

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

Last updated: April 12, 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: Continue Depth Constraint (30-Fathom) and Fleet Advisory

Recreational Fishery:

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

Contents

PRELIMINARY ASSESSMENT	- 1 -
I. Management Recommendation Summary Rationale	- 2 -
II. Alternative Management Actions for the Commercial Fishery	- 3 -
AVAILABLE DATA.....	- 4 -
III. Triggers Requiring Management Action	- 4 -
IV. Management Considerations.....	- 9 -

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	30-Fathom Depth Constraint; Fleet Advisory	30-Fathom Depth Constraint; Fleet Advisory	Fleet Advisory	Fleet Advisory
2	30-Fathom Depth Constraint; Fleet Advisory	30-Fathom Depth Constraint; Fleet Advisory	Fleet Advisory	Fleet Advisory
3	Season Closure	Season Closure	Crab Trap Prohibition; Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
4	Season Closure	Season Closure	Crab Trap Prohibition; Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
5	Season Closure	Season Closure	Crab Trap Prohibition; Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
6	Season Closure	Season Closure	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 March 28, 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, 2, 3 and 4 to inform Marine Life Concentrations (MLC) in open and closed Fishing Zones. MLC surveys in closed Fishing Zones inform ongoing recreational fishing activities and serve as an indicator for future risk evaluation as humpback whales continue their northward migration. CDFW surveyed Fishing Zones 1 and 2 on April 10, 2024, and observed zero humpback whales and one unidentified whale. CDFW conducted a survey in Fishing Zones 3 and portions of Fishing Zones 2 and 4 on April 2, 2024, and observed one humpback whale and two unidentified whales in Fishing Zone 3, and four humpback whales and two unidentified in Fishing Zone 4. Cascadia Research and the Marine Mammal Center conducted vessel surveys in Fishing Zones 3-4 between April 1 and 2, 2024. The Marine Mammal Center observed 15 humpback whales on April 1, 2024, in Fishing Zone 4. Monterey Bay Whale Available Data, April 12, 2024

Watch data observed a weekly average of 2.7 whales per half-day trip, and a peak of 12 whales observed during half-day trips on April 7, 2024.

Marine Region's preliminary recommendation is for the Director to continue the Management Actions currently in place for both the commercial and recreational fisheries, including the 30-fathom Depth Constraint in Fishing Zones 1-2 for the commercial fishery and the Crab Trap Prohibition in Fishing Zones 3, 4 and 5 for the recreational fishery. The Depth Constraint and Crab Trap Prohibition went into effect on April 8, 2024, at 6:00pm. A Fleet Advisory would be maintained for all open Fishing Zones for both the commercial and recreational fisheries.

Based on historical migration patterns, humpback whale sightings are expected to increase into all Fishing Zones over the coming weeks. At this time, Marine Region staff do not recommend additional Management Actions for Fishing Zones 1 and 2 for the commercial or recreational fisheries. The commercial fishery is closed in Fishing Zones 3-6 and recreational traps have been prohibited in Fishing Zones 3-5 until the season closure on June 30, 2024. The 30-fathom Depth Constraint currently in place for the commercial fishery will minimize overlap with foraging humpback whales and limited recreational trap fishing in Fishing Zones 1 and 2 does not present an elevated risk at this time. The total number of commercial traps in Fishing Zones 1 and 2 has decreased from a peak of 44,252 traps on March 1, 2024, to 26,706 as of the last bi-weekly reporting period. In addition, the Depth Constraint will also help mitigate entanglement risk due to high habitat compression, as modeled by the Habitat Compression Index, by limiting fishing activity to nearshore, shallower depths.

Extending the current Management Actions will allow for continued fishing opportunities in Fishing Zones 1 and 2 while mitigating entanglement risk until the next Risk Assessment in early May. This preliminary recommendation is based on the historical migration patterns, current Entanglement Impact Score and observed Marine Life Concentrations.

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 1st, 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 April 12, 2024, there have been zero Confirmed Entanglements of blue whales during the 2023-2024 period.

II. Marine Life Concentrations: §132.8(c)(2)

Data provided by: California Department of Fish and Wildlife, Scott Benson (NOAA-SWFSC) in collaboration with Peter Waldie (The Nature Conservancy- Solomon Islands), John Calambokidis (Cascadia Research Collective, in collaboration with the Marine Mammal Center and with support from the Pacific States Marine Fisheries Commission), and Monterey Bay Whale Watch (processed by Karin Forney, NOAA-SWFSC).

Aerial and vessel survey data from (March 30 to April 10, 2024) 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 greater 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, CRC Vessel Survey	No
Zone 4*	CDFW Aerial Survey**, CRC Vessel Survey, MBWW	Yes
Zone 5*	None	Yes – No data
Zone 6*	None	Yes – No data

* Fishing Zone is closed for the commercial fishery for the remainder of the statutory season.

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

A. CDFW Surveys (Fishing Zones 1-4)

CDFW conducted an aerial survey on April 2, 2024, covering Fishing Zone 3 and portions of Fishing Zones 2 and 4. CDFW flew between the coast and the 100-fathom line between Point Pinos (Fishing Zone 4) and Fort Bragg (Fishing Zone 2), but was unable to survey areas farther north due to poor conditions (low fog, haze, Beaufort 3 seas). Conditions in Fishing Zones 3 and 4 were generally good, with a survey altitude of 700-850 feet and Beaufort states of 1 and 2. One humpback and two unidentified whales were observed in Fishing Zone 3 and four humpback whales and two unidentified whales were observed in Fishing Zone 4.

A second CDFW aerial survey was conducted on April 10, 2024, covering Fishing Zones 1 and 2. CDFW flew between the coast and the 100-fathom line between Point Arena and the Oregon border. A small section of the transect in Fishing Zone 1, just south of Eureka, was not surveyed due to low fog. Conditions in both Fishing Zones were generally good, with a survey altitude between 700-1000' and Beaufort states of 1 and 2. The wind greatly increased (Beaufort state 5) around the Shelter Cove area for a short period of time.

CDFW aerial survey data is available online with the [Arc Map Viewer](#). For assistance with using Arc Map Viewer, please see the [How to Guide](#).

Table 4. Counts of Actionable Species seen by CDFW aerial surveys conducted on April 2 and 10, 2024.

Survey Date	Fishing Zone	Humpback whales	Unidentified whales
4/2/2024	Zone 2	0	0
4/2/2024	Zone 3	1	2
4/2/2024	Zone 4	4	2
4/10/2024	Zone 1	0	0
4/10/2024	Zone 2	0	1

B. Leatherback Sea Turtle Telemetry (All Fishing Zones)

A post-nesting female leatherback sea turtle was tagged with a satellite-linked transmitter by the Nature Conservancy colleagues 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 engaging in foraging behavior near Ensenada, Mexico. Past telemetry data indicates that the leatherback sea turtles often enter west coast water off southern California before turning northward and moving up the coast to central California during the late spring/early summer.

C. Cascadia Research Collective Surveys (Fishing Zones 3 and 4)

Cascadia Research conducted one survey on April 1, 2024, out of Monterey (Fishing Zone 4). The primary purpose of the survey was to identify the whales in the vicinity of active Dungeness crab gear near Monterey Bay and deploy suction cup attached tags to humpback whales to monitor their behavior around the gear. The survey had seven sightings of 15 humpback whales and successfully deployed two tags. Information from the survey along with the location of gear, tag deployment locations, and the track of one of the whales is shown in Figure 1.

TMMC conducted a second vessel survey on April 2, 2024, out of Sausalito (Fishing Zone 3). The primary purpose was to monitor whale presence in the shipping lanes. The survey observed one sighting of two humpback whales.

Table 5. Summary of sightings by day, including the organization leading the survey, and the total number of sightings and individuals of large whales.

Date	Organization	Fishing Zone	Number of humpback whale sightings	Number of humpback whales observed
4/1/2024	Cascadia Research Collective	4	7	15
4/2/2024	TMMC	3	1	2

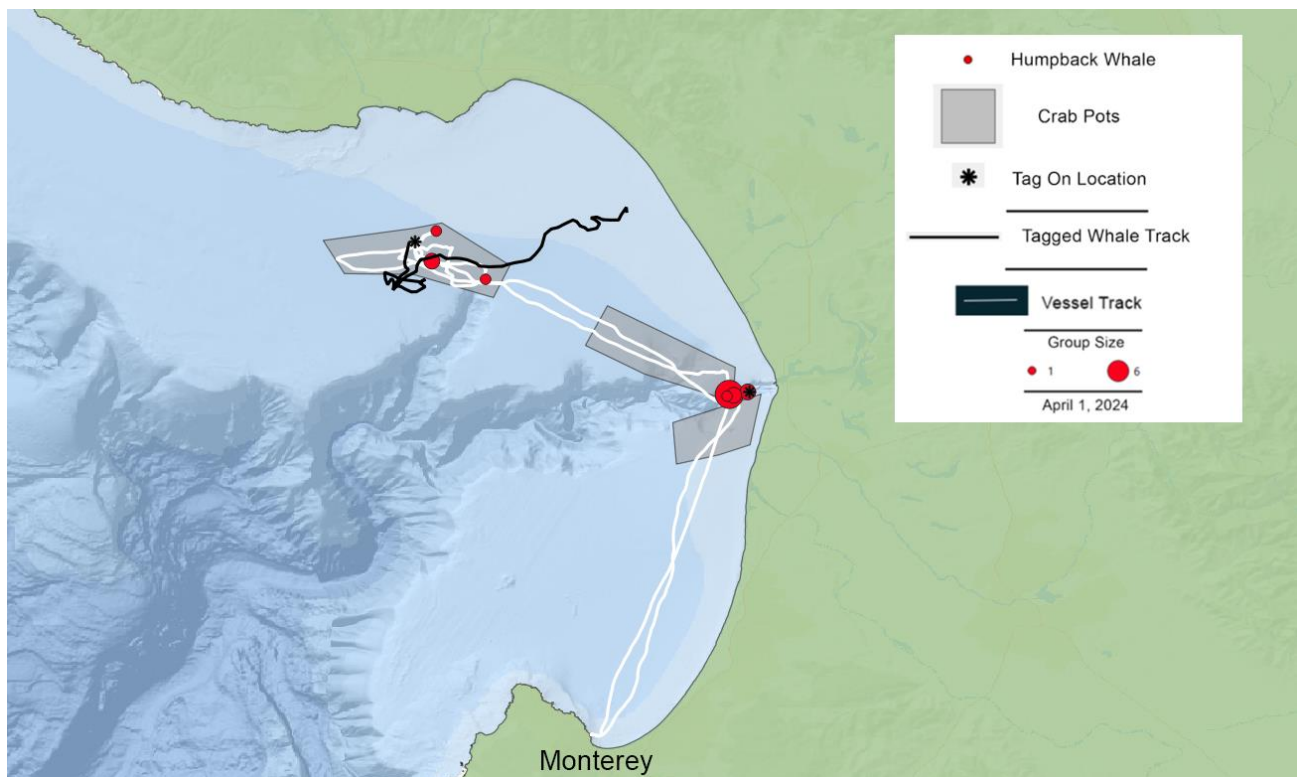


Figure 1. Plot of vessel track lines and locations of sightings for vessel survey in Fishing Zone 4 on April 1, 2024, by Cascadia Research, along with the location two tags were deployed and whale tracks in relation to where Dungeness crab gear was seen.

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

The 7-day average number of humpback whales-per-half-day-trip during April 1-7, 2024 was 2.7 (Figure 1), with a peak of 12 humpback whales observed during an all-day trip on April 7, 2024. No blue whales have been observed since two individuals were seen on July 16, 2023.

**Monterey Bay Whale Watch: Humpback whales per 1/2-day trip
(Jan 1, 2021 - Apr 7, 2024)**

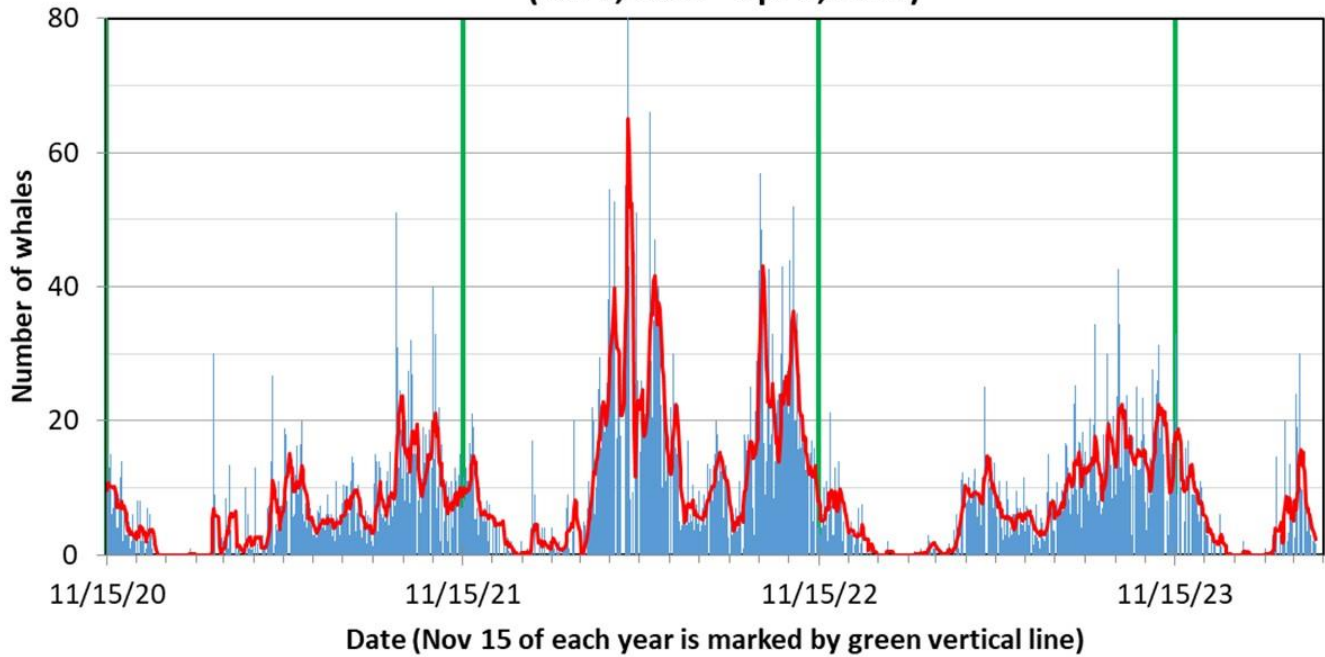


Figure 2. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2020 – 7 April 2024. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns a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

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 March 28, 2024. For more entanglement information please see the CDFW [RAMP Entanglement History](#) document.

II. Historic patterns and current Actionable 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 reported via Point Blue Conservation Science in Fishing Zones 3, 4, and 6 during the seven-day period ending April 10, 2024

Fishing Zone	Number of humpback whales sighted	Number of blue whales sighted
Zone 3	0	0
Zone 4	0	0
Zone 6	115	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 March 2024 was greater than the historical average for that time period, but whale numbers appear to have dropped to below-average levels during the first week of April (Figure 3).

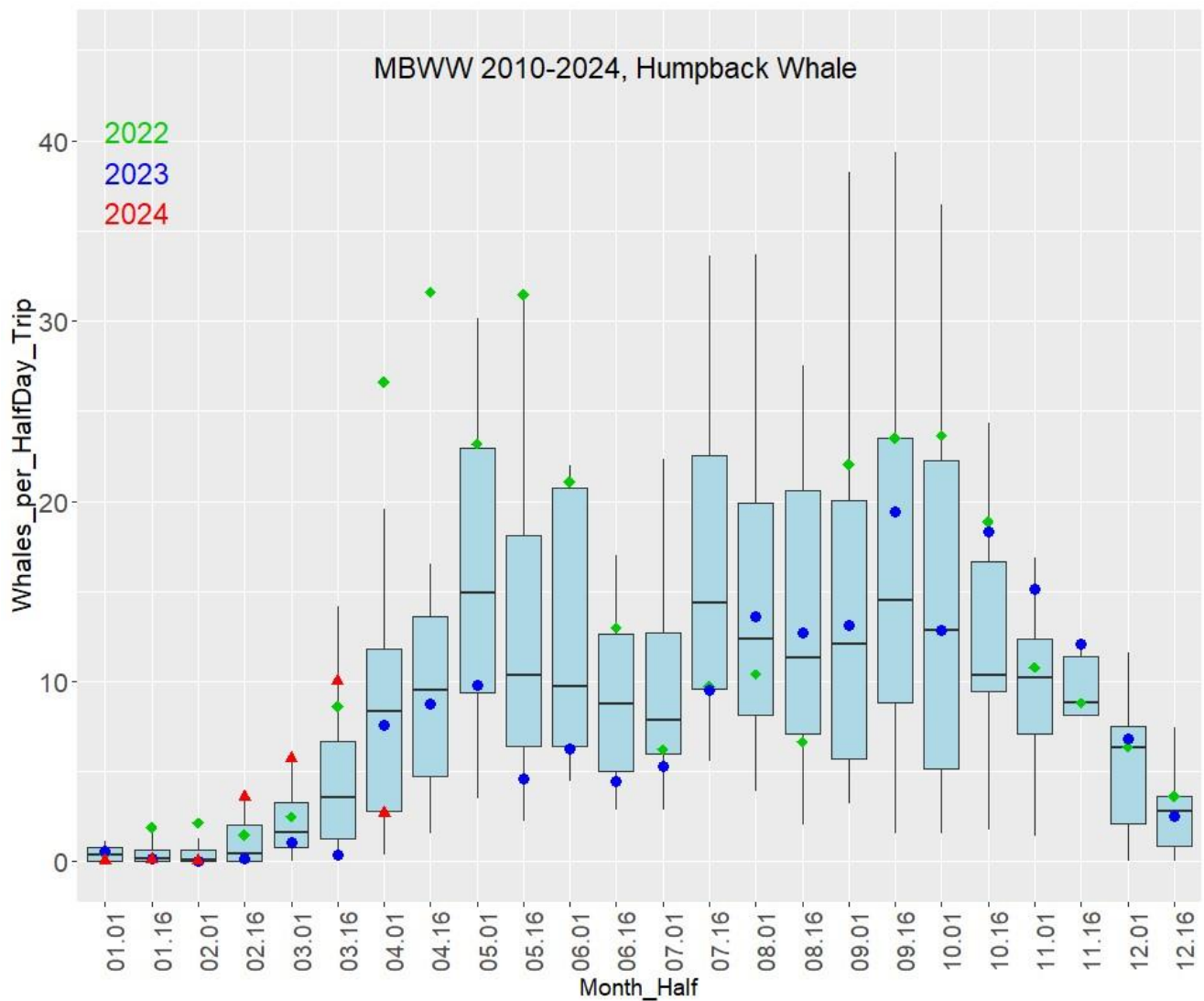


Figure 3. Historical Monterey Bay Whale Watch data for 2010-2024, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th-end of month). This boxplot follows standard statistical practice in that the black horizontal line is the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

C. Whale Watch 2.0 (All Fishing Zones)

Blue whale habitat predictions for March 29, 2024, show low habitat suitability in Fishing Zones 1-5, and suitable habitat in Fishing Zone 6 near the US-Mexico border. 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)

The commercial fishery is currently open in Fishing Zones 1 and 2 under a 30-Fathom Depth Constraint and all other Fishing Zones are closed. A summary of landings from all Fishing Zones is provided below (Table 7).

Table 7. Summary of fishing season dynamics information for the commercial fishery, as of April 10, 2024.

Metric	Value	Additional Info
Season status	Partially Closed	Fishing Zones 3-6 are closed
Number of daily landings	5,181	NA
Total volume (pounds)	13,404,499	NA
Total Ex-Vessel Value	\$45,353,055	NA
Average unit price	\$3.62	NA
Total number of active vessels	341	NA
Maximum potential traps (based on active permits)	80,800 <i>*Note: estimated maximum potential traps reflects the 50% Gear Reduction in Fishing Zones 3-6</i>	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 8.4 million pounds, followed by Fishing Zone 1 at 4.4 million pounds.

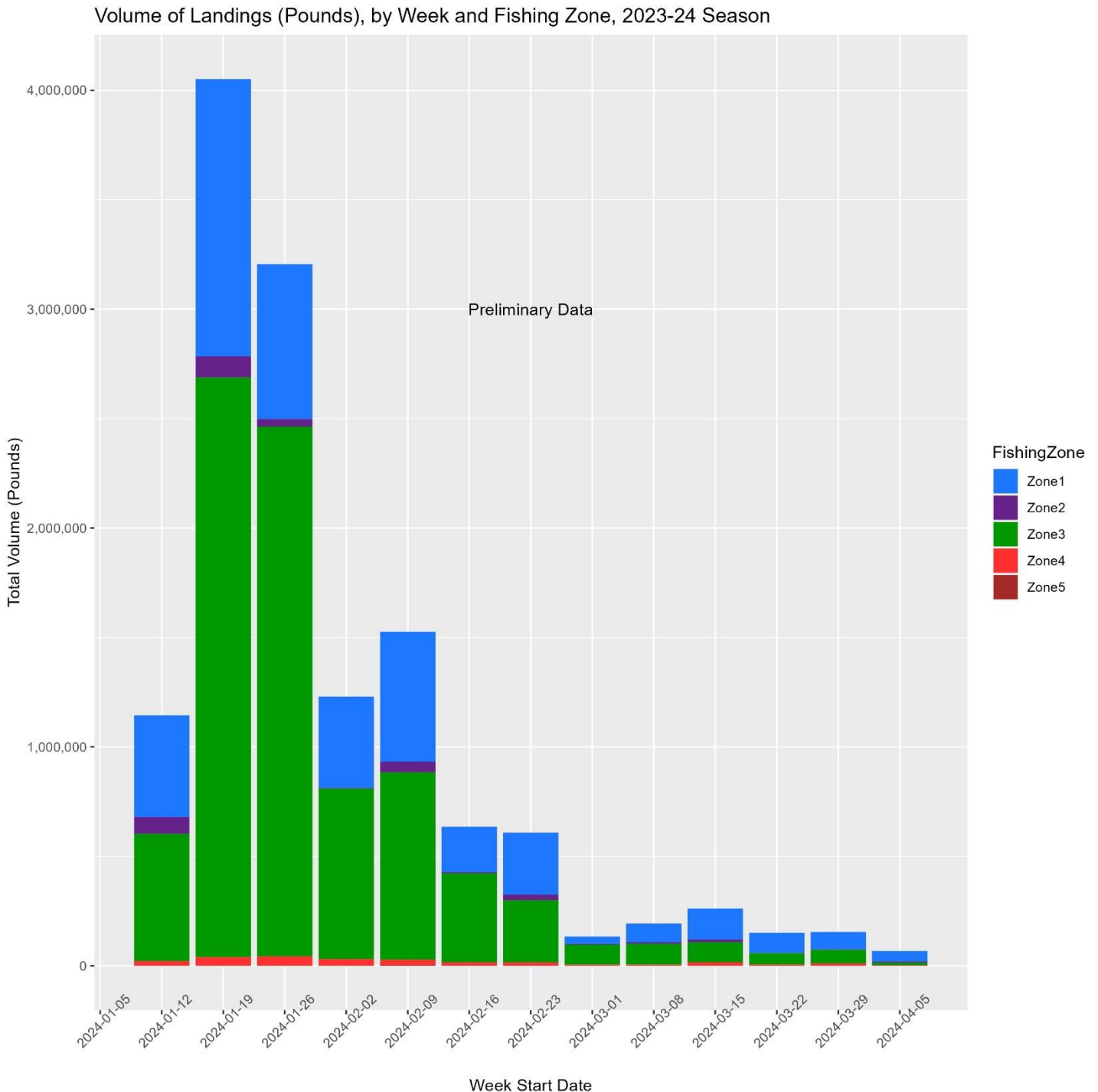


Figure 4. Cumulative volume (pounds) landed by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Certain week-Fishing Zone combinations are withheld due to confidentiality 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 (Figure 5). The number of active vessels peaked in late January and has been trending downward since the opening.

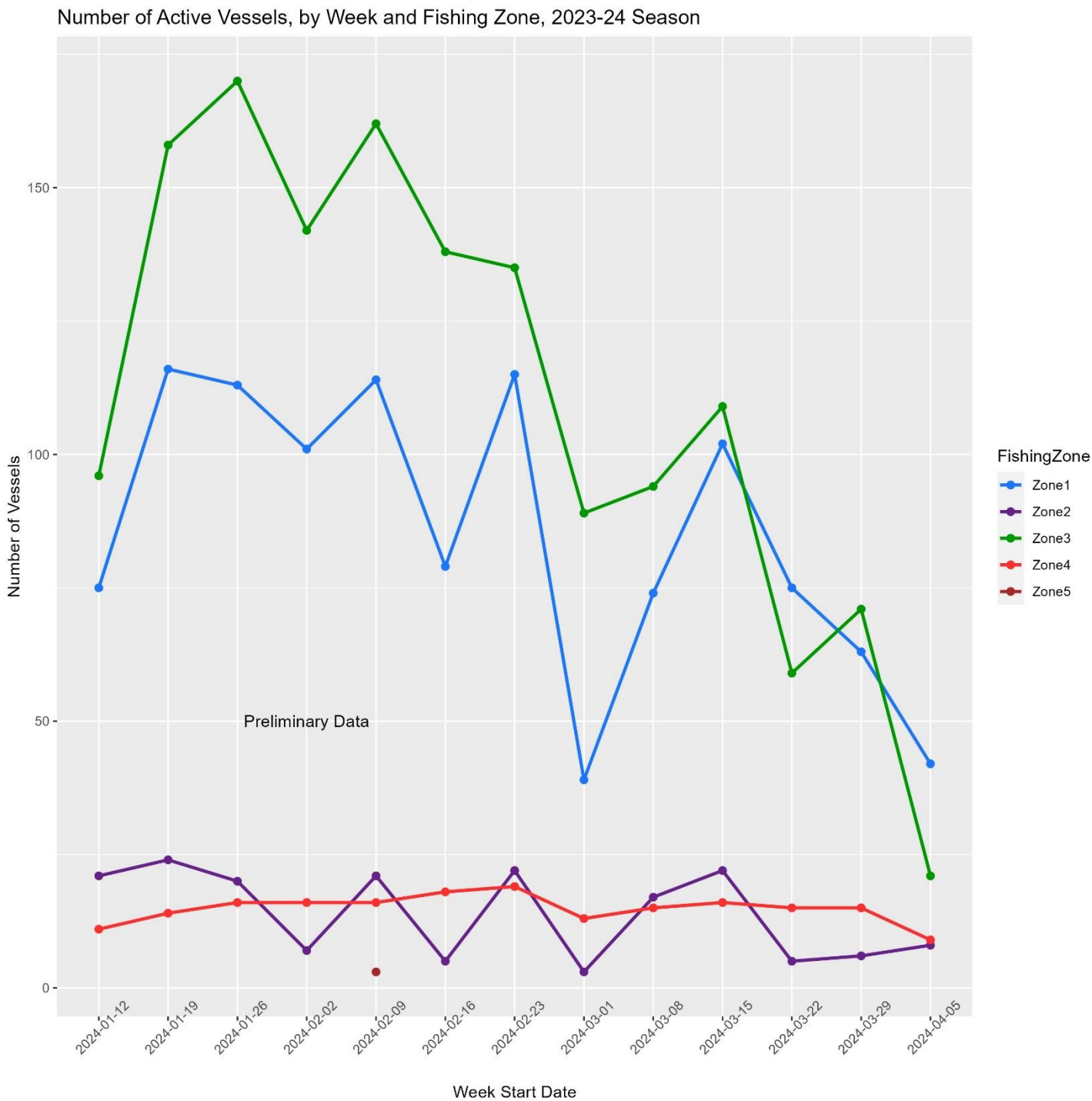


Figure 5. Number of active vessels by week and Fishing Zone. Week 1 starts with the first day the commercial Dungeness crab fishery was open in any area, January 5, 2024. All data are preliminary and subject to change. Some week- Fishing Zone combinations are withheld due to confidentiality constraints.

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 April 1, 2024. A summary of reports received for April 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 8. Summary of information provided for the April 1, 2024, bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on April 11, 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	87	309	24,124	12	27	50	13	57
Zone 2	16	172	2,582	12	24	38	2	50
Zone 3	97	136	10,704	18	34	80	40	196
Zone 4	15	97	1,263	22	40	70	5	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	215	NA	38,673	NA	NA	NA	60	309

Table 9. Total reported traps deployed in each Fishing Zone for the most recent six 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	Apr 1 - Total Traps
Zone 1	20,272	37,610	37,986	39,532	29,553	24,124
Zone 2	2,857	4,654	4,497	4,720	3,614	2,582
Zone 3	18,149	25,360	23,345	21,389	15,936	10,704
Zone 4	1,344	2,425	2,907	2,721	2,523	1,263
Zone 5	0	0	NR-C	NR-C	NR-C	NR-C
Zone 6	0	0	0	0	0	0
Totals	42,622	70,049	68,735	68,362	51,626	38,673

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

A. MBARI Krill Model

Modeled zooplankton conditions for March 2024 indicate lower than expected concentrations south of Point Conception and near expected concentrations near the rest of the coast. Current data can be accessed from the [MBARI website](#).

V. Ocean conditions: §132.8(d)(9)

A. El Niño/Southern Oscillation (ENSO) Diagnostic

As of March 14, 2024, a transition from El Niño to ENSO neutral is likely by April-June 2024 (83% chance), with the odds of a 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 remains in an El Niño state with warmer than normal coastal water temperatures. The current heatwave forecast suggests that warming along the coast is likely to persist through April and offshore conditions remaining warmer than normal through summer. Please visit the [NOAA Marine Heatwave Tracker webpage](#) for more information.

C. Habitat Compression Index

For the month of March, Regions 2 and 3 which include the north and central coast of California, show high habitat compression. Please visit the [NOAA Habitat Compression Index webpage](#) for more information.

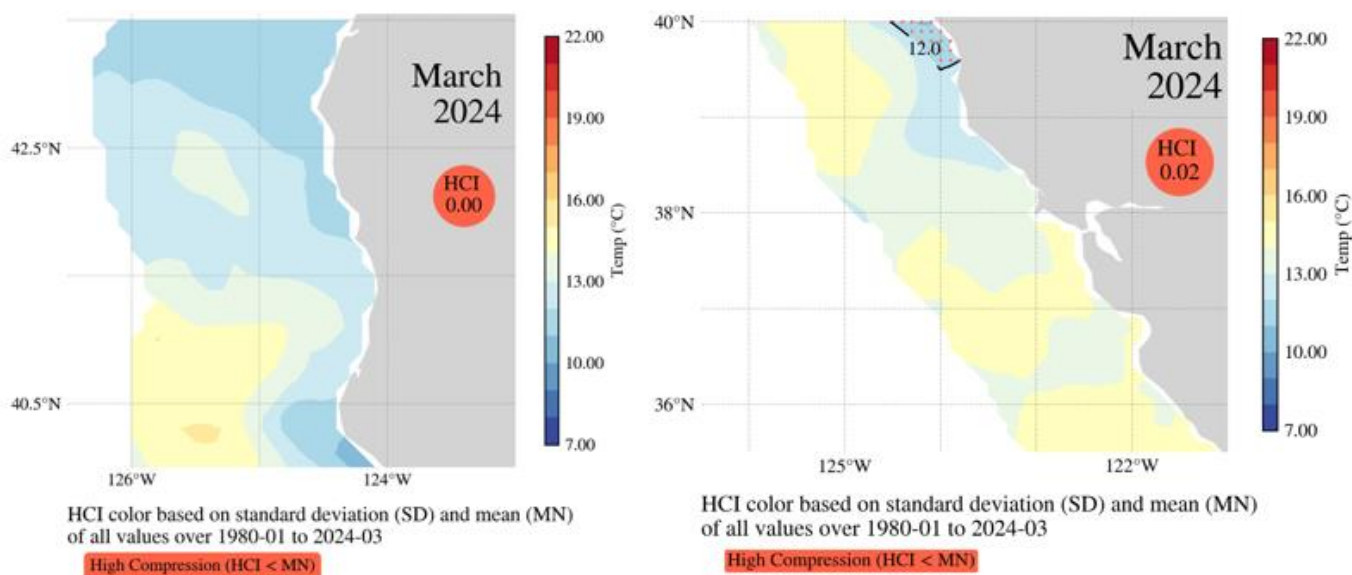


Figure 6. Spatial Structure of the Habitat Compression index for Region 2 (40 to 43.5 °N: left side) and Region 3 (35.5 – 40 °N: right side).

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 Preliminary 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](#).