

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

Last updated: December 4, 2023

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 Season Delay: Fishing Zones 1, 2, 3, 4, 5, and 6

Recreational Fishery:

- Lift Crab Trap Prohibition: Fishing Zones 1
- Continue Crab Trap Prohibition: Fishing Zones 3 and 4
- Continue Fleet Advisory in Fishing Zones: 1-6

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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	Season Delay	Season Delay	Crab Trap Prohibition; Fleet Advisory	Fleet Advisory
2	Season Delay	Season Delay	Fleet Advisory	Fleet Advisory
3	Season Delay	Season Delay	Crab Trap Prohibition; Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
4	Season Delay	Season Delay	Crab Trap Prohibition; Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
5	Season Delay	Season Delay	Fleet Advisory	Fleet Advisory
6	Season Delay	Season Delay	Fleet Advisory	Fleet Advisory

I. Management Recommendation Summary Rationale

Entanglements: The humpback whale entanglement reported on November 11, 2023, was confirmed to be CA commercial Dungeness crab fishing gear (20231111Mn). Humpback whale entanglements in California commercial Dungeness crab fishing gear and Unknown Fishing Gear bring the three-year rolling average Impact Score to 3.64. Additionally, a leatherback sea turtle entanglement was reported on November 24, 2023, near the Farallon Islands and confirmed to be CA commercial Dungeness crab fishing gear, which brings the three-year rolling average Impact Score for leatherback sea turtles to 0.33. Note: impact scores for Actionable Species are calculated separately.

Marine Life Concentrations: Based on Marine Life Concentration surveys for Fishing Zones 1-5 conducted by CDFW, Cascadia Research, and the US Coast Guard between November 20 and December 3, 2023, humpback whale sightings were elevated in Fishing Zone 3 and 4, exceeding the Marine Life trigger as defined by RAMP for the recreational and commercial Dungeness crab fisheries in Fishing Zone 4.

Marine Region's preliminary recommendation is for the Director to continue to delay the commercial season opener in all Fishing Zones (1, 2, 3, 4, 5, and 6). Marine Region also recommends lifting the temporary crab trap prohibition for the recreational fishery in Fishing Zone 1 and continuing the trap prohibition in Fishing Zones 3 and 4. Entanglement risk remains elevated in Zones 3 and 4 due to presence of whales and sea turtles. The recommendation is to also continue the Fleet Advisory for Fishing Zones 1-6 until the next Risk Assessment. These recommendations are based on confirmed entanglements in the commercial Dungeness crab fishing gear, exceedance of Marine Life Concentration data triggers, and known migration patterns for humpback whales in Fishing Zones 3, 4, 5, and

6. In addition, the current rolling average Impact Score for the commercial fishery for humpback whales is 3.64 and 0.33 for leatherback sea turtles, requiring Management Action.

Vessel surveys observed high concentrations of humpback whales in Fishing Zone 4, where whales were documented to be feeding on anchovy. On November 20, November 27 and December 3, 2023, Cascadia Research Collective surveys observed between 33 and 35 humpback whales. Monterey Bay Whale Watch data in Fishing Zone 4 indicated an average number of humpback whales per half-day trip during the last seven days was 13.5, with a peak of 22 whales observed during a half-day trip on November 25, 2023. The Point Blue Conservation Science data portal also indicated high levels of humpback whale sightings in Fishing Zone 4. Oceanographic models indicate that while the marine heatwave has decreased in area and receded from much of the coast, the heatwave could persist through winter and spring 2024. This anticipated spring warming could also be due to the expected El Niño which is expected to persist through March 2024 and have a 55% chance of being a “strong” El Niño. Oceanographic models also show high habitat compression as of October 2023, further elevating entanglement risk at this time. For Fishing Zone 6, lack of available data prior to the season opener requires Management Action, pursuant to 132.8(c)(2)(A) and 29.80(c)(7)(A).

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

- Vertical line/gear reduction for Fishing Zones 1-6 – given recent entanglements and current impact score, it will not offer sufficient reduction of entanglement risk.
- Depth Restriction by Fishing Zone- may concentrate crab trap gear thereby increasing entanglement risk.
- 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)

The table below outlines the confirmed entanglements under RAMP and their associated Impact Score for the year 2023. See "[FAQ: Impact Scoring for the Risk Assessment and Mitigation Program](#)" for information about the RAMP Impact Score.

Table 2. Actionable Species Entanglements during 2023 pursuant to RAMP regulations.

Entanglement ID	Date	Species	Fishery	Impact Score
20230417Mn	04/17/23	Humpback whale	Unknown Fishing Gear	0.38
20230420Mn	04/20/23	Humpback whale	Unknown Fishing Gear	0.38
20230611Mn	06/11/23	Humpback whale	CA commercial Dungeness crab	0.75
20230719Mn	07/19/23	Humpback whale	CA commercial Dungeness crab	0.75
20230819Mn	08/19/23	Humpback whale	CA commercial Dungeness crab	0.75
20231111Mn	11/11/23	Humpback whale	CA commercial Dungeness crab	0.75
20231124Dc	11/24/23	Leatherback sea turtle	CA commercial Dungeness crab	1.0

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.

Actionable Species	Current Fishing Season Impact Score (2023-24)	Current Calendar Year Impact Score (2023)	3-Year Rolling Average
Humpback whales	0	3.76	3.64
Leatherback sea turtles	0	1.0	0.33

As of December 4, 2023, 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, United States Coast Guard, John Calambokidis (Cascadia Research Collective, in collaboration with the Marine Mammal Center), Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC)

CDFW Survey Data Map Viewer

CDFW and USCG/CDFW aerial survey data are available as an interactive web map through ESRI Map Viewer for the [December 4, 2023, Risk Assessment](#). A map with current and past Risk Assessment survey data have been combined in a [2023-2024 Season RAMP survey map](#).

For assistance with using ESRI Map Viewer, please see the [How to Guide](#).

For the period of November 1 until the Fishing Season opens statewide a RAMP Marine Life Concentration trigger has been met when:

- The number of humpback whales is greater than or equal to 20, 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
- A Pacific leatherback sea turtle is seen in any Fishing Zone

Table 4. 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, USCG/CDFW Aerial Survey	No
Zone 2	CDFW Aerial Survey	No
Zone 3	CDFW Aerial Survey	No
Zone 4	CDFW Aerial Survey, Cascadia Research, MBWW	Yes
Zone 5	Cascadia Research	No
Zone 6	None	No Surveys

A. CDFW Surveys (Fishing Zones 1-4)

On November 21-22, 2023, CDFW conducted two aerial surveys at an altitude of 1000ft at 120kts. Conditions were favorable for both flights with a Beaufort state of less than two.

The November 21 flight flew east to west transect lines from the coast to the 100-fathoms from Monterey (Fishing Zone 4) to south of Tomales Point (Fishing Zone 3). 17 humpback whales were observed in Fishing Zone 3.

The November 22 flight flew a zig-zag pattern from the coast to 50 fathoms from Monterey (Fishing Zone 4) to the Oregon-California border (Fishing Zone 1). In Fishing Zone 3, 28 unidentified and 14 humpback whales were observed. Two humpback whales and two unidentified whales were recorded in Fishing Zone 2. No whales were observed in Fishing Zone 1.

Table 5. Counts of Actionable Species and unidentified whales seen by CDFW aerial surveys conducted on November 21-22, 2023.

Survey Date	Fishing Zone	Humpback whales	Unidentified whales
Nov 21	Zone 3	17	0
Nov 21	Zone 4	0	0
Nov 22	Zone 1	0	0
Nov 22	Zone 2	2	2
Nov 22	Zone 3	14	28
Nov 22	Zone 4	0	0

B. USCG/CDFW Joint Surveys (Fishing Zone 1)

On November 20, 2023, USCG and CDFW conducted a joint flight along the 50 to 200 fathom contours from Arcata to the California/Oregon border. The survey departed from Arcata and headed northward to the California/Oregon border, paused recording while heading to Crescent city to refuel and then continued surveying southward ending south of Fortuna. Visibility was limited due to cloudy water conditions. 14 unidentified whales and 11 humpback whales were recorded in Fishing Zone 1.

Table 6. Counts of Actionable Species and unidentified whales seen by the USCG/CDFW joint aerial survey conducted on November 20, 2023.

Fishing Zone	Humpback whales	Unidentified whales
Zone 1	11	14

C. Cascadia Research Collective (Fishing Zones 4 and 5)

Cascadia Research Collective and The Marine Mammal Center conducted three vessel surveys between November 20 and December 3, 2023 (Table 7). Key findings are outlined below.

Two surveys were conducted in Fishing Zone 4. The first survey on November 20, 2023 sighted 35 whales, and the second survey on December 3, 2023 sighted 33 humpback whales. Whale numbers in areas inside and northwest of Monterey Bay decreased between the November 20 and December 3 surveys, however the December 3 survey included an area south of Monterey Bay which resulted in a similar number of sightings overall (see Figures 1 and 3). Whales were documented primarily feeding on anchovies. In the most recent survey on December 3, most sightings occurred in deeper waters (65-328 fathoms) except for one sighting at 38 fathoms.

One survey was conducted in Fishing Zone 5 on November 27, 2023, and sighted 11 humpback whales (see Figure 2). Humpback whales were concentrated at the southern and northern portions of the survey area and were noted feeding on fish. Sightings occurred at both shallower inshore areas (38-43 fathoms) and deeper waters out to 246 fathoms.

Humpback whales are already being sighted on the Mexico breeding grounds based on reports from collaborators. Effort last year indicated that many of these early arrivals were from California feeding areas. Efforts will continue to update these sightings and how they compare to previous years.

Table 7. Summary of vessel surveys by Cascadia Research off central and southern California.

Survey Date	Fishing Zone	Humpback whales	Unidentified whales
Nov 20	Zone 4	35	0
Nov 27	Zone 5	11	1
Dec 3	Zone 4	33	0

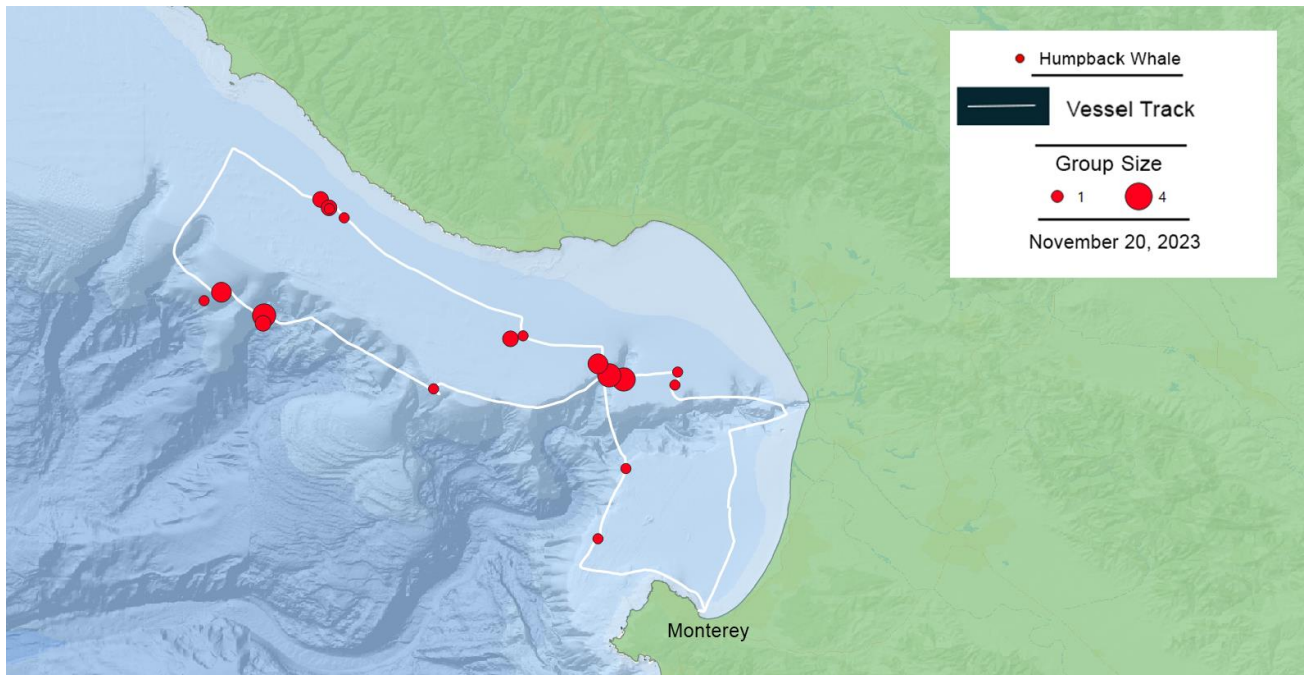


Figure 1. Plot of vessel track lines and locations of sightings for surveys in Fishing Zone 4 on November 20, 2023 by Cascadia Research Collective.

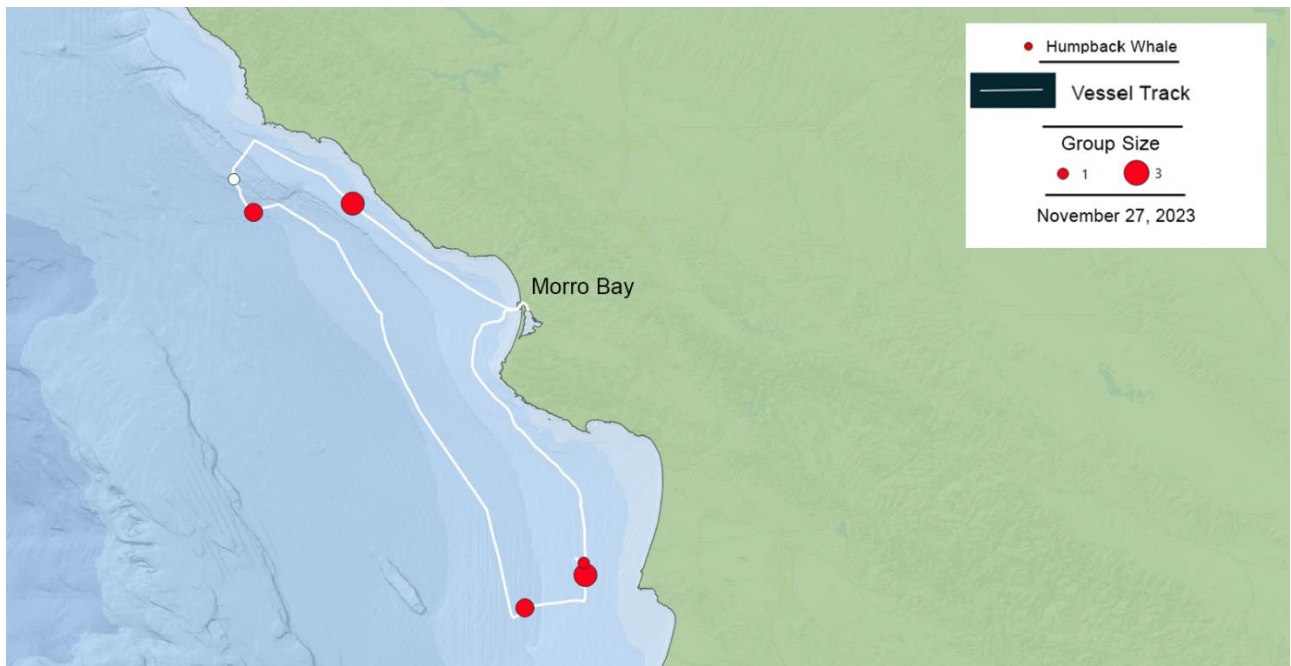


Figure 2. Plot of vessel track lines and locations of sightings for survey in Fishing Zone 5 on November 27, 2023 by Cascadia Research Collective.

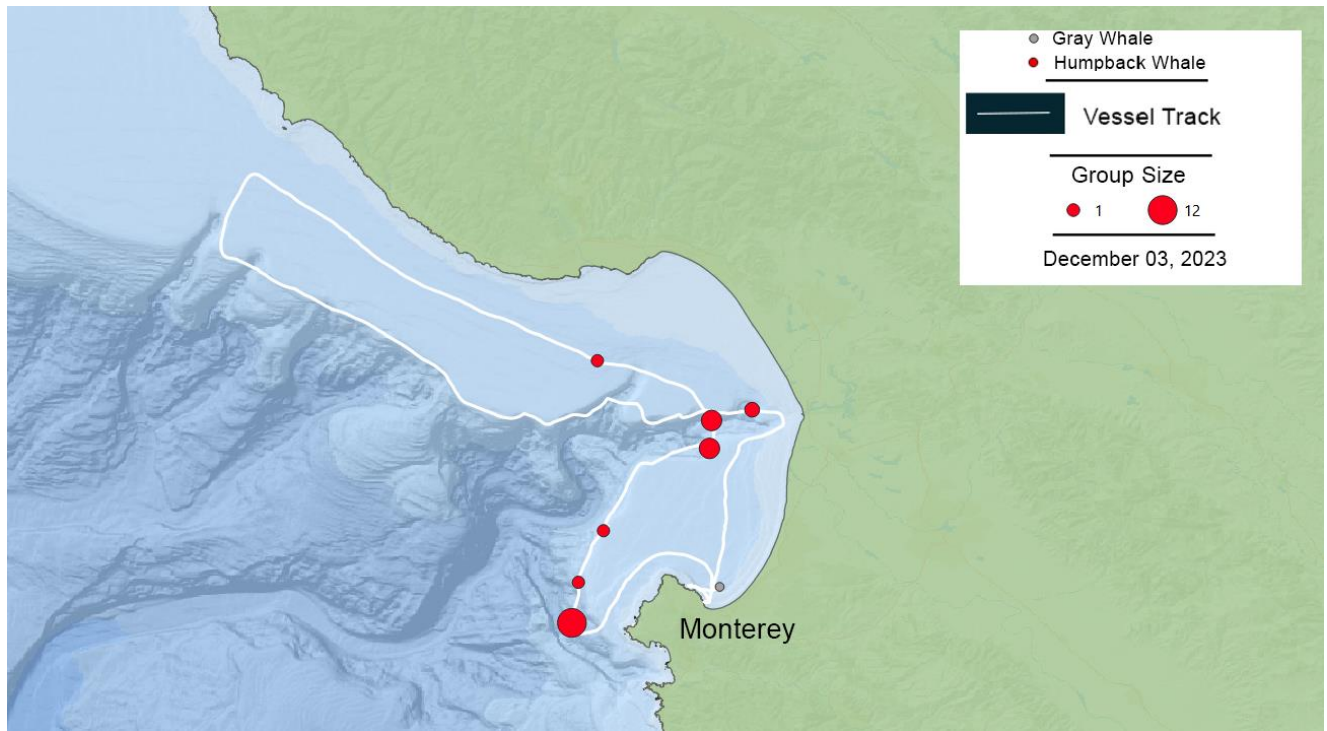


Figure 3. Plot of vessel track lines and locations of sightings for surveys in Fishing Zone 4 on December 3, 2023, by Cascadia Research Collective.

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

Monterey Bay Whale Watch conducted whale watching trips in southern Monterey Bay on four of seven days during the week of November 25-December 1, 2023. The average number of humpback whales per-half-day trip during the last seven days was 13.5, with a peak of 22 whales observed during a half-day trip on November 25, 2023.

**Monterey Bay Whale Watch: Humpback whales per 1/2-day trip
(Nov 15, 2020 - Dec 1, 2023)**

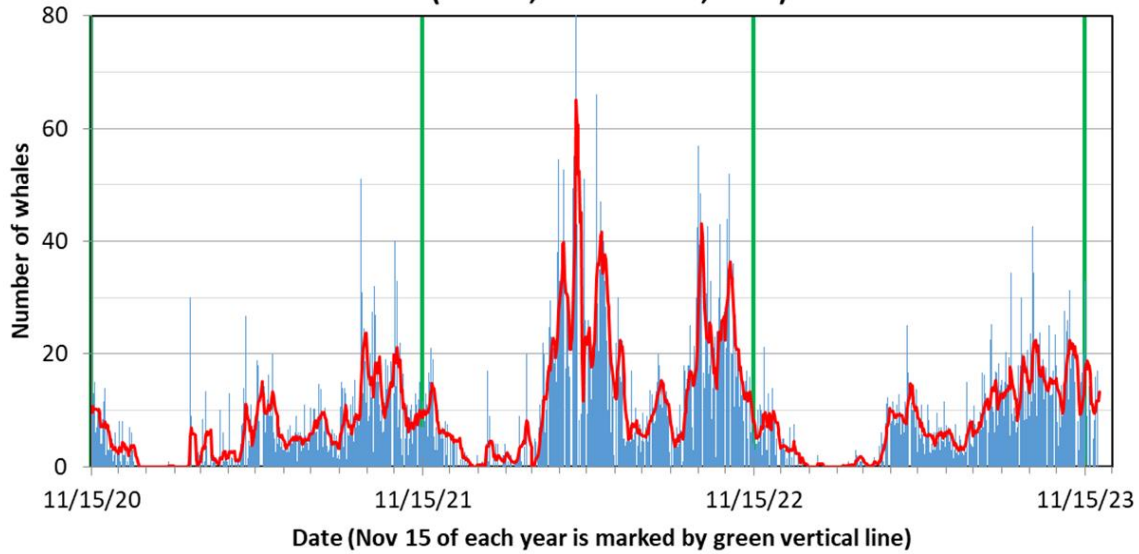


Figure 4. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2020 – 1 December 2023. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns 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.

IV. Management Considerations

III. Information from NOAA: § 132.8(d)(2)

A leatherback sea turtle entanglement mortality was reported on November 24, 2023, near the Farallon Islands and confirmed to be CA commercial Dungeness crab fishing gear. The gear was likely lost during the 2021-2022 fishing season.

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

Data provided by: Point Blue Conservation Science, California Coast Crab Association, Monterey Bay Whale Watch (processed by Karin Forney NOAA SWFSC) and NOAA Coastwatch.

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

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

Table 8. 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 December 1, 2023.

Fishing Zone	Number of humpback whales sighted	Number of blue whales sighted
Zone 3	9	0
Zone 4	79	0
Zone 6	19	0

B. California Crab Association (Fishing Zone 1)

The California Coastal Crab Association conducted vessel surveys on November 30 and December 1, 2023, out of Eureka and Crescent City (Fishing Zone 1). Two industry vessels departed from Crescent City (F/V Spirit of America, F/V Miss Heidi) and two from Eureka (F/V Sally Kay, F/V Seaila). Two of the four vessels had independent observers (F/V Seaila and F/V Spirit of America).

Visibility was clear for the southern transects and shifted between clear and poor (due to rain) for the northern transects. The sea was choppy for all transects with wind varying between 6-15 knots and swell of 2-4 ft.

A total of 30-31 whales, including 11-12 humpbacks and 5 gray whales were observed on the transect. All humpbacks were observed in the Crescent City South and Eureka North transects. All gray whales were observed off Crescent City. No whales were observed on the Eureka South transect.

Table 9. Summary counts of Actionable Species seen on CCCA vessel surveys conducted on November 30-December 1, 2023.

Fishing Zone	Humpback whales	Unidentified whales
Zone 1	11-12	14

C. Monterey Bay Whale Watch (Fishing Zone 4)

The semi-monthly average number of whales per half-day trip in southern Monterey Bay is elevated compared to both 2022 and the historical average for this time period (Figure 5).

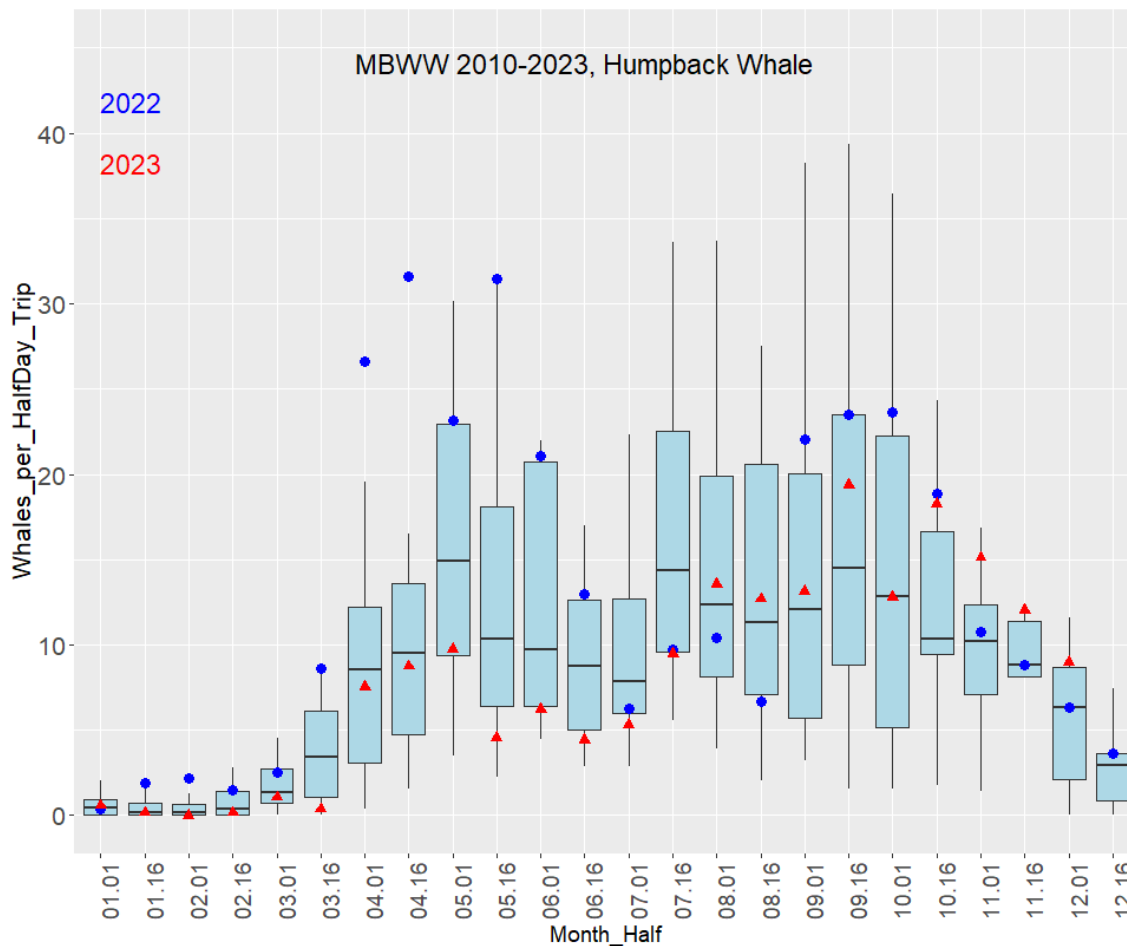


Figure 5. Historical Monterey Bay Whale Watch data for 2010-2023, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th-end of month). This boxplot follows standard statistical practice in that the black horizontal line is the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

D. Whale Watch 2.0 (All Fishing Zones)

Blue whale habitat predictions for November 26, 2023, show low habitat suitability in Fishing Zones 1-5, with some suitable habitat remaining within Fishing Zone 6. For current habitat suitability see the [NOAA Coastwatch Habitat Suitability Map](#).

V. 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. Domoic Acid and Quality Testing

Domoic Acid: As of November 21, 2023, [domoic acid results for all port areas](#) indicate all crabs are below the federal action level. No additional domoic acid testing is planned for the 2023-24 season.

Quality Testing: [Results for the second round of Tri-State quality testing](#) are available. Dungeness crab was collected on November 28, 2023, at the Eureka site only and passed quality testing with 25.5%. All three northern ports (Crescent City, Trinidad, and Eureka) have now passed quality testing and, under the Tri-State agreement, Fishing Zones 1 and 2 are no longer subject to a quality delay.

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

A. MBARI Krill Model

No new available data, please see the [October 23, 2023 Available Data document](#) for the latest data or visit the [MBARI website](#) and see “Current Conditions”.

VII. Ocean conditions: §132.8(d)(9)

A. El Niño/Southern Oscillation (ENSO) Diagnostic

El Niño is anticipated to continue through the Northern Hemisphere spring, with a greater than 55% chance of being at least a “strong” El Niño and persisting through January-March 2024. Please visit the [NOAA ENSO Diagnostic webpage](#) for more information.

B. Large Marine Heatwave Tracker

The current marine heatwave which formed in mid-May 2023 reached a maximum size during late September has since decreased in area and receded from much of the coast during October. The current forecast suggests that the heatwave will persist through the winter, with an increased risk of coastal warming in the spring of 2024. Some of the warming off the southern California coast may be residual heat from the heatwave but may be initial impacts of the current El Niño. Please visit the [NOAA Heatwave Tracker webpage](#) for more information and a current map.

C. Habitat Compression Index

As of October 2023, Region 2 (40-43.5 N) and Region 3 (35.5-40 N), which include the north and central coast of California, show high habitat compression. Please visit the [NOAA Habitat Compression Index webpage](#) for more information.

VIII. 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.

IX. 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.

X. Current Impact Score Calculation: §132.8(d)(10)

Data provided by: California Department of Fish and Wildlife

See Table 3 for the current fishing season and calendar year Impact Score. For more information about Impact scoring, please review the [Impact Score FAQ](#).