



**CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (DEPARTMENT)  
DECLARATION OF FISHING SEASON DELAY FOR  
THE COMMERCIAL DUNGENESS CRAB FISHERY AND TEMPORARY CRAB TRAP  
PROHIBITION FOR THE RECREATIONAL CRAB FISHERY  
DUE TO RISK OF MARINE LIFE ENTANGLEMENT**

Pursuant to Fish and Game Code Section 8276.1(b) and California Code of Regulations, Title 14, Sections 132.8 ("Section 132.8") and Section 29.80(c)(7) ("Section 29.80(c)"), I find and declare that:

I

On November 1, 2021, I evaluated entanglement risk for the commercial Dungeness crab fishery pursuant to Section 132.8(b) and the recreational Dungeness crab fishery pursuant to Section 29.80(c). I provided the California Dungeness Crab Fishing Gear Working Group (Working Group) and the Whale Safe Fisheries email listserv with notice of the risk assessment and all non-confidential data under consideration on October 22, 2021, and with an updated notice of all non-confidential data on October 29, 2021. Prior to this risk assessment and management response, I considered the Working Group's October 26, 2021, management recommendation and other relevant information provided to my staff, and consulted with the president of the Fish and Game Commission.

II

On October 18 and 19, staff from the Department's Marine Region conducted aerial surveys of Fishing Zones 2 through 5 and observed 48 Humpback whales in Fishing Zone 3. Aerial surveys undertaken by NOAA researchers throughout October showed Humpback whale abundances ranging from 34 to 96 whales in Fishing Zone 3. Pursuant to Section 132.8(c)(2)(A)(4)(a), I must implement a protective management action in the commercial crab fishery.

III

NOAA-standardized data from commercial whale-watching trips in Fishing Zone 4 throughout the summer and fall show continued presence of Humpback whales, with the most recent weekly running average of 18.9 Humpback whales in Monterey Bay. Pursuant to Section 132.8(c)(2)(A)(4)(a), I must implement a protective management action in the commercial crab fishery.

IV

Aerial surveys undertaken by NOAA researchers throughout October showed at least four distinct individual Pacific leatherback sea turtles in Fishing Zone 3. Additionally, telemetry

data show a Pacific leatherback sea turtle foraging in Fishing Zones 3 and 4. Pursuant to Section 132.8(c)(2)(A)(4)(c), I must implement a protective management action in the commercial crab fishery.

V

Numerical triggers for marine life concentrations have been reached in Fishing Zones 3 and 4 for Humpback whales and Pacific leatherback sea turtles. Pursuant to Section 29.80(c), I must implement a protective management action in the recreational Dungeness crab fishery. Section 29.80(c) requires that any temporary prohibition on the use of crab traps extend the general crab trap prohibition outlined in Section 29.80(c)(4).

VI

Upon evaluation of the management considerations pursuant to Section 132.8(d), I have determined that the management action listed below protects Humpback whales and Pacific leatherback sea turtles based on the best available science. Additional information on the relevant management considerations is provided in the attachment to this declaration.

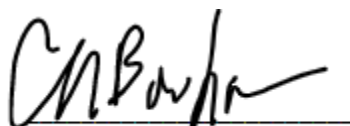
VII

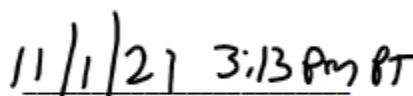
**THEREFORE**, under the authority granted by Fish and Game Code Sections 8276.1(b) and Sections 132.8 and 28.80(c) of Title 14 of the California Code of Regulations, I am implementing the following management actions:

1. The opening of the commercial Dungeness crab fishery in Fishing Zones 3 and 4 is delayed. Take and possession of commercially caught Dungeness crab is prohibited in the delayed Fishing Zones.
2. The deployment and use of crab traps in any recreational fishery is temporarily prohibited in Fishing Zones 3 and 4.

This management action is in effect until modified. The next risk assessment is expected to occur on or before November 22, 2021.

Updates and material regarding future entanglement risk evaluations in the commercial Dungeness crab fishery will be made available on the Department's Whale Safe Fisheries [web page](#).

  
Charlton H. Bonham, Director

  
Date/Time

ATTACHMENT TO DIRECTOR'S NOVEMBER 1, 2021 DECLARATION OF FISHING  
SEASON DELAY FOR THE COMMERCIAL DUNGENESS CRAB FISHERY AND  
TEMPORARY CRAB TRAP PROHIBITION FOR THE RECREATIONAL DUNGENESS  
CRAB FISHERY  
DUE TO RISK OF MARINE LIFE ENTANGLEMENT

Information referenced in this Attachment is further described in the Available Data compilation dated October 29, 2021 and located at the Department's [Whale Safe Fisheries web page](#), which to the Department's knowledge represents the best available science informing the management considerations in Section 132.8(d).

**Information Supporting Trigger for Management Action Under Section 132.8(c)**

**Marine Life Concentrations:**

- **Fishing Zone 3:** 48 Humpback whales observed during CDFW aerial surveys, and 32 humpback whales observed during NOAA and Upwell surveys, in addition to Pacific leatherback sea turtles.
- **Fishing Zone 4:** weekly running average of 18.9 Humpback whales based on Monterey Bay Whale Watch data. Pacific leatherback sea turtles observed during NOAA and Upwell surveys.

**Relevant Management Considerations Under Section 132.8(d)**

**1. Working Group Management Action Recommendation and Best Available Science Made Available to the Department**

The Working Group recommended a delay of the recreational crab trap fishery in Fishing Zones 1 and 2 until November 12, 2021, to then open with a Fleet Advisory; and to open the commercial trap fishery in Fishing Zones 1 and 2 on December 1, 2021, with a Fleet Advisory. However, the group recognized the dates were subject to change based on the next risk assessment. For Fishing Zones 3 and 4, the group recommended delaying the recreational crab trap fishery until November 12, 2021, to then open with a Fleet Advisory, and the commercial fishery until November 19, 2021, to then open with a Fleet Advisory; both dates would be subject to change based on the next risk assessment. The Working Group supported opening the recreational fishery and commercial fisheries in Fishing Zones 5 and 6 on time under a Fleet Advisory.

The recommendation memo is available on the Department's [Whale Safe Fisheries web page](#).

No other information was made available to the Department.

## **2. Information from NOAA**

No additional information was provided for this risk assessment.

## **3. Effectiveness of Management Measures to Minimize Entanglement Risk**

Based on the available information, a temporary prohibition on the use of recreational crab traps in Fishing Zones 3 and 4 and a delay of the commercial season in Fishing Zones 3 and 4 is likely to be the most effective management action to reduce entanglement risk. A season delay/temporary prohibition would prevent crab traps from entering the water, which removes any entanglement risk from both the commercial and recreational fishery in those Zones. Additionally, a season delay is the anticipated management action in Section 132.8(c)(2)(1)(4)(a) in response to concentration triggers being reached for Humpback whales and Pacific leatherback sea turtles.

Based on data for Fishing Zones 5 and 6, Humpback whale concentrations are minimal. A Fleet Advisory will keep anglers aware of the possibility of marine life entanglements in the area, even though risk is low, and encourage them to modify fishing practices accordingly.

## **4. Total Economic Impact to the Fleet and Fishing Communities**

Total economic costs are considered when deciding between management measures that equivalently reduce entanglement risk. A commercial season delay will impact operators and businesses. There will be economic impacts to individual operators, however given the risk of entanglement (which is expected to decrease), the short-term economic impacts must be weighed against the longer-term viability of the commercial fishery across California.

Economic impacts from a temporary recreational trap prohibition are unknown at this time given the lack of data on the fishery, however businesses dependent on recreational fishing activity may be impacted.

## **5. Data Availability Within and Across Fishing Zones**

CDFW and/or USCG aerial survey data are available for Fishing Zones 1 through 5. NOAA and Upwell aerial survey data are available for Fishing Zones 3 and 4. Monterey Bay Whale Watch (MBWW) data are available for Fishing Zone 4. Cascadia Research vessel survey data are available for Fishing Zones 3 through 6. Point Blue Conservation Science observation data are available for Zones 3, 4, and 6. The Habitat Compression Index is available for Zones 2, 3, 4 and the northern portion of Zone 5. Whale Watch 2.0 habitat predictions are available for all Zones. The Department considers this comprehensive data set to adequately cover the full

geographic extent of Fishing Zones 1 through 6 to inform the appropriate management response.

## **6. Known Historic Marine Life Migration Patterns**

Seasonal migration for Humpback whales out of California waters typically occurs in November and early December. Humpback whales are anticipated to migrate from north-central California (where high numbers of Humpback whales were observed) south to Mexico and Central America. Aerial surveys indicate continued presence of large aggregations of Humpback whales across Fishing Zones 3 and 4. Based on MBWW data, observed Humpback whale numbers are above average when compared to historical data, which may indicate that the bulk of the migration has yet to begin.

Pacific leatherback sea turtles typically forage in an area extending from Monterey Bay to Point Reyes during the summer months. Recent surveys and satellite tagging observations indicate foraging turtles are still present in Fishing Zones 3 and 4.

## **7. Fishing Season Dynamics**

Preliminary domoic acid testing results indicate a potential delay for the commercial fishery in the northern portion of Zone 3. Results for an area that encompasses Zones 5 and 6 are pending. Quality testing is not applicable to Fishing Zones impacted by the November 15 season opener. It is unclear how fishing effort may shift given any season delays, but any season opener is expected to result in relatively high gear concentrations.

## **8. Known Distribution and Abundance of Key Forage**

Abundant schooling fish, a key prey element for Humpback whales, were evident during aerial surveys conducted off the coast of San Mateo County and the Gulf of the Farallones. Presence of dense aggregations of brown sea nettles and abundant large molas, indicators of leatherback foraging habitat, was evident from around Point Reyes to Pigeon Point within water depths of 20-40 fathoms, as well as between Davenport and Año Nuevo. Krill were not observed.

## **9. Ocean Conditions**

La Niña conditions are currently forecast, with an 87% chance of La Niña in December 2021-February 2022. Waters in the Southern California Bight (Fishing Zone 6) remain warmer than normal. Within Fishing Zones 1-5, nearshore waters are cooler than usual for this time of year.

## **10. Current Impact Score Calculations**

- a. Fishing Season – n/a
- b. Calendar Year – 1.13 for Humpback whales; 0 for Blue whales and Pacific leatherback sea turtles

## **11. Marine Life Concentrations and Distribution During the Current Fishing Season**

The large numbers of humpback whales distributed across Fishing Zones 3 and 4 is an indication that significant migration has yet to occur out of central California waters. Aerial and vessel survey data is supported by MBWW data and Point Blue Conservation Science observation data collected by trained naturalists associated with the National Marine Sanctuaries and National Park Service as well as trained observers. Leatherback sea turtles are also still present within the Gulf of the Farallones and offshore of Monterey Bay. Humpback whales were observed foraging in 20-50 fathoms and Leatherback sea turtles were observed foraging in 20-40 fathoms.

### **Chosen Management Action and Rationale**

Based on the management considerations outlined above, the Director will implement a delay of the November 15, 2020 opening of the commercial Dungeness crab season in Fishing Zones 3 and 4, and temporary crab trap prohibition in the recreational Dungeness crab fishery in Fishing Zones 3 and 4. Use of crab traps in other recreational fisheries is also temporarily prohibited pursuant to Section 29.80(c)(4) of Title 14 of the California Code of Regulations. A Fleet Advisory is issued for recreational fishery in Fishing Zones 1, 2, 5, and 6, and the commercial fishery in Fishing Zones 5 and 6.

Aerial and vessel survey data, supported by observation data from Point Blue Conservation Science, shows large aggregations of foraging Humpback whales in Fishing Zones 3 and 4 could be at risk of entanglement with recreational and commercial crab traps. Additionally, data indicates that large aggregations of schooling fish still present Humpback foraging opportunity in that area. The wide distribution of Humpback whales across Fishing Zone depths from 20-50 fathoms indicates that a depth restriction on fishing activity would be ineffective in reducing entanglement risk as these are depths at which fishing activity tends to occur. Additionally, given the high volume of traps anticipated to be set during a season opener, it has been determined that a trap reduction would not sufficiently reduce entanglement risk. A season delay is the most protective management action given existing whale presence. At this time, no data available indicates a different management response is appropriate for the recreational fishery.

Furthermore, multiple Pacific leatherback sea turtles were observed in Fishing Zones 3 over recent weeks, telemetry data show a Pacific leatherback sea turtle foraging in Fishing Zones 3 and 4, and data indicates Leatherback sea turtle foraging opportunity is still present in those areas. Section 132.8 anticipates a delay in the season opener in the event Pacific

leatherback sea turtles are present. Given the critical status of the species and likelihood of Pacific leatherback sea turtles remaining in foraging areas in Fishing Zones 3 and 4, a season delay/temporary crab trap prohibition is the most protective management response.

Fishing Zones 3 and 4 reached a marine life concentration trigger, leading to analysis of the management considerations under Section 132.8(d) and appropriate management response under Section 132.8(c). Those sections anticipate a broader analysis of the factors impacting entanglement risk statewide. Although no triggers for management action were met in Fishing Zones 1, 2, 5, and 6, survey data indicates small concentrations of Humpback whales in those Fishing Zones. Both recreational and commercial fleets should use additional precaution when setting gear in those areas. A Fleet Advisory under section 132.8(e) is not necessarily limited to a single Fishing Zone, and compliance with best management practices throughout the state will ensure that entanglement risk continues to remain low for any remaining Humpback whales in those Fishing Zones.



## California Department of Fish and Wildlife Final Assessment of Marine Life Entanglement Risk and Management Action Recommendation

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Date: October 29, 2021

An initial assessment and preliminary recommendation were developed by California Department of Fish and Wildlife (CDFW) Marine Region staff for consideration by the California Dungeness Crab Fishing Gear Working Group (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 recreational and commercial Dungeness crab fishery. The initial assessment and preliminary Management Action recommendation were shared with the Working Group on October 22, 2021, and finalized on October 29, 2021 based on discussions with the Working Group and after consideration of all available data. *Note: CDFW was able to coordinate an additional reconnaissance survey with the US Coast Guard for Zone 1 after the Working Group meeting; the Available data document was updated on October 29, 2021, to include this information. The document was also posted on the CDFW Whale Safe Fisheries webpage, emailed through the Whale Safe Fisheries listserv, and shared with the Working Group on October 29, 2021.*

### A. Recommended Management Actions

#### Recreational Fishery

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

#### Commercial Fishery

- **Fleet Advisory: Fishing Zone 5 and 6**
- **Season Delay: Fishing Zones 3 and 4**
- **Zones 1 and 2 were not evaluated**

#### Fleet Advisories

The recreational fishery is scheduled to open statewide on November 6, 2021 and the commercial Fishery is scheduled to open on November 15, 2021, in Zones 3, 4, 5 and 6. CDFW Marine Region staff's final recommendation is for the Director to issue a Fleet Advisory for Fishing Zones 1, 2, 5 and 6 for the recreational Dungeness crab fishery and a Fleet Advisory for Zones 5 and 6 for the commercial fishery. Based on available data, no RAMP triggers have been reached in Fishing Zones 1, 2, 5 and 6 that would require additional protective measures beyond a Fleet Advisory. However, CDFW aerial surveys and Cascadia Research vessel surveys indicated small concentrations of Humpback whales in Zones 1, 2, 5 and 6 and the recreational fleet (Zones 1, 2, 5, 6) and commercial fleet (Zones 5 and 6) should use additional precaution when setting gear in those Zones by adhering to the Fleet Advisory. It



should also be noted that the Fishing Grounds in Zones 5 and 6 have few commercially permitted vessels and, based on historic landings data, only minor landings are made in these port areas. Both the commercial and recreational fishing fleet should however remain vigilant and move or avoid setting gear in areas where whales are transiting or foraging to further minimize risk of entanglement. As a reminder, the commercial fishery opener in Zones 1 and 2 will be further evaluated at the next risk assessment (expected to occur on or before November 22, 2021).

### **Season Delay/Temporary Crab Trap Prohibition**

Regarding the commercial season delay and temporary recreational crab trap prohibition, CDFW Marine Region staff's final recommendation is for the Director to delay the commercial fisheries in Zones 3 and 4 and temporarily prohibit the use of recreational crab traps in those Zones until the next risk assessment. This recommendation is based on exceedance of Marine Life Concentration data triggers for Humpback whales and Leatherback sea turtles in Zones 3 and 4. CDFW aerial surveys indicated large aggregations of Humpback whales in Zone 3, which was further supported by observation data from Point Blue around the Farallon Islands. NOAA and Upwell aerial surveys also indicated large aggregations of foraging Humpback whales and at least four Leatherback sea turtles foraging in areas off Half Moon Bay and Point Reyes. Humpback whales were observed foraging in 20-50 fathoms and Leatherback sea turtles were observed foraging in 20-40 fathoms. Monterey Bay Whale Watch Data (MBWW) data for Zone 4 indicate Humpback whale observations are above average based on the historical record, indicating migration out of California waters has yet to occur. Foraging activity by both Humpback whales and Leatherback sea turtles poses a risk of entanglement with vertical lines and surface gear in Zones 3 and 4 if the recreational season opens with use of crab traps on November 6, 2021, and the commercial season opens on November 15, 2021. A season delay/temporary trap prohibition in those Zones for both fisheries is the recommended Management Action based on the wide distribution of Humpback whales across Fishing Zone depths and the likelihood of Leatherback sea turtles remaining in the foraging areas of Zones 3 and 4. A depth restriction or gear reduction for the commercial fishery would not minimize entanglement risk due to whale distribution and expected high gear concentrations during the season opener. As a result, CDFW Marine Staff's final recommendation is a delay of the Fishing Season for the commercial fishery and temporary prohibition on the use of crab traps for the recreational fishery for Zones 3 and 4 until at least the next risk assessment (expected to occur on or before November 22, 2021).

### **Summary of RAMP triggers and Management Considerations analyzed during preparation of this Final Assessment and Management Action Recommendation.**

#### **B. Marine life entanglement risk, based on triggers in subsection (c)**

##### **Confirmed Entanglements in California Commercial Dungeness Crab Gear:**

- During the current Fishing Season: 0
- During the current calendar year: 1 humpback whale

## Confirmed Entanglements in Unknown Fishing Gear reported from California:

- During the current Fishing Season: 0
- During the current calendar year: 1 Humpback whale
  - Note: Three additional confirmed entanglements in unidentified fishing gear are under review.

## Marine Life Concentration Surveys and/or Satellite Telemetry Observations:

- **Fishing Zone 3 and 4:** CDFW aerial surveys observed 48 Humpback whales in Zone 3, and NOAA and Upwell surveys documented 32 Humpback whales in Zone 3, both exceeding the trigger pursuant to Title 14, CCR, section 132.8(c)(2)(A)(4)(a). In addition, based on MBWW data, the running weekly average for Zone 4 is 18.9 Humpback whales, which exceeds 5 Humpback whales in a single Fishing Zone and triggers management response under RAMP section 132.8(c)(2)(A)(4). NOAA and Upwell Aerial surveys observed at least 4 unique Leatherback sea turtles within Zone 3, exceeding a trigger pursuant to 132.8, Title 14, CCR (c)(2)(A)(4)(c).

### C. Scope of risk based on Management Considerations in subsection (d)

#### Section 132.8(d)(2): Information from NOAA

- No additional information was made available for this risk assessment

#### Section 132.8(d)(3): Effectiveness of management measures to reduce entanglement risk

- In Zones 3 and 4, the aerial survey and vessel-based observations show continued large aggregations of foraging Humpback whales. Leatherback sea turtles were also observed in Zones 3 and 4. As a result of Marine Life Concentration triggers for Humpback whales and Leatherback sea turtles being met, a Fishing Zone delay/temporary trap prohibition is the most effective Management Action for Zones 3 and 4 to minimize co-occurrence with Dungeness crab trap fishing gear and Actionable Species.
- In Zones 1, 2, 5 and 6, a Fleet Advisory is the most effective Management Action based on the few Humpback whales observed and known migration patterns in these areas. Additionally, a Fleet Advisory is appropriate given the lower level of fishing effort by the commercial fleet in Zones 5 and 6.

#### Section 132.8(d)(4): Total economic impact to the fleet and fishing communities

- A Fishing Zone closure will impact operators and businesses. In particular, there will be economic costs to individual operators, however given the risk of entanglement (which is expected to decrease), the short-term economic costs must also be weighed against the longer-term viability of the commercial fishery across California.

#### Section 132.8(d)(5): Data availability within and across Fishing Zones

- CDFW and USCG aerial survey data are available for Zones 1, 2, 3, 4 and 5. NOAA and Upwell Aerial Survey Data are available for Zones 3 and 4. Satellite tagging information for Leatherback sea turtles is available for Zones 3 and 4. MBWW data are available for Fishing Zone 4. Point Blue Conservation Science observation data are available for Zones 3, 4, and 6. Cascadia Research Vessel surveys are available for Zones 3, 4, 5 and 6. The Habitat Compression Index is available for Zones 2, 3, 4 and the northern portion of Zone 5. Whale Watch 2.0 habitat predictions are available for all Zones.

#### Section 132.8(d)(6): Known historic marine life migration patterns

- Aerial surveys indicate continued presence of large aggregations of Humpback whale across Zones 3 and 4.
- Presence of Humpback whales is also above average based on MBWW data, an indication that significant migration out of California waters has yet to occur.
- Leatherback sea turtles typically forage in an area extending from Monterey Bay to Point Reyes during the summer months. Recent surveys and satellite tagging information indicate foraging turtles are still present within Zones 3 and 4.

#### Section 132.8(d)(7): Fishing Season dynamics

- Preliminary domoic acid testing results indicate a potential delay for the commercial fishery in the northern portion of Zone 3. Results for an area that encompasses Zones 5 and 6 are pending. Quality tests, which could affect the commercial fishery opener in Zones 1 and 2, are not yet available.

#### Section 132.8(d)(8): Known distribution and abundance of key forage

- Abundant schooling fish were documented off the San Mateo County coast and the Gulf of the Farallones during aerial surveys.
- Leatherback foraging habitat was evident between Pt. Reyes to Pigeon Point within water depths of about 20-40 fathoms as well as between Davenport and Año Nuevo, as indicated by dense aggregations of brown sea nettles and abundant large molas.
- No krill were observed during CDFW or NOAA aerial surveys.

#### Section 132.8(d)(9): Ocean conditions

- The prediction of ENSO conditions was last updated on October 14, 2021. La Niña conditions have developed and are expected to continue with an 87% chance of La Niña in December 2021- February 2022.

#### Section 132.8(d)(10): Current Impact Score Calculation

- Impact score calculation under RAMP began on January 1, 2021. The current impact score for the 2021 calendar year is 1.13 for Humpback whales and 0 for Blue whales and Pacific Leatherback sea turtles.

Section 132.8(d)(11): Actionable Species migration into or out of Fishing Grounds and across Fishing Zones

- Based on aerial surveys conducted by CDFW and NOAA, Humpback whales and Leatherback sea turtles are still present within the Gulf of the Farallones and Monterey Bay. Monterey Bay Whale Watch data and Point Blue observation data provided frequent sightings of Humpback whales as well, also indicating significant migration has yet to occur out of California waters.

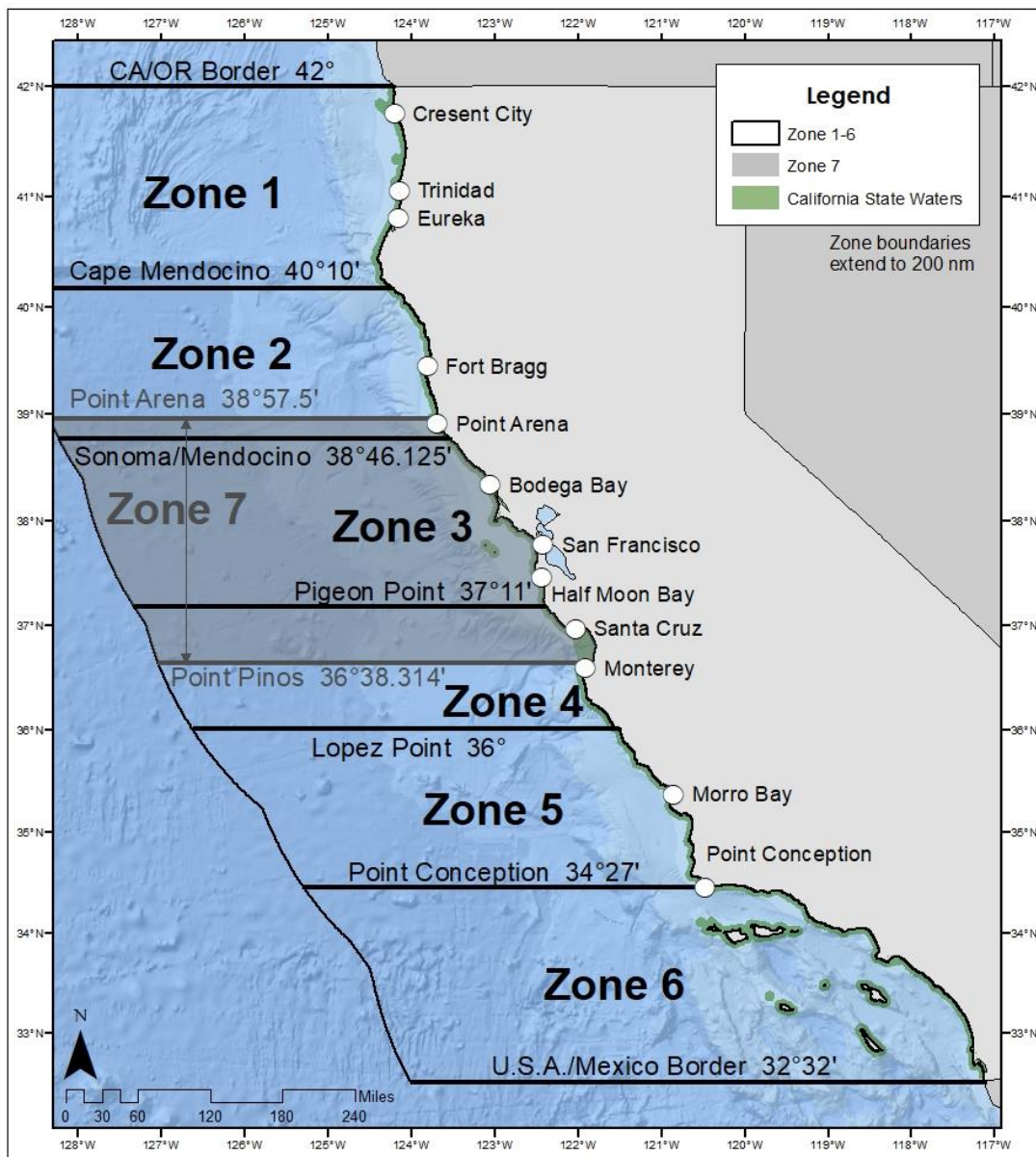


Figure 1. RAMP Fishing Zone boundaries.

California Dungeness Crab Fishing Gear Working Group (Working Group) Management Recommendation Form to inform the Risk Assessment and Mitigation Program for the California Department of Fish and Wildlife

**Working Group Discussion Date: October 26, 2021**

**Anticipated Risk Assessment Date: November 1, 2021**

Submitted to the California Department of Fish and Wildlife Director for the Risk Assessment Mitigation Program Section 132.8 Title 14, California Code of Regulations to assess marine life entanglement risk in the Commercial Dungeness Crab Fishery.

The Working Group considered Available Data provided by CDFW and scientific advisors, as well as an initial CDFW assessment and the preliminary Management Action recommendation. All documents will be made available on the [Whale Safe Fisheries webpage](#) upon completion of the risk assessment process.

**Working Group Recommendation**

*Management Action:*

**Fishing Zone 1 and 2:** Recommends delaying the recreational crab trap fishery until November 12, 2021, with a Fleet Advisory and to open the commercial trap fishery on December 1, 2021 with a Fleet Advisory. Both dates are subject to change based on the next Risk Assessment.

**Fishing Zones 3 and 4:** Recommends delaying the recreational crab trap fishery until November 12, 2021, and delay the commercial fishery until November 19, 2021, both fisheries would open under a Fleet Advisory. Both dates are subject to change based on the next Risk Assessment.

**Fishing Zones 5 and 6:** The Working Group supports CDFW's preliminary recommendation to open both the recreational fishery and commercial Dungeness crab fisheries under a Fleet Advisory on November 6, 2021, and November 15, 2021, respectively.

*Implementation Date:*

(See recommendations above)

*Key Rationale based on Management Considerations:*

RAMP must be applied consistently across both the recreational and commercial fisheries. The priority must be to survey and gather all the data possible within Fishing Zones. The Working Group does however support using adjacent Fishing Zone data as well as seasonal/historic migratory information to inform risk in the absence of data within the Fishing Zone. The Working Group emphasized the importance of setting dates for when fisheries open to support business operations and trip planning

purposes, while recognizing that opening decisions must be contingent on the next risk assessment and best available data.

*Limitations/Concerns:*

The Working Group requests that when both the recreational crab trap fishery and commercial Dungeness crab fisheries are delayed in a Fishing Zone, that CDFW provide sufficient lead time between the opening dates for the recreational and commercial fisheries based on historic opening date differentials. They also request CDFW provide anecdotal insights into recreational fishery operations based on their understanding of fishery operations. This will be valuable for future Working Group recommendations as the recreational fishery has limited data available.

*Level of Support:*

The recommendation received broad support from Working Group membership, with eleven members supporting the recommendation; the remaining non-agency members remained neutral. One member also supported CDFW's Preliminary Recommendation.





## California Department of Fish and Wildlife Initial Assessment of Marine Life Entanglement Risk and Preliminary Management Recommendation

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Date: October 22, 2021

***CDFW will prepare a Final Assessment and Management Recommendation after review of the Working Group Recommendation and any other relevant information.***

This initial assessment and preliminary recommendation have been developed by California Department of Fish and Wildlife (CDFW) Marine Region staff based on the most recently available data 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 Dungeness crab fishery. These data will also facilitate discussion regarding potential management actions the Director may take pursuant to Section 29.80, Title 14, CCR to address marine life entanglement risk in the recreational Dungeness crab fishery.

### **A. Recommended Management Actions**

#### **Recreational Fishery:**

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

#### **Commercial Fishery:**

- **Fleet Advisory: Fishing Zone 5 and 6**
- **Season Delay: Fishing Zones 3 and 4**
- **Zones 1 and 2 were not evaluated**

#### **Fleet Advisories**

Regarding Fleet Advisories, CDFW Marine Region staff's preliminary recommendation is for the Director to issue a Fleet Advisory for Fishing Zones 5 and 6 for the commercial Dungeness crab fishery and Fishing Zones 1, 2, 5, and 6 for the recreational Dungeness crab fisheries. The recreational fishery is scheduled to open on November 6, 2021, in Zones 1, 2, 5 and 6. The commercial Fishery is scheduled to open on November 15, 2021, in Zones 5 and 6. Based on available data, no RAMP triggers have been reached in Fishing Zones 2 or 5 that would require additional protective measures. However, CDFW aerial surveys indicated small concentrations of Humpback whales in Zones 2 and 5 and both fleets should use additional precaution when setting gear in those Zones by adhering to the Fleet Advisory. For Zones 1 and 6, both commercial and recreational regulations require the Director to implement a Management Action when data are unavailable. Based on known migration patterns and adjacent Zone data, CDFW staff's preliminary recommendation for the recreational fishery is a Fleet Advisory.

Similarly, based on known migration patterns and adjacent Zone data, CDFW staff recommend that the Director issue a Fleet Advisory for the commercial fishery in Zones 5 and 6. The Fishing Grounds in these Zones have few commercially permitted vessels and based on historic landings data, only minor landings are made in these port areas. Both the commercial and recreational fishing fleet should remain vigilant and move or avoid setting gear in areas where whales are transiting or foraging to further minimize risk of entanglement. As a reminder, the commercial fishery opener in Zone 1 and 2 will be further evaluated at the next risk assessment (expected to occur on or before November 22, 2021).

### **Season Delay/Crab Trap Prohibition**

Regarding the commercial season delay and recreational crab trap prohibition, CDFW Marine Region staff's preliminary recommendation is for the Director to delay the commercial fisheries in Zones 3 and 4 and prohibit the use of recreational crab traps until the next risk assessment. This recommendation is based on exceedance of Marine Life Concentration data triggers for Humpback whales and Leatherback sea turtles in Zones 3 and 4. CDFW aerial surveys indicated large aggregations of Humpback whales in Zone 3, which was further supported by observation data from Point Blue around the Farallon Islands. NOAA and Upwell aerial surveys also indicated large aggregations of foraging Humpback whales and at least four Leatherback sea turtles foraging in areas off Half Moon Bay and Point Reyes. Humpback whales were observed foraging in 20-50 fathoms and Leatherback sea turtles were observed foraging in 20-40 fathoms. Monterey Bay Whale Watch Data (MBWW) data for Zone 4 indicate Humpback whale observations are above average based on the historical record, indicating migration out of California waters has yet to occur. Foraging activity by both Humpback whales and Leatherback sea turtles poses a risk of entanglement with vertical lines and surface gear in Zones 3 and 4 if the recreational season opens with use of crab traps on November 6, 2021, and the commercial season opens on November 15, 2021. A season delay in those Zones for both fisheries is the recommended Management Action based on the wide distribution of Humpback whales across Fishing Zone depths and the likelihood of Leatherback sea turtles remaining in the foraging areas of Zones 3 and 4. A depth restriction or gear reduction would not minimize entanglement risk due to whale distribution and expected high gear concentrations during the season opener. As a result, CDFW Marine Staff's preliminary recommendation is a delay of the Fishing Season for the commercial fishery and prohibition on the use of crab traps for the recreational fishery for Zones 3 and 4 until the next risk assessment (expected to occur on or before November 22, 2021).

### **Summary of RAMP triggers and Management Considerations analyzed during preparation of this Initial Assessment and Preliminary Recommendation.**

#### **B. Marine life entanglement risk, based on triggers in subsection (c)**

#### **Confirmed Entanglements in California Commercial Dungeness Crab Gear:**

- During the current Fishing Season: 0
- During the current calendar year: 1 humpback whale



## Confirmed Entanglements in Unknown Fishing Gear reported from California:

- During the current Fishing Season: 0
- During the current calendar year: 1 Humpback whale
  - Note: Three additional confirmed entanglements in unidentified fishing gear are under review.

## Marine Life Concentration Surveys and/or Satellite Telemetry Observations:

- **Fishing Zone 1 and 6:** For the commercial fishery no current CDFW approved survey data are available for Zone 6, which triggers management response for the commercial fishery, pursuant to Title 14, CCR, section 132.8(c)(2)(A)(1). For Zone 1 and 6, pursuant to Title 14, CCR, section 29.80(c)(7)(B)(2), if data are unavailable prior to the recreational Dungeness crab season opener, the Director shall take action pursuant to subsection 29.80(c)(7)(B) in the recreational fishery.
- **Fishing Zone 3 and 4:** CDFW aerial surveys observed 48 Humpback whales in Zone 3, and NOAA and Upwell surveys documented 32 Humpback whales in Zone 3, both exceeding the trigger pursuant to Title 14, CCR, section 132.8(c)(2)(A)(4)(a). In addition, based on MBWW data, the running weekly average for Zone 4 is 18.9 Humpback whales, which exceeds 5 Humpback whales in a single Fishing Zone and triggers management response under RAMP (c)(2)(A)(4). NOAA and Upwell Aerial surveys observed 4 Leatherback sea turtles within Zone 3 and 4, exceeding a trigger pursuant to 132.8, Title 14, CCR (c)(2)(A)(4)(c).

## C. Scope of risk based on Management Considerations in subsection (d)

### Section 132.8(d)(2): Information from NOAA

- No additional information was made available for this risk assessment

### Section 132.8(d)(3): Effectiveness of management measures to reduce entanglement risk

- In Zones 3 and 4, the aerial survey and vessel-based observations show continued large aggregations of foraging Humpback whales. Leatherback sea turtles were also observed in Zones 3 and 4. As a result of Marine Life Concentration triggers for Humpback whales and Leatherback sea turtles being met, a Fishing Zone delay/trap prohibition is the most effective Management Action for Zones 3 and 4 to minimize co-occurrence with Dungeness crab trap fishing gear and Actionable Species.
- In Zones 2 and 5, a Fleet Advisory is the most effective Management Action based on the few Humpback whales observed and known migration patterns in these areas. Additionally, based on adjacent Zone data for Zones 1 and 6, a Fleet Advisory is appropriate given the lower level of fishing effort by the commercial fleet in Zone 6. Zone 1 will be further evaluated during the next risk assessment for the commercial fishery.

### Section 132.8(d)(4): Total economic impact to the fleet and fishing communities

- A Fishing Zone closure will impact operators and businesses. In particular, there will be economic costs to individual operators, however given the risk of entanglement (which is expected to decrease), the short-term economic costs must also be weighed against the longer-term viability of the commercial fishery across California.

#### Section 132.8(d)(5): Data availability within and across Fishing Zones

- CDFW aerial survey data are available for Zones 2, 3, 4 and 5. NOAA and Upwell Aerial Survey Data are available for Zones 3 and 4. MBWW data are available for Fishing Zone 4. Point Blue Conservation Science observation data are available for Zones 3, 4, and 6. The Habitat Compression Index is available for Zones 2, 3, 4 and the northern portion of Zone 5. Whale Watch 2.0 habitat predictions are available for all Zones.

#### Section 132.8(d)(6): Known historic marine life migration patterns

- Aerial surveys indicate continued presence of large aggregations of Humpback whale across Zones 3 and 4.
- Presence of Humpback whales is also above average based on MBWW data, an indication that significant migration out of California waters has yet to occur.
- Leatherback sea turtles typically forage in an area extending from Monterey Bay to Point Reyes during the summer months. Recent observation and surveys indicate foraging turtles are still present within Zones 3 and 4.

#### Section 132.8(d)(7): Fishing Season dynamics

- Preliminary domoic acid testing results indicate a potential delay for the commercial fishery in Zones 3 and 4. Quality tests, which could affect the commercial fishery opener in Zones 1 and 2, are not yet available.

#### Section 132.8(d)(8): Known distribution and abundance of key forage

- Abundant schooling fish were documented off the San Mateo County coast and the Gulf of the Farallones during aerial surveys.
- Leatherback foraging habitat was evident from about Pt. Reyes to Pigeon Point within water depths of about 20-40 fathoms, as indicated by dense aggregations of brown sea nettles and abundant large molas.
- No krill were observed during CDFW or NOAA aerial surveys.

#### Section 132.8(d)(9): Ocean conditions

- The prediction of ENSO conditions was last updated on October 14, 2021. La Niña conditions have developed and are expected to continue with an 87% chance of La Niña in December 2021- February 2022.

## Section 132.8(d)(10): Current Impact Score Calculation

- Impact score calculation under RAMP began on January 1, 2021. The current impact score is 1.13 for Humpback whales and 0 for Blue whales and Pacific Leatherback sea turtles.

## Section 132.8(d)(11): Actionable Species migration into or out of Fishing Grounds and across Fishing Zones

- Based on aerial surveys conducted by CDFW and NOAA, Humpback whales and Leatherback sea turtles are still present within the Gulf of the Farallones and Monterey Bay. Whale Watch data and Point Blue observation data provided frequent sightings of Humpback whales as well, also indicating significant migration has yet to occur out of California waters.

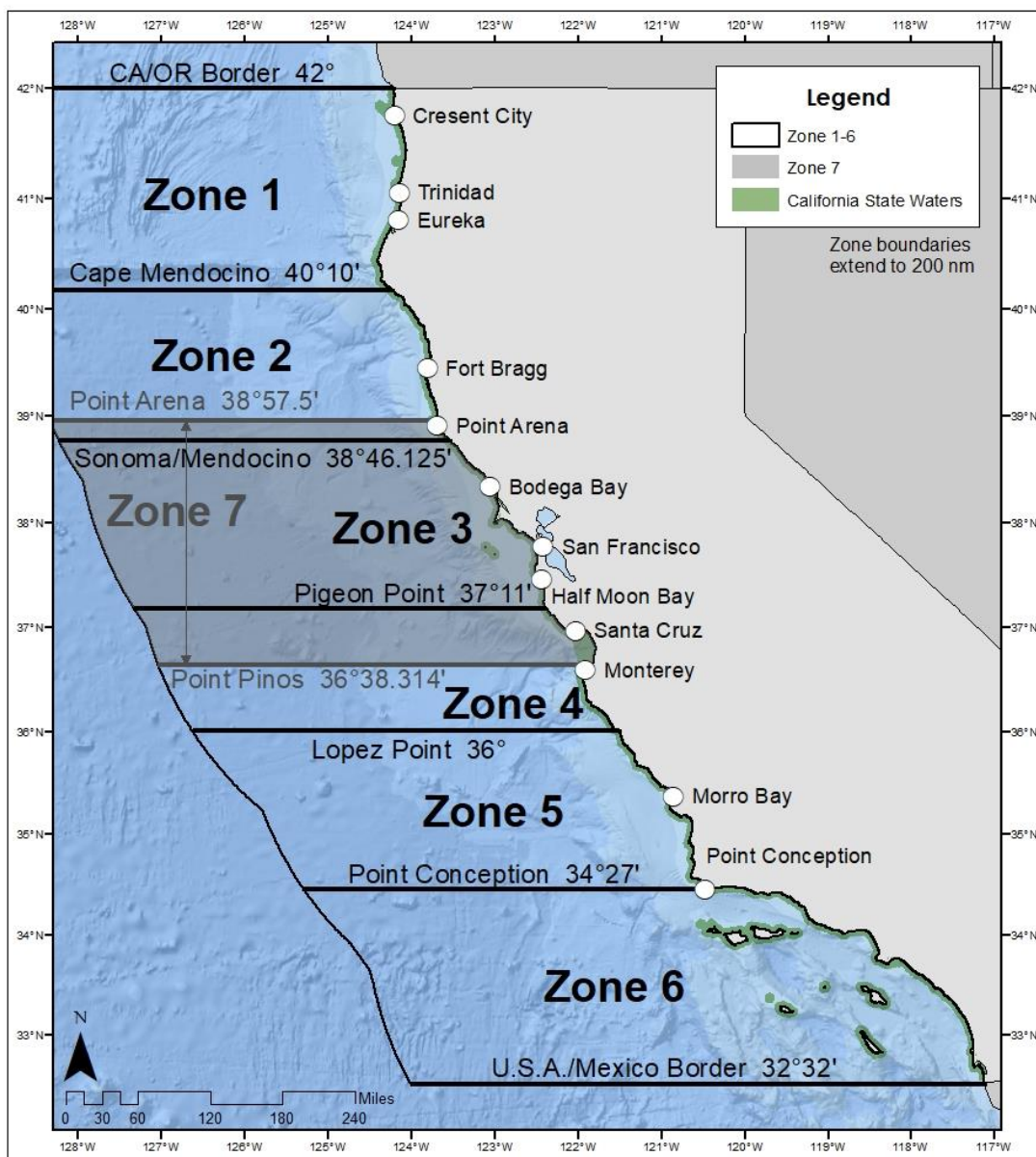


Figure 1. RAMP Fishing Zone boundaries.

## 2021-22 Risk Assessment: Available Data

Last updated: October 29, 2021. See the [RAMP Data Sources Overview](#) for more information.

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### TRIGGERS REQUIRING MANAGEMENT ACTION

#### Confirmed Entanglements: §132.8(c)(1) \*

*Data provided by: Lauren Saez and Dan Lawson, NMFS*

**Table 1. Number of Confirmed Entanglements of Actionable Species between January 1 and October 20, 2021, prepared by West Coast Region.**

Actionable Species	Confirmed Entanglements in CA commercial Dungeness crab gear	Confirmed Entanglements in unidentified fishing gear reported off CA
Humpback whales	1	4
Blue whales	0	0
Leatherback sea turtles	0	0

Between January 1 and October 20, 2021 there have been 11 confirmed humpback whale entanglements, 0 confirmed blue whale entanglements, and 0 confirmed leatherback sea turtle entanglements reported to NMFS West Coast Region (Table 1). Of the 11 confirmed humpback whale entanglements, eight were reported from California: seven in Fishing Zone 6 and one in Fishing Zone 5. Three of these eight entanglements were attributed to specific fisheries (one each to spot prawn, experimental box crab, and Washington commercial Dungeness crab), one has been provisionally attributed to commercial lobster, and four are classified as occurring in unidentified fishing gear. Of the other three confirmed humpback whale entanglements, one was reported from Mexico in California commercial Dungeness crab gear on June 9, and one entanglement each was reported from Oregon and Washington.

**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, prepared by CDFW.**

Actionable Species	Current Fishing Season	Current Calendar Year
Humpback whales	0	0.75 + 0.38 = 1.13 *Preliminary total; see below
Blue whales	0	0
Leatherback sea turtles	0	0

The fishing season has not yet started, so the cumulative Impact Score for the current fishing season is 0 for all three species (Table 2). There have been no confirmed entanglements of either blue whales or leatherback sea turtles in California commercial Dungeness crab gear (reported from any location) or unidentified fishing gear (reported from California) during the current calendar year, so the cumulative Impact Score for the current calendar year is 0 for these two species.

For humpback whales, there have been two confirmed entanglements during the current calendar year for which CDFW has assigned an Impact Score. One was confirmed in California commercial Dungeness crab gear and assigned an Impact Score of 0.75; one was from Unknown Fishing Gear (i.e., unidentified fishing gear which could not be ruled out as California commercial Dungeness crab gear) and was assigned an impact score of 0.38. See the [April 13, 2021 Available Data document](#) for additional information regarding the Unknown Fishing Gear entanglement. Three additional confirmed entanglements in unidentified fishing gear are pending review by CDFW.

## Marine Life Concentrations: §132.8(c)(1) \*

Data provided by: CDFW; Karin Forney and Scott Benson (NMFS), in collaboration with Upwell Turtles (Upwell.org); Cascadia Research and The Marine Mammal Center; Monterey Bay Whale Watch (processed by Karin Forney, NMFS)

Table 3. Summary of available CDFW-approved survey data for marine life concentrations for Fishing Zones 1-6, 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/USCG Aerial Survey	No
Zone 2	CDFW Aerial Survey	No
Zone 3	CDFW Aerial Survey, NOAA Aerial Survey, Cascadia/TMMC Vessel Survey	Yes – CDFW and NOAA Aerial Surveys, Cascadia/TMMC Vessel Survey
Zone 4	CDFW Aerial Survey, NOAA Aerial Survey, Cascadia/TMMC Vessel Survey, MBWW	Yes - MBWW
Zone 5	CDFW Aerial Survey, Cascadia/TMMC Vessel Survey	No
Zone 6	Cascadia/TMMC Vessel Survey	No

### CDFW Aerial Surveys (Fishing Zones 2-5)

- CDFW aerial reconnaissance surveys were conducted on October 18 and 19, 2021 between Shelter Cove and Piedras Blancas (Figure 1). Sea conditions were generally calm with good visibility. Two flight lines were chosen to maximize airtime and coverage across Fishing Zones; an inshore flight line at approximately 1-2 miles offshore and an offshore flight line at approximately 5-6 miles offshore.
- Few humpback whales were observed between Shelter Cove and Bodega Bay (Fishing Zone 2 and the northern portion of Fishing Zone 3). Large aggregations of feeding humpback whales were observed in the area from Point Reyes down to Half Moon Bay and extending out to the Farallon Islands, with a total of 48 humpback whales observed in Fishing Zone 3. Few humpback whales were observed in Fishing Zones 4 and 5, with only a small aggregation observed in Fishing Zone 5 off the Big Sur coast.



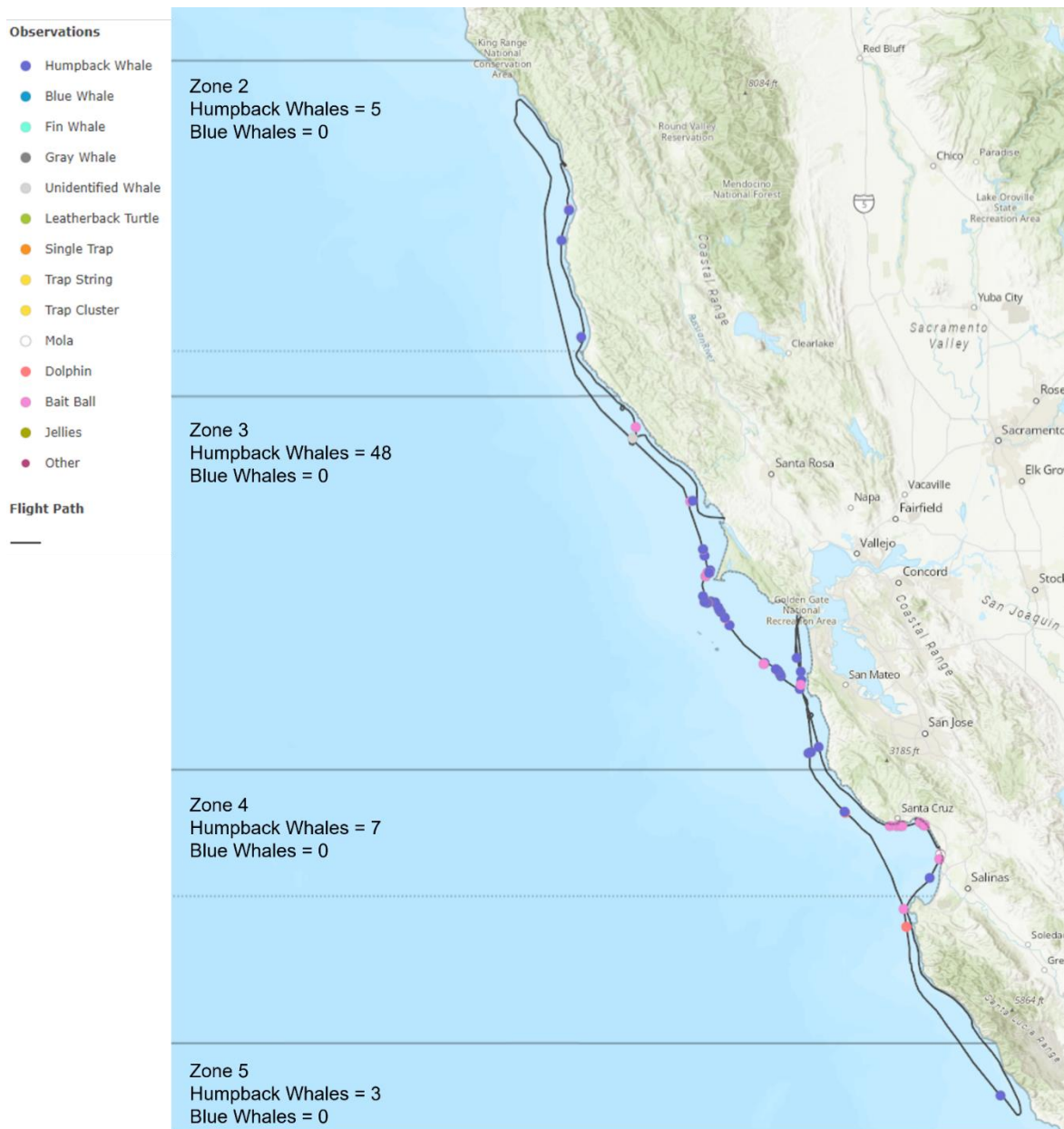


Figure 1. Track lines and observations from CDFW aerial survey on October 19 and 20, 2021. Survey covered Fishing Zones 2, 3, and 4, as well as the northern portion of Fishing Zone 5.

### CDFW/USCG Aerial Surveys (*Fishing Zone 1*)

CDFW and the USCG conducted a previously planned rotary flight from Shelter Cove to the Oregon border over two legs on October 27, 2021. The first leg flew south from McKinleyville to Shelter Cove following the 200-foot contour. From Shelter Cove to the Oregon border, the air crew flew the 100-foot contour. On the return flight they flew the 200-foot contour south to McKinleyville. During both legs, a total of three humpback whales were observed between Eureka and Crescent City. Three additional unknown whales and a large group of dolphins were observed in the same area.

## NOAA and Upwell Aerial Surveys (*Fishing Zones 3 and 4*)

- Aerial surveys in support of leatherback research were conducted on October 2, 3, 14, 15, 16, and 19 (Figures 2-7) by NOAA in collaboration with Upwell Turtles. Standard NOAA survey methods were used to record all observations of leatherbacks, humpback whales, blue whales, their respective prey if observed (jellies, schooling fish, and krill), as well as other ecosystem indicators such as large ocean sunfish (*Mola mola*; henceforth 'mola'), which are often found in the same habitat as leatherbacks and feed on the same jellyfish prey (i.e., brown sea nettles).
- Leatherback turtles were observed off the San Mateo County coast and in the Gulf of the Farallones (Fishing Zone 3) on 4 of the 5 survey days in this region.
- The five leatherback sightings included at least four distinct individuals, based on observed body size and shape, and animal coloration (which can vary based on diatom fouling and other factors). The fifth individual may also have been different, but this could not be ascertained with certainty. The leatherbacks were documented foraging in waters of about 20-40 fathoms depth, both north and south of the Golden Gate.
- Few humpback whales were seen on October 2, 2021 inside Monterey Bay (Fishing Zone 4). Humpback whales were very abundant off the San Mateo County coast and in the Gulf of the Farallones (Fishing Zone 3) and were observed feeding on abundant schooling fish (anchovies) within water depths of approximately 20 to 50 fathoms. Daily totals for surveys within Fishing Zone 3 were:
  - October 3, 2021: 34 humpback whales
  - October 14, 2021: 96 humpback whales
  - October 15, 2021: 48 humpback whales
  - October 16, 2021: 65 humpback whales
  - October 19, 2021: 32 humpback whales
- No blue whales were observed during these surveys.



(Source: Karin Forney and Scott Benson, NOAA/SWFSC)



UPWELL

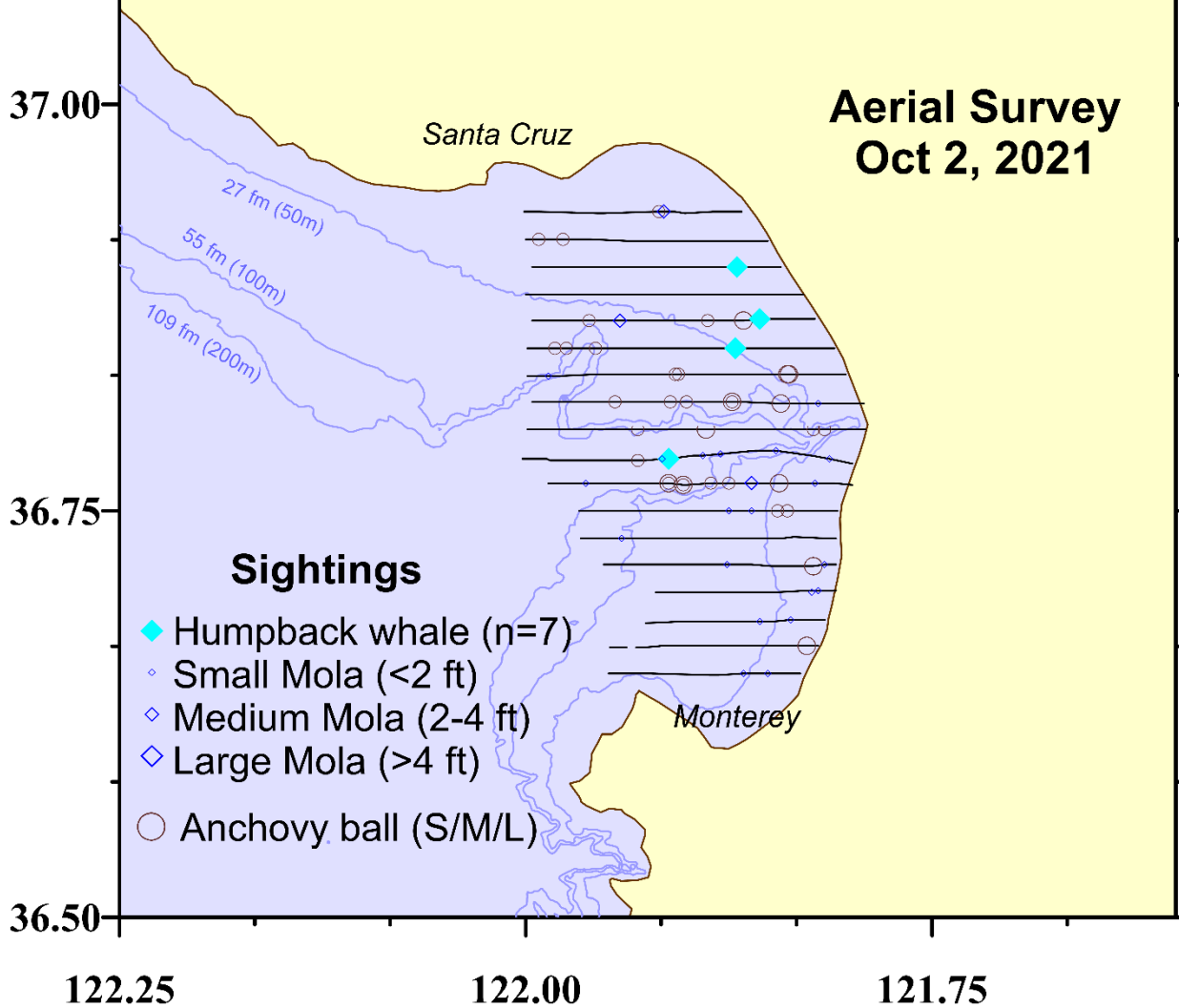


Figure 2. Aerial survey track lines and observations of humpback whales, molas (ocean sunfish), and anchovy balls in Monterey Bay (Fishing Zone 4) on October 2, 2021. Molas and anchovy balls are scored as small/medium/large based on estimated size; large molas tend to co-occur with leatherback turtles but were not observed during this flight. The number of individual whales observed (n=7) is indicated in parentheses.

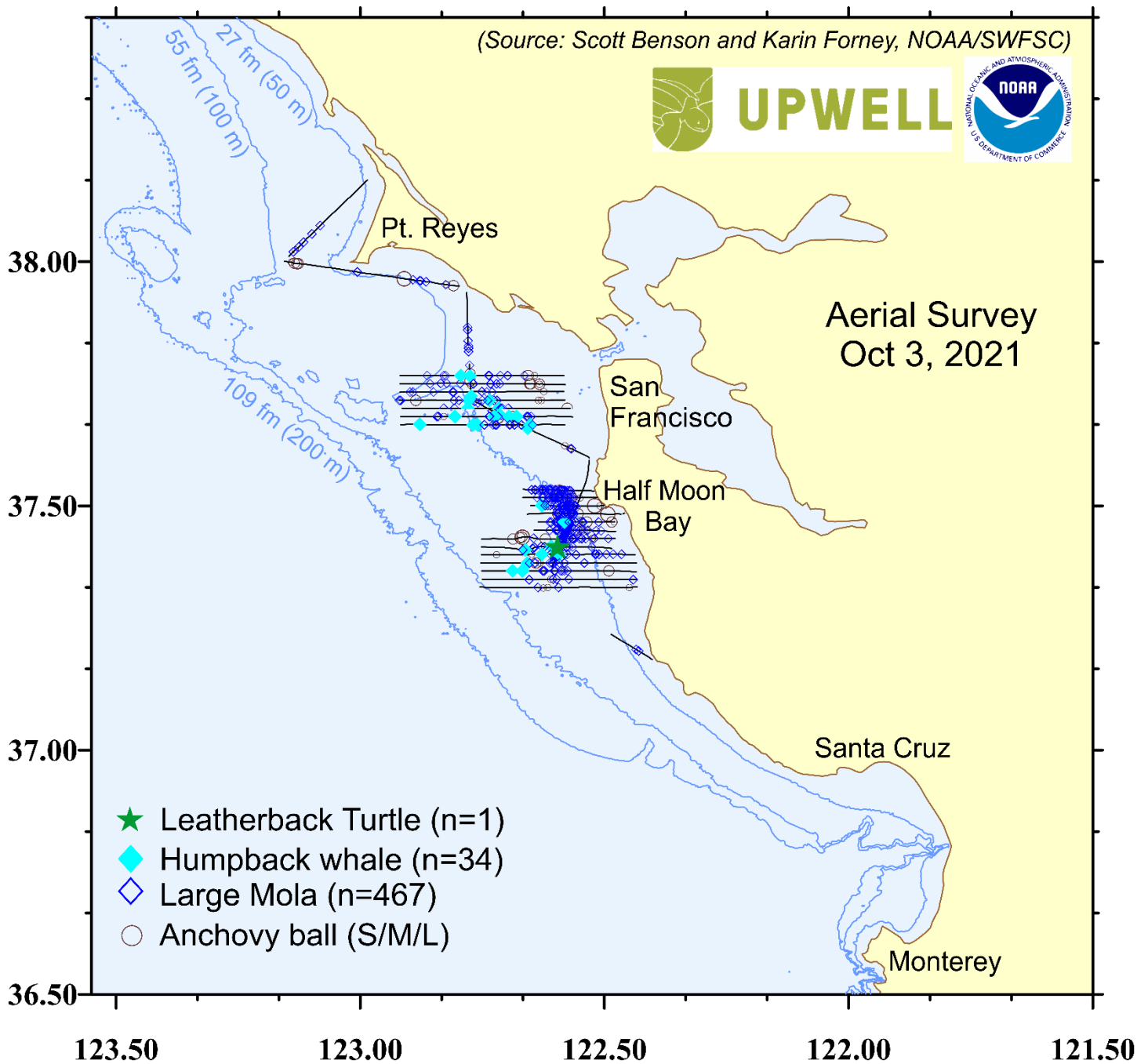


Figure 3. Aerial survey track lines and observations of humpback whales, leatherback turtles, large molas (ocean sunfish), and anchovy balls off San Mateo County and in the Gulf of the Farallones (Fishing Zone 3) on October 3, 2021. Survey coverage was limited by low clouds throughout the day. For clarity, this plot only includes large molas, which tend to co-occur with leatherback turtles. The number of individual whales, leatherbacks, and molas observed are indicated in parentheses (e.g., n=34 for humpback whale).

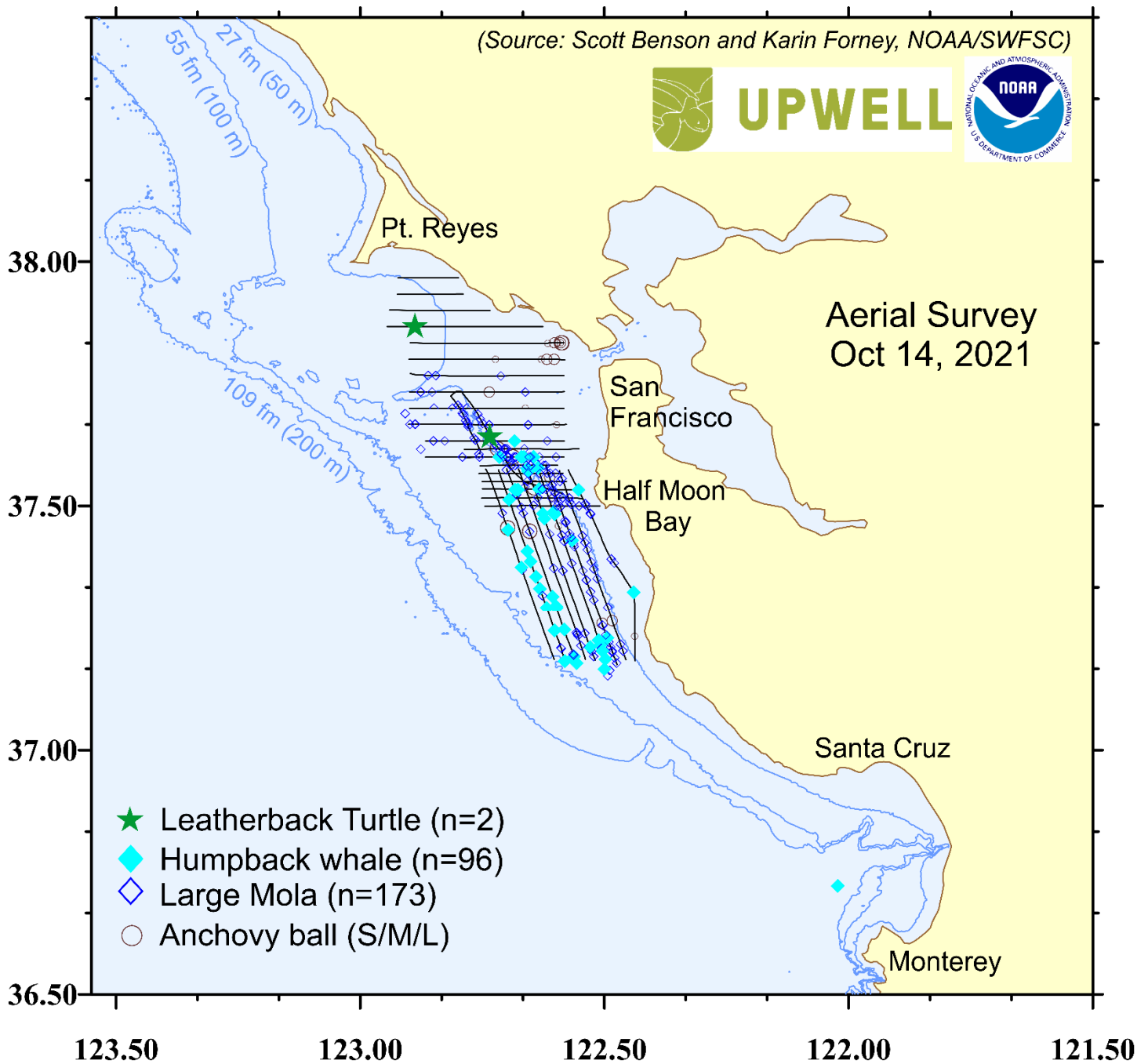


Figure 4. Aerial survey track lines and observations of humpback whales, leatherback turtles, large molasses (ocean sunfish), and anchovy balls off San Mateo County and in the Gulf of the Farallones (Fishing Zone 3) on October 14, 2021. Survey coverage included east-west lines from Drakes Bay to Half Moon Bay, and NW/SE lines within the water depths where leatherback turtles have commonly been observed in the past between Half Moon Bay and Pigeon Point. Only large molasses, which tend to co-occur with leatherback turtles, are included for simplicity. The number of individual whales, leatherbacks, and molasses observed are indicated in parentheses (e.g., n=96 for humpback whale).

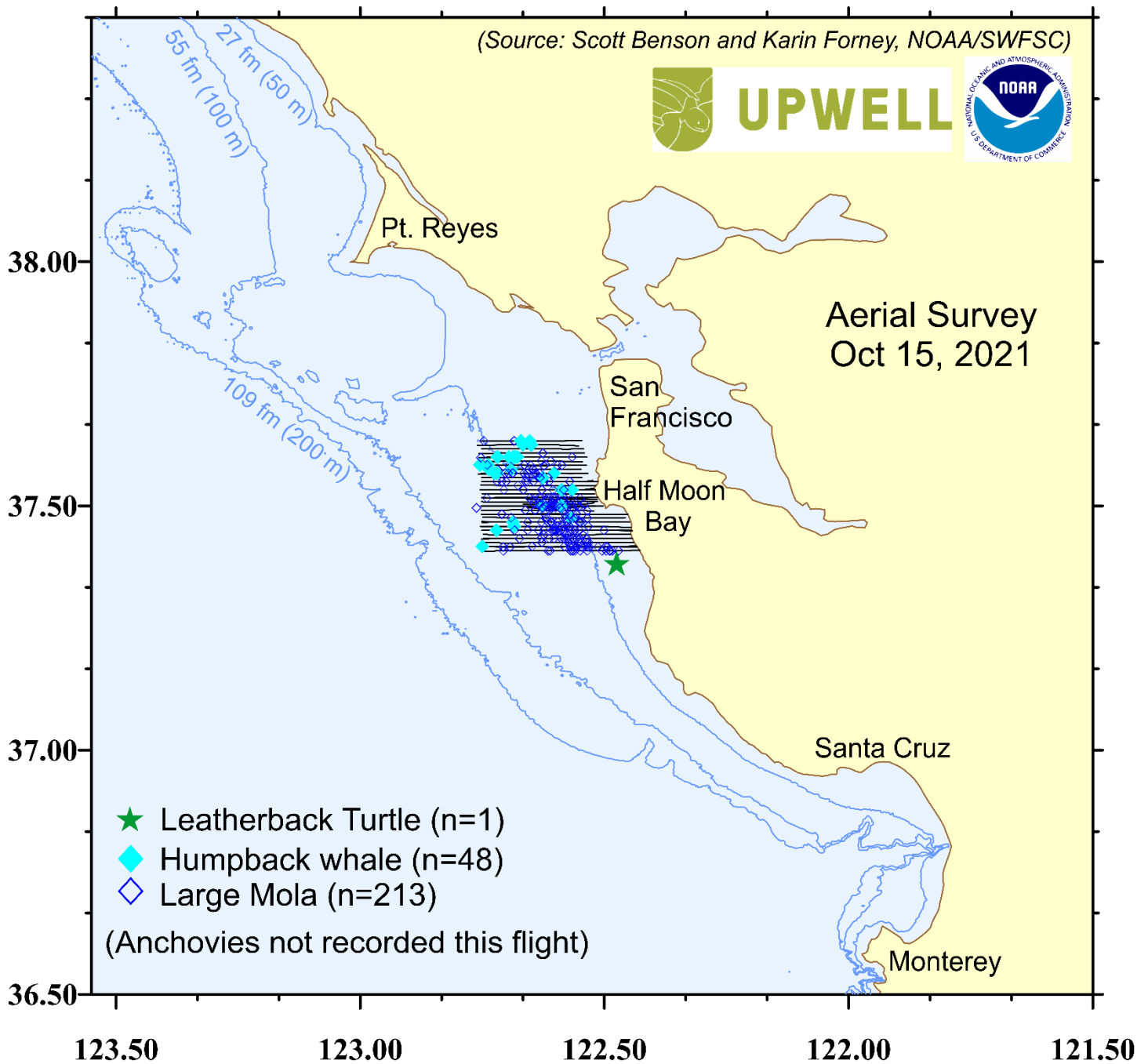


Figure 5. Aerial survey track lines and observations of humpback whales, leatherback turtles, and large molas (ocean sunfish) off San Mateo County and in the Gulf of the Farallones (Fishing Zone 3) on October 15, 2021. These surveys were specifically conducted to search for leatherback turtles near Half Moon Bay for capture/tagging operations. Anchovies were not recorded during this flight to allow the team to focus on searching for leatherbacks. One leatherback turtle was sighted at the end of the day, as the aerial team headed south back to Monterey. Only large molas, which tend to co-occur with leatherback turtles, are included for simplicity. The number of individual whales, leatherbacks, and molas observed are indicated in parentheses (e.g., n=48 for humpback whale). Given the fine-scale nature of the transects (0.5 nautical mile spacing), some of the humpback whale sightings likely represented re-sightings of the same individuals.

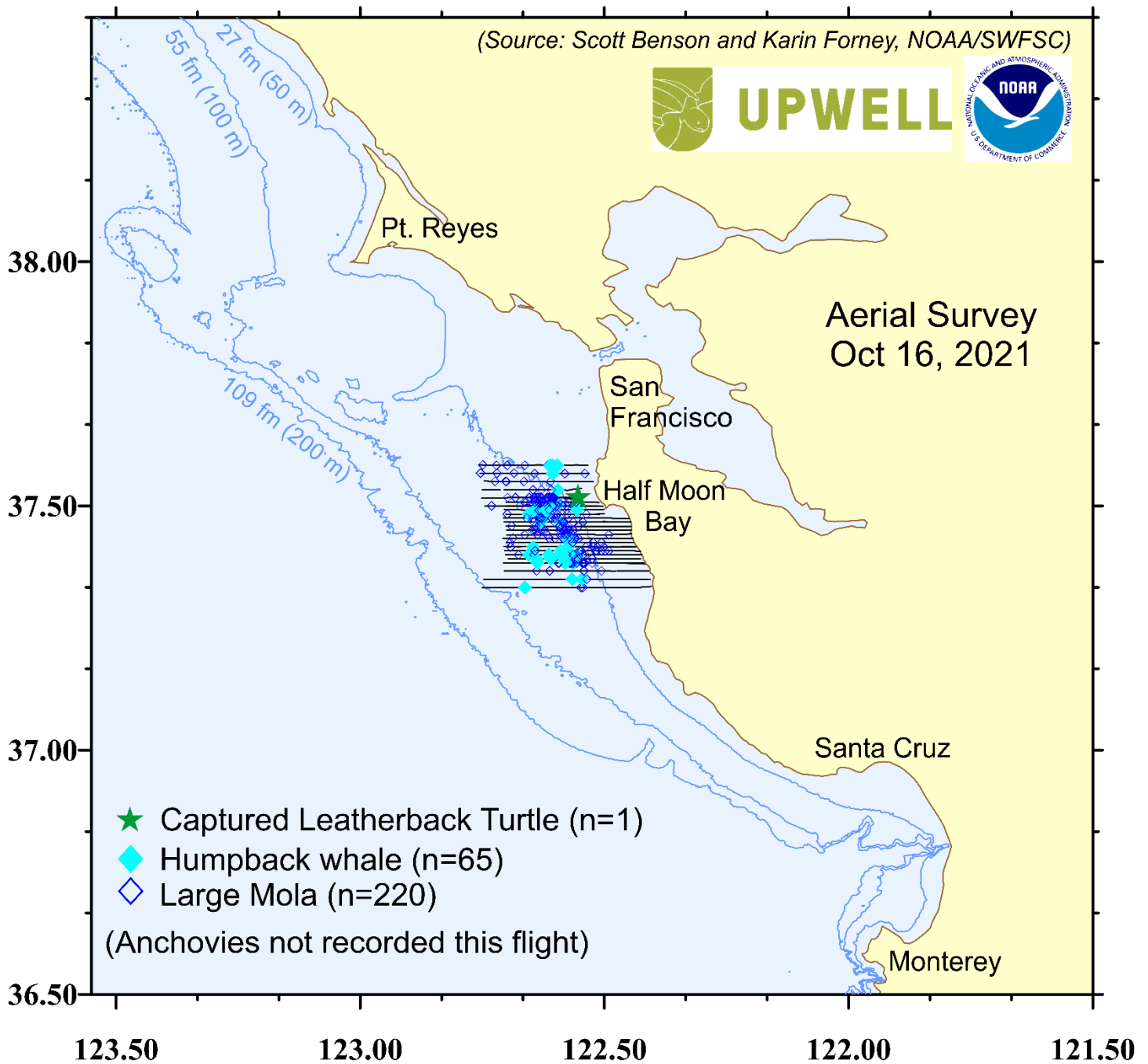


Figure 6. Aerial survey track lines and observations of humpback whales, leatherback turtles, and large molas (ocean sunfish) off San Mateo County and in the Gulf of the Farallones (Fishing Zone 3) on October 16, 2021. These surveys were specifically conducted to search for leatherback turtles near Half Moon Bay for capture/tagging operations. Anchovies were not recorded during this flight to allow the team to focus on searching for leatherbacks. One leatherback turtle was sighted and subsequently captured, tagged with a satellite-linked transmitter, and released (see separate telemetry data contribution). Only large molas, which tend to co-occur with leatherback turtles, are included for simplicity. The number of individual whales, leatherbacks, and molas observed are indicated in parentheses (e.g., n=65 for humpback whale). Given the fine-scale nature of some of the transects (0.5 nautical mile spacing), some of the humpback whale sightings likely represented re-sightings of the same individuals.

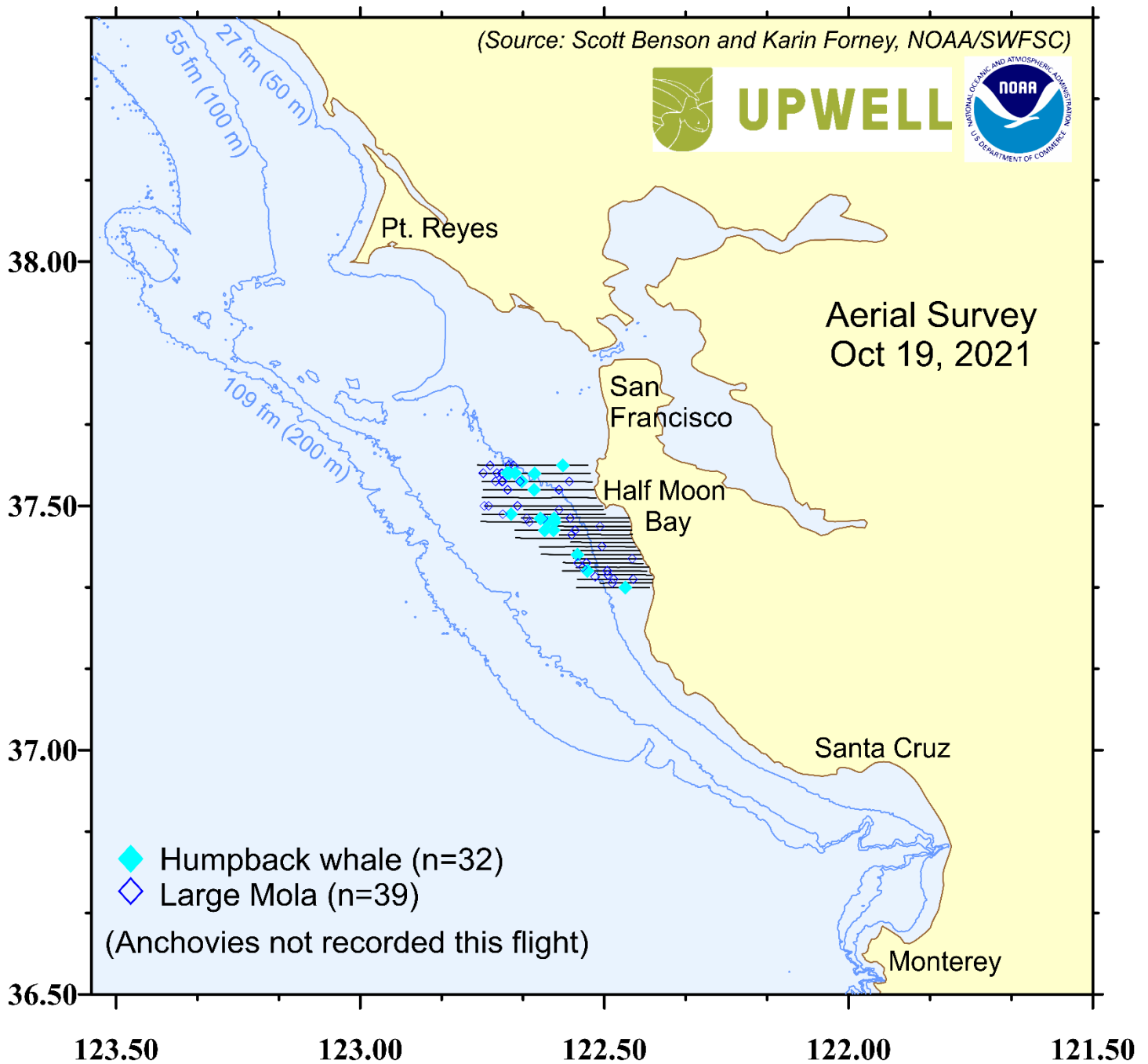


Figure 7. Aerial survey track lines and observations of humpback whales and large molas (ocean sunfish) off San Mateo County and in the Gulf of the Farallones (Fishing Zone 3) on October 19, 2021. Viewing conditions were suboptimal (with extensive clouds that limited the ability to see subsurface animals and moderately high winds creating whitecaps), and no leatherback turtles were seen. These surveys were specifically conducted to search for leatherback turtles near Half Moon Bay for capture/tagging operations. Anchovies were not recorded during this flight to allow the team to focus on searching for leatherbacks. Only large molas, which tend to co-occur with leatherback turtles, are included for simplicity. The number of individual whales, leatherbacks, and molas observed are indicated in parentheses (e.g., n=32 for humpback whale). Given the fine-scale nature of some of the transects (0.5 nautical mile spacing), some of the humpback whale sightings likely represented re-sightings of the same individuals.

#### Leatherback Sea Turtle Telemetry (*Fishing Zone 3*)

- An adult male leatherback turtle was captured at about 37° 31.3" N, 122° 33.9" W, roughly 3 miles northwest of Pillar Point (Half Moon Bay, CA) and tagged with a satellite-linked transmitter on October 16, 2021. This individual (aka "Bumpy") was previously captured



and tagged in the same area during September 2016. The turtle was in superb body condition and weighed 645 kg (1419 lbs, Figure 8).

- Following release, the turtle spent approximately 10 hours in shelf waters within about 5-15 miles off Half Moon Bay and subsequently moved off the shelf and southward (Figure 9). The most recent position was received on October 20, 2021, when the leatherback was over deep offshore waters west of Pt. Lobos in Monterey County. It should become evident during the next 1-2 weeks whether the turtle returns to nearshore waters for additional foraging or continues southwestward to tropical overwintering grounds or Western Pacific nesting beaches for breeding activities.



Figure 8. Adult male leatherback turtle captured and tagged with a satellite-linked transmitter by the NOAA/Upwell team about 3 miles northwest of Pillar Point (Half Moon Bay, CA) on October 16, 2021. The turtle was in superb body condition and weighed 645kg (1419 lbs).



Figure 9. Telemetry track for the period October 16 – 20, 2021 of an adult male leatherback turtle tagged on October 15, 2021 off Half Moon Bay. The transmitter reported frequently immediately after release of the turtle, and it is now reporting approximately every 24 hrs.

#### Cascadia Research and TMMC Small Vessel Surveys (*Fishing Zones 3-6*)

Eight surveys conducted in September 2021 in Fishing Zone 3 revealed high concentrations of humpback whales (more than 70 sighted on each of three different days) in inshore waters especially between Point Reyes and Half Moon Bay (Table 4 and Figure 10). Most of these humpback whales were feeding on fish with the seven largest groups (eight or more whales) all occurring between 50 and 70m of water inshore of the Farallon Islands.

During these surveys, blue whales were only seen near the shelf edge (around 200m water depth) most concentrated west of Cordell Bank. Tag deployments also confirmed that blue whales were feeding on krill layers near the shelf edge but they were sometimes moving into slightly more inshore waters and calling at night (Figure 11). Deployments on three humpback whales feeding in between the Farallon Islands and San Francisco Bay confirmed they were feeding close to the surface on fish but were also moving more widely through the Gulf of the Farallones.

Table 4. Summary of surveys and sightings in Fishing Zone 3 from surveys conducted in September 2021.

Date	Vessel	Locality	Hours	NMi	Blue	Humpback	UnLgCet
02-Sep-21	ROB	Bodega – Cordell	9.4	91	18	21	1
03-Sep-21	ROB	Bodega – Cordell	8.5	98	11	31	0



Date	Vessel	Locality	Hours	NMi	Blue	Humpback	UnLgCet
03-Sep-21	TMMC	Gulf of the Farallones	5.9	84	0	75	0
04-Sep-21	ROB	Gulf of the Farallones	9.7	93	4	72	0
11-Sep-21	MUS	Gulf of the Farallones	7.0	101	0	77	0
15-Sep-21	ROB	Half Moon Bay	10.0	94	4	22	1
16-Sep-21	ROB	Gulf of the Farallones	9.8	123	0	31	1
17-Sep-21	ROB	Gulf of the Farallones	7.8	88	0	17	2

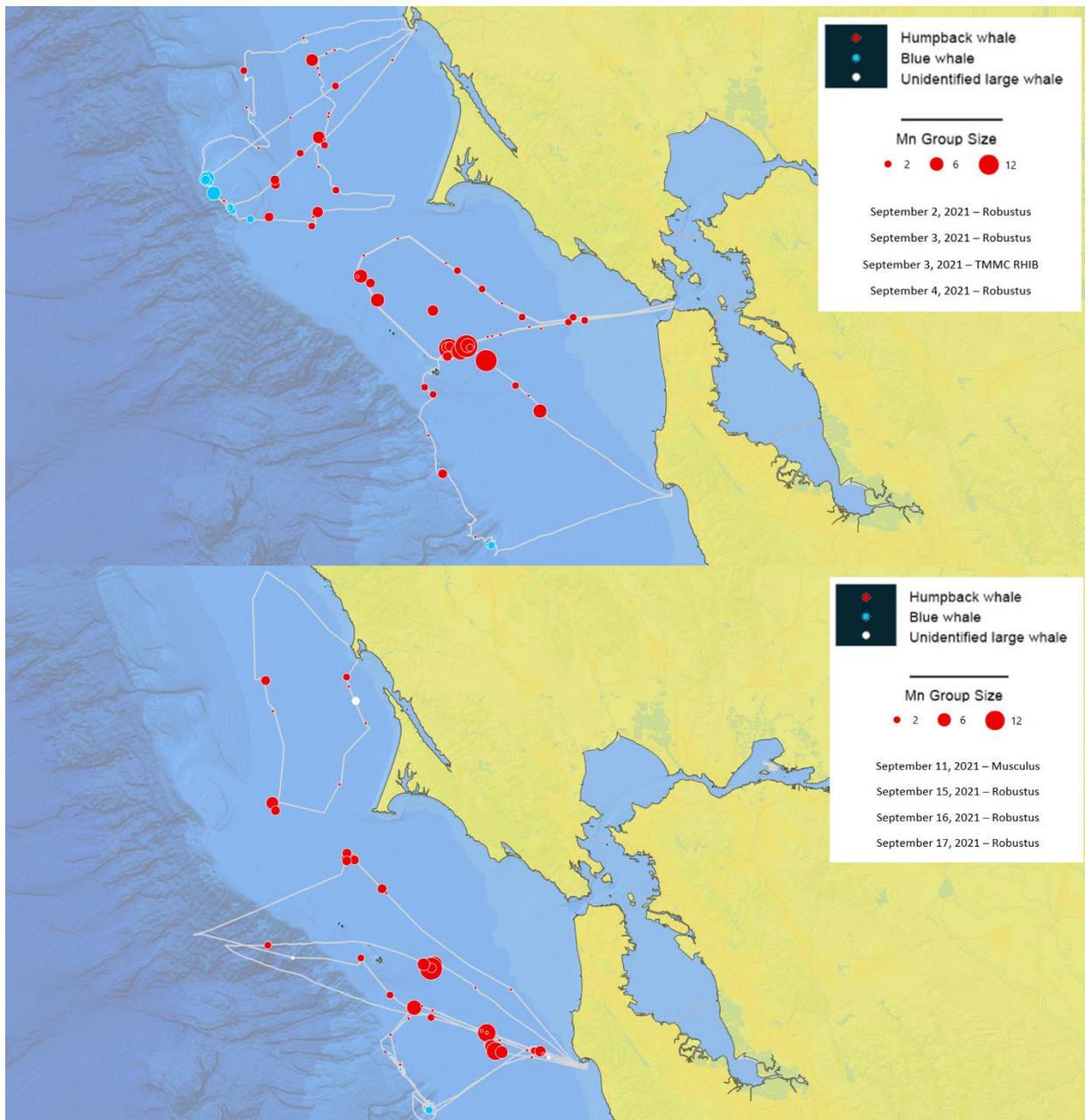


Figure 10. Small boat surveys (gray lines) and whale sightings in early (top) and mid-September (bottom) in the Gulf of the Farallones region (N of Bodega Bay to just S of Half-Moon Bay).

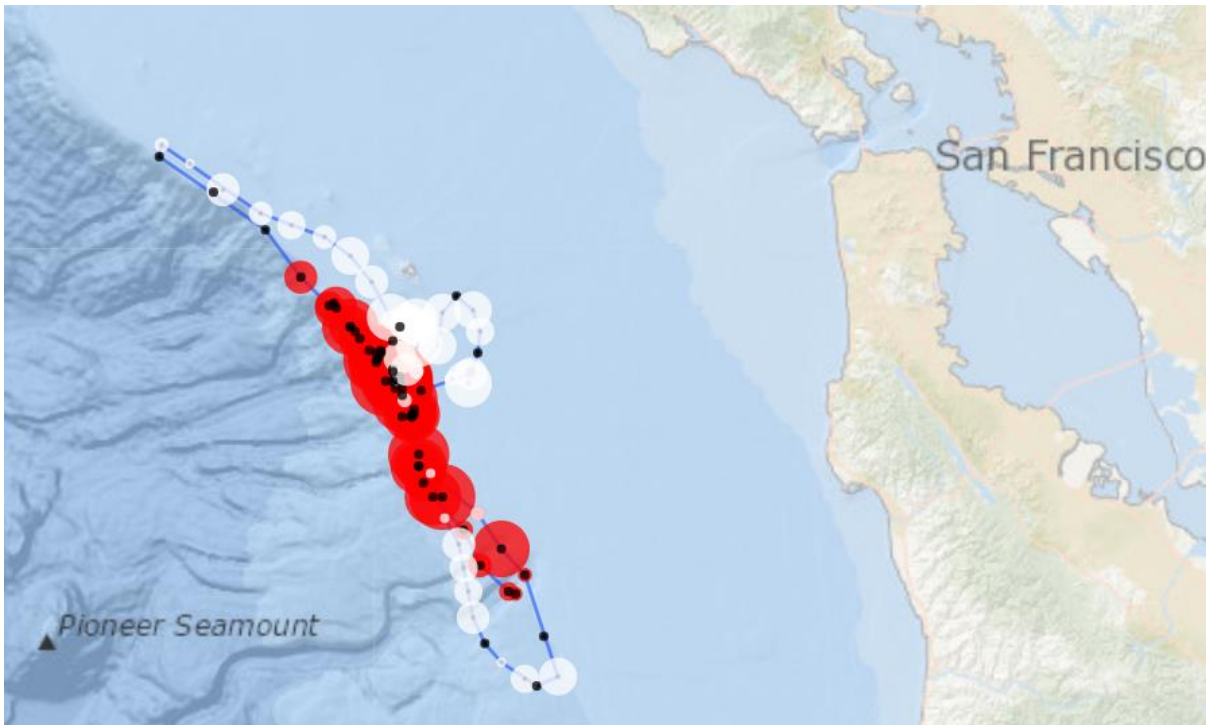


Figure 11. Movements of one of two blue whales tagged on September 4, 2021 showing feeding locations (red circles) along shelf edge and calling locations (white circles).

Surveys conducted primarily in the Monterey Bay region in September revealed generally low concentrations of whales with a maximum of 13 seen in one day (Table 5). The humpback whales that were seen were generally scattered in the southern half of the bay (Figure 12).

Table 5. Summary of surveys and sightings in Fishing Zone 4 from surveys conducted in September 2021.

Date	Vessel	Locality	Hours	NMi	Humpback	UnLgCet
13-Sep-21	MUS	Monterey Bay	3.8	40	8	0
13-Sep-21	ROB	Monterey Bay	3.3	26	9	0
14-Sep-21	MUS	Monterey Bay	6.4	90	13	0
14-Sep-21	RAD	Monterey Bay	8.0	69	0	0
14-Sep-21	ROB	Monterey Bay	5.5	73	0	0
15-Sep-21	MUS	Monterey Bay	3.5	32	7	0
16-Sep-21	MUS	Monterey Bay	3.9	29.4	6	0
17-Sep-21	MUS	Monterey Bay	2.5	13.4	1	0
18-Sep-21	MUS	Monterey Bay	1.0	19	4	0

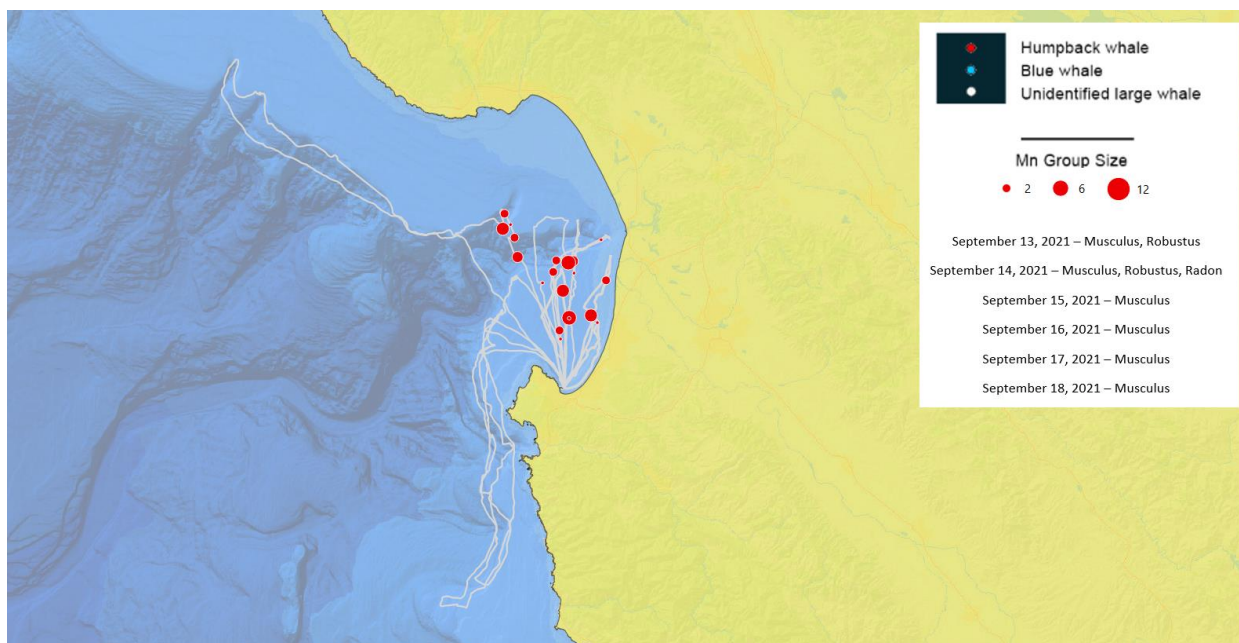


Figure 12. Survey tracks (faint white lines) and sighting locations of humpback whales in the Monterey Bay region (Fishing Zone 4) during surveys by Cascadia (on collaboration with Stanford University) in September 2021.

Surveys conducted in Zones 5 and 6 generally found lower concentrations of humpback whales in the areas surveyed (Table 6, Figure 13). Additional surveys conducted for a different project in early to mid-October revealed humpback whales feeding on fish off Palos Verdes Peninsula and near Catalina Island and photo-identification of these whales revealed they were primarily whales that were typically seen in the Southern California Bight and not humpback whales migrating south from feeding areas to the north. To date seven of 11 different whales identified had known winter breeding areas.

Table 6. Surveys and sightings in Fishing Zones 5 & 6 from surveys conducted in September 2021.

Date	Vessel	Locality	Hours	NMi	Humpback	UnLgCet
18-Sep-21	ROB	Morro Bay (Zone 5)	3.3	34	6	0
19-Sep-21	ROB	Santa Barbara Ch. (Zone 6)	8.8	108	6	1
20-Sep-21	ROB	Santa Barbara Ch. (Zone 6)	9.2	117	5	0
21-Sep-21	ROB	Morro Bay (Zone 5)	9.1	109	6	0



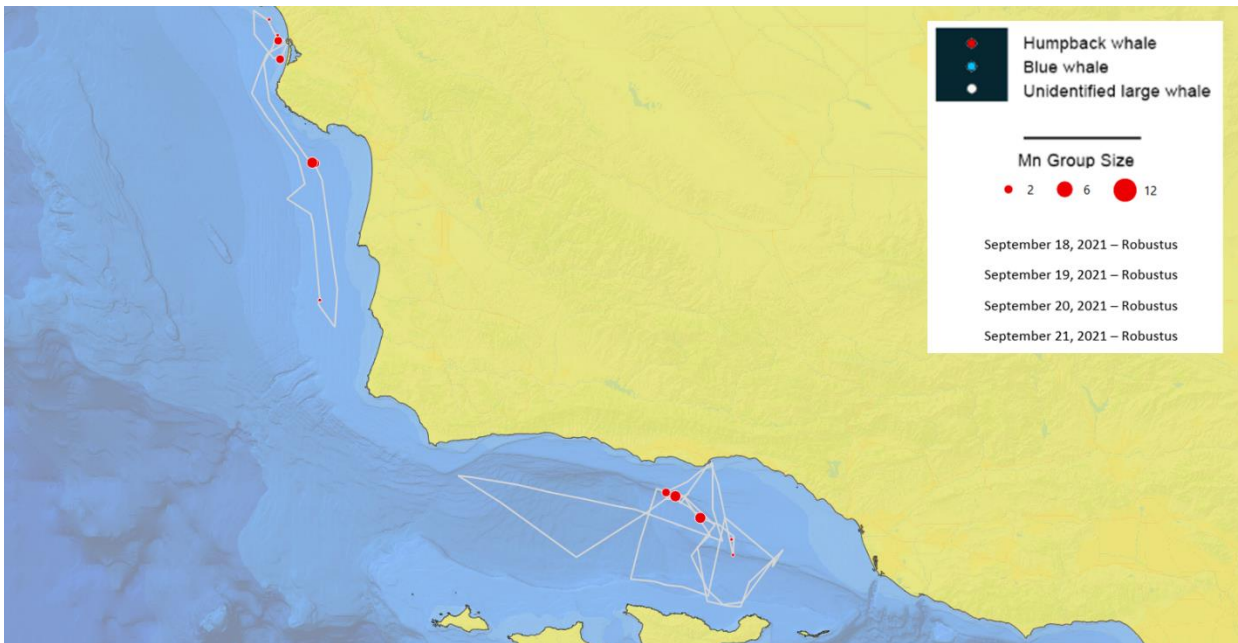


Figure 13. Survey tracks (faint white lines) and sighting locations of humpback whales in Fishing Zones 5 & 6 during surveys by Cascadia in September 2021.

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

- MBWW has regularly conducted whale-watching trips in southern Monterey Bay throughout the summer and fall. The average number of humpback whales-per-trip during the last 7-day period (October 12-18) was 18.9 whales per half-day trip, with a peak of 40 whales observed on October 14, 2021.
- No blue whales have been observed by MBWW since late August.

## MANAGEMENT CONSIDERATIONS

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

No additional information was shared.

### Total economic impact to the fleet: §132.8(d)(4)

Economic analysis beyond landings data submitted to CDFW is not currently available. See management consideration (d)(7) for available information on fishing activity to date during the 2020-21 fishing season.

### Historic patterns and current Actionable Species migration: §132.8(d)(6) and (11) \*

*Data provided by: Monterey Bay Whale Watch (processed by Karin Forney, NMFS); Karen Grimmer (Monterey Bay National Marine Sanctuary) and Jaime Jahncke (Point Blue Conservation Science); Briana Abrahms (University of Washington)*

## Monterey Bay Whale Watch (Fishing Zone 4)

- The semi-monthly average number of whales-per-half-day-trip during the last 14 days (October 5-18) was 16.6 (Figure 14). This is above average for this time of year compared to the overall 2003-2020 record, and slightly higher than for the same period in 2020.
- No blue whales have been observed by MBWW since late August. This is largely consistent with their historical seasonal migration patterns during late summer and fall (Figure 15).

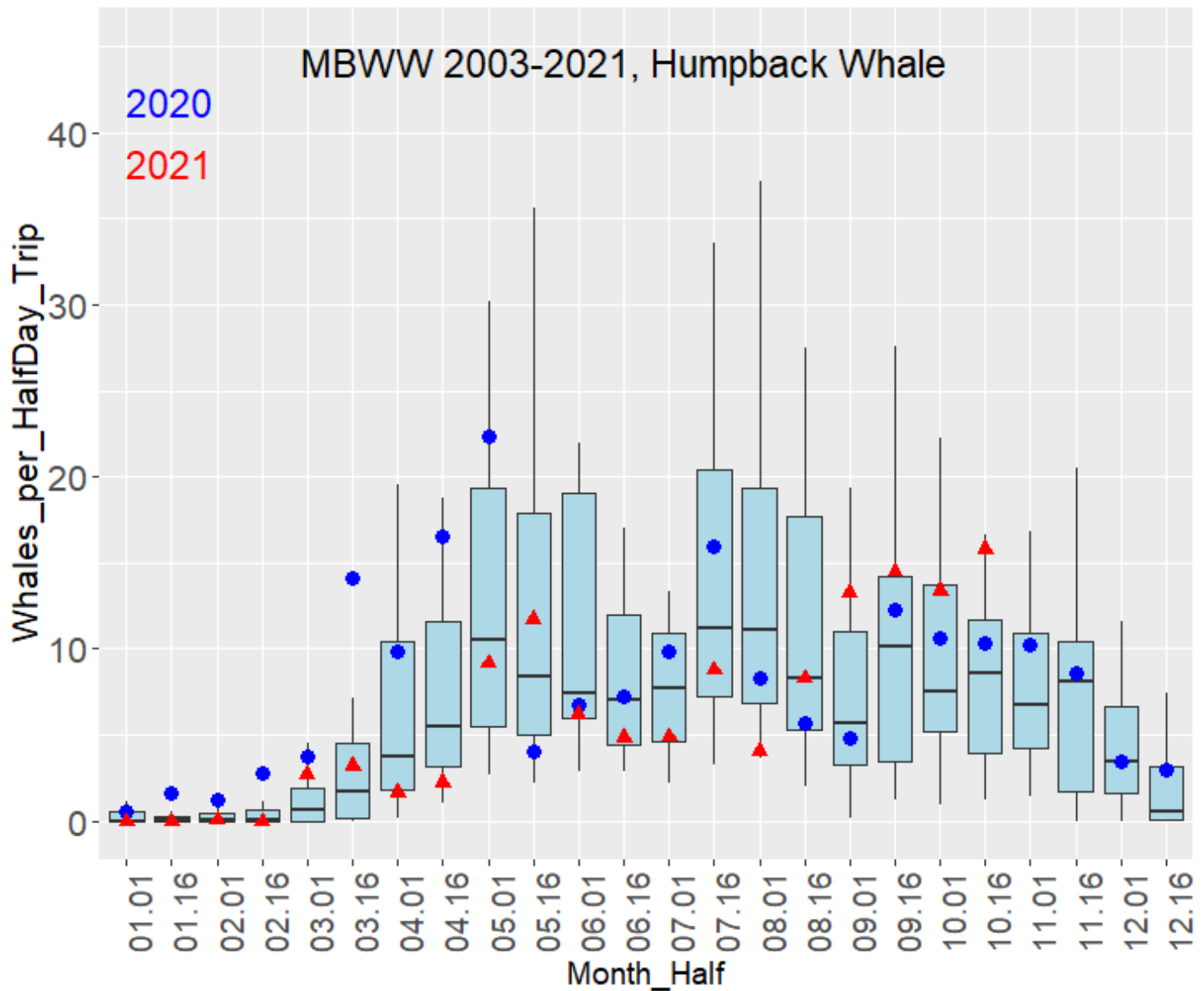


Figure 14. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of humpback whales per half-day trip on a semi-monthly basis (1<sup>st</sup>- 15<sup>th</sup>, 16<sup>th</sup>- end of month). This boxplot follows standard statistical practice in that 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 2020 (large blue dots) and 2021 (red triangles) and are provided for reference, placing recent whale numbers in a historical context.

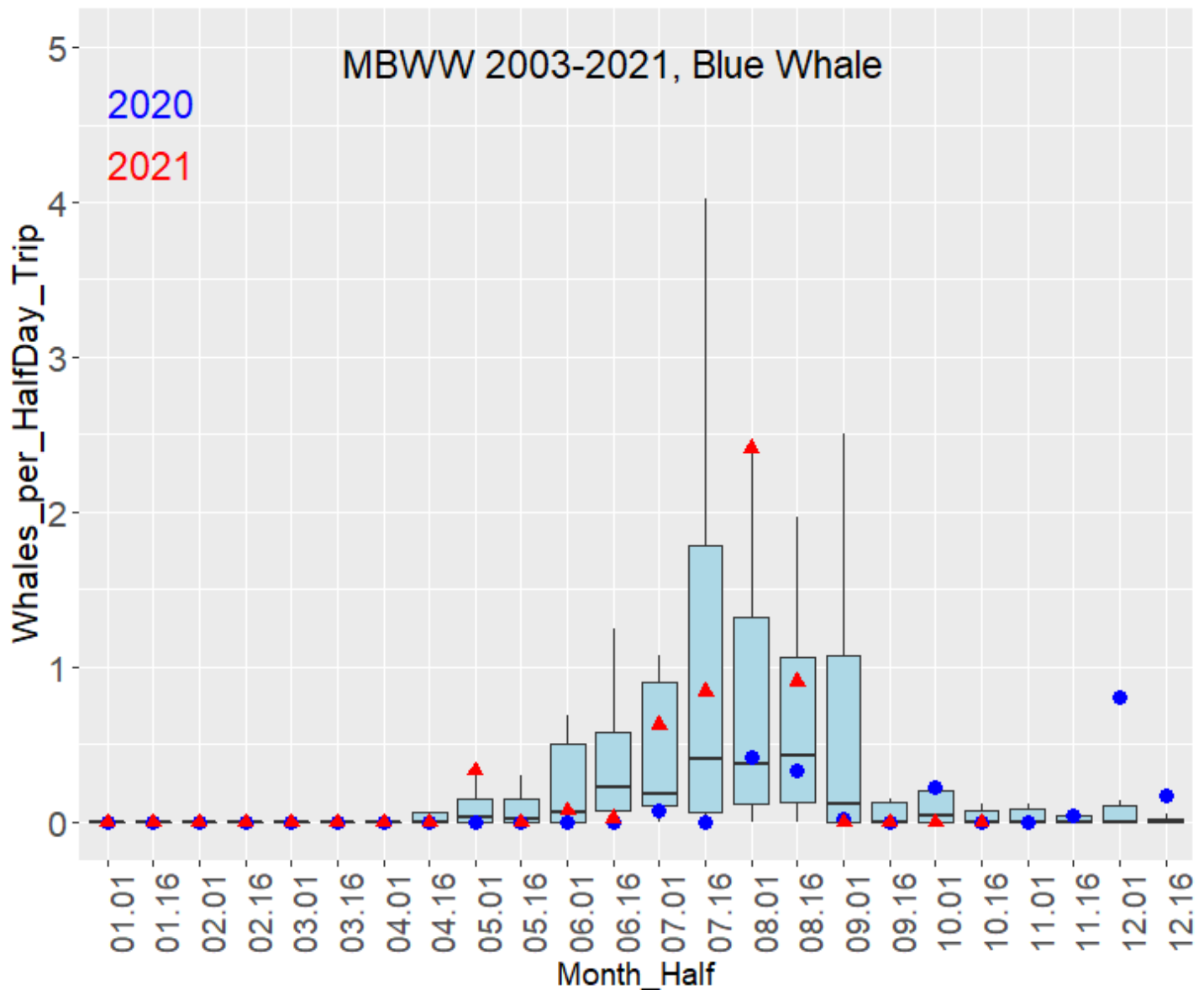


Figure 15. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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 2020 (large blue dots) and 2021 (red triangles) and are provided for reference, placing recent whale numbers in a historical context.

#### Point Blue Conservation Science Data Portal (*Fishing Zones 3, 4 and 6*)

- 126 humpback whale sightings were reported for the Greater Farallones National Marine Sanctuary (Zone 3) over the past seven days (October 13 – 20, 2021; Figure 16). No blue whales were sighted during this period. Observations were recorded by trained observers on the Farallon Islands and reported through the Spotter/Whale Alert app.
- 54 humpback whale sightings were reported for Monterey Bay National Marine Sanctuary (Zone 4) over the past seven days (Figure 17). No blue whales were sighted during this

period. Observations were reported by trained naturalists aboard Monterey Bay Whale Watch and Marine Life Studies.

- 100 humpbacks whale sightings were reported for Channel Islands National Marine Sanctuary (Zone 6) over the past seven days (Figure 18). No blue whales were sighted during this period. Observations were reported by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service.

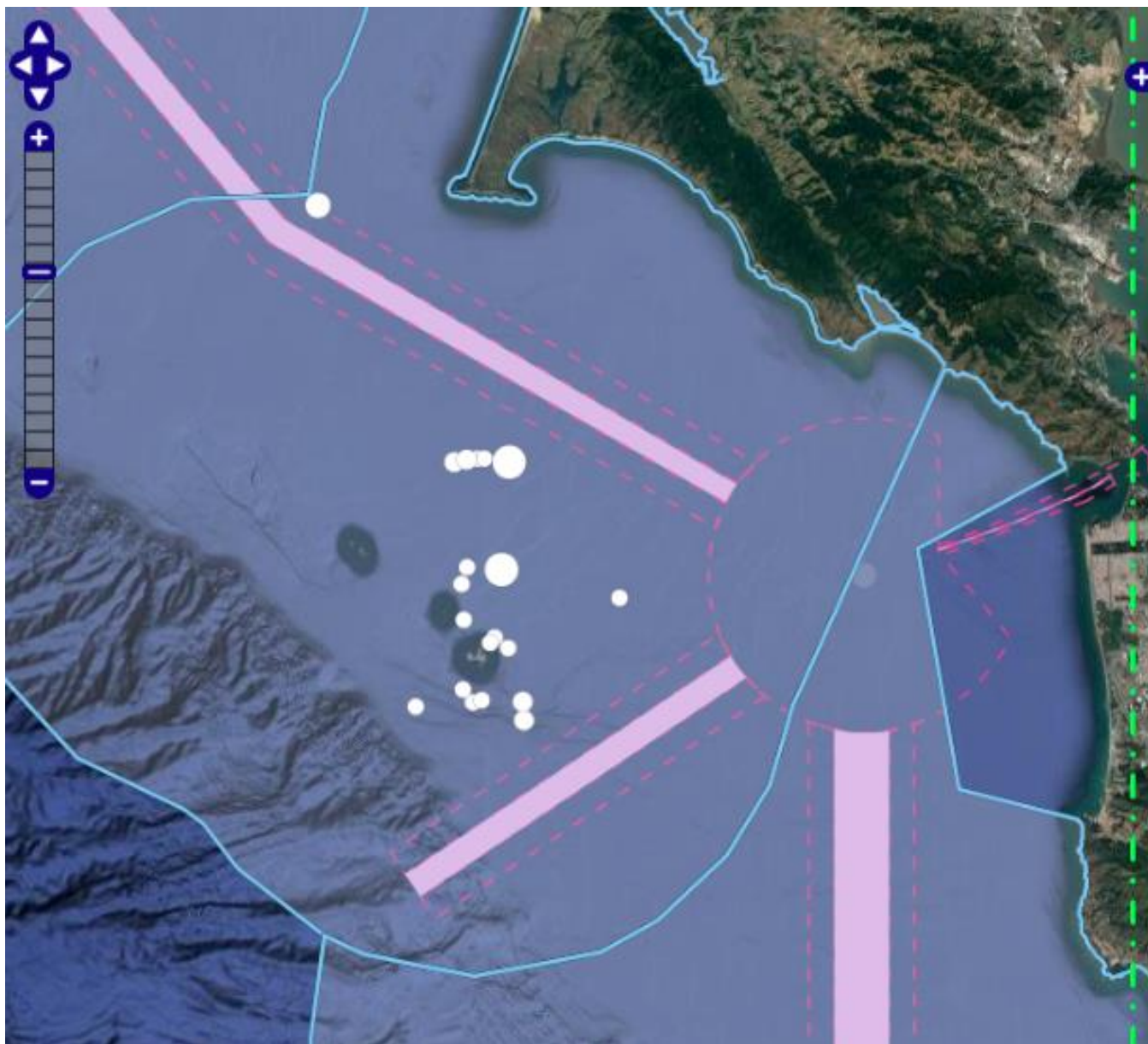


Figure 16. Location of 126 Humpback whale sightings in Fishing Zone 3. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals. [View updated information.](#)



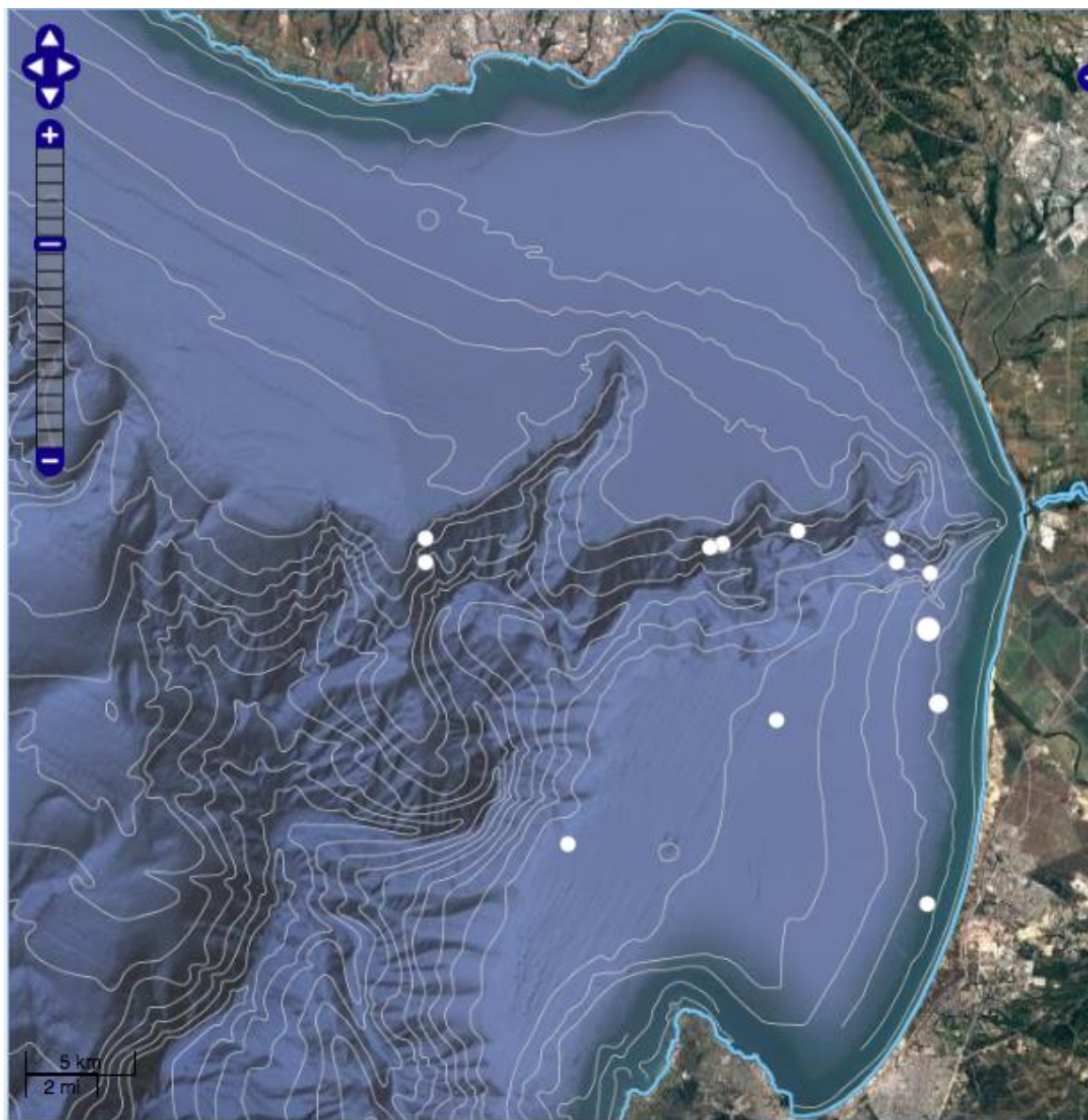


Figure 17. Location of 54 Humpback whale sightings in Fishing Zone 4. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals. [View updated information.](#)



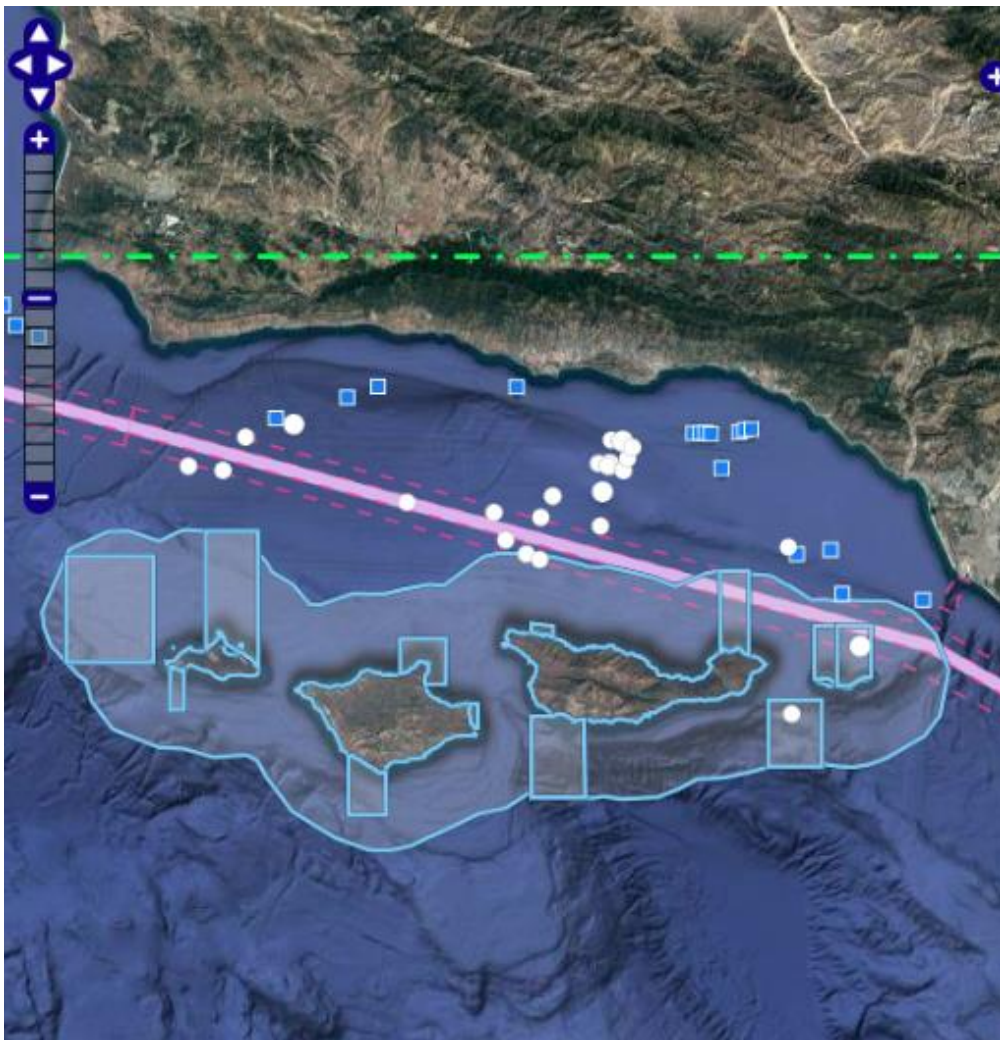


Figure 18. Location of 100 Humpback whale sightings in Fishing Zone 6. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals. [View updated information.](#)

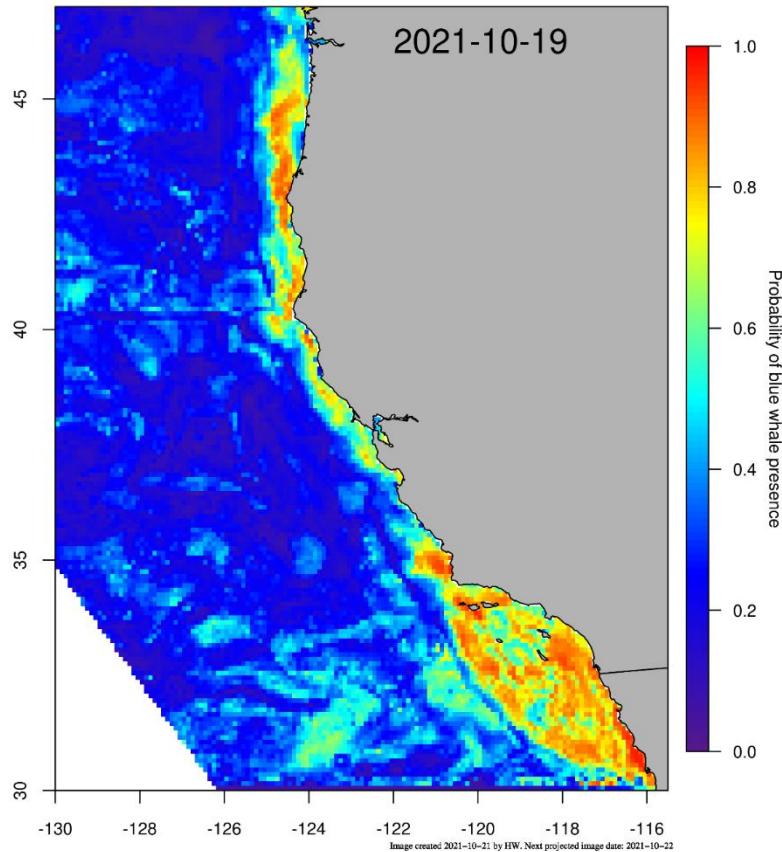
#### WhaleWatch 2.0 – All Fishing Zones

Blue whale habitat predictions for October 19, 2021 (Figure 19) indicate the probability of blue whale presence is moderate-to-high nearshore between Oregon and Monterey Bay; low in the southern portion of Fishing Zone 4 (south of Monterey Bay); and high in the nearshore portion of Fishing Zone 5 and throughout the Southern California Bight (Fishing Zone 6).

# WhaleWatch 2.0



Experimental Product



WhaleWatch 2.0 [or future product name] is a dynamic ocean management tool that aims to provide information on suitable whale habitat in real-time to minimize ship strike risk. Map shows predicted daily blue whale habitat suitability at 10km resolution which represents where whales are most likely to be based on environmental conditions. ([link to website](#))

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Figure 19. WhaleWatch 2.0 map for October 19, 2021. [View a current map.](#)

## Fishing Season dynamics: §132.8(d)(7) \*

Data provided by: California Department of Public Health, California Department of Fish and Wildlife

## Domoic Acid and Quality Testing

- Although many sites tested below the action level during the first round of domoic acid sampling (Figure 20), two sites (Russian River and Monterey) within the Central Management Area had samples above the action level. Both sites now need to be retested,

with two consecutive samples taken at least one week apart with all testing below the action level.

- Two locations from the first round of testing are still pending results; one is in the Northern Management Area and one is in the Central Management Area. The latest information can be found on [the CDPH website](#).
- Quality testing results are anticipated to be available the week of November 1. Low crab quality only affects the Northern Management Area.

CDPH SUMMARY OF DOMOIC ACID LEVELS IN CRABS

JULY 1, 2021 - OCTOBER 22, 2021

AREA	COLLECTION SITE	PORT	SAMPLE COLLECTION DATE	CRAB TYPE VISCERA	INDIVIDUAL SAMPLE RESULTS (FDA ACTION LEVEL >30 PPM)						AVERAGE LEVEL (Information Only)	PERCENT OF SAMPLES EXCEEDING ACTION LEVEL
A	George Reef	Crescent City	9/29/2021	Dungeness	<2.5	<2.5	<2.5	2.6	<2.5	<2.5	0.4	0%
A	Klamath River	Crescent City	9/29/2021	Dungeness	5.1	<2.5	<2.5	7.7	<2.5	3.1	2.7	0%
B	Lagoons	Trinidad	9/21/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	NA	Non-Detect	0%
B	Lagoons	Trinidad	10/7/2021	Dungeness	3.1	3.4	<2.5	2.5	3.2	<2.5	2.0	0%
B	Trinidad Head	Trinidad	9/21/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	Non-Detect	0%
B	LP Eureka	Eureka	9/30/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	7.8	1.3	0%
B	Eel River	Eureka	9/30/2021	Dungeness	3.4	<2.5	<2.5	<2.5	<2.5	2.6	1.0	0%
C	Usal	Fort Bragg		Dungeness								
D	Manchester Beach	Fort Bragg	10/9/2021	Dungeness	<2.5	<2.5	4.0	<2.5	<2.5	<2.5	0.7	0%
E	Salt Point	Bodega Bay	10/2/2021	Dungeness	<2.5	5.0	<2.5	<2.5	<2.5	5.4	1.7	0%
E	Russian River	Bodega Bay	10/2/2021	Dungeness	<2.5	<2.5	<2.5	36	<2.5	2.5	6.4	17%
E	Bodega Head	Bodega Bay	10/2/2021	Dungeness	12	6.3	9.6	<2.5	<2.5	<2.5	4.7	0%
E	Point Reyes	Bodega Bay	10/2/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	Non-Detect	0%
F	Duxbury Reef	Half Moon Bay/ San Francisco	10/5/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	Non-Detect	0%
F	Pillar Point	Half Moon Bay/ San Francisco	9/27/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	Non-Detect	0%
F	Pigeon Point	Half Moon Bay/ San Francisco	9/27/2021	Dungeness	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	Non-Detect	0%
G	Monterey Bay	Monterey	9/21/2021	Dungeness	37	<2.5	21	<2.5	<2.5	<2.5	9.7	17%
G	Monterey Bay	Monterey	9/18/2021	Rock	7.4	9.7	<2.5	<2.5	<2.5	<2.5	2.9	0%
H	Avila Beach	Morro Bay		Dungeness								

Figure 20. California Department of Public Health Domoic Acid Test Results for Crab, Updated October 22, 2021.

### Distribution and abundance of key forage: §132.8(d)(8) \*

Data provided by: CDFW; Karin Forney and Scott Benson (NMFS), in collaboration with Upwell Turtles (Upwell.org)

### CDFW Aerial Surveys (Fishing Zones 2-5)

- Multiple bait balls were observed in Fishing Zones 3 and 4, particularly near Point Reyes and nearshore along the northern portion of Monterey Bay (Figure 1).

### NOAA and Upwell Aerial Surveys (Fishing Zones 3 -4)

- Abundant schooling fish were documented off the San Mateo County coast and the Gulf of the Farallones, often associated with humpback whales and/or very dense aggregations of piscivorous (fish-eating) seabirds, including brown pelicans, common murre, and a variety of gulls (Figures 3-7).

- Leatherback foraging habitat was evident from about Point Reyes to Pigeon Point within water depths of about 20-40 fathoms, as indicated by dense aggregations of brown sea nettles (leatherback prey) and abundant large molas (ocean sunfish, another brown sea nettle predator that often is found in the same areas as leatherbacks). During transit, abundant sea nettles were also seen between Davenport and Año Nuevo (Fishing Zone 4), around 1-2 miles offshore (Figures 3-7).
- No krill (blue whale prey) were observed on any of the October 2-19, 2021 aerial surveys.

#### **Ocean conditions: §132.8(d)(9) \***

*Data provided by: National Weather Service Climate Prediction Center, California Current Integrated Ecosystem Assessment Program*

#### **El Niño/Southern Oscillation Diagnostic Discussion**

As of October 14, 2021, La Niña conditions have developed and are expected to continue, with an 87% chance of La Niña in December 2021-February 2022.

#### **Marine Heatwave Tracker**

The NEP21A large marine heatwave began in late April 2021 and as of October 12, 2021 has remained fairly strong in offshore waters (Figure 21). Waters in the Southern California Bight (Fishing Zone 6) remain warmer than normal, however this is a separate feature from the main NEP21A large marine heatwave. Within Fishing Zones 1-5, nearshore waters are cooler than usual for this time of year.



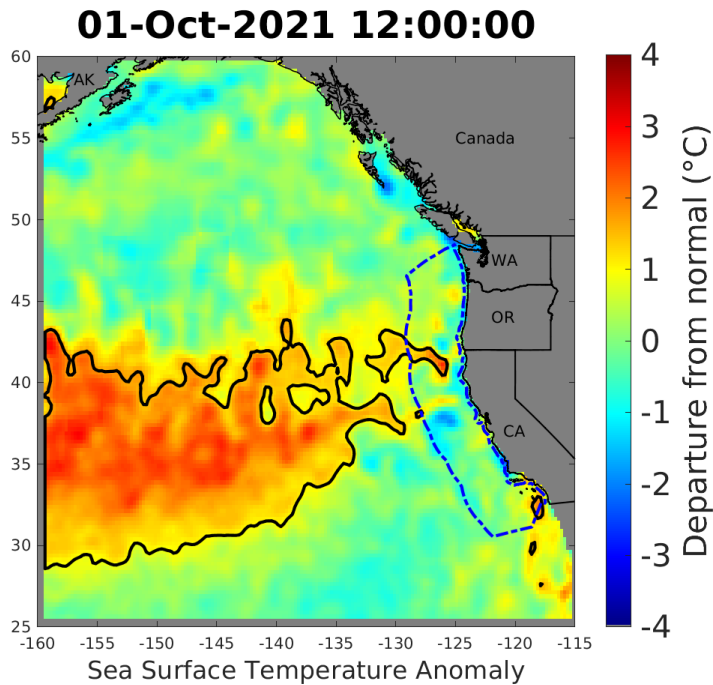
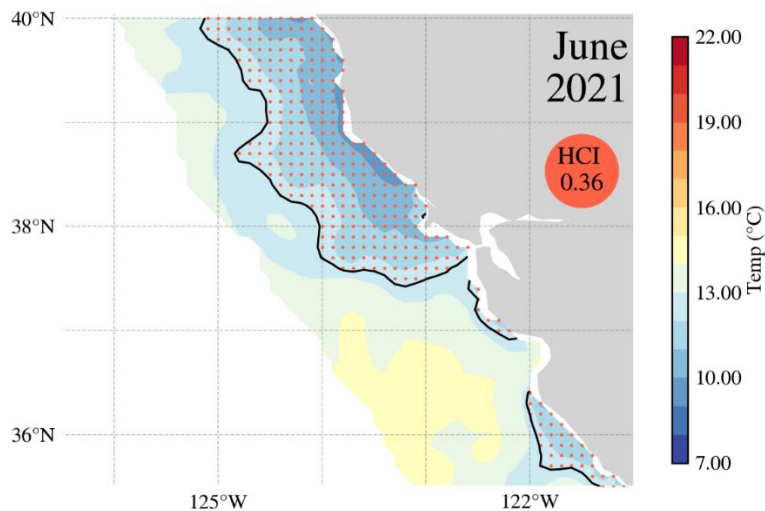


Figure 21. Science-quality (delayed 3-weeks), daily interpolated standardized sea surface temperature anomalies (SSTa) in the California Current ecosystem available for analysis of MHW presence. Dark outline shows the current extent of MHW conditions, as delineated by values of the normalized SST + 1.29 SD from normal. Blue dashed line represents the US West Coast EEZ. SST data from [NOAA's Optimum interpolation Sea Surface Temperature analysis \(OISST\)](#), with the SST anomaly calculated using climatology from NOAA's AVHRR-only OISST dataset.

### Habitat Compression Index

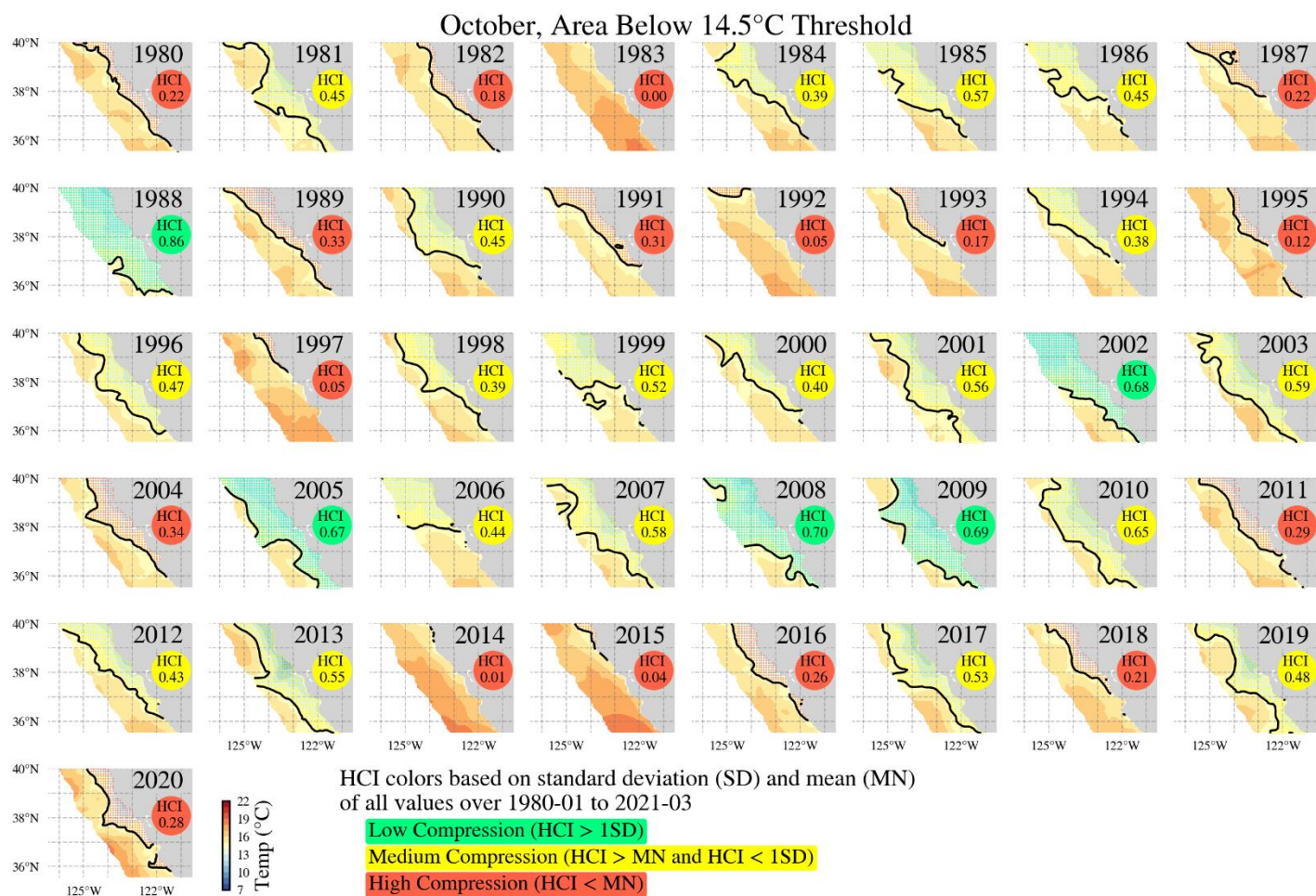
The most recent Habitat Compression Index values available are for June 2021 (Figure 22). At that time, there was high compression, with limited available cool water habitat. Compression is typically moderate or high during October (Figure 23).



HCI color based on standard deviation (SD) and mean (MN) of all values over 1980-01 to 2021-06

High Compression (HCI < MN)

Figure 22. Map of June 2021 sea surface temperature and location of the Habitat Compression Index (HCI) boundary (think black line).



**Figure 23. Maps of historical October sea surface temperatures and location of the Habitat Compression Index (HCI) boundary (think black line) between 1980 and 2020.**

### **Current Impact Score Calculation: §132.8(d)(10) \***

*Data provided by: CDFW*

Pursuant to the Risk Assessment and Mitigation Program (Section 132.8, Title 14, CCR), Impact Score Calculations will be assigned beginning with the 2021 calendar year based on confirmed entanglements of Actionable Species (humpback whales, blue whales, or leatherback sea turtles) reported to CDFW by NOAA. Impact Score totals for the current fishing season (2021-22) and calendar year (2021) are provided in Table 2 (see above).