



2018 West Coast Whale Entanglement Summary

Spring 2019

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Starting in 2016, NOAA Fisheries West Coast Region began publishing an annual summary of entanglement reports along the west coast to provide information on known entanglements occurring in U.S. territorial waters or nearby. This summary provides entanglement information and related updates that are particularly useful to those engaged in efforts to understand and address the issue on the U.S. West Coast from the fishery management perspective. NOAA Fisheries collects, verifies, documents, and responds to reports of large whale entanglements that originate from a variety of sources including boaters, fishermen, law enforcement, marine resource agencies, and the public. NOAA Fisheries publishes a separate National entanglement report that highlights emergency response activities to help whales in U.S. waters by the U.S. Large Whale Entanglement Response Network nationwide.

In 2018, 46 whales were confirmed¹ entangled off the coasts of Washington, Oregon, and California (Table 1). Similar to recent years, humpback whales continue to be the most common species entangled with 34 separate entanglements confirmed in 2018. In addition, there were 11 gray whales confirmed entangled and one confirmed fin whale entanglement. Seven of the confirmed entanglements (five humpback whales and two

gray whales) were reported as dead; all other reports involved live whales. NOAA Fisheries confirmed the reports based upon the documents submitted, follow-up sightings, and entanglement response information provided to us from our West Coast Region Marine Mammal Stranding Network partners.

¹Criteria used to deem a report “confirmed” include:

- Photos or video of the gear on the whale.
- NOAA Fisheries staff has direct visual observation.
- The report came from a trusted source (trained or professional reporting party).
- An experienced member of our West Coast Region Marine Mammal Stranding Network or NOAA Fisheries expert interviewed the reporting party and the information provided is detailed and specific enough to confirm entanglement.
- Multiple sources providing reports with detailed descriptions of the animal and the entanglement.



Humpback whale with line attached to the right pectoral flipper.

Photo: Slater Moore. NMFS MMHSRP Permit #18786-03

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There were 11 additional reported entanglements that could not be confirmed (Table 1). There was one unconfirmed report of a blue whale entanglement, three unconfirmed reports of gray whale entanglements, five unconfirmed reports of humpback whale entanglements and two unconfirmed entanglement reports where the species was unidentified.

Entanglements were reported in every month except January, with the highest number of reports in May (10 confirmed, two unconfirmed). Of the 46 confirmed whale entanglements, 30 were reported off California, 12 were reported off Washington, and three were reported off Oregon. One additional report was from Baja, Mexico, where we determined a whale was entangled in gear from the United States. The location where entangled animals are observed and reported does not necessarily reflect where and when the entanglement originated. Animals

can travel great distances while remaining entangled in gear for many weeks, months, or even years.

The higher number of reported entangled whales off the coast of California relative to other states may reflect an increased likelihood of sighting and reporting due to high recreational and commercial activity. For example, Monterey Bay is known to be a preferred area that whales frequently visit during migrations, and this area is also densely populated with many people recreating on the water in the bay; therefore, there may be more entanglement sightings than in other areas along the coast. Successful public outreach in recent years on how to report entanglements may also contribute to locally higher reporting rates. Although the predominance of entangled whales reported from California in 2018 is consistent with historical patterns, the number of reports from Washington and Oregon was exceptionally high



Trained team uses large buoys as part of response in order to assess and potentially remove entanglement from humpback whale. Photo: Julia O'Hern. NMFS MMHSRP Permit #18786-03

Comparing Entanglements in 2018 to Past Years

Figure 1 indicates the annual number of confirmed whale entanglements, by species, for the years 2000 to 2018. Confirmed entanglements in 2018 were slightly lower than the historic highs of 2015 (n=49) and 2016 (n=48), but still represent a concerning level and a large increase compared to pre-2014 levels when the average was less than 10 confirmed entanglements per year.

The recent increased and variable levels of entanglement reporting may reflect a variety of dynamic factors, including changes in the abundance and distribution of whales and their prey, changes in environmental conditions, shifting patterns in fishing and other human

activities, and increased public reporting. NOAA Fisheries along with other partners are actively researching how these dynamics are interacting and affecting entanglement risk and reporting.

Table 1 tallies the total number of confirmed and unconfirmed whale entanglements by species and by month for 2018. The number of confirmed humpback whale entanglements in 2018 increased from 2017, approaching again the high of 48 individuals in 2016. The number of confirmed gray whale entanglements remained relatively consistent with previous years, although at the higher end of the historical range. There

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were no confirmed blue whale entanglements this year for the first time since 2015, although there was one unconfirmed report of an entangled blue whale. Historically, fin whale entanglements have been occasionally reported, and one fin whale entanglement was confirmed in 2018.

Gray whale entanglements were reported primarily in the winter and spring months, while humpback whale entanglements were primarily reported in the summer and fall, generally reflecting the annual migrations of these species. Most gray whales migrate south in November through February from their foraging grounds in Alaska. They travel along British Columbia and the U.S. West Coast states of Washington, Oregon, and California, to their wintering breeding grounds in Mexico; returning to Alaska from February to June. Humpback whales found off the U.S. West Coast generally migrate south from foraging grounds along the coast to their winter breeding grounds in Mexico and Central America in the fall months, although some individuals may remain farther north.

Data reported in Table 1 and Figure 1 do not include reports received by NOAA Fisheries determined to be re-sightings of a previously reported entangled whale, which is a common occurrence. Photographs are used for individual whale identification and to help determine if a report is a new or unique report, a re-sighting of an entangled whale, or a whale that may have been previously entangled.

Figure 1. Confirmed U.S. West Coast whale entanglements by year and species, 2000 to 2018. In the legend, “n” represents the total number of that species confirmed entangled in the 19-year period.

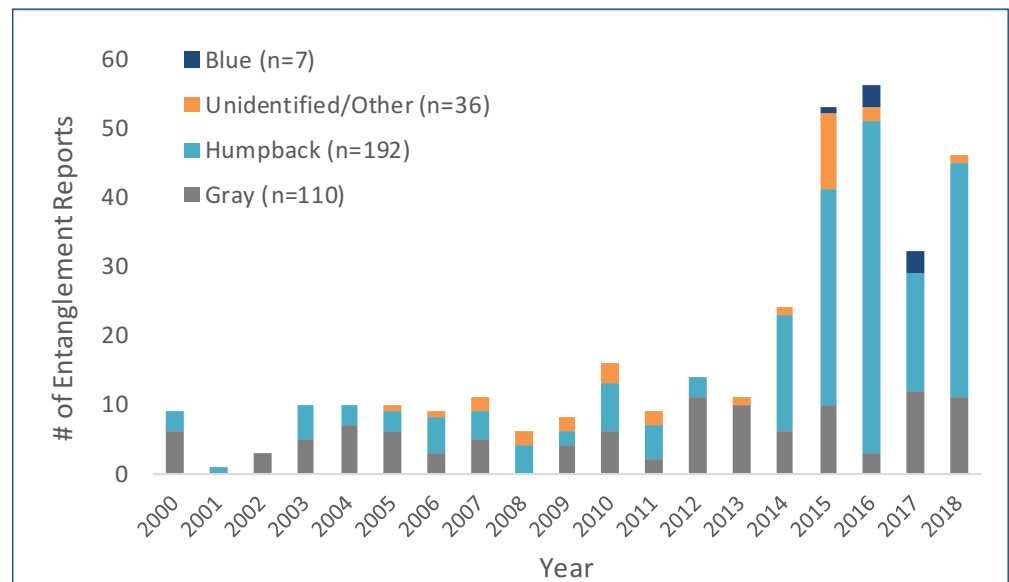


Table 1. Total 2018 U.S. West Coast whale entanglement reporting activity (confirmed and unconfirmed) by month and species. Confirmed reports are listed with unconfirmed reports provided in parentheses. *Includes one humpback whale entanglement reported from Mexico.

MONTH	HUMPBACK	GRAY	OTHER	TOTAL
JANUARY	0	0	0	0 (0)
FEBRUARY	0	2	0	2 (0)
MARCH	0	1 (1)	0	1 (1)
APRIL	1	4	0	5 (0)
MAY	6	3 (1)	1 Fin, (1 Unidentified)	10 (2)
JUNE	1	1	0	2 (0)
JULY	7*	(1)	(1 Blue)	7 (2)
AUGUST	7 (2)	0	(1 Unidentified)	7 (3)
SEPTEMBER	6 (1)	0	0	6 (1)
OCTOBER	3 (1)	0	0	3 (1)
NOVEMBER	2 (1)	0	0	2 (1)
DECEMBER	1 (0)	0	0	1 (0)
TOTAL	34 (5)	11 (3)	1 (3)	46 (11)

Sources of Entanglement

In 2018, 24 of the 46 confirmed reports were identified as associated with specific fisheries or gear type (Table 2). This includes gear identifiable to state, tribal, and federally-managed fisheries occurring off the coasts of Washington, Oregon, and California. Washington, Oregon, and California.

Table 2. Confirmed sources of whale entanglements in 2018.

FISHERY	NUMBER OF REPORTS
California Dungeness crab commercial trap fishery	7 (7 humpback)
Washington Dungeness crab commercial trap fishery, including tribal fisheries	5 (3 gray, 2 humpback)
Oregon Dungeness crab commercial trap fishery	2 (1 gray, 1 humpback)
Commercial Dungeness crab commercial trap fishery, state unknown	1 (1 humpback)
California commercial spot prawn trap fishery	1 (1 humpback)
California recreational spot prawn trap fishery	1 (1 humpback)
Gillnet fisheries**	7 (3 gray, 4 humpback)

** There are numerous gillnet fisheries that include state, federal, and tribal fisheries that occur along the U.S. West Coast that may be involved with whale entanglements. There are additional gillnet fisheries in adjacent countries that may also be involved with entanglements. Identification of the specific origin of gillnet entanglements is particularly challenging in most cases given the general nature and appearance of gillnet gear that is reported. In addition, several more entanglements were reported that involved gear that may have been associated with nets of some variety but could not be positively identified as a gillnet.

*Fluke of entangled humpback whale, trailing a buoy and kelp.
Photo: San Diego Whale Watch. NMFS MMHSRP Permit #18786-03*



Entanglement Response and Outcomes

Of the 46 confirmed entanglements, 39 involved live animals and seven involved dead animals that were investigated by NOAA Fisheries West Coast Region Marine Mammal Stranding Network. NOAA Fisheries' Large Whale Entanglement Response Program initiated a response for 18 (14 humpback and four gray whales) of the 39 confirmed reports of live animal entanglements.

There were four unauthorized responses to humpback whale entanglements conducted by the public. These unauthorized and extremely dangerous responses were poorly documented and can only be confirmed as partial disentanglements, which leaves the final status (uninjured/injured/dead) of the whale in question. Trained responders prioritize human health and safety as well as attaining detailed documentation before engaging in any disentanglement effort.

There were three unconfirmed entanglement reports where a network response was initiated but the reported entangled whale was not resighted or ultimately confirmed. Entanglement response does not always include attempts to disentangle whales even when entangled whales are successfully re-sighted.

The outcomes of the 18 reports of live whales where a NOAA Fisheries' authorized entanglement response was initiated are listed below:

- Full disentanglement: One entangled humpback whale was fully released from California commercial Dungeness crab gear.
- Partial disentanglement: Two reports (one humpback whale with Oregon commercial Dungeness crab gear and one gray whale with Washington commercial Dungeness crab gear) where some, but not all, of the gear was removed. The gray whale later died.
- Self-release: Two reports. One case where a humpback whale fully self-released from California recreational spot prawn gear. One case where a gray whale partially self-released from Oregon commercial Dungeness crab gear.
- No gear removed: 13 reports (11 humpback whales and two gray whales). Gear was not removed from entangled whales in multiple reports based on environmental conditions, including available daylight and sea conditions at the time of response. Despite the gear remaining on the whales, the trained NOAA Fisheries team was able to document valuable information from these incidents.

Known outcomes of reports that did not have a NOAA Fisheries authorized response:

- No response initiated, died later: One case of an entangled humpback whale that was originally reported alive but days later the animal was re-sighted dead.
- No response initiated, re-sighted gear free: One case of a humpback whale entangled with netting off Washington that was later sighted again gear-free.
- Un-authorized responses: Four cases of un-authorized responses to humpback whale entanglements, resulting in partial gear removal.



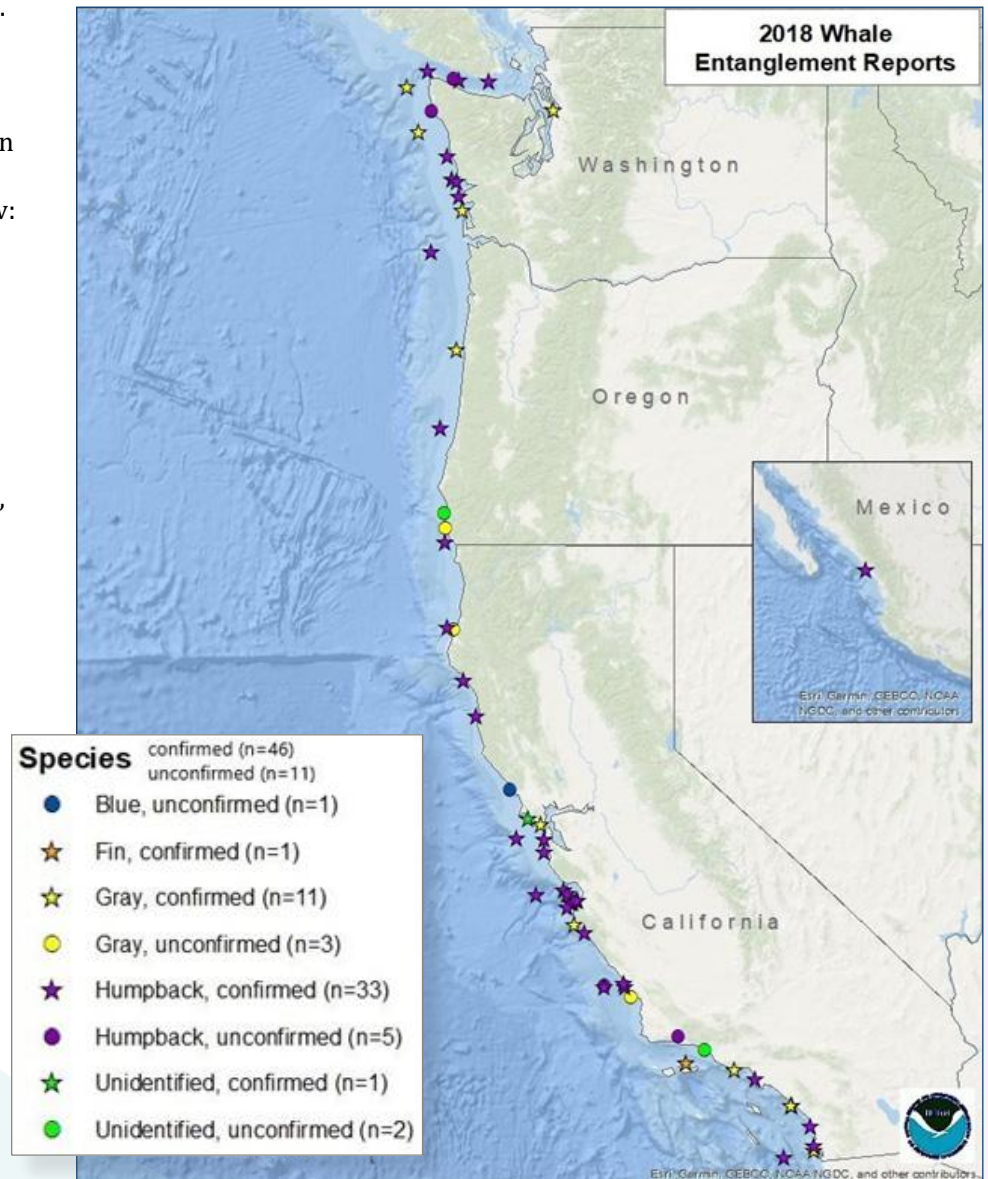
Humpback whale entangled with recreational spot prawn gear around tail. Photo: Duke University. NMFS MMHSRP Permit #18786-03

Geographic Location of Entanglement Reports in 2018

Reports of entangled whales originated from all along the U.S. West Coast in 2018, but were concentrated off central California and Washington. Gray whale entanglement reports were most common off southern California and Washington, whereas humpback whales were most common off central California (Figure 2). A summary of the results is listed below:

- 26% (n=12) of all confirmed reports originated from Washington
 - ◆ One unconfirmed report originated from Washington
- 13% (n=6) of all confirmed reports originated from Oregon or Northern California (Del Norte, Humboldt, and Mendocino)
 - ◆ Four unconfirmed reports originated from Oregon or northern California
- 24% (n=11) of all confirmed reports originated from central California (Marin, Monterey, San Francisco, San Mateo, San Luis Obispo, and Sonoma counties)
 - ◆ 15% (n=7) of all confirmed reports were from Monterey County
 - ◆ Four unconfirmed reports originated from central California
- 13% (n=6) of all confirmed reports originated from southern California (Santa Barbara, Los Angeles, Orange, and San Diego counties)
 - ◆ Two unconfirmed reports originated from southern California

Figure 2. Actual or estimated locations where whales were first reported as entangled (confirmed or unconfirmed) in 2018, color-coded by species. Entanglement report locations may not reflect where the entanglements occurred.



Additional Observations in 2018

- Commercial Dungeness crab gear from all three states (CA, OR, WA) were reported as entangling gear types in 2018. Both commercial and recreational spot prawn gear were involved in entanglements reported this year, as were commercial and tribal gillnets.
- There was an increase in the number of entanglements reported in the Pacific Northwest in 2018, including both gray and humpback whales. While the underlying causes for this are subject to further analysis, it is likely due to a combination of an increase in the number of whales present in Pacific Northwest waters, the number of entanglements occurring in the area, and an increased awareness among mariners of the problem of entanglements and how to report them. Further, increased large whale research effort in areas of high whale density in 2018 played a role in the increased detection of entangled whales. The relatively wide distribution of entanglements reported and occurring in gear along the U.S. West Coast



Photo captured by the whale entanglement response team, documenting the extent of an entanglement on a humpback whale. Photo: Jenn Tackaberry/Kirsten Flynn. NMFS MMHSRP Permit #18786-03

was generally consistent with assessments of humpback whale foraging distributed widely along the coast in 2018 conducted as part of the California Risk Assessment and Mitigation Program (RAMP - see below).

- There was a substantial increase in the number of reported entanglements that were associated with dead whales in 2018 compared to previous years. Although reports of entangled whales that are dead at the time of sighting are not common, we

know that entanglements may often lead to mortality or serious injury. While the increase in dead whales in 2018 is substantial and warrants further investigation, it is possible that the increased reporting from more remote areas in the Pacific Northwest where sightings and reportings traditionally have been lower were coincident with some whales that were entangled for a long period of time before sighting.

Unauthorized Disentanglement Response

When NOAA Fisheries' authorized teams respond to an entangled whale, they collect a wealth of important data on each event. These include documentation of the nature of the entanglement and the resulting injuries, as well as gear involved. Unfortunately, in the four unauthorized cases from 2018, these data were not collected, leaving substantial information gaps for each case. Fortunately, in all four of the 2018 cases there were no reports of human injuries. Nevertheless, the limited photo and video documentation provided revealed some very dangerous actions taken by the unauthorized responders. Attempts to disentangle whales have resulted in the death of would-be-rescuers in the past. Most entanglement reports are not immediately life threatening to the whale, and there is usually time for a NOAA Fisheries response team to mount a safe and effective response to the entanglement. The most important thing is that sightings of entangled whales are reported to NOAA Fisheries as soon as possible, and that reporting parties stand by at a safe distance from the whale to monitor and observe it only until trained responders can arrive on scene.

Addressing the Issue

California Stakeholder Working Group: In 2018, the California Dungeness Crab Fishing Gear Working Group continued development and pilot implementation of the Risk Assessment and Mitigation Program (RAMP) in support of the California Department of Fish and Wildlife (CDFW). This Working Group was originally convened by CDFW in partnership with the California Ocean Protection Council and NOAA Fisheries to address an increase in large whale entanglements in Dungeness crab fishing gear. Collaborating with experts (fishermen, researchers, non-governmental organizations, etc.) the Working Group continues to assess ongoing levels of entanglement risk during the Dungeness crab fishing season and evaluate the need for management action to reduce risks. In 2018, the Working Group also issued an updated Best Practices Guide to Minimizing Whale Entanglement Risk in the California Dungeness crab fishery. More information about these efforts is available online: <http://www.opc.ca.gov/whale-entanglement-working-group/>.

State of California Response: In 2018, legislation (SB 1309) was passed by the California legislature and signed into law giving the CDFW Director authority to take management action in the Dungeness crab fishery to address entanglements during a fishing season beginning in January 2019. This legislation also provides CDFW

authority to implement gear marking improvements across a variety of California fixed gear fisheries to improve the identification of gear involved in entanglements. The California legislature also set aside \$5.5 million to fund activities to reduce the risks of marine life entanglements in fixed gear fisheries. Regulations that limit the extent of surface gear that is allowed in the Dungeness crab fishery to minimize entanglement risks were also enacted by CDFW in 2018 (<https://www.wildlife.ca.gov/Notices/Regulations/Crabbing-Gear>).

Oregon and Washington Working Groups: In 2018, Working Groups in Oregon and Washington (both initially formed in 2017) continued meeting to evaluate whale entanglements, develop Best Practices Guides applicable to their respective state fisheries, and discuss potential measures to avoid entanglements with Dungeness crab and other gear in their state. Potential measures that have been discussed by the Working Groups and industry at large include: limitations on gear during the later portion of the fishing season, implementing summer buoy tags to better distinguish when entanglements may be occurring, and promoting research to determine if there are particular whale “hot spot” areas that could be avoided by fishermen during certain times.



*Humpback whale breaching shows line entanglement through mouth, around left pectoral flipper, with trailing towards tail.
Photo: Mark Girardeau. NMFS MMHSRP Permit #18786*

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Advancements in Photo Identification Analysis:

Through partnership between NOAA Fisheries, Cascadia Research Collective, and other entities, there has been significant development in “photo ID” analysis of entangled whales to learn more about their life histories and better understand which populations of whales are being impacted by entanglements. It is anticipated that useful results will be forthcoming in 2019 and beyond.

Forensic Data Workshop: In August 2018, the Pacific States Marine Fisheries Commission and NOAA Fisheries hosted a workshop in Long Beach, California, with U.S. West Coast fishermen, whale entanglement responders, scientists, and gear experts to review and discuss the collective knowledge and available forensic data surrounding U.S. West Coast whale entanglements, including the types of gear involved and the nature of how that gear is entangled on or around whales. The overall goal of the workshop was to enhance the collective understanding of common characteristics of whale entanglements that can be used to better understand and address U.S. West Coast entanglements in federal, state, and tribal fixed gear fisheries (<http://habitat.psmfc.org/preventing-whale-entanglement/>). Although forensic information from many reported entanglements is minimal, the group reviewed the forensic work done by NOAA Fisheries to date and discussed a number of ideas that have potential for reducing entanglements and/or

improving our ability to understand the underlying nature of entanglements and how to avoid them.

Trainings and Partnerships: NOAA Fisheries continues to develop and increase the capacity to respond to entanglement reports along the U.S. West Coast by conducting training for responders at various levels and building partnerships with interested stakeholders. During 2018, over 25 trainings were conducted by NOAA Fisheries and/or Network partners in California, Oregon, Washington, and British Columbia (boaters who are active in transboundary waters) with approximately 500 people trained at the basic levels (Levels 1 and 2) of our Large Whale Entanglement Response Program. NOAA Fisheries conducted classroom and on-water trainings in San Diego, Dana Point, Los Angeles Harbor, Santa Barbara, Monterey, and San Francisco. Additionally NOAA Fisheries and The Nature Conservancy collaborated to create an online Entanglement Response 101 Training to educate boaters and other ocean users on what to do if they encounter an entangled whale, including reporting and documentation protocols, and with a focus on ensuring safety and minimizing risks to both themselves and the whale (https://west-coast-training.whaledisentanglement.org/#/?_k=zwg4h). In Washington and Oregon, over 20 individuals participated in our advanced (Level 3) training during 2018.

How do I learn more about whale entanglements?

Large Whale Entanglement Response Network:

www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/disentangle_network.html

Whale & Fisheries Interactions:

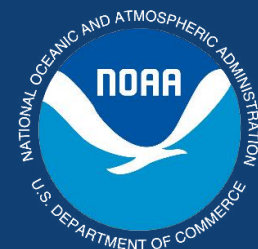
www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/fisheries_interactions.html

Best Practices Guide for Crab Fishing:

http://www.opc.ca.gov/webmaster/_media_library/2016/08/Best_Practices_Guide_Final.pdf

Fixed Fishing Gear Guide:

www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/fixed_gear_guide_final_12.14.11.pdf



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How to Report an Entangled Whale

The public plays an important role in saving distressed whales, like those that become entangled. Prompt reporting and monitoring of the animal are the best ways to help.

You can report whales in distress to either:

**The 24/7 reporting hotline:
1-877-SOS-WHAlE (767-9425)**

or

**The United States Coast
Guard on VHF CH-16**

Entangled whales are unpredictable and potentially dangerous. Please keep a safe distance and do not approach the animal. You can continue to monitor the animal's condition and document the encounter while waiting for a response team to arrive.

What to include in your report

1. Location of the animal;
2. A detailed description of the color and gauge of rope;
3. Location of gear on the whale;
4. Color and size of buoys;
5. Direction of the whale's movement, including whether it is solitary or with a group;
6. Behavior of the whale, including whether it is surfacing or diving, and the length of dive times;
7. Species of whale; and
8. Size and condition of the whale.

Documentation in the form of photos and videos of the entangled whale can provide valuable information to the responders and resource managers. The information from each whale entanglement contributes to our larger knowledge-base and can be a valuable tool in helping to prevent future entanglements.



Gray whale (*Eschrichtius robustus*) 39-46 feet



Humpback whale (*Megaptera novaeangliae*) 40-60 feet



Fin whale (*Balaenoptera physalus*) 75-85 feet



Blue whale (*Balaenoptera musculus*) 88-108 feet



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