

2024-2025 Risk Assessment Preliminary Assessment and Available Data for Risk Assessment Mitigation Program

Last updated: ~~October 18, 2024~~ October 22, 2024

PRELIMINARY ASSESSMENT

This Preliminary Assessment and Management Recommendation has been developed by the 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 reviewing the Working Group Recommendation and other relevant data.

Recommended Management Actions

Commercial Fishery:

- Season Delay: Fishing Zones 3, 4, 5, and 6
- Fishing Zones 1 and 2 will be evaluated during the next Risk Assessment, pursuant to Fish and Game Code section 8276.

Recreational Fishery:

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

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.....	- 13 -

Table 1. Fishing Zones and current/proposed 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	Closed	Not Assessed	Closed	Fleet Advisory
2	Closed	Not Assessed	Closed	Fleet Advisory
3	Closed	Season Delay	Closed	Crab Trap Prohibition; Fleet Advisory
4	Closed	Season Delay	Closed	Crab Trap Prohibition; Fleet Advisory
5	Closed	Season Delay	Closed	Fleet Advisory
6	Closed	Season Delay	Closed	Fleet Advisory

I. Management Recommendation Summary Rationale

Entanglements: Numerous humpback whale entanglements have been reported since the close of the 2023-24 fishing season. Table 2 describes confirmed Actionable Species entanglements in 2024 that have been reported by the National Marine Fisheries Service (NMFS) as of Oct. 18, 2024. Humpback whale entanglements in California commercial Dungeness crab fishing gear and Unknown Fishing Gear bring the three-year rolling average Impact Score to 5.44 (subject to revision), which exceeds the trigger as defined in RAMP for the commercial Dungeness crab fishery.

Marine Life Concentrations: Based on recent Marine Life Concentration surveys in Fishing Zones 1, 2, 3, 4 and 5, humpback whale sightings remain high. The Cascadia vessel survey conducted on Oct. 11, 2024, observed 99 humpbacks whales and two blue whales in Fishing Zone 3. The survey conducted on Oct. 16, 2024, observed 73 humpbacks whales in Fishing Zone 4. Monterey Bay Whale Watch data indicated an average number of humpback whales-per-half-daytrip during the last seven days of 22.1, with a peak of 42 whales observed during a half-day trip on Oct. 14, 2024. CDFW aerial surveys conducted on Oct. 10, 2024, observed 15 humpback whales and two blue whales in Fishing Zone 1. An additional CDFW aerial survey on Oct. 16, 2024, observed 14 humpbacks and one unidentified whale in Fishing Zone 4.

Marine Region's preliminary recommendation is for the Director to delay the commercial fishery in Fishing Zones 3-6. The Marine Region also recommends the prohibition of recreational crab traps in Fishing Zones 3 and 4 and the issuance of a Fleet Advisory for Fishing Zones 1-6 until the next Risk Assessment. These recommendations are based on the high 3-year rolling average Impact Score, exceedance of Marine Life Concentration data triggers and known migration patterns for humpback whales in Fishing Zones 3 and 4. Vessel surveys in Fishing Zone 3 in September showed concentrations of humpback

whales both feeding on krill at the shelf edge (associated with blue and fin whales) and also in shallower waters feeding on fish. By October humpback whale concentrations were seen primarily inshore in all areas. Furthermore, Regions 2 and 3, which include the north and central coast of California, showed high habitat compression in September 2024.

A Fleet Advisory for the recreational fishery in Fishing Zones 1 - 6 is recommended based on aerial survey data and known migration patterns of humpback whales. Under a trap prohibition, hoop nets will still be allowed, requiring increased precaution when setting gear to avoid entanglements in vertical lines.

It is anticipated that the delay and trap prohibition for commercial and recreational fishery would be in place until at least the next Risk Assessment, which is expected to occur on or around November 15, 2024. That assessment will inform a potential commercial fishery opener on December 1, 2024, and/or a lifting of the trap restriction for the recreational fishery.

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

- Gear Reduction - given the current exceedance of the Impact Score and elevated risk due to concentrations of humpback whales across Fishing Zones 3 and 4, this was not the recommended Management Action.
- Depth Restriction - will not sufficiently provide protection due to distribution of humpback whales across depths (particularly inshore depth ranges) and may concentrate 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 2024. Many entanglements categorized as “Unknown Fishing Gear” are actively being reviewed by NMFS staff and are subject to revision as new data becomes available. See “[FAQ: Impact Scoring for the Risk Assessment and Mitigation Program](#)” for information about the RAMP Impact Scores.

Table 2. Actionable Species Entanglements during 2024 pursuant to RAMP regulations. ***NOTE: Updated on October 22, 2024.**

Entanglement ID	Date	Species	Fishery	Impact Score
20241020Mn	10/20/24	Humpback whale	Unknown Fishing Gear*	0.38
20241019Mn	10/19/24	Humpback whale	Unknown Fishing Gear*	0.38
20241011Mn	10/11/24	Humpback whale	CA commercial Dungeness crab	0.75
20241009Mn	10/09/24	Humpback whale	Unknown Fishing Gear*	0.50
20240928Mn	09/28/24	Humpback whale	CA commercial Dungeness crab	0.75
20240927Mn_2	09/28/24	Humpback whale	CA commercial Dungeness crab	0.75
20240927Mn_1	09/27/24	Humpback whale	Unknown Fishing Gear*	0.38
20240922Mn	09/22/24	Humpback whale	Unknown Fishing Gear*	0.38
20240921Mn	09/21/24	Humpback whale	Unknown Fishing Gear*	0.38
20240905Mn	09/05/24	Humpback whale	Unknown Fishing Gear*	0.38
20240902Mn	09/02/24	Humpback whale	Unknown Fishing Gear*	0.38
20240713Mn	07/13/24	Humpback whale	Unknown Fishing Gear*	0.38
20240517Mn2	05/17/24	Humpback whale	Unknown Fishing Gear*	0.38
20240517Mn1	05/17/24	Humpback whale	CA commercial Dungeness crab	0.75

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.

*NOTE: Updated on October 22, 2024.

Actionable Species	Current Fishing Season Impact Score (2024-25)	Current Calendar Year Impact Score (2024)	3-Year Rolling Average
Humpback whales	0	6.16 6.92	5.44 5.70
Leatherback sea turtle	0	0	0.33

As of October 18, 2024, there have been zero Confirmed Entanglements of blue whales or leatherback sea turtles during the 2024-2025 period.

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

Data provided by: CA Department of Fish and Wildlife, US Coast Guard, Scott Benson and Karin Forney (NOAA SWFSC and Upwell), John Calambokidis (Cascadia Research Collective, in collaboration with the Marine Mammal Center), Monterey Bay Whale Watch (processed by Karin Forney, NOAA SWFSC)

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. * Denotes CDFW aerial survey did not cover the entire Fishing Zone due to conditions (fog).

Fishing Zone	CDFW-approved survey data	Triggers attained?
Zone 1	CDFW Aerial Survey, USCG Aerial Survey	No
Zone 2	CDFW Aerial Survey, USCG Aerial Survey	No
Zone 3	NOAA Leatherback Surveys, CRC Vessel Surveys,	Yes
Zone 4*	CDFW Aerial Survey, TMMC Vessel Surveys, NOAA Leatherback Surveys, MBWW	Yes
Zone 5*	CDFW Aerial Survey	No
Zone 6	None	NA

A. CDFW Surveys (Fishing Zones 1, 2, 4 and 5)

CDFW conducted aerial surveys on October 10 and 16, 2024, covering Fishing Zones 1, 2, 4 and 5. On October 10, 2024, CDFW surveyed Fishing Zones 1 and 2 between the coast and the 100-fathom line starting at Point Arena and heading north towards the Oregon border (Figure 1). The survey ended near Klamath River due to low fog cover obscuring visibility. Conditions up until the end of the survey were good with clear, sunny skies, Beaufort states of 1 and 2, and a survey altitude between 700-1000 ft. Two blue whales and 15 humpback whales were observed in Fishing Zone 1.

Table 5. Counts of Actionable Species seen by CDFW aerial surveys conducted on October 10 and 16, 2024. * Fishing Zone was not completely surveyed due to conditions (fog).

Date	Fishing Zone	Humpback whales	Blue Whales	Unidentified whales
10/10/2024	Zone 1	15	2	0
10/10/2024	Zone 2	0	0	0
10/16/2024	Zone 3	Not surveyed	Not surveyed	Not surveyed
10/16/2024	Zone 4*	14	0	1
10/16/2024	Zone 5*	0	0	0

CDFW Aerial Survey October 10, 2024_

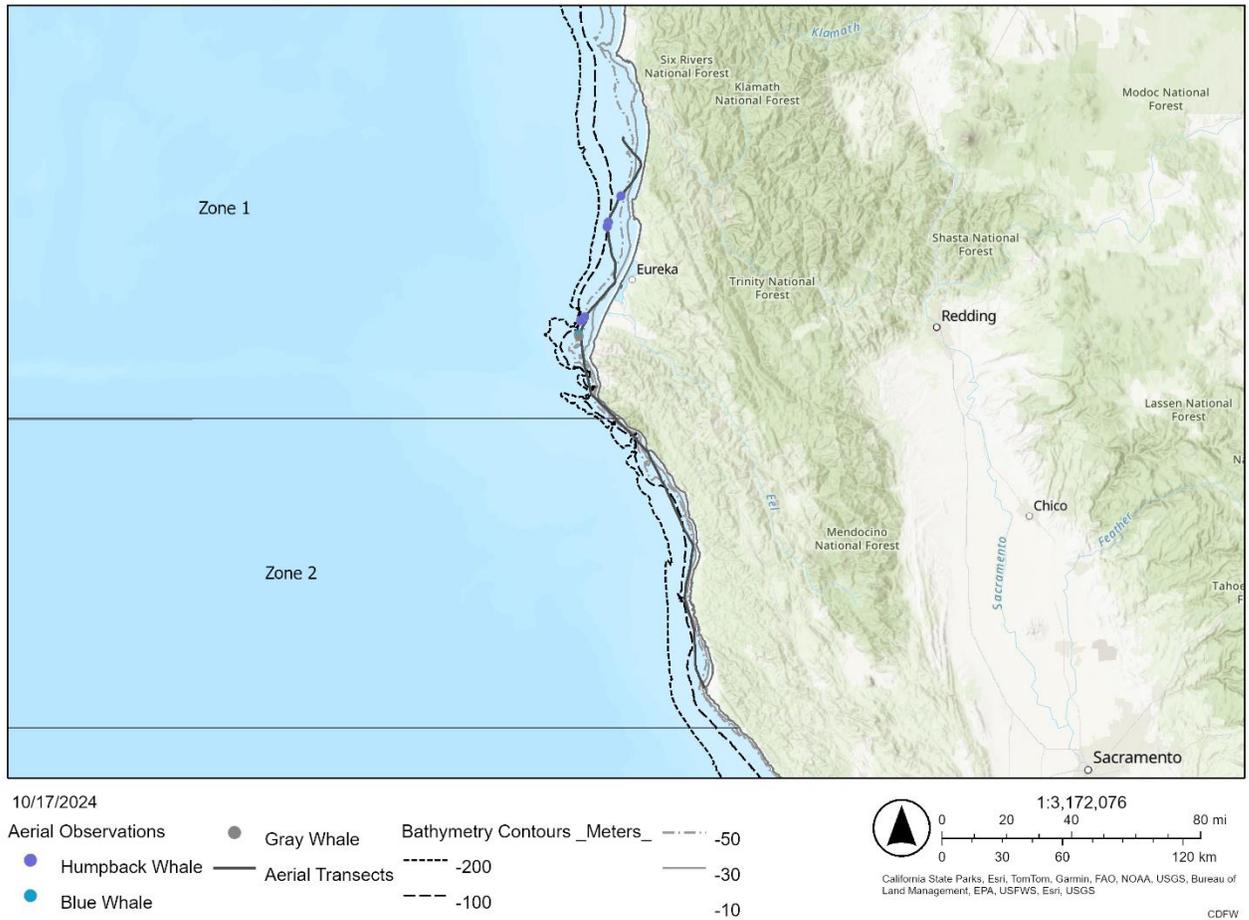


Figure 1. Flight path and observations from the CDFW aerial survey on October 10, 2024.

A second aerial survey was conducted by CDFW on October 16, 2024, in Fishing Zones 4 and 5 between the coast and the 100-fathom line (Figure 2). The survey began in San Simeon (Fishing Zone 5) and continued north towards Point Sur. The survey was paused due to fog and resumed south of Carmel, slightly seaward of the transect line due to fog inshore. The survey was unable to continue north beyond Davenport in Fishing Zone 3 due to the marine layer. Conditions were generally favorable, with Beaufort states of 2 and 3, and a survey altitude between 700-1000 ft.

CDFW Aerial Survey October 16, 2024

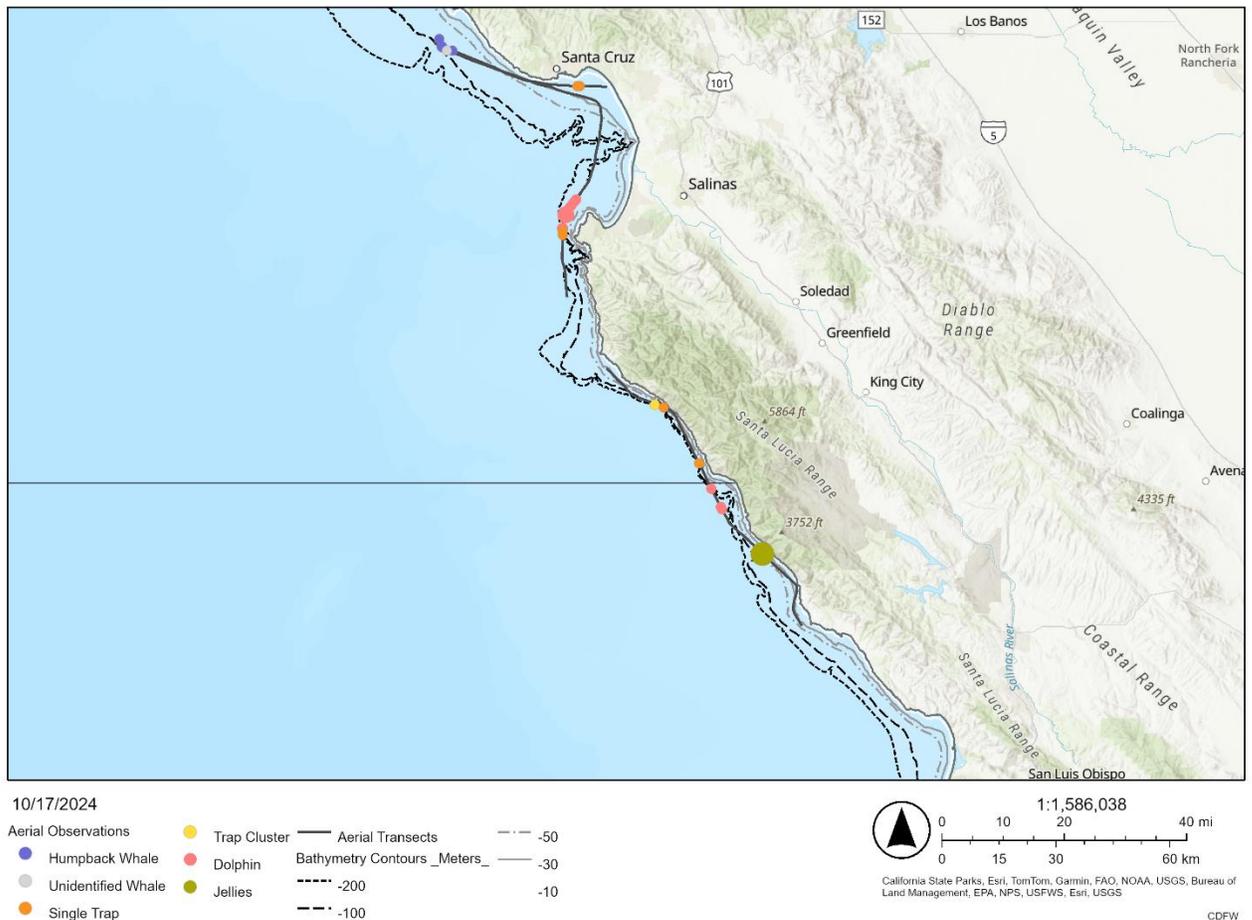


Figure 2. Flight path and observations from CDFW aerial survey on October 16, 2024.

B. US Coast Guard Survey (Fishing Zones 1-2)

***NOTE: Updated on October 22, 2024**

USCG conducted an aerial survey in Fishing Zones 1 and 2 on October 9, 2024, at around 1000ft between the 20 and 100-fathom contour lines (Figure 3). The survey began north of Eureka (Fishing Zone 1), continued south to Shelter Cove (Fishing Zone 2), and ended in Eureka. Conditions were poor with heavy fog obscuring observations. Observations were possible for a small portion of the survey path from the Cape Mendocino to Shelter Cove and in small pockets just north of Humboldt Bay. One unidentified whale was seen in Fishing Zone 1, but the weather conditions prevented species identification.

USCG Aerial Survey October 9, 2024

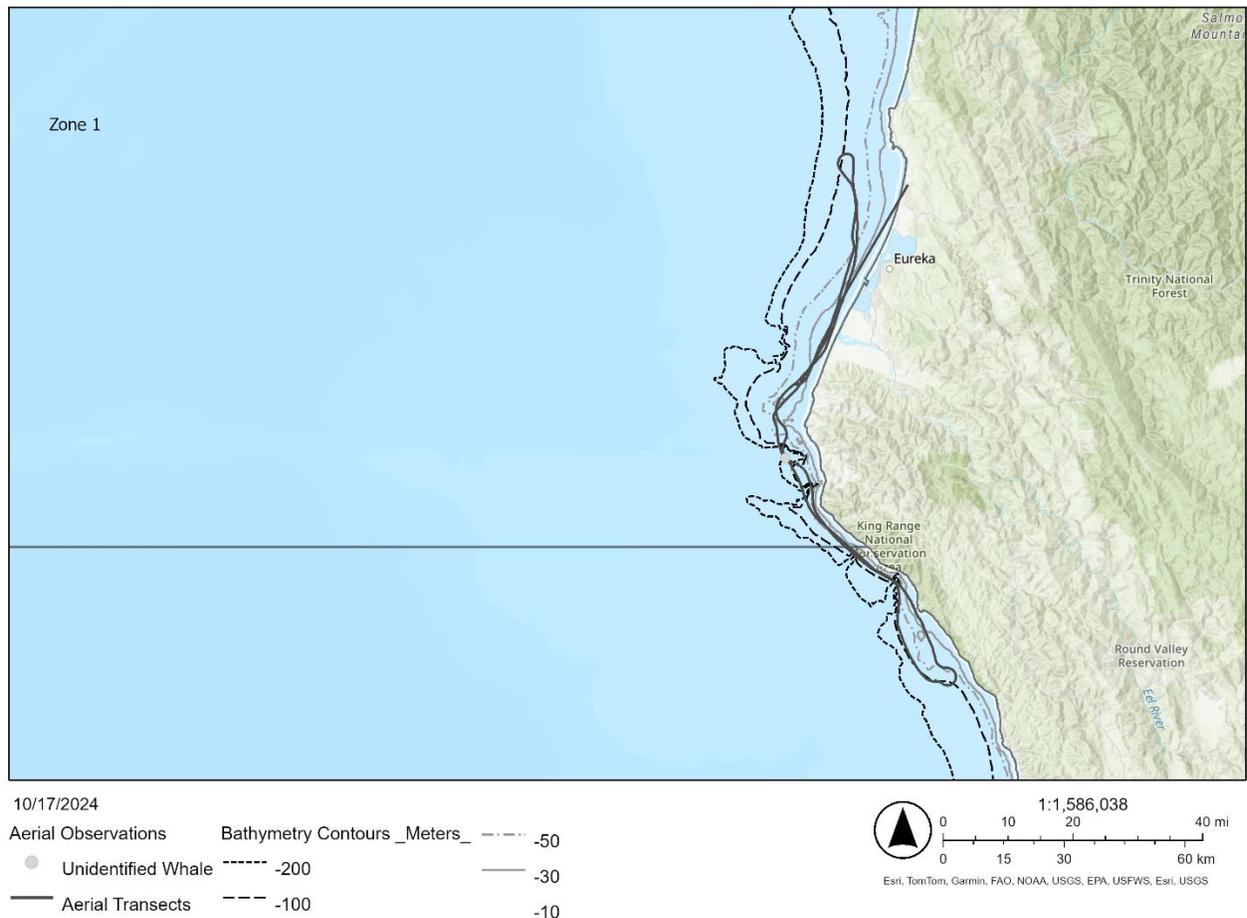


Figure 3. Flight path and observations from the USCG aerial survey on October 9, 2024.

C. Cascadia Research Survey (Fishing Zones 3-4)

***NOTE: Updated on October 22, 2024, additional data provided in the addendum beginning on page 18.**

Surveys were conducted by Cascadia and The Marine Mammal Center (TMMC) in Fishing Zones 3, and 4 in October 2024 and are summarized in Table 6 and Figures 4-5. Surveys observed increasing inshore distribution of humpback whales in all three Fishing Zones. Surveys in Fishing Zone 3 in September observed concentrations of humpback whales both feeding on krill at the shelf edge (associated with blue and fin whales) and in shallower waters feeding on fish. By October humpback whale concentrations were seen primarily inshore in all areas.

The Cascadia response team is conducting surveys in conjunction with TMMC in Monterey Bay due to reported sightings of what appeared to be 4-5 different entangled humpback whales.

Cascadia effort in all regions have provided large numbers of photographic identifications for abundance monitoring, sample collection, and tag deployments on blue and fin whales. UCSC is currently deploying LIMPET satellite tags on

humpback whales to provide some movement information. SWFSC is currently conducting a ship survey along the California Coast through October and November.

Table 6. Summary of Cascadia Research and The Marine Mammal Center vessel surveys in Fishing Zones 3 and 4 between October 11-16, 2024.

Date	Fishing Zone	Humpback whale sightings	# of humpback whales sighted	Blue whale sightings	# of Blue whales sighted	Unidentified whale sightings	# of unidentified whales sighted
10/11	3	34	99	1	2	0	0
10/16	4	16	73	0	0	0	0

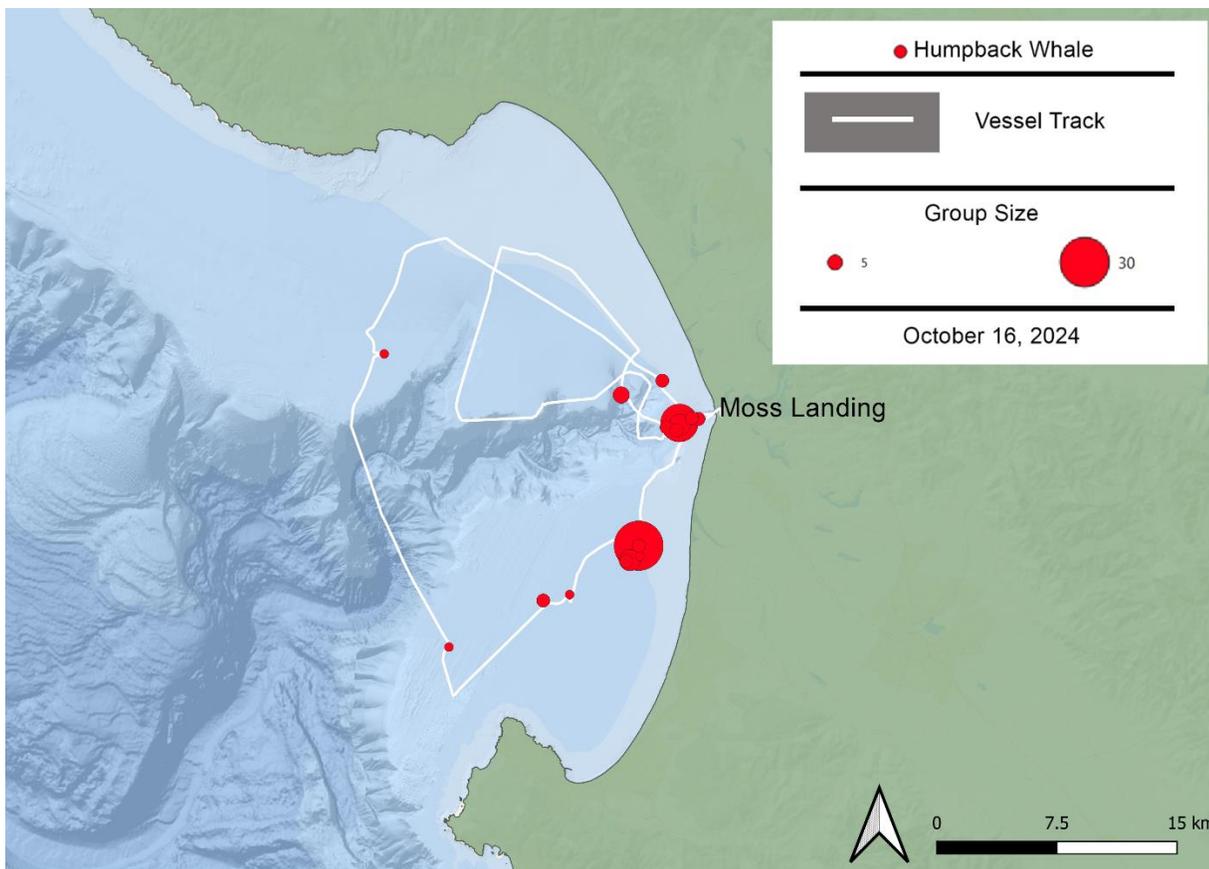


Figure 4. Survey effort and whale sightings during small boat surveys by TMMC/CRC in Fishing Zone 4 searching for reported entangled whales in Monterey Bay.

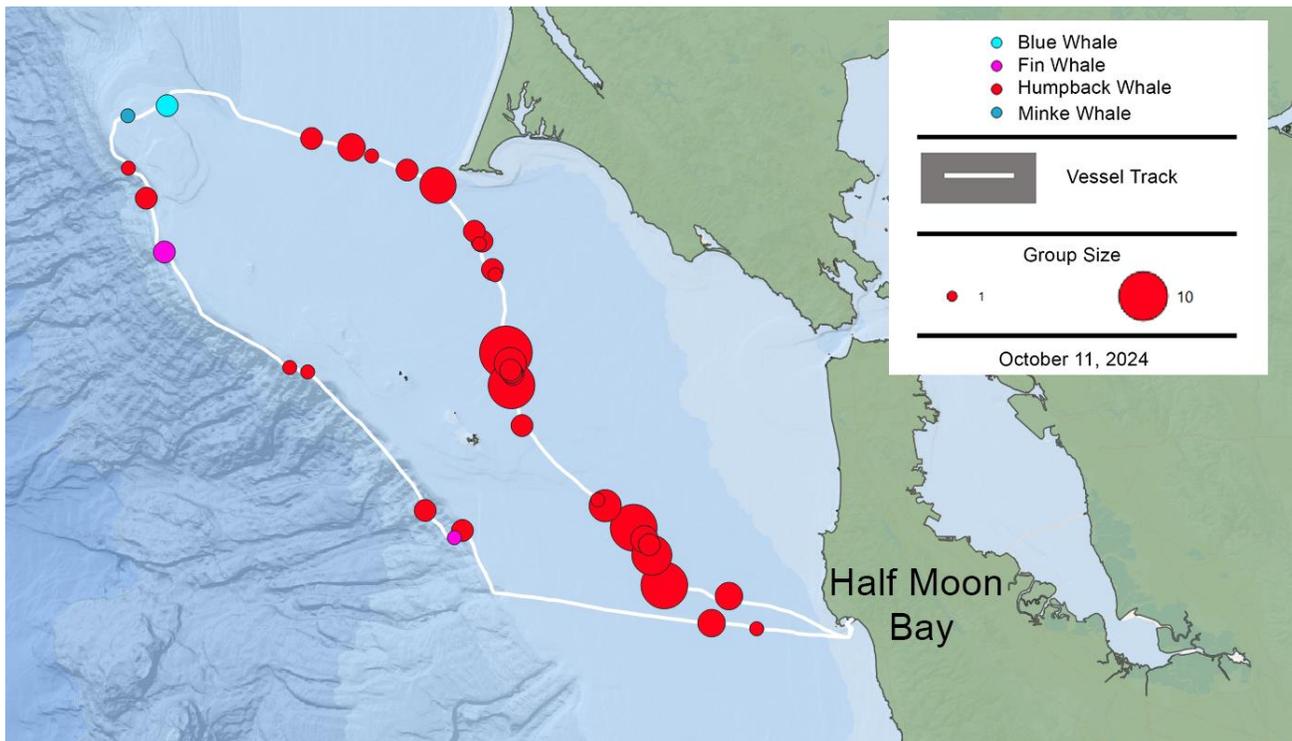


Figure 5. Survey effort and sightings from small boat survey by Cascadia in Fishing Zone 3 on October 11, 2024, through the Gulf of the Farallon's.

D. NOAA Aerial Leatherback Surveys (Fishing Zones 3 – 4)

***NOTE: Updated on October 22, 2024, additional data provided in the addendum beginning on page 18.**

Aerial surveys in support of leatherback sea turtle capture and tagging operations were conducted from September 10-19, 2024, within Fishing Zones 3 and 4. East-West transect lines spaced at 1-2 nm intervals were flown within Monterey Bay, the Gulf of the Farallon's, and between Bodega Head and Point Reyes.

The observation team consisted of two observers who searched through a bubble window (non-glare side) and a belly port, plus a data recorder. Standardized survey methods were applied from a Partenavia P-68 Observer aircraft to record whales, turtles, dolphins/porpoises, and other ecosystem indicator species such as forage fish, sea nettles and moon jellies (leatherback prey), and ocean sunfish (Molas', which are often found in the same habitat as leatherback turtles and also feed on jellies). Surveys were compromised by persistent low clouds and fog, particularly in the Gulf of the Farallon's. Multiple surveys were forced to fly beneath the cloud layer rendering poor light conditions which made detection of marine species difficult.

Although no leatherback turtles were observed during the aerial surveys, two leatherback sightings were made by the in-water team in foggy conditions approximately five miles directly west of Pillar Point (Half Moon Bay). Without aerial support, the in-water team eventually lost sight of these turtles in foggy conditions.

Low to moderate aggregations of jellyfish (brown sea nettles, and egg yolk jellies) were documented from about Half Moon Bay to San Francisco, and near Año

Nuevo, mostly in water depths of about 20-30 fathoms where large ocean sunfish were also present, indicating that suitable foraging habitat for leatherback turtles was present.

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

Monterey Bay Whale Watch conducted whale-watching trips in southern Monterey Bay on six of seven days during the week of October 8-14th 2024. The 7-day average number of humpback whales-per-half-daytrip during October 8-14th 2024 was 22.1 (Figure 6), with a peak of 42 humpback whales observed on an all-day trip on 14 October 2024. Blue whales were documented on several trips during late July and August, but none have been observed since August 30, 2024.

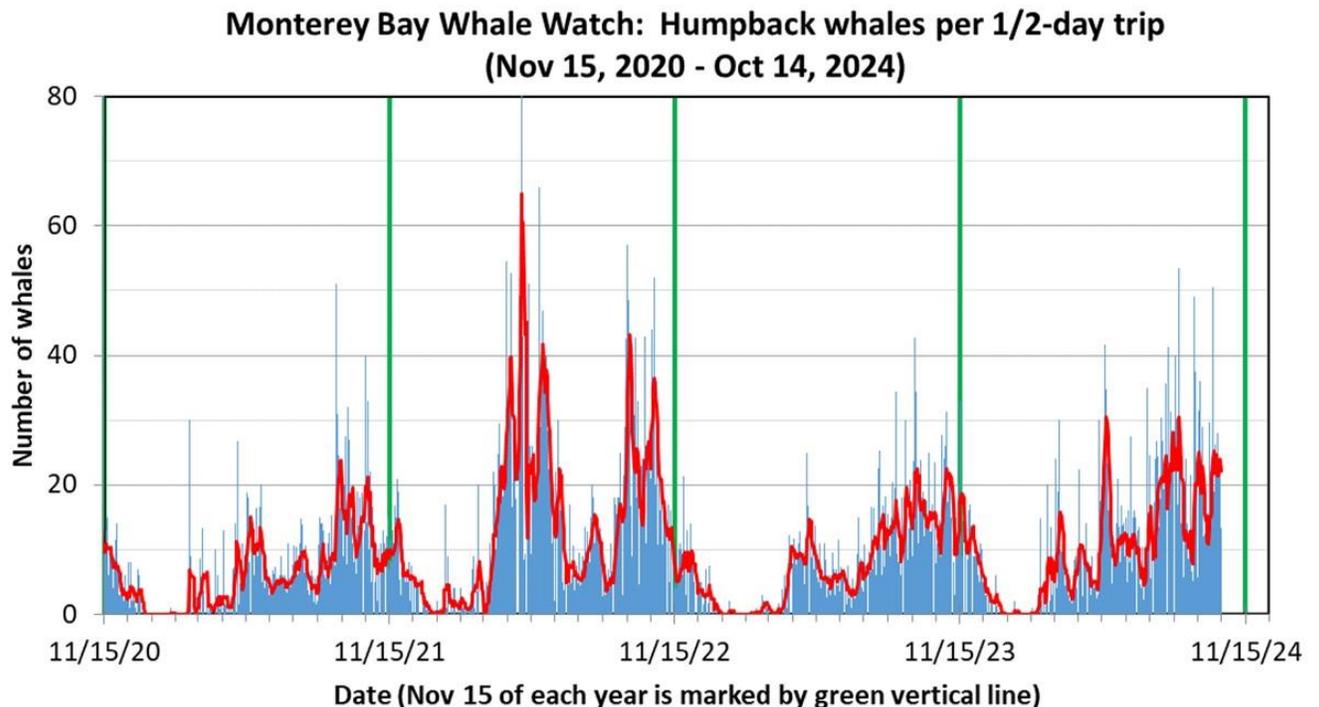


Figure 6. Standardized number of humpback whale sightings for Monterey Bay Whale Watch from 15 November 2020 – 14 October 2024. The y-axis is the number of whales per half-day trip; the thin blue bars are the average daily whale numbers, and the red line is a 7-day running average to make the patterns a bit easier to see. A vertical green line has been added on 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.

As of October 18, 2024, NMFS has reported four confirmed CA commercial Dungeness crab gear entanglements and eight Unknown Fishing Gear entanglements for the 2024 calendar year. Many entanglements categorized as “Unknown Fishing Gear” are actively being reviewed by NMFS staff and are subject to revision as new data becomes available. For more entanglement information please see the CDFW [Recent Entanglement History document](#).

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

Data provided by: Point Blue Conservation Science, 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 7. 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 October 18, 2024.

Fishing Zone	Number of humpback whales sighted	Number of blue whales sighted
Zone 3	43	0
Zone 4	87	0
Zone 6	48	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 is greater than the historical average for this time of year (Figure 7).

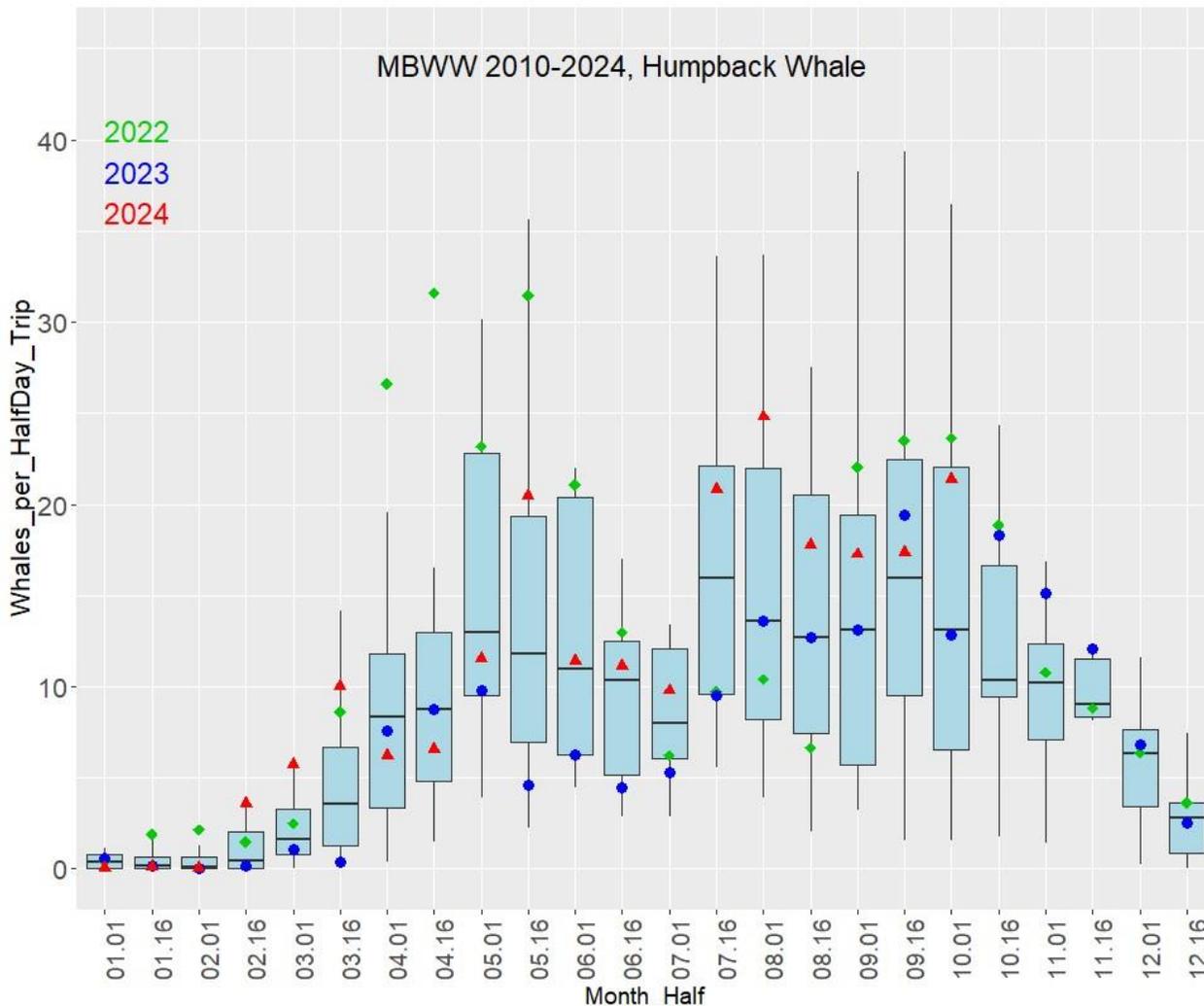


Figure 7. Historical Monterey Bay Whale Watch data for 2010-2024, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th-end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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.

C. Whale Watch 2.0 (All Fishing Zones)

Blue whale habitat predictions for September 5, 2024, show high habitat suitability throughout Fishing Zones 1-6. Current habitat suitability can be accessed at [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 (Fishing Zones 1, 3, 4, and 5)

***NOTE: Updated on October 22, 2024.**

- Most samples from collection sites in Fishing Zones 1, 3, 4 and 5 have been collected and submitted to the California Department of Public Health (CDPH) with [results through October 18, 2024](#), posted on the [CDPH domoic acid website](#).
 - The results indicate one location in [southern Fishing Zone 1](#) and one location in northern Fishing Zone 3 will require additional retesting at this time. Concentrations of domoic acid in the meat of crab with elevated concentrations of domoic acid in the viscera are below action levels that would otherwise warrant a recreational closure. These results so far would likely result in [an advisory from the Department of Public Health](#) for the following two areas:
 - Northern Zone 3: Point Reyes (38° 0.000' N. lat.) north to the Sonoma/Mendocino County line (38° 46.125' N. lat.) and,
 - Southern Zone 1: Cape Mendocino (40° 10.000' N. lat.) north to the southern boundary of the Reading Rock State Marine Reserve (41° 17.600' N. Lat.)
 - CDPH pending test results are from the following port locations: Crescent City, Fort Bragg, San Francisco, and Morro Bay
 - Crab sample collections at remaining sites in Mendocino and Humboldt counties are still being coordinated
- Quality testing logistics are still being finalized. Crab quality criteria only affect Fishing Zones 1 and 2.

B. Lost Trap Summary (2023-24 Season)

RAMP regulations require permit holders to submit the total number of lost traps at the conclusion of the fishing season to be reported on the final bi-weekly report that is submitted to the Department. Table 8 reflects the total number of lost traps reported during the 2023-24 fishing season.

Table 8. Total number of lost traps reported at the end of the 2023-2024 season by Fishing Zone (1-5). NR-C refers to data withheld due to confidentiality.

Fishing Zone	Lost Traps Reported
Zone 1	822
Zone 2	118
Zone 3	732
Zone 4	116
Zone 5	NR-C
Total	1,788

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

A. MBARI Krill Model

Modeled zooplankton conditions for September 2024 show areas of higher-than-average concentrations from Point Arena to Point Conception (Fishing Zones 3-5) and lower-than average concentrations along 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

ENSO-neutral conditions are present throughout the central and eastern Pacific Ocean. La Nina conditions are anticipated to emerge late October to November (60% chance) and are expected to be weak and short. Please visit [the NOAA ENSO Diagnostic webpage](#) for more information.

B. Large Marine Heatwave Tracker

As of September 12, 2024, a large marine heatwave is expanding into the coastal regions. The heatwave is following patterns similar to offshore heatwaves in the past five years in this region, strengthening in the fall and possibly declining in the upcoming months. Please visit the [NOAA Marine Heatwave Tracker webpage](#) for more information.

C. Habitat Compression Index

Regions 2 and 3, which include the north and central coast of California, showed high habitat compression in September 2024 (Figure 8).

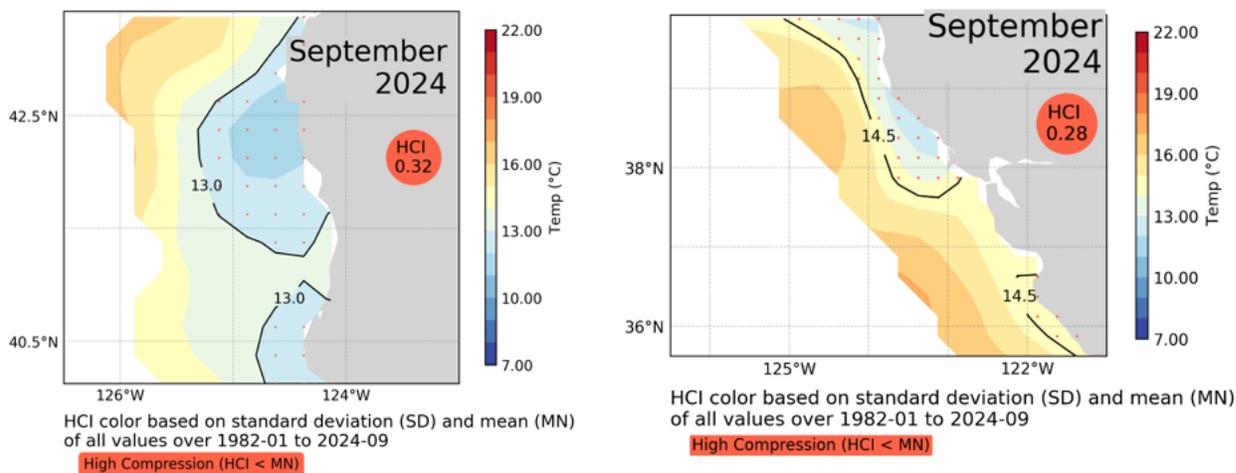


Figure 8. Spatial structure of the Habitat Compression Index for Region 2 (40 to 43.5° N: left side). And Region 3 (35 to 40° N: right side).

Please visit the [NOAA Habitat Compression Index webpage](#) for more information.

D. Annual Forage Species Indices

Annual forage species indices indicate a continued high abundance of adult and young of the year anchovies. Although lower than previous years, abundance indices are greater than the long-term average.

Krill abundance is average across the central coast, but higher than average in the northern region.

High abundance of anchovies closer to shore was seen throughout summer and is anticipated to continue. High anchovy abundance, coinciding with persistent high habitat compression, will likely result in continued increased whale sightings and higher

whale abundance closer to shore in the central coast region (Figure 9).

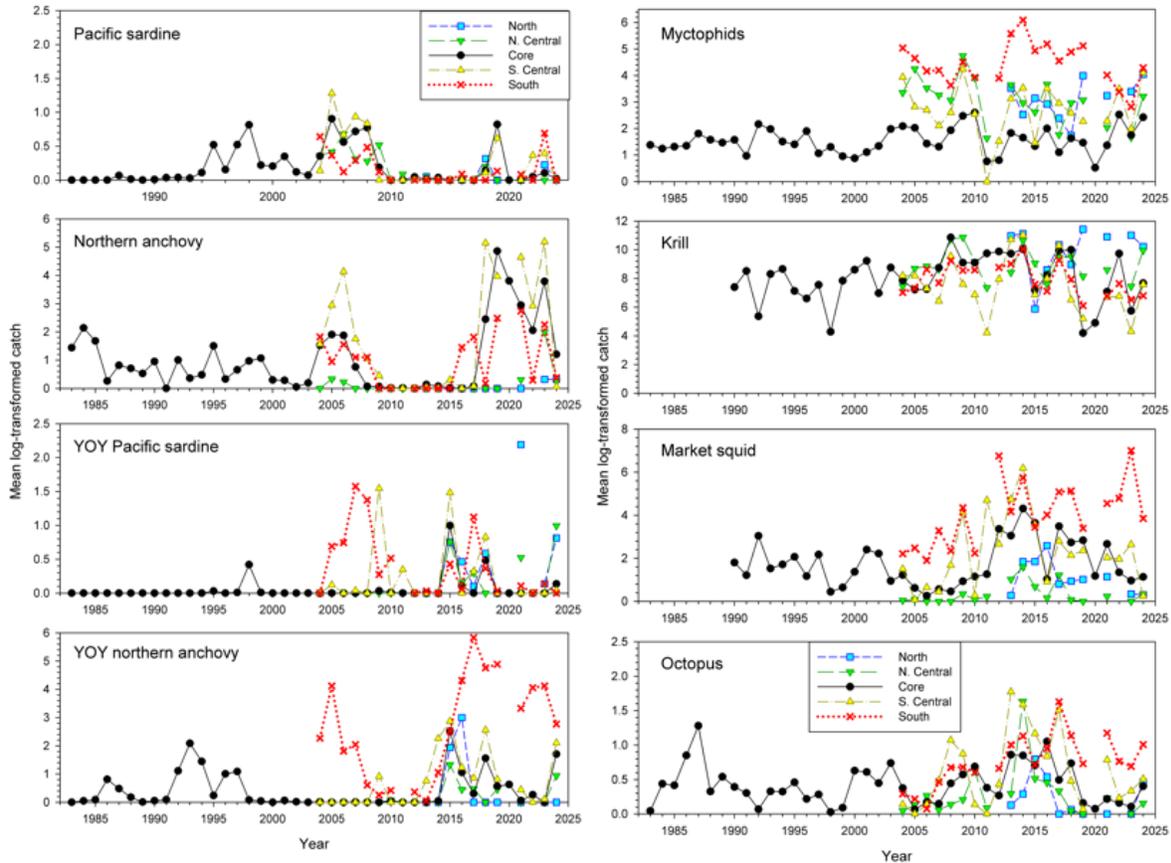


Figure 9. Annual indices of forage species regional abundance (Catch per unit effort; CPUE; YOY is Young-of-the-Year); updated from 2024 NOAA-NMFS Rockfish Recruitment and Ecosystem Assessment Survey (RREAS), May 1 – June 18, 2024. Derived from the RREAS annual project report.

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

Addendum: October 22, 2024

Triggers Requiring Management Action

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

Data provided by: Scott Benson and Karin Forney (NOAA SWFSC and Upwell), John Calambokidis (Cascadia Research Collective, in collaboration with the Marine Mammal Center and UCSC).

A. NOAA Aerial Leatherback Surveys (Fishing Zones 3 – 4)

Data provided by Scott Benson and Karin Forney (NOAA SWFSC and Upwell)

An additional aerial survey was conducted on October 19, 2024, within the Gulf of the Farallon's to assess leatherback presence and foraging habitat conditions. Weather conditions were excellent, and the team documented all observations of RAMP target species (leatherbacks, humpback whales, blue whales), and their respective prey (jellies, schooling fish, and krill).

No leatherback turtles were observed, but foraging habitat was identified (Figure 10), see ecosystem indicator species below). Leatherback foraging habitat was identified from Pillar Point to the Farallon Islands within water depths of about 20-40 fathoms, as indicated by jellyfish patches (egg yolk jellies and brown sea nettles, which are the primary leatherback prey), and numerous large ocean sunfish (aka 'Molas', which are often found in the same areas as leatherbacks); See Figure 10.

Schooling fish were observed during the surveys, including near humpback whales and dense aggregations of piscivorous (fish-eating) seabirds, including Brown Pelicans, Common Murres, and a variety of gulls (Figure 11). Large ocean sunfish (Mola), which are often found in the same habitat as leatherbacks and feed on the same jellyfish prey (i.e., brown sea nettles) were also recorded.

During the aerial survey, 63 sightings of 108 individual humpback whales were documented on October 19, 2024, with most whales observed in water depths of 30-50 fm, but several additional whales were seen in shallower waters (Figure 11). One blue whale was observed in about 30 fathoms of water within the Gulf of the Farallon's (Figure 11).

Aerial survey transects and sightings
of large ocean sunfish (*Mola*) and jellyfish
19 October 2024

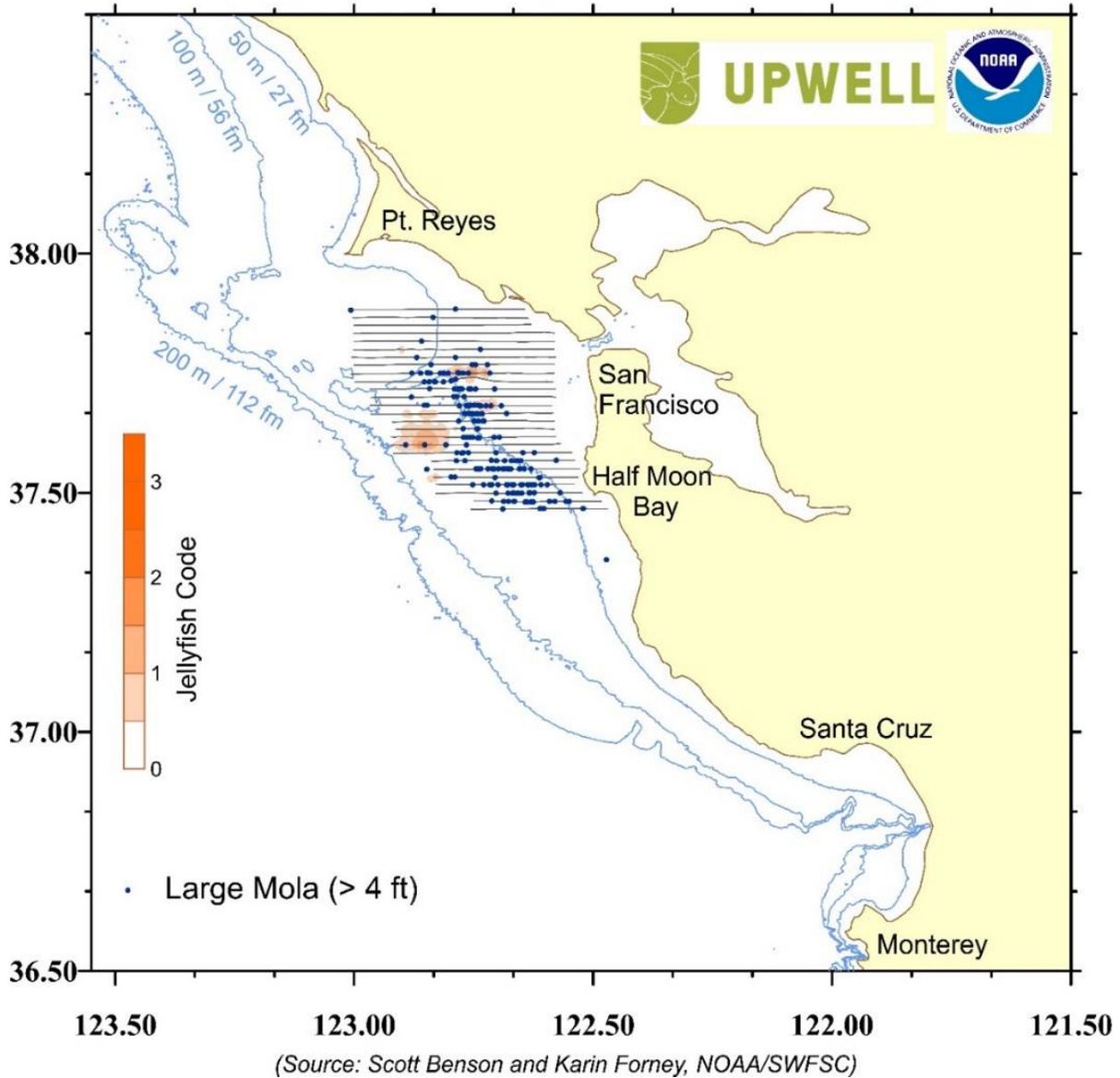


Figure 10. Aerial survey track lines and observations of large molas and jellyfish within the Gulf of the Farallon's on October 19, 2024.

Aerial survey transects, whale sightings,
and observations of schooling fish,
19 October 2024

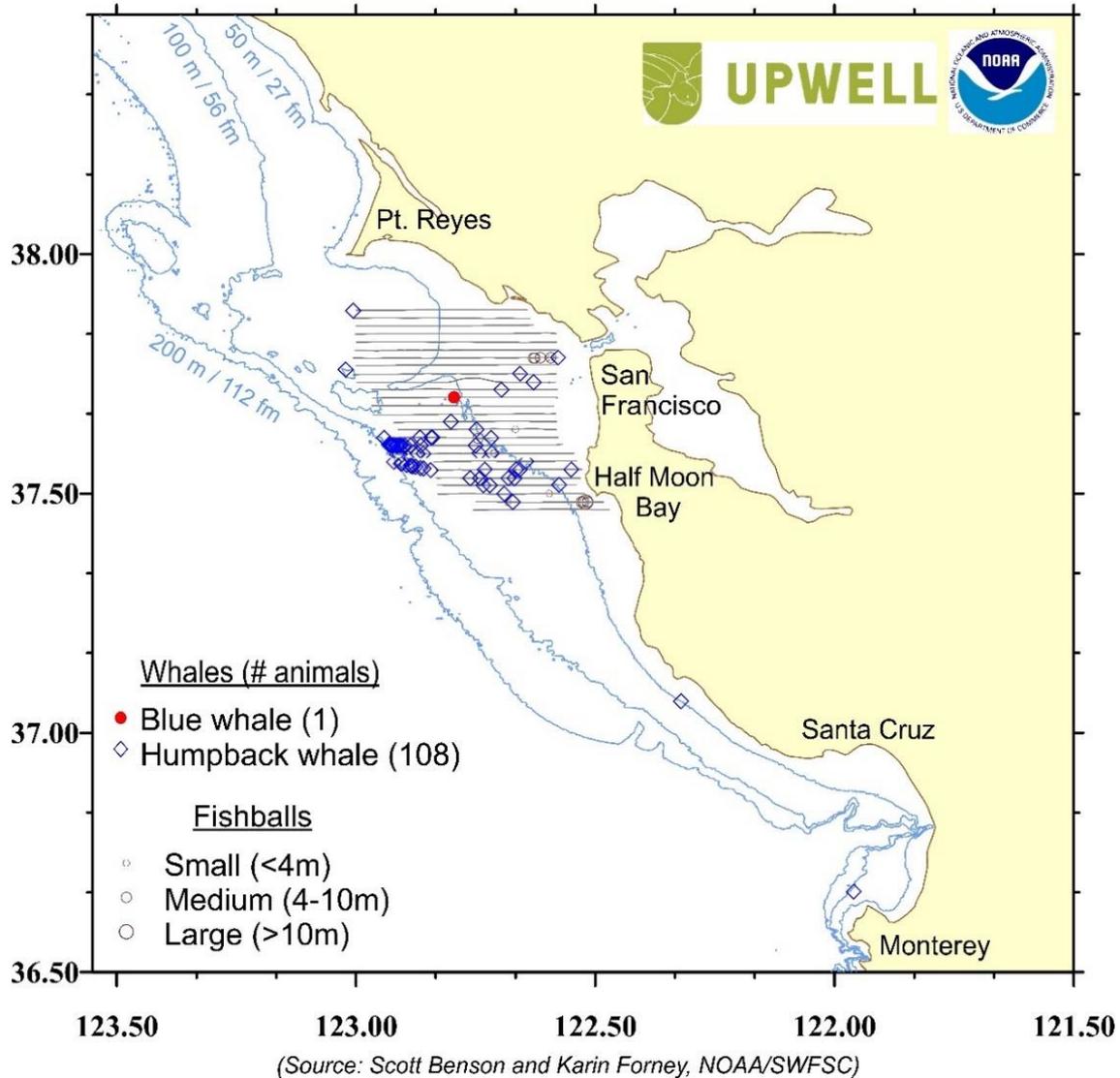


Figure 11. Aerial survey track lines and observations of humpback whales, a single blue whale, and schooling fish within the Gulf of the Farallon's on October 19, 2024. The total number of individual whales observed is indicated in parentheses.

Cascadia Research Survey (Fishing Zones 3-4)

Cascadia Research Collective and The Marine Mammal Center conducted vessel surveys in Monterey Bay and Half Moon Bay from October 18, 2024, to October 21, 2024. Vessel surveys recorded humpback whale sightings as well two entangled whales (Figure 12).

Table 10. Summary of Cascadia Research vessel surveys in Fishing Zones 3 between October 18-21, 2024.

Date	Fishing Zone	Vessel	Effort (nm)	Entangled whales	Unique IDs	Identifications	Central America DPS	Mexico DPS	Hawaii DPS
10/18	3	Robustus	31	0	20	17	4	6	0
10/19	3	Robustus	105	1	20	18	4	7	0
10/20	3	Yoshiko	71	1	4	2	1	0	0
10/20	3	Robustus	76	0	27	21	4	6	1
10/21	3	Robustus	64	0	9	8	2	3	0

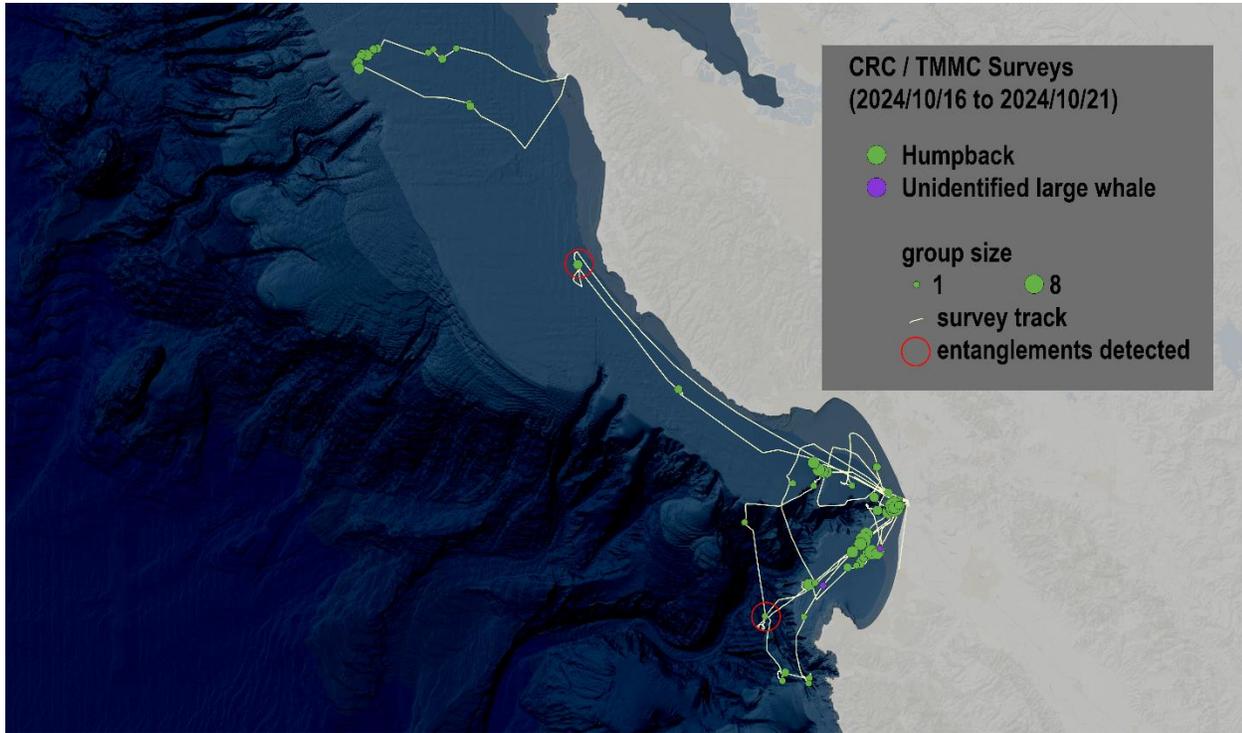


Figure 12. Surveys related to entanglements conducted by Cascadia and TMMC since 16 October 2024.

UCSC also recorded the movement patterns of six humpback whales that were satellite tagged in October 2024 in Monterey Bay (Figure 13).

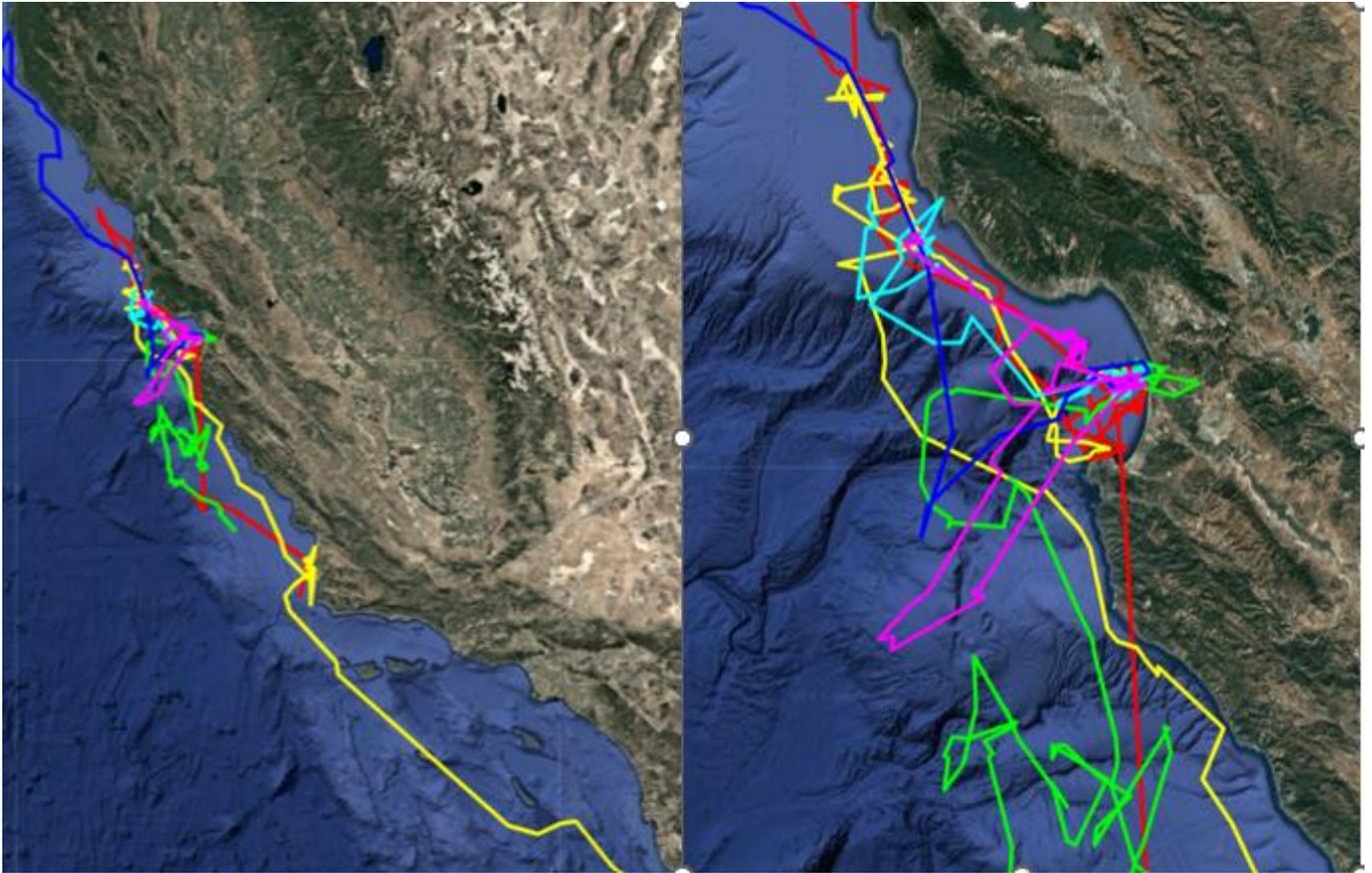


Figure 13. Tracks of six satellite tagged humpback whales deployed by UCSC in October 2024 in Monterey Bay. Right shows a zoomed in portion.