

# 2023-2024 Risk Assessment Preliminary Assessment and Available Data for Risk Assessment Mitigation Program

Last updated: March 25, 2024

## PRELIMINARY ASSESSMENT

This Preliminary Assessment and Management Recommendation has been developed by California Department of Fish and Wildlife (CDFW) Marine Region staff for consideration by the California Dungeness Crab Fishing Gear Working Group for the Risk Assessment Mitigation Program (RAMP; Section 132.8, Title 14, California Code of Regulations) regarding Management Actions to address marine life entanglement risk in the commercial and recreational Dungeness crab fishery. CDFW will prepare a Final Assessment and Management Recommendation after review of the Working Group Recommendation and other relevant data.

### Recommended Management Actions

#### Commercial Fishery:

- Fishing Zones 1 and 2: Depth Constraint (30-Fathom) and Fleet Advisory
- Fishing Zones 3, 4, 5 and 6: Season Closure

#### Recreational Fishery:

- Fishing Zones 3, 4, and 5: Crab Trap Prohibition
- All Fishing Zones: Fleet Advisory

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Table 1. Fishing Zones and current management status in the California commercial and recreational Dungeness crab fishery.

<b>Fishing Zone</b>	<b>Commercial Fishery: Current Management Status</b>	<b>Commercial Fishery: Proposed Management Status</b>	<b>Recreational Fishery: Current Management Status</b>	<b>Recreational Fishery: Proposed Management Status</b>
1	Fleet Advisory	30-Fathom Depth Constraint; Fleet Advisory	Fleet Advisory	Fleet Advisory
2	Fleet Advisory	30-Fathom Depth Constraint; Fleet Advisory	Fleet Advisory	Fleet Advisory
3	50% Gear Reduction; Fleet Advisory	Season Closure	Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
4	50% Gear Reduction; Fleet Advisory	Season Closure	Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
5	50% Gear Reduction; Fleet Advisory	Season Closure	Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
6	50% Gear Reduction; Fleet Advisory	Season Closure	Fleet Advisory	Fleet Advisory

## I. Management Recommendation Summary Rationale

Marine Region’s preliminary recommendation is for the Director to implement a Season Closure for the commercial fishery in Fishing Zones 3-6 and a 30-fathom Depth Constraint in Fishing Zones 1-2, effective on April 5, 2024, at 6:00 pm. Marine Region also recommends a crab trap prohibition for the recreational fishery in Fishing Zones 3, 4 and 5, effective April 5, 2024, at 6:00 pm. The take and possession of Dungeness crab would be prohibited after 6:00 pm on April 5, 2024, in Fishing Zones that have been closed for the remainder of the statutory season. A Fleet Advisory would be maintained for all Fishing Zones for both the commercial and recreational fisheries.

These management actions are expected to allow for continued fishing opportunity in Fishing Zones 1 and 2 while mitigating entanglement risk until the next risk assessment. This preliminary recommendation is based on the current Entanglement Impact Score and increasing Marine Life Concentrations.

*Entanglements:* No new entanglements of Actionable Species have been reported since the

last Risk Assessment on February 15, 2024. Confirmed humpback whale entanglements in California commercial Dungeness crab fishing gear and Unknown Fishing Gear bring the three-year rolling average Impact Score to 3.39. Additionally, the three-year rolling average Impact Score for leatherback sea turtles is 0.33. Since both Impact Scores exceed triggers under RAMP, Management Action is required. For more information, please see the [RAMP Entanglement History](#) document.

*Marine Life Concentrations:* CDFW conducted aerial surveys in Fishing Zones 1-5 on March 18-19 and observed 13 humpback whale sightings in Fishing Zone 4. Cascadia Research and the Marine Mammal Center conducted vessel surveys in Fishing Zones 3-4 on March 16-20. The Marine Mammal Center observed 14 humpback whales on March 16, in Fishing Zone 4. Cascadia research observed 47 humpback whales on March 17 and 12 humpback whales on March 21 in Fishing Zone 4. Monterey Bay Whale Watch data also show increasing humpback whale observations, with a weekly average of 9 whales per half-day trip, and a peak of 34 whales observed during half-day trips on March 16.

Observed and historical whale migration patterns show an increase in humpback whale abundance along California's coastline as individuals move northward from their winter breeding grounds. Migrating humpback whales typically return to key foraging areas in Monterey Bay (Fishing Zone 4) and the Gulf of the Farallones (Fishing Zone 3) in early to mid-April. Historical data indicate that once humpback whales begin returning to the Fishing Grounds their numbers can increase rapidly over a short time. A Season Closure/Trap Prohibition for Zone 5 is recommended because it is within the migration corridor and key foraging areas. A Depth Restriction in Fishing Zones 1 and 2 will minimize overlap with trap gear as whales move up the coast. Cascadia Research Collective and the Marine Mammal Centers vessel surveys observed high concentrations of humpback whales in Fishing Zone 4 on multiple survey days. Monterey Bay Whale Watch also recorded humpback whale sightings exceeding Marine Life Concentration triggers and noted current concentrations are greater than the historical averages observed in both 2022 and 2023. In addition, CDFWs aerial surveys and vessels surveys observed humpback whale concentrations in Fishing Zone 4 that trigger a Management Action per RAMP regulations. Allowing the commercial and recreational fisheries to continue setting traps in the Central Management Area (CMA; Fishing Zones 3-6), creates elevated entanglement risk for whales as they transit through California's waters.

For additional details, see the Entanglement and Marine Life Concentration sections of this Available Data document.

## **II. Alternative Management Actions for the Commercial Fishery**

### Alternatives Considered but Rejected

- Alternative Gear- can be authorized after April 1<sup>st</sup>, but no gear is currently authorized for the commercial Dungeness crab fishery.
- Gear Reduction – considered for Fishing Zones 1 and 2 but not recommended at this time due to declining fishing effort (based on bi-weekly reporting) but will be evaluated again at the next assessment.

# AVAILABLE DATA

## III. Triggers Requiring Management Action

### I. Confirmed Entanglements: §132.8(c)(1)

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

No entanglements have been reported in 2024. For recent entanglement information please see the CDFW [RAMP Entanglement History](#) document. See “[FAQ: Impact Scoring for the Risk Assessment and Mitigation Program](#)” for information about the RAMP Impact Score.

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 (2023-24)	Current Calendar Year Impact Score (2024)	3-Year Rolling Average
Humpback whales	0	0	3.39
Leatherback sea turtle	0	0	0.33

As of March 25, 2024, there have been zero Confirmed Entanglements of blue whales during the 2023-2024 period.

### II. Marine Life Concentrations: §132.8(c)(1)

Data provided by: California Department of Fish and Wildlife, John Calambokidis (Cascadia Research Collective, in collaboration with the Marine Mammal Center), Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC), and Scott Benson (NOAA SWFSC, data courtesy of Peter Waldie, Nature Conservancy Solomon Islands)

Aerial and vessel survey data from March 15 to 22, 2024 are available online with the [Arc Map Viewer](#). For assistance with using Arc Map Viewer, please see the [How to Guide](#).

According to the RAMP regulations for the period of March 1 until the Fishing Season closes statewide a trigger has been met when:

- The number of humpback whales is greater than or equal to 10, or there is a running average of five or more animals over a one-week period within a single Fishing Zone.
- The number of blue whales is greater than or equal to three, or there is a running average of three or more animals over a one-week period within a single Fishing Zone
- The number of Pacific leatherback sea turtle is than or equal to one within any Fishing Zone

Table 3. 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.

<b>Fishing Zone</b>	<b>CDFW-approved survey data</b>	<b>Triggers attained?</b>
Zone 1	CDFW Aerial Survey*	No
Zone 2	CDFW Aerial Survey	No
Zone 3	CDFW Aerial Survey	No
Zone 4	CDFW Aerial Survey	Yes
Zone 5	CDFW Aerial Survey*	No
Zone 6	None	Yes – No data

\*Partial coverage of Fishing Zone due to weather and flight limitations.

### **A. CDFW Surveys**

CDFW conducted aerial surveys on March 18 and March 19, 2024, covering Fishing Zones 2-4 and partially covering Fishing Zones 1 and 5. On March 18, CDFW flew between the coast and the 100-fathom line between Point Estero (Fishing Zone 5) and Monterey (Fishing Zone 4) and then conducted east-west transects between Monterey and Tomales Bay. The flight was conducted at an average altitude of 1000ft, and conditions were favorable with a Beaufort state of less than one. On March 19, CDFW flew between the coast and the 100-fathom line between Tomales Bay (Fishing Zone 3) and Eureka (Fishing Zone 1) at an average altitude of 1000ft.

Table 4. Counts of Actionable Species seen by CDFW aerial survey conducted on March 18-19, 2024.

<b>Fishing Zone</b>	<b>Humpback whales</b>	<b>Unidentified whales</b>
Zone 1	3	0
Zone 2	2	0
Zone 3	0	2
Zone 4	14	8
Zone 5	0	1

### **B. Cascadia Research Surveys (Fishing Zones 3 and 4)**

Five vessel surveys were conducted from March 16-21, 2024, by Cascadia Research and the Marine Mammal Center (Figure 1). Humpback whales were primarily observed in more offshore areas and in some cases feeding on fish. Additionally, fish balls were observed inshore without whales present. Some whales were observed near Dungeness crab gear including gray whales in Half Moon Bay and a group of 12 humpback whales off Año Nuevo (Fishing Zone 4).

Sharply decreased sightings of humpback whales in the Mexico winter breeding grounds were reported in recent weeks by collaborators. It is reported that these

decreased sightings are happening earlier than previous years in certain areas of the breeding grounds.

Table 5. Summary of Cascadia Research and The Marine Mammal Center vessel surveys in Fishing Zones 3 and 4 between March 16-21, 2024. The abbreviation HMB indicates Half Moon Bay.

Date	Vessel	Fishing Zone	Port	Humpback whale sightings	# of humpback whales sighted	Unidentified whale sightings	# of unidentified whales sighted
3/16/24	TMMC	4	Moss Landing	9	14	14	15
3/17/24	CRC	4	Monterey	20	47	0	0
3/18/24	TMMC	3	Sausalito	2	2	1	1
3/21/24	CRC	3	HMB	4	8	0	0
3/21/24	CRC	4	HMB	1	12	0	0
3/21/24	TMMC	4	Sausalito	1	1	0	0

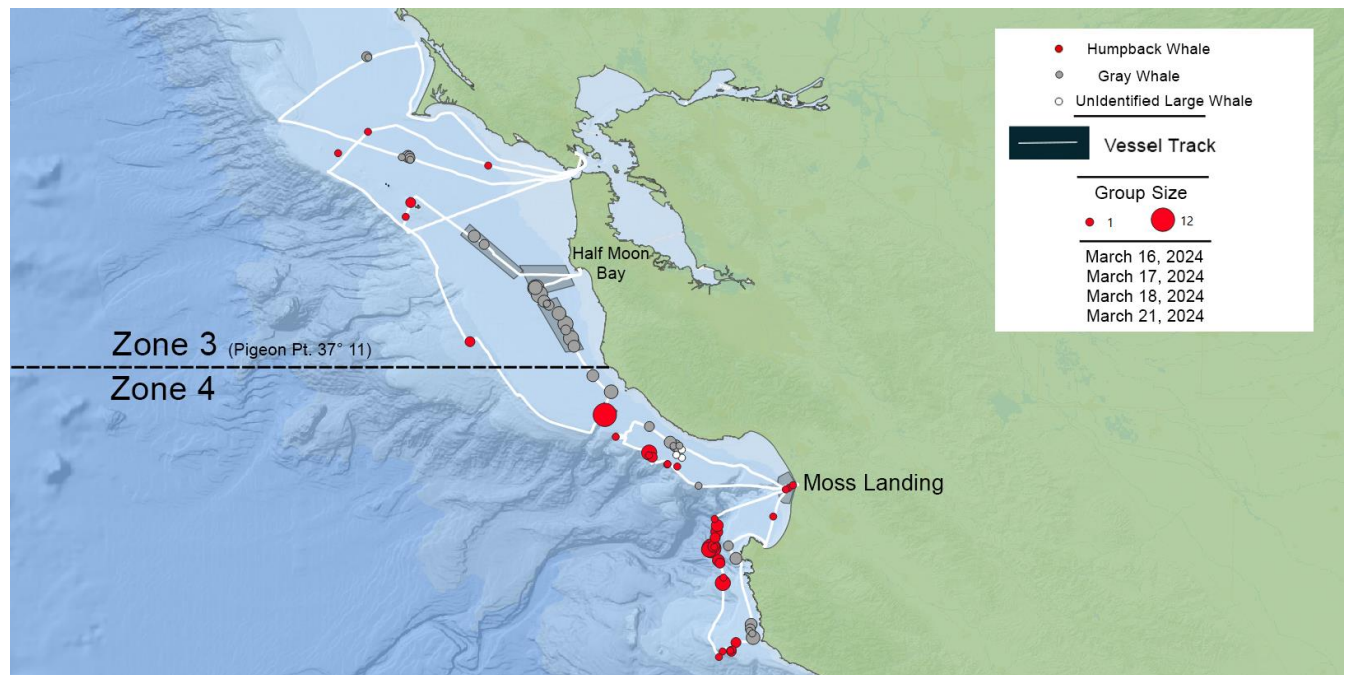


Figure 1. Plot of vessel track lines and locations of whale sightings for surveys in Fishing Zones 3 and 4 from March 16-21, 2024 by Cascadia Research and The Marine Mammal Center.

### C. Monterey Bay Whale Watch Surveys (Fishing Zone 4)

Monterey Bay Whale Watch conducted whale watching trips in southern Monterey Bay every day during the week of March 12-18, 2024. The 7-day average number of humpback whales per half day trip during March 12-18, 2024, was 9.0 (Figure 2),



with a peak of 34 humpback whales observed during a half-day trip on March 16, 2024.

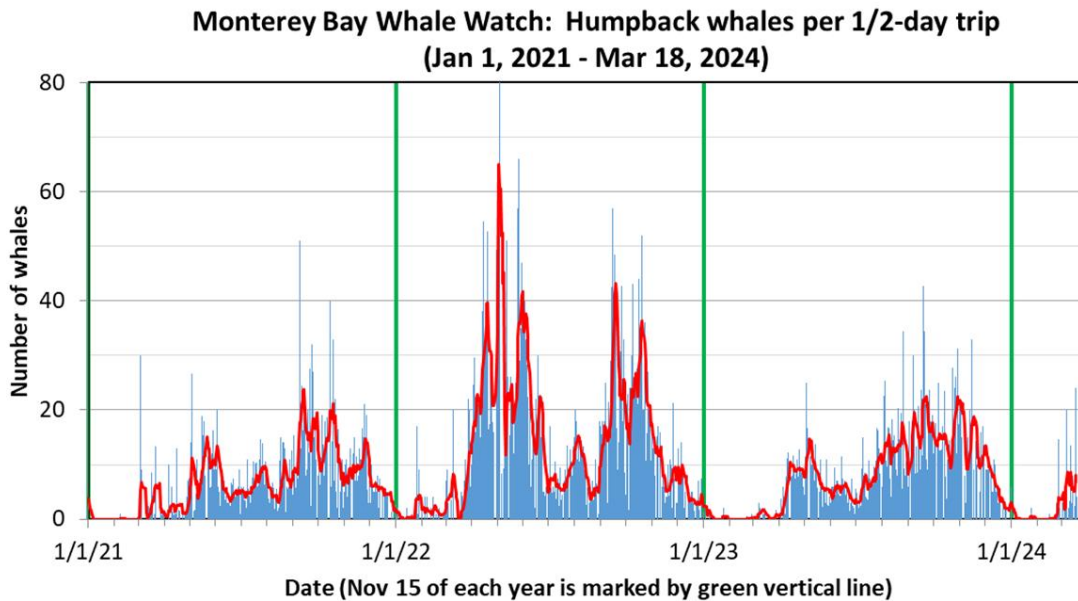


Figure 2. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2020 – 18 March 2024. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns 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.

#### D. Leatherback Turtle Telemetry

A post-nesting female leatherback sea turtle was tagged with a satellite-linked transmitter by the Nature Conservancy at a beach in the Solomon Islands on June 7, 2023. The transmitter remains active, and the turtle has completed a trans-Pacific crossing. It is currently 290 km southwest of San Diego, CA and is engaged in foraging behavior in deep waters off northern Baja California, Mexico.

Past telemetry data indicate that leatherback turtles often enter US West Coast waters off southern California before turning northward and moving up the coast to central California during late spring/early summer.

## IV. Management Considerations

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

Data provided by: Lauren Saez and Dan Lawson, National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife.

No entanglements for Actionable Species have been reported since the Risk Assessment on February 15, 2024. For more entanglement information please see the CDFW [RAMP Entanglement History](#) document.

### II. Historic patterns and current Actional Species migration: § 132.8(d)(6) and (11)

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

#### A. Point Blue Conservation Science (Fishing Zones 3, 4, and 6)

For current observation data please see the [Point Blue Whale Alert map](#).

Table 6. Summary of available humpback and blue whale recorded by observers and reported on via Point Blue Conservation in Fishing Zones 3, 4, and 6 during the seven-day period ending March 22, 2024.

Fishing Zone	Number of humpback whales sighted	Number of blue whales sighted
Zone 3	10	0
Zone 4	0	0
Zone 6	88	0

#### B. California Coast Crab Association (Fishing Zone 5)

The California Coast Crab Association (CCCA) conducted a vessel survey on March 20, 2024, out of Morro Bay (Fishing Zone 5), on F/V Brita Marie. Conditions were mild with visibility of 4 nautical miles, a swell height of 3 feet and wind speed of 3 knots. Two unidentified whales and zero humpback whales were observed.

Table 7. Summary counts of Actionable Species seen on CCCA vessel surveys conducted on March 20, 2024.

Fishing Zone	Humpback whales	Unidentified whales
Zone 5	0	2



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

The semi-monthly average number of humpback whale per half day trip in southern Monterey Bay during the first half of March 2024 is greater than the historical average for this time period (Figure 3), and greater than the number observed during both 2022 and 2023.

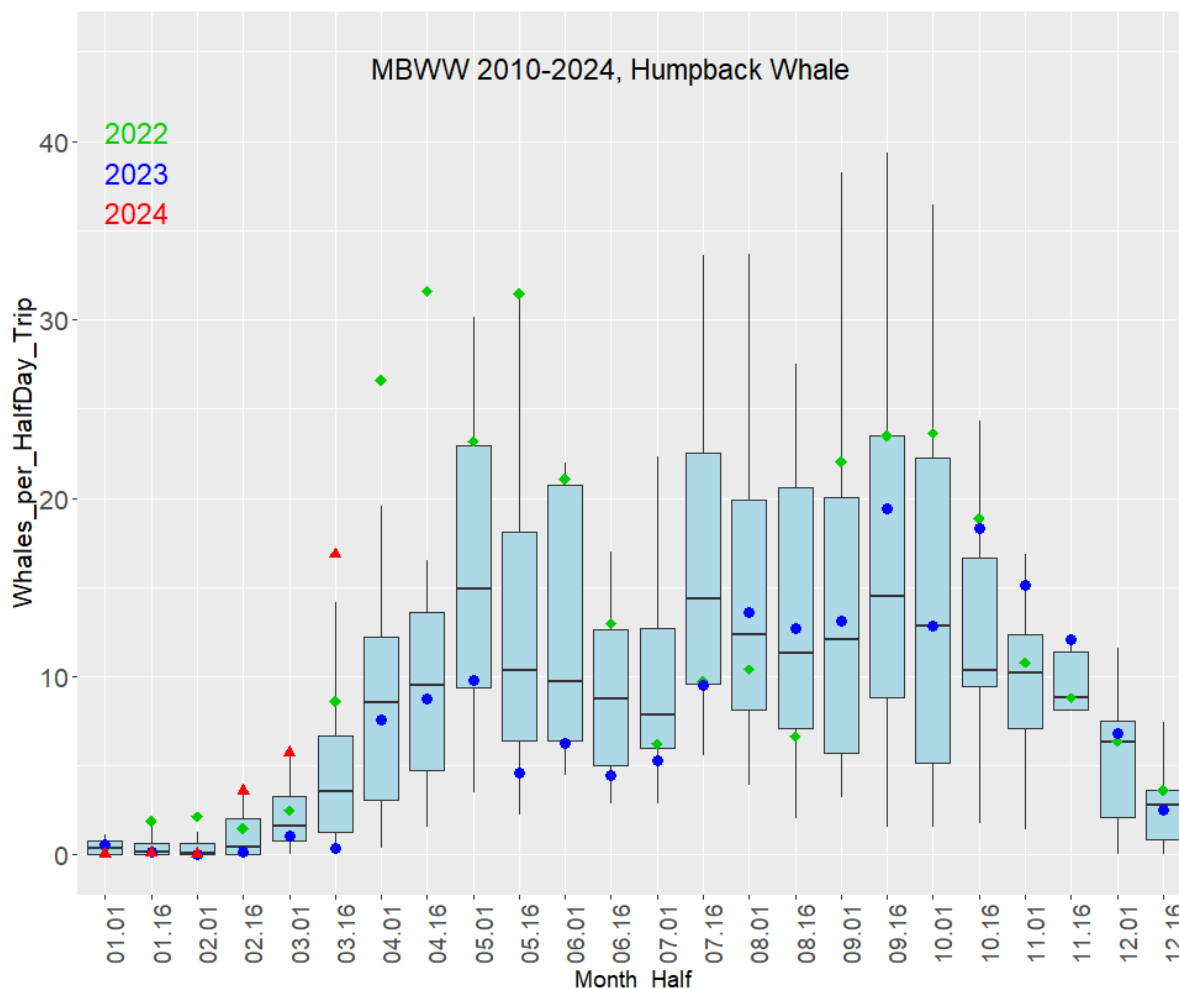


Figure 3. Historical Monterey Bay Whale Watch data for 2010-2024, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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 (green diamonds), 2023 (blue dots) and 2024 (red triangles) and are provided for reference, placing recent whale numbers in a historical context.

### D. Whale Watch 2.0 (All Fishing Zones)

Blue whale habitat predictions for March 17, 2024, show low habitat suitability in Fishing Zones 1-5, and suitable habitat in Fishing Zone 6. For current habitat suitability check the [NOAA Coastwatch Habitat Suitability Map](#).

### III. 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.

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

All Fishing Zones are open as of January 18, 2024, and a summary of landings from all Fishing Zones is provided below (Table 8).

Table 8. Summary of fleet dynamics information, as of March 22, 2024.

<b>Metric</b>	<b>Value</b>	<b>Additional Info</b>
Season status	Open	Fishing Zones 3-6 under a 50% Gear Reduction
Number of daily landings	4,594	NA
Total volume (pounds)	12,990,713	NA
Total Ex-Vessel Value	\$43,367,870	NA
Average unit price	\$3.48	NA
Total number of active vessels	350	NA
Maximum potential traps (based on active permits)	111,675	Estimates are also provided in the Bi-Weekly Fishing Activity Reports Subsection

Total volume (pounds) peaked during the week of January 19, 2024 at just over 4 million pounds and has since been decreasing (Figure 4). Fishing Zone 3 shows the highest landings over the course of the season at 8.2 million pounds, followed by Fishing Zone 1 at 4.2 million pounds.

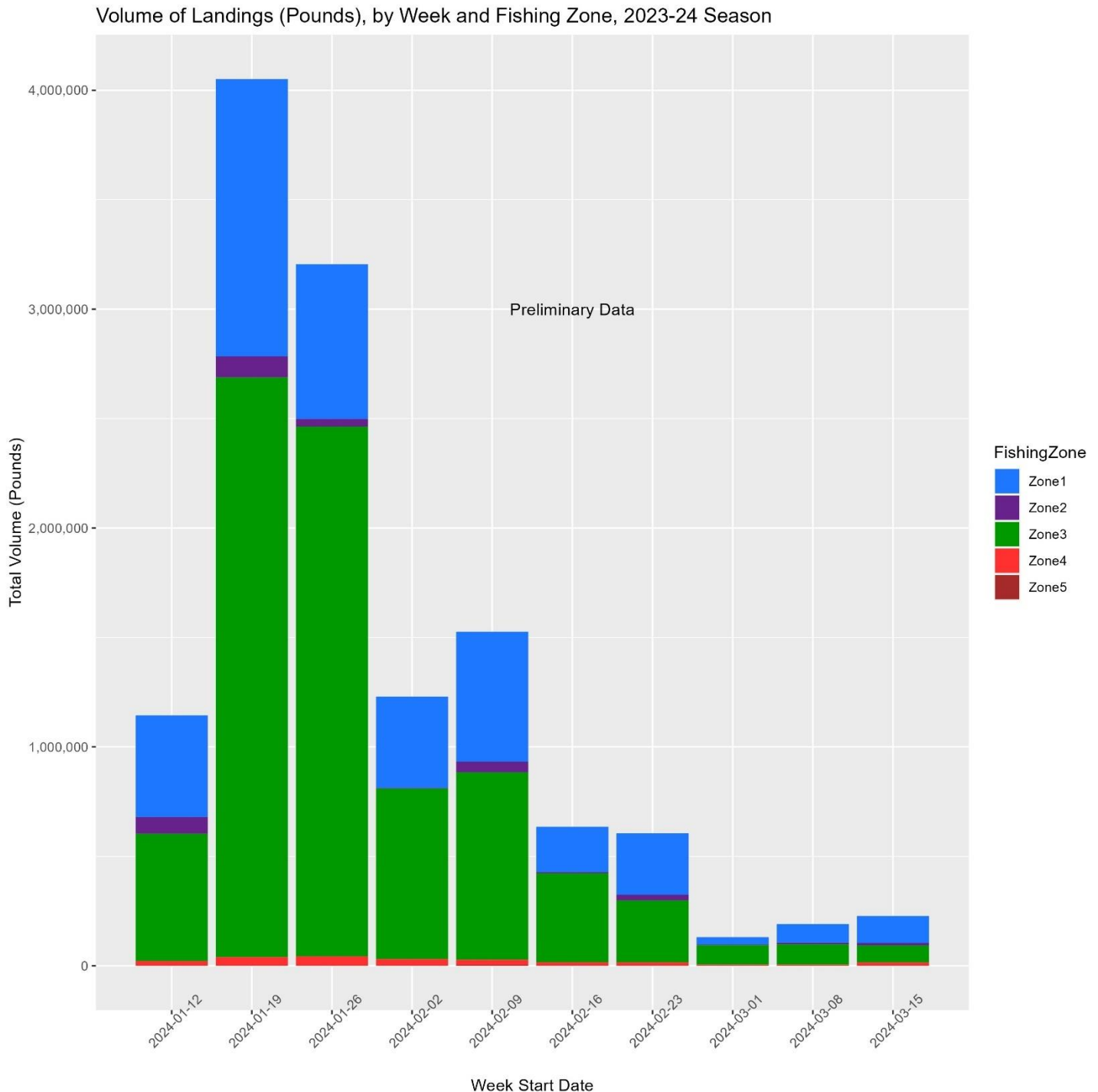


Figure 4. Cumulative volume (pounds) landed by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Certain week-port complex combinations are withheld due to confidentiality constraints.

Fishing Zone 3 shows the highest number of active vessels throughout the fishing season to date with a high of 170 active vessels, followed by Fishing Zone 1 with a high of 116 active vessels (Figure 5). The number of active vessels peaked in late January, decreased sharply at the beginning of March, and increased throughout the month of March.

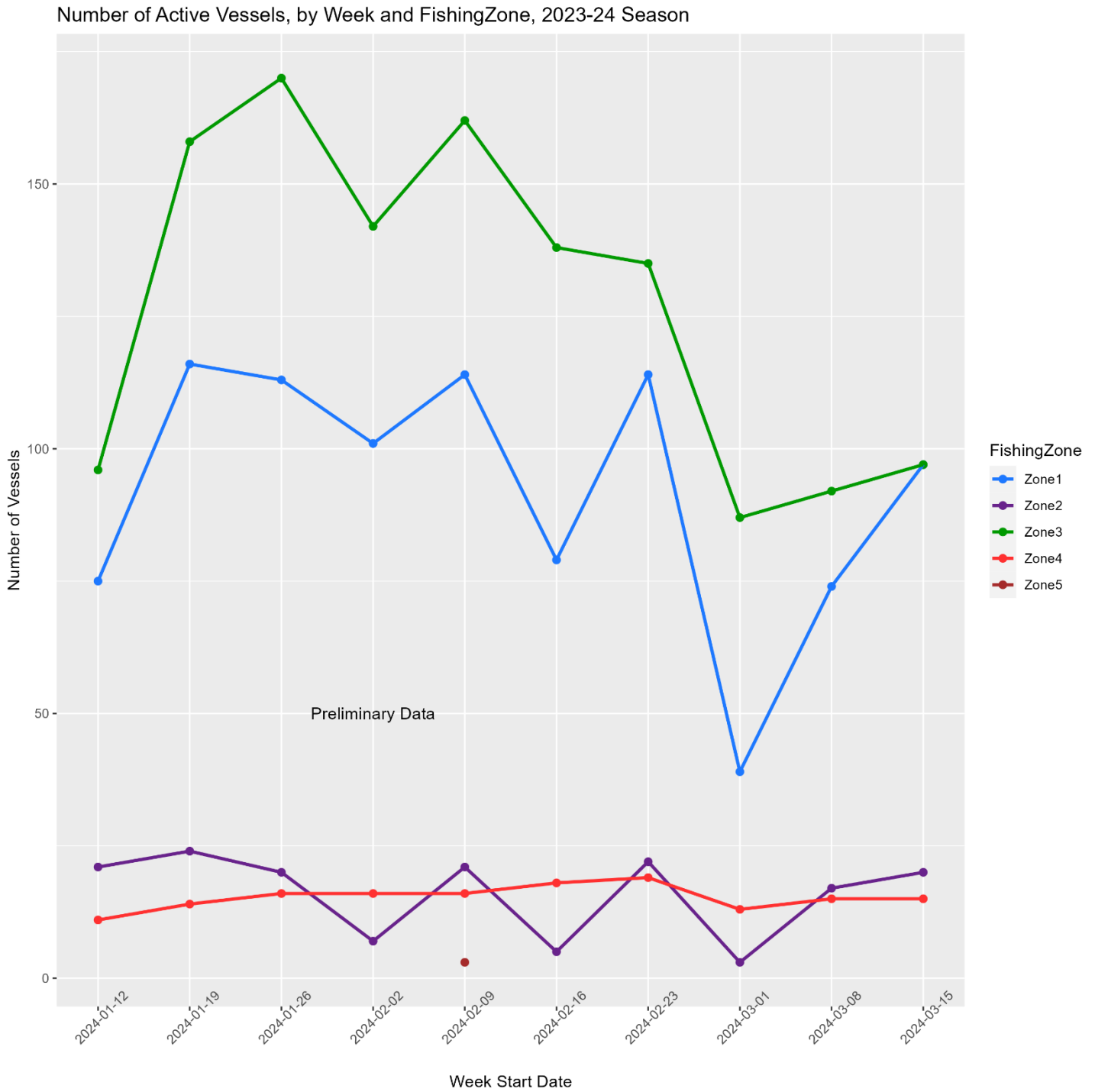


Figure 5. Number of active vessels by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Some week-port complex combinations are withheld due to confidentiality constraints.

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

CDFW has received bi-weekly reports since the first reporting period on January 16, 2024, through the most recent reporting period of March 16, 2024. A summary of reports received for March 16, 2024, are provided in Table 9; note this summary may not reflect all permitted vessels participating in the fishery due to compliance issues.

Table 9. Summary of information provided for the March 16, 2024, bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 21, 2024. 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	72	338	23,663	12	27	50	5	23
Zone 2	14	210	2,953	11	23	40	1	9
Zone 3	98	141	13,286	18	34	80	5	16
Zone 4	21	112	2,358	19	36	70	3	6
Zone 5	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Zone 6	0	0	0	0	0	0	0	0
Totals	205	NA	42,260	NA	NA	NA	14	54

Table 10. Total reported traps deployed in each Fishing Zone for the most recent five bi-weekly reporting periods. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Jan 16 - Total Traps	Feb 1 - Total Traps	Feb 16 - Total Traps	Mar 1 - Total Traps	Mar 16 - Total Traps
Zone 1	19,962	30,179	36,035	31,673	23,663
Zone 2	2,857	3,314	3,601	3,068	2,953
Zone 3	17,524	20,428	22,745	19,311	13,286
Zone 4	1,344	2,309	2,907	2,083	2,358
Zone 5	0	0	NR-C	NR-C	NR-C
Zone 6	0	0	0	0	0
Totals	41,687	56,230	65,288	56,135	42,260

### IV. Distribution and abundance of key forage: §132.8(d)(8)

#### A. MBARI Krill Model

Please see the [February 9, 2024 Preliminary Assessment and Available Data Document](#) or the [MBARI website](#) for current krill conditions.

### V. Ocean conditions: §132.8(d)(9)

#### A. El Nino/Southern Oscillation (ENSO) Diagnostic

A transition from El Niño to ENSO neutral is likely by April-June 2024 (83% chance) with the odds of La Niña developing by June-August 2024 (62% chance). Please visit the [NOAA ENSO Diagnostic webpage](#) for more information.

## **B. Large Marine Heatwave Tracker**

The California Current is currently in an El Niño state, with coastal waters that are warmer than normal for this time of year. The current heatwave forecast suggests that the warming along the coast has a high probability of persisting through April. Please visit the [NOAA Marine Heatwave Tracker webpage](#) for more information.

## **C. Habitat Compression Index**

Please see the [February 9, 2024, Preliminary Assessment and Available Data Document](#) for latest data.

### **VI. 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) are provided above in the Initial Assessment.

### **VII. 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.

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

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

See Table 2 for the current fishing season and calendar year Impact Score. For more information about Impact scoring, please review the [Impact Score FAQ](#).