2021-22 Risk Assessment: Available Data

Last updated: November 17, 2021

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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. Actionable Species Entanglements, prepared by NMFS West Coast Region between January 1 andNovember 15, 2021.

Actionable Species	Number Confirmed Entanglements in CA commercial Dungeness crab gear	Number Confirmed Entanglements in Unknown Fishing Gear Reported off CA
Humpback whales	1	4
Blue whales	0	0
Leatherback sea turtles	0	0

- Between January 1 and November 15, 2021 there have been 12 confirmed humpback whale entanglements, 0 confirmed blue whale entanglements, and 0 confirmed leatherback sea turtle entanglements reported to NMFS West Coast Region (Table 1).
- Humpback whales:
 - 12 confirmed entanglements (nine reported in California, one reported from Mexico with CA commercial Dungeness crab gear, one reported in Oregon, and one reported in Washington)
 - Fishery confirmations:
 - One confirmed humpback whale entanglement with California commercial Dungeness crab gear, reported from Mexico, gear set fishing zone unknown
 - Of the nine confirmed reported in California, five were contributed to fisheries other than California commercial Dungeness crab: one spot prawn, one experimental box crab, one Washington commercial Dungeness crab gear, one gillnet, and one commercial lobster *pending review*
 - Of the nine confirmed reported in California, four are currently unidentified entanglement source
 - Fishery Zone: Of the nine confirmed humpback whale entanglements in California, eight were reported in Fishing Zone 6 and 1 in Fishing Zone 5
- Blue whales: 0 confirmed entanglements
- Leatherback turtles: 0 confirmed entanglements

 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.

Actionable Species	Current Fishing Season Impact Score	Current Calendar Year Impact Score
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 <u>April 13, 2021 Available Data document</u> for additional information regarding the

Unknown Fishing Gear entanglement. Three additional confirmed entanglements in unidentified fishing gear are pending review by CDFW. An entanglement involving unknown gear and an unidentified whale is currently being reviewed by NOAA and CDFW. The entanglement was first reported on November 15, 2021 in an area near Trinidad, north of Eureka by CDFW staff.

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	Cascadia/TMMC Vessel Survey	No
Zone 2	none	No
Zone 3	NOAA Aerial Survey, Cascadia/TMMC Vessel	Yes
	Survey	
Zone 4	NOAA Aerial Survey, Cascadia/TMMC Vessel	Yes
	Survey, MBWW	
Zone 5	none	No
Zone 6	none	No

Cascadia Research and TMMC Small Vessel Surveys (Fishing Zones 1, 3, and 4)

 Research teams working out of four harbors conducted surveys in Fishing Zones 1, 3, and 4 between October 29-31, 2021 (Table 4 and Figures 1 & 2). Surveys revealed low to intermediate concentrations of humpback whales widely distributed in both nearshore and offshore waters. While overall numbers and sighting rates have decreased since September (see the October 29, 2021 Available Data Document), many humpback whales had not yet migrated out of the area. Researchers observed a lot of behaviors and interactions more common to the winter breeding ground, which might indicate some of these whales were close to migrating.

Table 4. Summary of surveys and sightings conducted October 29-31, 2021. ZIP and ROB are RHIBs operated by Cascadia, TMMC is the Marine Mammal Center RHIB, and MLS is the Marine Life Studies vessel Current Sea chartered for these surveys. Includes both on and off-transect observations.

Date	Vessel	Locality (Zone)	Hours	NMi	Humpback	Unid./Other
29-Oct-21	ZIP	Pt. St George (1)	3.7	60	1	1
30-Oct-21	ZIP	Pt. St George (1)	9.4	110	9	0
31-Oct-21	ZIP	Pt. St George (1)	5.6	69	0	4

Date	Vessel	Locality (Zone)	Hours	NMi	Humpback	Unid./Other
30-Oct-21	MLS	Pigeon Pt. to Pt. Reyes (3)	2.9	47	19	3
30-Oct-21	MLS	Pt. Reyes to HMB (3)	2.2	30	16	1
30-Oct-21	ROB	HMB-Gulf of Farallones (3)	10.4	120	44	0
31-Oct-21	ROB	HMB and south (3)	6.3	54.5	21	2
31-Oct-21	TMMC	SF-Gulf of Farallones (3)	5.8	111	14	3
30-Oct-21	MLS	MB-Pigeon Pt. (4)	3.3	40	9	0
30-Oct-21	MLS	Monterey Bay (4)	1.9	10.5	2	0
31-Oct-21	ROB	S of Pigeon Pt. (4)	3.1	34	9	3

 Within Fishing Zone 1, three surveys were conducted October 29-31, 2021 out of Crescent City but mostly in more challenging conditions in two of the days. Surveys generally found low concentrations of humpback whales (10 total seen across the three days) scattered in both inshore and offshore waters (Figure 1). Four gray whales that were likely part of the Pacific Coast Feeding Aggregation were also sighted in nearshore waters.



Figure 1. Small boat surveys (white lines) and whale sightings in Fishing Zone 1 (N California) on October 29-31, 2021.

• Within Fishing Zone 3, three surveys were conducted out of Half Moon Bay, San Francisco, and coming north from Moss Landing on October 30-31, 2021 in mostly good to excellent conditions (Figure 2). Intermediate concentrations of humpback whales were present, with a total of 79 humpback whales encountered across the two days (Table 4). Humpback whales were distributed widely both inshore and offshore. Along the 50 and 70m transect lines, there were 0.4-0.5 humpback whales per nautical mile. Preliminary photo ID work indicates a minimum of 38 unique whales were seen during these two days, with an estimated total of around 200 whales.

Available Data, November 17, 2021

 Within Fishing Zone 4, two surveys were conducted on October 30-31, 2021 out of Moss Landing and coming south out of Half-Moon Bay in mostly good to excellent conditions (Figure 2). Intermediate concentrations of humpback whales were present, with a total of 20 humpback whales encountered across the two days (Table 4). Humpback whales were distributed widely both inshore and offshore. Along the 70m transect line, there were 0.2 humpback whales per nautical mile. An additional survey conducted in early November included a single sighting of five humpback whales.



Figure 2. Small boat surveys (white lines) and whale sightings in Fishing Zones 3 and 4 (Gulf of Farallones region to Monterey Bay) on October 30-31, 2021.

An additional survey on November 8, 2021 between Monterey Bay and Point Sur involved a single sighting of five humpback whales, which were seen just south of Monterey Bay traveling south.

NOAA and Upwell Aerial Survey (Fishing Zones 3 and 4)

- Aerial surveys were conducted from Gualala to Monterey, on November 10 and 11, in a Partenavia P68 Observer aircraft. The completed transects included 408 nautical miles of effort on east-west lines spaced every 6 naut. miles between the coast an approximately 200 m (110 fm) water depth (Figure 3).
- Humpback whales appeared less abundant than in October, but were observed scattered throughout the survey area. There were 18 sightings of 32 humpback whales during the systematic east-west transect lines, and an additional 21 sightings of 57 humpback whales during transits between lines and when traveling northbound through the study area. The total of 39 sightings of 89 whales may have included a few re-sighted individuals across the two survey days. Three additional sightings of five unidentified whales that probably were humpback whales were also recorded.
- No blue whales or leatherback sea turtles were observed.



Figure 3. Upwell/NOAA aerial survey track lines and observations of humpback whales, unidentified whales, large molas (ocean sunfish), and brown sea nettles (leatherback prey) off central California in Fishing Zones 3 and 4 during Nov 10-11, 2021. Only large molas, which tend to co-occur with leatherback turtles, are shown in this figure for simplicity. The number of whales in each sighting are shown below each of the symbols at the sighting locations. Given that the survey took place over two days, it is possible that some of the humpback whale sightings may represent re-sightings of the same individuals.

US Coast Guard Aerial Surveys (Fishing Zone 3)

 The US Coast Guard was able to conduct a flight in an area extending from Jenner to Pigeon Point on November 13, 2021, (Figure 4). Five observations were made, with 2-4 whales within each pod, presumed to be humpback whales. Track lines are shown in green.



Figure 4. USCG aerial survey in Fishing Zone 3 (Gulf of Farallones region) on November 13, 2021.

Leatherback Sea Turtle Telemetry (Fishing Zone 3 and 4)

• The adult male leatherback turtle that was captured approximately 3 miles northwest of Pillar Point (Half Moon Bay, CA) and tagged with a satellite-linked transmitter on 16 October 2021 has moved to deep offshore waters approximately 115 miles west of Pt. Sur in Monterey County. The turtle is moving in a southwest direction (Figure 5).



Figure 5. Leatherback sea turtle telemetry track for the period 16 October -14 November 2021 of an adult male leatherback turtle tagged off Half Moon Bay. The transmitter is reporting approximately every 24 hrs.

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 seven days (Nov 7 - 13) was 8.7, with a peak of 15 whales observed on Nov 11.
- One blue whale was observed by MBWW on Nov 13. This is largely consistent with their historical seasonal migration patterns during late summer and fall.

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: Cascadia Research, Monterey Bay Whale Watch (processed by Karin Forney, NMFS); CDFW, Karen Grimmer (Monterey Bay National Marine Sanctuary) and Jaime Jahncke (Point Blue Conservation Science); NOAA Coast Watch; Briana Abrahms (University of Washington)

Humpback Whale Sightings in Mexico/Central America

• As of November 17, at least nine humpback whales known to forage off California have been documented on breeding grounds in Baja and mainland Mexico.

CDFW Aerial Surveys (Fishing Zones 2, 3, 4 and 5)

- CDFW aerial reconnaissance surveys were conducted on October 18 and 19, 2021 between Shelter Cove and Piedras Blancas. 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.

Monterey Bay Whale Watch (Fishing Zone 4)

- The semi-monthly average number of humpback whales-per-half-day-trip during the first half of November is lower than during the second half of October (Figure 6). It is also lower than during the same period last year (although still slightly above average for this time of year compared to the overall 2003-2020 record).
- One blue whale was observed by MBWW on Nov 13. This is largely consistent with their historical seasonal migration patterns during late summer and fall (Figure 7).



Figure 6. 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) and are provided for reference, placing recent whale numbers in a historical context.



Figure 7. 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)

- Three humpback whale sightings were reported for Greater Farallones National Marine Sanctuary (Zone 3) (through the Spotter/Whale Alert app) over the past seven days (November 8-15, 2021) (Figure 8). No blue whales were sighted during this period. Observations were recorded by trained observers on the Farallon Islands.
- Three humpback whale sightings were reported for Monterey Bay National Marine Sanctuary (Zone 4) over the past 7 days (November 8-15, 2021) (no figure available). No blue whales were sighted during this period. Observations were reported by trained naturalists aboard Monterey Bay Whale Watch and Marine Life Studies.
- 21 humpbacks whale sightings were reported for Channel Islands National Marine Sanctuary (Zone 6) over the past 7 days (November 8-15, 2021) (Figure 9). 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 8. Location of three humpback whale sightings in Fishing Zone 3. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.



Figure 9. Location of 21 Humpback whale sightings in Fishing Zone 6. Reporting locations are represented by white circles. A given report may or may not represent multiple individuals.

WhaleWatch 2.0 All Fishing Zones

 Blue whale habitat predictions for November 12, 2021 (Figure 10) indicate the probability of blue whale presence is low-to-moderate nearshore between Oregon and Point Conception; and high in the nearshore portion of Fishing Zone 5 and throughout the Southern California Bight (Fishing Zone 6).



Figure 10. WhaleWatch 2.0 map for November 12, 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

CDFW data presented in this section is preliminary and subject to revision.

Domoic Acid and Quality Testing

- One site within Zone 3, Russian River, requires more testing since results from the Oct 31 test had two crab above the action level for domoic acid. Two consecutive samples must be taken at least one week apart with all crab below the action level for the area to clear. One sample retest occurred on Thurs., Nov. 11 with another sample anticipated to occur as early as Thurs., Nov. 18. The latest results information can be found on <u>CDPH's Domoic acid website</u>.
- Quality test results from Nov. 2 are posted on <u>PSMFC's crab website</u>. All ports tested below the requisite 24% (no rounding) and all need to pass in order to not delay the fishery in the Northern Management Area. Another test is being scheduled for the week of Nov. 15. Results will likely be made available on or before Nov. 22 to inform the Dec. 1 conditional opener. If a delay is warranted, information will be shared via a Director memo posted on <u>CDFW's crab website</u> and a CDFW press release.

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

Data provided by: Cascadia Research and The Marine Mammal Center, NOAA/Southwest Fisheries Science Center and Upwell

Cascadia Research and TMMC Small Vessel Surveys (Fishing Zones 1, 3, and 4)

• Humpback whales in Fishing Zones 3 and 4 were foraging primarily on small fish in both inshore and offshore waters.

Upwell/NOAA Aerial Surveys (Fishing Zones 3 and 4)

• Few anchovy schools were observed by the aerial team, although piscivorous (fish-eating) seabirds were very abundant. Several feeding flocks were observed, and a few of the humpback whales were observed lunge-feeding on near-surface schooling fish. Based on these observations, it appears that schooling fish were mostly too deep to be seen from the air. One patch of dense sea nettles (leatherback prey) was recorded in approximately 20-40 fm water depth off San Francisco. Large ocean sunfish (Mola mola), a sea nettle predator that often co-occurs with leatherback turtles, were markedly less abundant than during aerial surveys in October 2021, with 28 large molas observed in water depths of about 25-40 fm between Pigeon Point and Point Reyes.

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

• Synopsis: La Niña is likely to continue through the Northern Hemisphere winter 2021-22 (~90% chance) and into spring 2022 (~50% chance during March-May).

Marine Heatwave Tracker

• The NEP21A large marine heatwave began in late April 2021 and as of October 26, 2021 has begun to shrink in size and recede from the coast. The latest satellite imagery (Figure 11) suggests that the recession has been fairly rapid over the past two weeks, likely hastened by the record-breaking (in terms of rainfall) storm which impacted the entire west coast between October 23-35, 2021. Waters are cooler than normal in the nearshore portions of Fishing Zones 1-6.



Figure 11. 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 <u>NOAA's Optimum interpolation Sea Surface Temperature analysis (OISST)</u>, 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 September 2021 (Figure 12). At that time, there was moderate compression, with cooler water habitat available between 38 and 40°N. Compression is typically moderate or high during November (Figure 13).



HCI color based on standard deviation (SD) and mean (MN) of all values over 1980-01 to 2021-09

Medium Compression (HCI > MN and HCI < 1SD)

Figure 12. Map of September 2021 sea surface temperature and location of the Habitat Compression Index (HCI) boundary (think black line).



Figure 13. Maps of historical November 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).