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

Last updated: March 7, 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:

- Continue 50% Gear Reduction in Fishing Zones 3, 4, 5 and 6
- Continue Fleet Advisory for all Fishing Zones

Recreational Fishery:

- Continue Fleet Advisory for all Fishing Zones

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

Fishing Zone	**Commercial Fishery:** Current Management Status	**Commercial Fishery:** Proposed Management Status	**Recreational Fishery:** Current Management Status	**Recreational Fishery:** Proposed Management Status
1	Fleet Advisory	Fleet Advisory	Fleet Advisory	Fleet Advisory
2	Fleet Advisory	Fleet Advisory	Fleet Advisory	Fleet Advisory
3	50% Gear Reduction; Fleet Advisory	50% Gear Reduction; Fleet Advisory	Fleet Advisory	Fleet Advisory
4	50% Gear Reduction; Fleet Advisory	50% Gear Reduction; Fleet Advisory	Fleet Advisory	Fleet Advisory
5	50% Gear Reduction; Fleet Advisory	50% Gear Reduction; Fleet Advisory	Fleet Advisory	Fleet Advisory
6	50% Gear Reduction; Fleet Advisory	50% Gear Reduction; Fleet Advisory	Fleet Advisory	Fleet Advisory

I. Management Recommendation Summary Rationale

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. For more information, please see the RAMP Entanglement History document.

Marine Life Concentrations: Based on the February 28, 2024, CDFW aerial survey in Fishing Zones 1-5, humpback whale sightings remain relatively low but are expected to increase in the coming weeks. Monterey Bay Whale Watch data also show low but increasing humpback whale observations, with a weekly average of 3.6 whales per half-day trip, with a peak of 22 whales observed during half-day trips on February 25, 2024.

Marine Region's preliminary recommendation is for the Director to continue the current Management Actions for both the commercial and recreational fisheries. This includes the continuation of the 50% Gear Reduction in Fishing Zones 3, 4, 5 and 6 for the commercial fishery and continuation of the Fleet Advisory for all Fishing Zones in both fisheries. No Marine Life Concentration triggers were exceeded for Actionable Species under RAMP. Humpback whale sightings are still low, although increasing as whales begin their

migration to California waters from their winter breeding grounds.

Since the last Risk Assessment on February 15, 2024, biweekly reports and landing data show a decrease in fishing effort in both the Northern Management Area (NMA) and the Central Management Area (CMA). Fishing activity remains largely concentrated in Fishing Zones 1 and 3, but both Fishing Zones showed a decline in active fishing vessels based on the most recent bi-weekly reporting data. Across all Fishing Zones, biweekly reports show a decline from 65,288 traps on February 16 to 56,135 traps on March 1 (Table 8). Similarly, reported landings have seen a steady decline since the statewide opener, which saw a peak at just over 4 million pounds during the week of January 19, 2024.

Given the decline in fishing effort, Marine Region recommends a continuation of the existing Management Actions to allow fishing opportunity for the fleet while managing entanglement risk. Humpback whale arrivals are expected to increase in the coming weeks, so the fleet should anticipate modifications to the existing Management Actions at the next Risk Assessment. The current Entanglement Impact Score and risk of entanglement due to increased humpback whale abundance will be factors considered during the next assessment.

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

- Depth Restriction- not considered for this assessment because it would not reduce overall risk from vertical lines.
- Alternative Gear- can only be authorized after April 1st.

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 7, 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, Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC), and Peter Waldie (The Nature Conservancy – Soloman Islands) via Scott Benson (NOAA-SWFSC.

Aerial survey data from February 28, 2024, is available online with the Arc Map Viewer. Past Risk Assessment survey data have been combined in a 2023-2024 Season RAMP Survey Map.

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

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

A. CDFW Surveys

On February 28th, 2024, CDFW conducted a zig-zag aerial survey between the coast and the 100-fathom contour at an altitude of 1000 ft covering Fishing Zones 2-4 and partially covering Fishing Zone 1 and 5. Conditions were mostly favorable with a Beaufort state of less than 2 until reaching Eureka (Fishing Zone 1), where weather prevented surveying farther north. Actionable Species and unidentified whales seen in each Fishing Zone are summarized below in Table 4.

Table 4. Counts of Actionable Species seen by CDFW aerial survey conducted on February 28, 2024.

Fishing Zone	Humpback whales	Unidentified whales
Zone 1	1	1
Zone 2	7	2
Zone 3	2	4
Zone 4	8	11
Zone 5	4	1

B. Monterey Bay Whale Watch Surveys (Fishing Zone 4)

Monterey Bay Whale watch conducted whale watching trips in southern Monterey on six of the seven days during the week of February 23-29th, 2024. The average number of humpback whales-per-half-day-trip during that week was 3.6, with a peak of 22 humpback whales observed during two half-day trips on February 25, 2024 (Figure 1).

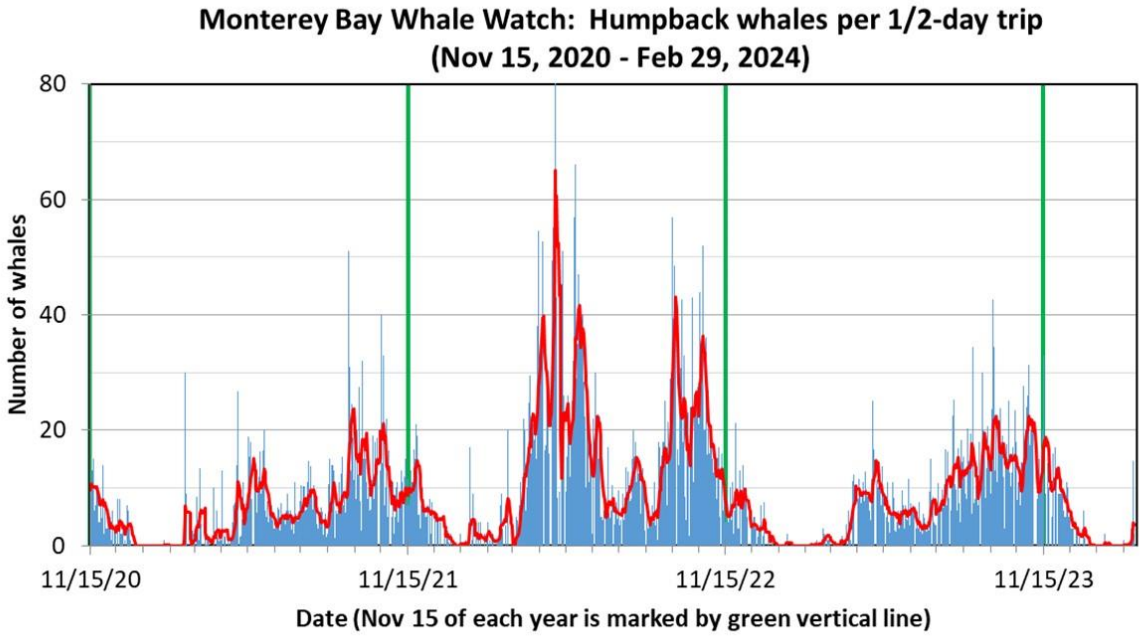

Figure 1. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2020 – 29 February 2024. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns 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.

C. Leatherback Turtle Telemetry

A post-nesting female leatherback turtle was tagged with a satellite-linked transmitter by Nature Conservancy colleagues at a beach in the Soloman Islands on June 7, 2023. The transmitter remains active, and the turtle has completed a trans-Pacific crossing.

The turtle is currently southwest of San Diego, CA and engaged in foraging behavior in deep water off the northern Baja California, Mexico. Past telemetry data indicates that leatherback turtles often enter US West Coast waters off southern California before turning northward and moving up the coast to central California during later 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 last Risk Assessment on February 15, 2024. An entangled gray whale was reported on February 2, 2024, near Fort Bragg; this entanglement is still under review by NOAA.

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 5. Summary of available humpback and blue whale recorded by observers and reported via Point Blue Conservation in Fishing Zones 3, 4, and 6 during the seven-day period ending March 5, 2024.

Fishing Zone	Number of humpback whales sighted	Number of blue whales sighted
Zone 3	3	0
Zone 4	0	0
Zone 6	28	0

B. Monterey Bay Whale Watch (Fishing Zone 4)

The semi-monthly average number of humpback whales-per-half-day-trip in southern Monterey Bay during the second half of February 2024 is greater than the historical average for this time period (Figure 2), and greater than the number observed during 2022 and 2023.

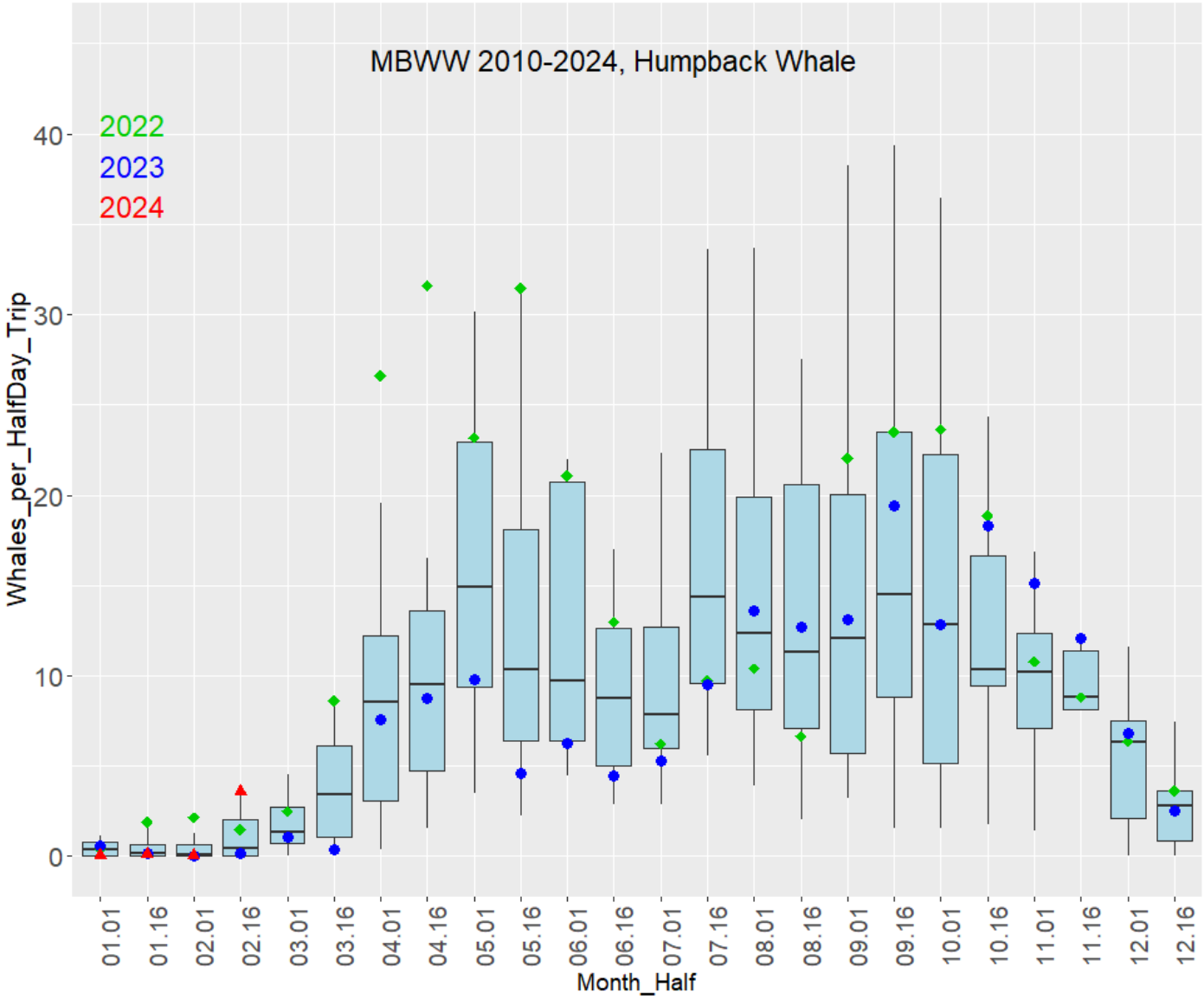

Figure 2. Historical Monterey Bay Whale Watch data for 2010-2024, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th-end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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) are provided for reference, placing recent whale numbers in a historical context.

C. Whale Watch 2.0 (*All Fishing Zones*)

Modeled probability of blue whale presence based on habitat suitability is low in Fishing Zones 1-5 and moderate in some areas of Fishing Zone 6, as of February 26, 2024. For the latest 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 6).

Table 6. Summary of fleet dynamics information, as of March 6, 2024.

Metric	Value	Additional Info
Season status	Open	Fishing Zones 3-6 open under 50% Gear Reduction
Number of daily landings	3,877	NA
Total volume (pounds)	12,473,282	NA
Total Ex-Vessel Value	$41,080,820	NA
Average unit price	$3.35	NA
Total number of active vessels	347	NA
Maximum potential traps (based on active permits)	110,350	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. Fishing Zone 3 shows the highest landings over the course of the season at approximately 8 million pounds, followed by Fishing Zone 1 at 3.9 million pounds.

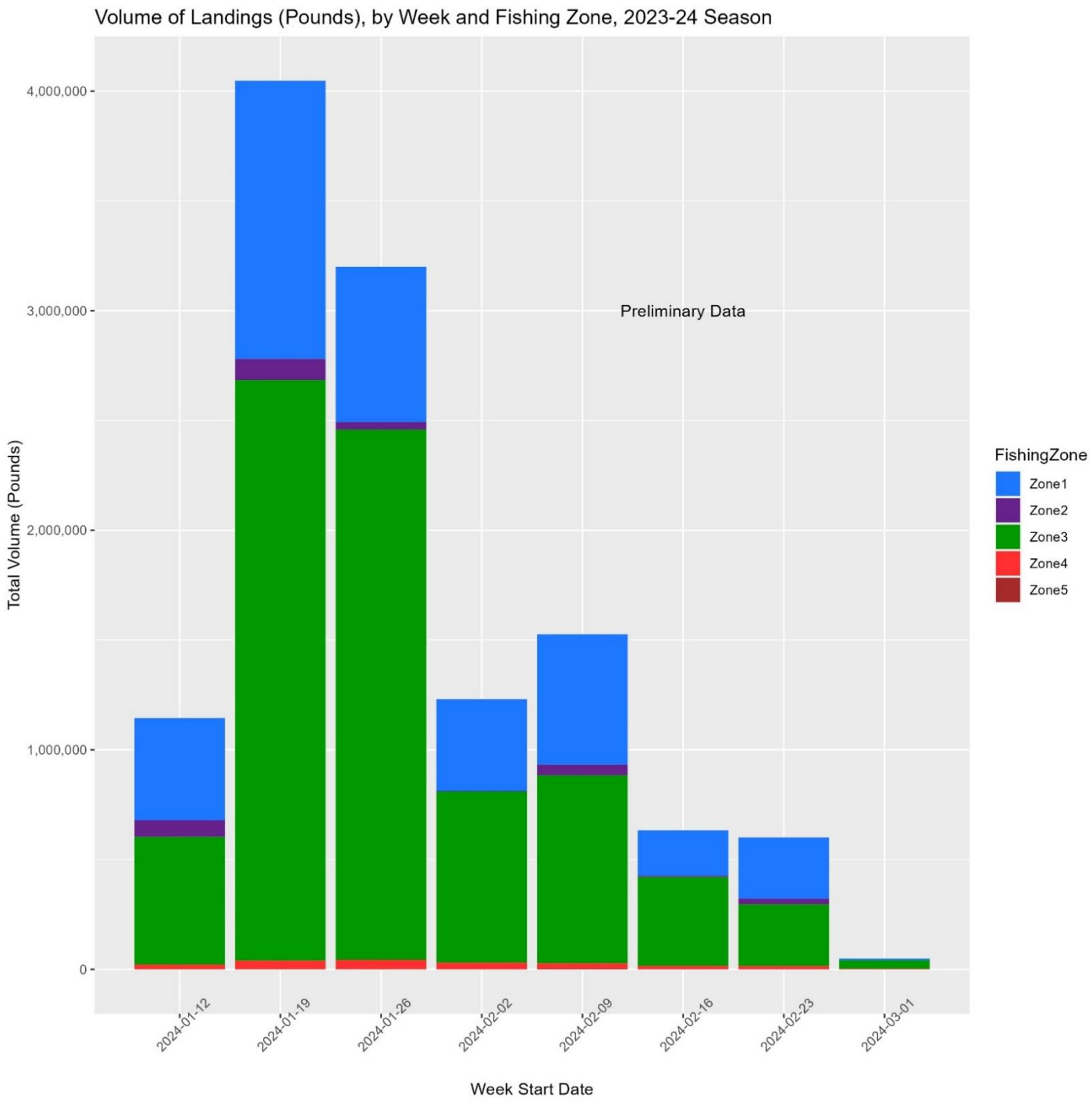

Figure 3. Cumulative volume (pounds) landed by week and port complex. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Certain week-port complex combinations are withheld due to confidentiality 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 vessels. The number of active vessels peaked in late January and has since been decreasing.

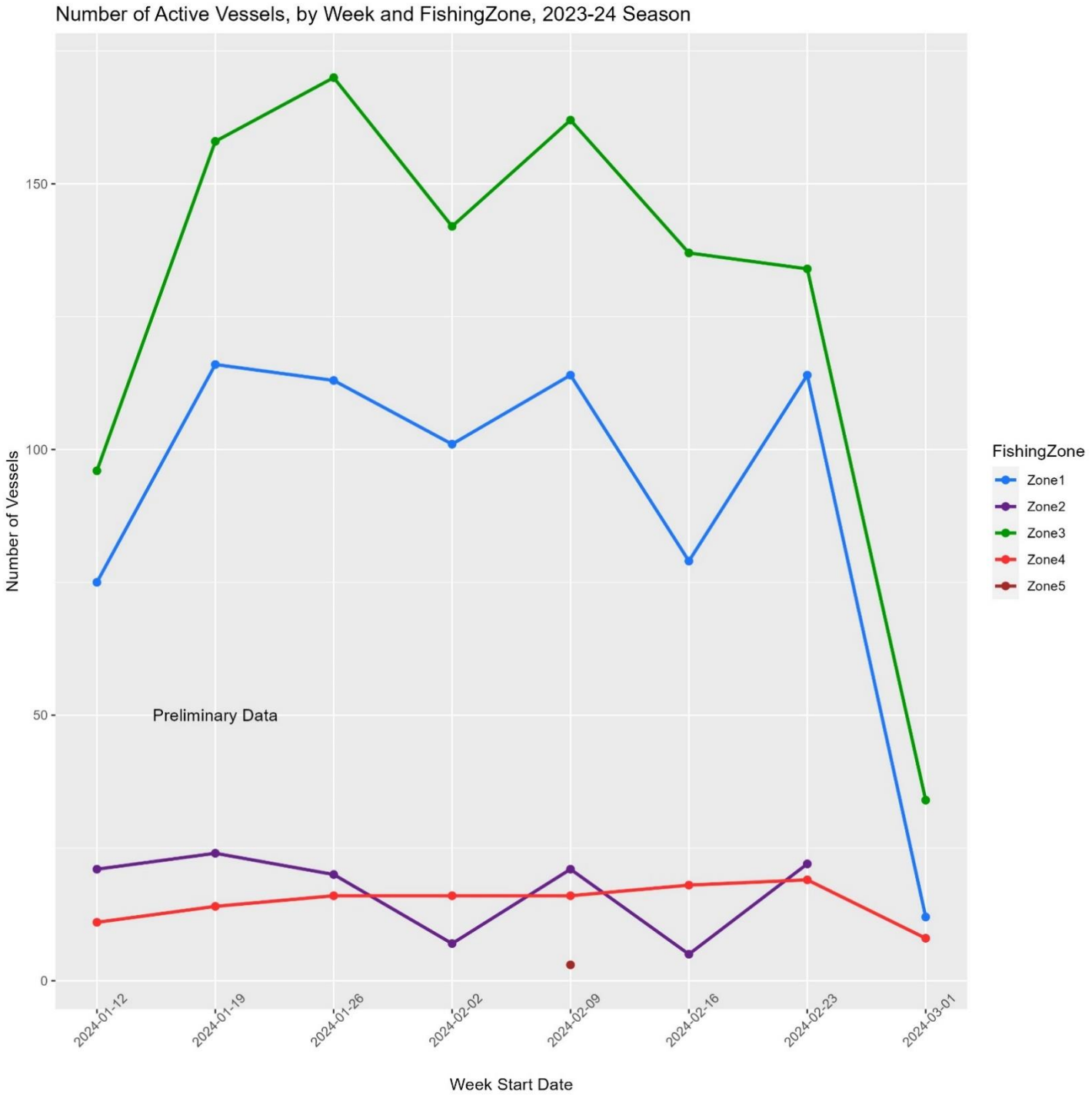

Figure 4. Number of active vessels by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Some week-port complex combinations are withheld due to confidentiality constraints.

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 1, 2024. A summary of reports received for February 16, 2024, provided in Table 7 and those received for March 1, 2024, are provided in Table 8; note this summary may not reflect all permitted vessels participating in the fishery due to compliance issues.

Table 7. Summary of information provided for the February 16, 2024, bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 6, 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	110	330	36,035	13	29	60	0	
Zone 2	17	211	3,601	12	27	75	1	0
Zone 3	153	151	22,745	21	38	80	7	9
Zone 4	25	116	2,907	21	37	70	0	
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	305	NA	65,288	NA	NA	NA	8	9

Table 8. Summary of information provided for the March 1, 2024, bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on March 6, 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	104	316	31,673	12	29	80	8	29
Zone 2	14	219	3,068	11	29	75	0	
Zone 3	139	145	19,311	21	37	120	21	136
Zone 4	19	109	2,083	22	41	70	2	14
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	276	NA	56,135	NA	NA	NA	31	179

Table 9. Total reported traps deployed in each Fishing Zone (1-6) for the most recent four 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
Zone 1	19,962	30,179	36,035	31,673
Zone 2	2,857	3,314	3,601	3,068
Zone 3	17,524	20,428	22,745	19,311
Zone 4	1,344	2,309	2,907	2,083
Zone 5	0	0	NR-C	NR-C
Zone 6	0	0	0	0
Totals	41,687	56,230	65,288	56,135

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.

V. Ocean conditions: §132.8(d)(9)

A. El Nino/Southern Oscillation (ENSO) Diagnostic

Please see the February 9, 2024, Preliminary Assessment and Available Data Document.

B. Large Marine Heatwave Tracker

Please see the February 9, 2024, Preliminary Assessment and Available Data Document.

C. Habitat Compression Index

For the month of February Regions 2 and 3, which include the north and central coast of California, show very high habitat compression, similar to conditions during 2015-2016. These conditions suggest poor krill conditions and lower production of young-of-the-year groundfish, consistent with the El Nino ocean/climate state. Please visit the NOAA Habitat Compression Index webpage for more information.

D. North Pacific High

The North Pacific High (NPH) Area Index monitors the area and intensity of the NPH atmospheric pressure cell off the West Coast and acts an indicator of what potential spring upwelling and in turn, krill abundance and young-of-the-year production, may look like within California coastal waters.

The NPH Area Index in February 2024 (Figure 5) is significantly below average, indicating likely weaker spring upwelling, lower production of young-of-the-year groundfish, and poor krill abundance.

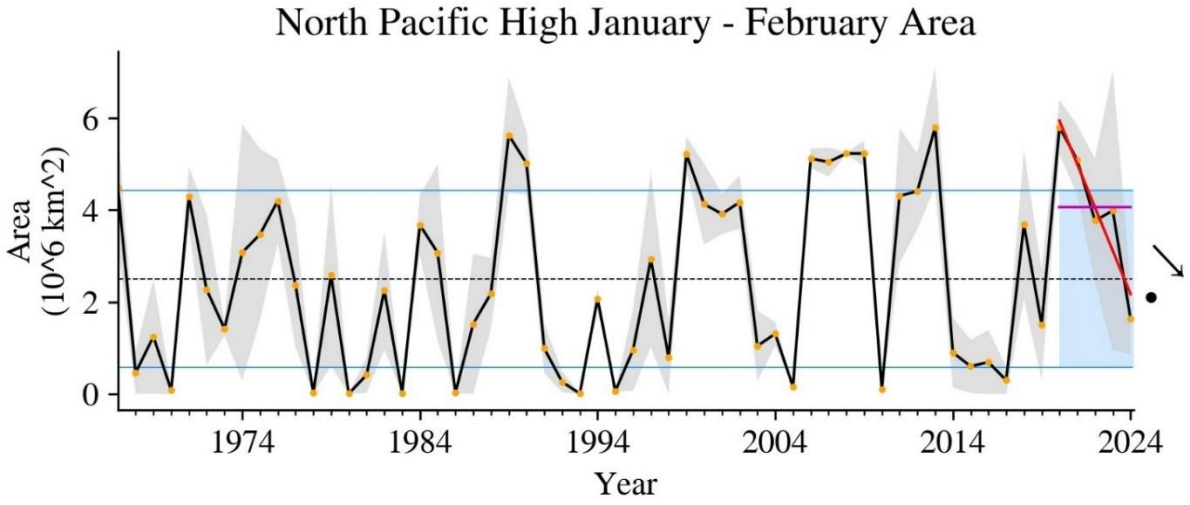

Figure 5. The North Pacific High (NPH) index from February from 1964 to 2024. Data provided by: Jarrod Santora (NMFS SWSFC).

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.