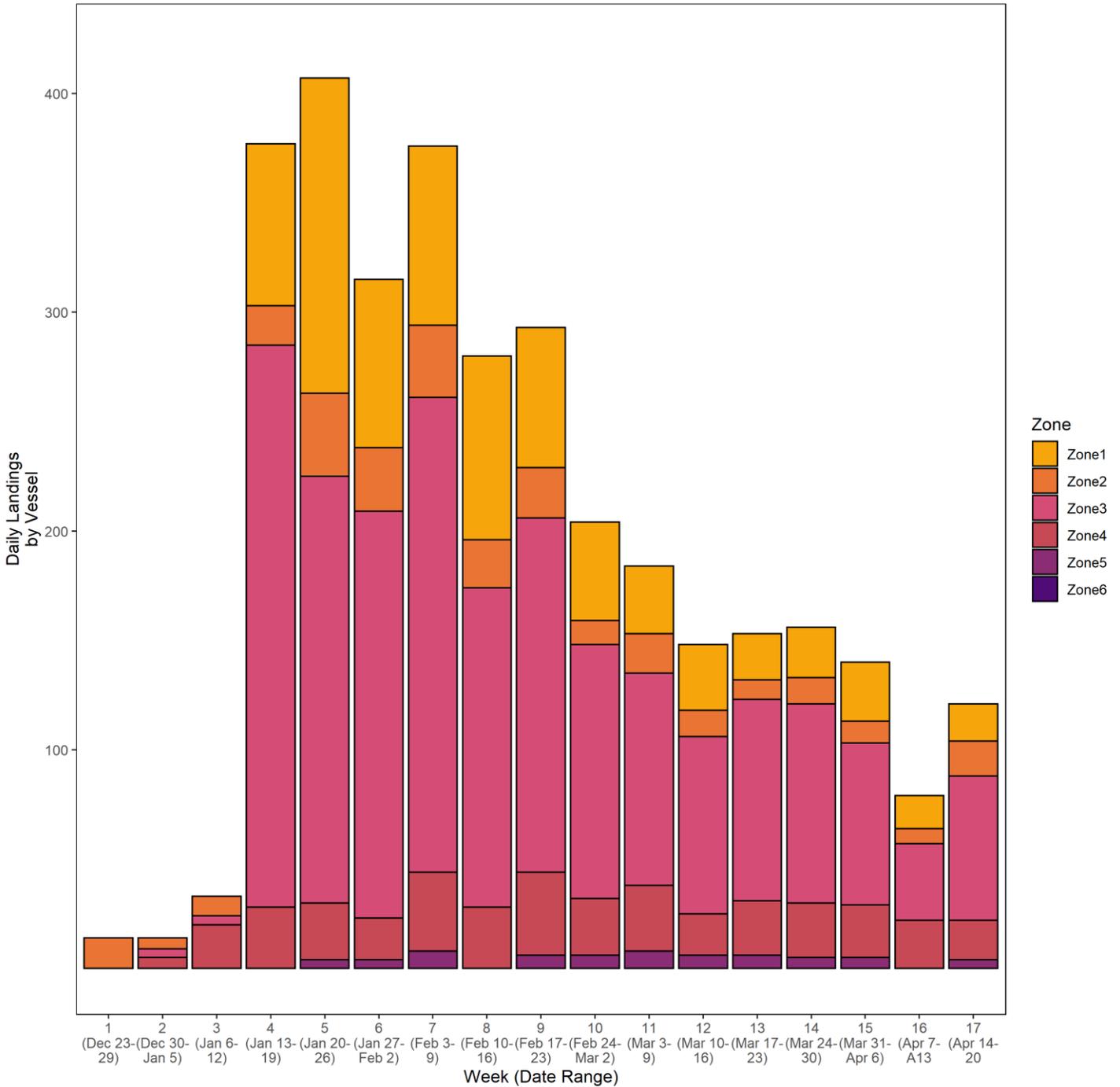


Figure 5. Dungeness crab daily vessel landings by week and Fishing Zone. Accessed from CDFW’s MLDS on April 26, 2021. All data are preliminary and subject to change.

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Maximum Potential Traps, by Week and RAMP Zone, 2020-21 Season

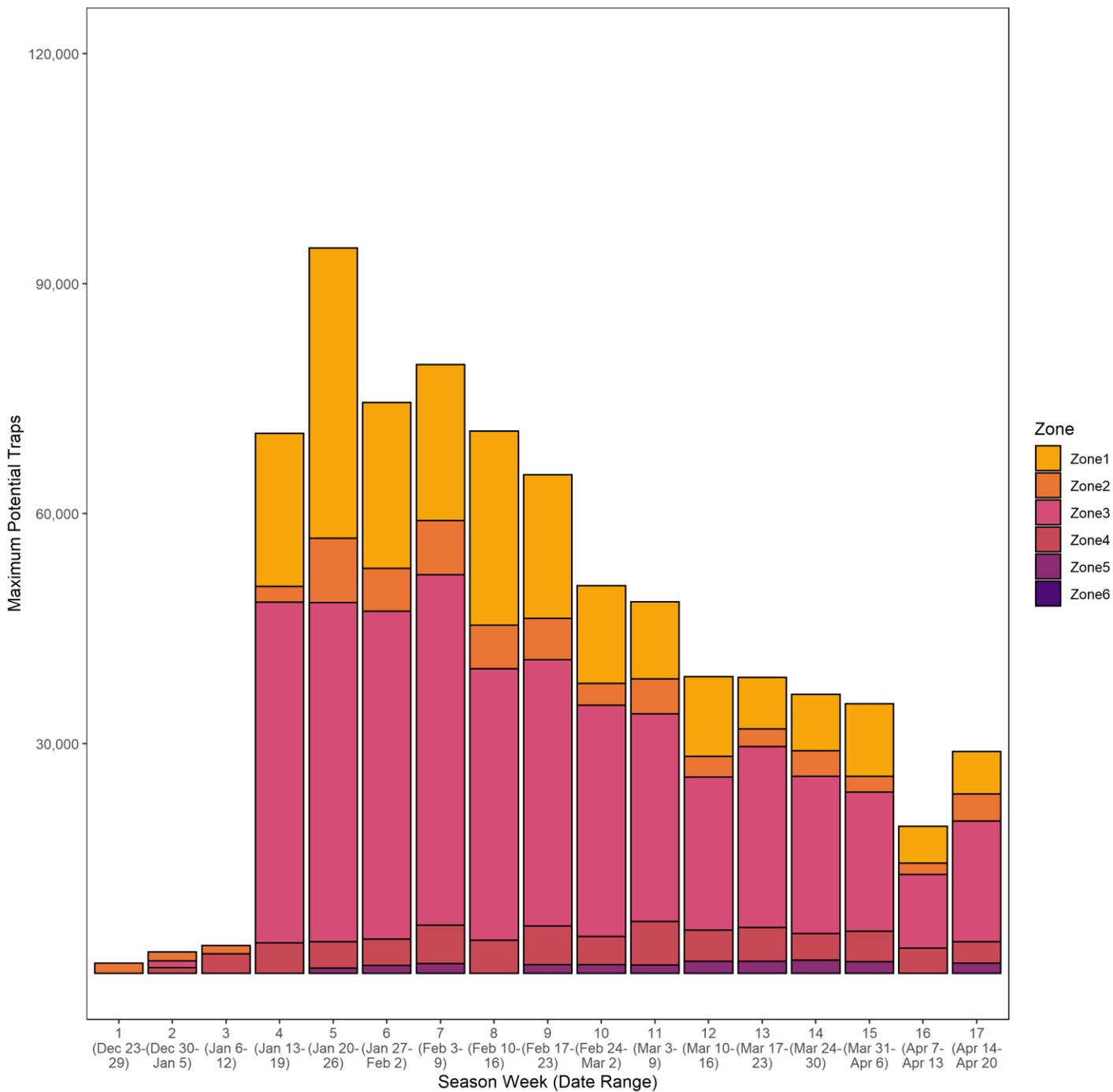


Figure 6. Maximum potential traps by week and Fishing Zone, based on landings data and Dungeness crab vessel permit tier information. Accessed from CDFW’s MLDS on April 26, 2021 and CDFW’s ALDS on April 7, 2021. All data are preliminary and subject to change.

Average Price by Week and Port Complex, 2020-21 Season

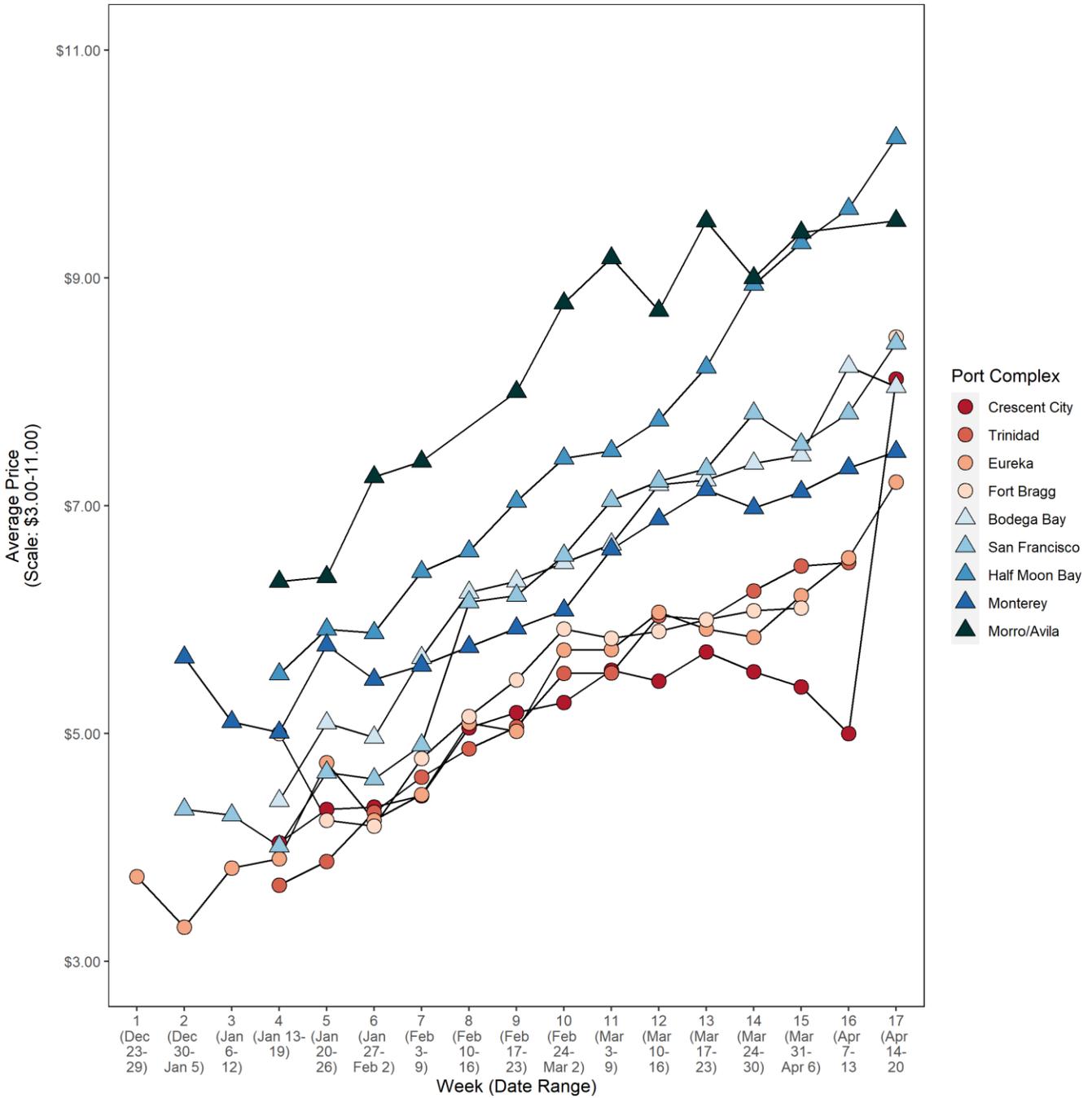


Figure 7. Average price per pound by week and port complex (removing receipts that reported \$0 unit price). Northern management area ports are designated by circles while central management area ports are designated by triangles. Accessed from CDFW’s MLDS on April 26, 2021. All data are preliminary and subject to change.

Number of Active Vessels During March and April, 2014-2021

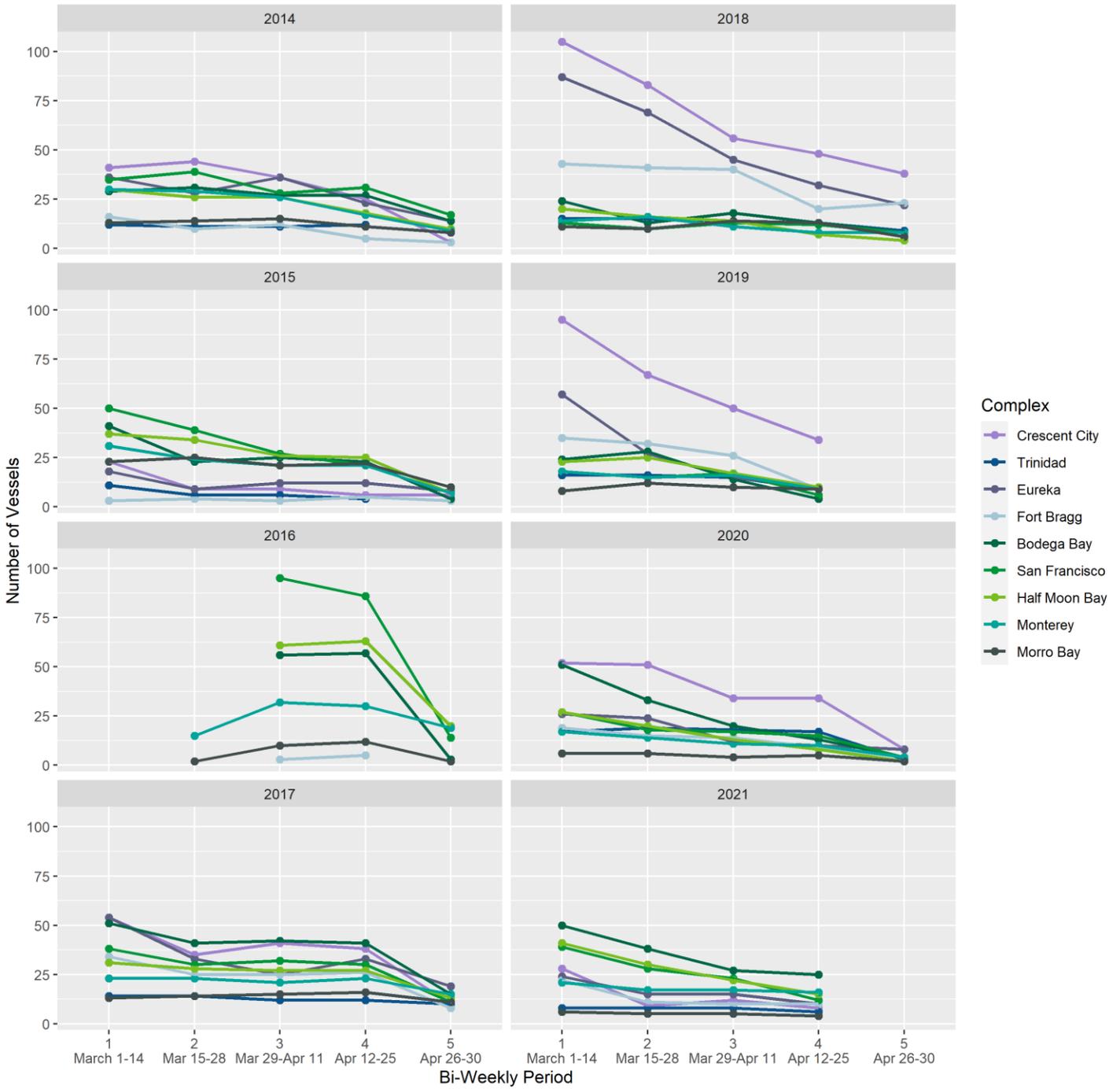


Figure 8. Panels showing number of active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and April 30. Accessed from CDFW's custom PowerBi report with last data refresh on April 23, 2021. All data are preliminary and subject to change.

Maximum Potential Traps During March and April, 2014-2021

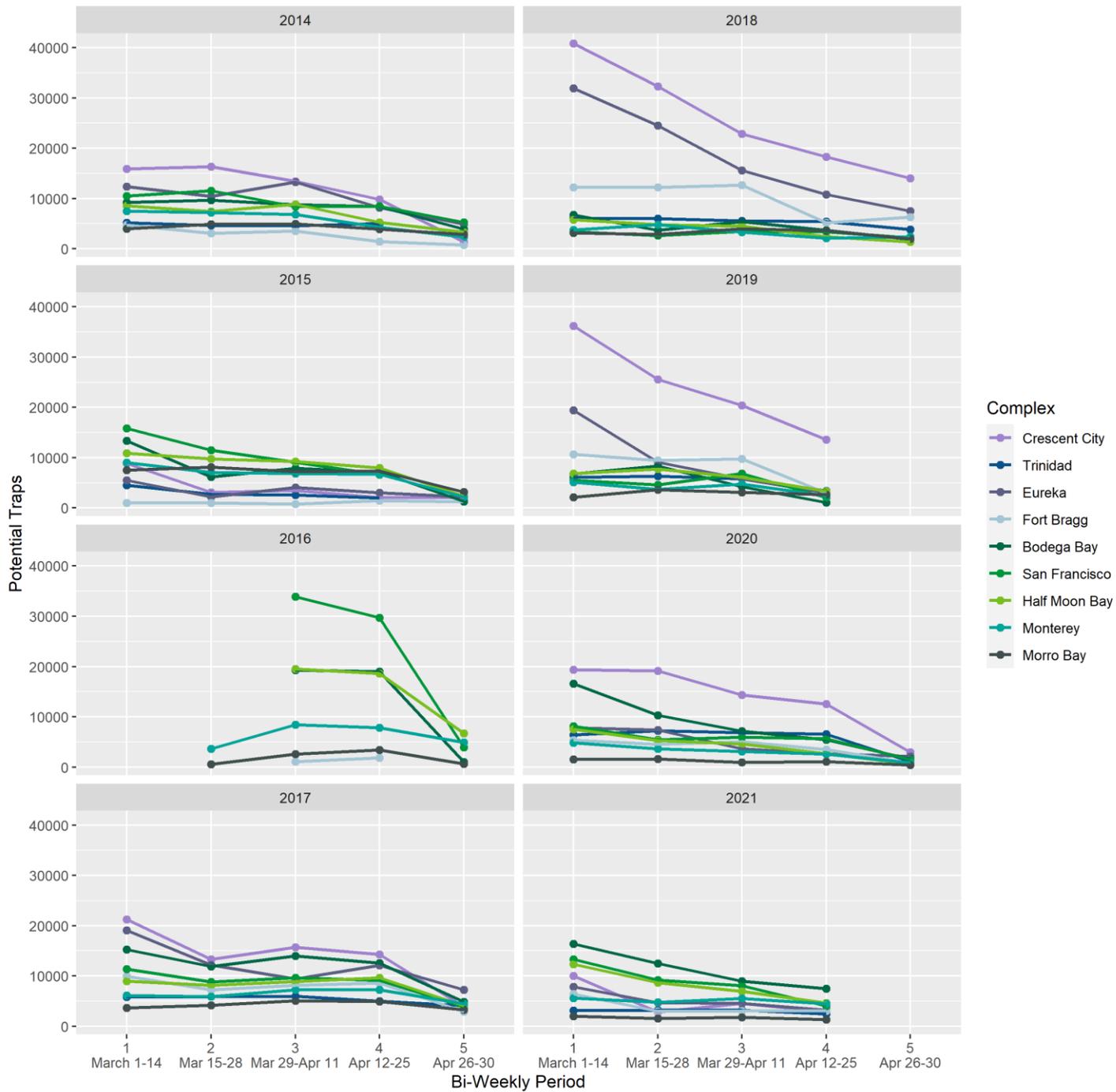


Figure 9. Panels showing number of maximum potential traps based on active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and April 30. Accessed from CDFW's custom PowerBi report with last data refresh on April 23, 2021. All data are preliminary and subject to change.

Bi-Weekly Fishing Activity Reports (All Fishing Zones)

- **CDFW data presented in this section is preliminary and subject to revision.**
- CDFW has received bi-weekly reports since the first reporting period of January 1, 2021 through the most recent reporting period of April 16, 2021. Although total reports for each period may not reflect all permitted vessels participating in the fishery, summaries are being provided for the following periods: April 1, 2021 (Table 1) and April 16, 2021 (Table 2).
- For the April 16 reporting period, covers fishery participation from April 1-15, about 24,821 traps are estimated to be deployed statewide with just over half of these located within Fishing Zone 3. Between April 1 and April 16, just over 7,700 traps have been removed from Fishing Zone 3.

Table 1. Summary of information provided for the April 1, 2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on April 26, 2021. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Average Trap Number	Total Traps	Average Min. Depth (fathoms)	Average Max. Depth (fathoms)	Max. Reported Depth (fathoms)	Final Report	Number of Lost Traps
Zone 1	37	267	9,894	11	23	65	8	15
Zone 2	17	218	3,704	14	32	75	2	0
Zone 3	104	204	21,226	17	36	80	24	96
Zone 4	9	201	1,806	21	41	60	0	0
Zone 5	6	219	1,315	29	53	60	1	2
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	173		37,945				35	113

Table 2. Summary of information provided for the April 16, 2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on April 26, 2021. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Average Trap Number	Total Traps	Average Min. Depth (fathoms)	Average Max. Depth (fathoms)	Max. Reported Depth (fathoms)	Final Report	Number of Lost Traps
Zone 1	24	279	6,701	13	27	65	2	5
Zone 2	16	194	3,110	15	31	75	1	3
Zone 3	71	186	13,240	16	35	120	16	154
Zone 4	6	162	970	14	25	60	2	0
Zone 5	5	160	800	18	40	55	1	1
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	122		24,821				22	163

*Solar Loggers (Fishing Zones 1, 3, and 5)*

- The vessel track data provided by the solar logger pilot project is shown for the April 8-25, 2021 period. The following maps show vessel activity in 1) entire coast of California (Figure 10) and 2) Fishing Zones 1, 3 and 5 (Figure 11). From vessel participation in the project (and not necessarily representative of the entire fishery), Fishing Zone 3 showed the most activity. Some vessels participating in the pilot with track lines shown may no longer be participating in the fishery or have vessel tracks included from participation in other fisheries, also vessel tracks are not shown for those that are fishing outside of California this season. A summary of cumulative fishing trips every one to two weeks since January 1, 2021 is provided in Table 3.

Table 3. Summary of individual fishing trips based on data provided by the solar logger project (and not necessarily representative of the entire fishery) between different time periods since January 1, 2021 until April 25, 2021.

Date Ranges	Fishing Trips
April 8-25, 2021	59
March 29 – April 7, 2021	28
March 10-28, 2021	81
March 1-9, 2021	50
February 10-28, 2021	78
February 1-9, 2021	50
January 16-31, 2021	81
January 1-15, 2021	58

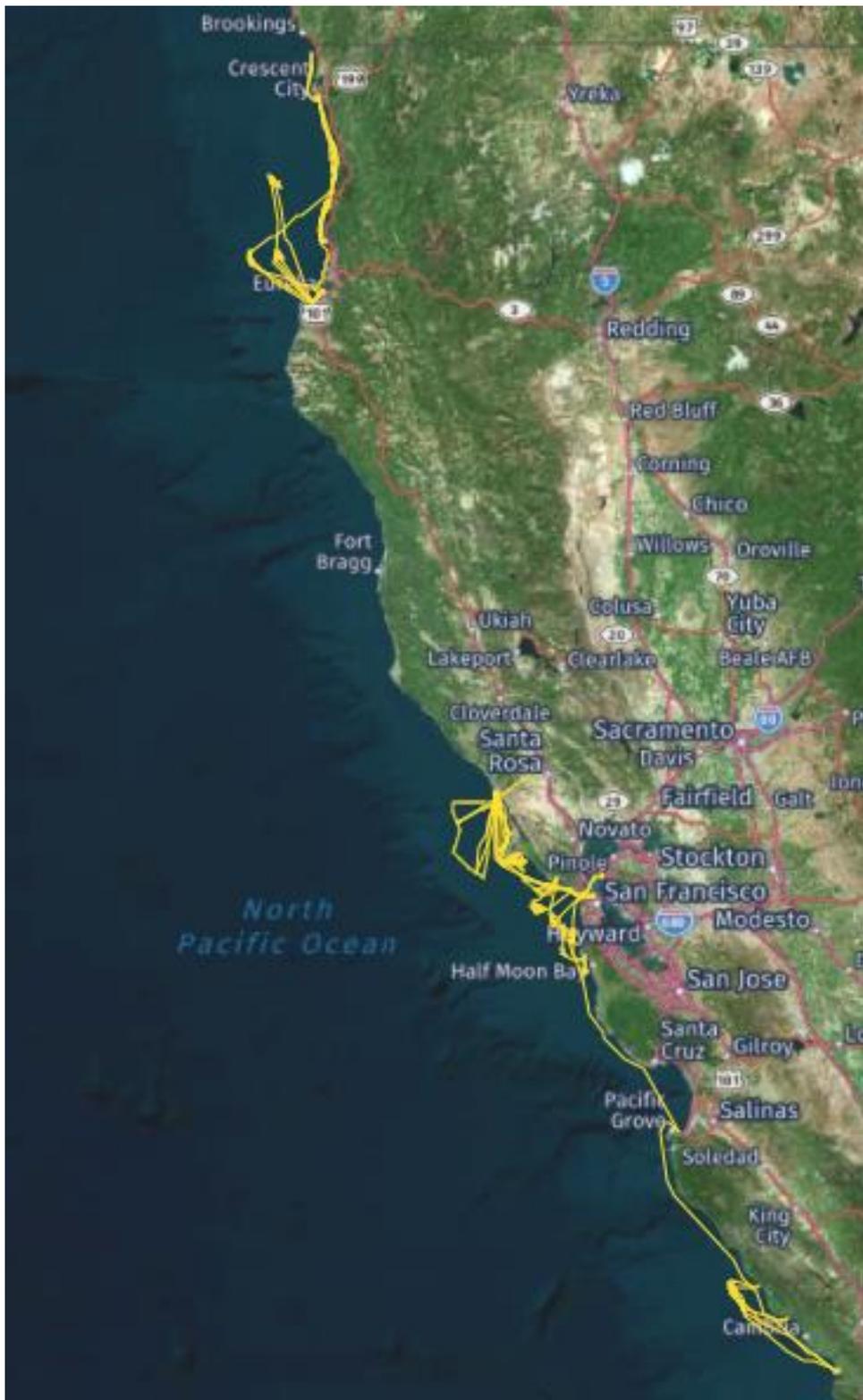


Figure 10. Fishing trips from April 8 – 25, 2021 for the entire California coast where vessels may be participating.

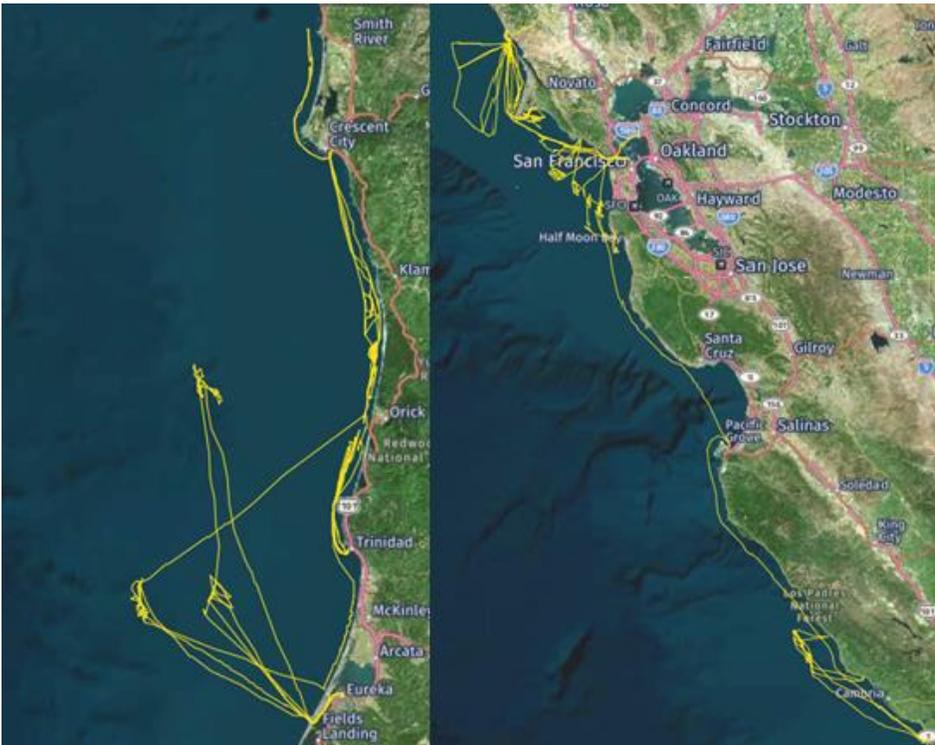


Figure 11. Fishing trips where vessels may be participating in the fishery from April 8 – 25, 2021. The map on the left shows vessel activity in Fishing Zone 1 while the map on the right shows vessel activity in Fishing Zones 3 and 5.

Section 132.8(d)(8): Known distribution and abundance of key forage

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

<https://www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-whale-entanglement>

Forage Indices (All Fishing Zones)

- Krill abundance (higher offshore in the outer slope) is also anticipated to be closer to average while anchovy is still considered to be above average, given the historical record.

Section 132.8(d)(9): Ocean conditions

ENSO prediction accessed from [NOAA's Climate Prediction Center website](https://www.noaa.gov/climate-prediction-center) on April 26, 2021,

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

El Nino/Southern Oscillation (ENSO) Alert System Status (All Fishing Zones)

- The prediction of ENSO conditions were last updated on April 8, 2021. La Niña conditions persisted in March with an 80% chance of a transition from this condition to ENSO-neutral during May - July 2021.

### Habitat Compression Index (*All Fishing Zones*)

- Please refer to the [April 13, 2021 Available Data](#) package for the latest information on the Habitat Compression Index.

### Section 132.8(d)(10): Current Impact Score Calculation

*Data provided by: California Department of Fish and Wildlife*

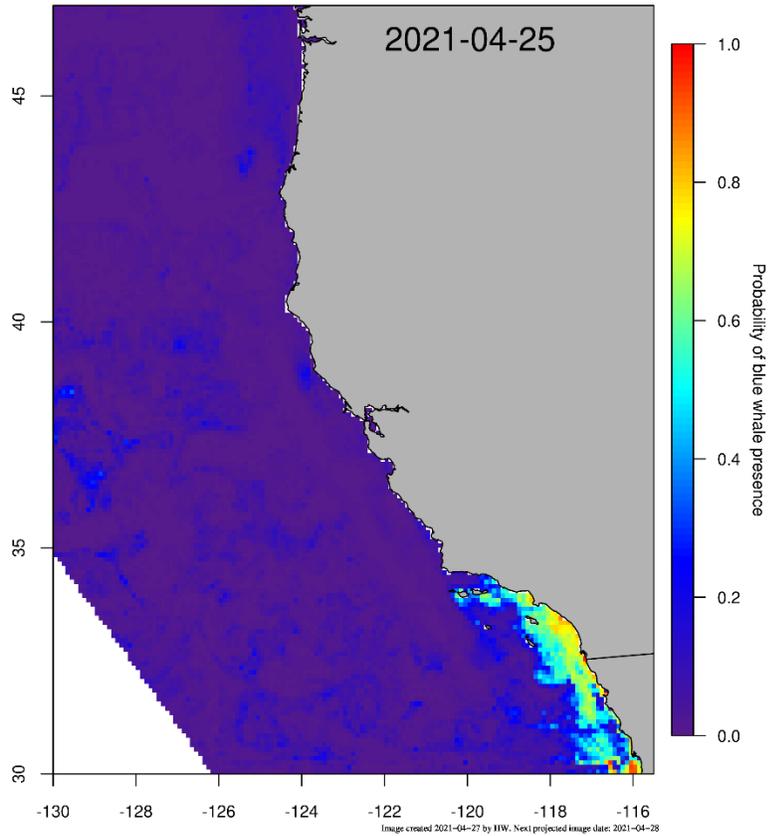
- Pursuant to the Risk Assessment and Mitigation Program (Section 132.8, Title 14, CCR), Impact Score Calculations will be assigned beginning with the 2021 calendar year based on confirmed entanglements of Actionable Species (Humpback whales, Blue whales, or Leatherback Sea Turtles) reported to CDFW by NOAA. As described in Section 132.8(c)(1) above, one confirmed entanglement of a Humpback whale in unidentified gear has been reported for the current calendar year. Therefore, the Impact Score Calculation for Humpback whales is 0.38 and 0 for both Blue whales and Pacific Leatherback sea turtles.

### Section 132.8(d)(11): Actionable Species migration into or out of Fishing Grounds and across Fishing Zones

*Data provided by: Briana Abrahms (University of Washington), Cascadia Research, SR3, The Marine Mammal Center, Kathi George (The Marine Mammal Center), Karen Grimmer (Monterey Bay National Marine Sanctuary) and Jaime Jahncke (Point Blue Conservation Science), Jon Gonzalez (California Coast Crab Association), NOAA*

## WhaleWatch 2.0 (All Fishing Zones)

- WhaleWatch habitat predictions for April 25, 2021 indicate that probability of Blue whale - presence is low in Fishing Zones 1-5 and medium-high in Fishing Zone 6 (Figure 12).



WhaleWatch 2.0 [or future product name] is a dynamic ocean management tool that aims to provide information on suitable whale habitat in real-time to minimize ship strike risk. Map shows predicted daily blue whale habitat suitability at 10km resolution which represents where whales are most likely to be based on environmental conditions. ([link to website](#))

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Environmental Research Division, SWFSC, NMFS, NOAA  
99 Pacific Street, Monterey CA 93940, USA



Figure 12. WhaleWatch 2.0 map for April 25, 2021. [View a current map.](#)

## Cascadia Research, SR3, The Marine Mammal Center (Fishing Zones 3 and 4)

- A total of twenty-two animals observed over 4 survey days conducted between April 12-16, 2021 across Fishing Zones 3 and 4 and mostly along the deeper transect line, suggest that animals are beginning to arrive.
- A total of nine Humpback whales was observed on April 26, 2021 in Fishing Zone 4. A concentration of some of these animals along with a Blue whale and Fin whales were observed feeding on krill just off the 70-m line.

### Solar Loggers (*Fishing Zone 4*)

- Track lines from whale watching vessels participating in the solar logger pilot project (Figure 13) indicate more widespread effort across Monterey Bay during 78 trips conducted between April 8-25, 2021. A summary of cumulative whale watching trips every one and two weeks since January 1, 2021 is provided in Table 4.

**Table 4. Summary of whale watching trips based on data provided by the solar logger project between different time periods from January 1, 2021 until April 7, 2021.**

Time Periods	Whale Watching Trips
April 8-25, 2021	78
March 29 – April 7, 2021	6
March 10-28, 2021	46
March 1-9, 2021	21
February 10-28, 2021	38
February 1-9, 2021	15
January 16-31, 2021	19
January 1-15, 2021	28

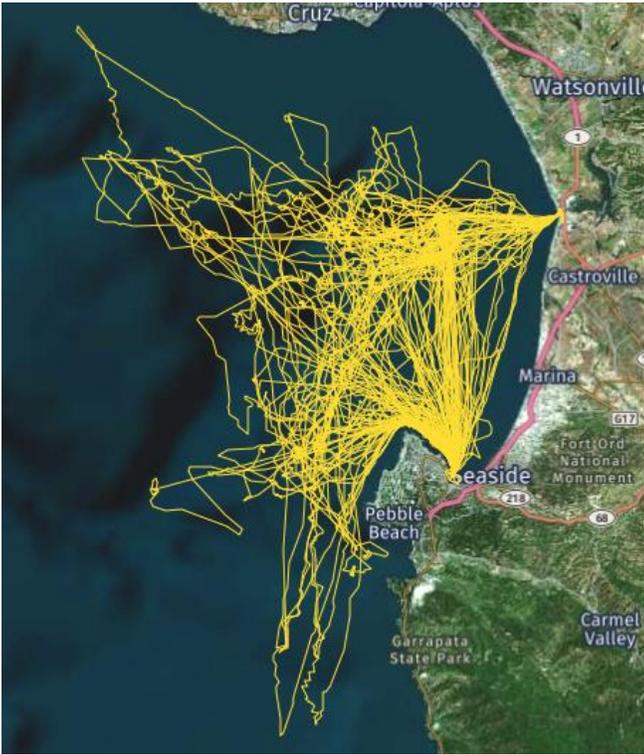


Figure 13. Track lines for 78 whale watch trips in Monterey Bay from April 8-25, 2021. Sightings, numbers and species are not reflected on this map.

Point Blue Conservation Science Data Portal (*Fishing Zones 3, 4 and 6*)

- The Greater Farallones National Marine Sanctuary (through the Spotter/Whale Alert app) has observed five Humpback whales in Fishing Zone 3 from April 19-26, 2021 (Figure 14). No Blue whales have been observed. Observations were recorded by trained observers on the Farallon Islands.
- Monterey Bay National Marine Sanctuary has observed seven Humpback whales from April 19-26, 2021 (Figure 15). No Blue whales have been sighted during the past month. Observations were reported from trained naturalists aboard Monterey Bay Whale Watch and Secret Harbors Charter.
- Channel Islands National Marine Sanctuary observed 23 Humpback whales from April 19-26, 2021, and no Blue whales in Fishing Zone 6 (Figure 16). These observations are conducted by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service.

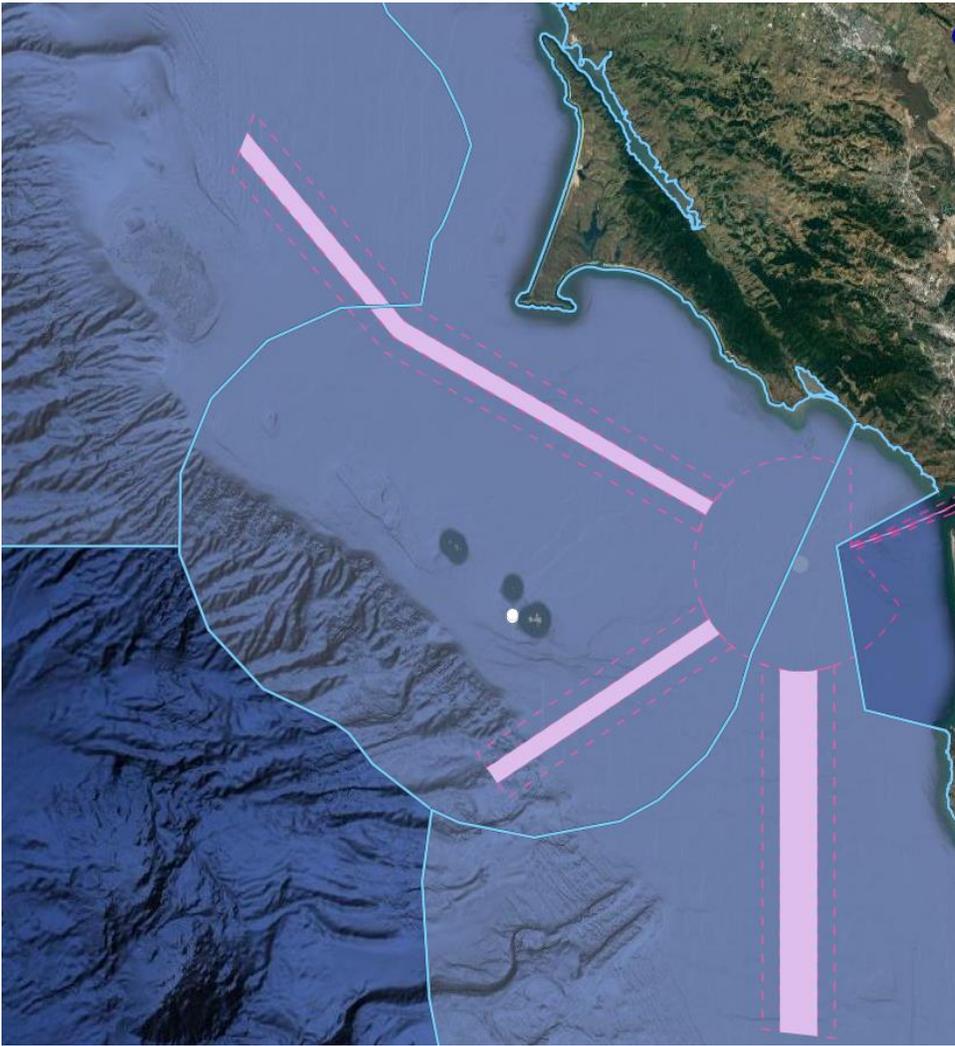


Figure 14. Location of five Humpback whale sightings in Fishing Zone 3 from April 19-26, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

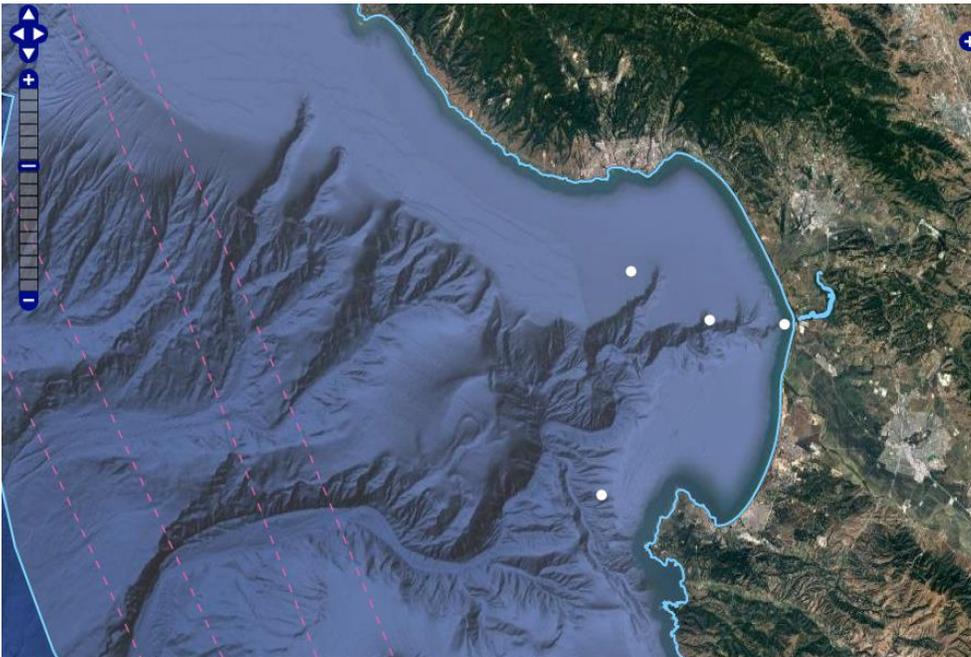


Figure 15. Location of seven Humpback whale sightings in Fishing Zone 4 from April 19-26, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

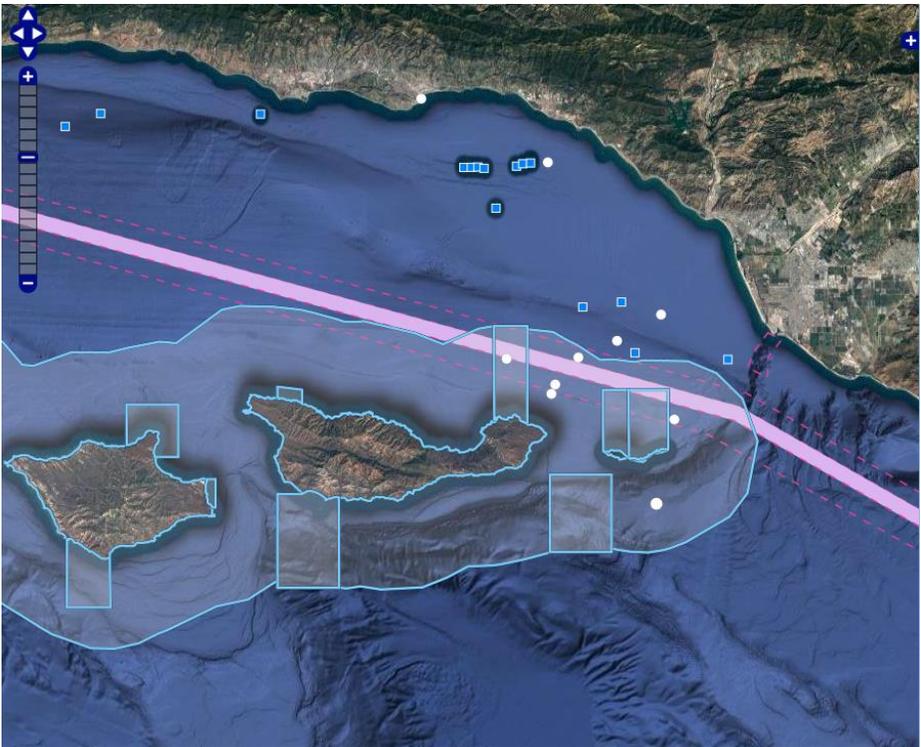


Figure 16. Location of 23 Humpback whale sightings in Fishing Zone 6 from April 19-26, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

## California Coast Crab Association (*Fishing Zones 1 and 5*)

- Vessel-based surveys conducted in Fishing Zone 1 from Dungeness crab commercial vessels occurred on April 26, 2021 (Figure 17). Weather conditions were amenable with 6 miles to unlimited miles of visibility and 3- to 5-foot swells. Fifty-one Humpback whales were sighted with large numbers observed near Reading Rock breaching and blowing as far as you could see and mostly heading north. The depth range of these observations occurred between the 30- to 45-fathom contour. It was difficult to count all animals in that area. Four Gray whales and 16 unknown whales were also observed.
- Vessel-based surveys conducted in Fishing Zone 5 from Dungeness crab commercial vessels occurred on April 23, 2021 (Figure 18). Weather conditions were amenable with 5-10 miles of visibility and 2- to 4-foot swells. A group of six Humpback whales were observed feeding out in front of Morro Bay in 45 fathoms on the way to the first transect waypoint. Two sightings of unidentified whales were also observed with no other marine life or forage around.

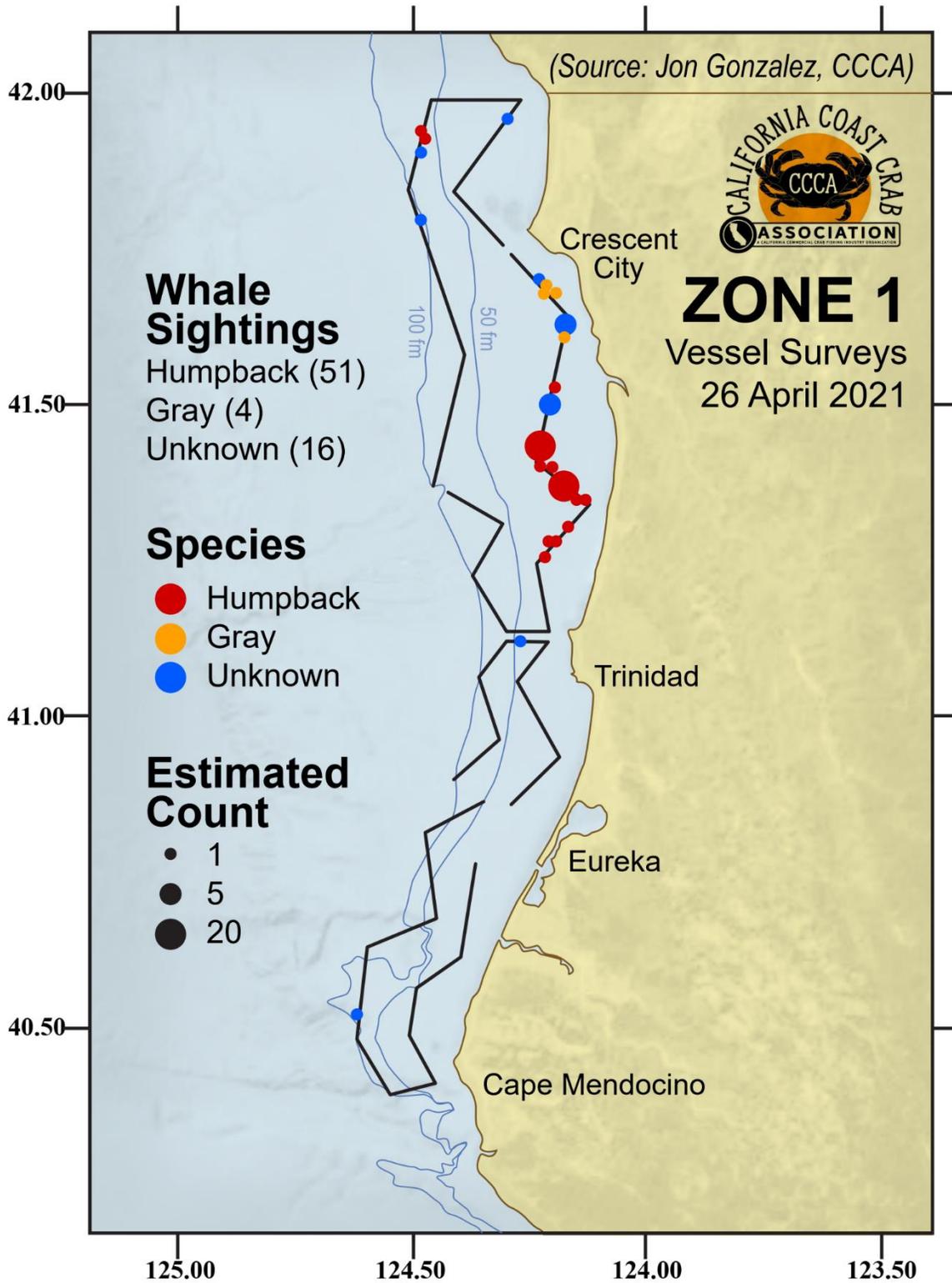


Figure 17. Vessel-based surveys conducted in Fishing Zone 1 on April 26, 2021 showing vessel path and whale observations.

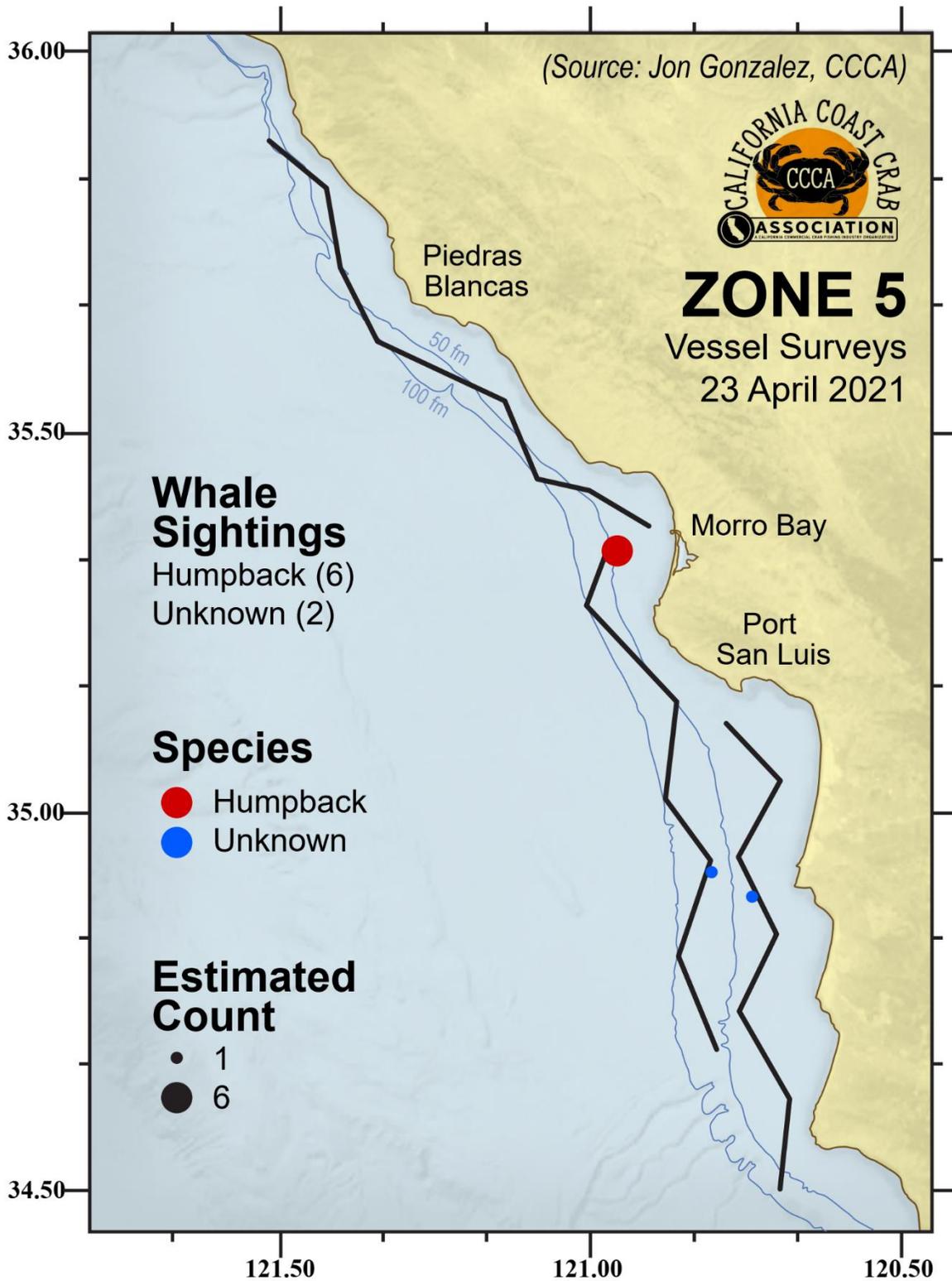


Figure 18. Vessel-based surveys conducted in Fishing Zone 5 on April 23, 2021 showing vessel path and whale observations.

NOAA Research Cruise (*Fishing Zone 1*)

- NOAA observed over 50 Humpback whales in depths of 30 – 55 fathoms, with some animals deeper and shallower.