

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

Last updated: November 14, 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. CDFW has based its suggested Management Action on current Marine Life Concentration data.

### I. Recommended Management Actions

#### Commercial Fishery:

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

#### Recreational Fishery:

- Crab Trap Prohibition: Fishing Zones 1, 3 and 4
- Fleet Advisory: Fishing Zones 1, 2, 3, 4, 5 and 6

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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:</b> Current management status	<b>Commercial Fishery:</b> Proposed management status	<b>Recreational Fishery:</b> Current management status	<b>Recreational Fishery:</b> Proposed management status
1	Closed	Season Delay	Fleet Advisory	Crab Trap Prohibition; Fleet Advisory
2	Closed	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

## II. Management Recommendation Summary Rationale

*Entanglements:* A humpback whale entanglement was reported on November 11, 2023, in Monterey, CA and confirmed to be CA commercial Dungeness crab fishing gear (entanglement ID 20231111Mn). Humpback whale entanglements in California commercial Dungeness crab fishing gear and Unknown Fishing Gear bring the three-year rolling average Impact Score to 3.39 (excluding the 11/11/23 entanglement; update pending based on additional information from NMFS), which exceeds the trigger as defined in RAMP for the commercial Dungeness crab fishery.

*Marine Life Concentrations:* Based on recent Marine Life Concentration surveys for Fishing Zones 1-5 conducted by CDFW, Cascadia Research, and the US Coast Guard between October 10 and November 8, 2023, humpback whale sightings were elevated in Fishing Zones 1, 3 and 4, exceeding the Marine Life Concentration trigger as defined by RAMP for the recreational and commercial Dungeness crab fisheries in those Fishing Zones.

Marine Region's preliminary recommendation is for the Director to delay the commercial fishery in Fishing Zones 1-6. Marine Region also recommends a continuance of the prohibition of recreational crab traps in Fishing Zones 3 and 4 and to include Fishing Zone 1 in the prohibition. The recommendation is to also continue the Fleet Advisory for Fishing Zones 1-6 until the next Risk Assessment. The recreational trap prohibition for Fishing Zone 1 would be effective on Sunday November 26, 2023, at 6:00 p.m. and continue until at least the next assessment. These recommendations are based on confirmed 2023 entanglements in CA commercial Dungeness crab fishing gear, exceedance of Marine Life Concentration data triggers, and known migration patterns for humpback whales in Fishing Zones 1, 2, 3, 4 and 5. In addition, the current Impact Score for the commercial fishery is 3.39 (excluding the 11/11/23 entanglement; update pending based on

additional information from NMFS), requiring Management Action. Vessel surveys observed high concentrations of humpback and blue whales in Fishing Zones 1, 3, and 4. On October 30 and 31, 2023, the OSU MOSAIC survey observed up to 13 blue and fin whales and 46 humpback whales in Fishing Zone 1. Cascadia Research observed between 35 and 68 humpback whales on October 10, 13, 14, and 16, 2023 in Fishing Zone 3. Up to seven blue whales were also observed in the Cascadia vessel surveys in Fishing Zone 3. 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 19.9, with a peak of 61 whales observed during a full day trip on October 28, 2023. Oceanographic models show high habitat compression for Fishing Zones 2 and 3 through October 2023, and predict strong El Niño conditions through spring 2024, further elevating entanglement risk at this time due to compression of available forage. Recent vessel surveys confirmed humpbacks were foraging on inshore schools of anchovy. 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.

### III. **Alternative Management Actions**

#### **Commercial Fishery** - Alternatives Considered by Rejected

- Gear Reduction - given the current exceedance of the Impact Score and elevated risk due to concentrations of humpback whales across Fishing Zones 1, 3 and 4, this was not the recommended Management Action.
- Depth Restriction - will not sufficiently provide protections due to distribution of humpback whales across depths and may concentrate trap gear thereby increasing entanglement risk.
- Alternative Gear - can only be authorized after April 1st.

#### **Recreational Fishery** - Alternatives Considered by Rejected

- Continuing only the Fleet Advisory for Zone 1 – given exceedance of Marine Life Concentration triggers in this Zone 1, this was not the recommended Management Action.

# AVAILABLE DATA

## IV. 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	Pending

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	3.01* update pending	3.39* update pending

As of November 13, 2023, there have been 0 Confirmed Entanglements of blue whales or leatherback sea turtles 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 [November 17, 2023 Risk Assessment](#). 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 41. 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, USCG/CDFW Aerial Survey, Cascadia Research Collective and OSU MOSAIC	Yes
Zone 2	CDFW Aerial Survey, USCG/CDFW Aerial Survey	No
Zone 3	CDFW Aerial Survey, Cascadia Research Collective	Yes
Zone 4	CDFW Aerial Survey, Monterey Bay Whale Watch, Cascadia Research Collective	Yes
Zone 5	CDFW Aerial Survey, Cascadia Research Collective	No
Zone 6	None	No Surveys

### A. CDFW Surveys

On October 31 and November 1, 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 one, however, visibility was limited by sun glare.

The October 31 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). 22 unidentified whales were seen in Fishing Zone 3, 13 humpback whales in Fishing Zone 3 and 4 humpback whales in Fishing Zone 4. The flight also surveyed Fishing Zone 5 in a zig-zag pattern, but no whales were observed. Note that the Zone 5 survey lines do not appear in the CDFW web map due to technical difficulties.

The November 1 flight flew a zig-zag pattern from the coast to 100-fathoms from Monterey (Fishing Zone 4) to the Oregon-California border (Fishing Zone 1). Surveying was paused between south of Shelter Cove and Tomales bay to avoid re-surveying areas covered in the previous day's flight. Four unidentified whales were recorded in Fishing Zone 1, two in Fishing Zone 2, and three in Fishing Zone 3. Eight humpback whales were seen in Fishing Zone 1, one in Fishing Zone 2, 15 in Fishing Zone 3, and six in Fishing Zone 4.

Table 5. Summary counts of Actionable Species and unidentified whales seen by CDFW aerial surveys conducted on October 31 and November 1, 2023.

Survey Date	Fishing Zone	Humpback whales	Unidentified whales
Oct 31	Zone 3	13	22
Oct 31	Zone 4	4	0
Oct 31	Zone 5	0	0
Nov 1	Zone 1	8	4
Nov 1	Zone 2	1	2
Nov 1	Zone 3	15	3
Nov 1	Zone 4	6	0

## B. CDFW/USCG Joint Surveys

On October 31, 2023, USCG and CDFW conducted a joint flight along the 30-fathom contour from Arcata south towards Shelter Cove, then north back to Crescent City. Visibility was poor due to heavy fog between Shelter Cove and Eureka but improved between Eureka and Crescent City. Two humpback whales were recorded in Fishing Zone 1 and two in Fishing Zone 2.

Table 6. Counts of Actionable Species and unidentified whales seen by the USCG/CDFW joint aerial survey conducted on October 31, 2023.

Fishing Zone	Humpback whales	Unidentified whales
Zone 1	2	0
Zone 2	2	0

## C. Cascadia Research Collective and The Marine Mammal Center (Fishing Zones 1, 3, 4, 5)

Vessel surveys were conducted from October 10 to November 8, 2023, by Cascadia Research, The Marine Mammal Center (TMMC), and Oregon State University (OSU).

On October 27, 2023, a small boat survey was conducted in Fishing Zone 1. The survey was conducted out of Eureka and sighted 11 humpback whales. The OSU MOSAIC line-transect cruise surveys covered a portion of Fishing Zone 1 on October 30-31, 2023, and observed up to 13 blue and fin whales and 46 humpback whales during a single survey (Figure 1).

Surveys were conducted in Fishing Zone 3 from October 10-16, 2023. Humpback

whales in shallower waters were feeding on fish, and some humpback whales in deeper waters appeared to be feeding on krill as well (Figure 2).

Surveys were conducted in Fishing Zone 4 on November 2, 6, and 8, 2023. Whales were documented primarily feeding on inshore concentrations of anchovies (Figure 3).

A survey was conducted in Fishing Zone 5 on October 25, 2023. Humpback whales were concentrated at the southern inshore portion of the covered area and were feeding on fish (Figure 4).

Table 7. Summary of vessel surveys between October 10 and November 8, 2023 in Fishing Zones 1, 3, 4, and 5 by Cascadia research and the Marine Mammal Center off central northern California including data from the OSU MOSAIC cruise in Fishing Zone 1.

Date	Fishing Zone	Blue/fin		Humpback		Unidentified whales	
		Sightings	# of individuals	Sightings	# of individuals	Sightings	# of individuals
10-Oct-23	3			23	55	3	7
13-Oct-23	3	1	2	31	60	1	1
13-Oct-23	3			42	60	2	1
14-Oct-23	3			23	68		
16-Oct-23	3			23	35	4	7
25-Oct-23	5			7	15		
27-Oct-23	1			6	11		
30-Oct-23	1	9	13	3	5		
31-Oct-23	1	6	9	9	46		
02-Nov-23	4			17	31		
06-Nov-23	4			21	62		
08-Nov-23	4			3	7		

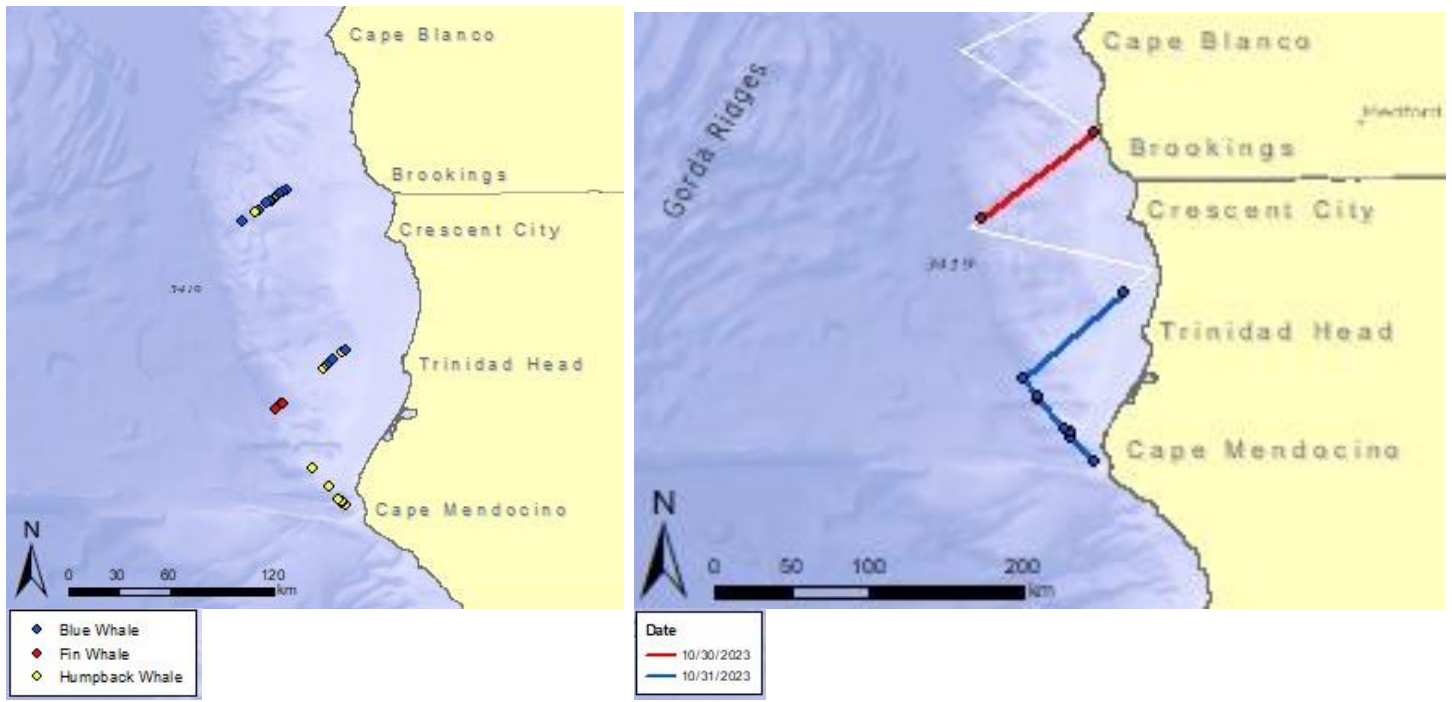


Figure 1. Sightings of large whales from the OSU MOSAIC cruise on October 30 and 31, 2023. Surveys were conducted from the Pacific Storm as part of a project supported by US Department of Energy that covers Oregon down to N California. Sightings are from their saw-tooth lines surveyed on October 30 and 31, 2023 which primarily covered S Oregon and N California.

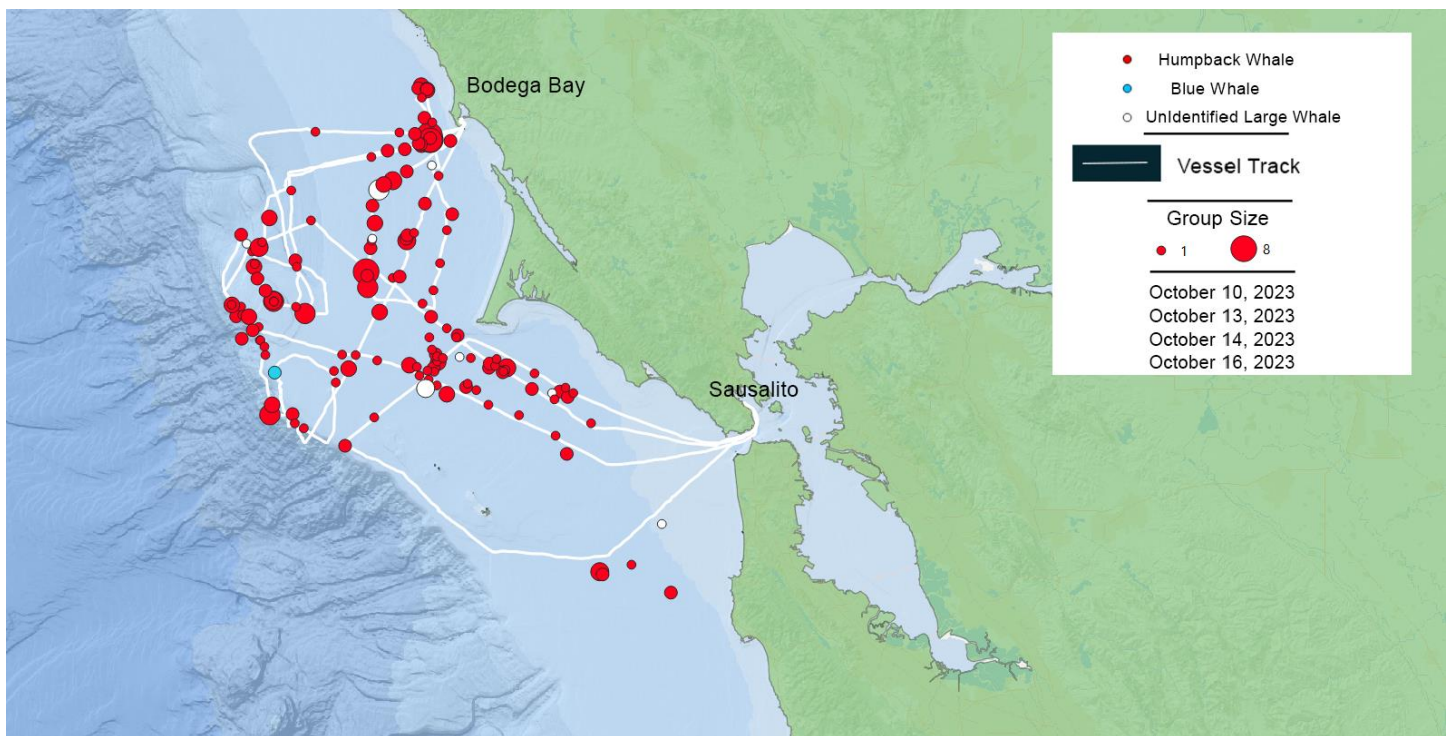


Figure 2. Plot of vessel track lines and locations of sightings for surveys in Fishing Zone 3 from October 10-16, 2023, by Cascadia and TMMC.



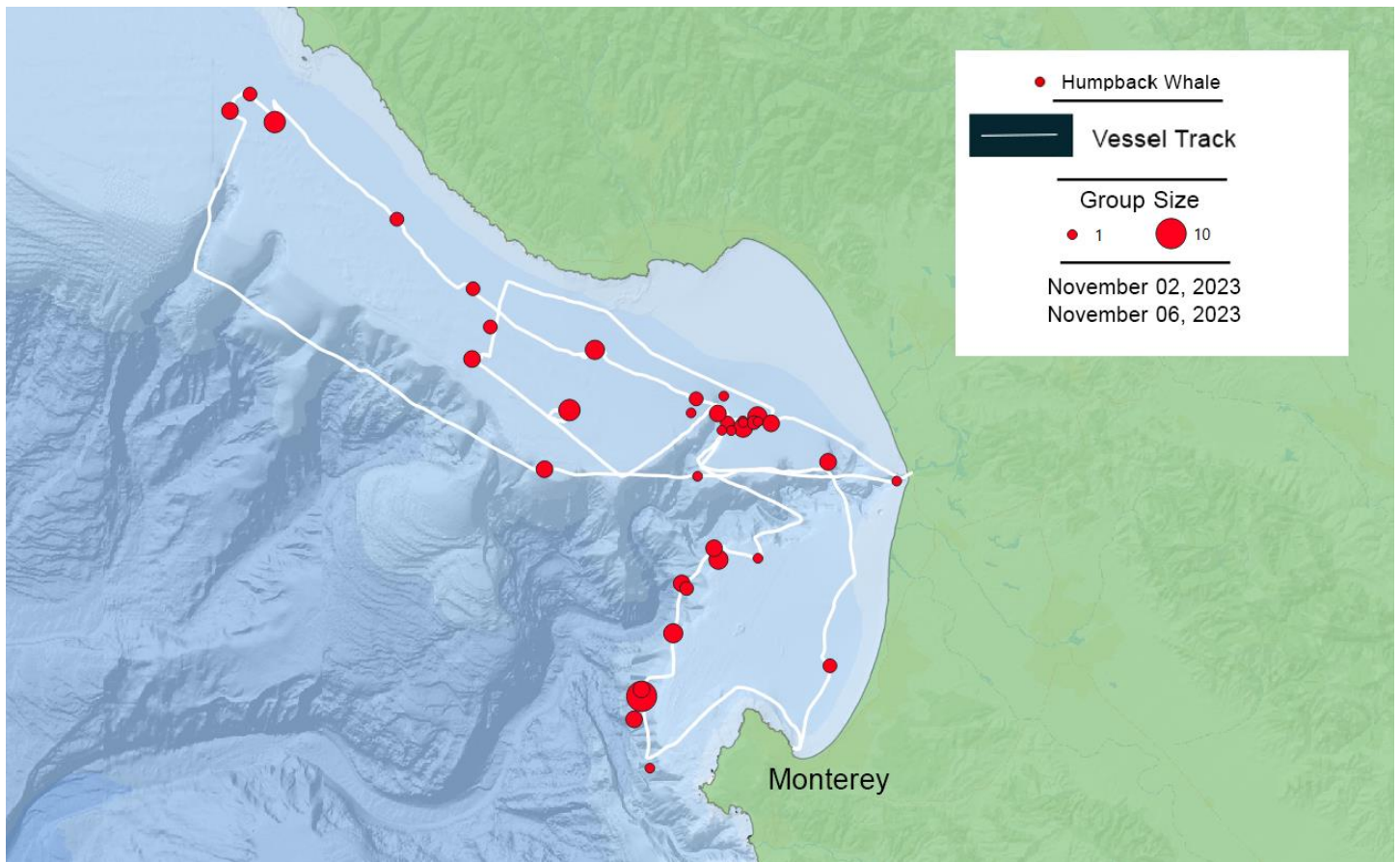


Figure 3. Plot of vessel track lines and locations of sightings for surveys in Fishing Zone 4 on November 2 and 6, 2023 by Cascadia and TMMC. This does not include a very limited survey on November 8, 2023 that only covered a small area.

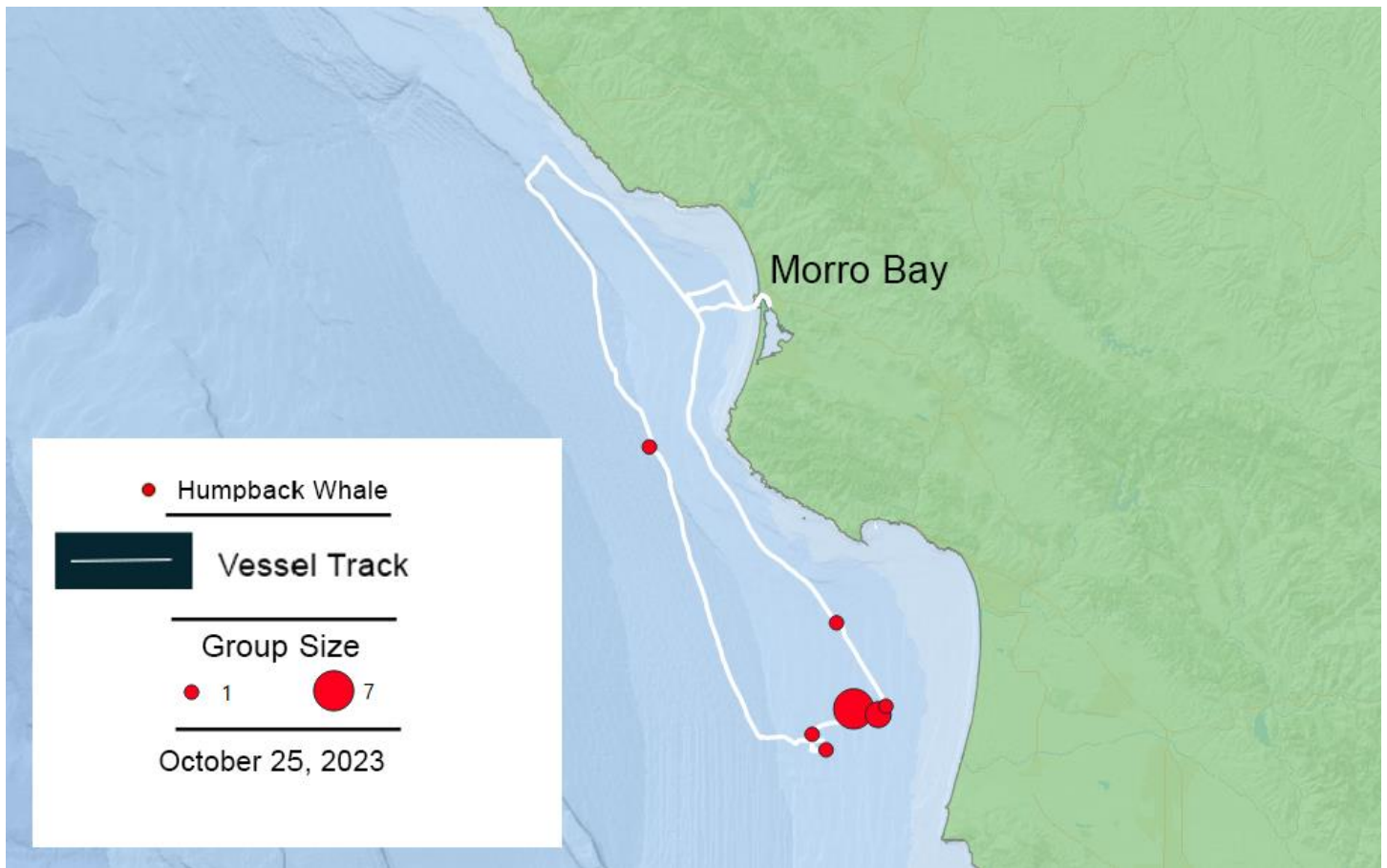


Figure 4. Plot of vessel track lines and locations of sightings for Fishing Zone 5 on October 25, 2023 by Cascadia Research.

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

Monterey Bay Whale Watch conducted whale watching trips in southern Monterey Bay on all seven days during the week of October 27-November 2, 2023. The average number of humpback whales per half day trip during the last seven days was 19.9, with a peak of 61 whales observed during a full day trip on October 28, 2023.

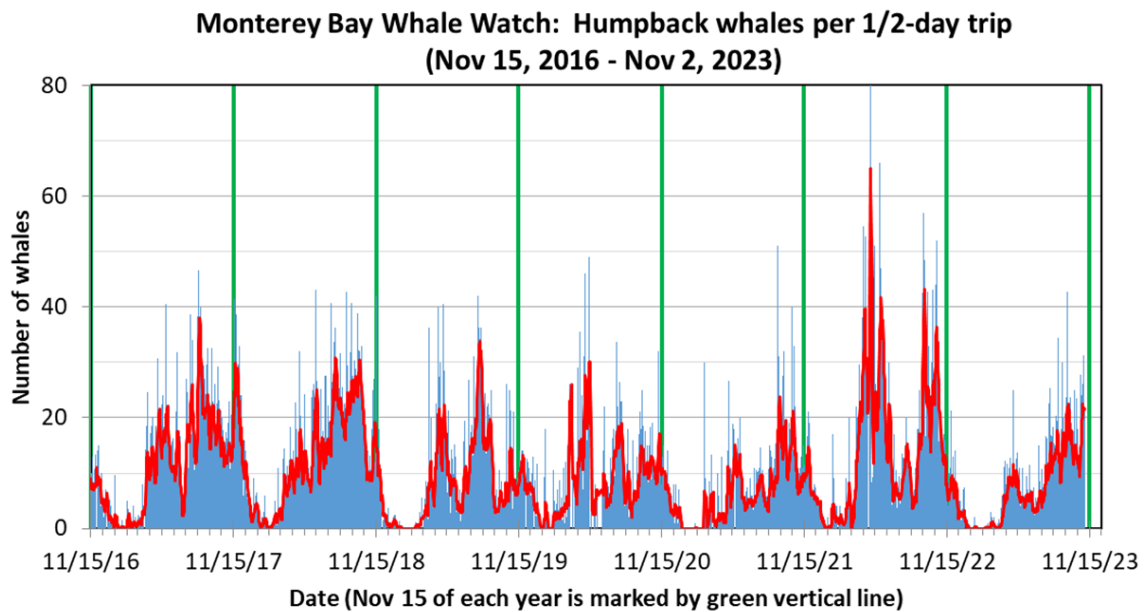


Figure 5. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2016 – 13 October 2023. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns 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.

## V. Management Considerations

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

*Data provided by: Lauren Saez and Dan Lawson (NMFS)*

Since the last Working Group meeting, two entanglements with humpback whales have been reported. One has been attributed to the CA commercial Dungeness crab fishery (ID 20231111Mn) reported in Monterey, CA. The second was reported in Mexico and has been attributed to the Oregon commercial Dungeness crab fishery.

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

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

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

Sightings of humpback whales were elevated for 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 November 9, 2023.

<b>Fishing Zone</b>	<b>Number of humpback whale sightings</b>	<b>Number of blue whale sightings</b>
Zone 3	19	0
Zone 4	70	0
Zone 6	66	0

### **B. California Coastal Crab Association (Fishing Zone 1 and 5)**

The California Coastal Crab Association conducted vessel surveys on October 31, 2023, out of Eureka and Crescent City (Fishing Zone 1) and on November 1, 2023, out of Morro Bay and Port San Luis (Fishing Zone 5).

The surveys conducted on October 31, 2023, used two industry vessels from Crescent City (F/V Spirit of America, F/V Sea Hunter) and two industry vessels from Eureka (F/V Celtic Aire, 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 fog) for the northern transect. The sea was nearly flat (2-3 ft swell). A total of 50-60 whales, including 39-49 humpbacks and four blue whales were observed on transect, with an additional four humpback whales off-transect. The majority of the humpbacks were sighted off of Eureka (southern half of Fishing Zone 1). All blue whales were sighted off Crescent City (northern half of Fishing Zone 1).

The surveys conducted on November 1, 2023, used one industry vessel from Morro Bay (F/V Brita Michelle) and one industry vessel from Port San Luis (F/V Eleanor Marie). No observers were present and all data was collected by captains and crew. Visibility was unlimited and the swell was 1-4 ft. A total of 15 humpback whales were observed. One was observed on the northern track and 14 were observed in the southern track.

Table 9. Summary counts of Actionable Species seen on CCCA vessel surveys conducted on October 31-November 1, 2023.

<b>Fishing Zone</b>	<b>Humpback whales</b>	<b>Blue whales</b>
Zone 1	39-49	4
Zone 5	15	0

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

The semi-monthly average number of whales per half day trip in southern Monterey Bay is above the historical average for this period, but lower than during 2022 (Figure 6).

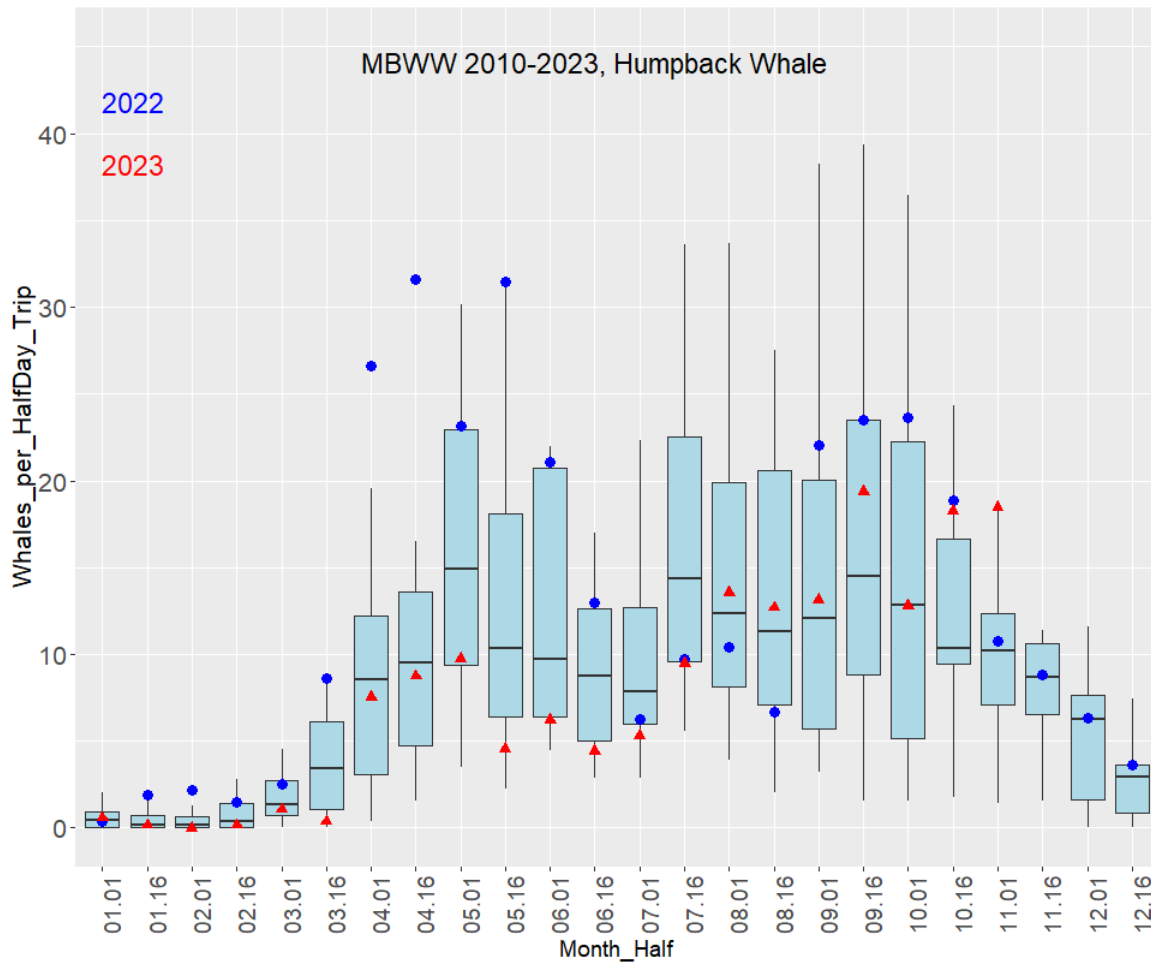


Figure 6. Historical Monterey Bay Whale Watch data for 2010-2023, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1<sup>st</sup>- 15<sup>th</sup>, 16<sup>th</sup>-end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average number of whales; the blue box shows the 25<sup>th</sup>-75<sup>th</sup> 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 October 29, 2023, show moderate habitat suitability in Fishing Zones 1-5 and high habitat suitability 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. Domoic Acid and Quality Testing

**Domoic acid:** Samples from collection sites in Fishing Zones 1, 2, 3, and 4 have been collected and submitted to the California Department of Public Health (CDPH) with [results through November 7, 2023](#) posted on the [CDPH domoic acid website](#). The

results so far indicate that no locations require additional testing at this time. Sampling in San Luis Obispo County is still being coordinated.

**Quality testing:** Results for crab were collected on November 8, 2023, from the three northern ports (Crescent City, Trinidad, and Eureka). Crescent City and Trinidad passed quality testing with 26.8% and 24.8%, respectively. Eureka failed with test results of 23.4% and will need to be retested. Under the Tri-State agreement Fishing Zones 1 and 2 are subject to a quality delay and will open no sooner than December 16<sup>th</sup>, 2023.

#### IV. 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](#).

#### V. Ocean conditions: §132.8(d)(9)

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

As of November 9, 2023, a strong El Niño is anticipated to continue in the Northern Hemisphere through spring 2024. Please visit the [NOAA ENSO Diagnostic webpage](#) for more information.

##### B. Large Marine Heatwave Tracker

As of October 4, 2023, the marine heatwave has decreased in area and receded from much of the coast. The current heatwave forecast suggests that coastal waters will continue to cool, and the heatwave will remain offshore through the fall. Unlike the events in 2014-15 (the last time this system had a strong marine heatwave with an El Niño looming), the current heatwave appears to be receding rather than building in strength, making it more similar to the heatwaves tracked over the past four years. Thus, we expect to see a return to cooler coastal temperatures until the El Niño brings back warmer coastal conditions in the late winter/early spring. Please visit the [NOAA Marine Heatwave Tracker webpage](#) for more information.

##### C. Habitat Compression Index

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.

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