State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (DEPARTMENT)
DECLARATION OF A STATEWIDE FISHERY CLOSURE FOR
THE COMMERCIAL DUNGENESS 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, Section 132.8 ("Section 132.8"), I find and declare that:

I

On May 18, 2021, I evaluated entanglement risk for the commercial Dungeness crab fishery pursuant to Section 132.8(b). 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 May 12, 2021. Prior to this risk assessment and management response, I considered the Working Group's May 13, 2021 management recommendation and other relevant information provided to my staff.

II

There are no marine life concentration survey data to inform the risk assessment in Fishing Zones 2, 3, 5, and 6. Pursuant to Section 132.8(c)(2)(B)(1), I must implement a protective management action.

III

The number of Humpbacks observed in Fishing Zone 1 and 4 exceeds 10 and a running average of 5, respectively. Pursuant to Section 132.8(c)(2)(B)(2)(a), I must implement a protective management action.

IV

Pursuant to Section 132.8(e)(5), I must allow use of any authorized Alternative Gear during a closure on April 1 or later.

V

Pursuant to Fish & Game Code Section 9002.5(b)(1)(A)(ii) and implementing regulations in Section 132.7 of Title 14 of the California Code of Regulations, I may authorize retrieval operations under the Lost or Abandoned Dungeness Crab Trap Gear Retrieval Program when take of crab is restricted pursuant to Section 132.8.

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, Blue 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 132.7 and 132.8 of Title 14 of the California Code of Regulations, I am implementing the following management actions:

1. Starting at 12:00PM on June 1, 2021, a Fishery Closure of Fishing Zones 1-7 (statewide) for commercial Dungeness crab for the remainder of the 2020-21 season, All Dungeness crab traps must be removed from ocean waters. The take and possession of Dungeness crab is therefore prohibited after 12:00PM on June 1, 2021. This closure does not apply to fishing activity with authorized Alternative Gear types as stated below.
2. Authorized Alternative Gear may be used in all closed Fishing Zones. Currently there are no authorized Alternative Gear types. If an Alternative Gear type is authorized before the statutory season closure dates, it may be used for take of Dungeness crab.
3. Retrieval operations under the Lost and Abandoned Dungeness Crab Trap Gear Retrieval Program may begin on June 7, 2021 at 6:00AM.

Updates and material regarding future entanglement risk evaluations in the commercial Dungeness crab fishery will be made available on the Department's web page: https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries.

Charlton H. Bonham, Director

5/18/21 3:18 pm
Date/Time

ATTACHMENT TO DIRECTOR'S MAY 17, 2021 DECLARATION OF A STATEWIDE FISHERY CLOSURE FOR THE COMMERCIAL DUNGENESS CRAB FISHERY DUE TO RISK OF MARINE LIFE ENTANGLEMENT

Information referenced in this Attachment is further described in the Available Data compilation dated May 17, 2021 and located at the Department's Whale Safe Fisheries website (https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries), 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 1, 2, 5, and 6:** No current data are available for these Zones, which triggers management response under RAMP (c)(2)(B)(1).

Relevant Management Considerations Under Section 132.8(d)

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

   Fleet representation on the Working Group opposed the Department's initial recommendation of a statewide Fishery Closure, with only two Working Group members supporting. The Working Group provided an alternative recommendation of a Depth Constraint in Fishing Zones 1-5 and a Fishery Closure in Zone 6, which received support from 13 members of the Working Group and was opposed by two members. The recommendation memo is available on the Department's web page: https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries.

   After the Working Group meeting but in advance of the Director's final determination, additional observational data from a UCSC survey in Fishing Zone 4 was provided via Cascadia Research reporting 31 sightings of 61 humpback whales over a 4-day survey period. These additional data confirm the predicted increased presence of actionable species in and/or near fishing grounds.

2. **Information from NOAA**

   No additional information was provided for this risk assessment.

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

   The running average sightings of Humpback whales in Monterey Bay (Zone 4) is now near historical average, which is an indication of increased migration when compared to previous reporting periods. Vessel surveys in Zone 1 observed moderate numbers

of Humpback whales. Observational data confirms presence of Actionable Species in the Fishing Grounds. As a result of marine life concentration triggers for Humpback whales being met, anticipated increasing densities of Humpback whales in the Fishing Grounds over the coming weeks, and the minimum two-week lead time requested by the fleet to safely remove all gear from the water, a Fishing Zone closure on June 1 is the most effective Management Action for Zones 1 - 7 to minimize entanglement risk Dungeness trap fishing gear and Humpback whales.

4. Total Economic Impact to the Fleet and Fishing Communities

A statewide fishing closure will impact operators and businesses still participating in the fishery. However, effort has continued to decrease with each bi-weekly reporting period as fishery participants switch to other fisheries or conclude fishing for the season. Additionally, while there will be economic impacts to individual participants, given the time of year and expected increasing entanglement risk through the remainder of the season, the short-term economic costs to individuals must also be weighed against the longer-term viability of the fishery statewide.

5. Data Availability Within and Across Fishing Zones

Monterey Bay Whale Watch (MBWW) data are available for Fishing Zone 4. Cascadia Research vessel survey data are available for Zone 1. Point Blue Conservation Science observation data are available for Zones 3, 4, 5 and 6, and additional observation data is available for Zone 4. The Habitat Compression Index and Whale Watch 2.0 habitat predictions are available for all Zones. No data is available for Zone 2 specific to whale or sea turtle presence. Given lack of data in Zone 2, the Department considered data available from adjacent Zones in determining management response.

6. Known Historic Marine Life Migration Patterns

Presence of Humpback whales in typically high concentrations areas in Fishing Zone 4 are near average based on MBWW data, and observation data in the same area supports increased whale presence from prior weeks. Additionally, Cascadia Research vessel-based surveys observed whales off Reading Rock near Trinidad.

Continued relative absence of Blue whales is consistent with their overwintering at breeding areas outside of California.

Pacific Leatherback sea turtles typically do not begin to arrive in California waters until late June based on sea turtle tagging studies and historical surveys.

7. Fishing Season Dynamics

Season price negotiations delayed the actual start of fishing following the December 23, 2020 statewide opener. Most vessels began setting gear on Monday January 11, 2021.

Based on CDFW landings data, 359 vessels have participated in the fishery as of May 4, 2021. Week 5 had the highest number of potential traps deployed across all Fishing Zones, with an estimated total of 94,675 traps. The most recent landings data indicates decreased fishing activity statewide, landing volumes remain the same for Fishing Zones 1, 2, 5, and 6. The estimated maximum number of traps is currently 16,750, which is another decrease from the last risk assessment when 28,975 were estimated. Fishing Zone 3 has the highest estimated number of traps deployed at 11,250 traps. Bi-weekly trap reporting also confirms Fishing Zone 3 has the highest number of deployed traps. Average fishing depths statewide range from 10-21 fathoms, with maximum depths ranging from 35-80 fathoms.

8. Known Distribution and Abundance of Key Forage

Krill abundance (higher offshore in the outer slope) is also anticipated to be closer to average yearly values while anchovy is still considered to be above average, given the historical record.

Cool ocean temperatures and strong spring upwelling conditions continued from February to March and the Habitat Compression Index (HCI) for both months indicates a low compression state. It is anticipated that cool conditions with expanded upwelling habitat will continue with no impact of habitat compression that would otherwise be anticipated to result in increased concentrations and aggregations forage (and therefore whales) nearshore.

9. Ocean Conditions

La Niña conditions persisted in March with a 80% chance of a transition from this condition to ENSO-neutral during May-July 2021.

The latest outlook of late winter/spring ocean ecosystem conditions shows that ocean conditions have cooled significantly over this past winter and conditions in spring are trending toward cool and productive conditions. It is anticipated that cool conditions will continue, with expanded upwelling habitat and no signs of impact of habitat compression that would be anticipated result in increased concentrations and aggregations of whales and forage nearshore.

10. Current Impact Score Calculations

a. Fishing Season – 0.38 for Humpback whales; 0 for Blue whales and Pacific Leatherback sea turtles

b. Calendar Year – 0.38 for Humpback whales; 0 for Blue whales and Pacific Leatherback sea turtles

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

Based on Monterey Bay Whale Watch data, Cascadia Research vessel surveys, Point Blue Conservation data, and additional sources of observation data, significant migration into the Fishing Grounds has begun and is expected to increase over the coming weeks. This is supported by whale concentrations increasing to historical averages in Fishing Zone 4 based on MBWW data, sightings of 45 Humpback whales over two days by Cascadia Research, and an increase in observations of Humpback whales as reported to Point Blue Conservation by trained naturalists associated with the National Marine Sanctuaries and National Park Service as well as trained observers.

Chosen Management Action and Rationale

Based on the management considerations outlined above, the Director will implement Fishery Closure statewide (Fishing Zones 1-7) beginning at 12:00PM on June 1, 2021.

No current survey data was available for Fishing Zones 2, 3, 5, and 6, which requires analysis of the management considerations under Section 132.8(d) and appropriate management response under Section 132.8(c)(2)(B)(1). Similarly, available survey data in Fishing Zones 1 and 4 reported more than 10 Humpback whales and a running average of greater than 5, respectively, which requires either a Fishing Zone closure or other protective management action under Section 132.8(c)(2)(B)(2). Those sections anticipate a broader analysis of the factors impacting entanglement risk statewide. Section 132.8(d)(5) anticipated that if data are not available, data from adjacent Fishing Zones may be used.

Available data since the last risk assessment indicates that Humpback whale migration to California waters is well underway, and Humpback whale numbers are expected to increase over the coming weeks. Based on the available data in Fishing Zones 1 and 4, Humpback whales are also likely to be present in higher numbers than previously observed in Fishing Zones 2, 3, 5, and 6. Increased whale presence increases the risk of co-occurrence between Dungeness crab gear and Humpback whales and therefore increased entanglement risk. Although fishing activity has been declining in recent weeks, remaining fishing activity poses an entanglement risk, particularly in Fishing Zones 1 (where reporting indicates over 5,000 traps are currently being fished, and possibly as high as 7,200 based on landings data) and Fishing Zone 3 (where reporting indicates over 8,300 traps are currently being fished, and possibly as high as 11, 250 based on landings data).

Furthermore, observational data in Fishing Zone 4 indicates an increase in Humpback whale activity in shallower waters. As whale concentrations increase, they are expected to disperse more widely across the Fishing Grounds, including into shallower waters which is more likely to overlap with fishing activity. Lack of data in certain Fishing Zones of the state supports a more restrictive management response in those areas given the time of year and anticipated increase of whale presence due to migration into California waters. Additionally, fleet representation on the Working Group indicated up to two weeks is necessary to remove all gear from the water; starting the process immediately is necessary in order to ensure reduction in entanglement risk as soon as possible. The RAMP regulations anticipate a Fishery Closure when marine life concentration triggers are reached, and best available science does not support a different management approach as protective of Humpback whales, Blue whales, or Pacific Leatherback Sea Turtles.

Pursuant to Section 132.8(e)(5), the Director shall allow use of any authorized Alternative Gear. Currently there are no authorized Alternative Gear types. If an Alternative Gear type is authorized before the statutory season closure dates, it may be used for the take of Dungeness crab.

Under the Lost or Abandoned Dungeness Crab Trap Gear Retrieval Program, the Director may authorize the beginning of retrieval operations during a period of time when take of crab is restricted pursuant to Section 132.8. Authorization of this program beginning June 7, 2021 at 6:00AM will further reduce entanglement risk by removing lost or abandoned gear.

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

Date: May 18, 2021

An initial assessment and preliminary recommendation was 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 commercial Dungeness crab fishery. The initial assessment was shared with the Working Group on May 12, 2021 and finalized on May 18, 2021 based on discussions with the Working Group and after consideration of all available data.

A. Recommended Management Action

Fishing Zones 1, 2, 3, 4, 5, 6 and 7 (statewide): CDFW Marine Region staff's final recommendation is to implement a Fishery Closure for Fishing Zones 1 and 4 triggered by Marine Life Concentration data and a Fishery Closure for Zones 2, 3, 5 and 6 triggered by lack of recent RAMP approved survey data, and in both instances supported by the best available science relevant to the management considerations. Monterey Bay Whale Watch Data (MBWW) data for Zone 4 indicate Humpback whale observations are near historical average for this time of year, indicating migration to California waters is well underway and will continue to increase over the coming weeks. Cascadia Research vessel surveys in Zone 1 show continued presence of Humpback whales at moderate levels. Based on historical migration patterns and as indicated by data from Zones 1 and 4, Humpback whales are also likely to be present in higher numbers than previously observed in Zones 2, 3, 5 and 6. This increases the risk of co-occurrence between Dungeness crab gear and Actionable Species and therefore increases entanglement risk. This is particularly true for Zone 3 where trap numbers are reported to be over 8,300 and could be as high as 11,250 based on trap tier allotments of actively landing vessels. Similarly, for Zone 1, reporting indicates over 5,000 traps are currently being fished and could be as high as 7,200 based on trap tier allotments. To reduce risk of entanglement, staff's recommendation is to implement a Fishery Closure for Zones 1, 2, 3, 4, 5, 6 and 7 (statewide) beginning June 1, 2021 at 12:00pm (noon). In addition to the Fishery Closure, staff recommend the Director authorize the Lost or Abandoned Dungeness Crab Trap Gear Retrieval Program to begin on June 7, 2021 at 12:00pm (noon) for all Fishing Zones. Authorization of this program will further reduce entanglement risk by removing lost or abandoned gear.

Through the remainder of the season, the Fleet should remain vigilant and move or avoid setting gear in areas where whales are transiting or foraging until all gear is removed at the close of the season. CDFW also reminds the Fleet that final bi-weekly reports must be submitted on or before June 16, 2021.

Summary of RAMP triggers and Management Considerations analyzed during preparation of this Final Assessment and Management 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: 0

Confirmed Entanglements in Unknown Fishing Gear reported from California:

- During the current Fishing Season: 1 Humpback whale (Zone 6)
- During the current calendar year: 1 Humpback whale

Marine Life Concentrations Surveys and/or Satellite Telemetry Observations:

- **Fishing Zone 1:** Number of Humpback whales observed in a single Fishing Zone exceeds 10, which triggers management response under RAMP (c)(2)(B)(2). Vessel surveys observed 30 and 15 Humpback whales during two survey days.
- **Fishing Zone 2, 3, 5 and 6:** No current CDFW approved survey data are available for these Zones, which triggers management response under RAMP (c)(2)(B)(1).
- **Fishing Zone 4:** Running weekly average exceeds 5 Humpback whales in a single Fishing Zone, which triggers management response under RAMP (c)(2)(B)(2). Running weekly average is 8.1 Humpback whales.

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

- The running average sightings of Humpback whales in Monterey Bay (Zone 4) is now near historical average, which is an indication of increased migration when compared to previous reporting periods. Vessel surveys in Zone 1 observed moderate numbers of Humpback whales. As a result of marine life concentration triggers for Humpback whales being met, and anticipated increasing densities of Humpback whales in the Fishing Grounds over the coming weeks, a Fishing Zone closure is the most effective Management Action for Zones 1 - 6 to minimize co-occurrence with Dungeness trap fishing gear and Humpback whales.

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

- A Fishing Zone closure will impact operators and businesses still participating in the

fishery. However, effort has continued to decrease with each bi-weekly reporting period as operators switch over to other fisheries, or conclude fishing for the season.

- There will be economic costs to individual operators, however given the time of year and risk of entanglement (which is expected to increase), 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

- MBWW data are available for Fishing Zone 4. Cascadia Research vessel survey data are available for Zone 1. Point Blue Conservation Science observation data are available for Zones 3, 4, 5 and 6. The Habitat Compression Index and Whale Watch 2.0 habitat predictions are available for all Zones.

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

- Presence of Humpback whales are near average based on MBWW data, an indication that migration into California waters is well underway. Humpback whale sightings from Cascadia Research vessel-based surveys observed whales between 40 and 90 fathoms off Reading Rock, near Trinidad.

- Pacific Leatherback sea turtles typically do not begin to arrive in California waters until late June based on sea turtle tagging studies. Those animals typically forage in an area extending from Monterey Bay to Point Reyes during the summer months.

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

- Season price negotiations delayed actual start of fishing following the December 23, 2020 statewide opener. Most vessels began setting gear on Monday January 11, 2021.

- Based on CDFW landings data, 359 vessels have participated in the fishery as of May 4, 2021, making at least one landing. Week 5 had the highest number of potential traps deployed across all Fishing Zones, with an estimated total of 94,675 traps. The estimated maximum number of traps is currently 16,750 which is another decrease from the last risk assessment when 28,975 traps were estimated. For the current season, Zone 3 has the highest estimated number of traps deployed at 11,250 with almost half of these originating from vessels landing in the port of San Francisco, estimated at 5,375.

- The most recent CDFW required bi-weekly trap reporting period of May 1 estimated a total of 17,130 (previous reporting period was 27,292) traps fishing in minimum depths of 10 – 21 fathoms and in maximum depths of 35 – 80 fathoms across all Fishing Zones. Bi-weekly reports confirm Zone 3 has the highest number of deployed traps at 8,387. *Note: CDFW has not achieved 100% reporting by all active permits.*

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

- Krill abundance (higher offshore in the outer slope) is also anticipated to be closer to average yearly values while anchovy is still considered to be above average, given

the historical record.

- Cool ocean temperatures and strong spring upwelling conditions continued from March to April and the Habitat Compression Index (HCI) for April indicates a continued low compression state. It is anticipated that cool conditions with expanded upwelling habitat will continue with no compression that would be anticipated to result in increased concentrations and aggregations of whales and forage nearshore.

Section 132.8(d)(9): Ocean conditions

- The prediction of ENSO conditions was last updated on April 8, 2021. La Niña conditions persisted in March with an 80% chance of a transition from this condition to ENSO-neutral during May - July 2021.

- The latest outlook of late winter/spring ocean ecosystem conditions shows that ocean conditions have cooled significantly over this past winter and conditions in spring are trending toward cool and productive conditions. It is anticipated that cool conditions will continue, with expanded upwelling habitat and no signs of habitat compression that would be anticipated to result in increased concentrations and aggregations of whales and forage nearshore.

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

- Impact score calculation under RAMP began on January 1, 2021. The current impact score is 0.38 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 Monterey Bay Whale Watch data, Cascadia Research vessel surveys and Point Blue observation data, significant migration into the Fishing Grounds has begun to occur and will continue to increase over the coming weeks.

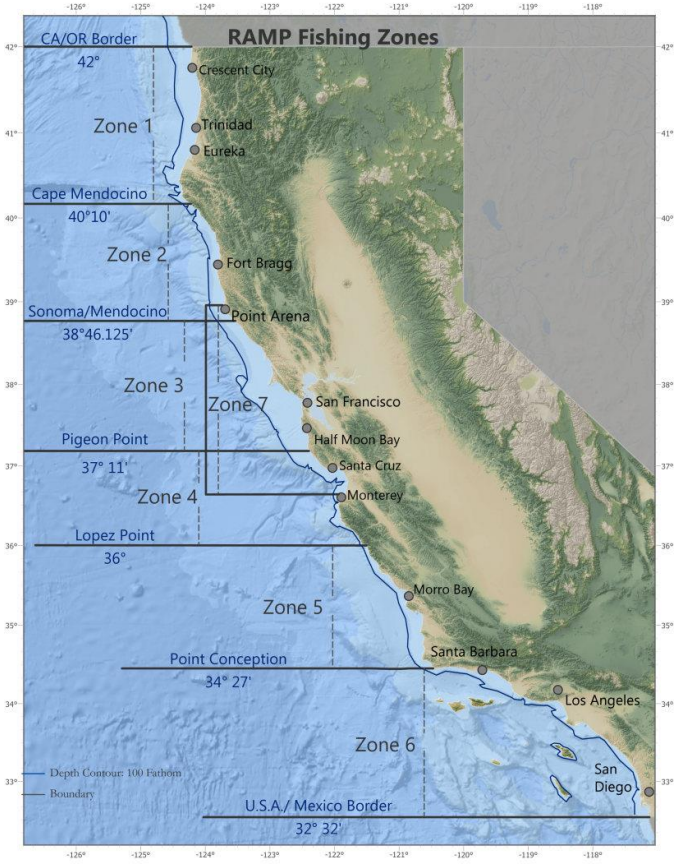

Figure 1. RAMP Fishing Zone boundaries.

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: May 13, 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.

Working Group Response to CDFW's Preliminary Management Action Recommendation

Eight of the Working Group opposed CDFW's recommendation of a Fishery Closure for Zones 1-6. Two members supported and the remainder of 7 members were neutral. An Alternative Management Action Recommendation was then put forward for consideration by the full Working Group (below).

Working Group Recommendation Option 1:

Management Action: **Depth Constraint in Zones 1-5 shoreward of 30-fathoms and a Fishery Closure for Zone 6. Electronic monitoring would be required to participate during the Depth Constraint.**

Fishing Zone(s): **1, 2, 3, 4, 5**

Implementation Date: **June 1, 2021**

Key Rationale based on Management Considerations: **Surveys indicate whales remain offshore. Forage does not appear to be compressed based on the Habitat Compression Index. There is declining fishing effort and those that remain fishing may not have access to other fisheries, which will result in greater economic impact.**

Any Limitations/Concerns: **None raised**

Level of Support: **13 Working Group Members supported, 2 were opposed, the remaining members in attendance were neutral.**

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

Date: May 12, 2021

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

This assessment and preliminary recommendation have been developed by California Department of Fish and Wildlife (CDFW) Marine Region staff for consideration by the California Dungeness Crab Fishing Gear Working Group for the Risk Assessment Mitigation Program (RAMP; Section 132.8, Title 14, California Code of Regulations) regarding Management Actions to address marine life entanglement risk in the commercial Dungeness crab fishery.

A. Recommended Management Action

Fishing Zones 1, 2, 3, 4, 5 and 6: CDFW Marine Region staff's preliminary recommendation is to implement a Fishery Closure for Fishing Zone 1 and 4 triggered by Marine Life Concentration data and a Fishery Closure for Zones 2, 3, 5 and 6 triggered by lack of recent RAMP approved survey data, and in both instances supported by the best available science relevant to the management considerations. Monterey Bay Whale Watch Data (MBWW) data for Zone 4 indicate Humpback whale observations are near historical average for this time of year, indicating migration to California waters is well underway and will continue to increase over the coming weeks. Cascadia Research vessel surveys in Zone 1 show continued presence of Humpback whales at moderate levels. Based on historical migration patterns and as indicated by data from Zones 1 and 4, Humpback whales are also likely to be present in higher numbers than previously observed in Zones 2, 3, 5 and 6. This increases the risk of co-occurrence between Dungeness crab gear and Actionable Species and therefore increases entanglement risk. This is particularly true for Zone 3 where trap numbers are reported to be over 8,300 and could be as high as 11,250 based on trap tier allotments of actively landing vessels. Similarly, for Zone 1, reporting indicates over 5,000 traps are currently being fished and could be as high as 7,200 based on trap tier allotments. To reduce statewide risk of entanglement, staff's recommendation is to implement a Fishery Closure for Zones 1, 2, 3, 4, 5 and 6 beginning June 1, 2021 at 12:00pm (noon). In addition to the Fishery Closure, staff recommend the Director authorize the Lost or Abandoned Dungeness Crab Trap Gear Retrieval Program to begin on June 7, 2021 at 12:00pm (noon) for all Fishing Zones. Authorization of this program will further reduce risk by removing lost or abandoned gear.

Through the remainder of the season, the Fleet should remain vigilant and move or avoid setting gear in areas where whales are transiting or foraging until all gear is removed at the close of the season.

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: 0

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- During the current Fishing Season: 1 Humpback whale (Zone 6)
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Marine Life Concentrations Surveys and/or Satellite Telemetry Observations:

- **Fishing Zone 1:** Number of Humpback whales in observed in a single Fishing Zone exceeds 10, which triggers management response under RAMP (c)(2)(B)(2). Vessel surveys observed 30 and 15 Humpback whales during two survey days.
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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

- The running average sightings of Humpback whales in Monterey Bay (Zone 4) is now near historical average, which is an indication of increased migration when compared to previous reporting periods. Vessel surveys in Zone 1 observed moderate numbers of Humpback whales. As a result of marine life concentration triggers for Humpback whales being met, a Fishing Zone closure is the most effective Management Action for Zones 1 - 6 to minimize co-occurrence with Dungeness trap fishing gear and Humpback whales.

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

- A Fishing Zone closure will impact operators and businesses still participating in the

fishery. However, effort has continued to decrease with each bi-weekly reporting period as operators switch over to other fisheries, or conclude fishing for the season.

- There will be economic costs to individual operators, however given the time of year and risk of entanglement (which is expected to increase), 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

- MBWW data are available for Fishing Zone 4. Cascadia Research vessel survey data are available for Zone 1. Point Blue Conservation Science observation data are available for Zones 3, 4, 5 and 6. The Habitat Compression Index and Whale Watch 2.0 habitat predictions are available for all Zones.

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

- Presence of Humpback whales are near average based on MBWW data, an indication that migration into California waters is well underway. Humpback whale sightings from Cascadia Research vessel-based surveys observed whales between 40 and 90 fathoms off Reading Rock, near Trinidad.

- Pacific Leatherback sea turtles typically do not begin to arrive in California waters until late June based on sea turtle tagging studies. Those animals typically forage in an area extending from Monterey Bay to Point Reyes during the summer months.

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

- Season price negotiations delayed actual start of fishing following the December 23, 2020 statewide opener. Most vessels began setting gear on Monday January 11, 2021.

- Based on CDFW landings data, 359 vessels have participated in the fishery as of May 4, 2021, making at least one landing. Week 5 had the highest number of potential traps deployed across all Fishing Zones, with an estimated total of 94,675 traps. The estimated maximum number of traps is currently 16,750 which is another decrease from the last risk assessment when 28,975 traps were estimated. For the current season, Zone 3 has the highest estimated number of traps deployed at 11,250 with almost half of these originating from vessels landing in the port of San Francisco, estimated at 5,375.

- The most recent CDFW required bi-weekly trap reporting period of May 1 estimated a total of 17,130 (previous reporting period was 27,292) traps fishing in minimum depths of 10 – 21 fathoms and in maximum depths of 35 – 80 fathoms across all Fishing Zones. Bi-weekly reports confirm Zone 3 has the highest number of deployed traps at 8,387. *Note: CDFW has not achieved 100% reporting by all active permits.*

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

- Krill abundance (higher offshore in the outer slope) is also anticipated to be closer to

average yearly values while anchovy is still considered to be above average, given the historical record.

- Cool ocean temperatures and strong spring upwelling conditions continued from March to April and the Habitat Compression Index (HCI) for April indicates a continued low compression state. It is anticipated that cool conditions with expanded upwelling habitat will continue with no compression that would otherwise result in increased concentrations and aggregations of whales and forage nearshore.

Section 132.8(d)(9): Ocean conditions

- The prediction of ENSO conditions was last updated on April 8, 2021. La Niña conditions persisted in March with an 80% chance of a transition from this condition to ENSO-neutral during May - July 2021.

- The latest outlook of late winter/spring ocean ecosystem conditions shows that ocean conditions have cooled significantly over this past winter and conditions in spring are trending toward cool and productive conditions. It is anticipated that cool conditions will continue, with expanded upwelling habitat and no signs of habitat compression that would otherwise result in increased concentrations and aggregations of whales and forage nearshore.

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

- Impact score calculation under RAMP began on January 1, 2021. The current impact score is 0.38 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 Monterey Bay Whale Watch data, Cascadia Research vessel surveys and Point Blue observation data, significant migration into the Fishing Grounds has begun to occur and will continue to increase over the coming weeks.

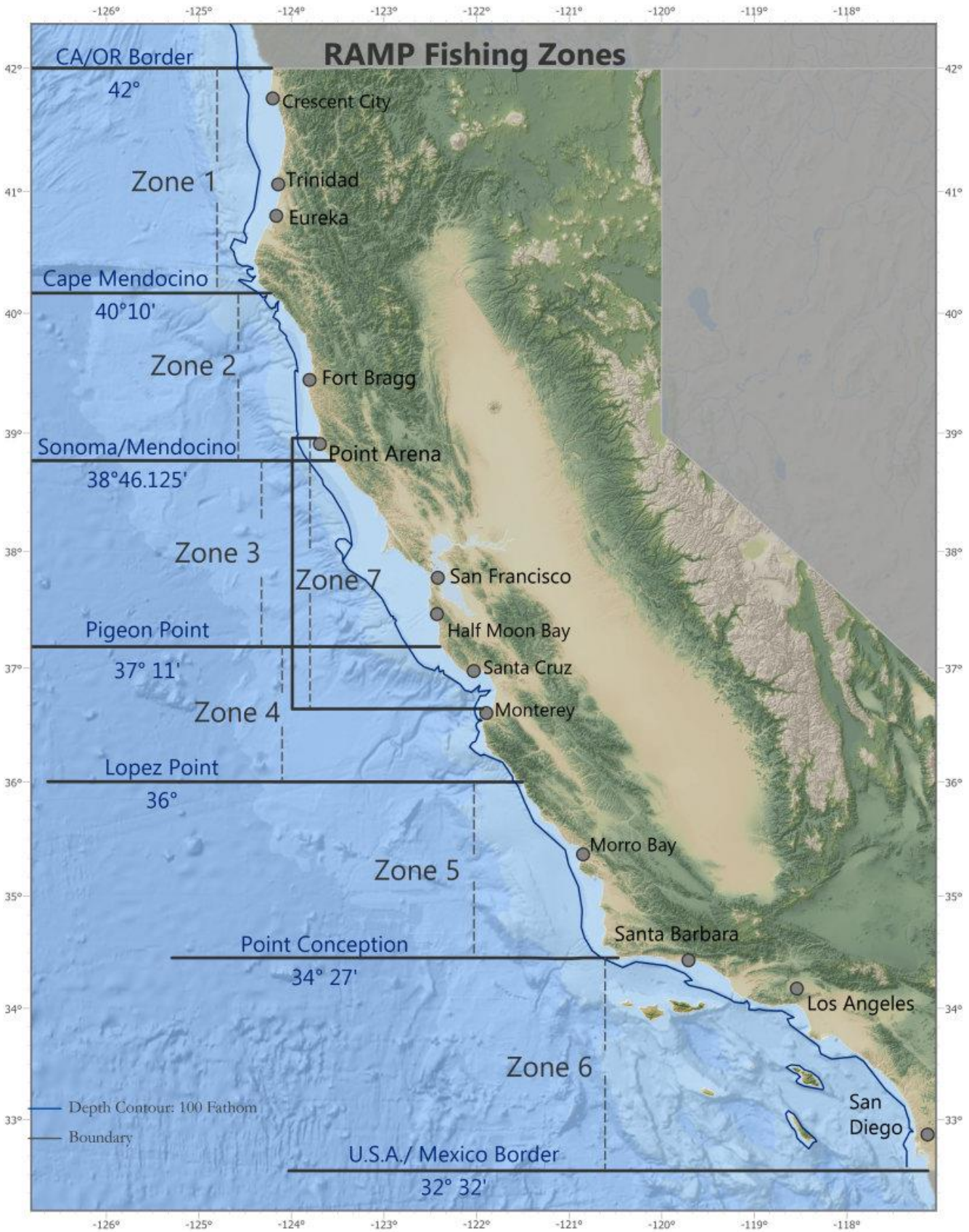


Figure 1. RAMP Fishing Zone boundaries.

2020-21 Risk Assessment Mitigation Program - Available Data

Last updated: May 17, 2021 – **Updated Section 132.8(d)(11)**

TRIGGERS REQUIRING MANAGEMENT ACTION

Section 132.8(c)(1): Confirmed Entanglements

Data provided by: Lauren Saez and Dan Lawson, National Marine Fisheries Service (NMFS) and evaluated by the California Department of Fish and Wildlife (CDFW)

Entanglement Summary for Actionable Species covered by RAMP (by NMFS)

Fishing Zone: *All Zones*

- Humpback whales: 1 confirmed entanglement, unidentified gear (Fishing Zone 6)
- Blue whales: 0 confirmed entanglements
- Leatherback sea turtles: 0 confirmed entanglements

All entanglement reports are subject to further review.

Supplemental Information: Please refer to the April 29, 2021 Available Data package for the latest information on confirmed 2021 entanglements.

Evaluation of Entanglement Triggers (by CDFW)

Total number of Confirmed Entanglements in California Commercial Dungeness Crab Gear

- During the current Fishing Season: 0
- During the current calendar year: 0

Total number of Confirmed Entanglements in Unknown Fishing Gear reported from California

- During the current Fishing Season: 1
- During the current calendar year: 1

Section 132.8(c)(2): Marine Life Concentrations

Data provided by: Monterey Bay Whale Watch (MBWW) (processed by Karin Forney, NMFS), John Calambokidis (Cascadia Research, SR3, and The Marine Mammal Center)

Monterey Bay Whale Watch *(Fishing Zone 4)*

- Monterey Bay Whale Watch (MBWW) was able to conduct trips on 13 of the last 14 days, with a maximum of 40 whales observed on each of two separate trips on May 3, 2021. The 14-day average number of Humpback whales-per-half-day-trip (for April 24-May 6) was 5.9; and the 7-day average (for May 1-6) was 8.1. These numbers represent an increase from the previous 14-day and 7-day averages of 1.8 and 1.0, respectively.
- No Blue whales have been observed by MBWW since December 24, when a single whale was seen.

Cascadia Research, SR3, and The Marine Mammal Center (Fishing Zone 1)

- Surveys were completed between May 5-6, 2021 to gather more detailed information from whales present between Crescent City and Eureka. The primary goal of this survey was to conduct photo IDs, estimated numbers, and behavior. Searches were conducted in different depths of 50-m, 100-m and 200-m depths (Figure 1).
- Conditions were variable and often poor due to low visibility but also wind and waves at different points in the two survey days, which decreased the effectiveness of detecting sightings, especially in the northern half of the area covered.
- There were 29 sightings of an estimated 56 whales with 22 sightings of 45 confirmed Humpback whales, while the others are suspected to be Humpback whales. The first survey day observed 30 of these confirmed Humpback whales and the remaining 15 were observed the next day.
- Good photographic identifications of an estimated 35 Humpback whales were obtained.
- Sightings were documented at water depths ranging from 72-m to 166-m with most sightings at the 100-m depth.
- Prey type was difficult to determine and could not be confirmed since there were indications consistent with fish (some association of fish eating birds) and krill (more broad layers as opposed to patches of prey).

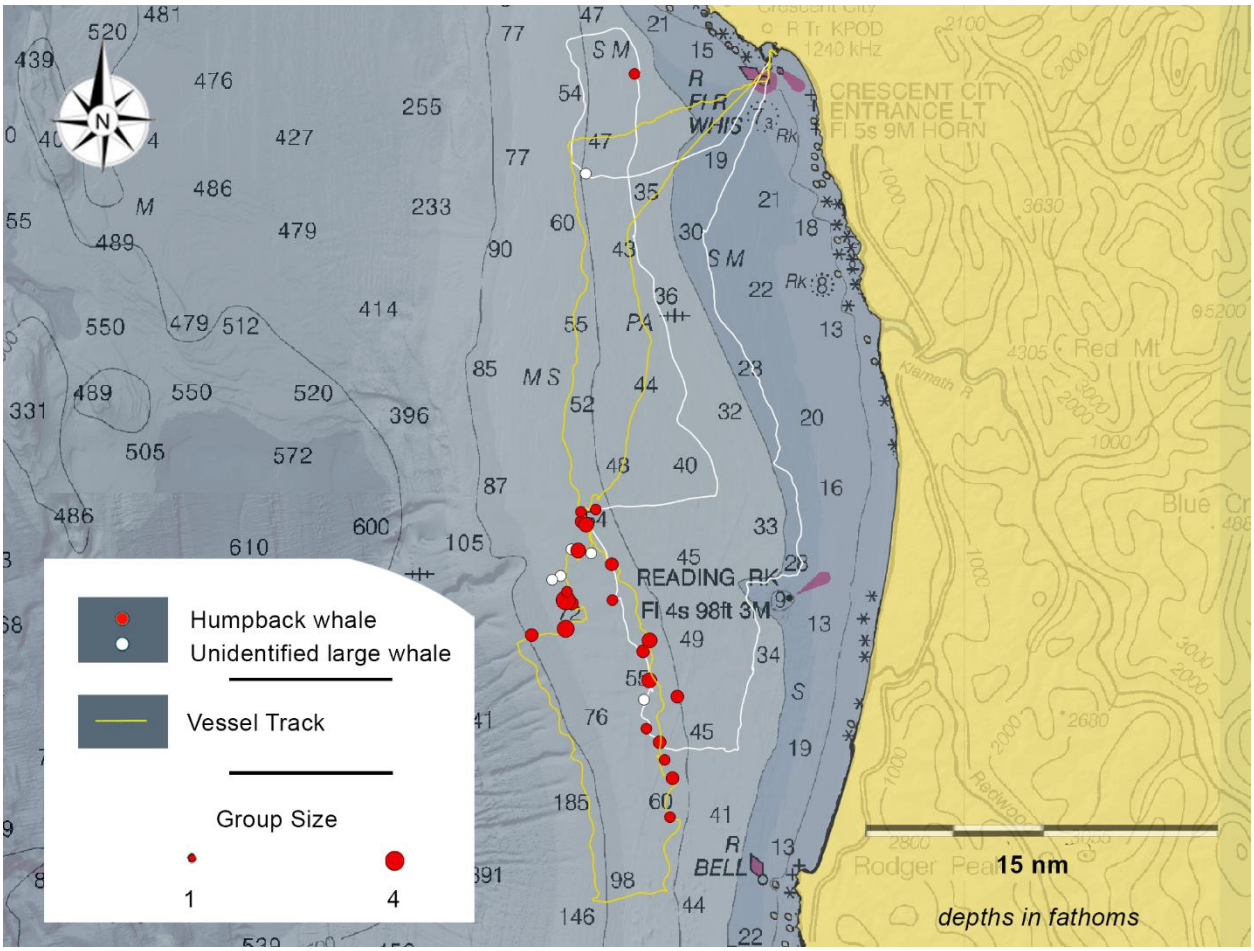


Figure 1. Vessel-based survey from R/V Robustus on May 5-6, 2021 showing vessel track and observations of large whales from Crescent City to Eureka. Note: Depths are in fathoms on this chart map.

MANAGEMENT CONSIDERATIONS

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

No additional information was shared.

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

- Economic analysis currently available is reflected in the landings data. See management consideration (d)(7) for available information on fishing activity to date during the 2020-21 fishing season.

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

Data provided by: Monterey Bay Whale Watch (processed by Karin Forney, NMFS)

Monterey Bay Whale Watch *(Fishing Zone 4)*

- The 14-day average Humpback whales-per-half-day-trip has increased markedly from below average to only slightly lower than the 2003-2021 average during the most recent period (Figure 2). Humpback whale abundance in the Monterey Bay region thus appears to be similar to average historical levels for this time of year.
- The absence of Blue whales is consistent with their historical seasonal migration patterns, although sightings expected to be increasingly likely during the coming weeks/months (Figure 3).

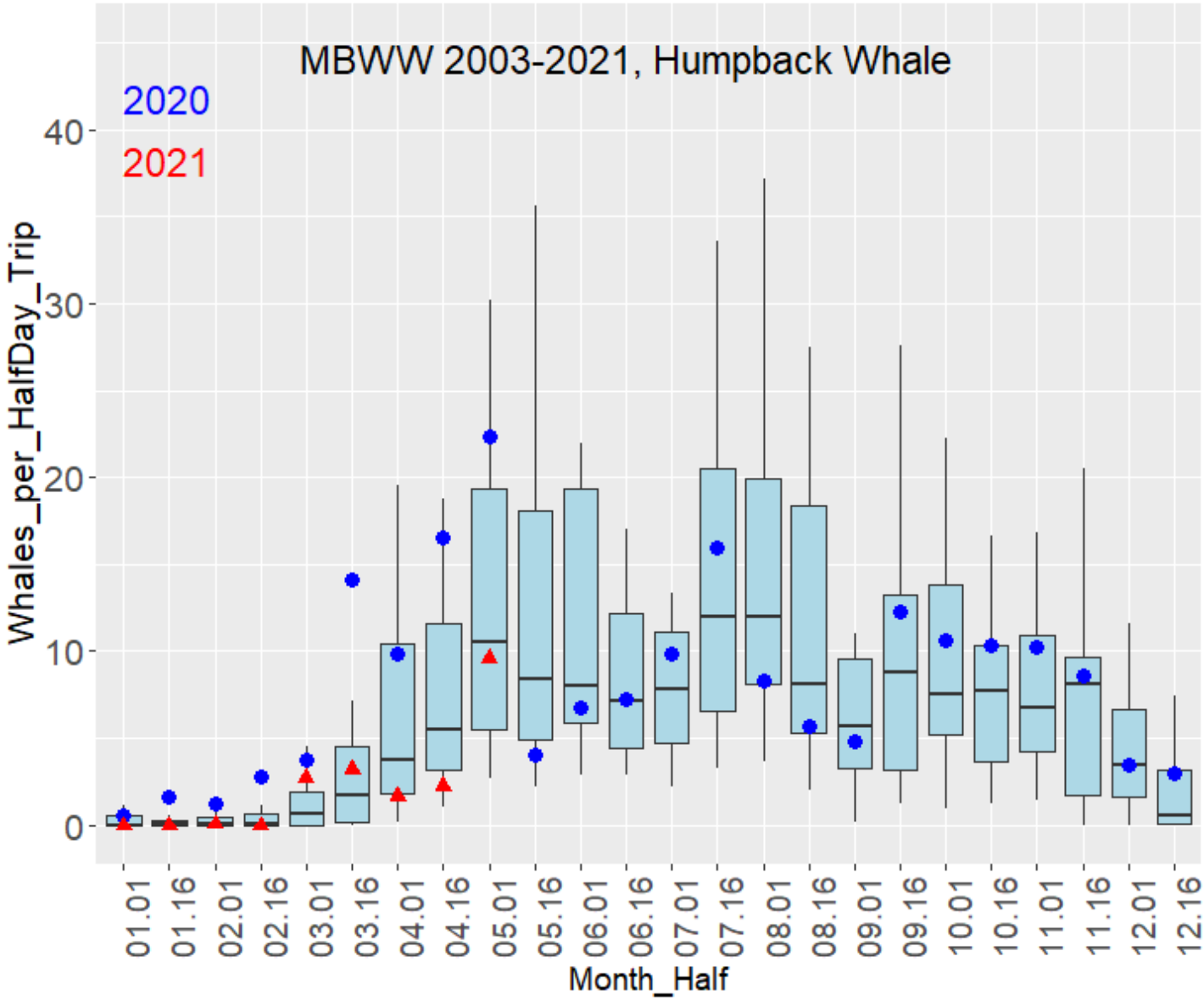


Figure 2. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Humpback whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the 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) are provided for reference, placing recent whale numbers in a historical context.

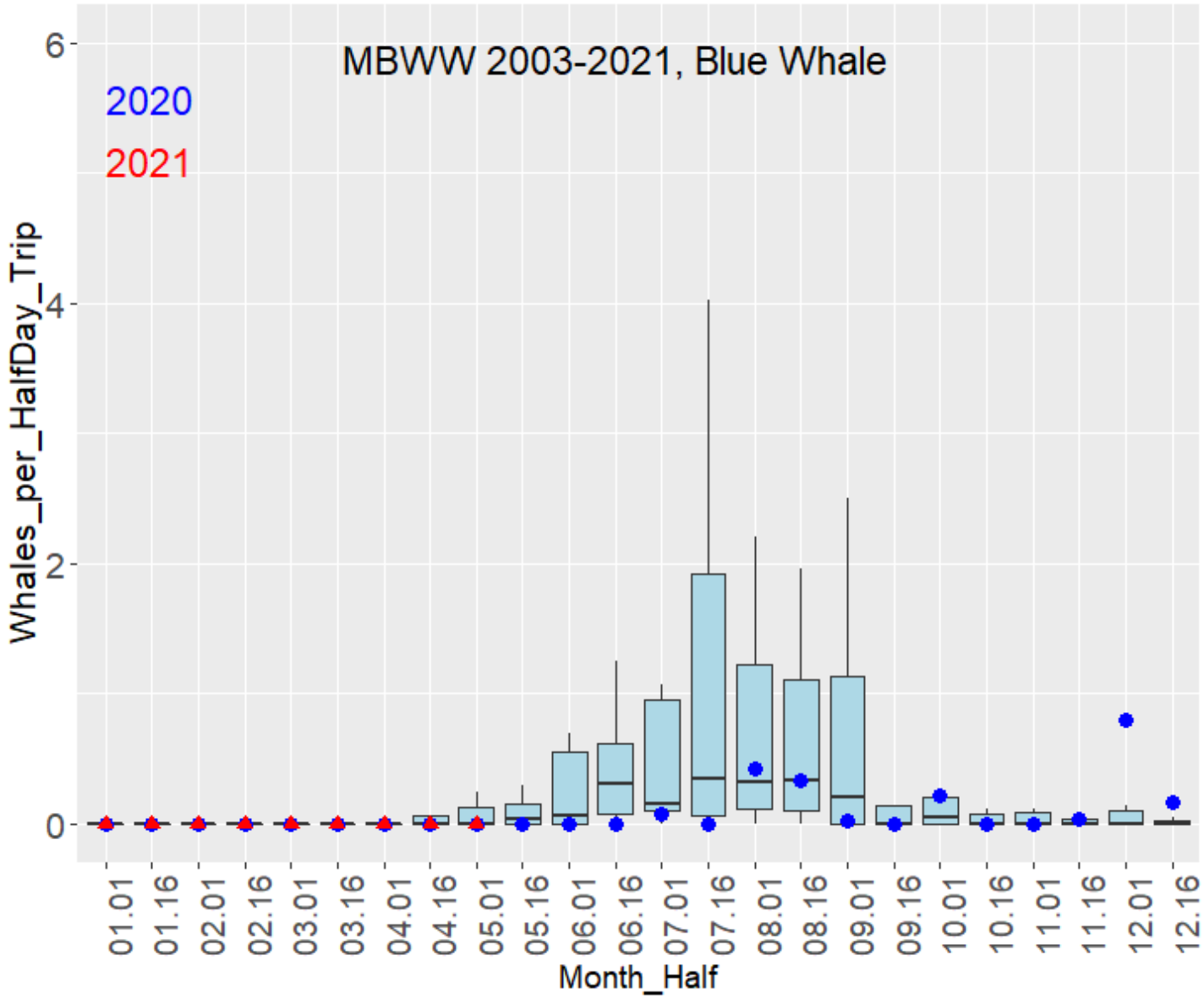


Figure 3. Historical Monterey Bay Whale Watch data for 2003-2021, summarizing the average and variation in the number of Blue whales per half-day trip on a semi-monthly basis (1st- 15th, 16th- end of month). This boxplot follows standard statistical practice in that the black horizontal line is the average 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) are provided for reference, placing recent whale numbers in a historical context.

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

Data provided by: California Department of Fish and Wildlife; Accessed from CDFW's Marine Landings Data System (MLDS) on May 7, 2021, Automatic Licensing Data System (ALDS) on May 7, 2021, Bi-Weekly Reporting Database on May 10, 2021, and PowerBI landings report

Available Data - CDFW - Risk Assessment Mitigation Program - May 17, 2021

Database on May 7, 2021. Solar Logger Pilot Project provided by Kathi George (The Marine Mammal Center).

Marine Landings Data System *(All Fishing Zones)*

- ***CDFW data presented in this section is preliminary and subject to revision.***
- The commercial Dungeness crab fishery opened statewide on December 23, 2020. Due to ongoing price negotiations, most vessels did not begin fishing until January 11, 2021.
- As of May 4, 2021, there have been 3,472 daily vessel landings of Dungeness crab with a total volume of 3,576,736 pounds and with a total Ex-Vessel Value of $18,695,427. Average unit price for these landings was $6.02 with a maximum of $14.00 and minimum of $2.00 (excluding receipts with unit price of $0 reported). A total of 359 vessels have made at least one landing during the 2020-21 season.
- Cumulative daily landings by vessel each week by CDFW Fishing Zones (aggregated CDFW Fishing Blocks used to report catch location) are shown in Figure 4 with 19 complete weeks of landings to summarize from the start date of December 23, 2020 to May 4, 2021. The highest number of daily landings statewide occurred in week 5. The highest weekly landings for Fishing Zone 3, where the most activity originated, occurred in week 4. By week 19, total statewide daily landings represent an 84% decline from the high daily landings in week 5.
- Of the 359 vessels, 356 could be tied to a Dungeness crab vessel permit and are organized in the trap tiers as follows and represent a total of 117,525 traps:
    - Tier 1: 45 vessels
    - Tier 2: 44 vessels
    - Tier 3: 44 vessels
    - Tier 4: 39 vessels
    - Tier 5: 36 vessels
    - Tier 6: 97 vessels
    - Tier 7: 51 vessels
- The maximum potential traps, represented by the number of vessels that made at least one landing each week and the overall traps in their vessel permit tier, is summarized each week by CDFW Fishing Zones (Figure 5). Week 5 shows the highest number of aggregated maximum potential traps, estimated at a total of 94,675 traps deployed. Fishing Zone 3

shows the highest proportion (47%) of total maximum potential traps, followed by Zone 1 (40%). By week 19, the total maximum potential trap numbers decreased to an estimated 16,750 traps.

- For the past 3 weeks (Weeks 17-19), the average weekly price per pound by port complex ranged between $7.21 and $12.00 each week (Figure 6). There is a demarcation in average price between the two management areas for this time period, with higher average price at the central ports ($7.45-$12.00) and lower average price at the northern ports ($7.21-$9.00).
- Two figures showing number of vessels (Figure 7) and the maximum potential trap number they represent (Figure 8) between the years of 2014 and 2021 are being provided to compare with the current low Dungeness crab season (2021 panel). This information is being summarized based on landings activity by port complex over five bi-weekly periods between March 1 and updated to include up to May 9. Data are current as of May 7, 2021.
- For time periods between March 1 and April 25 in 2021, the maximum potential traps for the port of Bodega Bay remains above the 2014-2020 (removing 2016) average. However by the last time period of April 26 - May 9, all port complexes remain below the 2014-2020 (removing 2016 and 2019) average.
- For the current season (2021 panel), the following maximum potential traps for the last period of April 26- May 9 by port complex are as follows:
    - Crescent City: 1,900
    - Trinidad: 1,975
    - Eureka: 3,375
    - Fort Bragg: 1,325
    - Bodega Bay: 3,900
    - San Francisco: 5,375
    - Half Moon Bay: 1,975
    - Monterey: 1,875
    - Morro Bay: 1,125

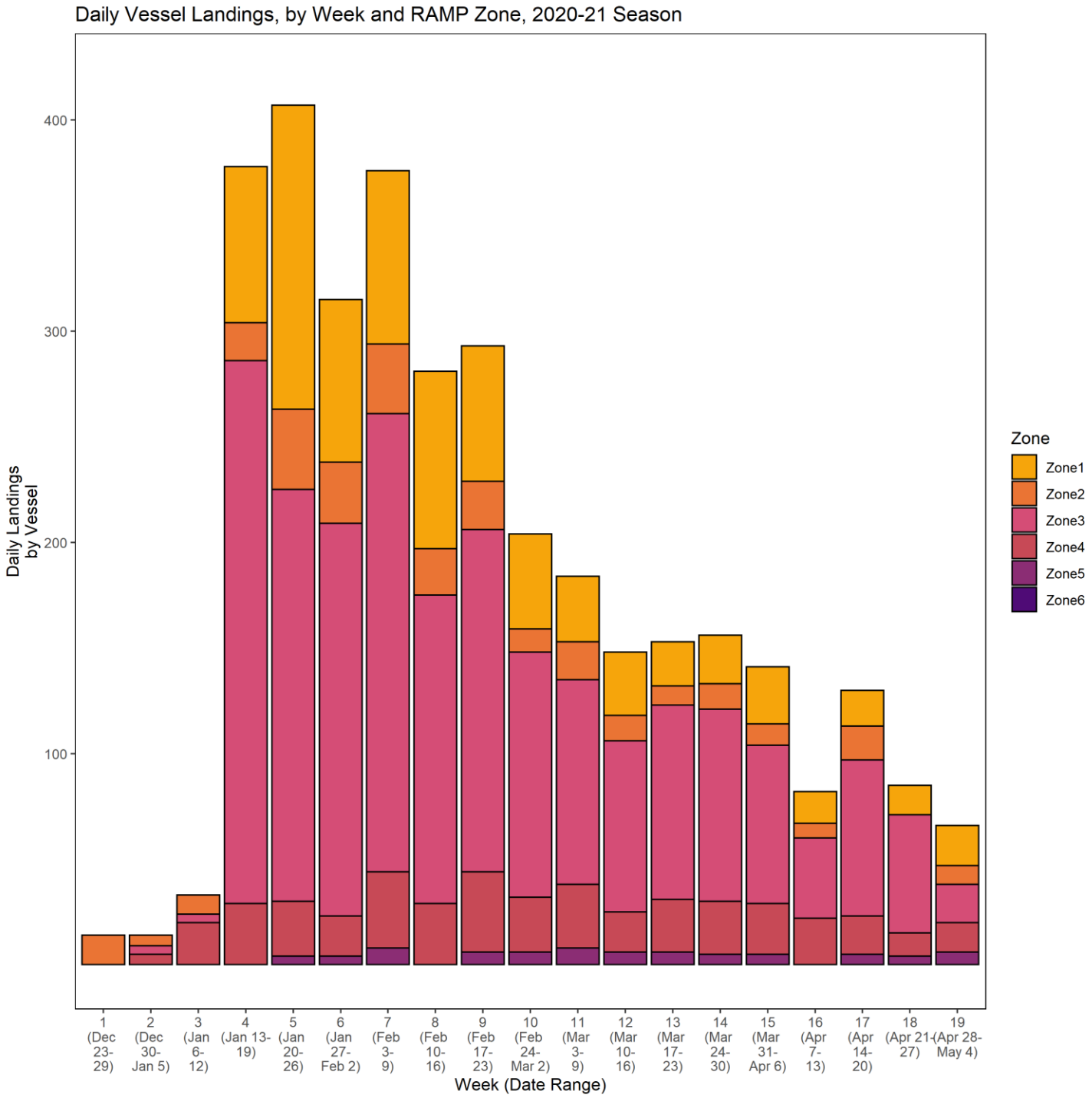


Figure 4. Unique, cumulative Dungeness crab daily vessel landings by week and Fishing Zone. Accessed from CDFW's MLDS on May 7, 2021. All data are preliminary and subject to change.

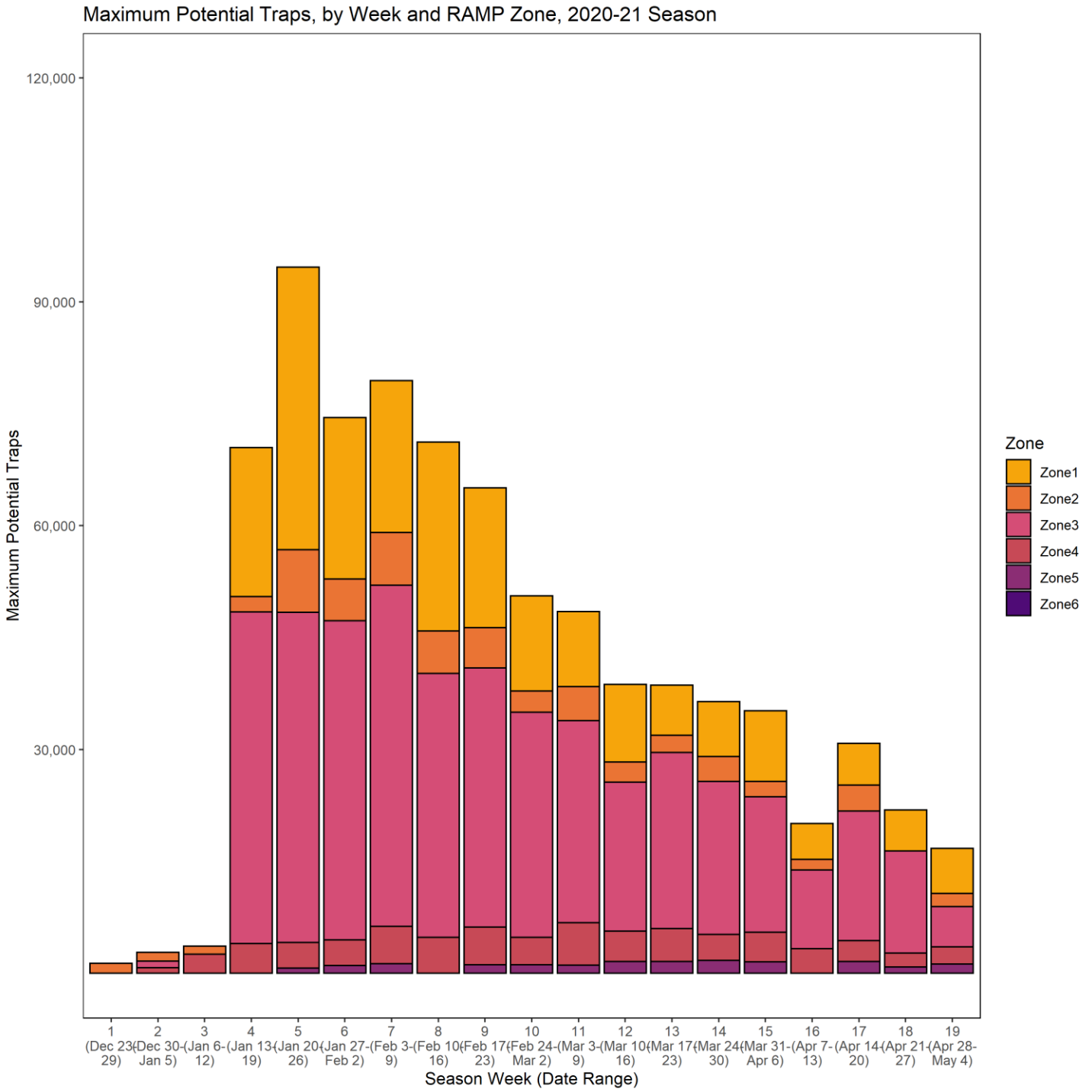


Figure 5. Maximum potential traps by week and Fishing Zone, based on landings data and Dungeness crab vessel permit tier information. Accessed from CDFW's MLDS and ALDS on May 7, 2021. All data are preliminary and subject to change.

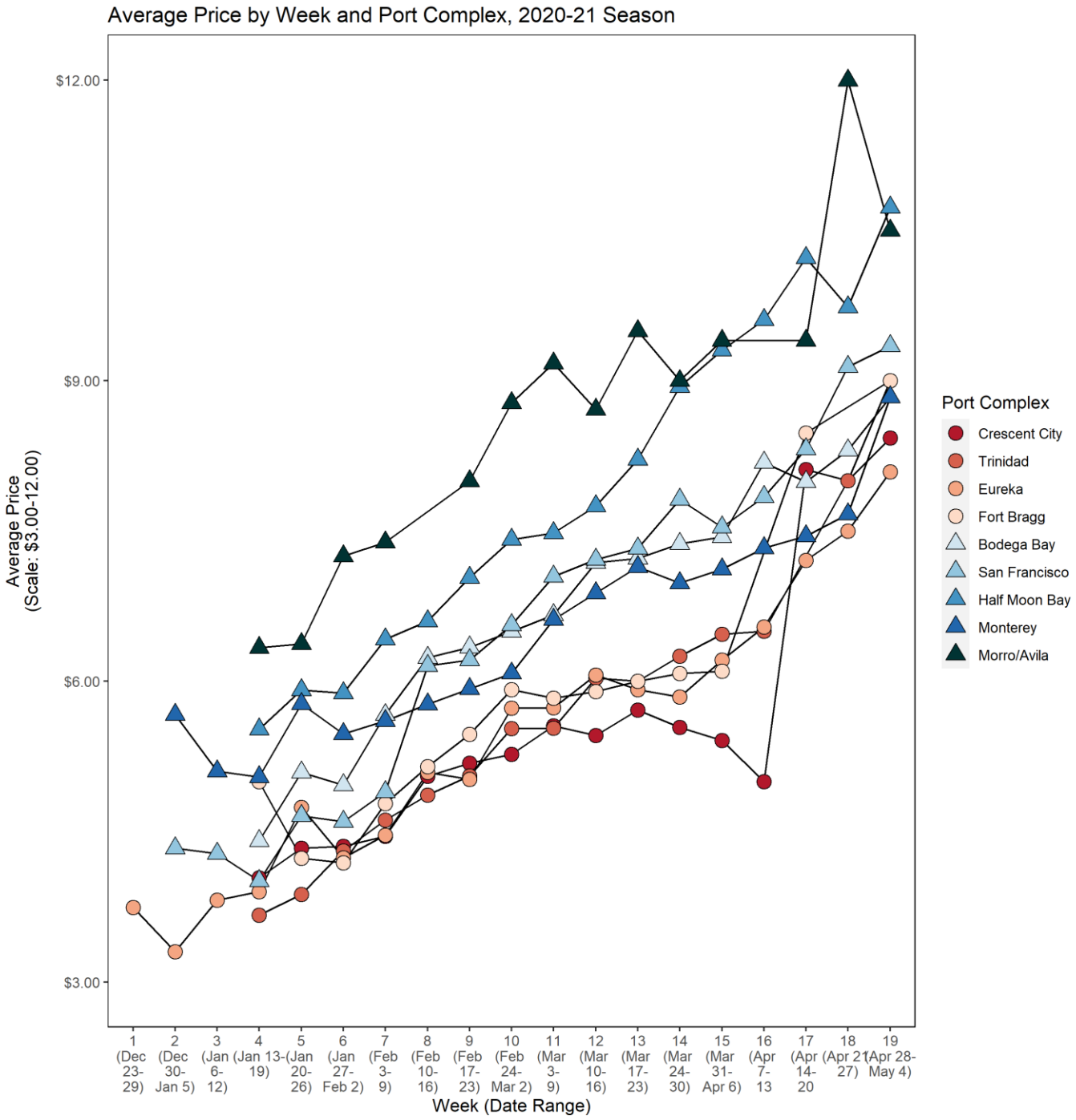


Figure 6. Average price per pound by week and port complex (removing receipts that reported $0 unit price). Northern management area ports are designated by circles while central management area ports are designated by triangles. Accessed from CDFW's MLDS on May 7, 2021. All data are preliminary and subject to change.

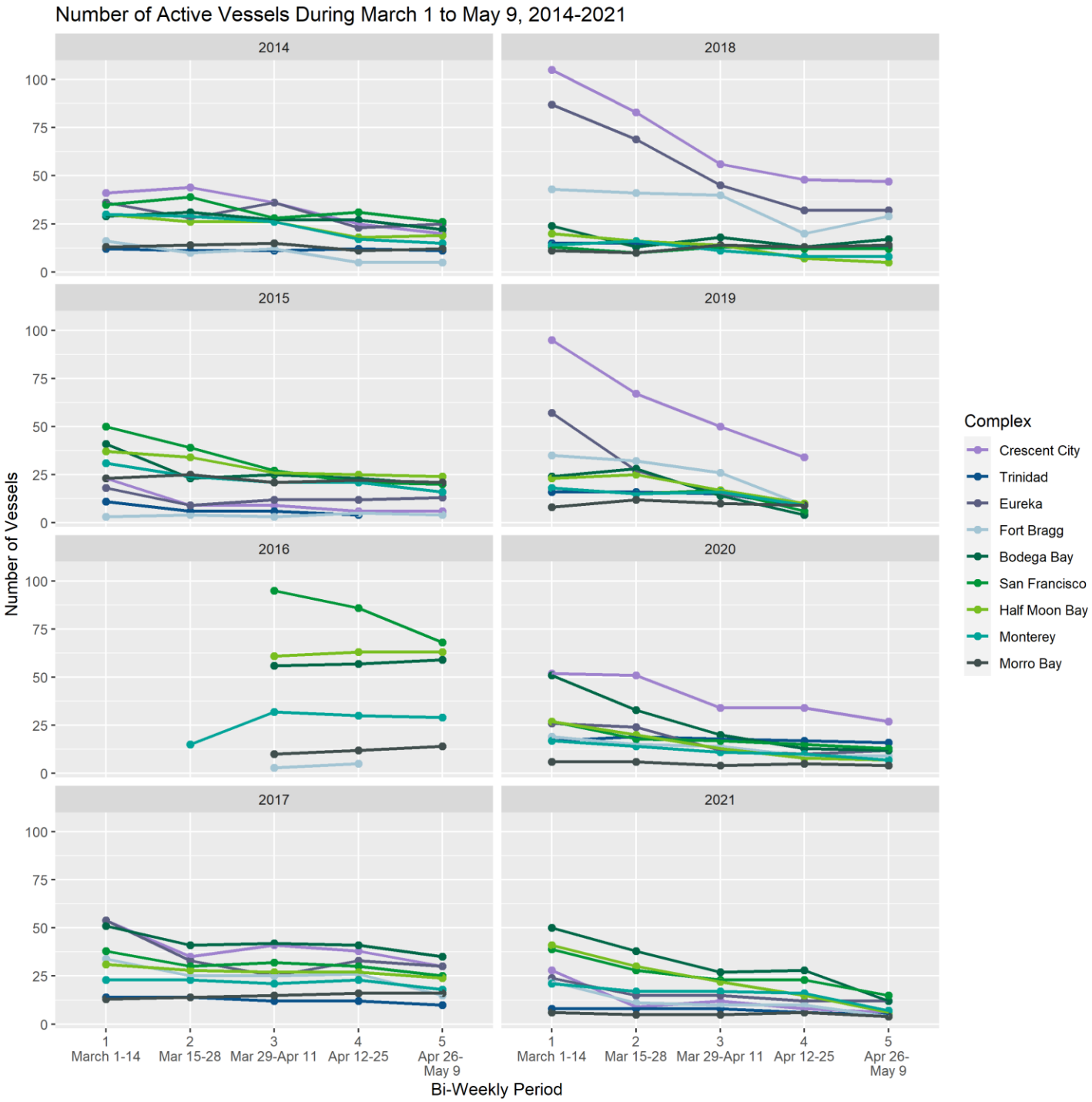


Figure 7. Panels showing number of active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and May 9. Accessed from CDFW's custom PowerBi report with last data refresh on May 7, 2021. All data are preliminary and subject to change.

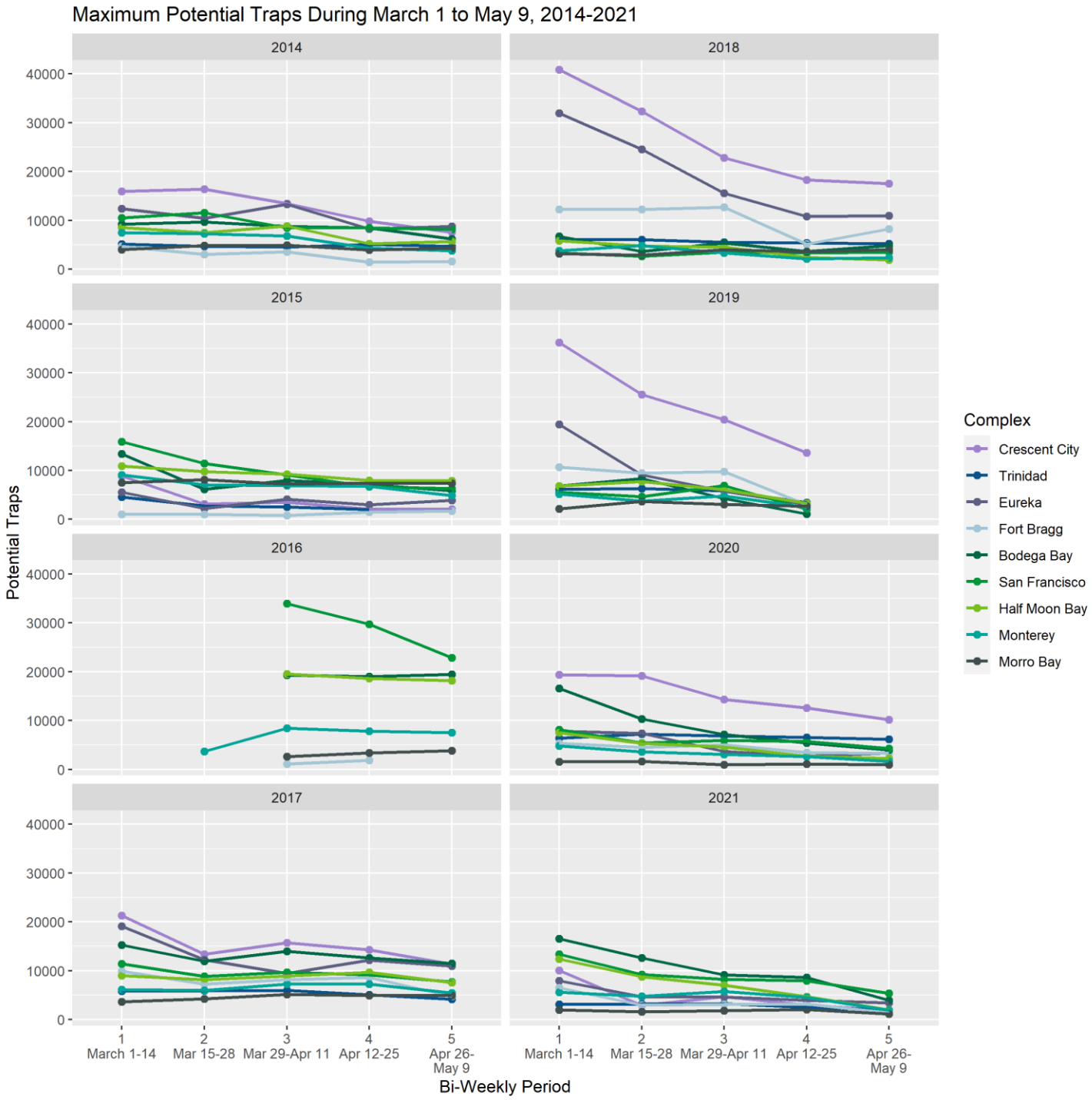


Figure 8. Panels showing number of maximum potential traps based on active Dungeness crab vessels each year between 2014 to 2021 by port complex over each bi-weekly period between March 1 and May 9. Accessed from CDFW's custom PowerBi report with last data refresh on May 7, 2021. All data are preliminary and subject to change.

Bi-Weekly Fishing Activity Reports *(All Fishing Zones)*

- ***CDFW data presented in this section is preliminary and subject to revision.***
- CDFW has received bi-weekly reports since the first reporting period of January 1, 2021 through the most recent reporting period of May 1, 2021. Although total reports for each period may not reflect all permitted vessels participating in the fishery, summaries are being provided for the following periods: April 16, 2021 (Table 1) and May 1, 2021 (Table 2).
- For the May 1 reporting period, covers fishery participation from April 16-30, about 17,130 traps are estimated to be deployed statewide with just under half of these located within Fishing Zone 3. Based on reports received by May 10, 2021, just over 7,000 traps have been removed from Fishing Zone 3 between April 16 and May 1.

Table 1. Summary of information provided for the April 16, 2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on May 10, 2021. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Average Trap Number	Total Traps	Average Min. Depth (fathoms)	Average Max. Depth (fathoms)	Max. Reported Depth (fathoms)	Final Report	Number of Lost Traps
Zone 1	27	267	7,196	13	27	65	2	5
Zone 2	16	194	3,110	15	31	75	1	3
Zone 3	81	188	15,216	16	35	120	17	157
Zone 4	7	139	970	12	21	60	3	5
Zone 5	5	160	800	18	40	55	1	1
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	136		27,292				24	171

Table 2. Summary of information provided for the May 1, 2021 bi-weekly reporting period by Fishing Zone (1-6). Accessed from CDFW's Bi-Weekly Reporting database on May 10, 2021. NR-C refers to data withheld due to confidentiality and all data are preliminary and subject to change.

Fishing Zone	Permits Reporting	Average Trap Number	Total Traps	Average Min. Depth (fathoms)	Average Max. Depth (fathoms)	Max. Reported Depth (fathoms)	Final Report	Number of Lost Traps
Zone 1	20	253	5,052	11	22	35	3	1
Zone 2	13	151	1,968	16	25	39	1	0
Zone 3	49	171	8,387	17	34	80	12	57
Zone 4	5	185	923	10	25	60	2	7
Zone 5	4	200	800	21	49	51	0	0
Zone 6	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C	NR-C
Totals	91		17,130				18	65

Solar Loggers *(Fishing Zones 1, 2, 3, and 5)*

- The vessel track data provided by the solar logger pilot project is shown for the April 26-May 10, 2021 period. The following maps show vessel activity in 1) the entire coast of California, 2) Fishing Zone 1 (Figure 9), 3) Fishing Zones 2 and 3, and 4) Fishing Zone 5 (Figure 10). From vessel participation in the project (and not necessarily representative of the entire fishery), Fishing Zone 3 showed the most activity. Some vessels participating in the pilot with track lines shown may no longer be participating in the fishery or have vessel tracks included from participation in other fisheries, also vessel tracks are not shown for those that are fishing outside of California this season. A summary of cumulative fishing trips every one to two weeks since January 1, 2021 is provided in Table 3.

Table 3. Summary of individual fishing trips based on data provided by the solar logger project (and not necessarily representative of the entire fishery) between different time periods since January 1, 2021 until May 10, 2021.

Date Ranges	Fishing Trips
April 26-May 10, 2021	15
April 8-25, 2021	59
March 29 – April 7, 2021	28
March 10-28, 2021	81
March 1-9, 2021	50
February 10-28, 2021	78
February 1-9, 2021	50
January 16-31, 2021	81
January 1-15, 2021	58

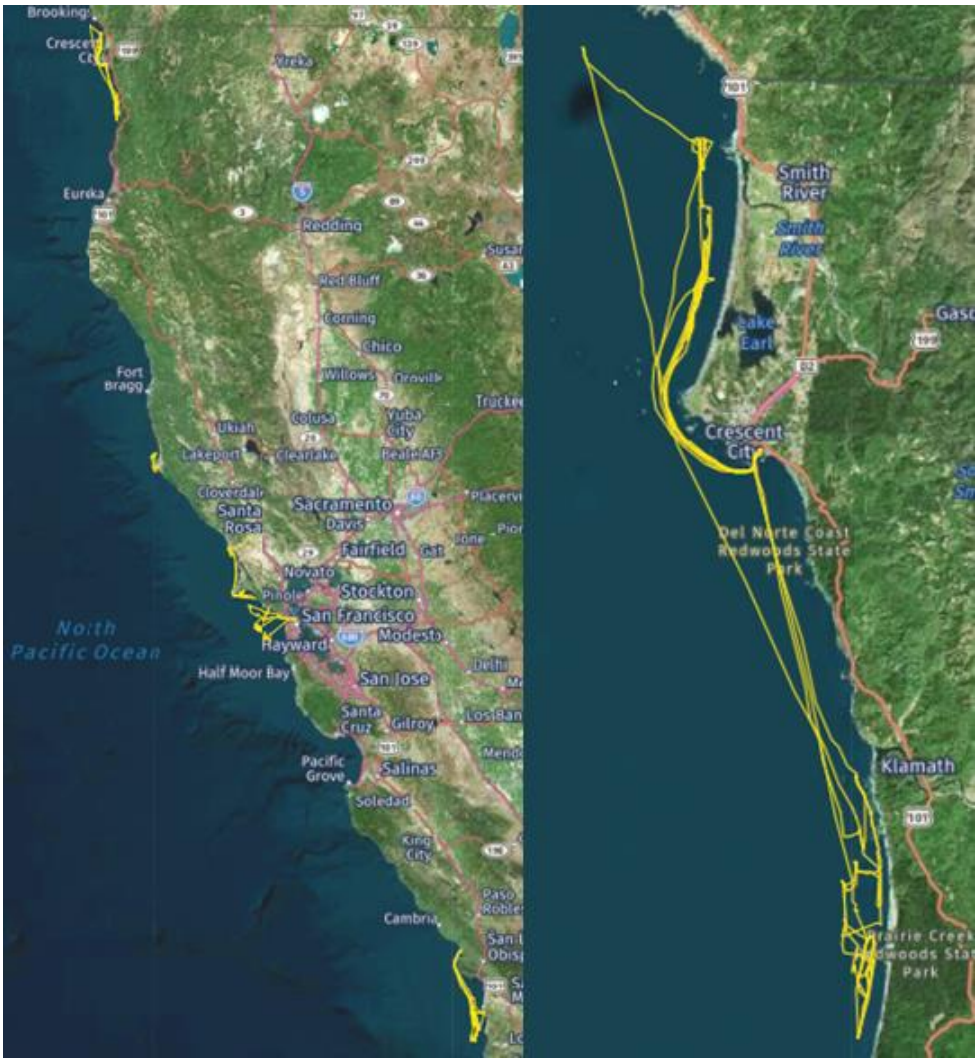


Figure 9. Fishing trips from April 26 – May 10, 2021 for the entire California coast where vessels may be participating in the fishery. The map on the left represents the entire coast where vessels may be participating. The map on the right focuses on fishing activity in Fishing Zone 1.

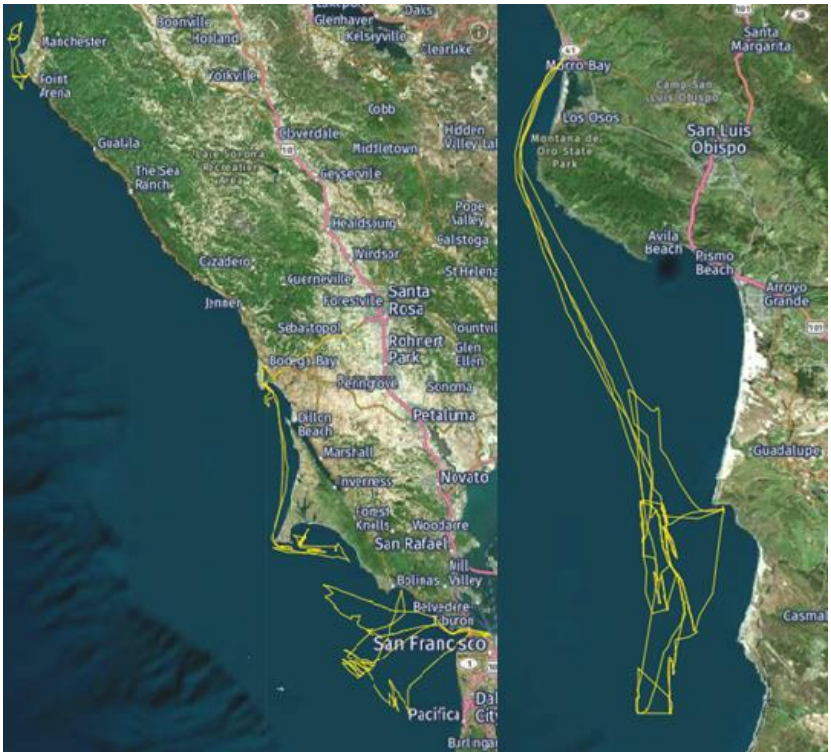


Figure 10. Fishing trips where vessels may be participating in the fishery from April 26 – May 10, 2021. The map on the left focuses on fishing activity in Fishing Zones 2 and 3. The map on the right focuses on fishing activity in Fishing Zone 5.

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

Data provided by: Jarrod Santora and Isaac Schroeder (NMFS SWFSC and UC Santa Cruz)

https://www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-whale-entanglement

Forage Indices (*All Fishing Zones*)

- Krill abundance (higher offshore in the outer slope) is also anticipated to be closer to average while anchovy is still considered to be above average, given the historical record.

Section 132.8(d)(9): Ocean conditions

ENSO prediction accessed from NOAA's Climate Prediction Center website *on May 11, 2021,*

Data provided by: Jarrod Santora and Isaac Schroeder (NMFS SWFSC and UC Santa Cruz)

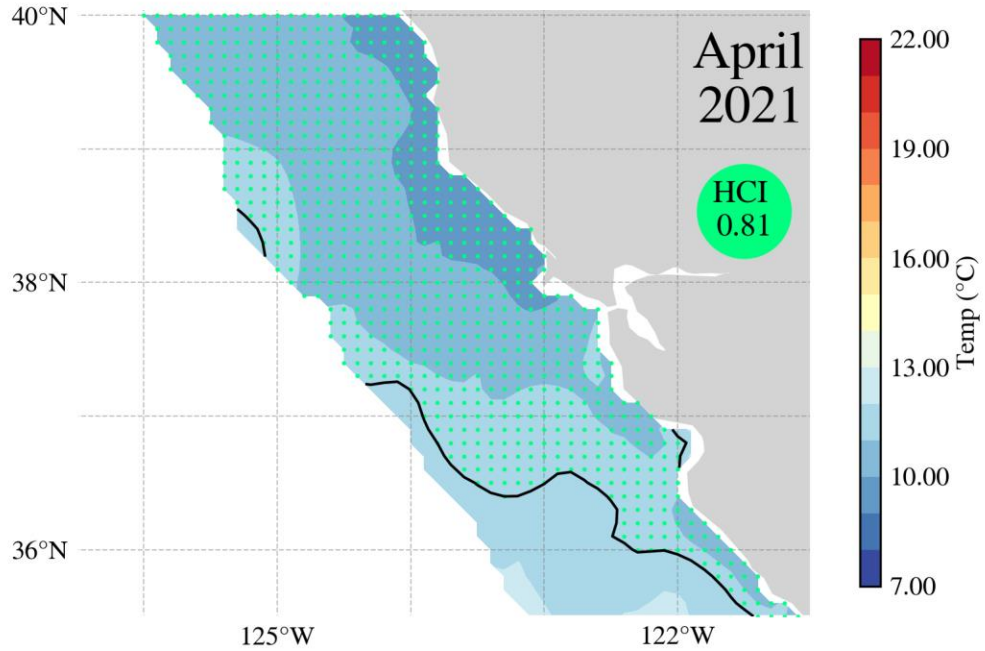
https://oceanview.pfeg.noaa.gov/hci/

El Nino/Southern Oscillation (ENSO) Alert System Status (*All Fishing Zones*)

- The prediction of ENSO conditions were last updated on April 8, 2021. La Niña conditions persisted in March with an 80% chance of a transition from this condition to ENSO-neutral during May - July 2021.

Habitat Compression Index (*All Fishing Zones*)

- Cool ocean temperatures and strong spring upwelling conditions continue from March to April and the Habitat Compression Index (HCI) indicates a current low compression state (Figure 11). It is anticipated that cool conditions with expanded upwelling habitat will continue with no impact of habitat compression that would otherwise result in increased concentrations and aggregations of whales and forage nearshore.
- The HCI for April 2021 indicates no risk of a high compression state and this is in stark contrast to the HCI values in April for the past 7 years between 2014 and 2020 (Figure 12). A low compression state for April has not been observed since 2013, the year just prior to the emergence of the large marine heatwave. This HCI information applies to all CDFW Fishing Zones.



HCI color based on standard deviation (SD) and mean (MN) of all values over 1980-01 to 2021-04

Low Compression (HCI > 1SD)

Figure 11. Map of April 2021 sea surface temperature and location of Habitat compression Index (HCI) boundary (black thin line) with and HIC value indicating low compression for the month. Source: https://oceanview.pfeg.noaa.gov/hci/

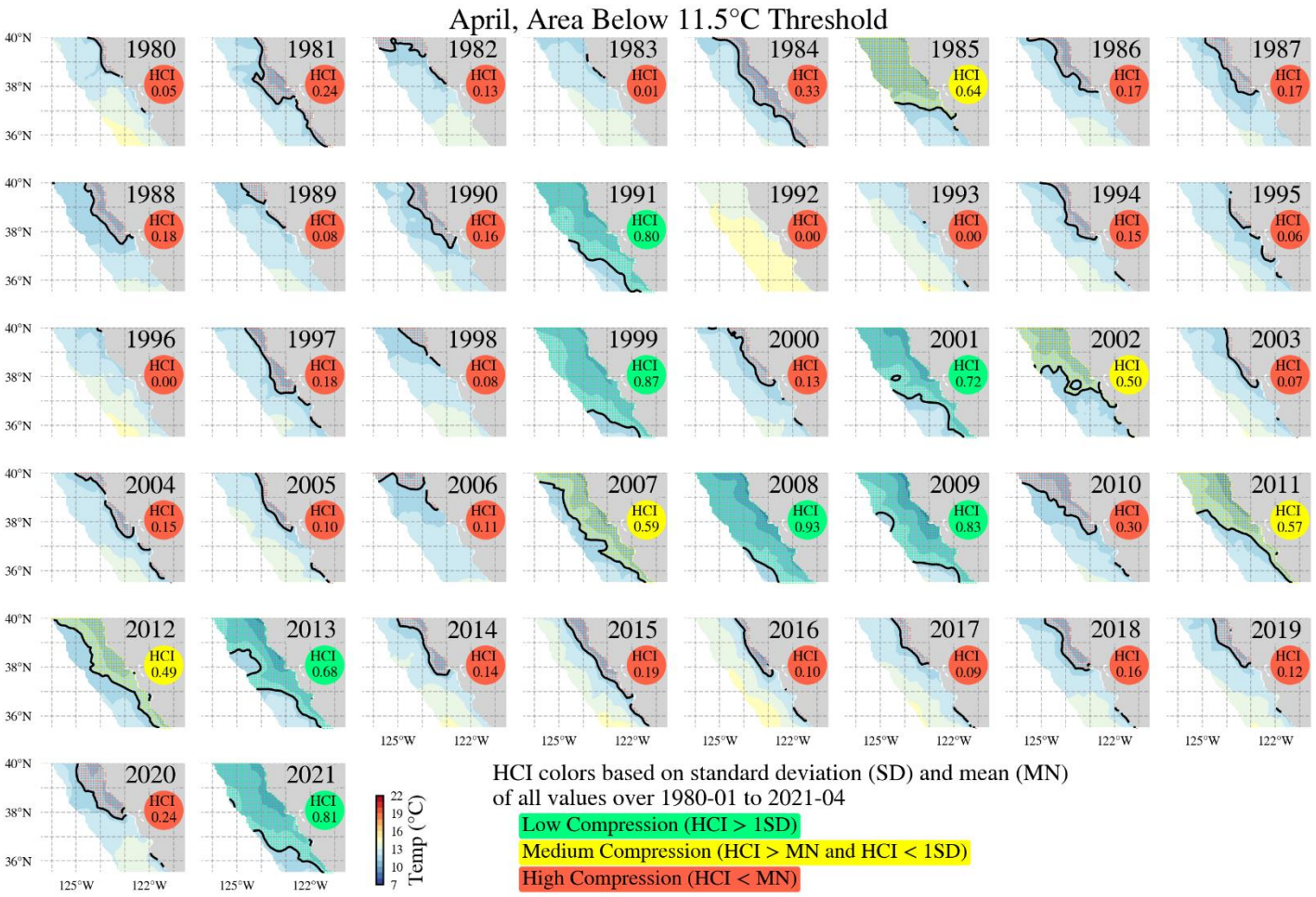


Figure 12. Maps of historical April sea surface temperature and location of Habitat Compression Index (HCI) boundary (black thin line) between 1980 and 2021 and resulting HCI values for each time period. Source: https://oceanview.pfeg.noaa.gov/hci/

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

Data provided by: California Department of Fish and Wildlife

- 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. As described in Section 132.8(c)(1) above, one confirmed entanglement of a Humpback whale in unidentified gear has been reported for the current calendar year. Therefore, the Impact Score Calculation for Humpback whales is 0.38 and 0 for both 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

Data provided by: Briana Abrahms (University of Washington), Cascadia Research, SR3, The Marine Mammal Center, Kathi George (The Marine Mammal Center), Karen Grimmer (Monterey Bay National Marine Sanctuary) and Jaime Jahncke (Point Blue Conservation Science), United States Coast Guard

WhaleWatch 2.0 *(All Fishing Zones)*

- WhaleWatch habitat predictions for May 8, 2021 indicate that probability of Blue whale - presence is low in Fishing Zones 1-5 and medium-high in Fishing Zone 6 (Figure 13).

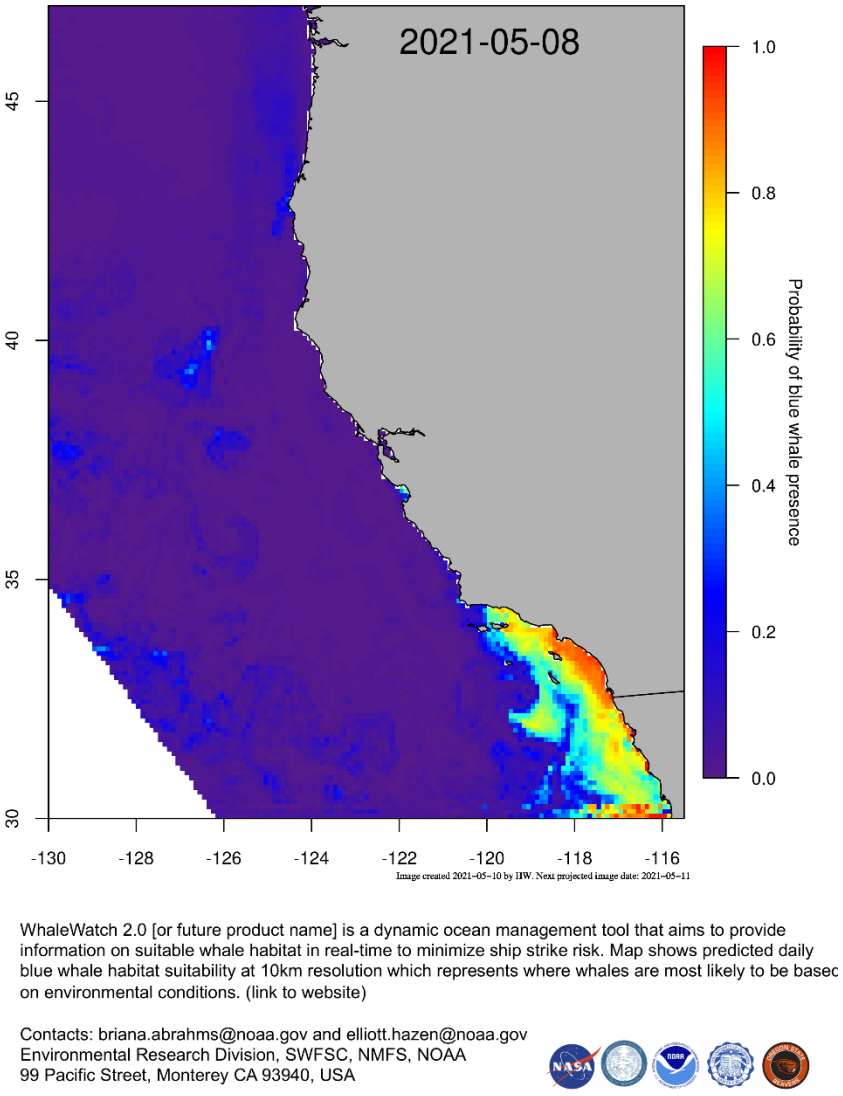


Figure 13.WhaleWatch 2.0 map for May 8, 2021. View a current map.

Cascadia Research, SR3, The Marine Mammal Center (*Fishing Zones 1 and 4*)

- A total of 30 and 15 confirmed Humpback whale observations occurred each day of the 2-day survey conducted between May 5-6, 2021 in Fishing Zone 1. Most of the whale sightings were found at the 100-m depth (55 fathoms), confirming continued observations of Humpback whales in the area that were summarized in the April 29, 2021 Available Data package.
- A partner of the Cascadia research collective, the University of California, Santa Cruz (UCSC) conducted photo-identification and sample collection surveys between May 11-14, 2021 from Moss Landing. Two vessels were used over the 4-day survey and a total of 31 sightings of 61 Humpback whales were observed (Figure 14), some observations could be duplicate individuals.

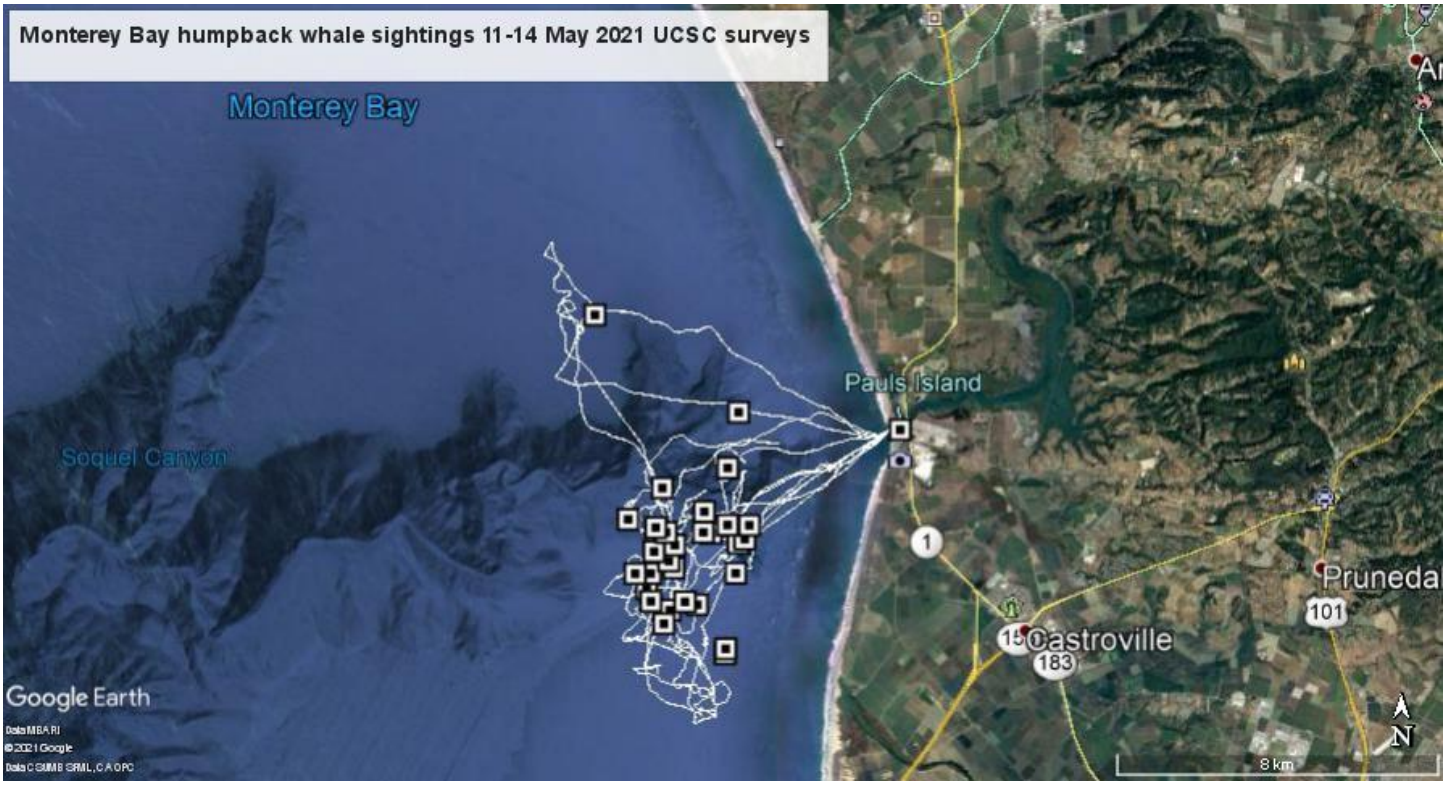


Figure 14. A map depicting Humpback whales sightings (squares) from surveys between May 11-14, 2021 in Monterey Bay conducted by UCSC. Sightings may represent more than one individual, and some observations over the course of the survey could be duplicate individual.

Solar Loggers *(Fishing Zone 4)*

- Track lines from whale watching vessels participating in the solar logger pilot project (Figure 15) indicate more widespread effort across Monterey Bay during 73 trips conducted between April 26-May 10, 2021. A summary of cumulative whale watching trips every one and two weeks since January 1, 2021 is provided in Table 4.

Table 4. Summary of whale watching trips based on data provided by the solar logger project between different time periods from January 1, 2021 until May 10, 2021.

Time Periods	Whale Watching Trips
April 26 – May 10,.2021	73
April 8-25, 2021	78
March 29 – April 7, 2021	37
March 10-28, 2021	46
March 1-9, 2021	21
February 10-28, 2021	38
February 1-9, 2021	15
January 16-31, 2021	19
January 1-15, 2021	28

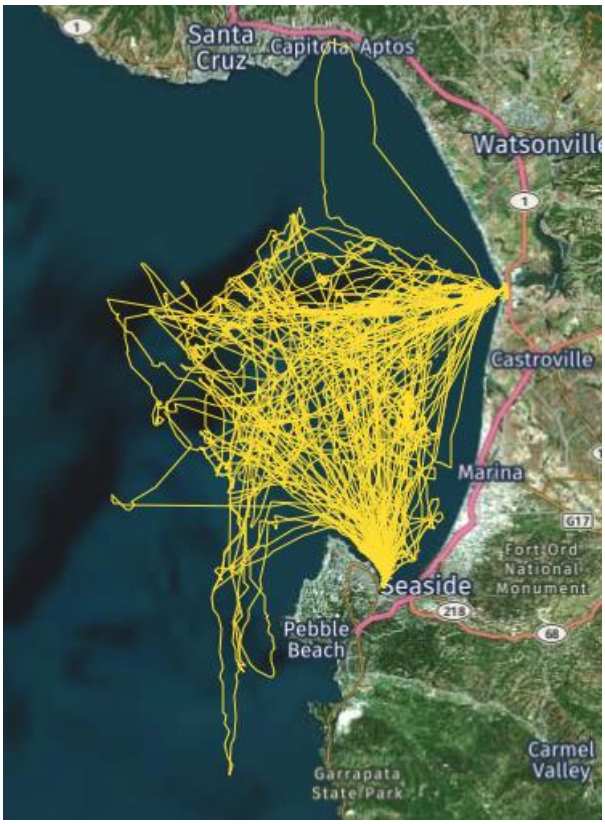


Figure 15. Track lines for 73 whale watch trips in Monterey Bay from April 26-May 10, 2021. Sightings, numbers and species are not reflected on this map.

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

- The Greater Farallones National Marine Sanctuary (through the Spotter/Whale Alert app) has observed two Humpback whales in Fishing Zone 3 from May 2-11, 2021 (Figure 16). No Blue whales have been observed. Observations were recorded by trained observers on the Farallon Islands.
- Monterey Bay National Marine Sanctuary has observed 81 Humpback whales from May 2-11, 2021 (Figure 17), and a total of 139 Humpback whales over the past 30 days from April 11-May 11, 2021 (Figure 18). On May 3, 2021, a total of 60 Humpback whales were reported. No Blue whales have been sighted during the past month. Observations were reported from trained naturalists aboard Monterey Bay Whale Watch and Secret Harbors Charter.
- Channel Islands National Marine Sanctuary observed 43 Humpback whales from May 2-11, 2021, and no Blue whales in Fishing Zone 6 (Figure 19). These observations are conducted by trained naturalists from the Channel Islands National Marine Sanctuary and National Park Service.

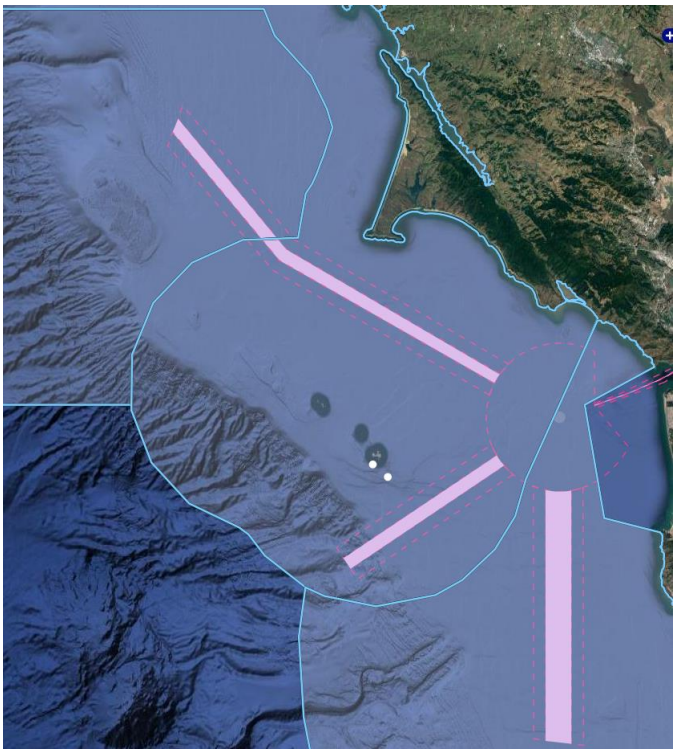


Figure 16. Location of two Humpback whale sightings in Fishing Zone 3 from May 2-11, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

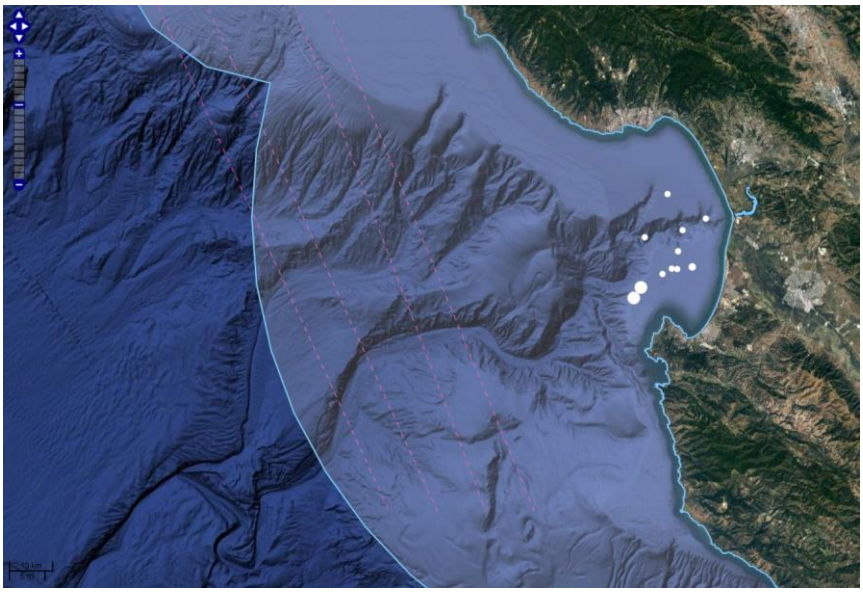


Figure 17. Location of 81 Humpback whale sightings in Fishing Zone 4 from May 2-11, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

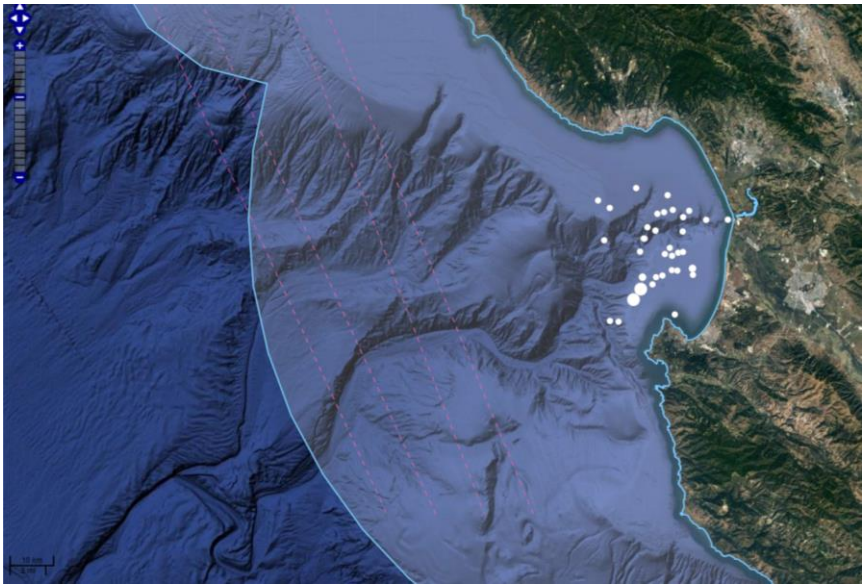


Figure 18. Location of 139 Humpback whale sightings in Fishing Zone 4 from the past 30 days from April 11-May 11, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

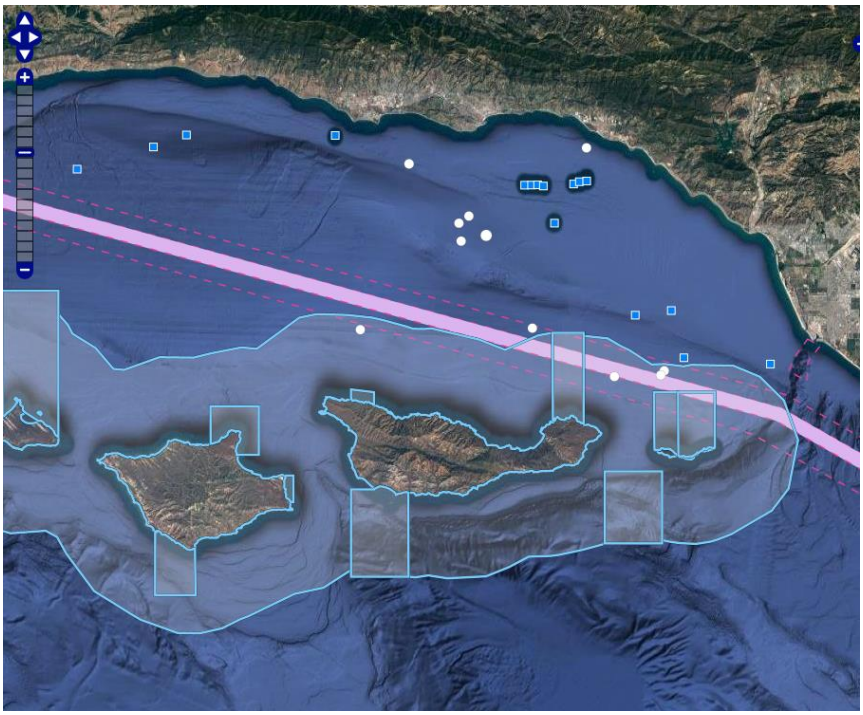


Figure 19. Location of 43 Humpback whale sightings in Fishing Zone 6 from May 2-11, 2021. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

United States Coast Guard *(Fishing Zone 3)*

- A rotary flight was conducted by the United States Coast Guard (USCG) from Air Station San Francisco on May 8, 2021. The 1-hour flight path traveled from the shoreline to about 8 nautical miles offshore between Pigeon Point and Stinson Beach (Figure 20). Three

individual whales each traveling alone were observed and although not identified, were suspected to be Grey whales.

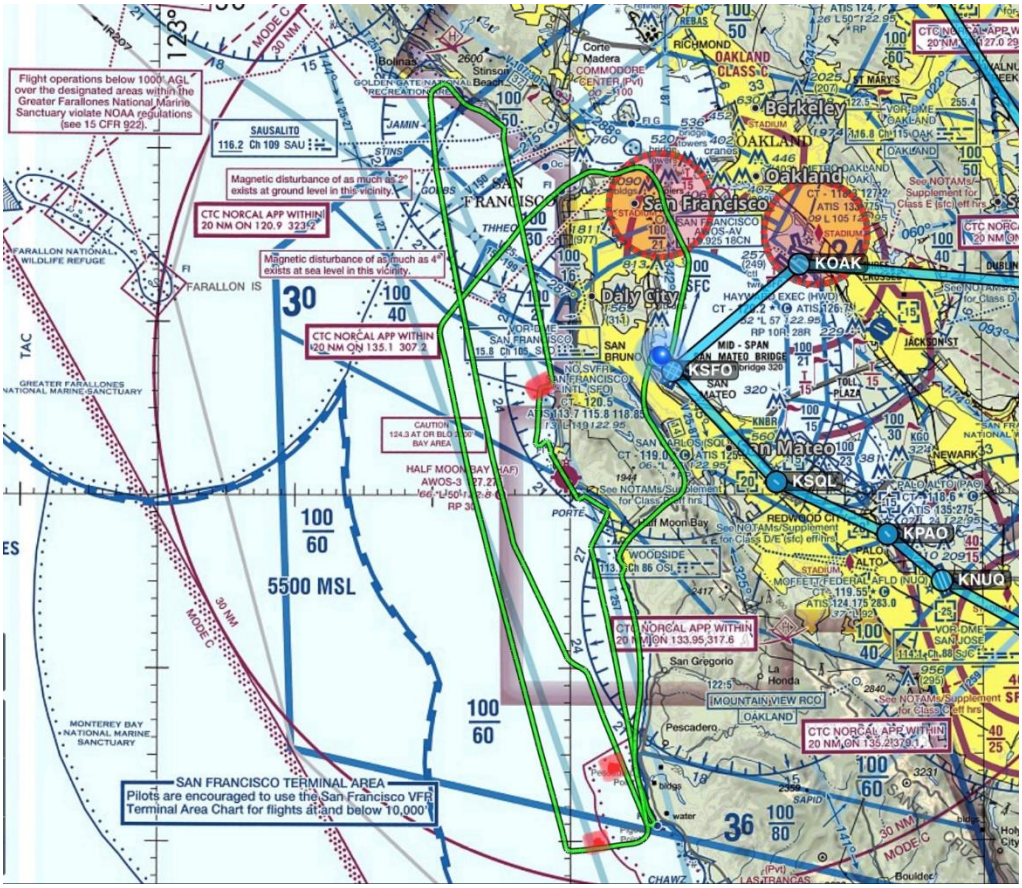


Figure 20. Map of USCG flight path (green line) on May 8, 2021 between Pigeon Point and Stinson Beach in RAMP Zone 3. Rectangular red marks along path are the three individual whale observations.