

2021-22 Risk Assessment: Available Data

Last updated: March 9, 2022

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TRIGGERS REQUIRING MANAGEMENT ACTION

Confirmed Entanglements: §132.8(c)(1)

Data provided by: Lauren Saez and Dan Lawson, National Marine Fisheries Service (NMFS)

There have been no new confirmed entanglements of Actionable Species since the last risk assessment. Additional information is provided in the [February 15, 2022 Available Data document](#).

Table 1. Actionable Species Entanglements in 2022, prepared by West Coast Region.

Actionable Species	Number Confirmed Entanglements in California Commercial Dungeness Crab Gear	Number Confirmed Entanglements in Unknown Fishing Gear Reported off California
Humpback whales	0	1
Blue whales	0	0

Actionable Species	Number Confirmed Entanglements in California Commercial Dungeness Crab Gear	Number Confirmed Entanglements in Unknown Fishing Gear Reported off California
Leatherback sea turtles	0	0

As described in the [February 15, 2022 Available Data document](#), there has been a single confirmed entanglement of a humpback whale reported in unidentified gear from Fishing Zone 4 (20220127Mn). CDFW currently considers this an entanglement in Unknown Fishing Gear and has assigned an Impact Score of 0.38. CDFW will consider revising this Impact Score if additional information becomes available, including input from the Working Group during their meeting on March 11, 2022.

Table 2. Impact Score Calculations based on Confirmed Entanglements in California commercial Dungeness crab gear and confirmed entanglements in Unknown Fishing Gear reported off California.

Actionable Species	Current Fishing Season Impact Score (2021-22)	Current Calendar Year Impact Score (2022)
Humpback whales	0.38	0.38
Blue whales	0	0
Leatherback sea turtles	0	0

The total calendar year impact score for 2021, and current total calendar year impact score for 2022, is provided in Table 3. CDFW will also evaluate risk based on a 3-year rolling average impact score starting with the 2023 season.

Table 3. Impact Score Calculations based on Confirmed Entanglements in California commercial Dungeness crab gear and confirmed entanglements in Unknown Fishing Gear reported off California underlying calculation of a 3-year rolling average.

Actionable Species	2021 Calendar Year Impact Score	2022 Calendar Year Impact Score	2023 Calendar Year Impact Score	3-Year Rolling Average
Humpback whales	1.89	0.38	NA	NA
Blue whales	0	0	NA	NA
Leatherback sea turtles	0	0	NA	NA

Marine Life Concentrations: §132.8(c)(1)*

Data provided by: Monterey Bay Whale Watch (processed by Karin Forney, NOAA), Andrew Ireland (US Coast Guard), CDFW, Scott Benson (NOAA/SWFSC, in collaboration with Upwell.org)

Table 44. Summary of available CDFW-approved survey data for marine life concentrations for each Fishing Zone, and whether the triggers established in Section 132.8(c)(2) have been met for any Fishing Zone.

Fishing Zone	CDFW-approved survey data	Triggers attained?
Zone 1	USCG Aerial Survey	No
Zone 2	NA	Yes – no data
Zone 3	USCG Aerial Survey, CDFW Aerial Survey	No
Zone 4	USCG Aerial Survey, MBWW, CDFW Aerial Survey	No
Zone 5	NA	Yes – no data
Zone 6	NA	Yes – no data

Monterey Bay Whale Watch (*Fishing Zone 4*)

- MBWW conducted whale-watching trips in southern Monterey Bay on all seven days during the week of February 25 – March 3, 2022.
- The average number of humpback whales-per-trip during those last seven days was 3.6, with a peak of nine whales observed on a single trip on March 1, 2022.
- No blue whales have been observed by MBWW since November 13, 2021, when one whale was documented.

US Coast Guard Aerial Survey (*Fishing Zones 1, 3-4*)

The US Coast Guard flew an aerial survey in Fishing Zone 1 on February 28, 2022. One humpback whale was observed just north of Crescent City. A gray whale was observed near Patrick's Point, and nine unidentified whales were observed between Reading Rock and Shelter Cove. All observations were in nearshore waters.

The US Coast Guard flew additional surveys on March 2, 3, and 4, 2022. During the March 2, 2022 survey two unidentified whales were observed near the Farallon Islands (Fishing Zone 3). During the March 3, 2022 survey two unidentified whales were observed in the northern portion of Monterey Bay (Fishing Zone 4). During the March 4, 2022 survey three pods of unidentified whales were observed off the northern coast of Big Sur (Fishing Zone 4).

CDFW Aerial Survey (*Fishing Zones 3-4*)

CDFW conducted a limited aerial survey on March 1, 2022 beginning in Monterey Bay down the Big Sur Coast to the northern extent of Fishing Zone 5. The return flight crossed Monterey Bay (Fishing Zone 4) and some portion of Fishing Zone 3. Fog in Fishing Zone 3 limited the survey area. Within Fishing Zone 4 three humpback whales, eight gray whales, and three unidentified whales were observed. The humpback whales were observed in waters between 50 and 100m. In Fishing Zone 5, seven gray whales were observed, but only the very northern region of this Zone was covered during the flight. No large whales were detected in the surveyed portion of Fishing Zone 3.

Leatherback Sea Turtle Telemetry (*All Fishing Zones*)

- No leatherback sea turtles have been reported within any of the RAMP Fishing Zones during 2022.
- The adult male leatherback turtle that was captured approximately 3 miles northwest of Pillar Point (Half Moon Bay, CA) and tagged with a satellite-linked transmitter on October 16, 2021 is approximately 450 miles south of Hawaii. The turtle continues to move in a southwest direction.

MANAGEMENT CONSIDERATIONS

Information from NOAA: §132.8(d)(2)

No additional information was shared.

Effectiveness of management measures: §132.8(d)(3)*

Data provided by: California Department of Fish and Wildlife

CDFW's effectiveness evaluation for the management actions specified in §132.8(e) will be provided in the March 9, 2022 Initial Assessment.

Total economic impact to the fleet: §132.8(d)(4)*

Data provided by: California Department of Fish and Wildlife

The RAMP regulations specify that, when deciding amongst multiple management measures which would equivalently reduce entanglement risk, CDFW shall consider total economic impact to the fleet and fishing communities. CDFW will provide this evaluation in the March 9, 2022 Initial Assessment.

Historic patterns and current Actionable Species migration: §132.8(d)(6) and (11)*

Data provided by: Monterey Bay Whale Watch (processed by Karin Forney, NOAA), Point Blue Conservation Science, NOAA Environmental Research Division

Monterey Bay Whale Watch (Fishing Zone 4)

The semi-monthly average number of whales-per-half-day-trip during the first week of March is low, but slightly higher than historical patterns for this time of the year (Figure 1). The lack of blue whale sightings since mid-November, 2021 is consistent with their historical seasonal migration patterns to lower latitudes during winter.

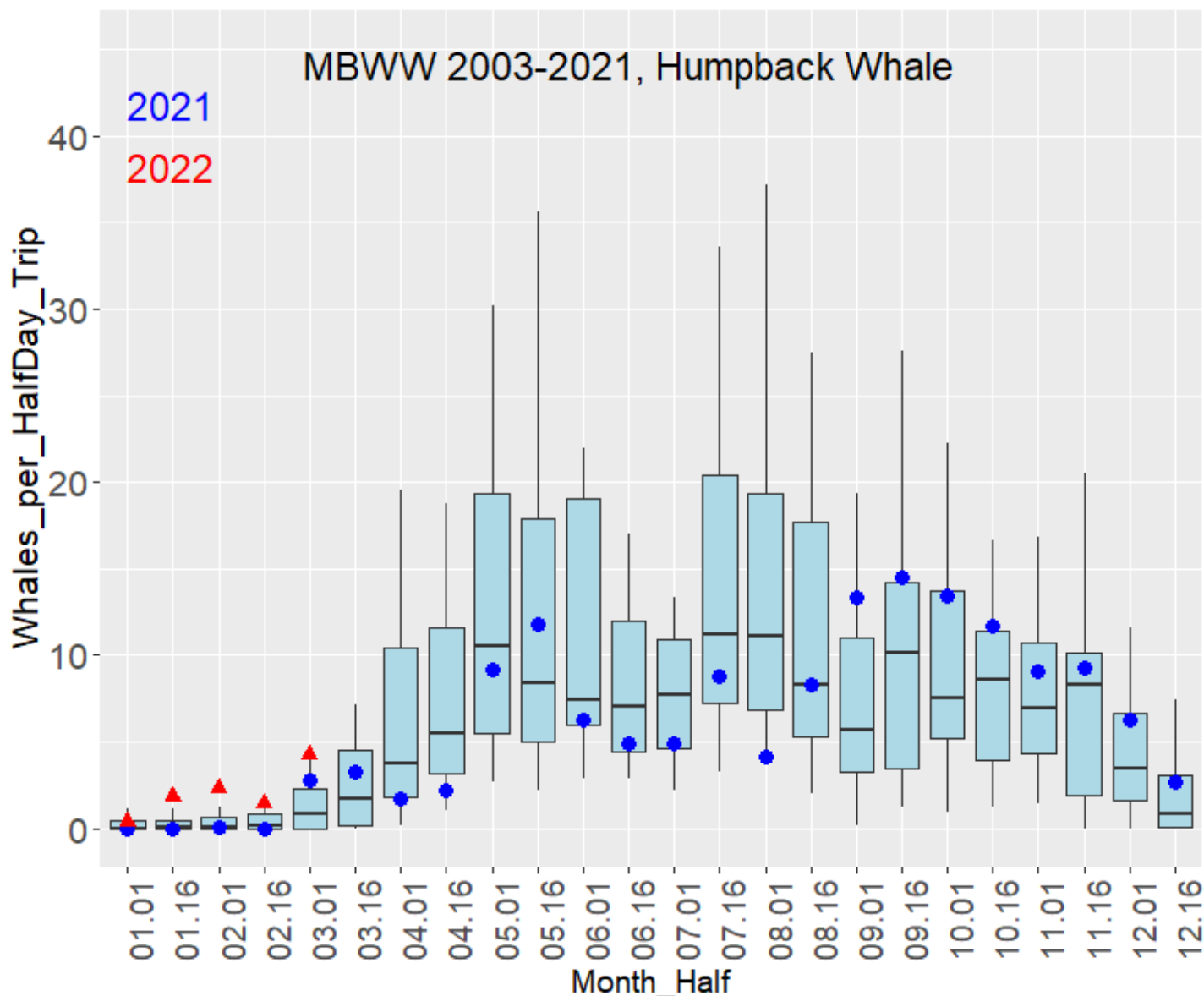


Figure 1. Historical Monterey Bay Whale Watch data for 2003-2022, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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 2021 (large blue dots) and 2022 (red triangles) and are provided for reference, placing recent whale numbers in a historical context.

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

During the seven-day period ending March 8, 2022 trained observers at the Farallon Islands did not report any humpback or blue whales within Fishing Zone 3, and trained naturalists aboard Monterey Bay Whale Watch and Marine Life Studies did not report any humpback or blue whales within Fishing Zone 4. Two humpback whale sightings were reported within Fishing Zone 6 by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service (Figure 2).

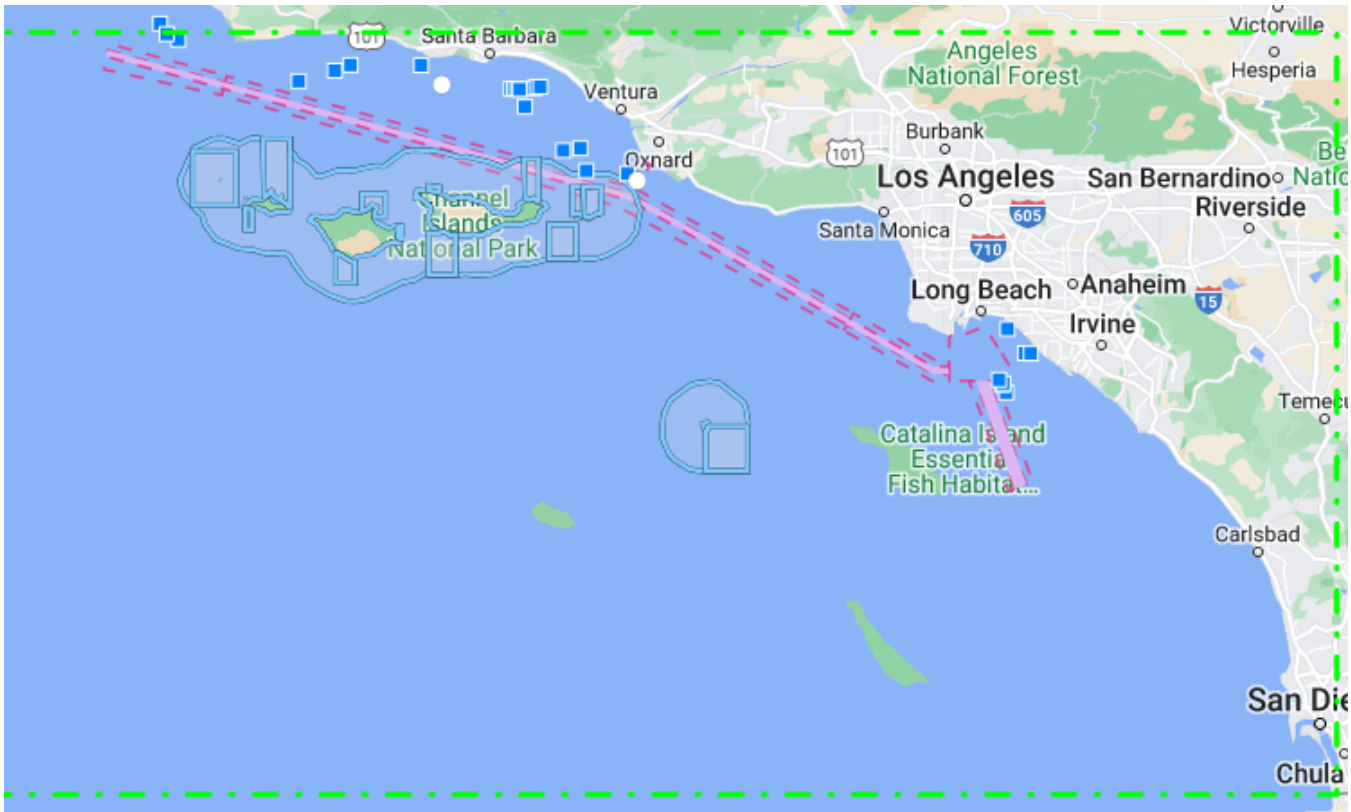


Figure 2. Locations of humpback whale sightings within Fishing Zone 6. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals. Fishing Zone boundaries are represented by the dashed green line.

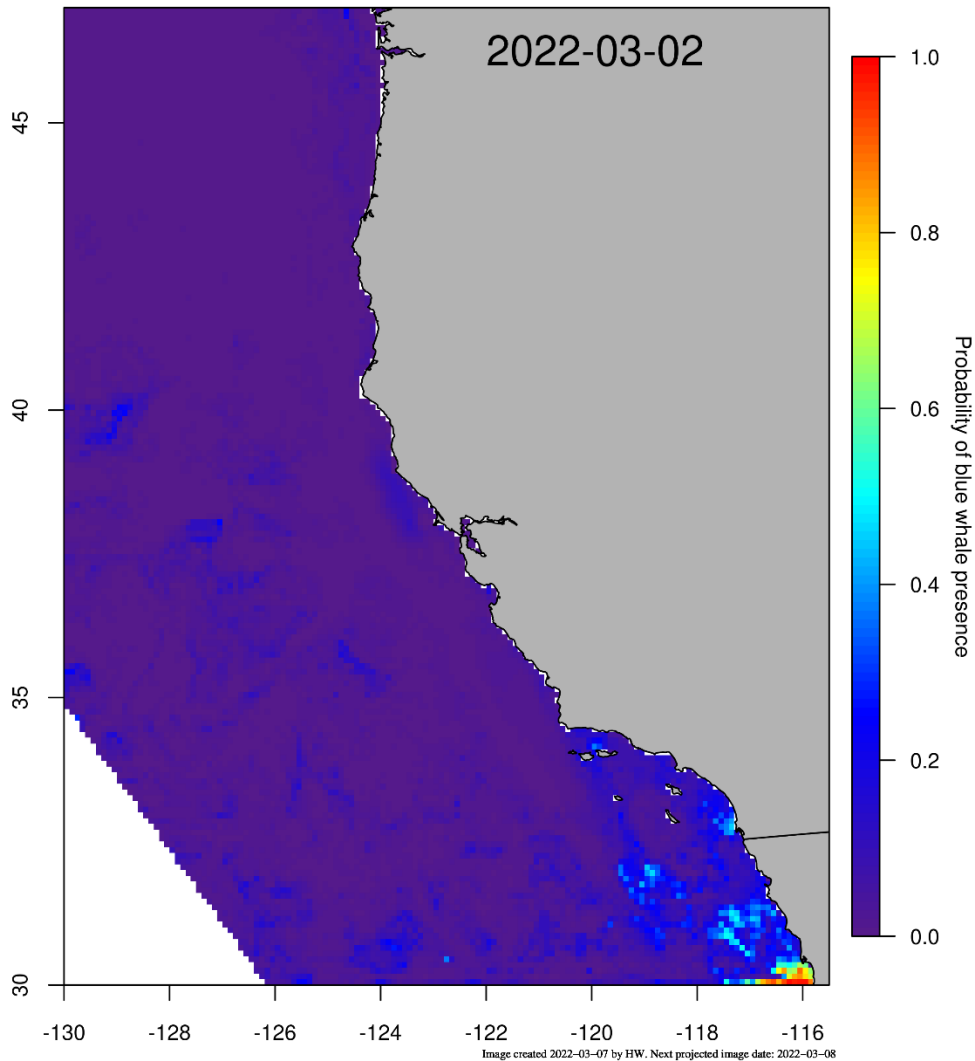
WhaleWatch 2.0 (All Fishing Zones)

Blue whale habitat predictions for March 2, 2022 (Figure 3) indicate low habitat suitability in Fishing Zones 1-5, and moderate habitat suitability in Fishing Zone 6.

WhaleWatch 2.0



Experimental Product



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 3. WhaleWatch 2.0 map for March 2, 2022. [View a current map.](#)

Fishing Season dynamics: §132.8(d)(7)*

Data provided by: California Department of Fish and Wildlife

Available Data, March 9, 2022

CDFW data presented in this section is preliminary and subject to revision.

Marine Landings Data System (All Fishing Zones)

Weekly total landing volume has continued to decrease since late December. In recent weeks, a majority of volume has been harvested from Fishing Zone 3. Overall, 65% of the total volume harvested this season has been from Fishing Zone 1, 30% from Fishing Zone 3, and less than 5% from each of the other Fishing Zones. To date, 41% of harvested volume has been landed into Crescent City, 19% into Eureka, 11% each into San Francisco and Half Moon Bay, and less than 10% each from other port complexes (Figure 4).

Looking at vessel activity by port over the course of the season, the highest activity has been in Crescent City (84 vessels) and Eureka (69 vessels), followed by San Francisco (56 vessels), Half Moon Bay (55 vessels), and Bodega Bay (54 vessels; Figure 5). Vessels have also made landings into Fort Bragg (31), Monterey (24), Trinidad (14), and Morro Bay (3).

The number of landings has also continued to decline, with the highest activity during recent weeks in the Central Management Area (Figure 6).

Unit price (price per pound) has continued to trend upwards for Crescent City, Trinidad, Eureka, Bodega Bay, San Francisco, and Half Moon Bay, with relatively stable prices in Fort Bragg and more mixed trends in Monterey (Figure 7). The most variable pricing has been in Half Moon Bay, with high prices (> \$10/lb) paid for some of the landings into Bodega Bay, San Francisco, Half Moon Bay, and Monterey.

CDFW has developed additional figures which display multi-season trends in vessel activity and maximum potential traps by Fishing Zone. These figures are binned into two-week periods, which do not necessarily align with the bi-weekly reporting periods used for the fishing activity reports. In general, trends in both vessel activity and maximum potential traps for the 2021-22 season are similar to those seen during the 2019-20 and 2020-21 seasons, with high (and declining) levels of vessel activity and potential trap estimates in Fishing Zone 3, followed by Fishing Zone 1 (Figures 8-9).

Table 5. Summary of fleet dynamics information, as of March 8, 2022.

Metric	Value	Additional Info
Season status	Open statewide	Fleet Advisory was reinstated for all Fishing Zones on February 17, 2022
Number of daily landings	4,613	NA
Total volume (pounds)	9,846,716	NA
Total Ex-Vessel Value	\$50,966,165	NA
Average unit price	\$5.47	NA
Total number of active vessels	360	NA
Maximum potential traps (based on active permits)	119,050	Estimates are also provided in the Bi-Weekly Fishing Activity Reports subsection.

Volume of Landings (Pounds), by Week and Port Complex, 2021-22 Season

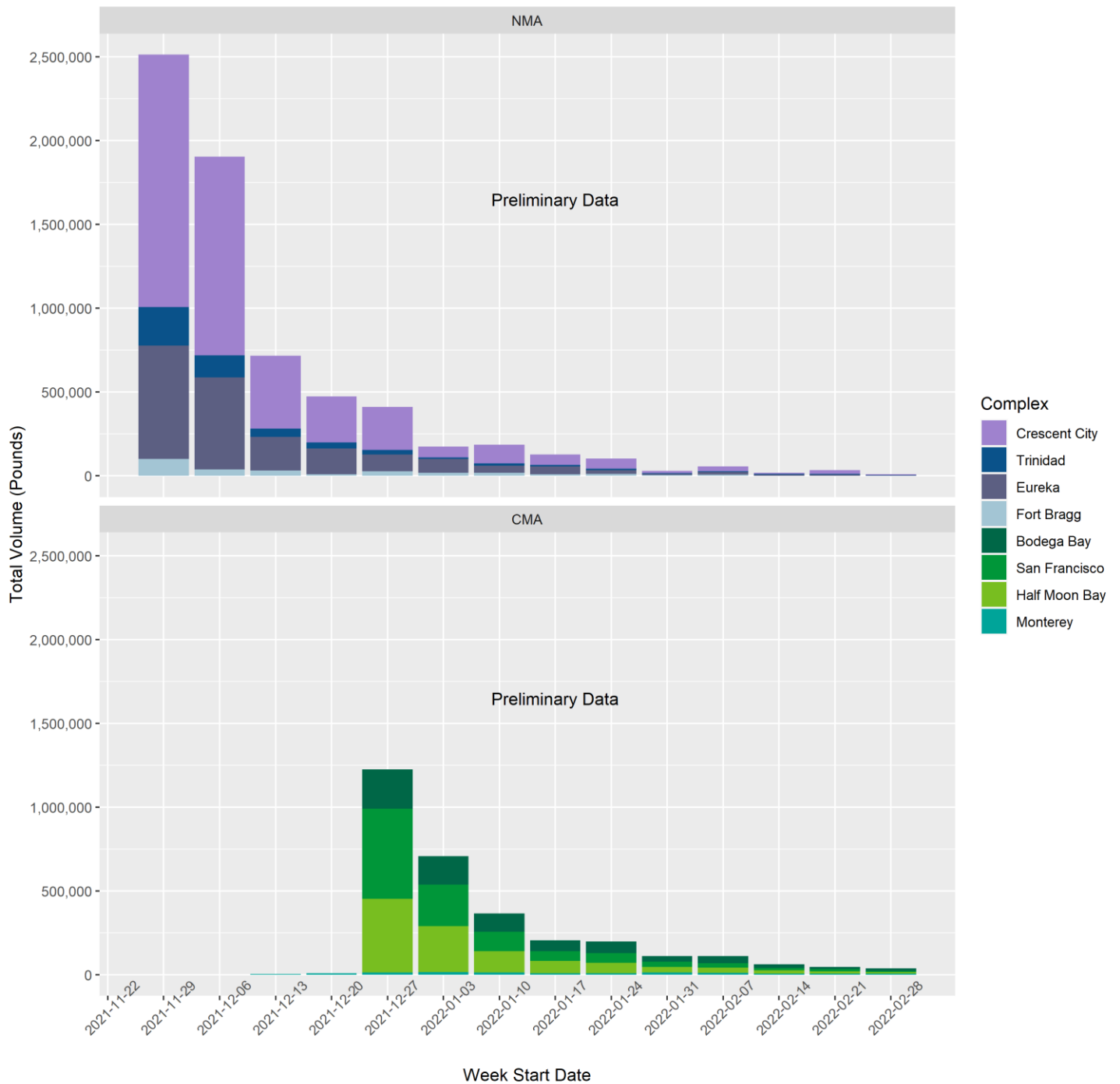


Figure 4. Cumulative volume (pounds) landed by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, November 15, 2021. All data are preliminary and subject to change. Certain week*port complex combinations are withheld due to confidentiality constraints.

Number of Active Vessels, by Week and Port Complex, 2021-22 Season

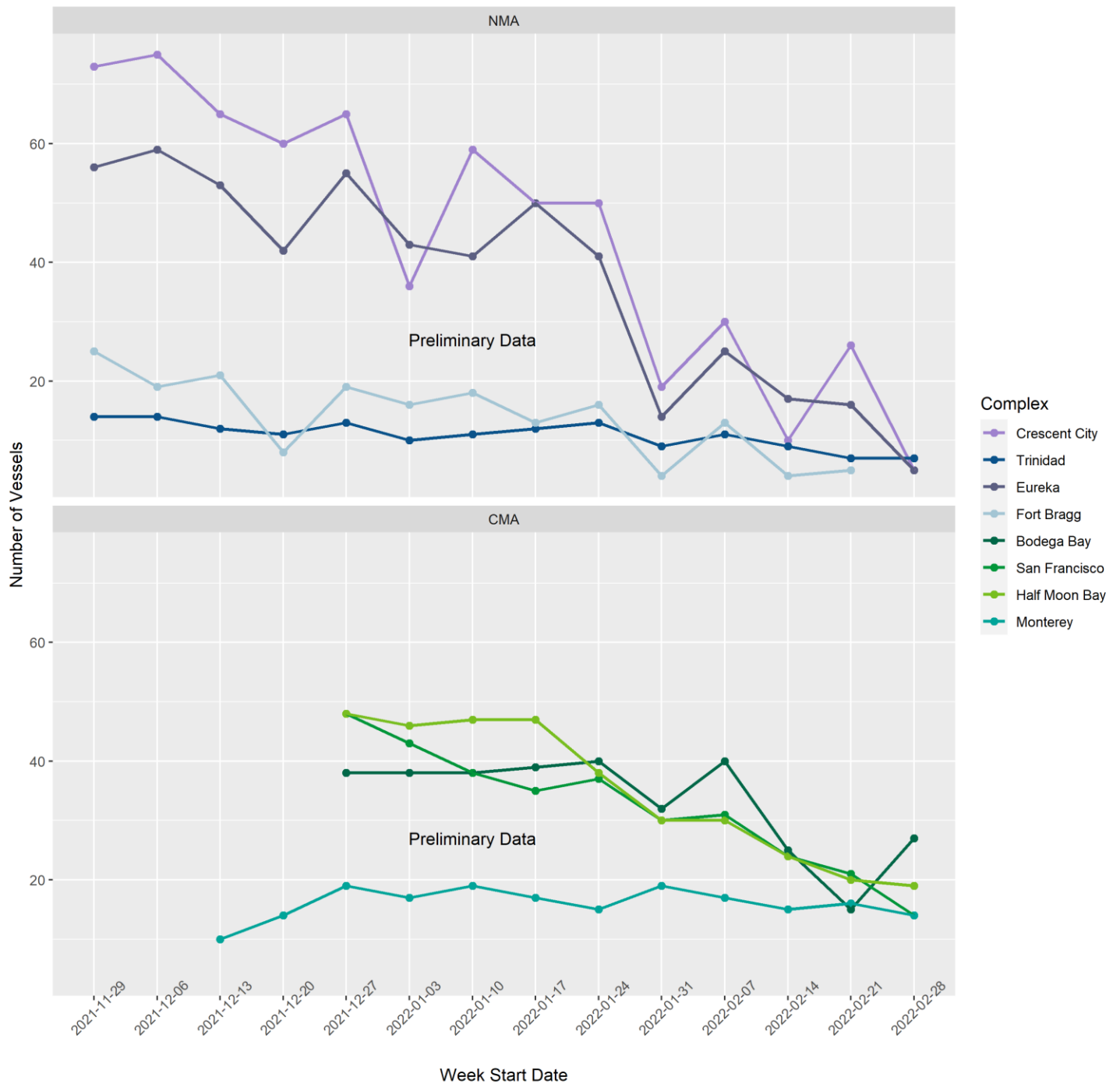


Figure 5. Number of active vessels by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, November 15, 2021. All data are preliminary and subject to change. Certain week*port complex combinations are withheld due to confidentiality constraints.

Number of Landings, by Week and Port Complex, 2021-22 Season

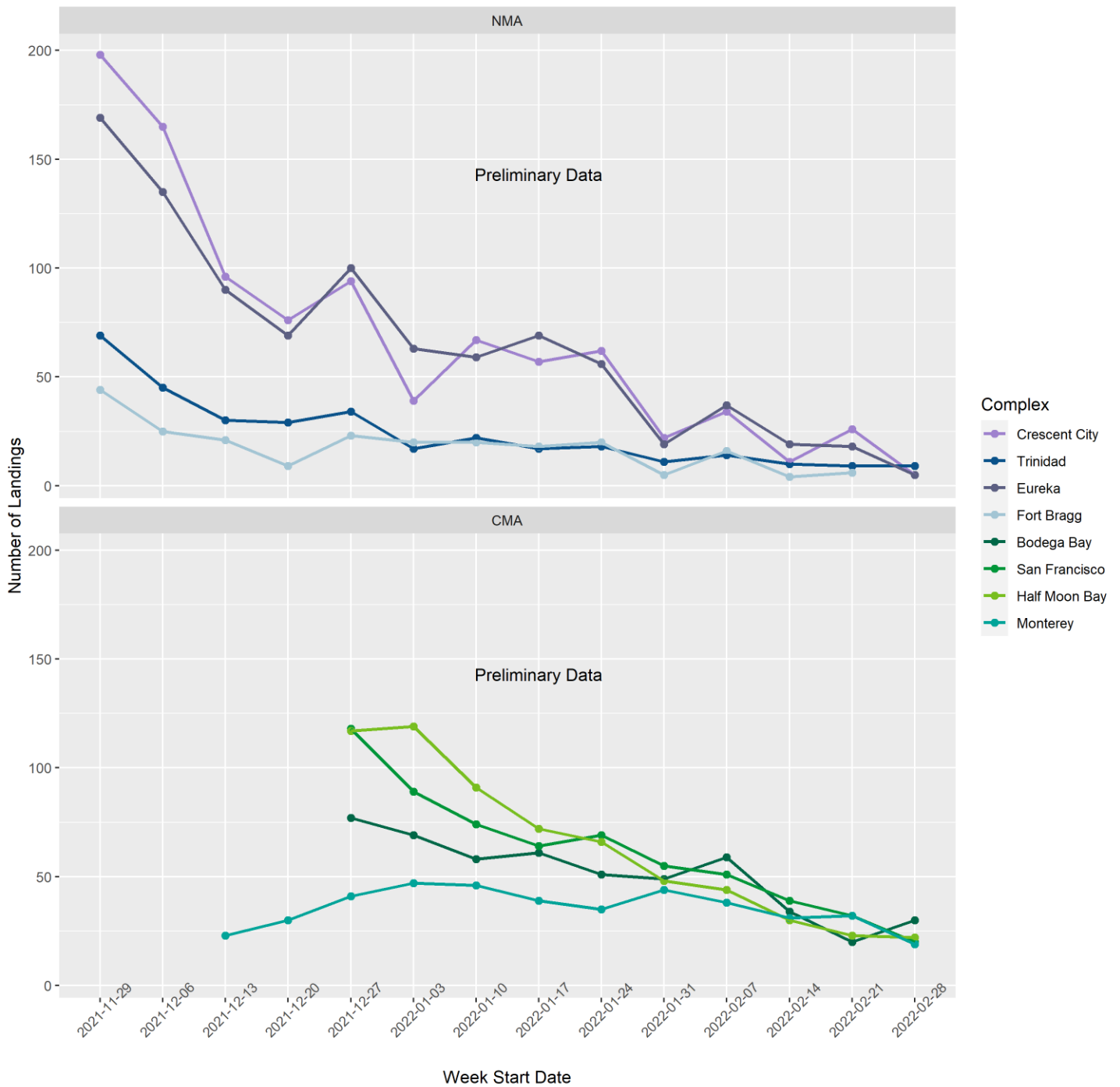


Figure 6. Number of unique landings by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, November 15, 2021. All data are preliminary and subject to change. Certain week*port complex combinations are withheld due to confidentiality constraints.

Average Unit Price, Excluding Personal Use, By Week and Complex, 2021-22 Season

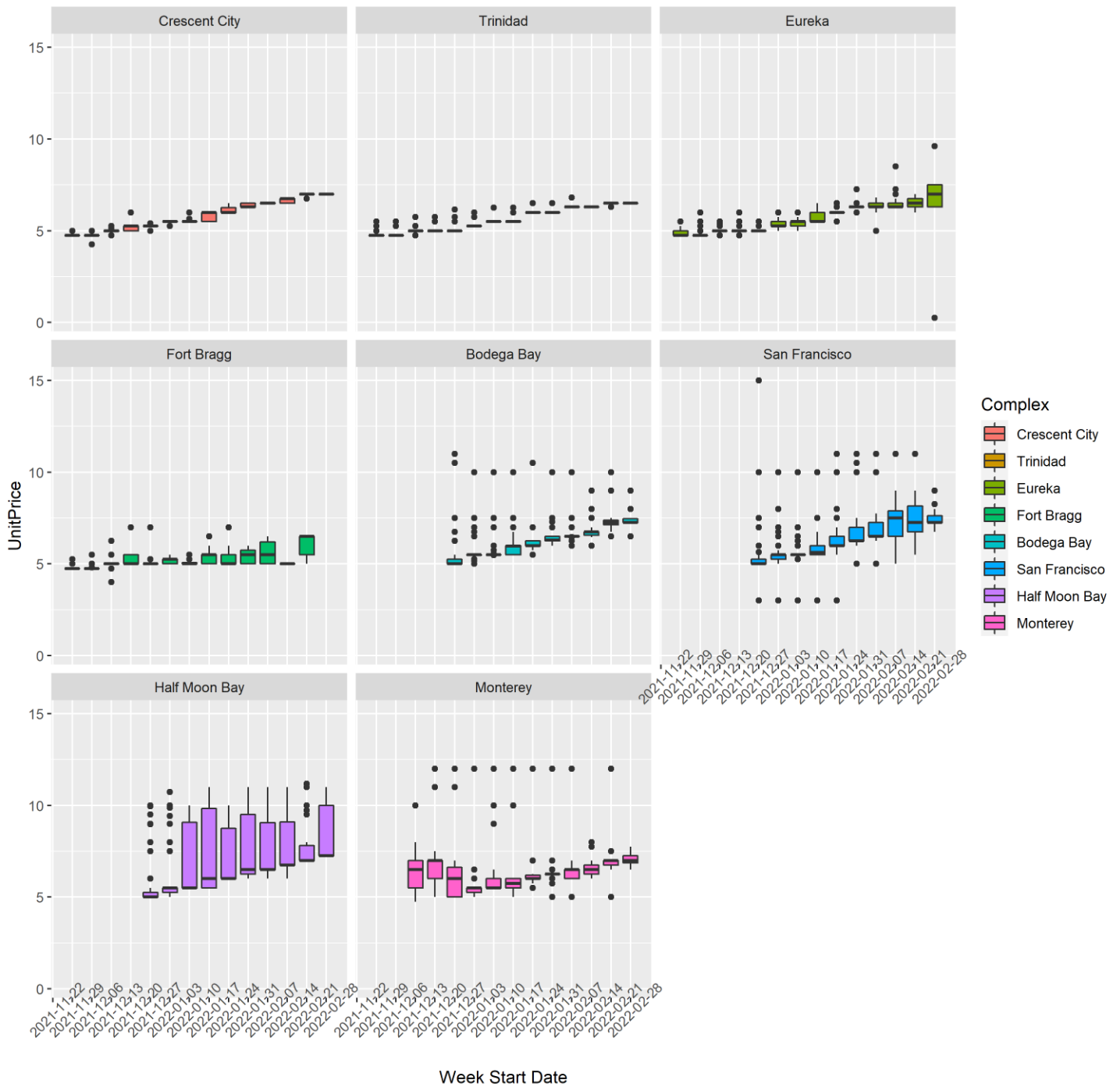


Figure 7. Mean unit price by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, November 15, 2021. All data are preliminary and subject to change. Certain week*port complex combinations are withheld due to confidentiality constraints.

Number of Active Vessels Per BiWeekly Period, 2013-14 to 2021-22 Seasons

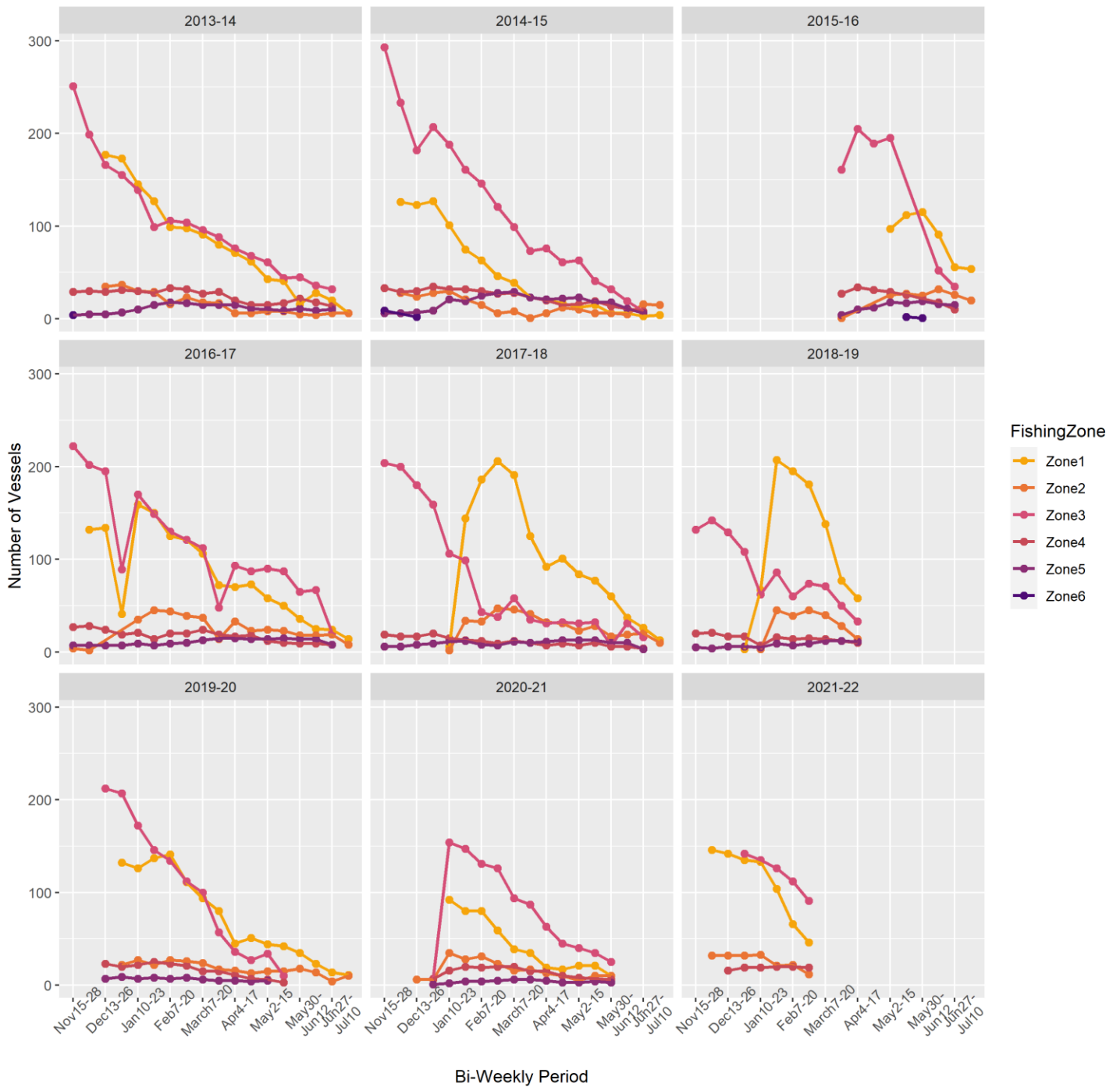


Figure 8. Number of active vessels during the 2013-14 to 2021-22 fishing seasons. Values are plotted over two-week intervals which begin with November 15 and continue through mid-July. All data are preliminary and subject to change. Certain week*Fishing Zone combinations are withheld due to confidentiality constraints.

Maximum Potential Traps Per BiWeekly Period, 2013-14 to 2021-22 Seasons

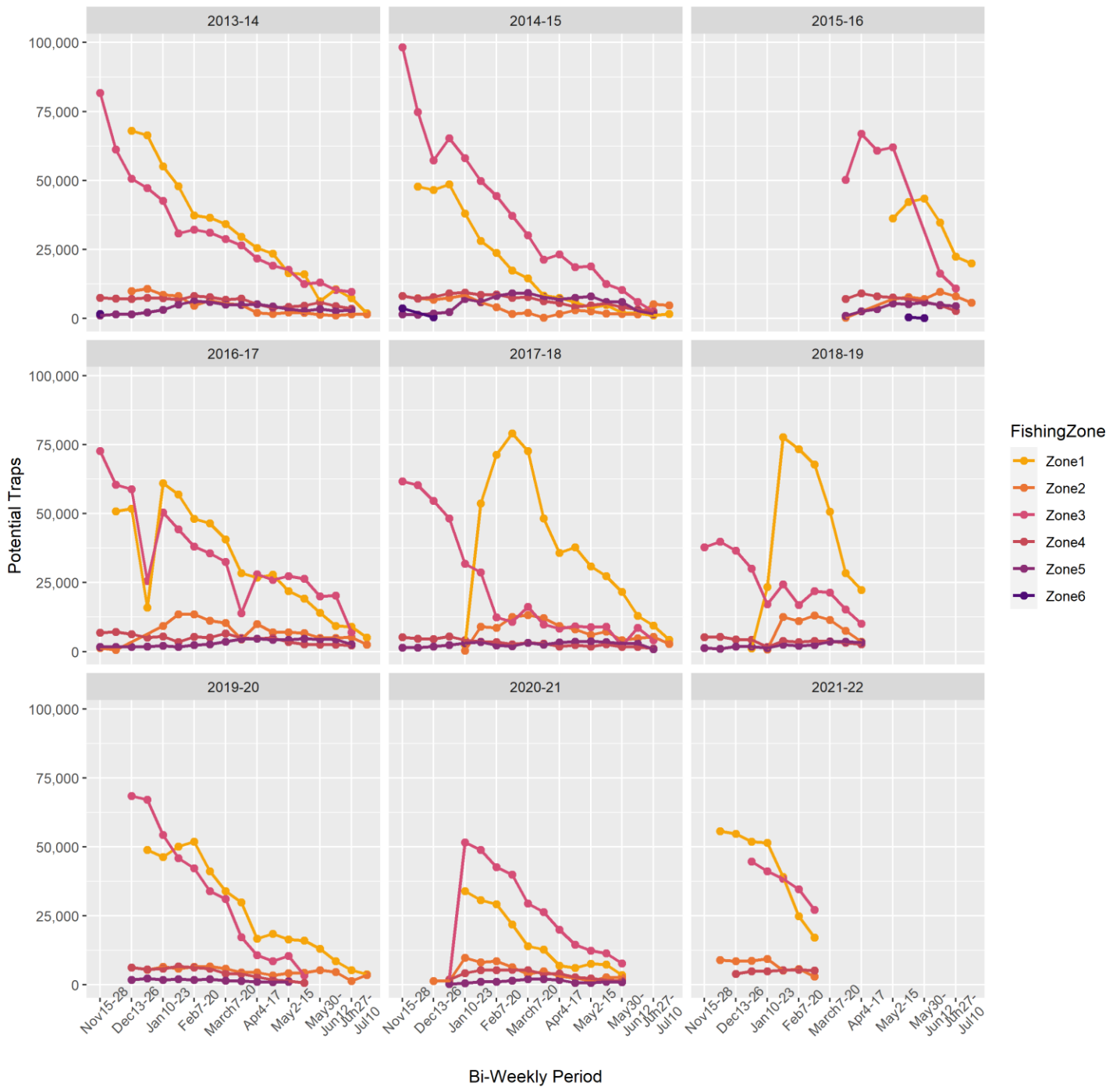


Figure 9. Estimated maximum number of deployed traps, based on vessel activity and permit tier level, during the 2013-14 to 2021-22 fishing seasons. Values are plotted over two-week intervals which begin with November 15 and continue through mid-July. All data are preliminary and subject to change. Certain week*Fishing Zone combinations are withheld due to confidentiality constraints.

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

- CDFW has received bi-weekly reports since the first reporting period of November 16, 2021 through the most recent reporting period of March 1, 2022. A summary of reports received for February 16 and March 1, 2022 is provided in Tables 6 and 7, respectively; note this summary may not reflect all permitted vessels participating in the fishery. In addition, a summary of traps by RAMP Zone over the six most recent reporting periods is provided in Table 8.

- About 38,220 traps are estimated to be deployed statewide for the March 1, 2022 reporting period, which covers fishery participation from February 16-28, 2022. The majority of these (51%) are located within Fishing Zone 3 while 34% of these located within Fishing Zone 1 (Table 7).
- The total traps reported during the March 1 report period has declined by about 60% from the season high that occurred during the January 16 reporting period. Of the 57,020 traps that have been removed between the January 16 and March 1 reporting periods, 63% were removed from Fishing Zone 1 followed by 27% from Fishing Zone 3 (Table 8).

Table 6. Summary of information provided for the February 16, 2022 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 8, 2022. CONFID refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Avg. Trap Number	Total Traps	Avg. Min. Depth (fa.)	Avg. Max. Depth (fa.)	Max. Depth (fa.)	Final Report	Number of Lost Traps
Zone 1	78	316	21,791	12	30	60	18	66
Zone 2	19	178	3,391	15	28	50	0	
Zone 3	108	261	26,586	20	40	80	12	481
Zone 4	18	168	3,019	25	42	90	1	36
Zone 5	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID
Zone 6	0	0	0	0	0	0	0	0
Totals	223	NA	54,787	NA	NA	NA	31	583

Table 7. Summary of information provided for the March 1, 2022 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 4, 2022. CONFID refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Avg. Trap Number	Total Traps	Avg. Min. Depth (fa.)	Avg. Max. Depth (fa.)	Max. Depth (fa.)	Final Report	Number of Lost Traps
Zone 1	47	312	13,115	12	29	42	7	34
Zone 2	15	196	2,746	16	31	58	1	13
Zone 3	90	231	19,682	21	39	70	9	131
Zone 4	70	157	2,677	26	46	70	1	3
Zone 5	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID
Zone 6	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID	CONFID
Totals	169	NA	38,220	NA	NA	NA	18	181

Table 8. Total reported traps deployed in each Fishing Zone for the most recent six bi-weekly reporting periods. All data is preliminary and subject to change.

Fishing Zone	Dec 16 - Total Traps	Jan 1 - Total Traps	Jan 16 - Total Traps	Feb 1 - Total Traps	Feb 16 - Total Traps	Mar 1 -Total Traps
Zone 1	51,665	50,226	49,168	37,008	21,791	13,115
Zone 2	7,894	7,206	7,006	5,210	3,391	2,746
Zone 3	Not open	34,239	35,238	35,218	26,586	19,682
Zone 4	544	3,529	3,828	3,455	3,019	2,677
Zone 5	CONFID	0	0	CONFID	CONFID	CONFID
Zone 6	0	0	0	CONFID	0	CONFID
Totals	60,103	95,200	95,240	80,891	54,787	38,220

CDFW Aerial Survey

CDFW opportunistically documented observed trap gear during the March 1, 2022 aerial survey, and far less gear was observed than during the February 12, 2022 survey. Note: Weather conditions and limited survey area could have been factors for fewer observations.

Distribution and abundance of key forage: §132.8(d)(8)*

Data provided by: California Department of Fish and Wildlife

CDFW Aerial Survey (Fishing Zones 3-5)

During the March 1, 2022 aerial survey, CDFW documented a single mola in Fishing Zone 4, as well as numerous bait balls (presumed to be anchovy) across Fishing Zones 3 and 4. The bait balls were located in waters deeper than 200m in Fishing Zone 4, and across a range of depths in Fishing Zone 3.

Ocean conditions: §132.8(d)(9)*

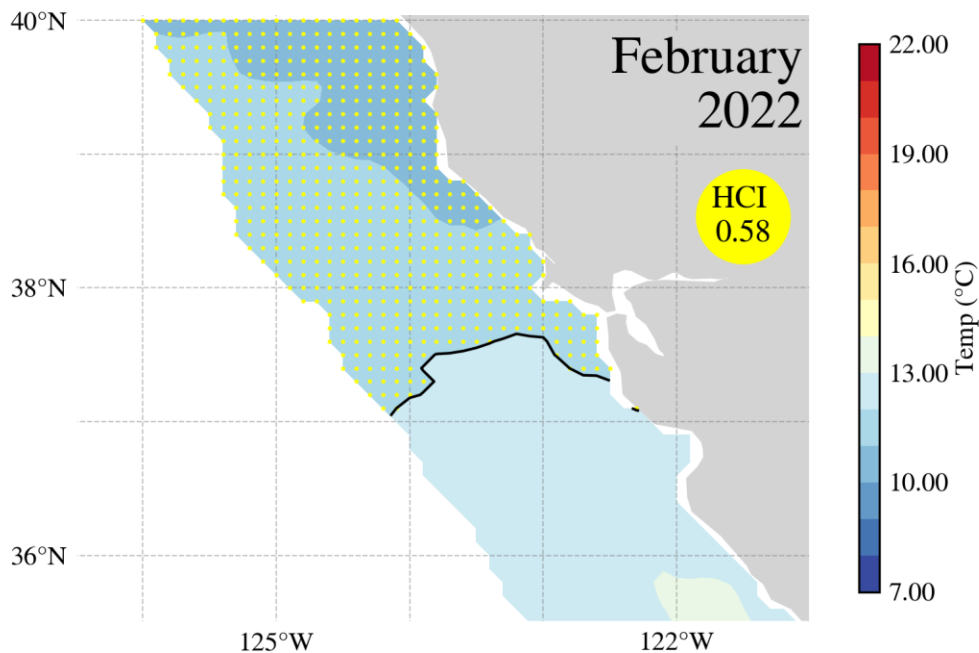
Data provided by: National Weather Service Climate Prediction Center, California Current Integrated Ecosystem Assessment Program

El Niño/Southern Oscillation Diagnostic Discussion

See the [February 15, 2022 Available Data document](#).

Habitat Compression Index

The most recent Habitat Compression Index values are for February 2022, during which there was moderate compression between 35.5 and 40°N (Figure 10). During the last two years, compression was low to moderate during the month of March (Figure 11).



HCI color based on standard deviation (SD) and mean (MN) of all values over 1980-01 to 2022-02

Medium Compression (HCI > MN and HCI < 1SD)

Figure 10. Map of February 2022 sea surface temperature and location of the Habitat Compression Index boundary (thin black line).

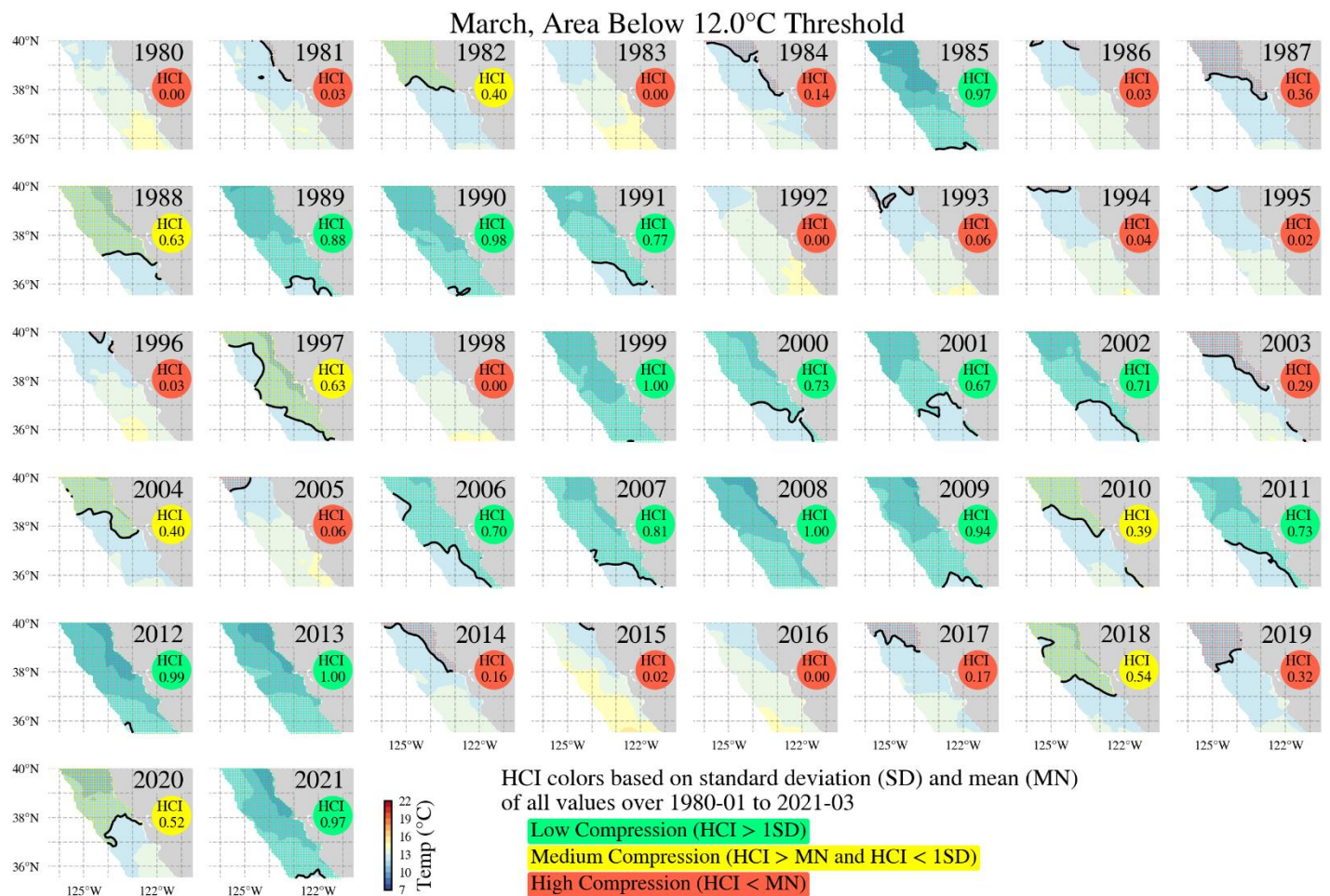


Figure 11. Maps of historical March sea surface temperature and location of the Habitat Compression Index boundary (thin black line) between 1980 and 2021.

Large Marine Heatwave Tracker

As of February 24, 2022 the CCIEA program is tracking the first large marine heatwave of 2022, NEP22A (Figure 12). This heatwave exceeded the size threshold for tracking individual events (400,000 km²) on January 18, 2022, and as of February 9, 2022 had already reached an area of 2.8 million km² within the Eastern North Pacific analysis region. Similar to previous years, this heatwave arose in the same general region where the previous year's heatwave terminated, and within 30 days of its end. Thus, it is likely that the region may have had some residual warm waters which preconditioned the region for this new heatwave development. Sea surface temperature anomalies suggest NEP22A is continuing to expand. If this event follows the trend for the last three years, then we might expect this heatwave to continue expansion and eventually encroach on the US west coast during late fall 2022. However, this is speculative and could easily be modified based on changes in atmospheric or oceanic conditions.

18-Feb-2022 12:00:00

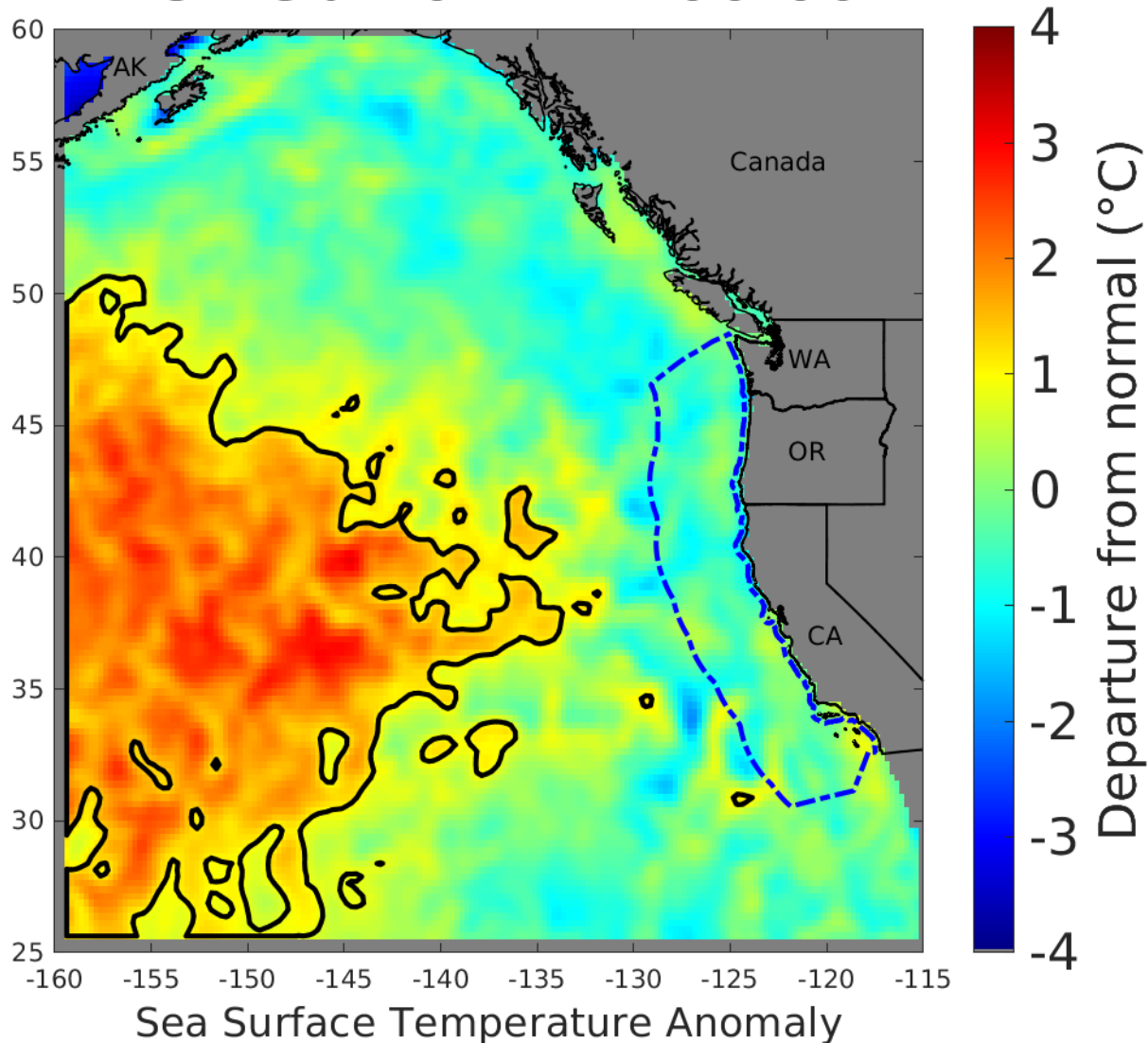


Figure 12. Science-quality (delayed 3-weeks), daily interpolated standardized sea surface temperature anomalies (SSTa) in the California Current ecosystem available for analysis of MHW presence. Dark outline shows the current extent of MHW conditions, as delineated by values of the normalized SST + 1.29 SD from normal. Blue dashed line represents the US West Coast EEZ. SST data from NOAA's Optimum interpolation Sea Surface Temperature analysis (OISST), with the SST anomaly calculated using climatology from NOAA's AVHRR-only OISST dataset.

Current Impact Score Calculation: §132.8(d)(10)

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. Impact Score totals for the current fishing season (2021-22) and calendar year (2022) are provided in Table 2 above. Impact Score totals for calendar year 2021 are provided in Table 3 above.