

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

Last updated: March 16, 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, 2 unconfirmed (Unknown species and Gray whale)

Supplemental Information:

- Unconfirmed whale entanglement reported February 17, 2021: Possible whale entanglement with CA Dungeness crab gear. A pile of blubber and large bones found on the beach in Manchester State Park loosely spun around CA Dungeness crab gear (3 buoys, a smaller marker buoy, line and an unattached trap further down the beach). At this time, we cannot confirm it was a whale (although likely based on the blubber depth and size of bones). We are hopeful to run genetics on the blubber soon, to determine what animal it was. The trained stranding network responders who examined it noted how easily the gear was removed as it was not really embedded in the remaining tissue.
- Unconfirmed Gray whale entanglement reported on February 2, 2021 near Oceanside, CA, entangling gear type unknown.
- 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

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- 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)*

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

- CDFW staff conducted an aerial survey over Zones 2, 3 and 4, Point Arena to Point Sur on March 10, 2021 (Figure 1). One Humpback whale was observed near the Farallon Islands (Zone 3). Several Gray and Fin whales were observed south of Point Arena and south of Pigeon Point (Zone 3 and 4). Trap gear was observed across all three Fishing Zones, with high concentrations around the Farallon Islands and south of Half Moon Bay. Vessel activity was observed within those Zones as well, with some vessels picking up and/or resetting gear.

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

- After a near-absence of humpback whales since late December, there have been four days with humpback whale sightings during March, including one day with 30 whales sighted. The 14-day average number of whales-per-half-day-trip is 3.4, and the 7-day average is 5.7.
- No Blue whales have been observed by MBWW since December 24, when a single whale was seen.

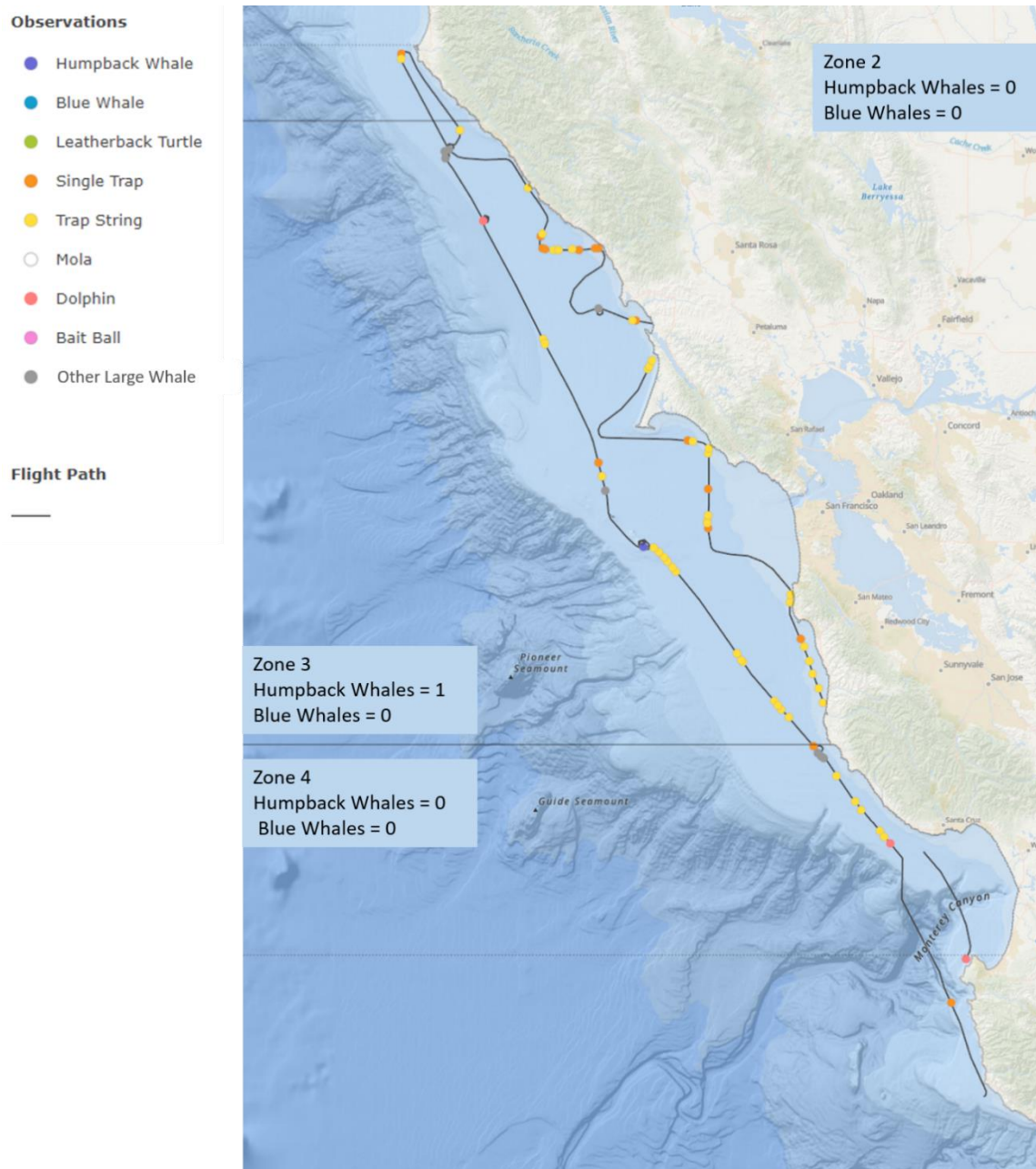


Figure 1. Flight path and observations during CDFW aerial survey in Fishing Zones 2, 3, and 4 on March 10, 2021.

## 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: John Calambokidis (Cascadia Research), Monterey Bay Whale Watch (processed by Karin Forney, NMFS)*

##### Cascadia Research (*All Fishing Zones*)

- Recent surveys at these breeding areas (Central America and Mexico) resulted in lower numbers of Humpback whales than previously observed during mid-winter surveys indicating some departures.

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

- The 7-day average number of whales is similar, but slightly higher than the average historical patterns (Figure 2), which show few or no humpback whale sightings during January-February (when whales are mostly at their breeding areas off Mexico and central America), and some whales starting to return to the central California feeding grounds during early March. Based on historical patterns, it is expected that whale numbers will continue to increase during the coming weeks.
- The absence of Blue whales is consistent with their known southward migration to breeding areas during winter (Figure 3).

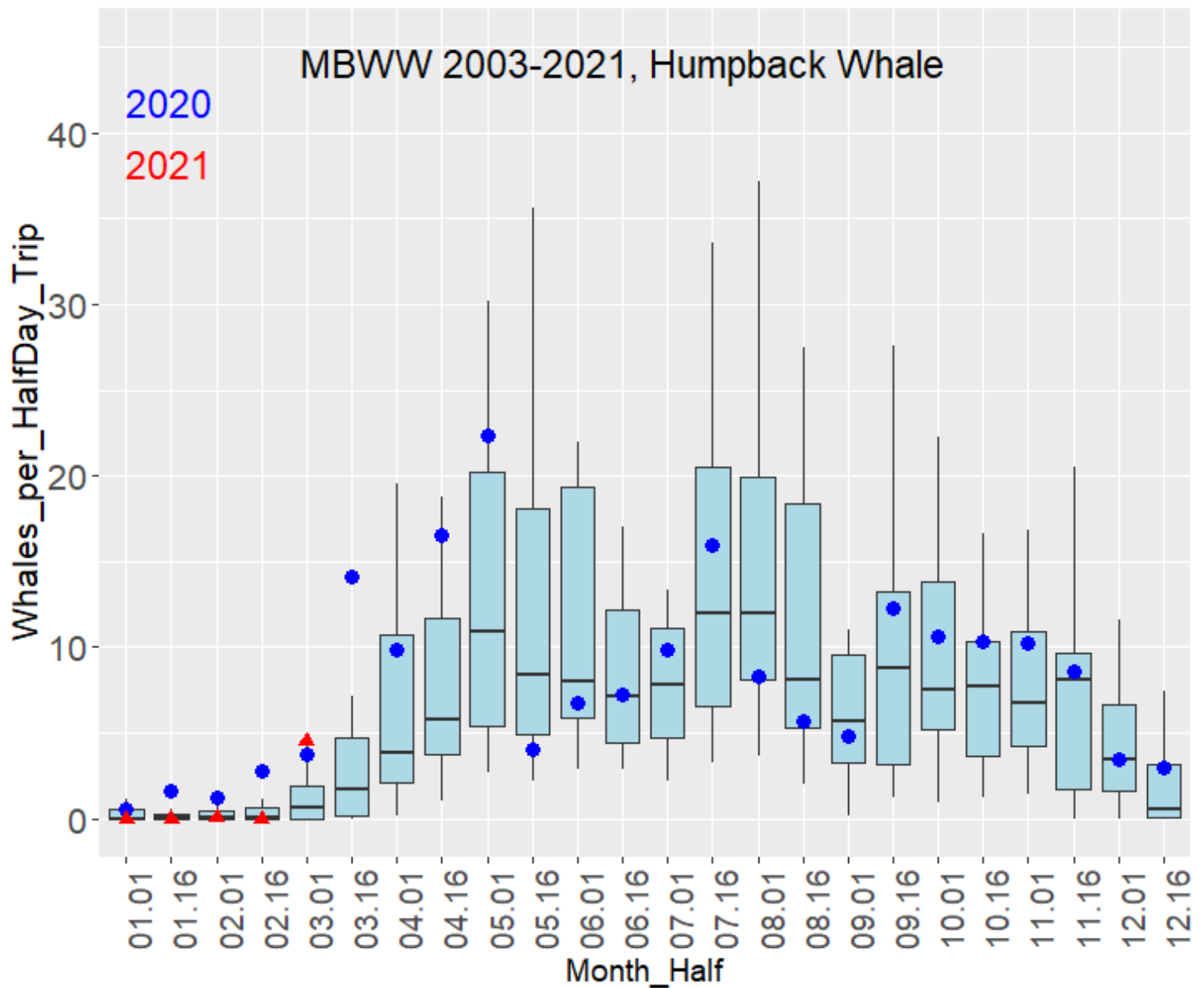


Figure 2. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Humpback whales per half-day trip on a semi-monthly basis (1<sup>st</sup>- 15<sup>th</sup>, 16<sup>th</sup>- end of month). This boxplot follows standard statistical practice in that 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.

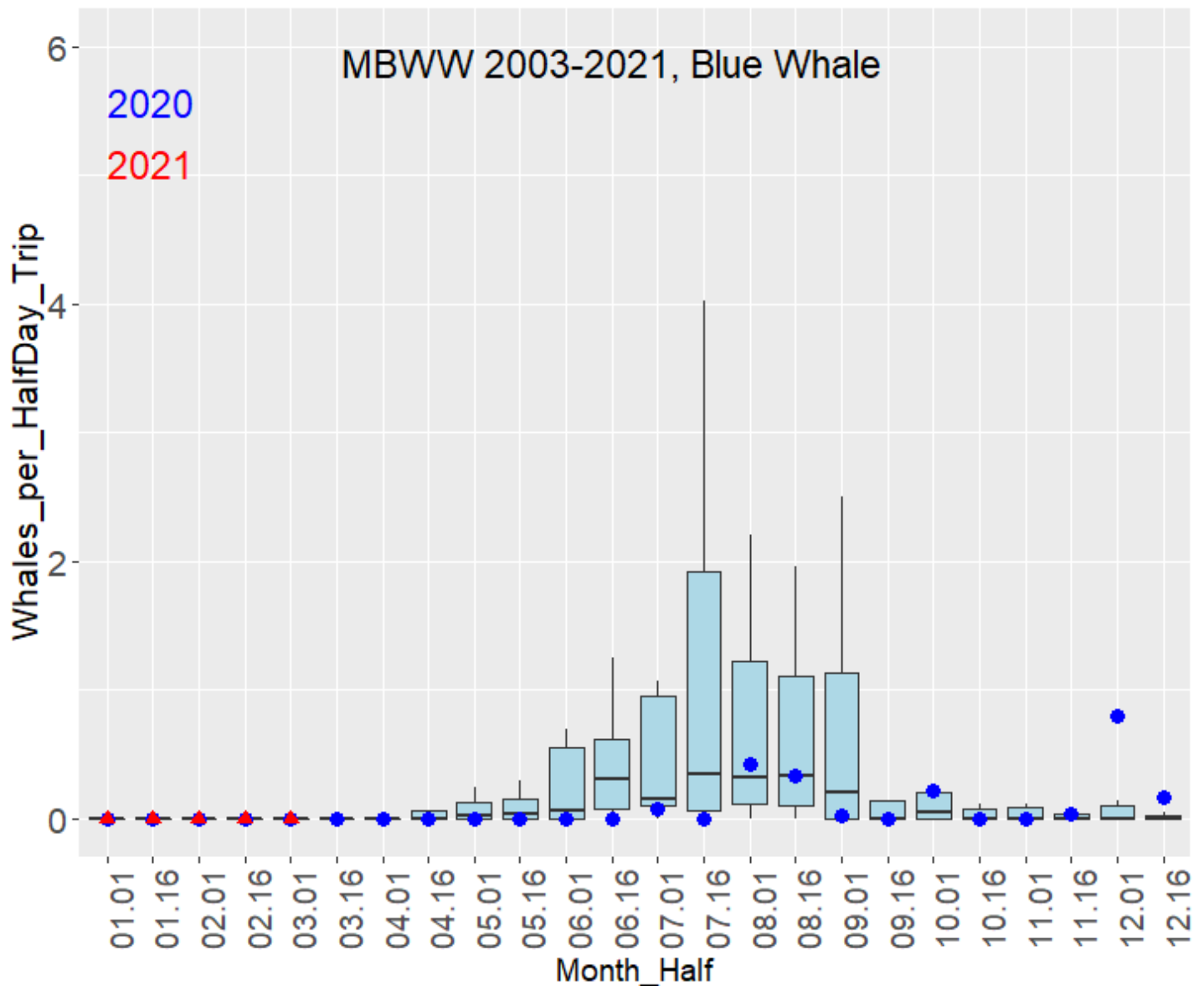


Figure 3. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average 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 5, 2021 and Automatic Licensing Data System (ALDS) on February 25, 2021, Bi-Weekly Reporting Database on March 11, 2021, Solar Logger Pilot Project provided by Kathi George (The Marine Mammal Center).

## 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 2, 2021, there have been 2,280 landings of Dungeness crab with a total volume of 3,016,532 pounds and with a total Ex-Vessel Value of \$14,638,746. Average unit price for these landings was \$5.28 (excluding receipts with unit price of \$0 reported). A total of 351 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 9 with 10 complete weeks of landings to analyze. The highest volume came from Fishing Zone 3 (Figure 14).
- Of the 351 vessels, 349 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: 35 vessels
  - Tier 6: 96 vessels
  - Tier 7: 47 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 94,350 traps deployed. Overall the highest number of these maximum potential traps are deployed in Fishing Zone 3, followed by Zone 1 (Figure 15). By Week 10, the maximum potential traps was estimated to be 45,625 traps.
- Average landings by week and port complex are ranging between \$4.50 and \$9 each week for the month of February and average price has been increasing each week for all ports from Week 6 onward (Figure 16).
- Number of vessels that made at least one landing each month separated by management area is compared between the prior season of 2019-20 and the current season, 2020-21, and (Figure 17). The data that we have complete months for this comparison are December

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through February. In the northern management area, the number of vessels is observably lower this season than last season during these months. In the central management area, the number of vessels this season is lower in January than last season, but by February the numbers look relatively similar.

#### 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 1, 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 1, 2021 (Table 1), February 16, 2021 (Table 2), March 1, 2021 (Table 3).

**Table 1. Summary of information provided in February 1, 2021 bi-weekly reporting period by Fishing Zone (1-6).** Accessed from CDFW's Bi-Weekly Reporting database on March 11, 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	58	318	18,434	13	29	50	7	0
Zone 2	15	240	3,596	15	32	64	0	0
Zone 3	118	289	34,073	22	43	80	NR-C	NR-C
Zone 4	8	207	1,654	21	41	60	0	0
Zone 5 & 6	4	153	612	32	50	60	0	0
Totals	203		58,369				7	0



Table 2. 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 11, 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	48	259	12,420	11	25	65	16	17
Zone 2	11	257	2,831	13	34	80	NR-C	NR-C
Zone 3	122	284	34,687	20	41	80	9	32
Zone 4	11	192	2,116	21	44	80	0	0
Zone 5 & 6	5	141	703	34	51	60	0	0
Totals	197		52,757				25	49

Table 3. 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 11, 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	33	288	9,505	13	30	65	4	12
Zone 2	12	227	2,720	12	27	51	NR-C	NR-C
Zone 3	99	275	27,263	19	43	100	8	35
Zone 4	9	191	1,723	23	43	65	0	0
Zone 5 & 6	5	153	764	30	49	60	0	0
Totals	158		41,975				12	47

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

The vessel track data provided by the solar logger pilot project was divided into three separate report periods to show movement of the fishing activity over time between: 1) February 10 – 28, 2021 (Figure 4 and 5) and 2) March 1 – 9, 2021 (Figure 6 and 7). 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 9, 2021.

Date Ranges	Fishing Trips
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

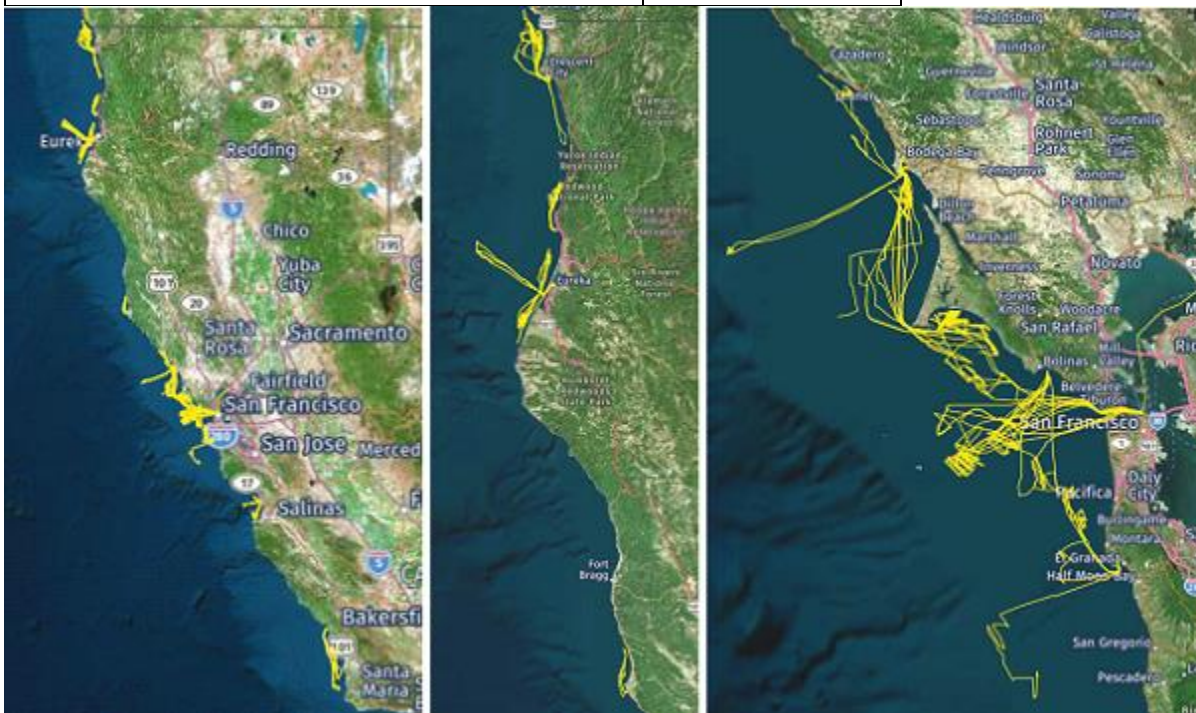


Figure 4. Fishing trips from February 10 - 28, 2021. The figure on the left represents the entire coast where vessels may be participating. The center figure focuses on fishing activity in the middle of Fishing Zones 1 and 2 while the figure on the right focuses in on fishing activity within Fishing Zone 3.



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

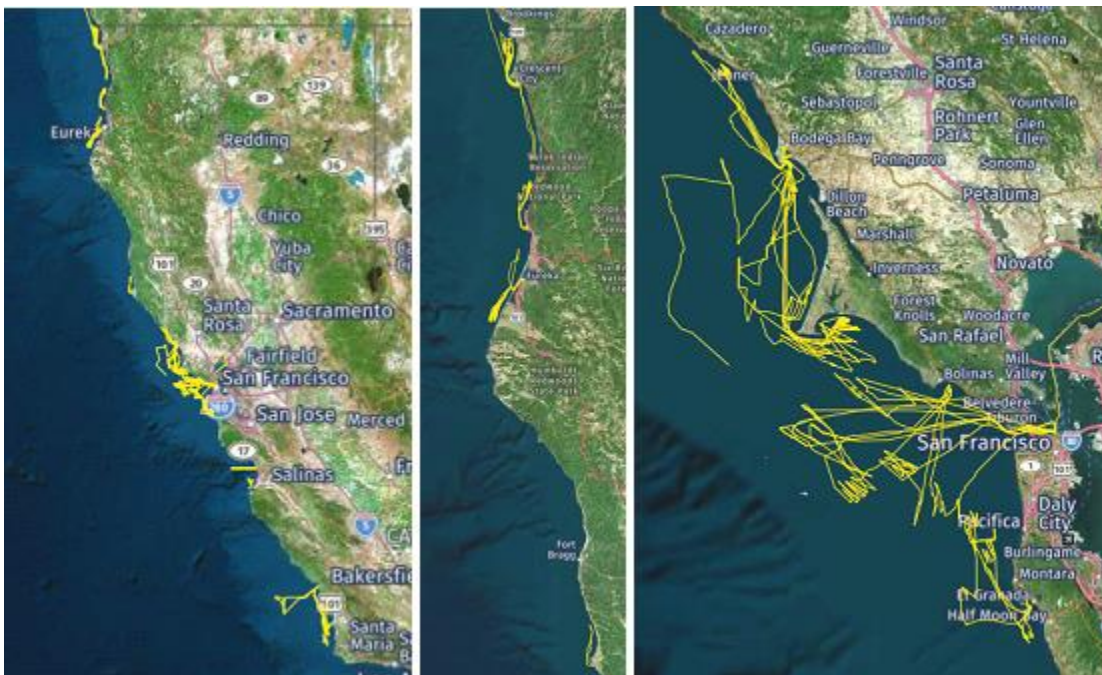


Figure 6. Fishing trips from March 1 - 9, 2021. The figure on the left represents the entire coast where vessels may be participating. The center figure focuses on fishing activity within Fishing Zones 1 and 2 while the figure on the right focuses in on fishing activity within Fishing Zone 3.



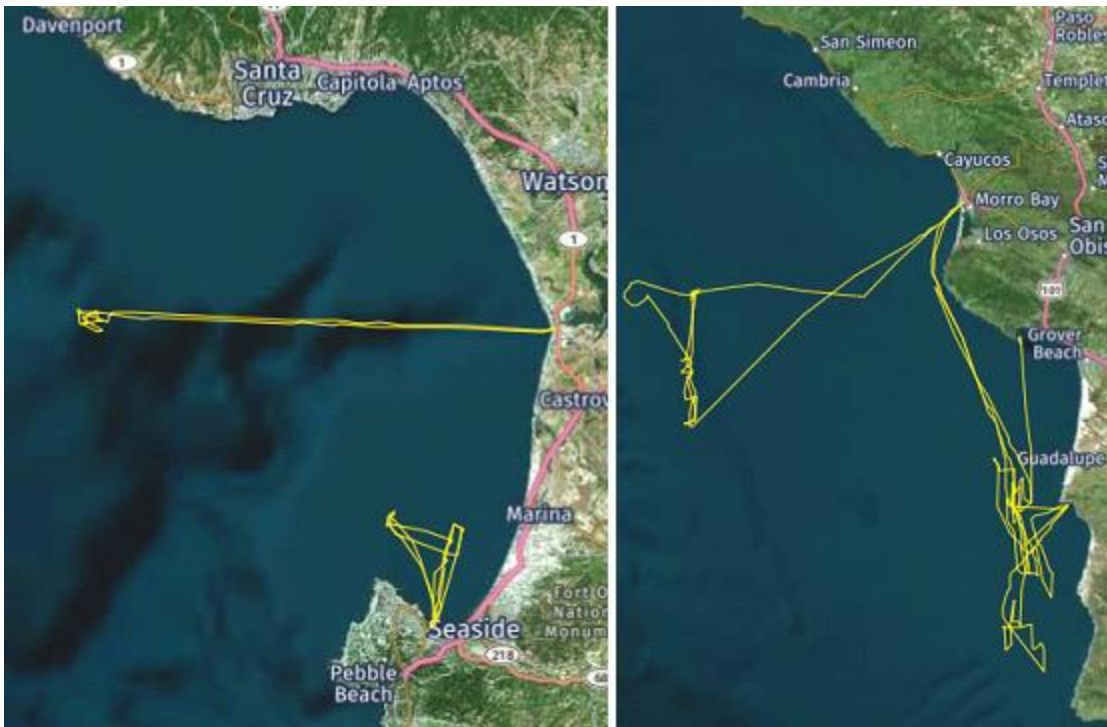


Figure 7. Fishing trips from March 1 – 9, 2021. The figure on the left shows fishing activity in Fishing Zone 4 while the figure on the right shows fishing activity in Fishing Zone 5.

#### 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>

#### 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 March 10, 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)

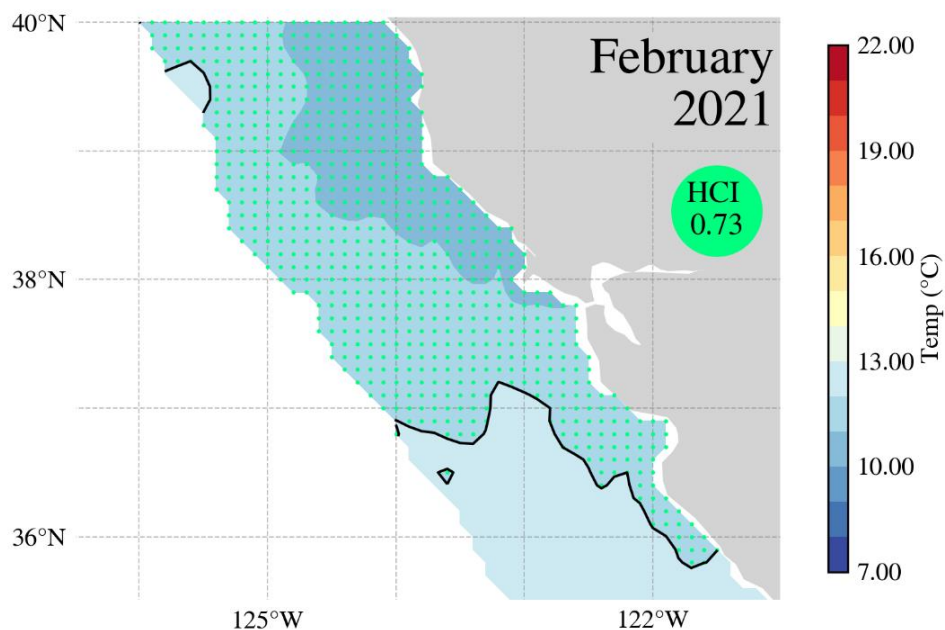
- The prediction of ENSO conditions last updated on February 11, 2021 has not changed since the last data compilation. La Niña conditions persisted in January with a 60% chance

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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)

- The latest outlook of late winter/spring ocean ecosystem conditions shows that ocean conditions have cooled significantly over this past winter and conditions in spring are trending toward cool and productive conditions. It is anticipated that cool conditions will continue, with expanded upwelling habitat and no signs of impact of habitat compression that would otherwise result in increased concentrations and aggregations of whales and forage nearshore.
- The February 2021 Habitat Compression Index (HCI) now indicates that there is no risk of a high compression state (Figure 8) and this is in stark contrast to the HCI values in February for the past 7 years between 2014 and 2020 (Figure 9). A low compression state for February has not been observed since 2013, the year just prior to the emergence of the large marine heatwave. This HCI information applies to all CDFW Fishing Zones.

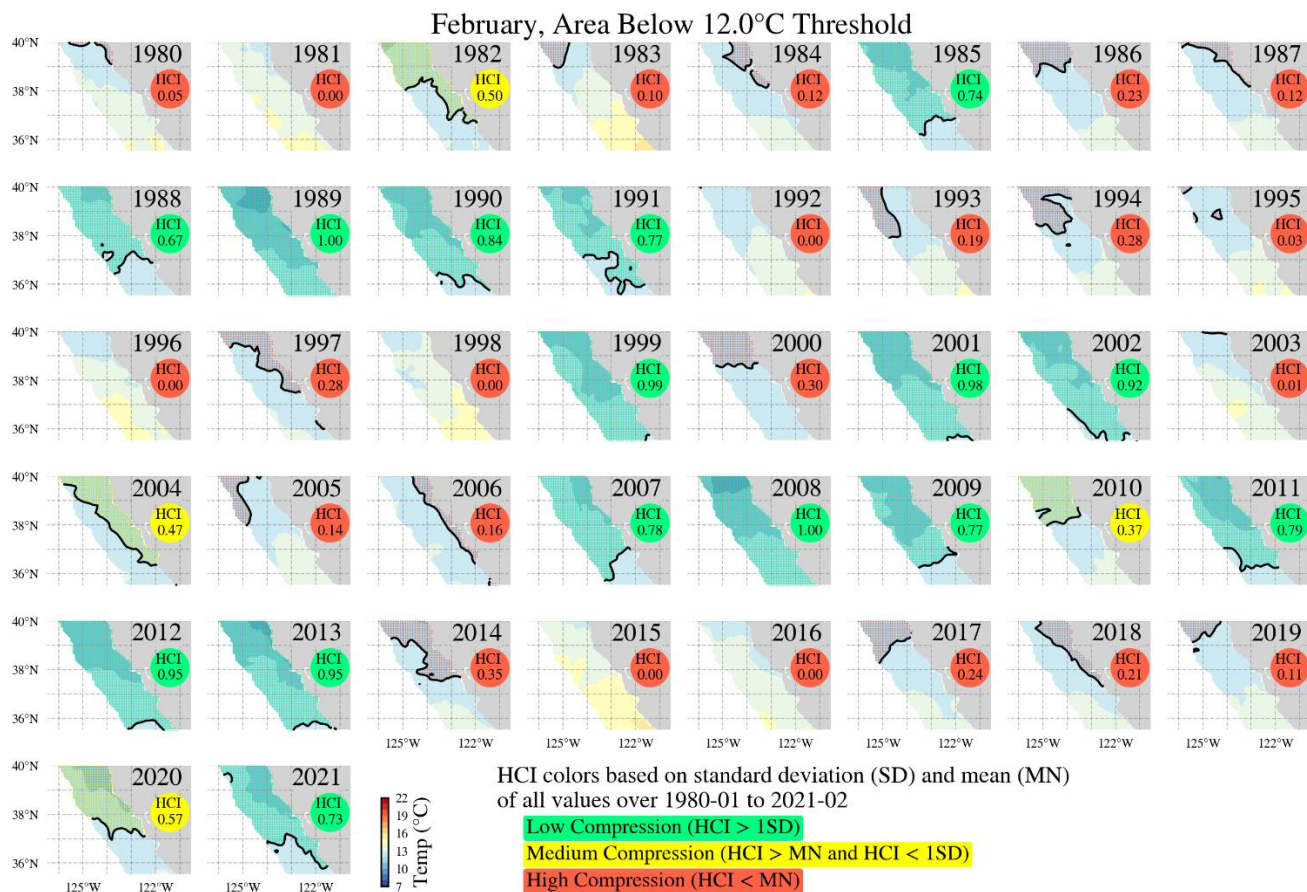


HCI color based on standard deviation (SD) and mean (MN) of all values over 1980-01 to 2021-02

Low Compression (HCI > 1SD)

Figure 8. Map of February 2021 sea surface temperature and location of Habitat Compression Index (HCI) boundary (black thin line) with an HCI value indicating low compression for the month. Source: <https://oceanview.pfeg.noaa.gov/hci/>

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**Figure 9. Maps of historical February sea surface temperature and location of Habitat Compression Index (HCI) boundary (black thin line) between 1980 and 2021 and resulting HCI values for each time period. Source: <https://oceanview.pfeg.noaa.gov/hci/>**

#### 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

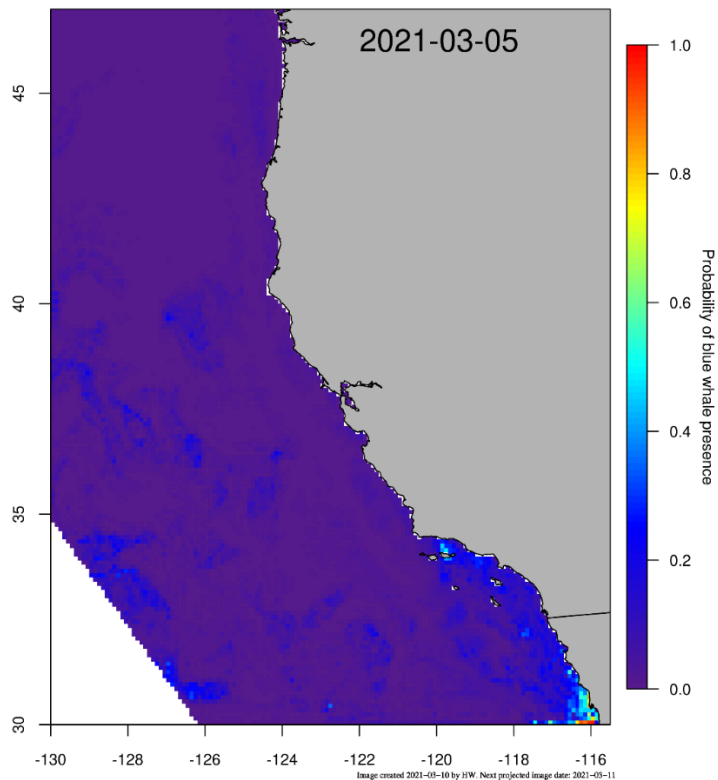
Data provided by: John Calambokidis (Cascadia Research), Briana Abrahms (University of Washington), Kathi George (The Marine Mammal Center), Jaime Jahncke (Point Blue Conservation Science)

### Cascadia Research (Fishing Zone 6)

One Blue whale was observed in Zone 6 within Santa Monica Bay.

### WhaleWatch 2.0 (All Fishing Zones)

The best whale habitat predictions for March 5, 2021 indicate that probability of Blue whale presence is low in Fishing Zones 1-6 (Figure 10).



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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Figure 10. WhaleWatch 2.0 map for March 5, 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 (Figures 11 and 12) indicate a high amount of effort in the southern half of Monterey Bay during 59 trips between February 10 – March 9, 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 9, 2021.**

Time Periods	Whale Watching Trips
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 11. Track lines for 38 whale watch trips in Monterey Bay from February 10 - 28, 2021. Sightings, numbers and species are not reflected on this map.

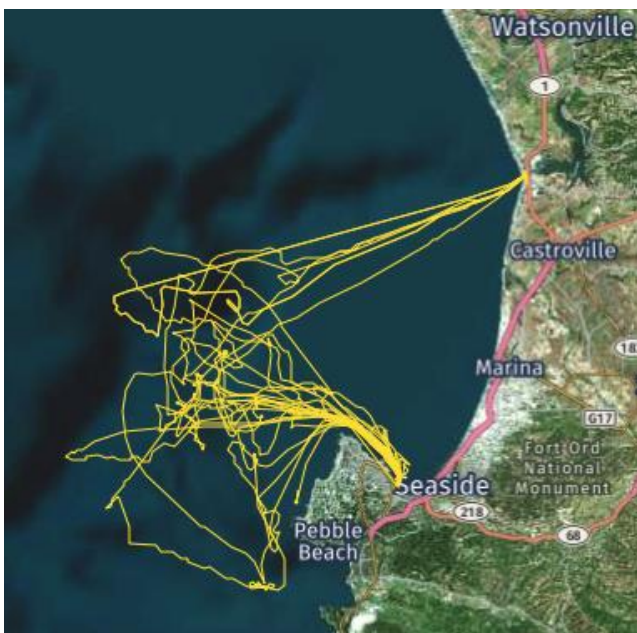


Figure 12. Track lines for 21 whale watch trips in Monterey Bay from March 1 - 9, 2021. Sightings, numbers and species are not reflected on this map.

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

- The Gulf of the Farallones (GFNMS) and Monterey Bay National Marine Sanctuaries (through the Spotter/Whale Alert app) have observed two Humpback whales in Zone 3 on March 14, 2021 while no whales have been reported in the last 30 days for Zone 4. Another Humpback whale observed inside San Francisco Bay was not recorded on the app.
- Three Humpback whales were observed in Zone 6 while no Blue whales were observed in this zone. These are observations conducted by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service. Two of the Humpback whales were observed off San Diego and 1 was observed off Los Angeles.

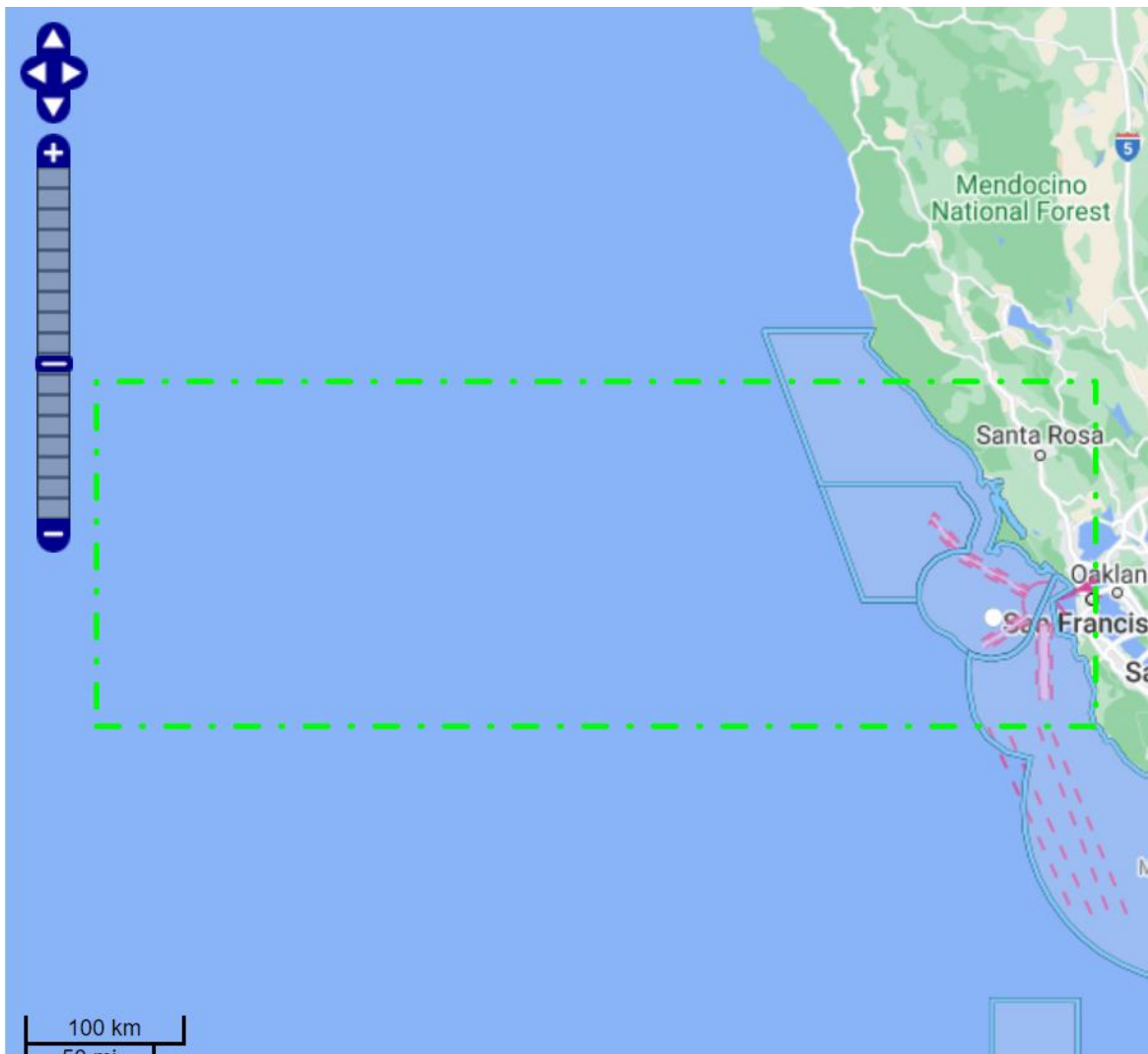


Figure 13. Location of a Humpback whale sighting in Fishing Zone 3 on March 14, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

Volume of Landings (Pounds), by Week and RAMP Zone, 2020-21 Season

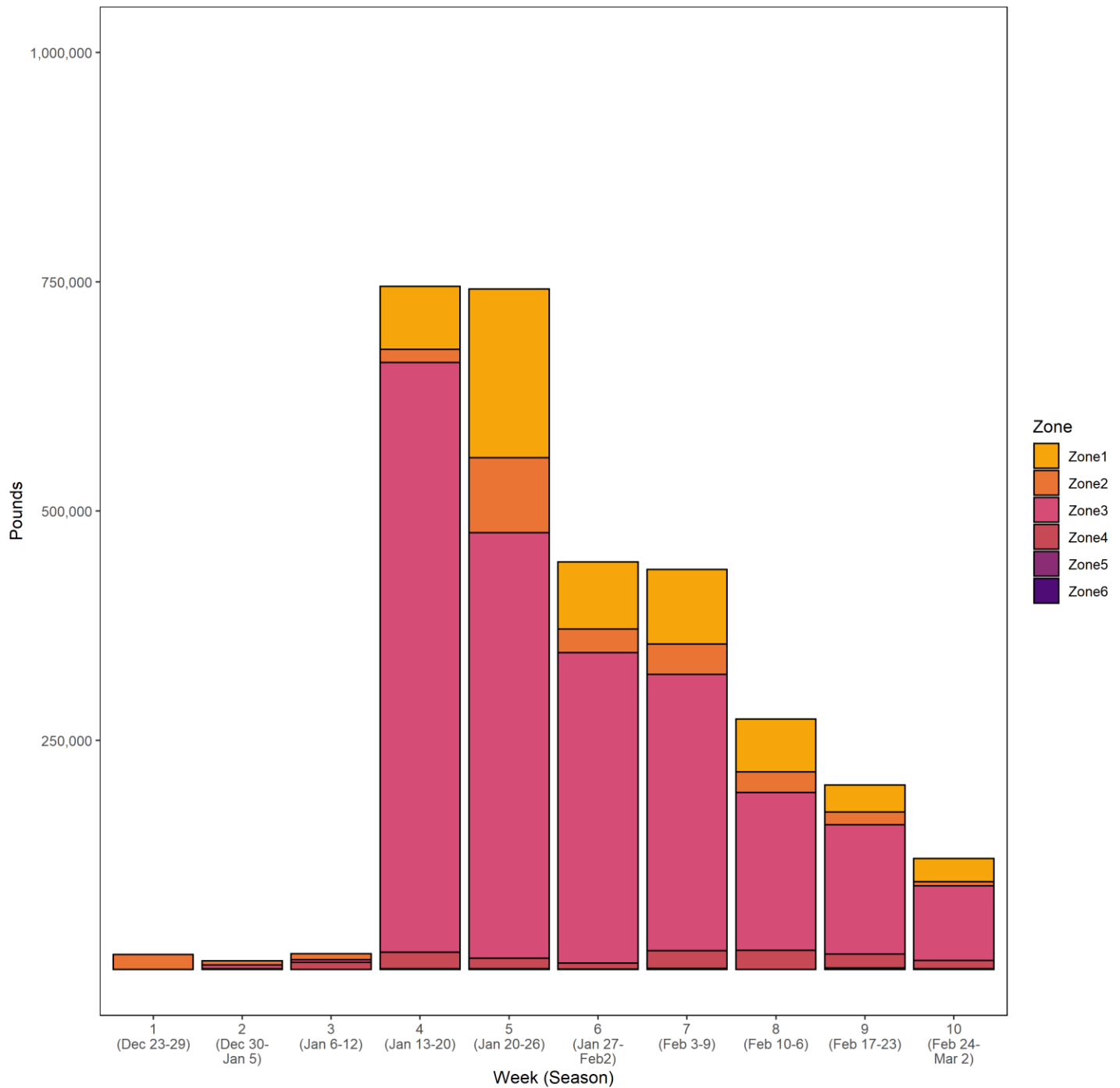


Figure 14. Dungeness crab landings (pounds) by week and Fishing Zone. Accessed from CDFW's MLDS on March 5, 2021. All data are preliminary and subject to change.

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

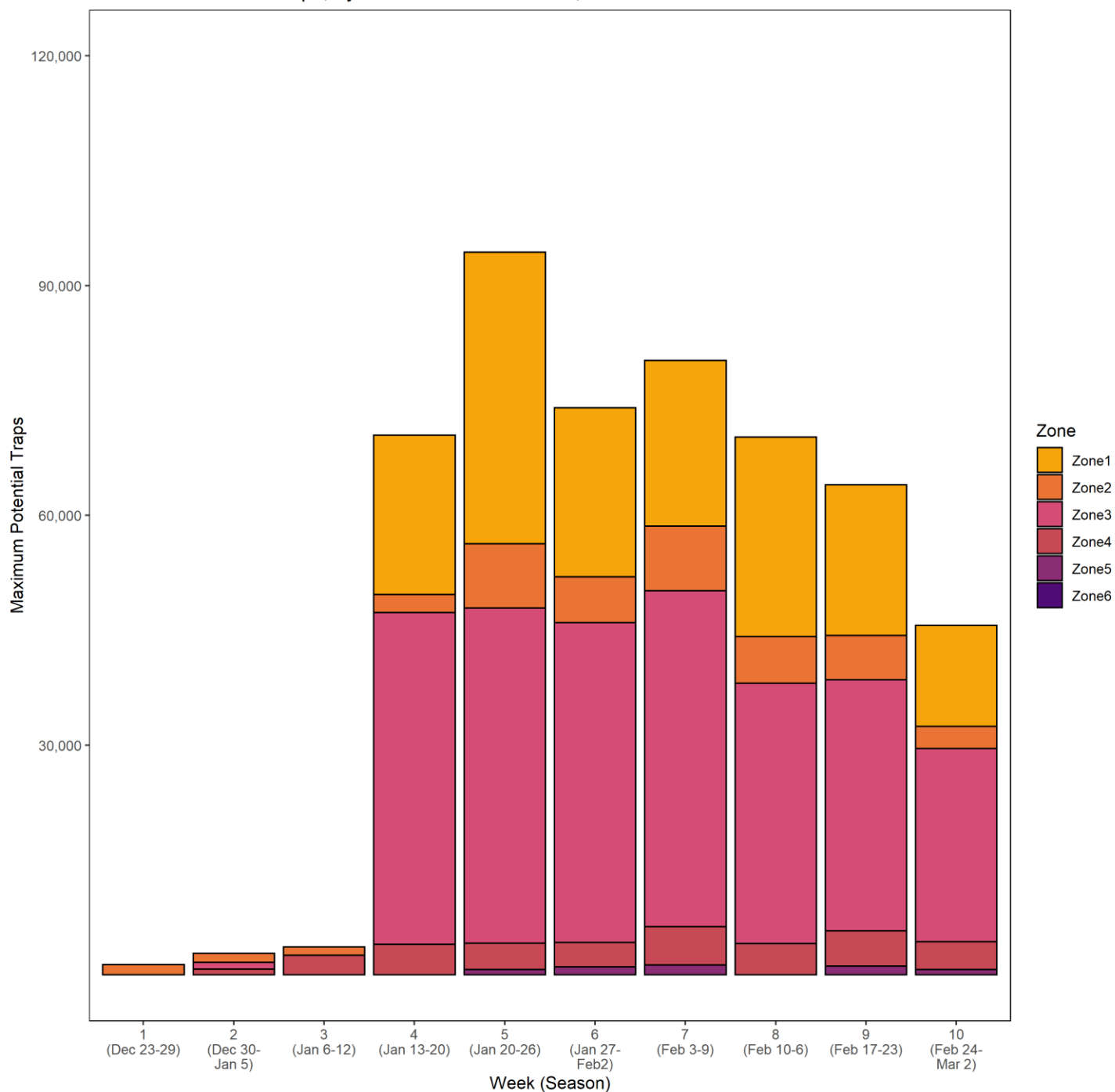


Figure 15. Maximum potential traps by week and Fishing Zone, based on landings data and Dungeness crab vessel permit tier information. Accessed from CDFW's MLDS on March 5,2021 and CDFW's ALDS on March 5, 2021. All data are preliminary and subject to change.

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

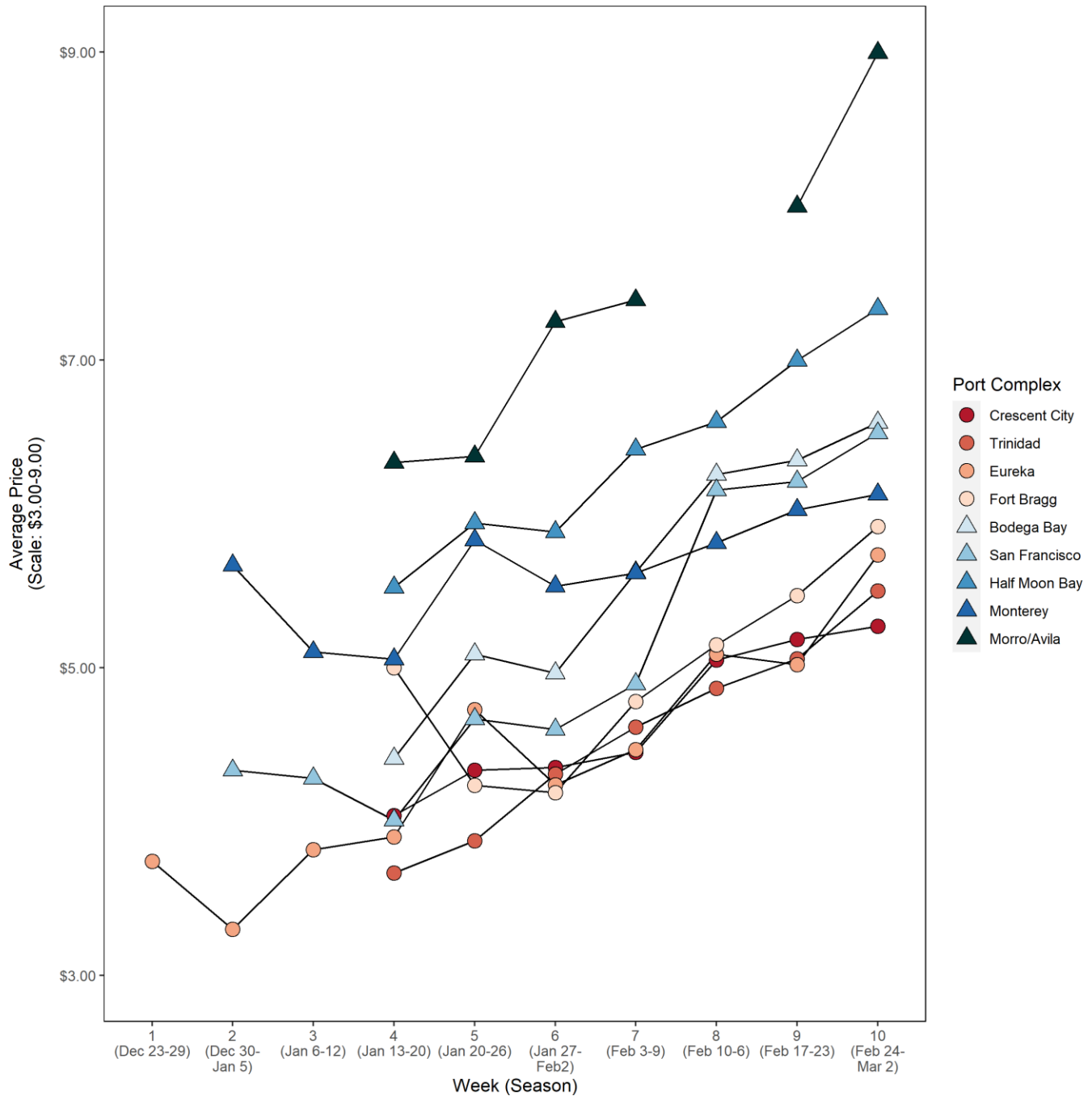


Figure 16. Average price per pound by week and port complex (removing receipts that reported \$0 unit price). Accessed from CDFW's MLDS on March 5, 2021. All data are preliminary and subject to change.

Number of Vessels by Month in the North (top panel)  
and Central (bottom panel), 2019-20 & 2020-21 Seasons

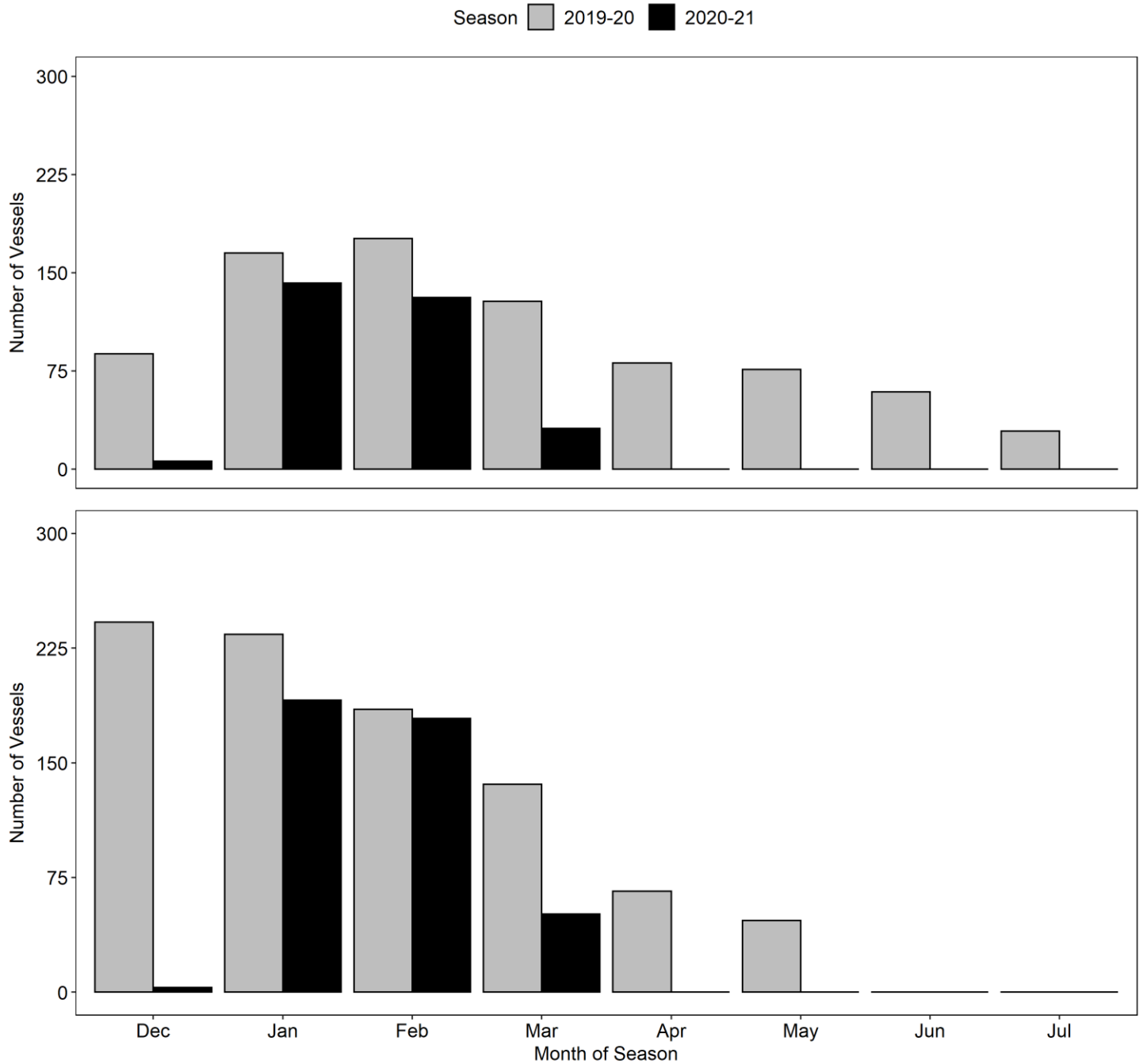


Figure 17. Comparison of the number of vessels that have made at least one landing by month and season, 2019-20 (gray bars) and 2020-21 (black bars) in ports of the northern management area (top panel) and the ports of the central management area (bottom panel). Accessed from CDFW's MLDS on March 5, 2021. All data are preliminary and subject to change.