2022-23 Risk Assessment: Available Data

Last updated: April 26, 2023

Contents

Items with updated information are followed by an *.

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 April 26, 2023, there have been a total of two confirmed humpback whale entanglements, zero confirmed blue whale entanglements, and zero confirmed leatherback sea turtle entanglements reported to the West Coast Region during 2023. Note: Other entanglements have occurred in California during 2023 but are not actionable under RAMP.

On April 17th, 2023, a confirmed humpback whale entanglement (20230417Mn) with Unknown Fishing Gear was reported in Monterey Bay. The whale was first reported on April 17th and while no gear was seen on the whale at the time it exhibited behavior that was

consistent with being anchored by trap gear. On April 18th the whale was sighted again, having freed itself from the downline. Drone footage showed line wrapped around the peduncle and trailing line above and below the fluke.

On April 20th, 2023, a response team confirmed a second humpback whale entanglement (20230420Mn) in Unknown Fishing Gear in Monterey Bay. Response teams reported multiple wraps of line at the base of the peduncle and a small amount of trailing line.

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	2
Blue whales	0	0
Leatherback sea turtles	0	0

As a result CDFW has assigned an Impact Score of 0.38 to each of the April 17, 2023 and April 20, 2023, humpback whale entanglements bringing the 2023 calendar year impact score to 0.76. CDFW considers both humpback whale entanglements (20230417Mn and 20230420Mn) in Fishing Zone 4 to be confirmed entanglements in unidentified fishing gear.

During 2022 and 2023, there were no confirmed entanglements of either blue whales or leatherback sea turtles in California commercial Dungeness crab gear (reported from any location) or Unknown Fishing Gear (reported from California). Therefore, the cumulative Impact Score for 2023 and the current fishing season is 0 for these two species.

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	0.76	0.76
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 0 for blue whales and leatherback sea turtles. The 2023 calendar year Impact Score is 0.76. Therefore, the 3-year Rolling Average Impact Score is now 2.64.

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	0.76	2.64
Blue whales	0	0	NA	NA
Leatherback sea turtles	0	0	NA	NA

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

Data provided by: United States Coast Guard (USCG), California Department of Fish and Wildlife (CDFW), Cascadia Research Collective, and Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC).

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, CDFW Aerial Survey	No
Zone 2	CDFW Aerial Survey	No
Zone 3	CDFW Aerial Survey, Cascadia Research Collective	Yes
Zone 4	MBWW	Yes
Zone 5	None	No
Zone 6	None	NA

USCG (Fishing Zone 1)

On April 24, 2023, the US Coast Guard flew a portion of Fishing Zone 1 from Cape Mendocino to the Oregon border (Figure 1). No whales were observed.

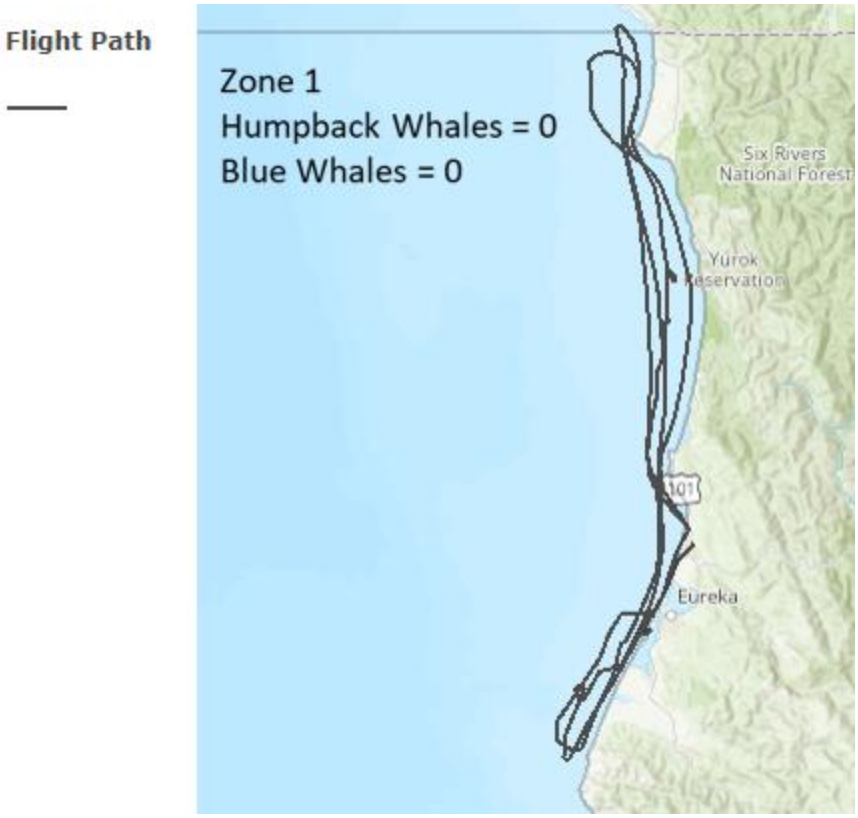

Figure 1. Map showing track lines and observations from USCG aerial survey of Fishing Zone 1 on April 24, 2022.

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

CDFW staff conducted an aerial survey on April 18, 2023 between Half Moon Bay and Cape Mendocino. Weather conditions were good to Cape Mendocino, and no humpback or blue whales were observed in the areas surveyed for Fishing Zones 1, 2, or 3 (Figure 2).

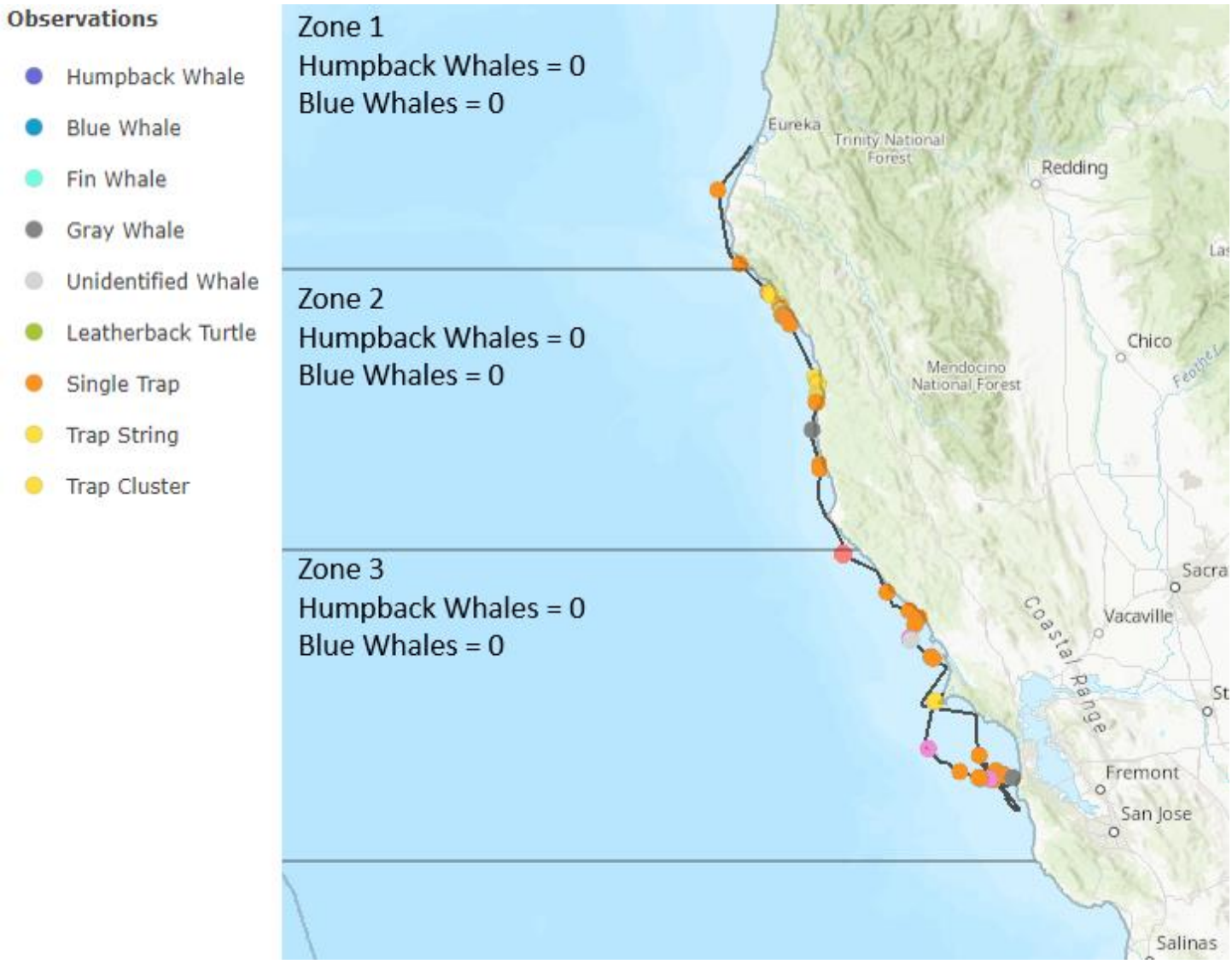

Figure 2. Map showing track lines and observations from CDFW aerial survey of Fishing Zones 1, 2, and 3 on April 18, 2023.

Cascadia Research Collective *(Fishing Zone 3)*

Cascadia Research conducted two surveys on March 31, 2023, out of Half Moon Bay. Five humpback whales were sighted on the survey of the 70-meter contour, and ten humpback whales were sighted on the survey of the 200-meter contour. The second survey was conducted out of San Francisco Bay and covered 140 nautical miles around the Southeastern Farallon Islands. Five humpback whales were sighted on the second survey, largely concentrated around the Farallon Islands.

Monterey Bay Whale Watch *(Fishing Zone 4)*

- Monterey Bay Whale Watch conducted whale-watching trips in southern Monterey Bay on all seven days during the week of April 15-21, 2023.
- The average number of humpback whales per half-day trip during the week of April 15-21, 2023, was 9.2, with a peak of 25 humpback whales observed during an all-day trip on April 16, 2023.
- Two blue whales were observed during an all-day trip on April 21, 2023.

MANAGEMENT CONSIDERATIONS

Information from NOAA: §132.8(d)(2)*

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

Two humpback whale entanglements in Unknown Fishing Gear were reported on April 17, 2023 (20230417Mn) and April 20, 2023 (20230420Mn) in Monterey Bay (Fishing Zone 4).

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 April 25, 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 April 25, 2023, 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 SWFSC), Point Blue Conservation Science Data Portal, and Cascadia Research Collective

Monterey Bay Whale Watch *(Fishing Zone 4)*

For humpback whales, the semi-monthly average of whales per half-day trip has continued to increase and is now close to the average historical value of about 10 whales at this time of year (Figure 3). Based on historical patterns, the number of humpback whales will likely continue to increase during the next few weeks and remain elevated through at least November (Figures 3 and 4).

Two blue whales were observed on April 21, 2023. This is the first 2023 observation of blue whales by MBWW, consistent with historical data showing the seasonal presence of blue whales near Monterey Bay from about April through November (Figure 5).

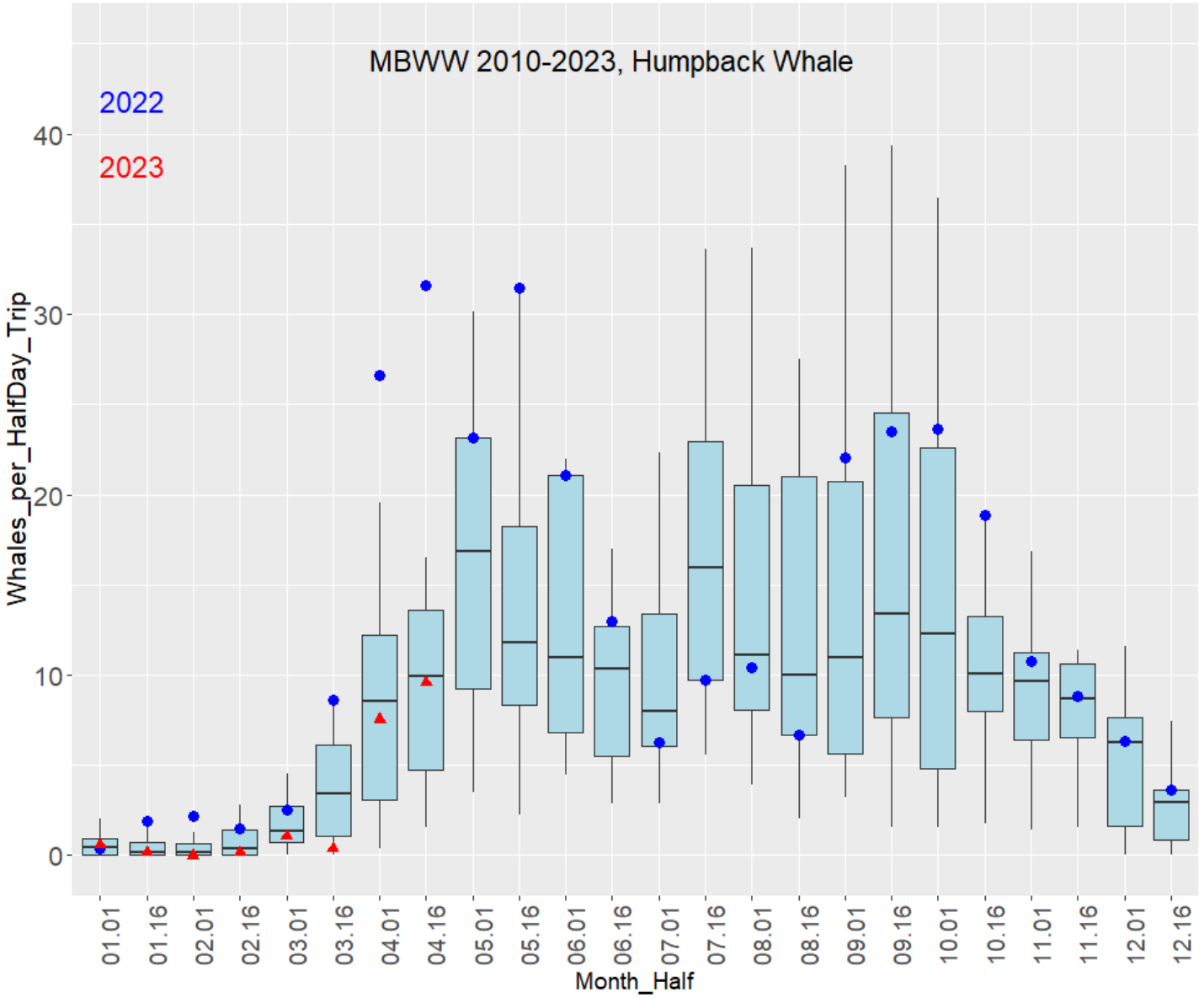

Figure 3. Historical Monterey Bay Whale Watch data for 2010-2023, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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.

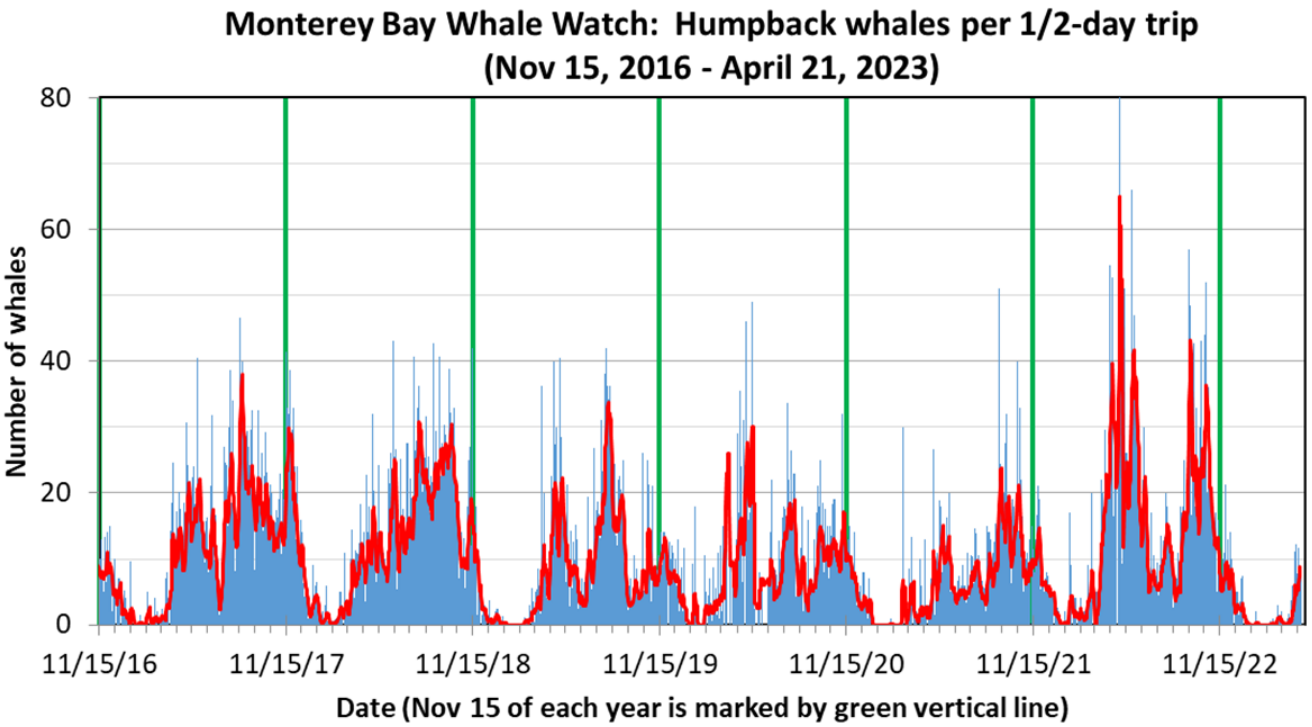

Figure 4. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2016 – 21 April 2023. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns a bit easier to see. A vertical green line has been added at November 15 of each year for reference. Each tick mark is one month.

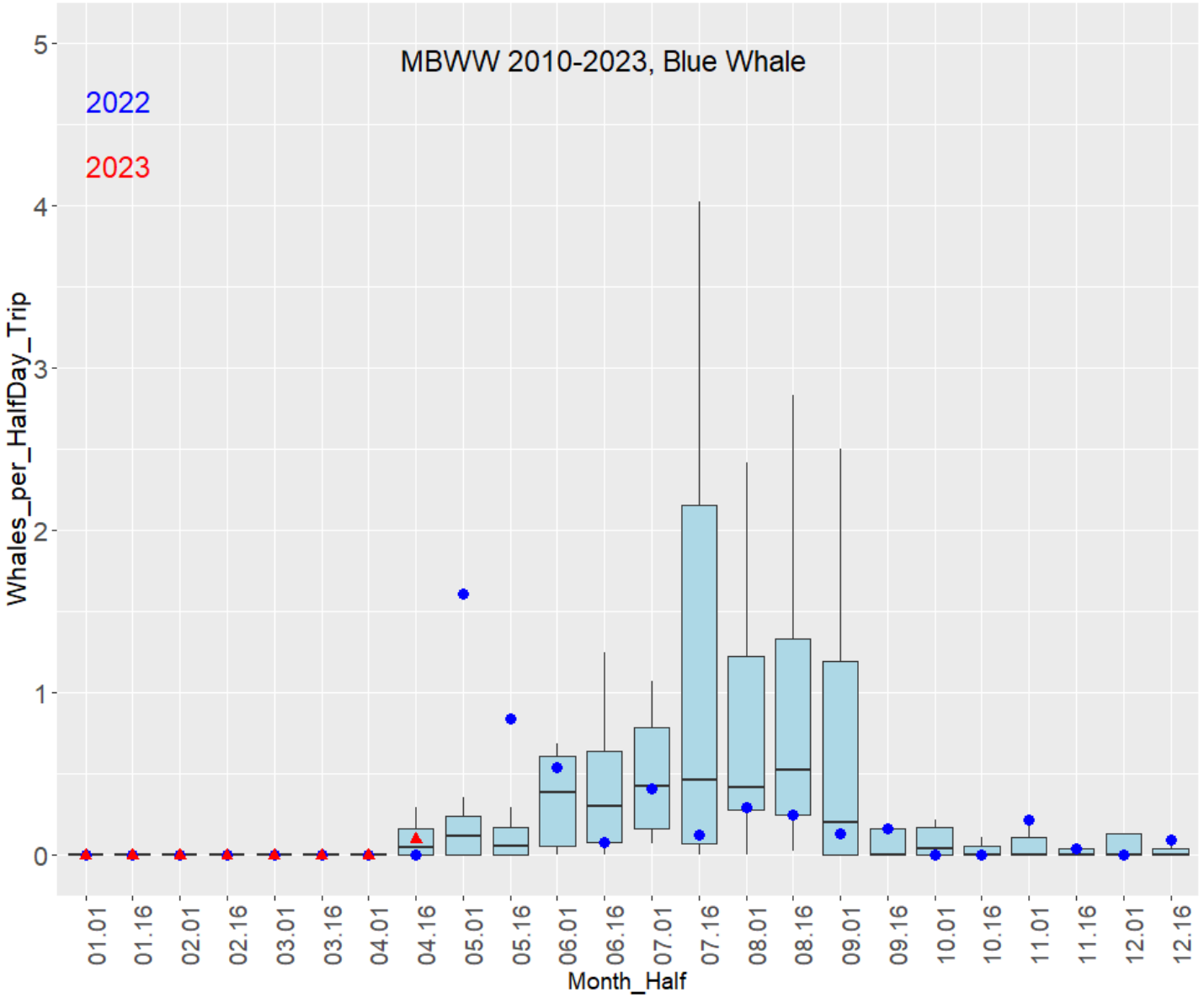

Figure 5. Historical Monterey Bay Whale Watch data for 2010-2023, summarizing the average and variation in the number of blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average number of whales; the blue box shows the 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.

Point Blue Conservation Science Data Portal *(Fishing Zone 6)*

During the seven-day period ending April 25, 2023, trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service reported 86 humpback whales in Fishing Zone 6 (Figure 6). No blue whales were observed in any Fishing Zone during this period.

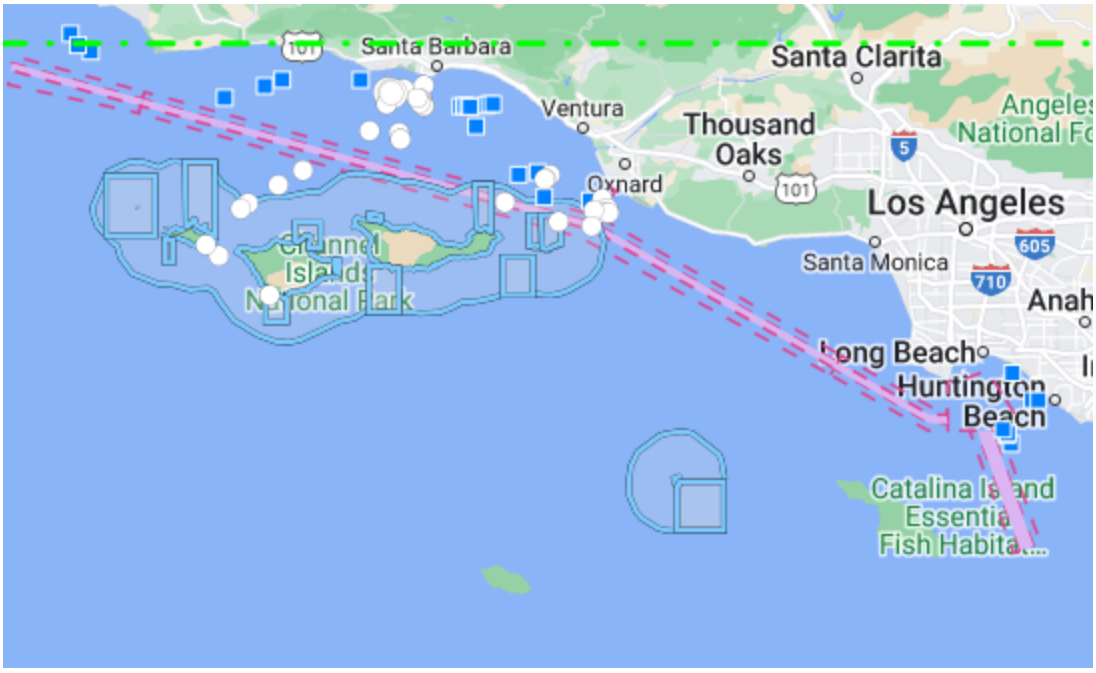

Figure 6. Locations of humpback whale sightings within Fishing Zone 6. Reporting locations are reported by white circles. A given report may or may not represent multiple individuals. Fishing Zone boundaries are represented by dashed lines.

Cascadia Research Collective *(Fishing Zones 1 and 2)*

Cascadia Research, in partnership with Oregon State University, recently conducted surveys as part of the MOSAIC project. The survey was conducted in southern Oregon and northern California from April 13, 2023 to April 15, 2023 and included Fishing Zones 1 and 2 (Figure 7). The California survey observed 28 humpback whales scattered across multiple depths from 80 meters to 1,000 meters.

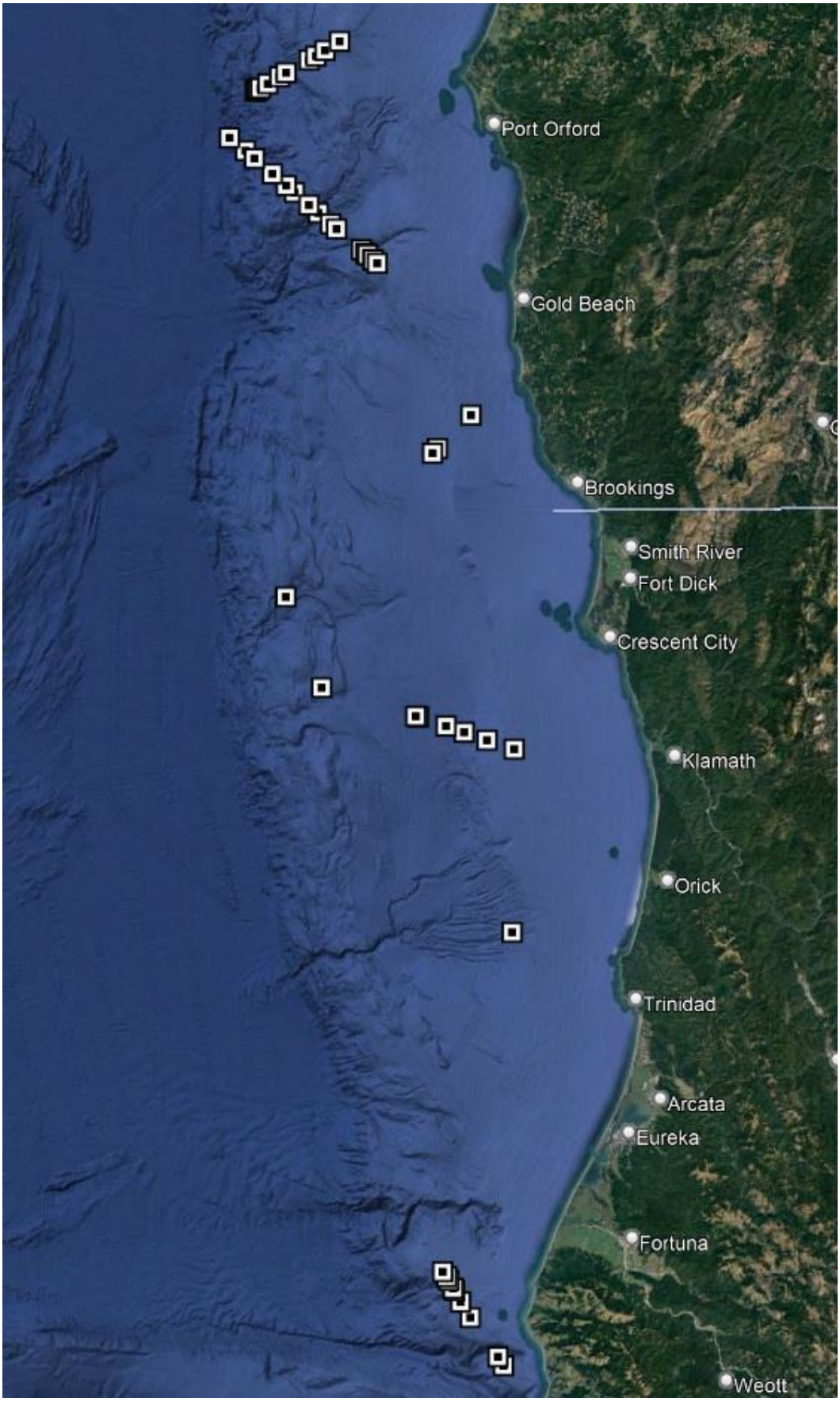

Figure 7. Map showing observations from the MOSAIC project run by Oregon State University and Cascadia Research Collective from April 13-15, 2023. Reporting locations are represented by white squares.

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)*

Fishing Zones 1 and 2 are open as of April 25, 2023, and all other Fishing Zones are closed, a summary of landings from all Fishing Zones is provided below (Table 5).

Weekly total landings volume has decreased since the beginning of January, with the highest harvest coming from Fishing Zone 1, followed by Fishing Zone 3 (Figure 8). So far, 74% of the total volume harvested for this season has been from Fishing Zone 1, with 19% from Fishing Zone 3, six percent from Fishing Zone 2 and the remaining percent coming from the other Fishing Zones. Vessel activity by Fishing Zone follows the same pattern, with the highest activity in Fishing Zones 1 and 3 and less activity in the remaining Fishing Zones (Figure 9). All Fishing Zones have had a continued decrease in vessel activity since mid-February.

Weekly landings by port have declined since the beginning of January with the highest activity in Crescent City, Eureka, Bodega Bay, Half Moon Bay, and San Francisco (Figures 10). Overall, 47% of the total volume harvested for this season has been landed into Crescent City, 22% landed in Eureka, seven percent landed into Bodega Bay, six percent landed in Half Moon Bay, Trinidad, and San Francisco, and five percent or less landed into Fort Bragg, Monterey, and Morro Bay.

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 11). Vessels have also made landings into Fort Bragg (25), Trinidad (14), Monterey (13), and Morro Bay (withheld due to confidentiality; Figure 11). However, vessel activity by Fishing Zone has significantly decreased since the beginning of April with most Fishing Zones showing less than half of their highest active vessels count active over the last few weeks.

Table 5. Summary of fleet dynamics information, as of April 25, 2023.

Metric	Value	Additional Info
Season status	Partial Closure	Fishing Zones 1 and 2 Open
Number of daily landings	5,851	NA
Total volume (pounds)	20,298,491	NA
Total Ex-Vessel Value	$50,598,255	NA
Average unit price	$2.76	NA
Total number of active vessels	371	NA
Maximum potential traps (based on active permits)	120,525	Estimates are also provided in the Bi-Weekly Fishing Activity Reports subsection

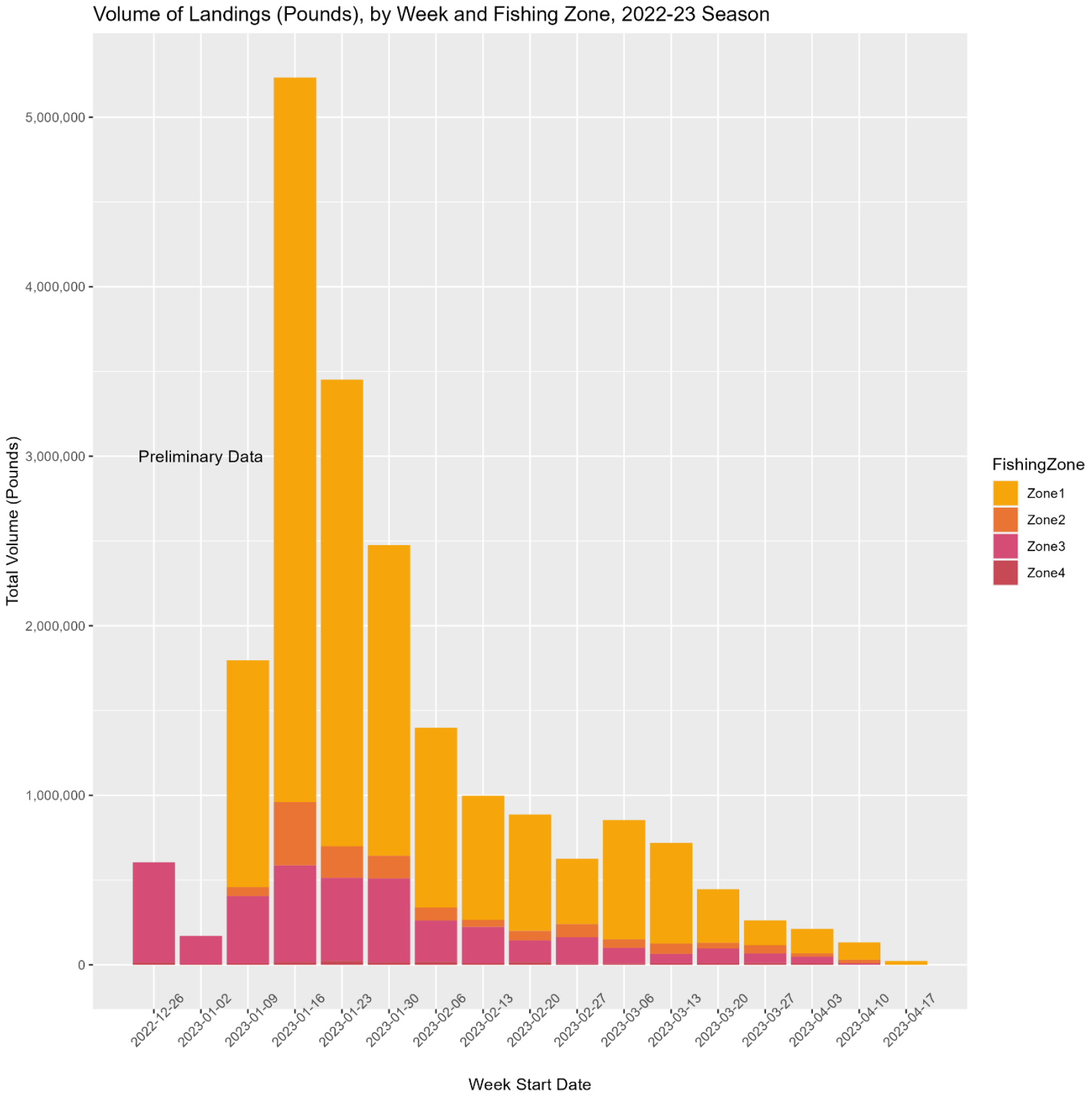

Figure 8. Cumulative volume (pounds) harvest by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change.

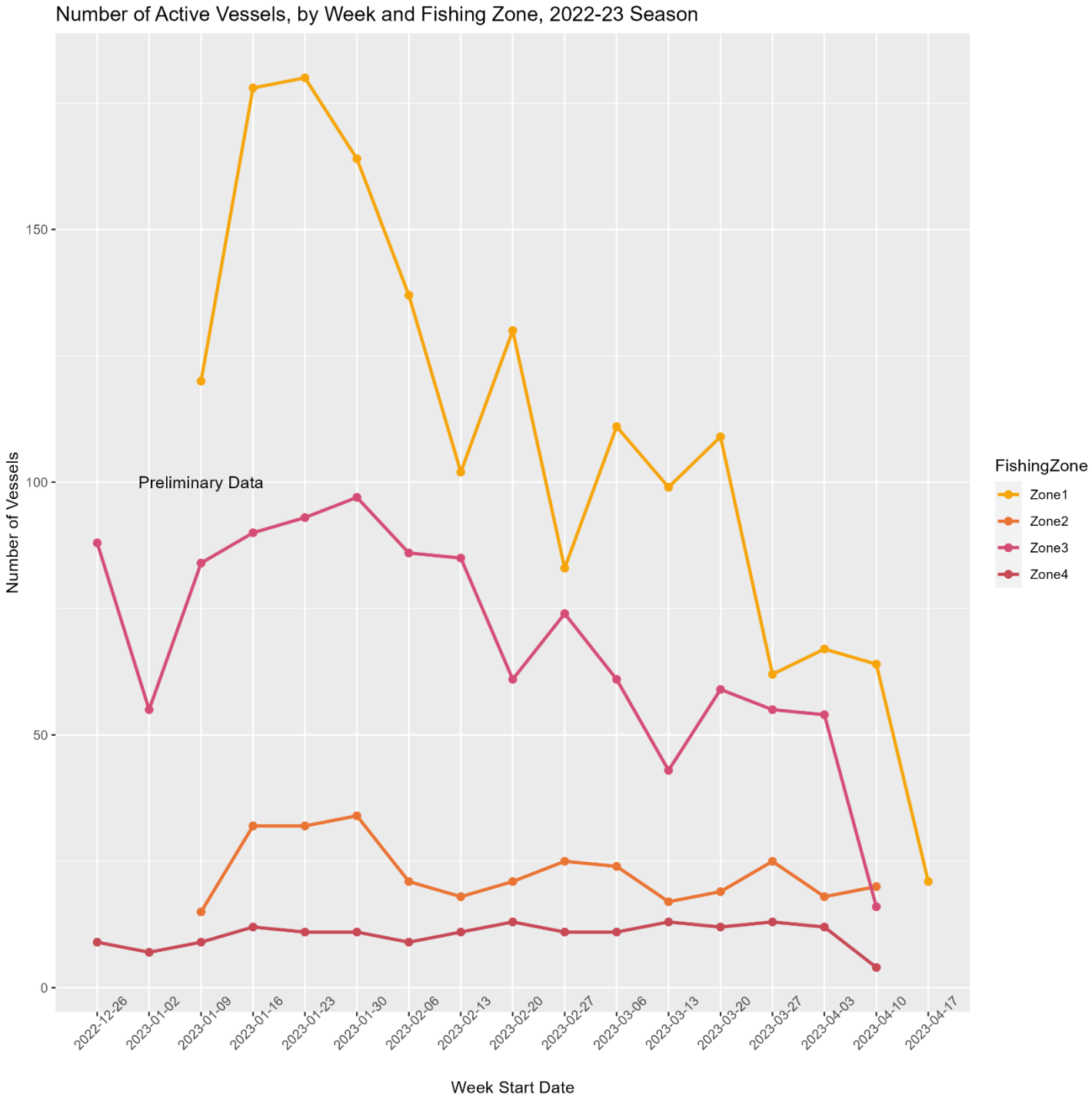

Figure 9. Number of active vessels by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change. Some week*port complex combinations are withheld due to confidentiality constraints.

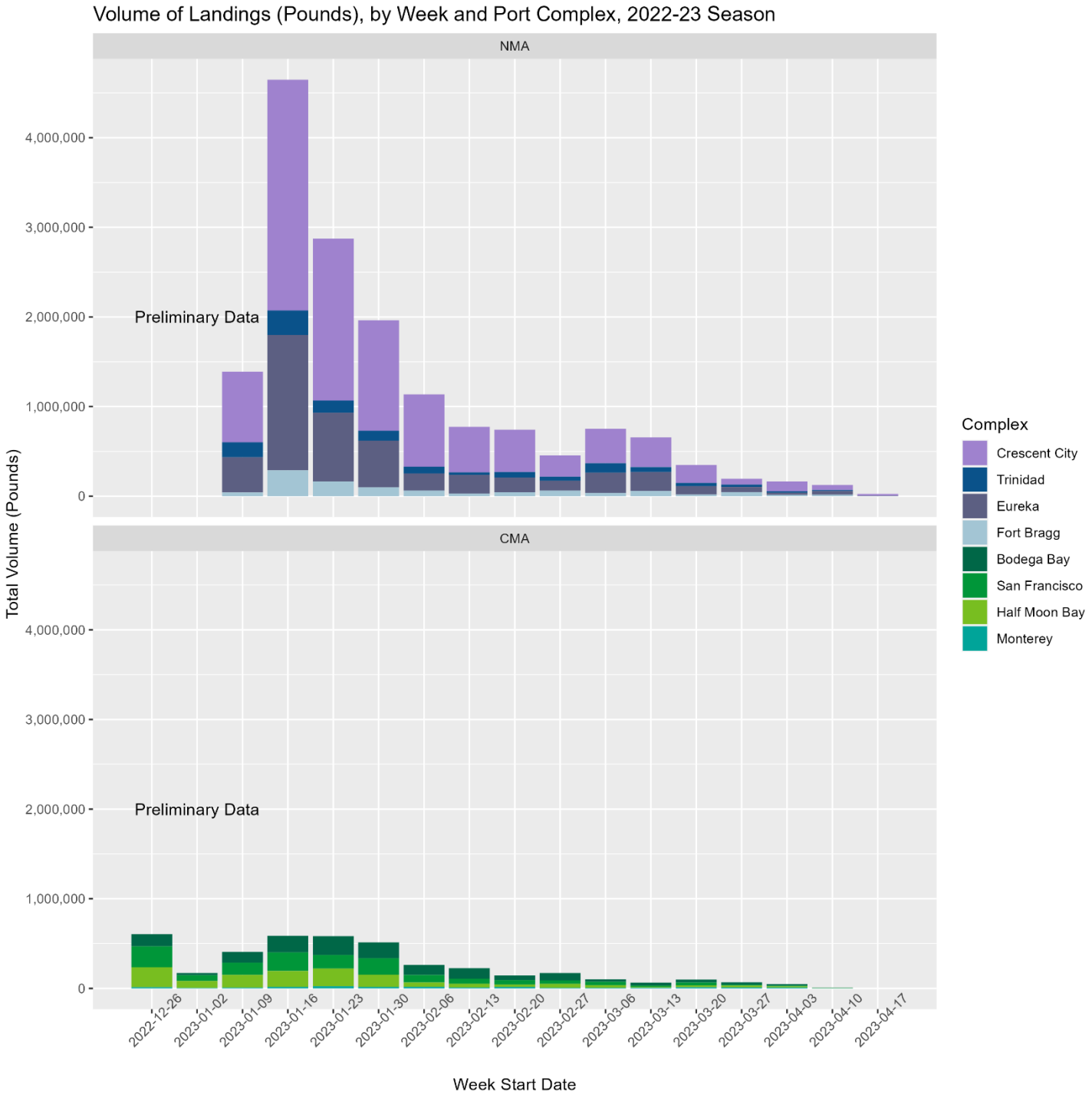

Figure 10. Cumulative volume (pounds) landed by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change. Certain week*port complex combinations are withheld due to confidentiality constraints.

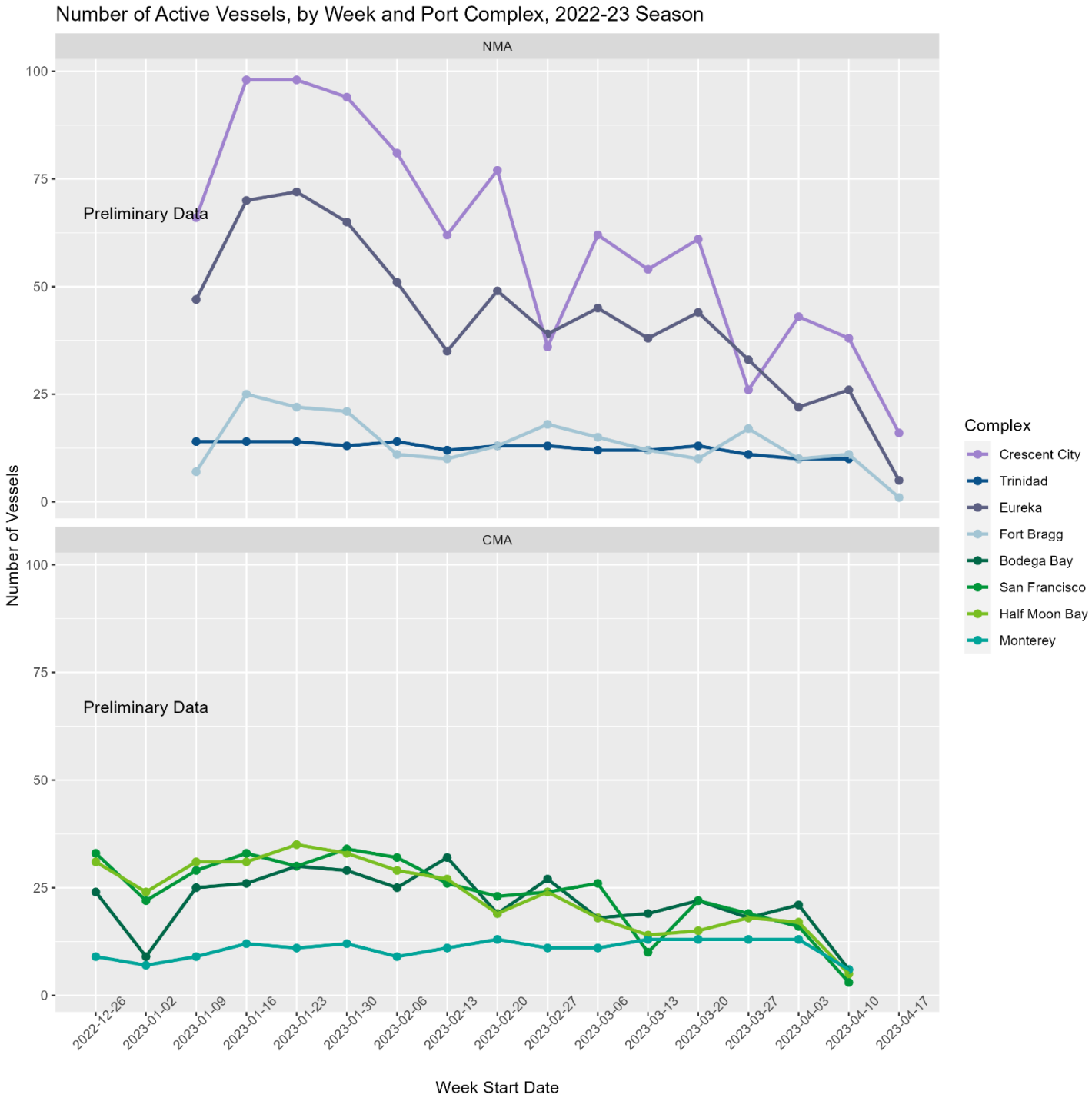

Figure 11. Number of active vessels by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, December 31, 2022. All data are preliminary and subject to change. Some week*port complex combinations are withheld due to confidentiality concerns.

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

CDFW has received bi-weekly reports since the first reporting period of January 1, 2023 through the most recent reporting period of April 16, 2023. A summary of reports received for April 1, 2023, is provided in Table 6 and those received for April 16, 2023, are provided in Table 7; note these summaries may not reflect all permitted vessels participating in the fishery. In addition, Table 8 shows the summary of total traps by Fishing Zone for the five most recent reporting periods. Based on these overall reported totals, total traps in Zone 1 have consistently been between 60% and 65% of total traps deployed each period until

the most recent period that covers when the season closed in Zones 3, 4, 5, and 6, number of traps in Zone 1 are over 70% of total.

Table 6. Summary of information provided for the April 1, 2023 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on April 25, 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	97	332	31,511	12	28	53	9	56
Zone 2	20	243	4,852	14	27	60	0	
Zone 3	65	217	13,191	19	33	80	14	229
Zone 4	15	167	2,493	20	36	60	2	29
Zone 5	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Zone 6	NA	NA	NA	NA	NA	NA	NA	NA
Totals	197		52,047				25	314

Table 7. Summary of information provided for the April 16, 2023 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on April 25, 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	80	328	24,255	12	27	53	13	139
Zone 2	16	213	3,394	14	30	85	0	
Zone 3	38	188	5,075	20	35	80	36	301
Zone 4	10	105	735	17	37	60	9	166
Zone 5	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Zone 6	NA	NA	NA	NA	NA	NA	NA	NA
Totals	144		33,459				58	606

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

Fishing Zone	Feb 16 - Total Traps	Mar 1 - Total Traps	Mar 16 - Total Traps	Apr 1 - Total Traps	Apr 16 - Total Traps
Zone 1	56,936	50,263	43,063	31,511	24,255
Zone 2	6,068	5,624	5,740	4,852	3,394
Zone 3	24,345	23,136	20,281	13,191	5,075
Zone 4	2,055	2,209	2,395	2,493	735
Zone 5	NR-C	NR-C	NR-C	NR-C	NR-C
Zone 6	NA	NA	NA	NA	NA
Totals	89,404	81,232	71,479	52,047	33,459

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 April 2023 indicate below average conditions from the CA/OR border to Point Arena, higher than expected concentrations from Point Arena to Point Sur, and below average expected conditions from Point Sur south to the Mexico/California border (Figure 12).

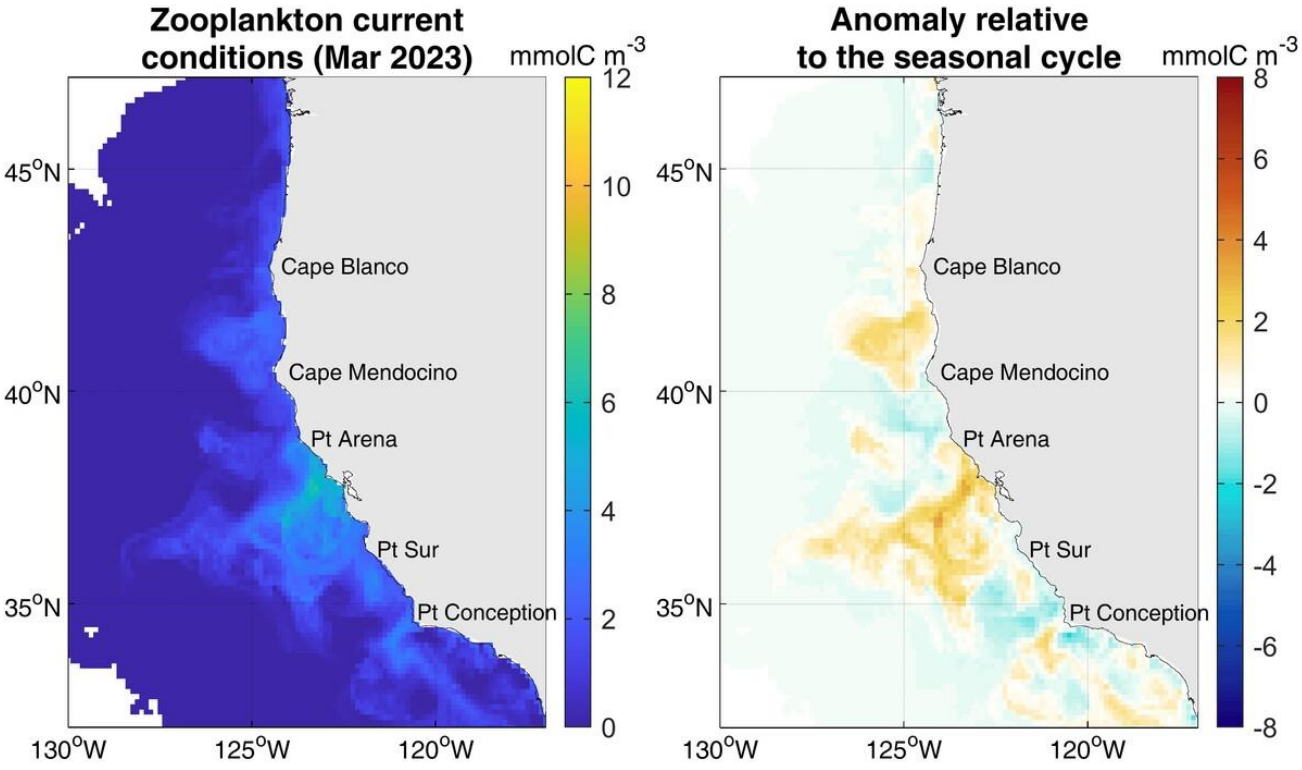

Figure 12. Latest modeled zooplankton concentrations in the California Current (left) and the corresponding anomaly relative to the 1993-2018 seasonal cycle (right), Derived from the operational krill hotspot model from February 2023 accessible on the MBARI website.

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 (ENSO) Diagnostic

As of April 13, 2023, La Niña conditions have ended, and ENSO-neutral conditions are present. Enso-neutral conditions are likely to continue until May-July when there is a strong chance of a transition to El Niño conditions.

Large Marine Heatwave Tracker

As of March 7, 2023, there are no new Large Marine Heatwaves (LMHs), and nearshore coastal waters are slightly colder-than the average temperatures (Figure 13). The heatwave that developed in January 2022, receded, and shrank from nearshore coastal waters in November of 2022.

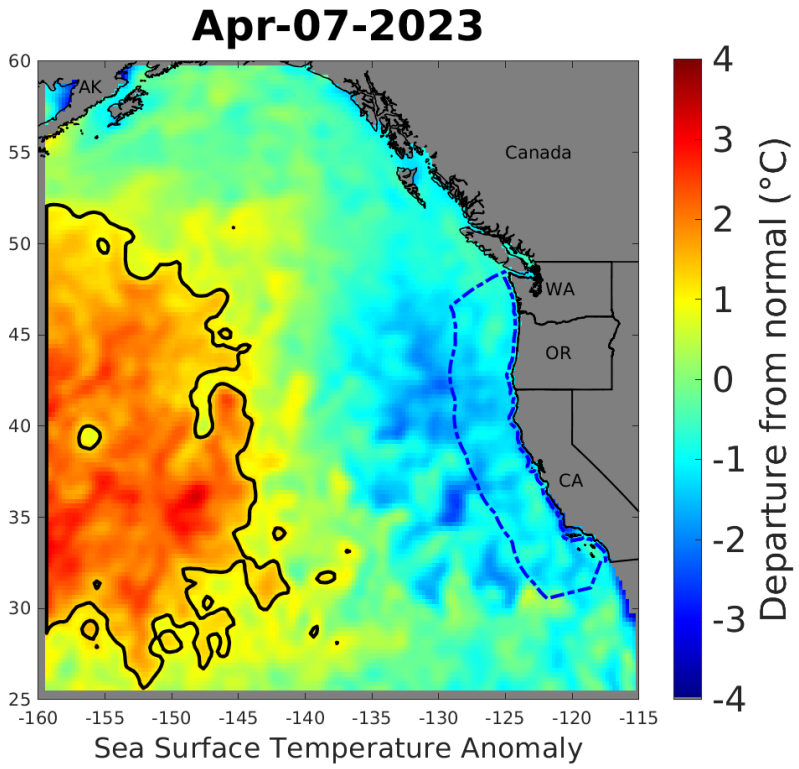

Figure 13. ***Science-quality (delayed 3-weeks), daily interpolated standardized sea surface temperature anomalies (SSTa) in the California Current ecosystem available for analysis of MHW presence. Dark outline shows the current extent of MHW conditions, as delineated by values of the normalized SST + 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

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.