



**NOAA
FISHERIES**

**WEST
COAST
REGION**

2017 West Coast Entanglement Summary

Overview of Entanglement Data

In 2017, a total of 31 whales were confirmed entangled off the coasts of Washington, Oregon, and California, as well in Mexico with gear from U.S. fisheries. An additional 10 animals were reported entangled but not confirmed. Reports were determined to be confirmed based upon documentation submitted, follow-up sightings, and entanglement response information provided to the NOAA Fisheries West Coast Region Protected Resources Division.



NMFS MMHSRP Permit #18786-01

Aerial photograph of an entangled gray whale with gillnet wrapped around tail fluke in Orange county, California. Photo: Frank Brennan, NMFS MMHSRP Permit #18786-01

Humpback whales continue to be the most common species entangled with 16 separate entanglements confirmed in 2017 and an additional three unconfirmed reports. Similarly, there were 12 gray whales confirmed entangled with an additional five unconfirmed reports. There were also three entangled blue whales confirmed and two unconfirmed reports of entangled whales of unidentified species. We also note that two of the confirmed entanglements involved whales that were found dead (both gray whales), while all other reports were associated with live individuals.

Entanglements were reported throughout the year, but the highest number of cases was reported in April with eight confirmed cases. Of the 31 confirmed whale entanglements with U.S. gear, 26 were reported off California, three off Washington, one off Oregon, and one off Baja Mexico.

However, the location where entangled animals are observed and reported does not necessarily reflect where and when an entanglement originated. For example, in 2017, an entangled humpback whale first reported off Mexico was entangled with gear associated with California State Dungeness crab recreational gear, and Washington State Dungeness crab gear was removed from another humpback whale in southern California. Animals can remain entangled for many weeks, months, or even years, and still remain capable of traveling great distances. Higher reporting rates in California may reflect higher sighting rates of whales off the coast of California even when the entanglement event may have originated elsewhere. More sightings may occur in locations preferred by both humans and whales like Monterey Bay, where there is a high level of human activity (e.g., recreation and whale watching) combined with an area frequented by whales feeding or migrating close to shore.

2017 West Coast Whale Entanglement Summary

Comparing Entanglements in 2017 to Past Years

Figure 1 shows the annual number of confirmed whale entanglements, by species, for the years 2000 to 2017. The number (or “n”) of confirmed entanglements in 2017 was lower than the historic highs of 2015 (n=50) and 2016 (n=48), but still represents a significant increase compared to pre-2014 levels when the average was less than 10 confirmed entanglements per year. Figure 2 shows the annual number of all known cases (confirmed and unconfirmed reports). Table 1 shows the total number of confirmed and reported whale entanglements by species and by month in 2017. Entanglement reports were received every month except May. Gray whale entanglements were reported primarily in the winter and spring months, while humpback and blue whale entanglements were primarily reported in the summer and fall months. These trends generally reflect the annual migrations of these species to and from breeding and foraging grounds.

Gray whales migrate from their summer foraging grounds in Alaska during the fall months past the U.S. West Coast to their wintering grounds in Mexico. They spend November through February breeding and giving birth. They return to their Alaskan

feeding grounds from February to June. Most Eastern North Pacific humpback whales and blue whales migrate south from summer foraging grounds that include the U.S. West Coast to their winter breeding grounds in Mexico and Central America in the fall months. However, some individuals of both species may be found off the U.S. West Coast at any time throughout the year.

In comparison to the last several years, fewer humpback whale entanglements were reported and confirmed in 2017, but a larger number of gray whale entanglements was reported and confirmed. A small number of blue whales were confirmed entangled in 2017 for the third year in a row.

The increased and variable levels of reported entanglements during the last few years, especially of humpback whales, likely 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. Developing a more complete understanding of how these dynamics are interacting and affecting entanglement risk and reporting is an area of active research.

Table 1. Total 2017 U.S. West Coast whale entanglement reporting activity (confirmed and not confirmed) by month and species (unconfirmed reports are listed in parentheses).

Month	HUMPBACK	GRAY	OTHER	TOTAL
JANUARY	1	1	0	2
FEBRUARY	0	0 (2)	0	0 (2)
MARCH	0	3 (2)	0	3 (2)
APRIL	1	6 (1)	0	7 (1)
MAY	0	0	0	0
JUNE	3 (1)	0	1 blue	4 (1)
JULY	3	0	0 (1 unidentified)	3 (1)
AUGUST	2 (1)	0	1 blue (1 unidentified)	3 (2)
SEPTEMBER	2	0	1 blue	3
OCTOBER	2 (1)	0	0	2 (1)
NOVEMBER	1	1	0	2
DECEMBER	1	1	0	2
TOTAL	16 (3)	12 (5)	3 (2)	31 (10)

Data reported in Table 1 and Figures 1 and 2 do not include reports we determined were re-sightings of an entangled whale previously reported, which is a common occurrence. Photo identification during re-sightings is used to help understand the dynamic nature of the injuries that can result from entanglements and changes in the animal's health condition over time. It can also provide information on the impact of entanglements on animal survival, behavior, and migrations while entangled or afterwards.

2017 West Coast Whale Entanglement Summary

Figure 1. Confirmed U.S. West Coast whale entanglements by year and whale species, 2000 to 2017.

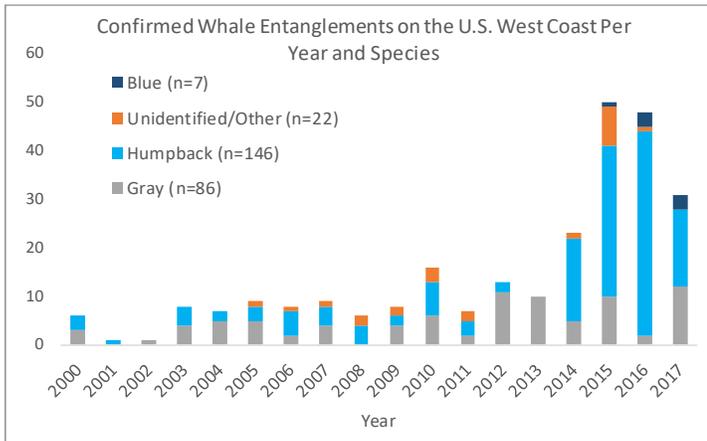
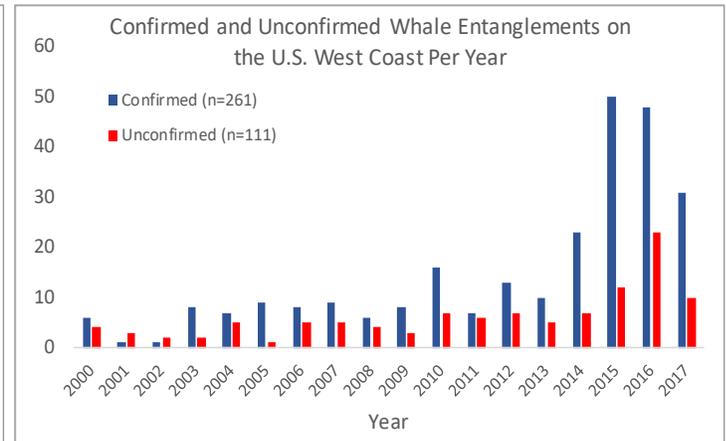


Figure 2. Confirmed and unconfirmed reported U.S. West Coast whale entanglement cases by year, 2000 to 2017.



Sources of Entanglement

In 2017, 14 of the 31 confirmed entanglement cases 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.

Table 2. Confirmed sources of whale entanglements in 2017.

FISHERY	NUMBER OF REPORTS
California Dungeness crab commercial trap fishery	5 (1 gray, 3 humpbacks, 1 blue)
California Dungeness crab recreational trap fishery	1 (1 humpback)
Washington Dungeness crab commercial trap fishery including tribal fisheries	3 (1 gray, 2 humpbacks)
Sablefish/coonstripe shrimp commercial trap fishery*	1 (1 humpback)
Gillnet fisheries**	4 (4 gray)

*Gear from both fisheries involved in the same single entanglement

**Several additional entanglements involved gear that may have been associated with nets of some variety but could not be identified



Winnie Mulé MMHSRP Permit 18786

Entangled humpback whale trailing lines and buoys. Photo: Wendy Mulé, NMFS MMHSRP Permit #18786

2017 West Coast Whale Entanglement Summary

Entanglement Response and Outcomes

Of the 31 confirmed entanglements, 29 involved live animals and two were dead animals that did not require a disentanglement response, but were investigated by the NOAA Fisheries West Coast Region Large Whale Entanglement Response Network. Of the 29 confirmed cases of live animals, 14 (nine humpback and five gray whales) included a response initiated by this network. During one of these responses, the entangled humpback whale was not re-sighted. The West Coast Region Marine Mammal Stranding Network also responded and conducted necropsies of two dead gray whales that were entangled and stranded along the West Coast. In one case the gear was identified to the Washington Dungeness crab fishery, but in the other case the gear was not identifiable. There were also three unconfirmed reports of gray whale entanglements where a response effort was initiated but the reported entangled whale was not re-sighted or confirmed.

Entanglement response does not always include attempts to disentangle whales even when entangled whales are successfully re-sighted. In 2017, there were four cases (two humpback and two gray whales) where entangled whales were re-sighted and evaluated by a response team but no disentanglement effort was conducted due to various factors including weather, time of day, and resource availability at the time of response.

Of the 29 confirmed cases of live animals, the immediate outcome of the entanglement and response was known in nine instances. A summary of the results is listed below:

Full Disentanglement: There were three cases of entangled humpback whales that were fully released from gear by response teams.

Partial Disentanglement: There were five cases (two humpback and three gray whales) where some, but not all, of the gear was removed from the whale by response teams.

Self-release: There was one case where a humpback whale appeared to free itself from entanglement.

Unknown: There were 20 confirmed cases where the outcome of the entanglement is unknown beyond what was initially reported.



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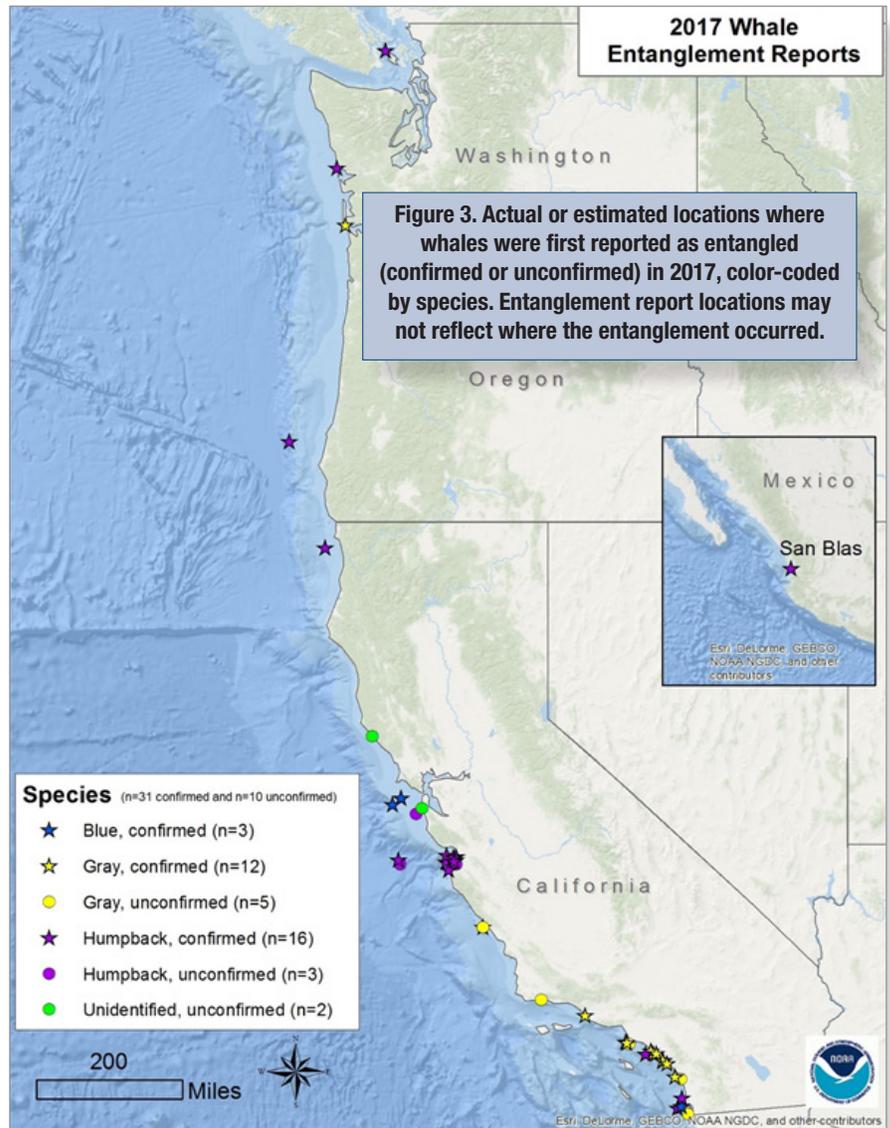
A humpback whale entangled in fishing gear surfaces for air about two miles off Crescent City, California. Disentanglement teams worked with local fishermen and others to free the whale on Tuesday July 19, 2017. Photo: Bryant Anderson, NOAA Fisheries, NMFS MMHSRP Permit #18786-01

2017 West Coast Whale Entanglement Summary

Geographic Location of Entanglement Reports in 2017

Reports of entangled whales originated from throughout the U.S. West Coast in 2017, but were concentrated in central and southern California. Gray whale entanglement reports were most common in southern California, whereas humpback whales were most common off central California (Figure 3). A summary of the results is listed below:

- 45 percent (n=14) of all confirmed cases originated from southern California (Santa Barbara, Los Angeles, Orange, and San Diego Counties)
 - Four unconfirmed reports originated from southern California
- 35 percent (n=11) of all confirmed cases originated from central California (Marin, Monterey, San Francisco, San Mateo, San Luis Obispo, and Sonoma Counties)
 - 26 percent (n=8) of all confirmed cases were from Monterey County
 - Six unconfirmed reports originated from central California
- 19 percent (n=6) of all confirmed cases originated from northern California, Oregon, and Washington
- No unconfirmed reports originated from northern California, Oregon, and Washington



NOAA researcher Scott Benson maneuvers to cut line from whale. Photo: Wendy Mulé, NMFS MMHSRP Permit #18786

2017 West Coast Whale Entanglement Summary

2017 Developments of Interest

- Entangled blue whales were confirmed again in 2017, suggesting that the blue whale entanglements reported in 2015 and 2016 may not be anomalies.
- In July 2017, a challenging but successful disentanglement of a humpback whale was coordinated and conducted by responders with substantial assistance and cooperation from commercial fishermen in Crescent City, California. This event highlights the opportunity for NOAA Fisheries and fishing communities to work together to respond to large whale entanglements.
- In 2017, Oregon Sea Grant convened a multi-stakeholder working group to start developing options for reducing the risk of whale entanglements in Dungeness crab and other fixed gear in Oregon (<http://extension.oregonstate.edu/clatsop/oregon-whale-entanglement-working-group>). Stakeholders in Washington also met in November of 2017 to discuss the current state of the entanglement issue and gauge interest in convening a similar working group in 2018. The broad range of activity surrounding whale entanglements that occurred in 2017 reflects the growing awareness and significance of this issue along the U.S. West Coast.

Addressing the Issue

- In 2017, the California Dungeness Crab Fishing Gear Working Group initiated a pilot Risk Assessment and Mitigation Program. The Program supports the California Department of Fish and Wildlife in working collaboratively with experts (fishermen, researchers, non-governmental organizations, etc.) to assess ongoing levels of entanglement risk during the Dungeness crab fishing season and evaluate the need for management action to reduce risks. In 2017 this Working Group issued an updated *Best Practices Guide to Minimizing Whale Entanglement Risk in the California Dungeness Crab Fishery*. More information is available online: <http://www.opc.ca.gov/whale-entanglement-working-group/>
- In March 2017, the Pacific States Marine Fisheries Commission hosted a workshop in Portland, Oregon, with U.S. West Coast fishermen and other stakeholders. Participants reviewed the state of worldwide knowledge for reducing whale entanglements in fishing gear and discussed possible gear and fishery innovations to reduce future whale entanglements in U.S. West Coast fisheries (<http://www.psmfc.org/crab/2016-2017index.html>). While there are no clear-cut solutions readily available or easily implemented at this time, participants discussed their interest in testing and developing ideas to reduce entanglement risks in U.S. West Coast fisheries.
- In 2016, NOAA Fisheries granted the Washington Department of Fish and Wildlife funds through Section 6 of the Endangered Species Act (<http://www.nmfs.noaa.gov/pr/conservation/states/grant.htm>) to evaluate increased human interactions with humpback whales off the U.S. West Coast, specifically ship strikes and entanglements in Dungeness crab fishing gear using a variety of research methods and data collection tools. Research under this grant will continue through 2018. Some results of tagging studies on whale behavior and photo identification data collected under this grant have already contributed to various discussions and activities addressing the entanglement issue across the U.S. West Coast, including assisting the California Dungeness Crab Fishing Gear Working Group efforts to evaluate risk factors associated with whale distributions under their pilot program.
- NOAA Fisheries continues to develop and increase the capacity to respond to entanglement reports throughout the U.S. West Coast by conducting training of responders at various levels and building partnerships with interested stakeholders to enhance the capabilities of the West Coast Region Large Whale Entanglement Response Network. During 2017, over 25 trainings were conducted in California, Washington, and British Columbia for boaters who are active in transboundary waters with approximately 500 people trained at the basic levels of whale entanglement response. In Washington, Level 3 entanglement response training and additional response network development was conducted with 45 responders during six different meetings.



Entangled gray whale photographed April 1, 2017. The source of the entanglement is unknown, but appears to be a metal frame. Photo: Michael White, NMFS MMHSRP Permit #18786-02

Efforts to Conserve Whales & Reduce Entanglements

Protecting Whales from Entanglements

NOAA Fisheries is engaged in a number of activities to minimize whale entanglements. We are:

- actively raising awareness about the importance of the quality of information needed in an entanglement report;
- expanding the capability of permitted organizations to respond to entanglements;
- collaborating with the California Department of Fish and Wildlife, commercial and recreational crab fishermen, and non-governmental organizations, to develop and evaluate ways to minimize entanglements in the California crab fishery, including refining a “Best Practices Guide” for fishermen that can be used coast-wide;
- working with states of California, Oregon, and Washington, as well as stakeholders to establish priorities for future evaluation of entanglement risk in particular fisheries and fishing gear;
- providing scientific expertise on all known or suspected sources of entanglements, exploring when, where, and how entanglements are occurring, and evaluating the available information on entanglements to determine the impacts on humpback whale populations; and
- developing a better understanding of how environmental conditions influence the vulnerability of whales to entanglements.



Humpback whale. Photo: Robert Pitman, NOAA



Entangled humpback whale, off of Huntington Beach, California. Photo: NMFS MMHSRP Permit #1878601

Management Considerations

Each year, the distribution of whales off the West Coast can shift based on a variety of biological and environmental conditions. Whales typically undertake regular migrations between feeding and breeding areas. Environmental conditions will also vary and influence the distribution of prey species (e.g., krill and small fishes) the whales need. This may bring the whales into areas that may or may not be used by fisheries, and could lead to greater or fewer chances of entanglements. The annual abundance and distribution of whales informs management efforts, and NOAA Fisheries considers all of this information, along with data collected on entangled animals, in its effort to protect whales from entanglements.

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.

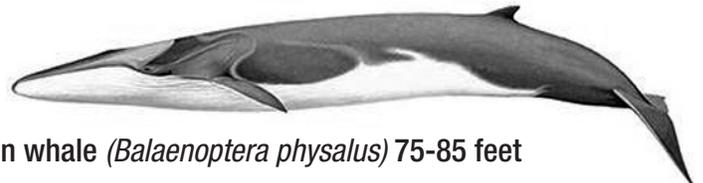
Documentation in the form of photos and videos of the entangled whale can provide valuable information to the responders and resource managers. The information from each whale entanglement contributes to our larger knowledge-base and can be a valuable tool in helping to prevent future entanglements.



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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