

## 2022-23 Risk Assessment: Available Data

Last updated: March 27, 2023

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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)

As of March 24, 2023, there have been no entanglements of Actionable Species reported to the NMFS West Coast Region during 2023.

**Table 1. Actionable Species Entanglements during 2023, 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	0

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

There have been no reported entanglements in the 2023 calendar year in Dungeness crab gear or unidentified gear.

**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 (2022-23)	Current Calendar Year Impact Score (2023)
Humpback whales	0	0
Blue whales	0	0
Leatherback sea turtles	0	0

The total calendar year Impact Score for 2021 was 1.89 for humpback whales and 0 for blue whales and leatherback sea turtles. The Impact Score for 2022 was 5.28 for humpback whales and zero for blue whales and leatherback sea turtles. The 3-year Rolling Average Impact Score is 2.39.

**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	5.28	0	2.39
Blue whales	0	0	0	0
Leatherback sea turtles	0	0	0	0

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

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

**Table 41. 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	None	No
Zone 2	None	No
Zone 3	CDFW Aerial Survey	No
Zone 4	CDFW Aerial Survey, MBWW	No
Zone 5	CDFW Aerial Survey	No
Zone 6	None	NA

**CDFW Aerial Survey (*Fishing Zones 3, 4, and 5*)**

CDFW staff conducted an aerial survey on March 18, 2023, between Moss Beach (Fishing Zone 3) and Morro Bay (Fishing Zone 5). Conditions were generally good, with Beaufort conditions of two or less across the surveyed Fishing Zones. Seven orca whales were observed off Año Nuevo (Fishing Zone 4) and numerous gray whales were observed throughout the survey area close to shore. No humpback or blue whales were observed in Fishing Zone 3, 4, or 5 (Figure 1).

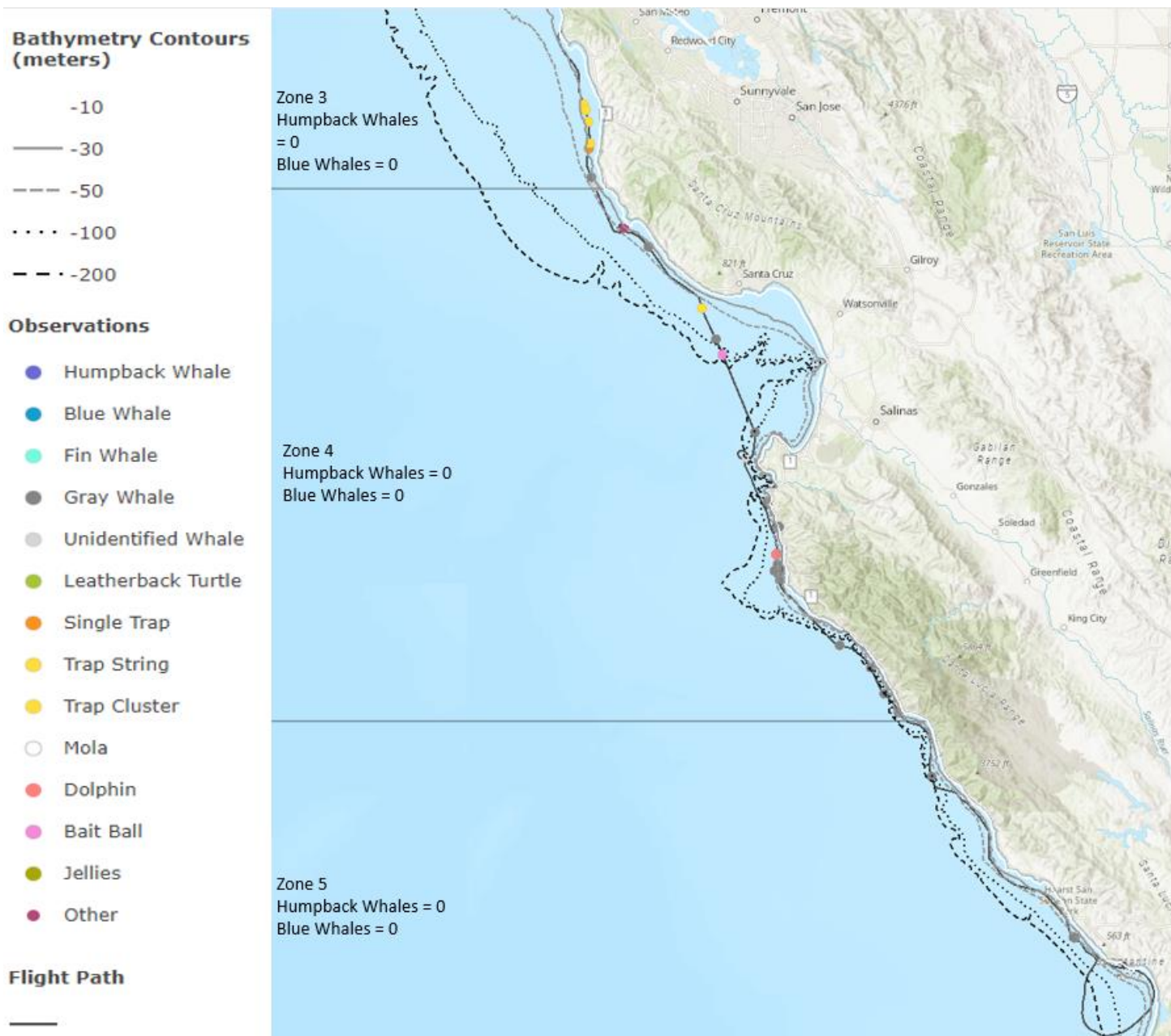


Figure 1. Map showing track lines and observations from CDFW aerial survey of Fishing Zones 3, 4, and 5 on March 18, 2023.

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

- Monterey Bay Whale Watch conducted whale-watching trips in southern Monterey Bay on six of seven days during the week of March 14-20, 2023.
- Following several days with sightings of one to three humpback whales during the week of March 7-13, 2023, only one humpback whale was observed the week of March 14 - 20, 2023.
- No blue whales have been observed yet in 2023.

#### MANAGEMENT CONSIDERATIONS

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

No additional information was provided for this Risk Assessment.

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

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

CDFW will provide this evaluation in the March 27, 2023, 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 27, 2023, Initial Assessment.

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

*Data provided by: Point Blue Conservation Science, Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC)*

#### **Point Blue Conservation Science Data Portal (*Fishing Zones 5 and 6*)**

During the seven-day period ending March 24, 2023, trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service reported 11 humpback whales in Fishing Zone 6. No blue whales were observed in any Fishing Zone during this period (Figure 2). During this period, large aggregations of humpback whales continued to be sighted in Fishing Zone 5 at the southeastern edge of the Monterey Bay National Marine Sanctuary, with 34 humpback whales observed on March 18, 2023.

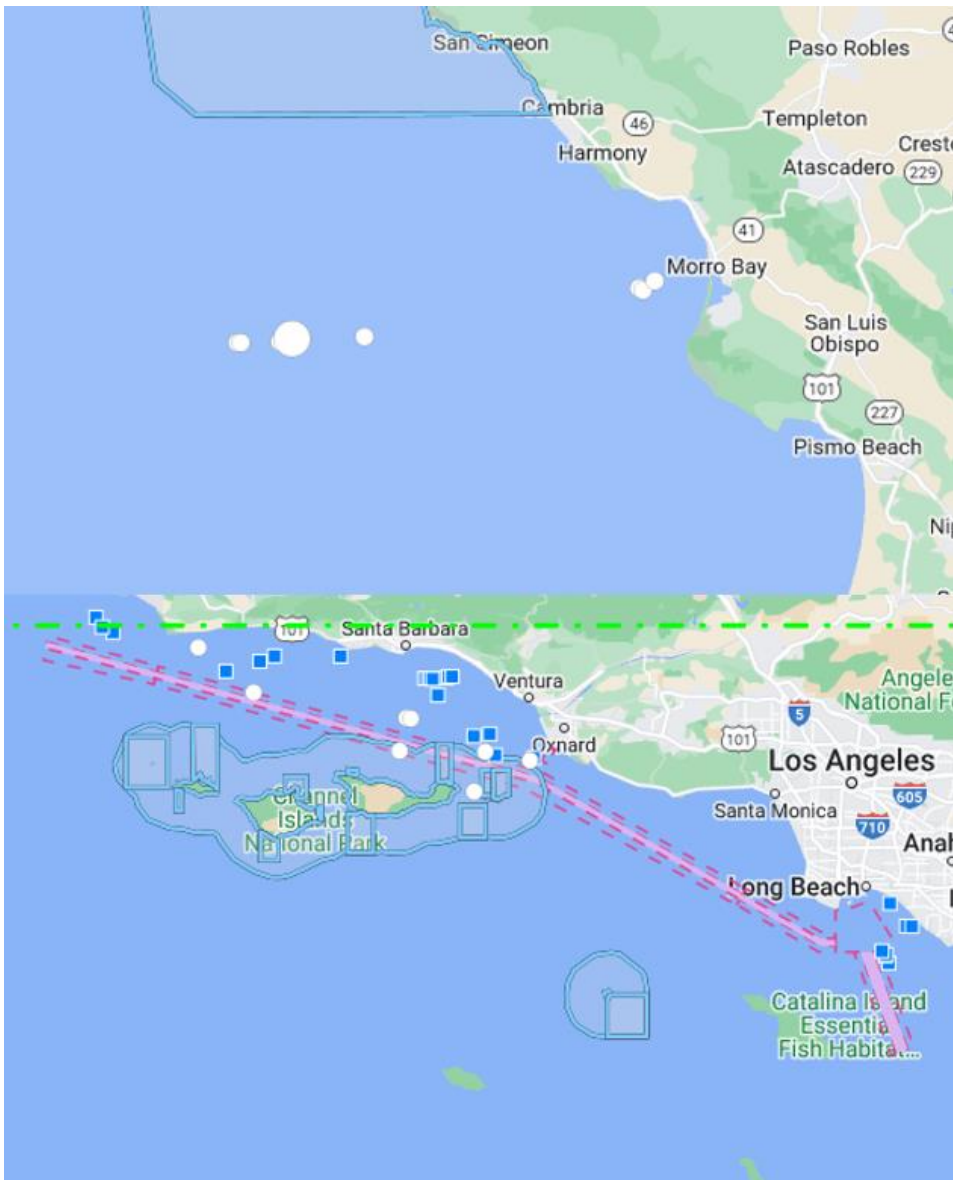


Figure 2. Locations of humpback whale sightings within Fishing Zone 5 (top) and 6 (bottom). Reporting locations are represented by white circles. A given report may or may not represent multiple individuals. Fishing Zone boundaries are represented by dashed lines.

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

The semi-monthly average number of whales-per-half-daytrip is 0.06, which is below the average historical value at this time of the year, suggesting that fewer whales have returned from the breeding areas compared to previous years. Based on historical patterns, it is expected that the number of humpback whales will begin to increase markedly during the next few weeks (Figure 3). The continued absence of blue whale sightings during 2023 is consistent with their historical migration patterns.

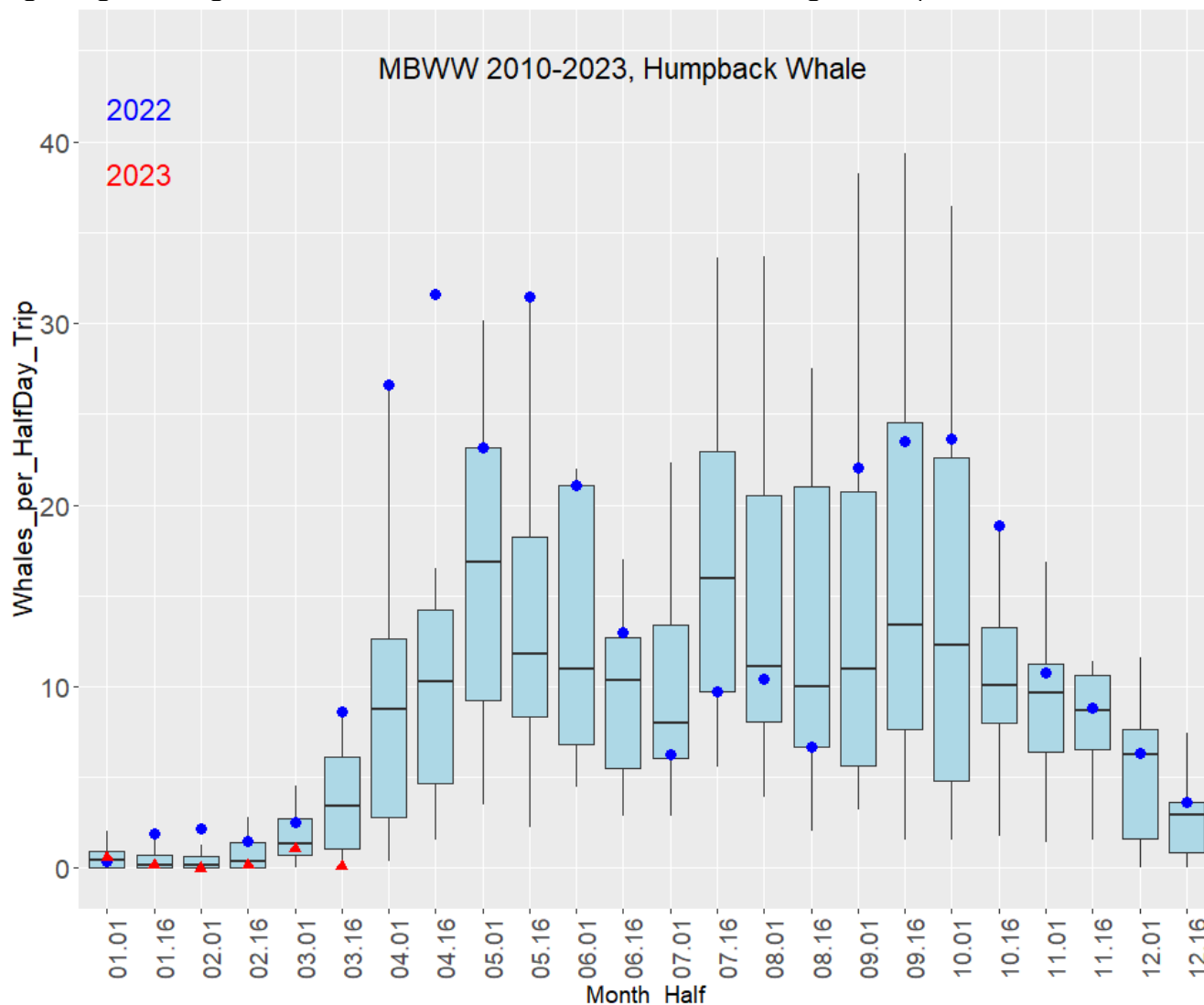


Figure 3. Historical Monterey Bay Whale Watch data for 2010-2023, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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 2022 (large blue dots) and 2023 (red triangles) and are provided for reference, placing recent whale numbers in a historical context.

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

Data provided by: California Department of Fish and Wildlife

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



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

All Fishing Zones have been open since December 31, 2022, and a summary of landings from all Fishing Zones is provided below (Table 5).

Weekly total landings volume continues to decrease since the beginning of January, with the highest harvest coming from Fishing Zone 1, followed by Fishing Zone 3 (Figure 4). So far, 75% of the total volume harvested for this season has been from Fishing Zone 1, 19% from Fishing Zone 3, five percent from Fishing Zone 2, and the remaining one percent from Fishing Zone 4. Vessel activity by Fishing Zone follows the same pattern, with the highest activity in Fishing Zones 1 and 3, and less activity in Fishing Zones 2 and 4 (Figure 5). Fishing Zones 1, 2, and 3 show decreased vessel activity since mid-February and Fishing Zone 4 has shown a slight increase since mid-February.

Weekly landings by port have been declining since the end of January with the highest activity in Crescent City, Eureka, San Francisco, and Half Moon Bay (Figure 6). Overall, 48% of the total volume harvested for the season has been landed in Crescent City, 22% from Eureka, seven percent from San Francisco and Bodega Bay, six percent from Half Moon Bay, five percent for Fort Bragg and Trinidad, and the remaining one percent from Monterey.

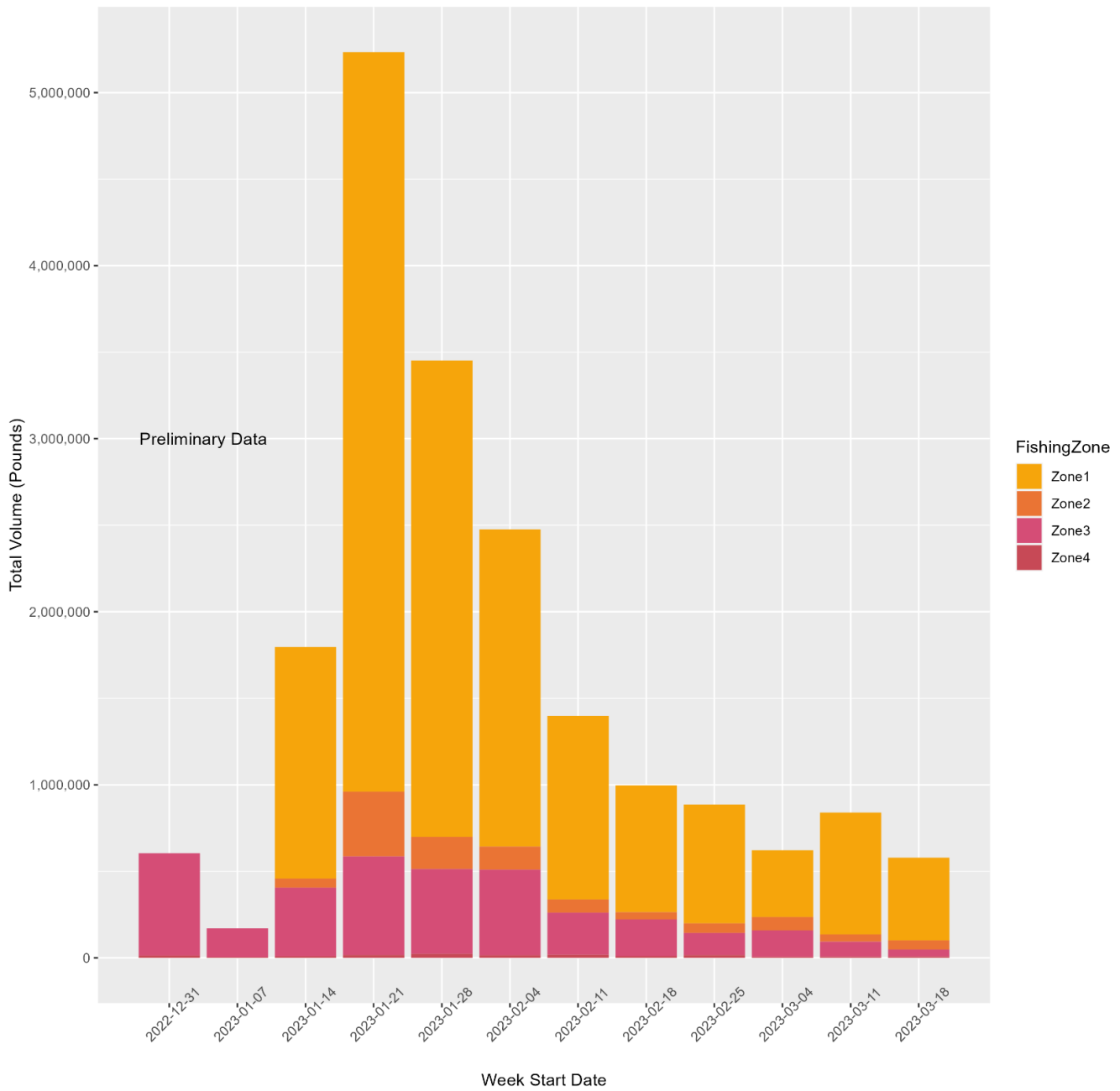
Looking at vessel activity by port over the course of the season, the highest activity has been in Crescent City (98 vessels) and Eureka (72 vessels), followed by Half Moon Bay (35 vessels, San Francisco (34 vessels), and Bodega Bay (32 vessels; Figure 7). Vessels have also made landings in Fort Bragg (25 vessels), Trinidad (14 vessels), and Monterey (13 vessels) (Figure 7). Overall, vessel activity has largely been decreasing since the beginning of February with Trinidad, Half Moon Bay, and San Francisco at seasonal lows.

**Table 5. Summary of fleet dynamics information, as of March 23, 2023.**

Metric	Value	Additional Info
Season status	Open	All Fishing Zones are Open
Number of daily landings	4,855	NA
Total volume (pounds)	19,060,525	NA
Total Ex-Vessel Value	\$46,781,090	NA
Average unit price	\$2.68	NA
Total number of active vessels	362	NA
Maximum potential traps (based on active permits)	118,150	Estimates are also provided in the Bi-Weekly Fishing Activity Reports subsection

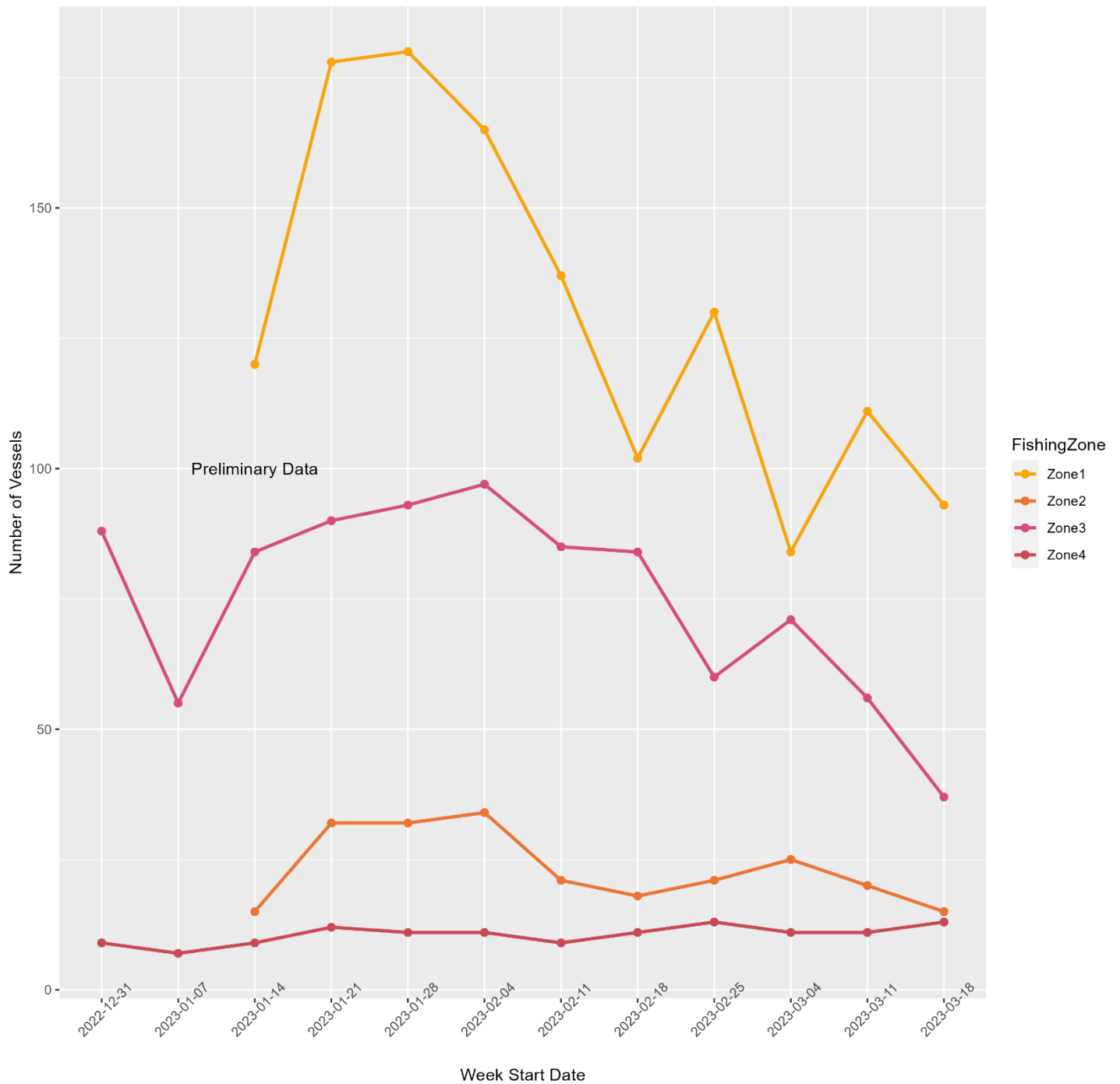


Volume of Landings (Pounds), by Week and Fishing Zone, 2022-23 Season



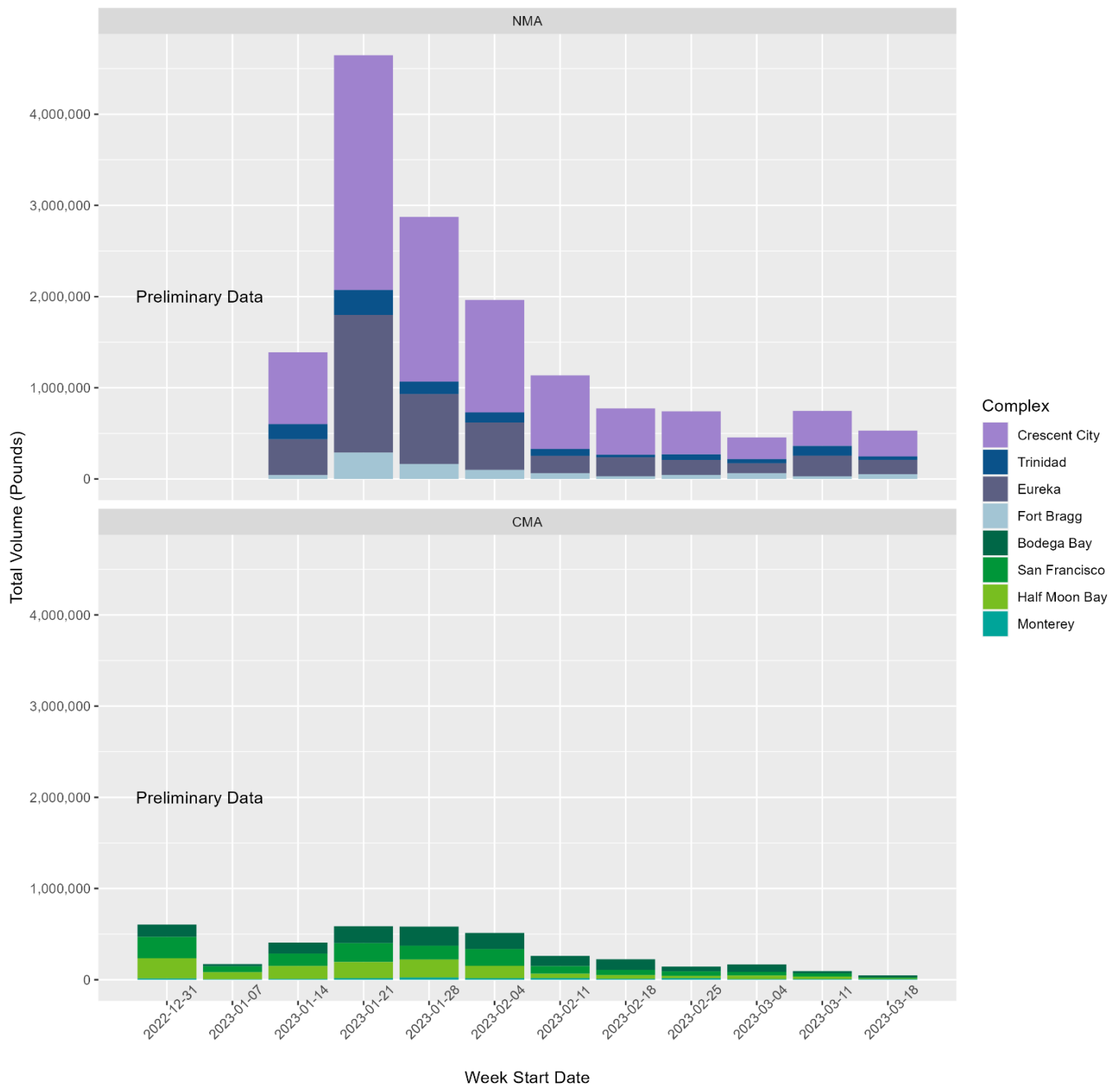
**Figure 4. Cumulative volume (pounds) harvest by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change.**

Number of Active Vessels, by Week and Fishing Zone, 2022-23 Season



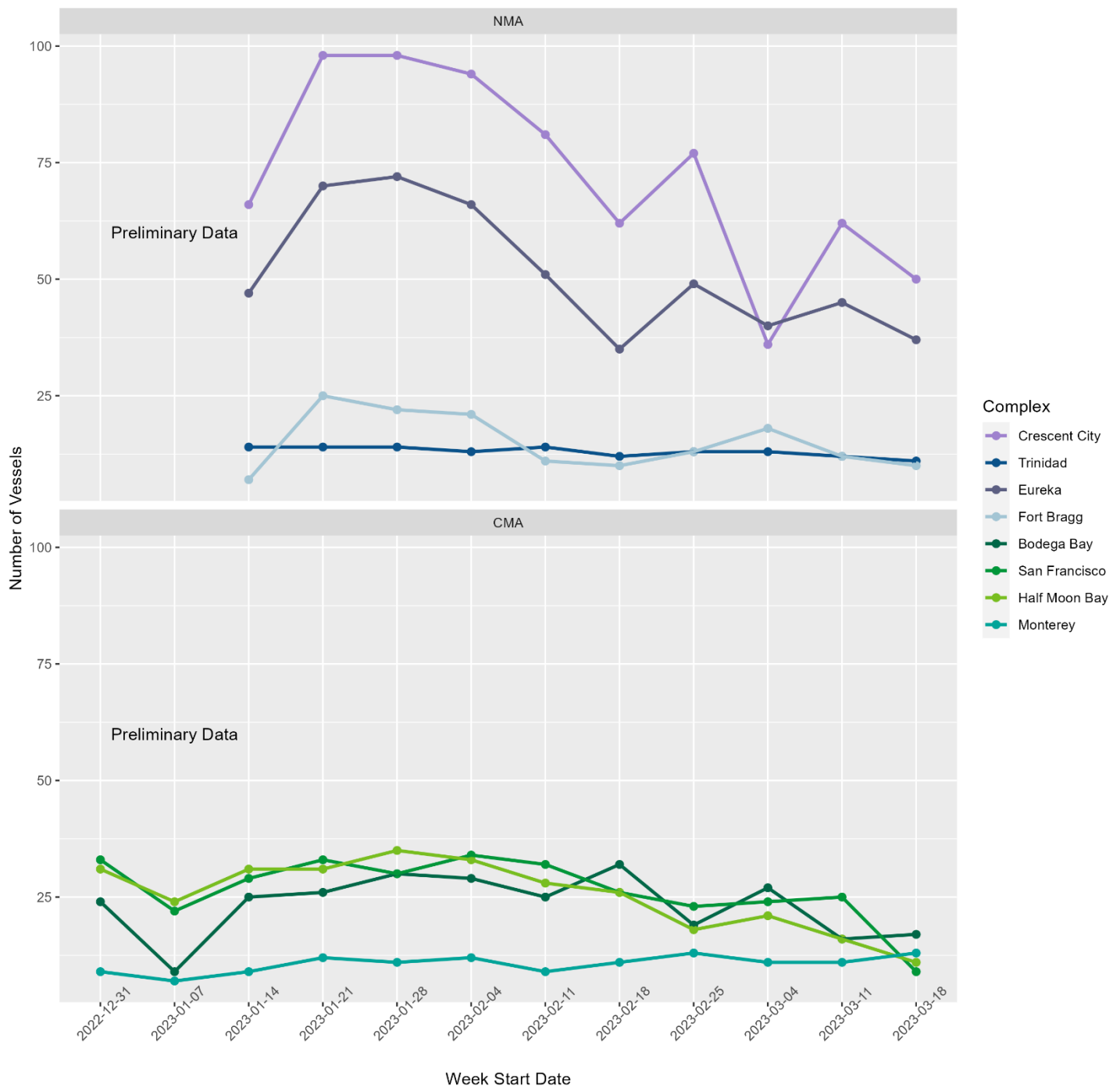
**Figure 5. Number of active vessels by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change.**

Volume of Landings (Pounds), by Week and Port Complex, 2022-23 Season



**Figure 6. 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, December 31, 2022. 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, 2022-23 Season



**Figure 7. 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, December 31, 2022. All data are preliminary and subject to change. Some week\*port complex combinations are withheld due to confidentiality concerns.**

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

CDFW has received bi-weekly reports since the first reporting period on January 1, 2023 through the most recent reporting period of March 16, 2023. A summary of reports received for March 16, 2023, is provided in Table 6; note this summary may not reflect all permitted vessels participating in the fishery. Based on this total, 60% of all estimated traps are being reported in Fishing Zone 1.

**Table 6. Summary of information provided for the March 16, 2023, bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 24, 2023. NR-C 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	99	348	34,383	13	32	92	5	28
Zone 2	19	203	3,848	14	26	40	0	0
Zone 3	70	233	16,307	19	35	80	1	0
Zone 4	12	182	2,175	22	42	70	0	0
Zone 5	3	119	356	27	42	50	0	0
Zone 6	NA	NA	NA	NA	NA	NA	NA	NA
Totals	203	NA	57,069	NA	NA	NA	6	28

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

*Data provided by: Monterey Bay Aquarium Research Institute*

#### **MBARI Krill Model**

Modeled zooplankton conditions for February 2023 indicate expected concentrations from Point Conception to Point Sur, Point Arena to Cape Mendocino and near the CA/OR border. There are also pockets of higher-than-expected concentrations south of Point Conception, from Point Sur to Point Arena, from Cape Mendocino to Cape Blanco, and north of Cape Blanco.

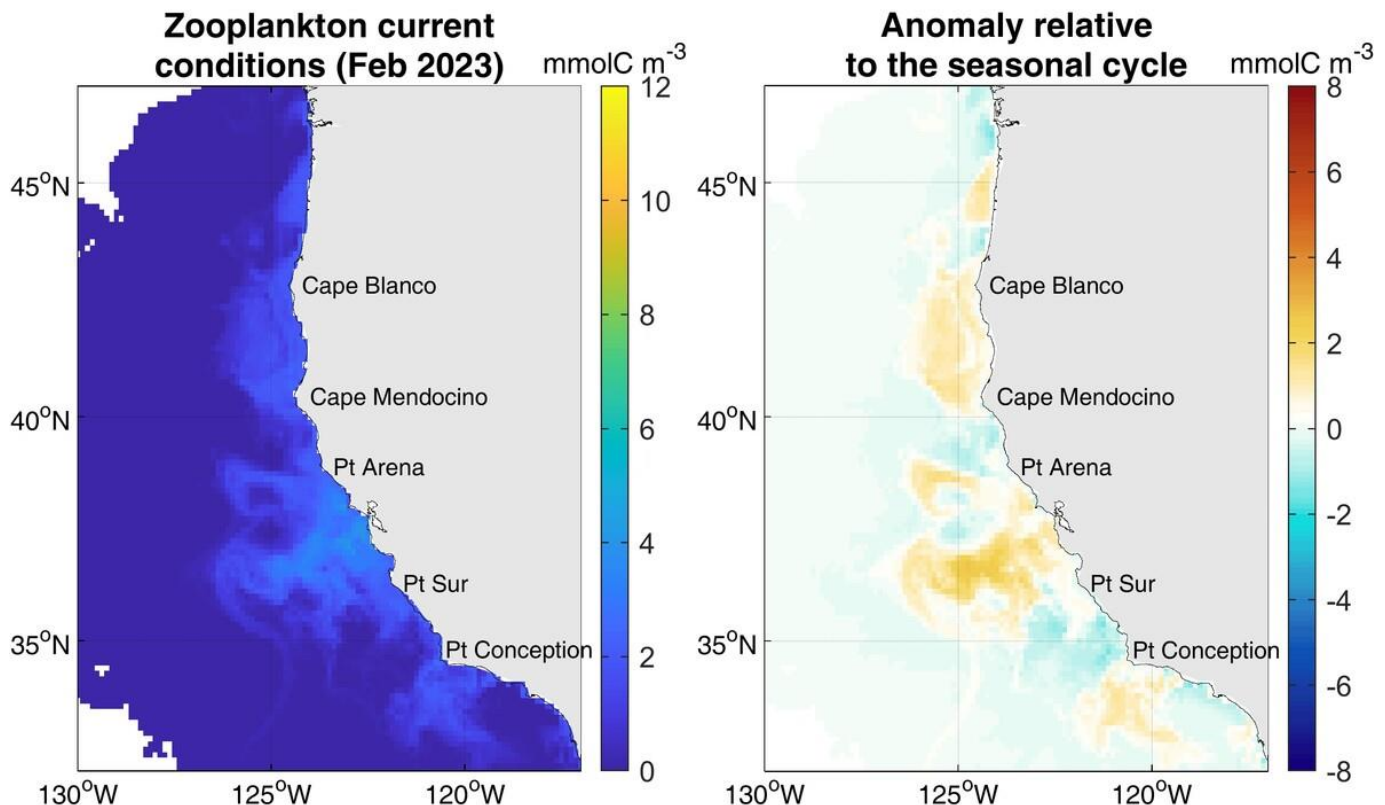


Figure 8. Latest modeled zooplankton concentrations in the California Current (left) and corresponding anomaly relative to the 1993-2018 seasonal cycle (right). Derived from the operational krill hotspot model from February 2023 accessible on the [MBARI Website](#).

### Forage Abundance Indices

See the [February 13, 2023, Available Data](#) document.

### Ocean conditions: §132.8(d)(9)

Data provided by: National Weather Service Climate Prediction Center, California Current Integrated Ecosystem Assessment Program, Jarrod Santora (NMFS SWFSC)

### El Niño/Southern Oscillation (ENSO) Diagnostic

See the [March 13, 2023, Available Data](#) document.

### Large Marine Heatwave Tracker

As of March 3, 2023, there are no new Large Marine Heatwaves (LMHs), and nearshore coastal waters are slightly colder-than the average temperatures (Figure 9). The heatwave that developed in January 2022, receded and shrank from nearshore coastal waters in November of 2022.

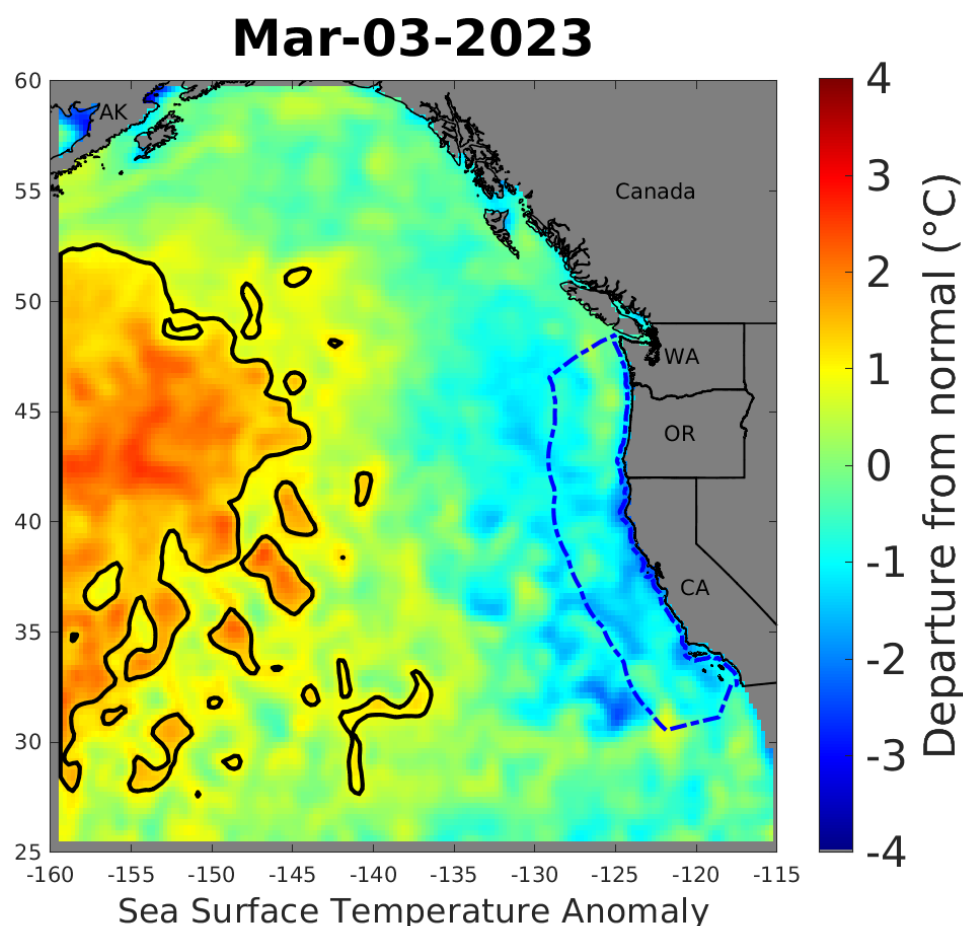


Figure 9. Science-quality (delayed 3-weeks), daily interpolated standardized sea surface temperature anomalies (SSTa) in the California Current ecosystem available for analysis of MHW presence. Dark outline shows the current extent of MHW conditions, as delineated by values of the normalized SST + 1.29 SD from normal. Blue dashed line

represents the US West Coast EEZ. SST data from [NOAA's Optimum interpolation Sea Surface Temperature](#) analysis with the SST anomaly calculated using climatology from NOAA's AVHRR-only OISST dataset.

#### Habitat Compression Index

See the [March 13, 2023, Available Data document](#).

#### North Pacific High

See the [March 13, 2023, Available Data document](#).

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

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 (2022-23) and calendar year (2023) are provided in Table 2 above. Impact Score totals for calendar year 2021 and 2022 are provided in Table 3 above.