

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

Last updated: March 30, 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: 0 confirmed entanglements
- Blue whales: 0 confirmed entanglements
- Leatherback sea turtles: 0 confirmed entanglements

Total entanglements for calendar year 2021: 0 confirmed. *All entanglement reports are subject to further review.*

#### **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: 0
- During the current calendar year: 0

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

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

### CDFW Aerial Survey (*Fishing Zones 1, 2, 3 and 4*)

- CDFW staff conducted aerial surveys on March 26 and 27, 2021 between Trinidad Head north of Eureka and Point Piños in Monterey. Figure 1 shows the flight path for Fishing Zone 1 and Fishing Zone 2. Figure 2 shows the flight path in Fishing Zone 3 and Fishing Zone 4.
- A total of 36 Gray whales were observed across Fishing Zones 2-4. A single Blue whale, Humpback whale, and Fin whale were seen in Zone 3, along with 4 Orcas (noted as “Other”).



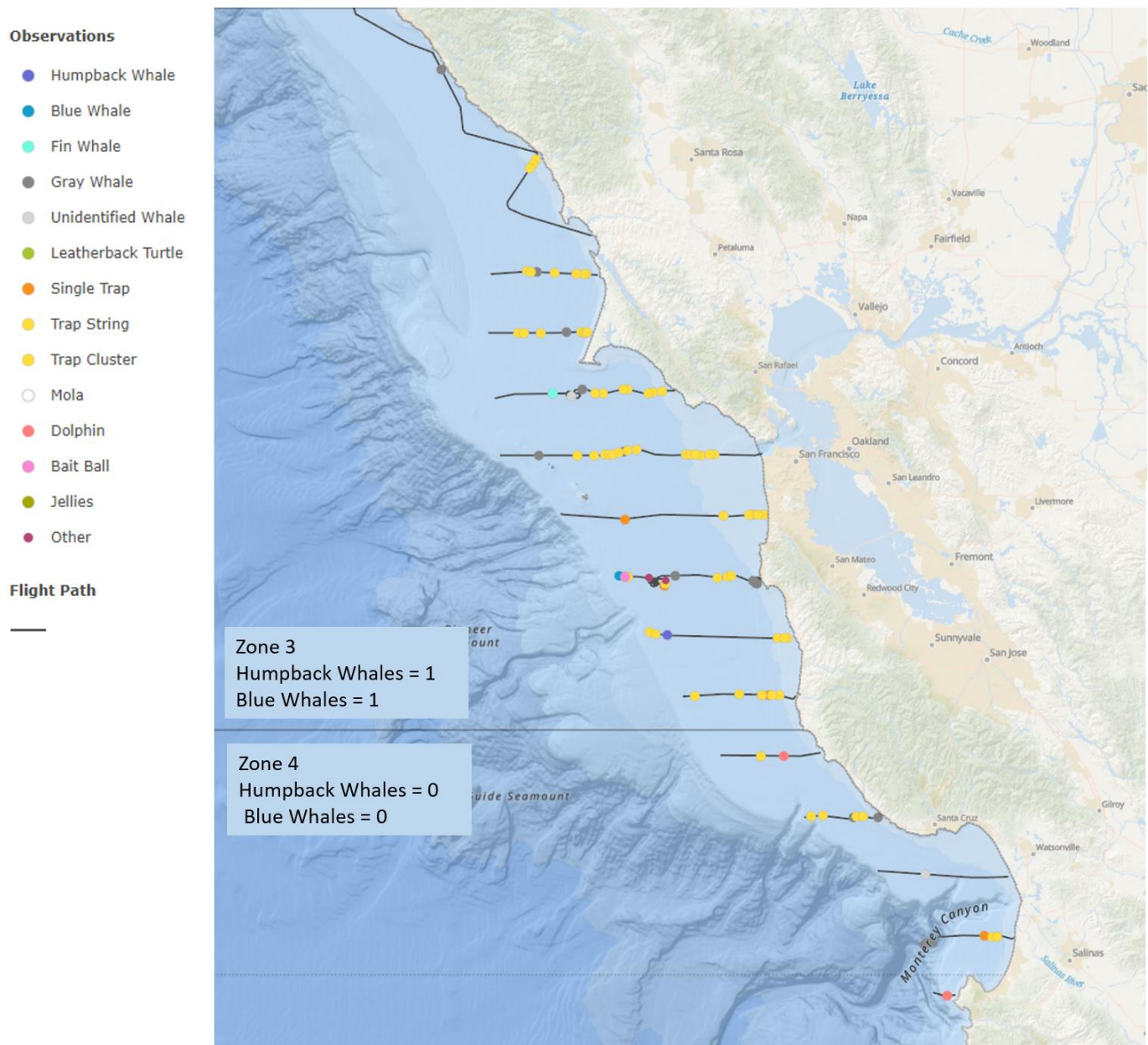


Figure 2. Observations made over flight path and survey transects conducted during CDFW aerial survey in Fishing Zones 3 and 4 on March 26-27, 2021.

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

- Monterey Bay Whale Watch (MBWW) was able to conduct trips on 8 of the last 14 days (high winds prevented trips on 6 days). The 14-day average number of whales-per-half-day-trip (based on 8 days with trips) was 4.8, with a maximum of 22 Humpback whales observed on a trip on March 20. Over the past 7 days the running weekly average (per-half-day-trip) was 2.2 Humpback whales observed, with 3 trips made.
- No Blue whales have been observed by MBWW since December 24.

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

- Surveys were completed on March 27-28, 2021 covering most of the transect lines along the 70-m and 200-m line from Monterey Bay to Pt Reyes (Figure 3). Weather was mostly good, but visibility was limited during the 200m line from Half Moon Bay to Monterey along with higher winds on the southern end of that line.
- There was a high diversity of whale species with sightings of Humpback, Blue, Fin, and Gray whales.
- Humpback whales were sighted at low densities in several areas though there were 7 sightings of 10 humpbacks along the 200-m line compared to only a single sighting of one whale along the 70-m line. Humpback whales appeared to be feeding primarily on krill and large prey patches of krill were observed near the surface along the 200m line especially between the Farallon Islands and Cordell Bank along with the presence of krill-feeding murrelets.
- One blue whale was observed along the 70-m line.
- Gray whales were mostly observed inshore and traveling northward and were primarily the whales seen closest to Dungeness crab gear.
- Fin whales were at a higher density (5 sightings of 16 whales) than seen in past surveys.

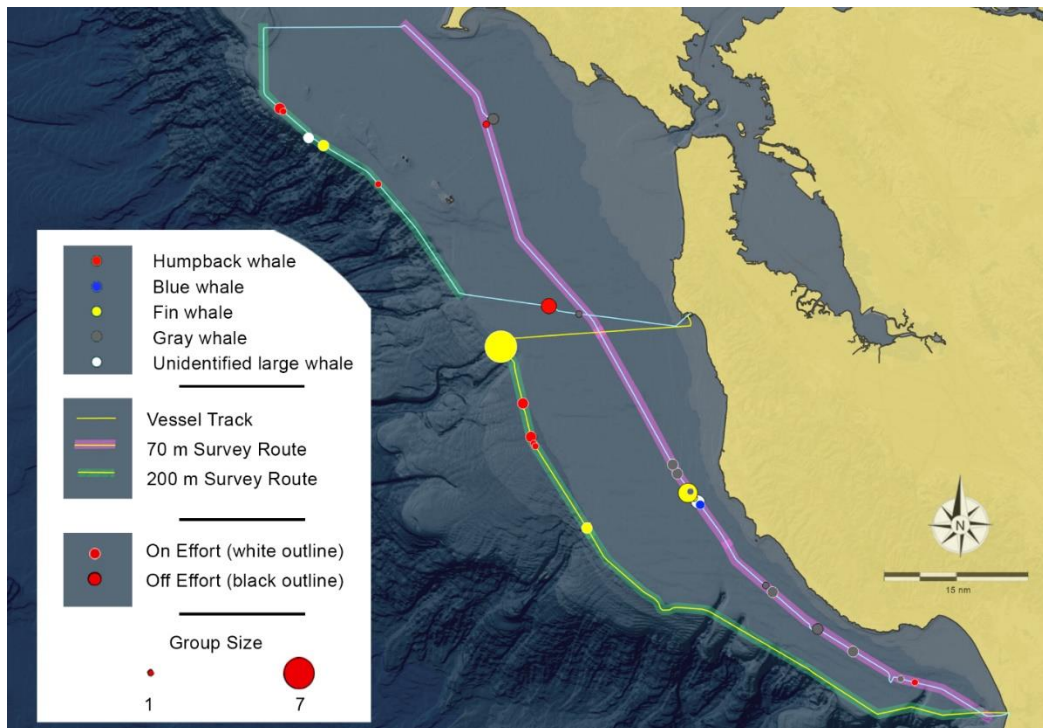


Figure 3. Vessel-based surveys from R/V Nova on March 27-28, 2021 showing vessel track and observations.

## 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 beyond landings data submitted to CDFW is not available currently. 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)*

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

- The 14-day average of 4.8 whales-per-half-day-trip is slightly higher than the average historical patterns (Figure 4), which show increasing numbers of humpback whales during March-April as they return to the central California feeding grounds. Based on historical patterns, it is expected that humpback whale numbers will continue to increase during the coming weeks.
- The absence of Blue whales is consistent with their overwintering at the breeding grounds (Figure 5).

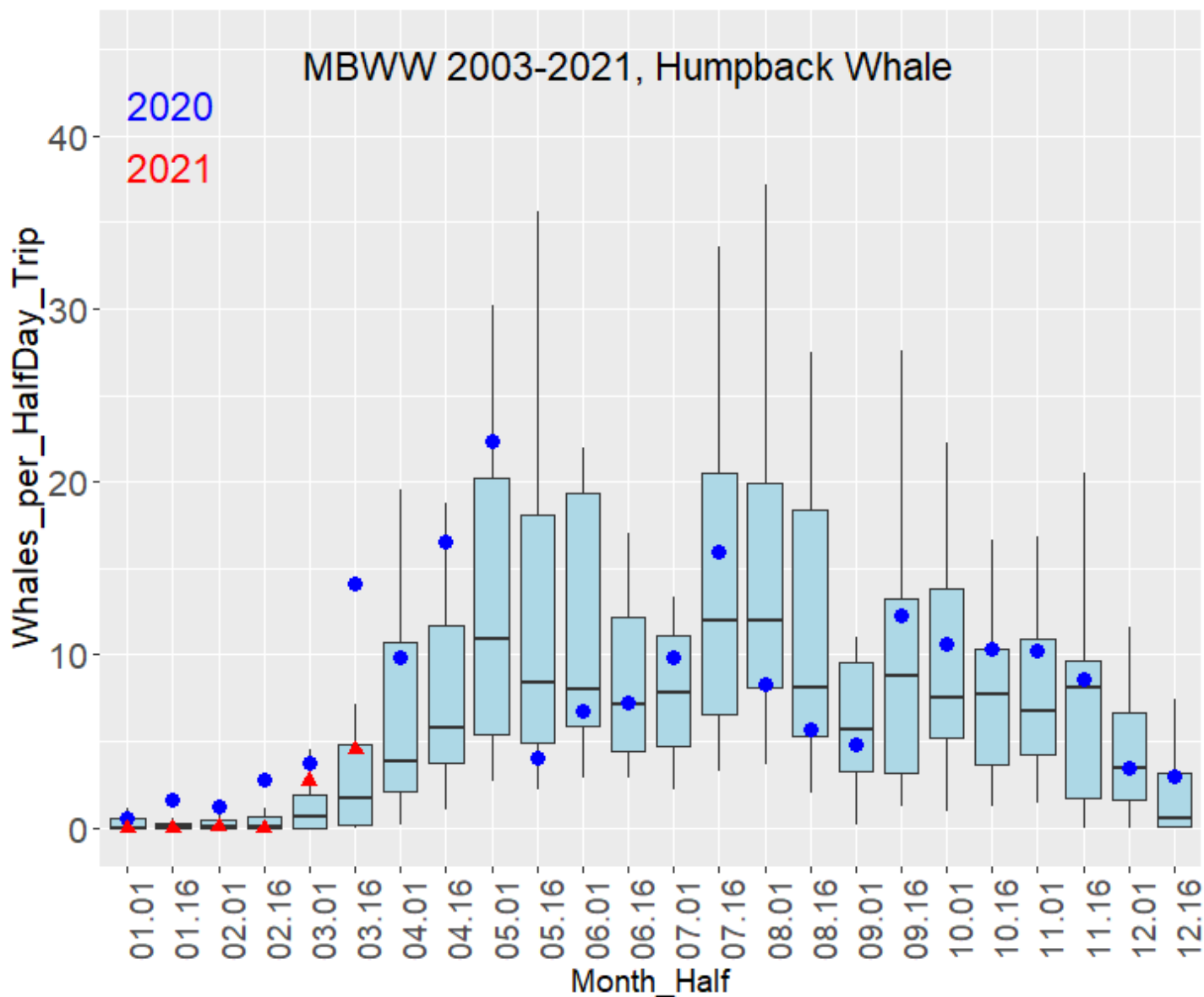


Figure 4. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Humpback whales per half-day trip on a semi-monthly basis (1<sup>st</sup>- 15<sup>th</sup>, 16<sup>th</sup>- end of month). This boxplot follows standard statistical practice in that 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.

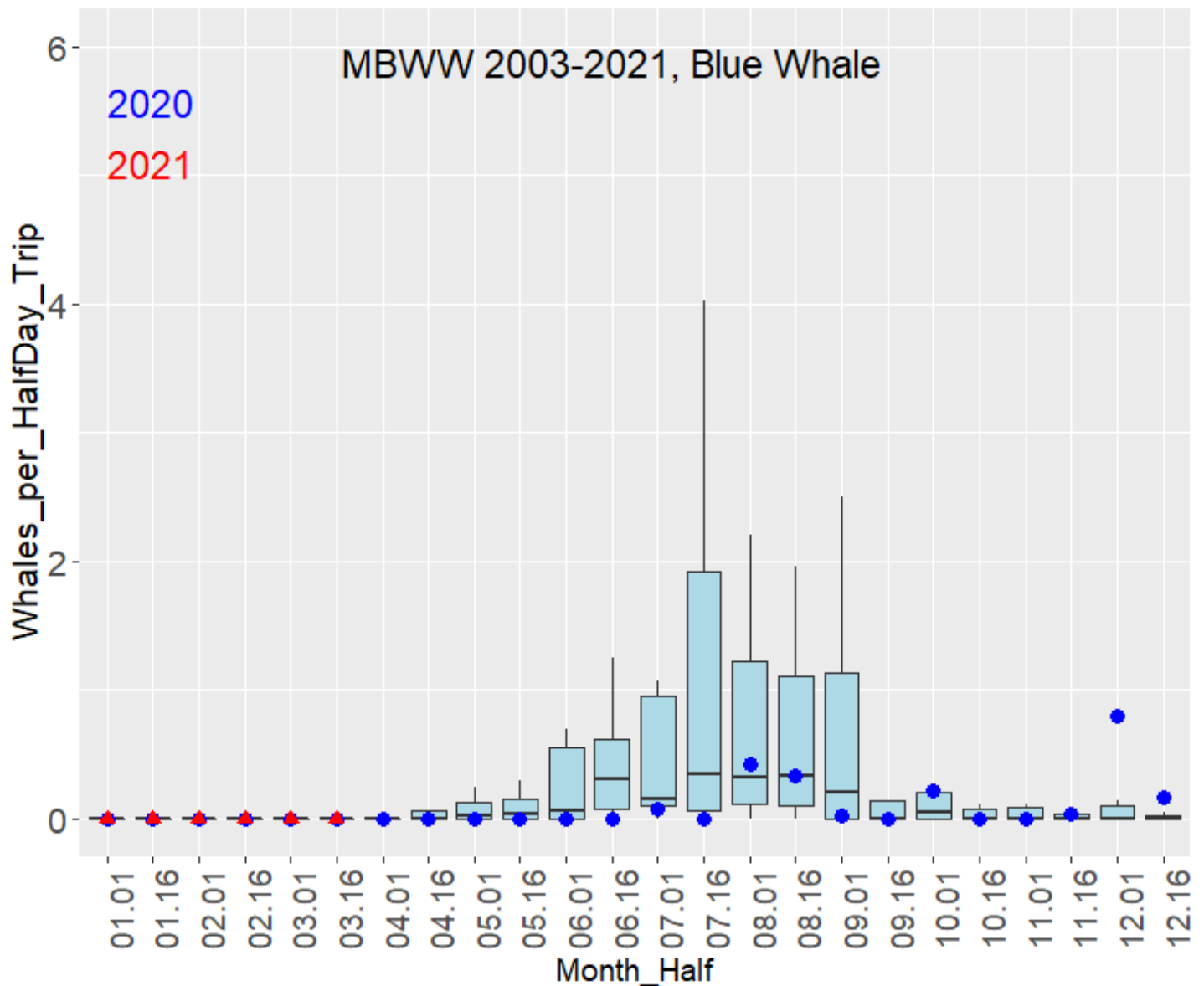


Figure 5. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average 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.

#### 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 March 29, 2021 and Automatic Licensing Data System (ALDS) on March 19, 2021, Bi-Weekly Reporting Database on March 26, 2021, Solar Logger Pilot Project provided by Kathi George (The Marine Mammal Center).

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

- 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 March 23, 2021, there have been 2,786 daily landings of Dungeness crab with a total volume of 3,294,895 pounds and with a total Ex-Vessel Value of \$16,491,443. Average unit price for these landings was \$5.57 (excluding receipts with unit price of \$0 reported). A total of 356 vessels have made at least one landing during the 2020-21 season.
- CDFW Fishing Zones (aggregated CDFW Fishing Blocks used to report catch location) are shown in Figure 6 with 13 complete weeks of landings to analyze. The highest volume came from Fishing Zone 3.
- Of the 356 vessels, 355 could be tied to a Dungeness crab vessel permit and are organized in the trap tiers as follows:
  - Tier 1: 45 vessels
  - Tier 2: 44 vessels
  - Tier 3: 43 vessels
  - Tier 4: 39 vessels
  - Tier 5: 36 vessels
  - Tier 6: 97 vessels
  - Tier 7: 51 vessels
- Week 5 shows the highest number of aggregated maximum potential traps represented by the number of vessels that made at least one landing and the overall traps represented by their vessel permit tier, with an estimated total of 134,350 traps deployed. Overall the highest number of these maximum potential traps are deployed in Fishing Zone 3, followed by Zone 1 (Figure 7). By Week 13, the maximum potential traps was estimated to be 43,725 traps.
- For the past 3 weeks (Weeks 11-13), average weekly price per landings by port complex are ranging between \$5.50 and \$9.50 each week (Figure 8).
- Two figures of graphs showing number of vessels (Figure 9) and the maximum potential trap number they represent (Figure 10) 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 March 19, 2021 and will be populated as the current season progresses.

- Although the latest March 15-28 period is showing declines for the current season, the landings data populating this summary is incomplete. The March 1-14 period is showing higher overall maximum trap numbers in relation to the past season average between 2014 and 2020 (removing 2016 data) for those ports in Fishing Zone 3 while this number is below average for those ports in Fishing Zones 1, 2, 4 and 5.

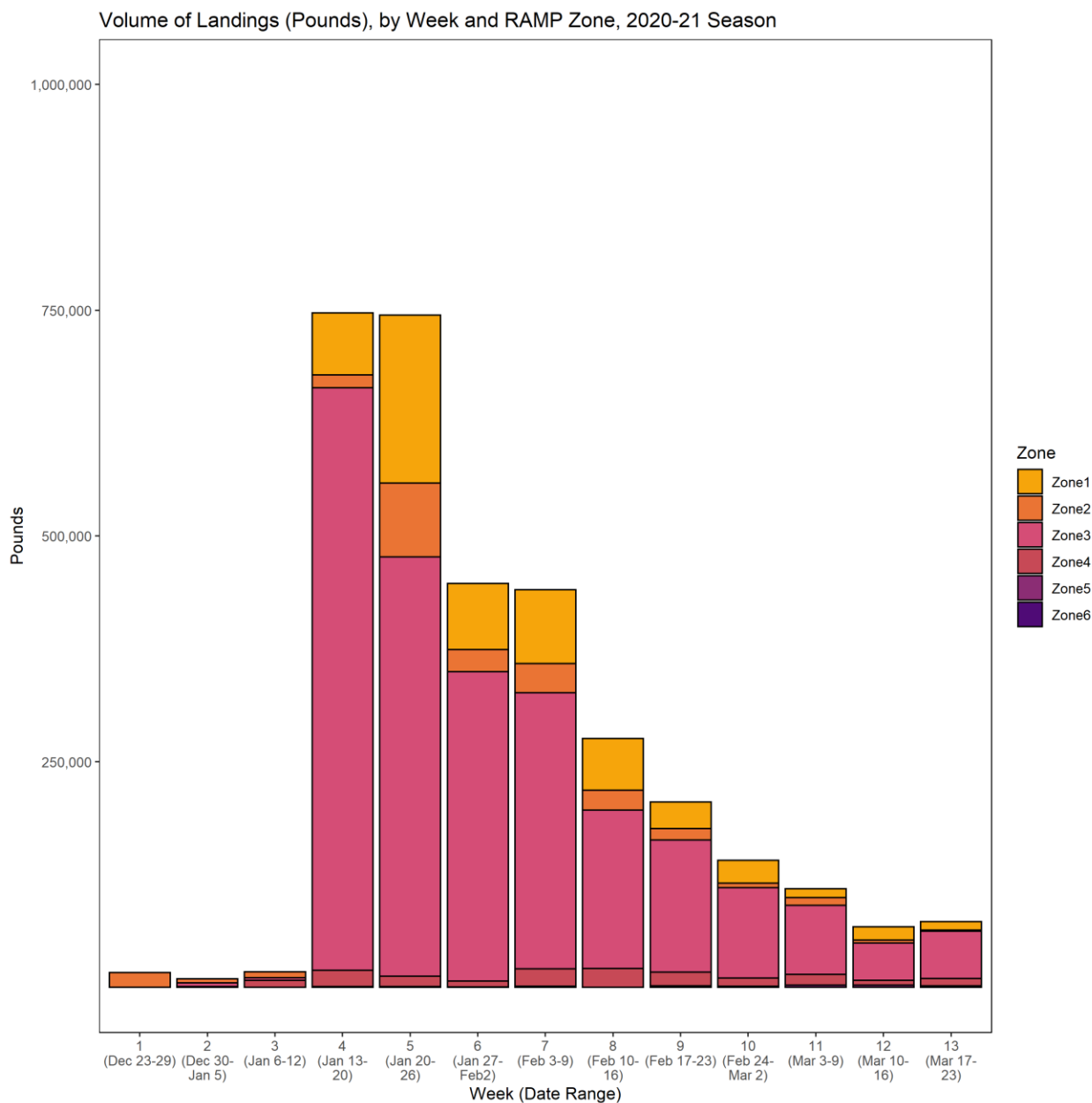


Figure 6. Dungeness crab landings (pounds) by week and Fishing Zone. Accessed from CDFW's MLDS on March 29, 2021. All data are preliminary and subject to change.

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

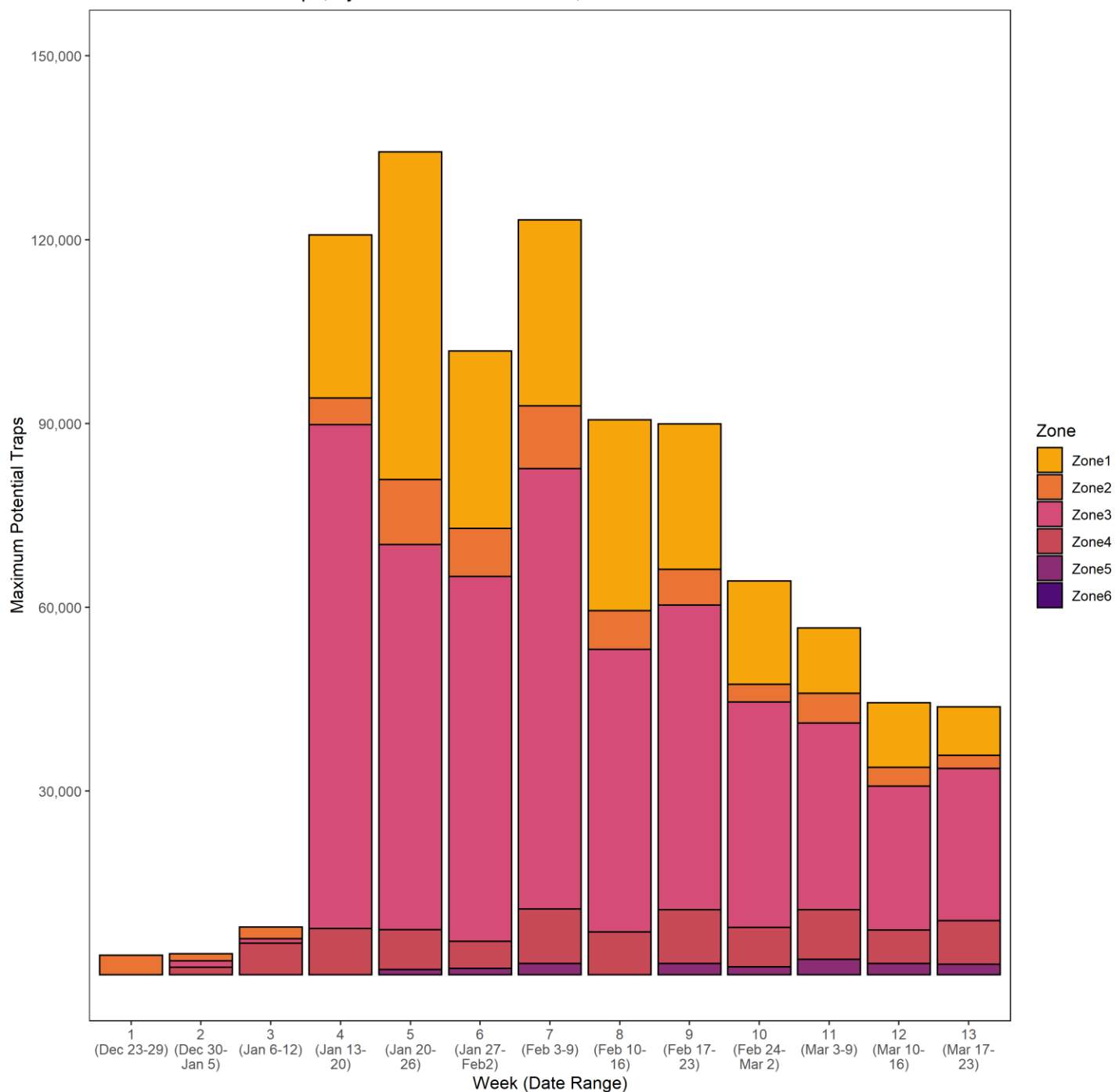


Figure 7. Maximum potential traps by week and Fishing Zone, based on landings data and Dungeness crab vessel permit tier information. Accessed from CDFW's MLDS on March 29,2021 and CDFW's ALDS on March 19, 2021. All data are preliminary and subject to change.

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

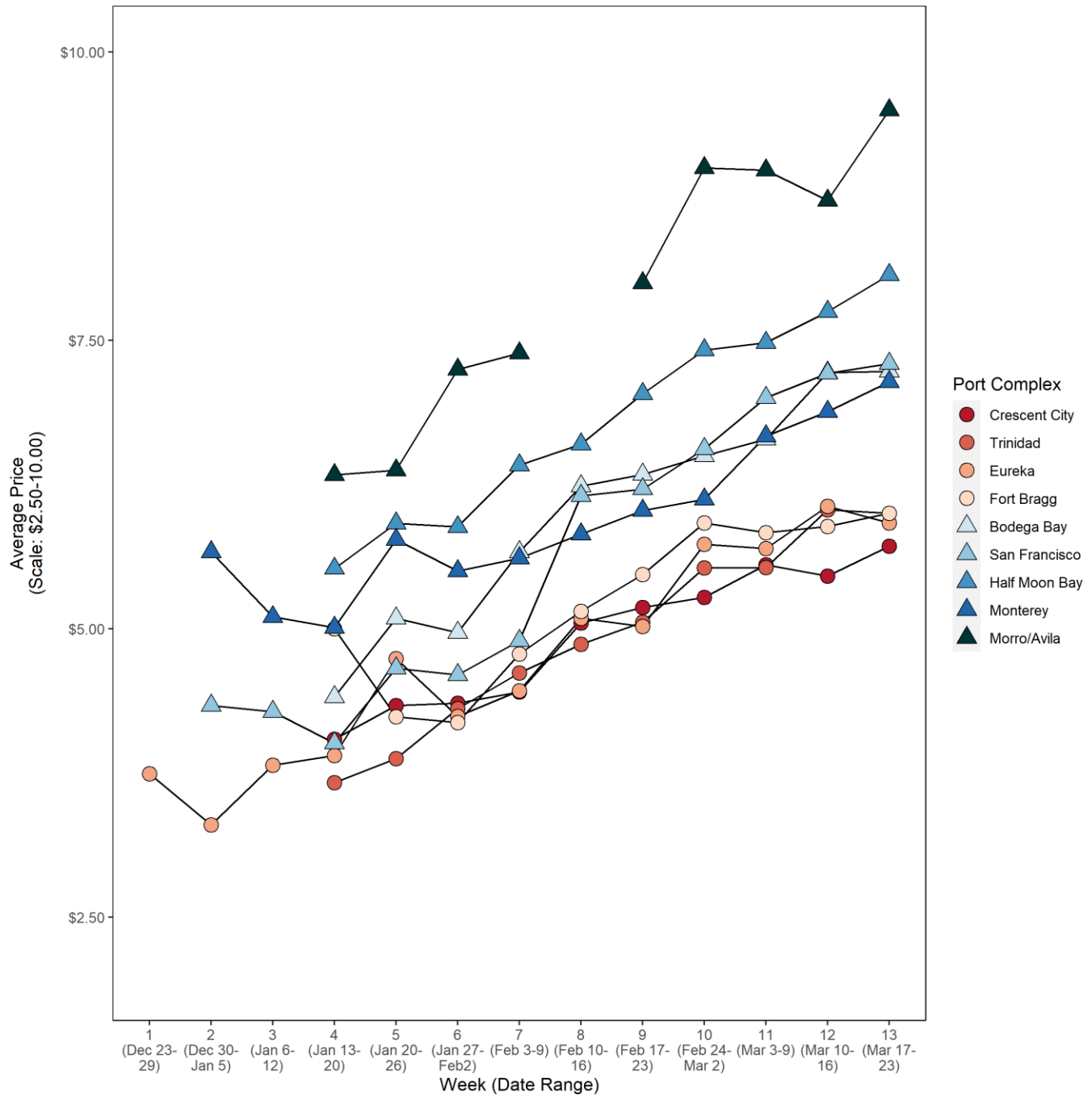


Figure 8. Average price per pound by week and port complex (removing receipts that reported \$0 unit price). Northern management area ports are designated by circles while central management area ports are designated by triangles. Accessed from CDFW's MLDS on March 29, 2021. All data are preliminary and subject to change.

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

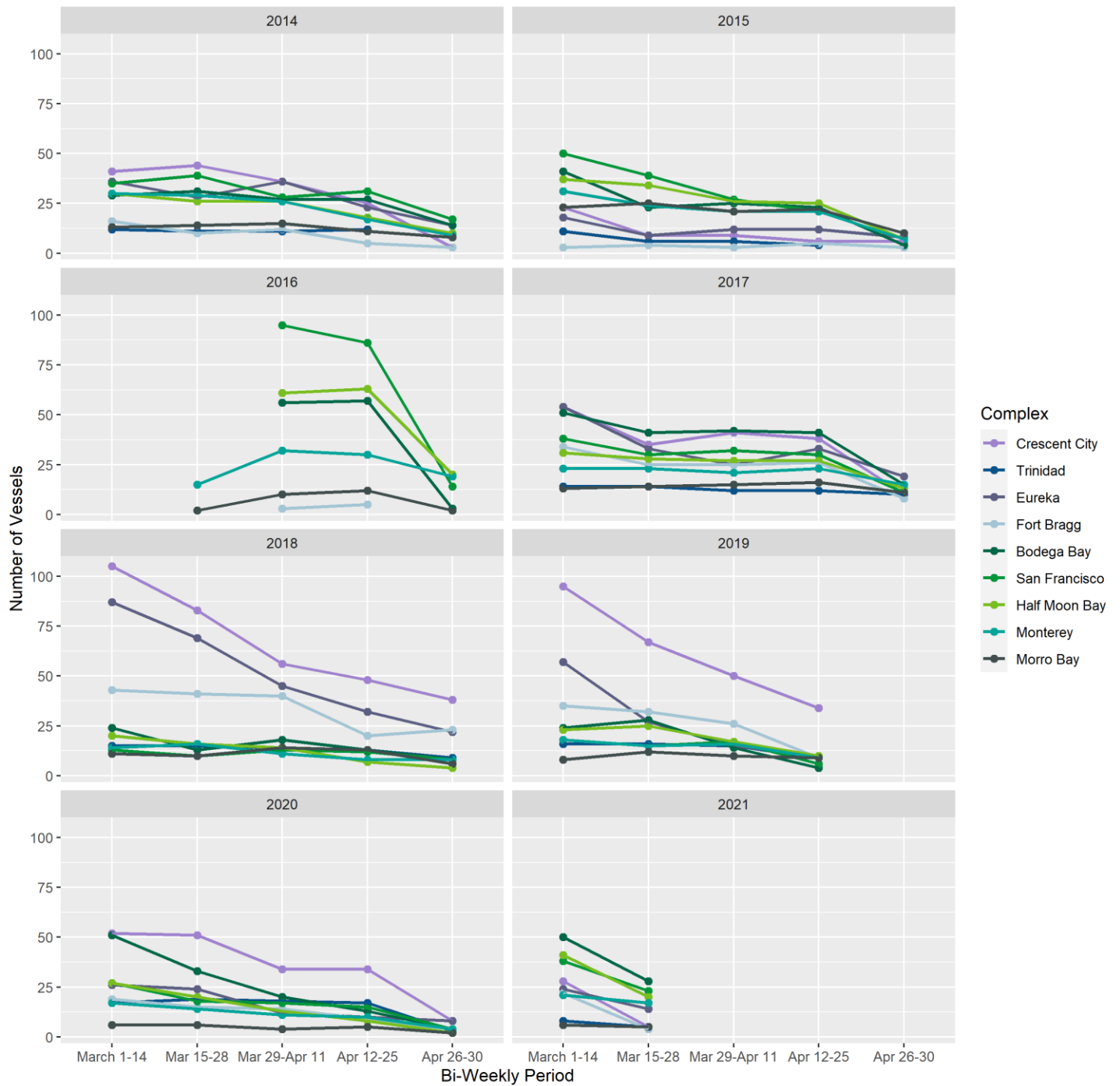


Figure 9. Panels showing number of active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and April 30. Accessed from CDFW's custom PowerBi report with last data refresh on March 19, 2021. All data are preliminary and subject to change.



Maximum Potential Traps During March and April, 2014-2021

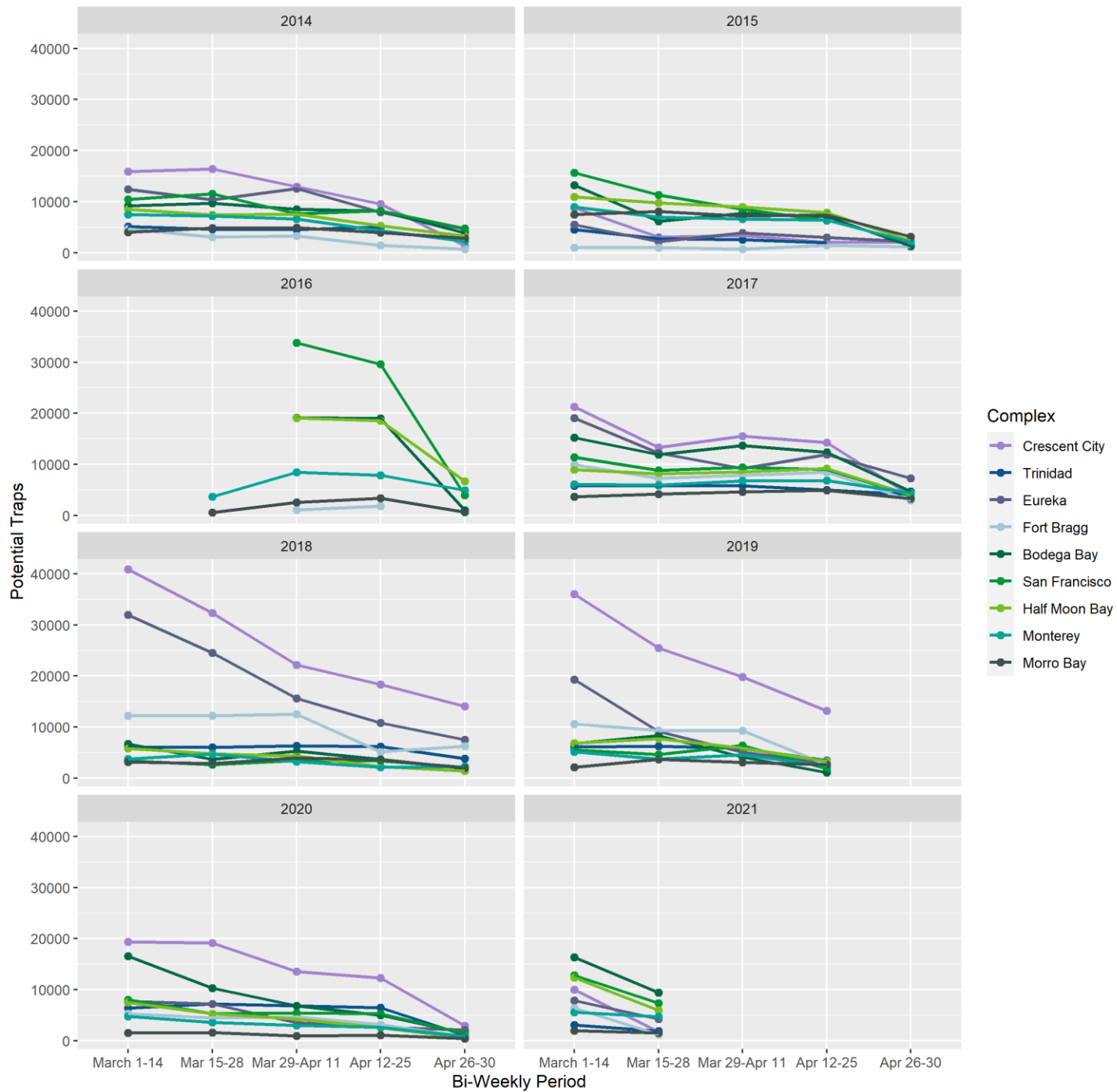


Figure 10. Panels showing number of maximum potential traps based on active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and April 30. Accessed from CDFW's custom PowerBi report with last data refresh on March 19, 2021. All data are preliminary and subject to change.

## Bi-Weekly Fishing Activity Reports (All Fishing Zones)

- CDFW has received bi-weekly reports since the first reporting period of January 1, 2021 through the most recent reporting period of March 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: February 16, 2021 (Table 1), March 1, 2021 (Table 2), and March 16, 2021 (Table 3).

**Table 1. Summary of information provided in February 16, 2021 bi-weekly reporting period by Fishing Zone (1-6).** Accessed from CDFW's Bi-Weekly Reporting database on March 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	62	263	16,280	12	25	65	7	20
Zone 2	13	240	3,123	13	34	80	3	1
Zone 3	130	283	36,782	20	41	80	9	32
Zone 4	11	192	2,116	21	44	80	0	0
Zone 5	4	122	486	34	55	55	0	0
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	220		58,787				31	53

Table 2. Summary of information provided in March 1,2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 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	46	267	12,280	12	26	65	7	14
Zone 2	14	220	3,082	13	28	51	2	1
Zone 3	109	269	29,3077	19	42	100	10	51
Zone 4	10	185	1,851	24	43	65	0	0
Zone 5	4	129	517	30	52	55	0	0
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	183		52,757				19	66

**Table 3. Summary of information provided in March 16, 2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 26, 2021. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.**

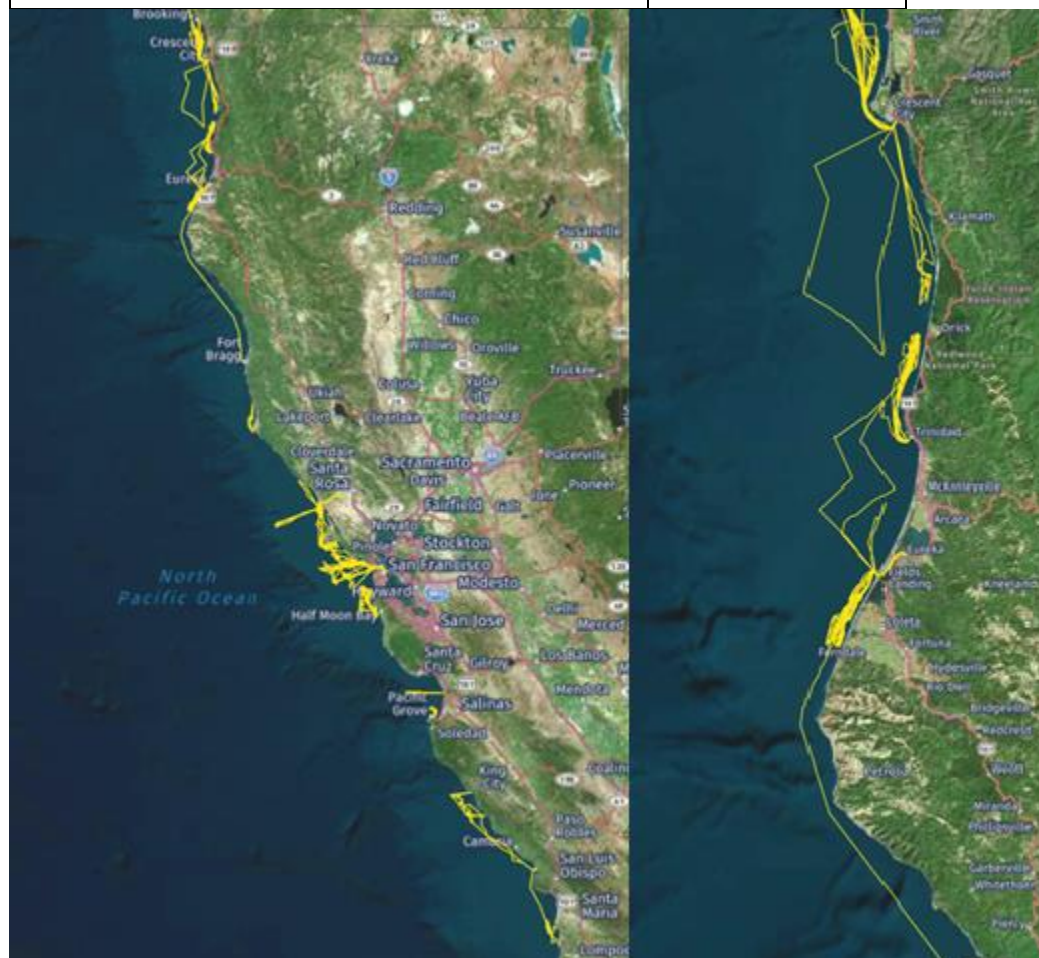
Fishing Zone	Permits Reporting	Average Trap Number	Total Traps	Average Min. Depth (fathoms)	Average Max. Depth (fathoms)	Max. Reported Depth (fathoms)	Final Report	Number of Lost Traps
Zone 1	35	269	9,425	10	24	65	10	22
Zone 2	12	200	2,400	18	30	51	3	5
Zone 3	96	264	25,379	20	43	80	8	44
Zone 4	10	191	1,913	22	42	60	1	2
Zone 5	5	158	790	27	49	52	0	0
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	158		39,907				24	73

#### **Solar Loggers (Fishing Zones 1-5)**

- The vessel track data provided by the solar logger pilot project is shown for the March 10-28, 2021 period. The following maps show vessel activity in 1) entire coast of California and Fishing Zone 1 (Figure 12), 2) Fishing Zones 2 and 3 (Figure 13) and 3) Fishing Zones 4 and 5 (Figure 14). From vessel participation in the project (and not necessarily representative of the entire fishery), Fishing Zone 3 showed the most activity. Several vessels participating in the pilot 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 4.

**Table 4. 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 December 19, 2020 until March 28, 2021.**

Date Ranges	Fishing Trips
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 11. Fishing trips from March 10 - 28, 2021. The map on the left represents the entire coast where vessels may be participating. The map on the right focuses on fishing activity in Fishing Zone 1.**

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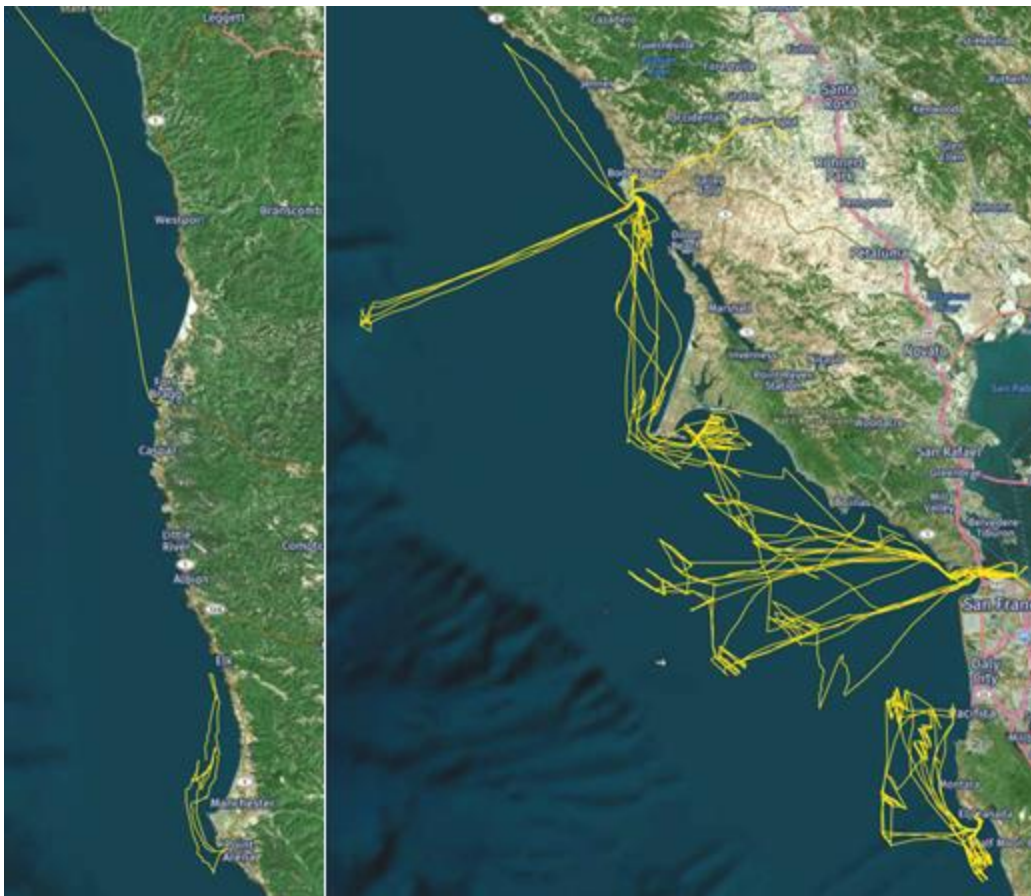


Figure 12. Fishing trips from March 10 - 28, 2021. The map on the left shows fishing activity in Fishing Zone 2 while the map on the right shows fishing activity in Fishing Zone 3.

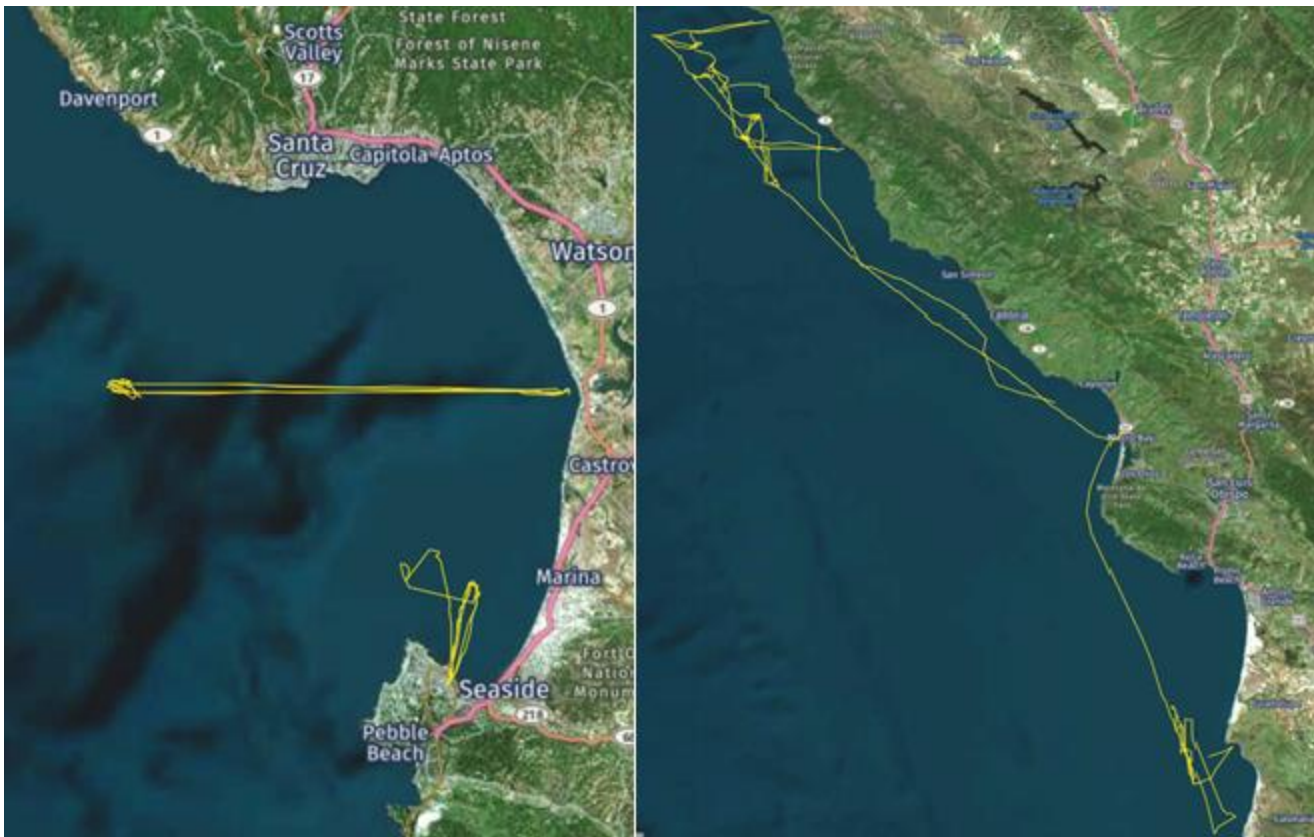


Figure 13. Fishing trips from March 10 - 28, 2021. The map on the left shows fishing activity in Fishing Zone 4 while the map on the right shows fishing activity in Fishing Zone 5.

#### 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>, John Calambokidis (Cascadia Research, SR3, and The Marine Mammal Center)

#### 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.
- Large prey patches of krill were observed near the surface along the 200-meter line, between the Farallons and Cordell Bank.

#### Section 132.8(d)(9): Ocean conditions

ENSO prediction accessed from [NOAA's Climate Prediction Center website](#) on March 23, 2021,

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

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

- The prediction of ENSO conditions were last updated on March 11, 2021. La Niña conditions persisted in February with a 60% chance of a transition from this condition to ENSO-neutral in the northern hemisphere by the spring months of April, May and June.

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

- Please refer to the last [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, no confirmed entanglements of Actionable Species have been reported for the current calendar year. Therefore, the Impact Score Calculation is 0 for all three species.

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

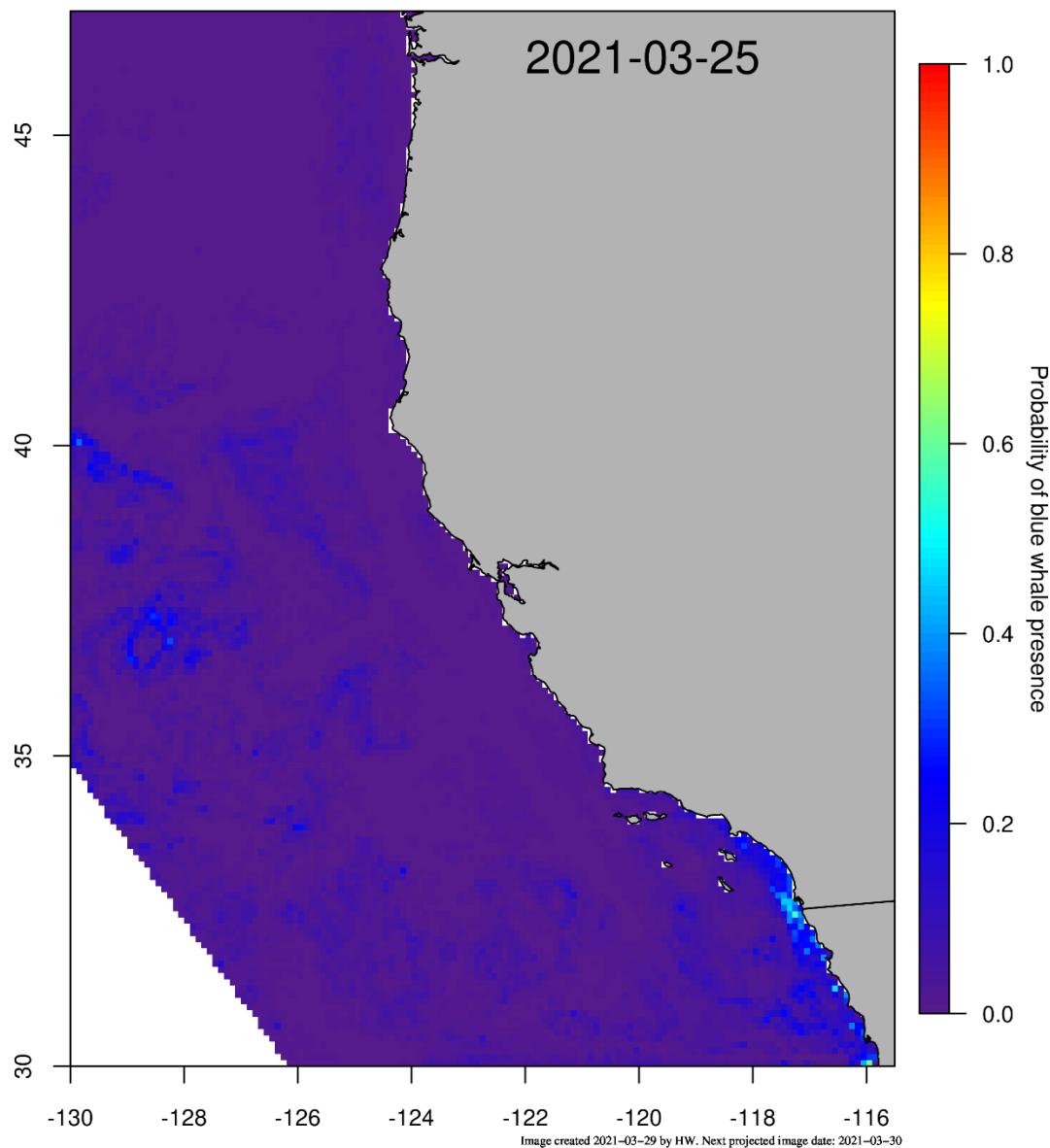
*Data provided by: John Calambokidis (Cascadia Research, SR3, and The Marine Mammal Center), Briana Abrahms (University of Washington), Kathi George (The Marine Mammal Center), Jaime Jahncke (Point Blue Conservation Science), Jon Gonzalez (California Coast Crab Association)*

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

- Three Humpback whales identified in recent vessel-based surveys in Fishing Zones 3 and 4 conducted on March 27-28, 2021 were known animals from Mexico.
- Recent surveys in north Costa Rica (where high sightings of humpback whales were seen in January and February) revealed few whales suggesting migration north is underway from there.

## WhaleWatch 2.0 (All Fishing Zones)

- WhaleWatch habitat predictions for March 25, 2021 indicate that probability of Blue whale presence is low in Fishing Zones 1-6 (Figure 15).



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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99 Pacific Street, Monterey CA 93940, USA



Figure 14. WhaleWatch 2.0 map for March 29, 2021. [View a current map.](#)

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

- Track lines from whale watching vessels participating in the solar logger pilot project (Figure 16) indicate a high amount of effort in the southern half of Monterey Bay during 46 trips between March 10 – 28, 2021. A summary of cumulative whale watching trips every one and two weeks since January 1, 2021 is provided in Table 5.

**Table 5. Summary of whale watching trips based on data provided by the solar logger project between different time periods from December 19, 2020 until March 28, 2021.**

Time Periods	Whale Watching Trips
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 15. Track lines for 46 whale watch trips in Monterey Bay from March 10 - 28, 2021. Sightings, numbers and species are not reflected on this map.

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

- The Gulf of the Farallones and Monterey Bay National Marine Sanctuaries (through the Spotter/Whale Alert app) has observed two Humpback whales in Fishing Zone 3 on March 14, 2021 (Figure 17). No Blue whales have been observed, yet 26 Gray whales have been observed over the past seven days (March 22-29, 2021). Observations were recorded by trained observers on the Farallon Islands.
- Monterey Bay National Marine Sanctuary has observed eight Humpback whales from March 22-29, 2021 within Fishing Zone 4 (Figure 18). No Blue whales sighted during this period. Observations were reported from trained naturalists aboard Monterey Bay Whale Watch and a newly trained naturalist aboard Secret Harbors Charter.
- Channel Islands National Marine Sanctuary observed ten Humpback whales and no Blue whales within Fishing Zone 6. These observations are conducted by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service.

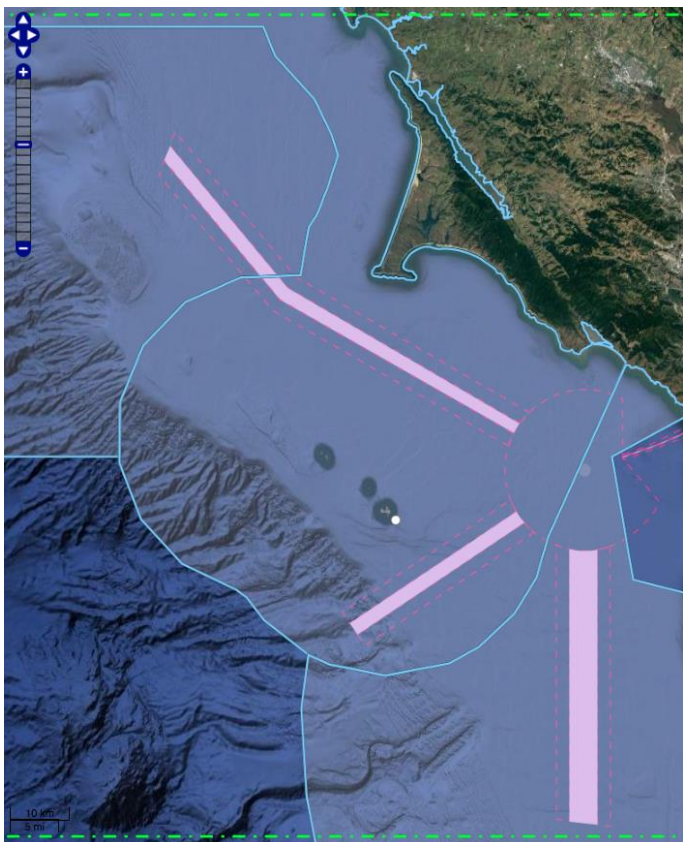


Figure 16. Location of 2 Humpback whale sightings in Fishing Zone 3 on March 14, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

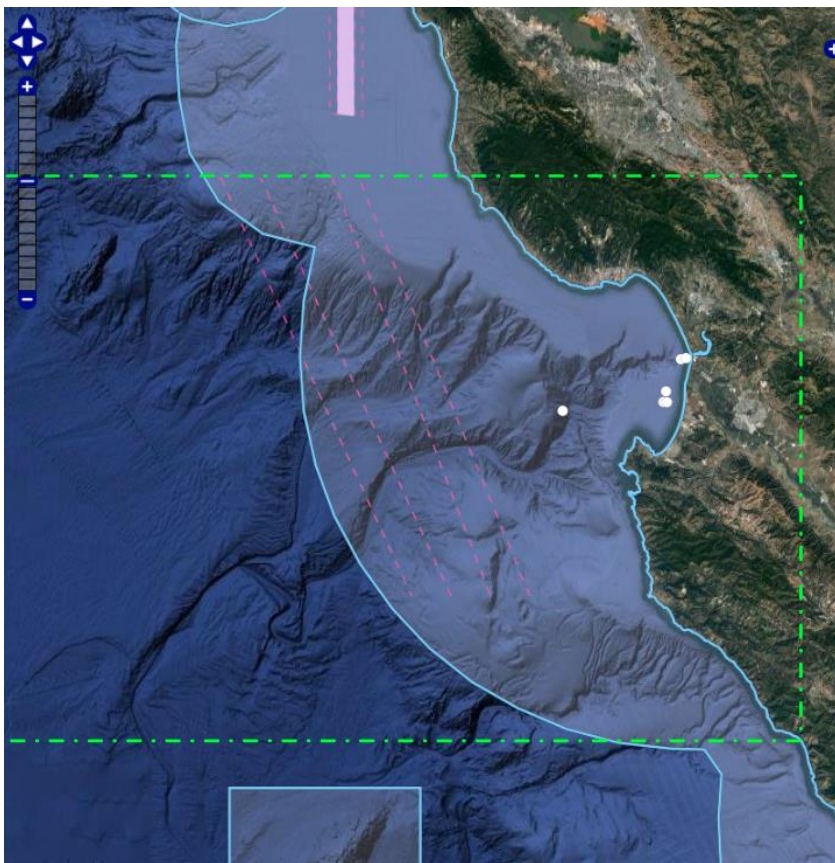


Figure 17. Location of 8 Humpback whale sightings in Fishing Zone 4 from March 22-29, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

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

- Vessel-based surveys conducted in Fishing Zone 1 from Dungeness crab commercial vessels occurred on March 22, 2021 (Figure 19). Weather conditions were amenable with 6 miles of visibility and 4-foot swells. Two Humpback whales were observed feeding, with the one in Crescent City breaching a bait ball with a lot of bird life. Eight Gray whales and 11 unknown whales were also observed. The distinguishable blow of Gray whales was observed in all 11 unknown whale sightings, however the whales were either too far away or not visible at the surface to positively assign it to species.
- Vessel-based surveys conducted in Fishing Zone 5 from Dungeness crab commercial vessels occurred on March 26, 2021 (Figure 20). Weather conditions were amenable with 6 miles to unlimited visibility and 4- to 6-foot swells. Ocean temperatures were recorded to be cold (48.9°C – 52.1°C) and there was very little to no forage present. One Humpback whale and eight Gray whales were observed traveling north and not feeding, while were also observed traveling north the one in Crescent City breaching a bait ball with



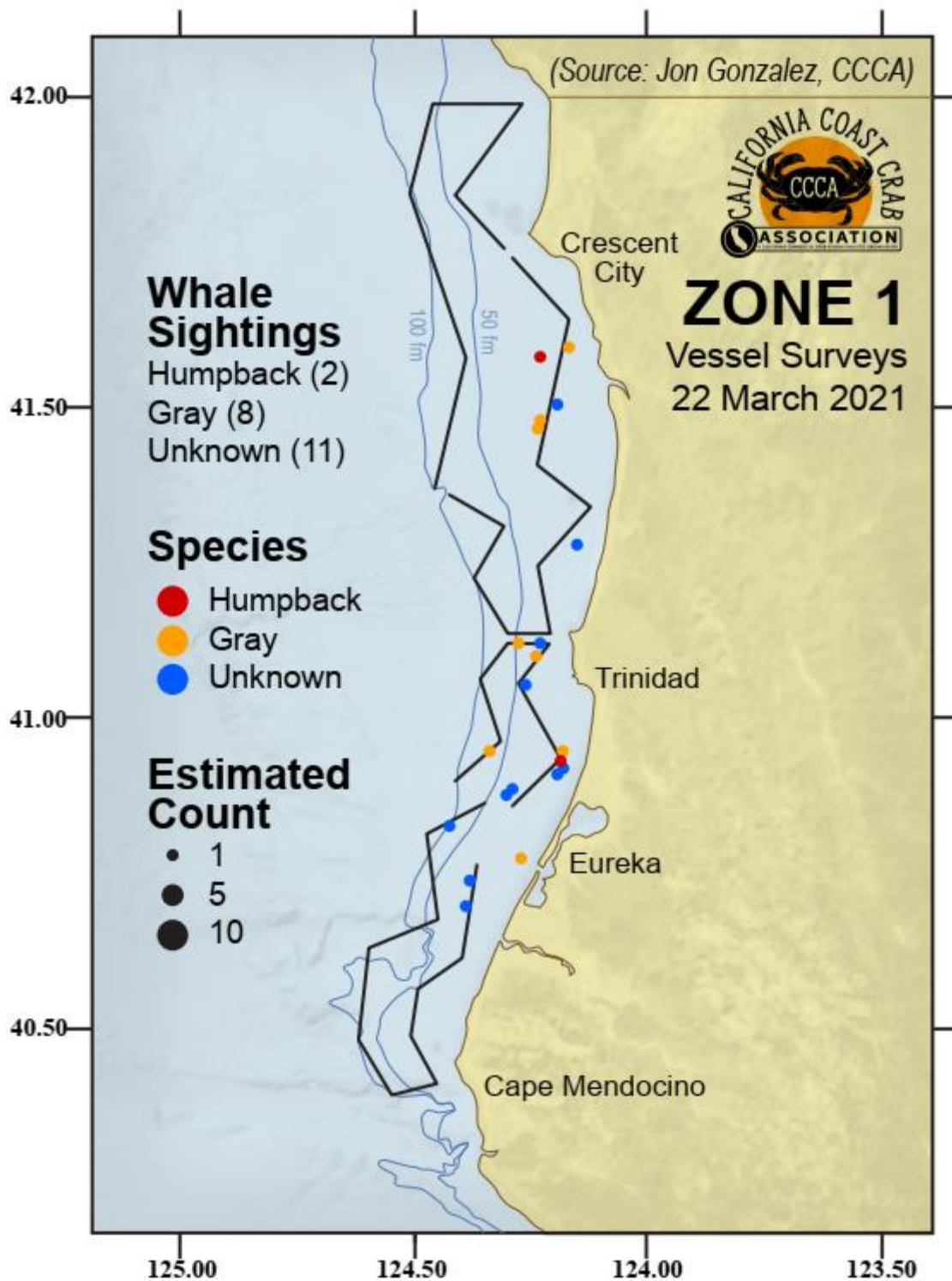


Figure 18. Vessel-based surveys conducted in Fishing Zone 1 on March 22, 2021 showing vessel path and whale observations.

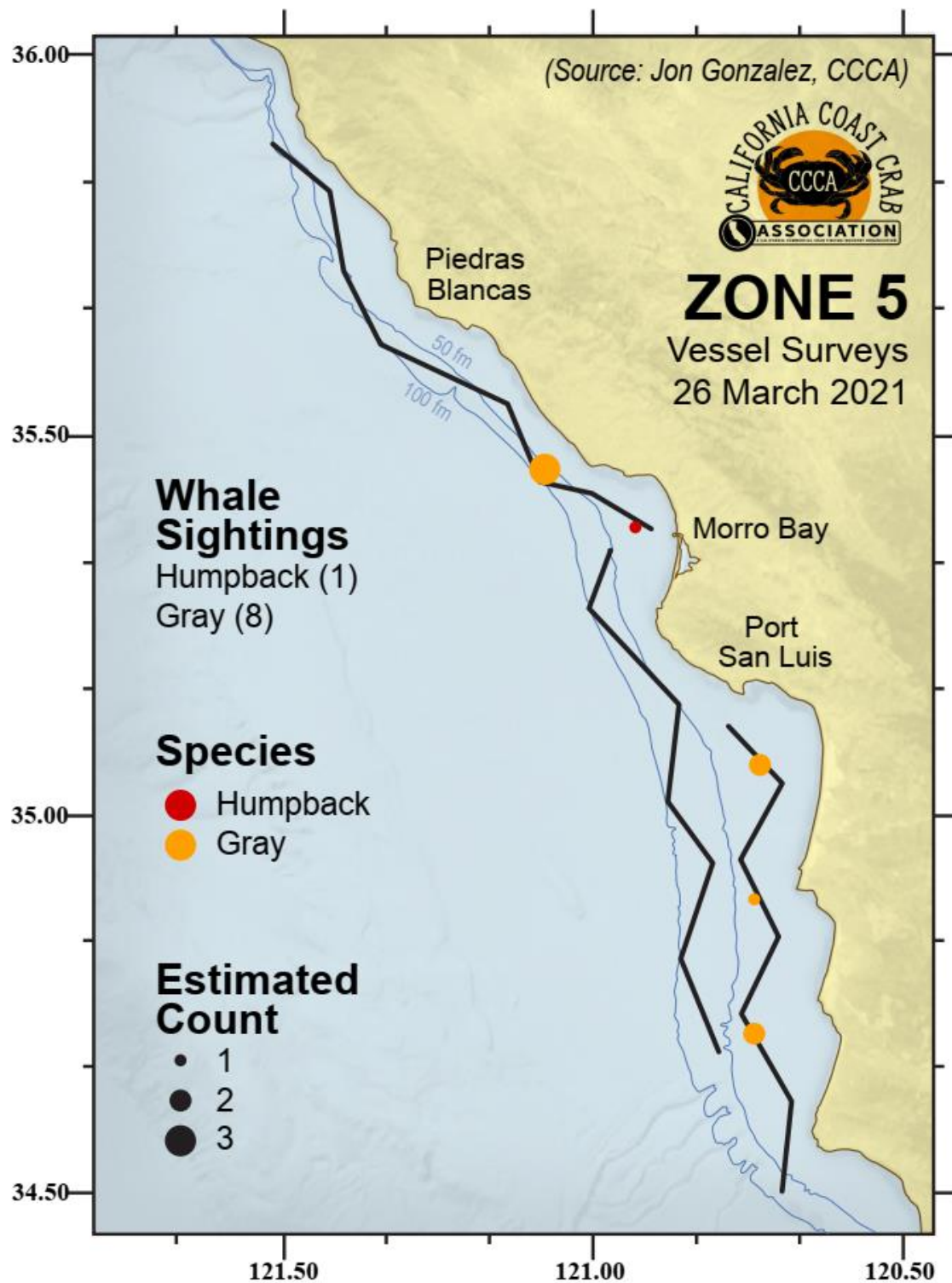


Figure 19. Vessel-based surveys conducted in Fishing Zone 5 on March 26, 2021 showing vessel path and whale observations.