



**NOAA
FISHERIES**

**West Coast
Region**

Understanding U.S. west coast whale entanglements

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California Dungeness Crab Task Force Meeting

October 17, 2017

Ukiah, CA

The concern

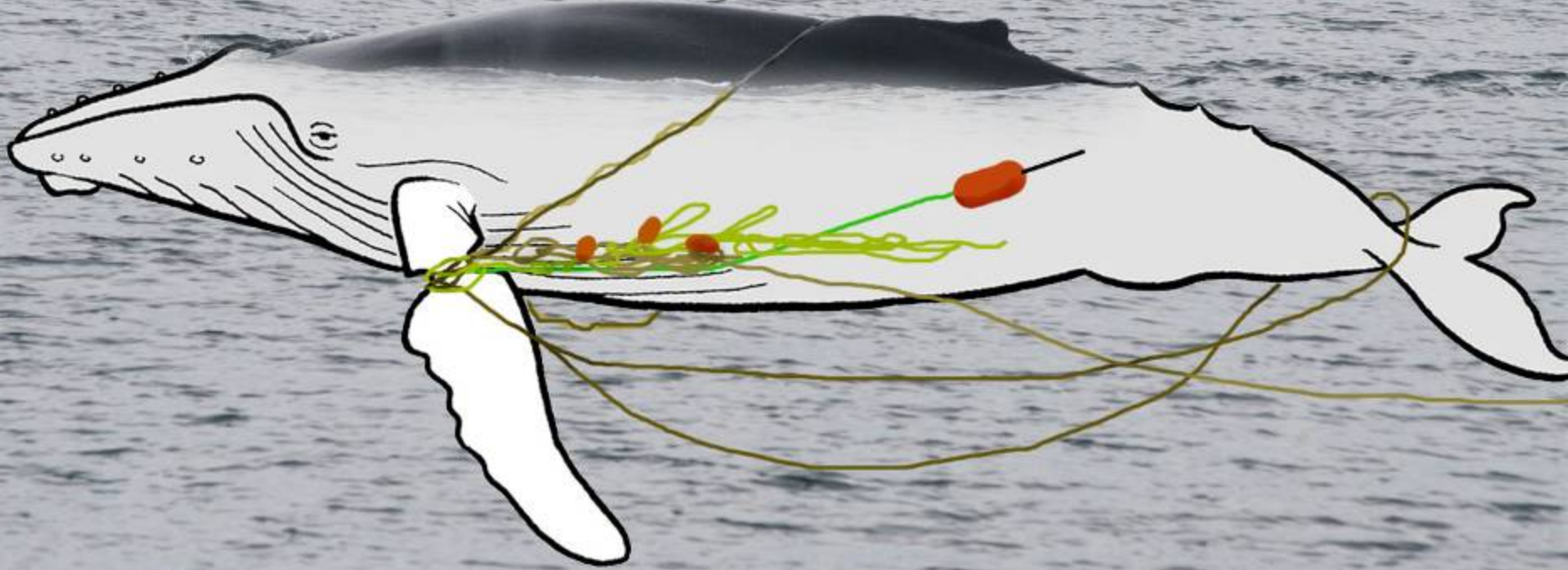
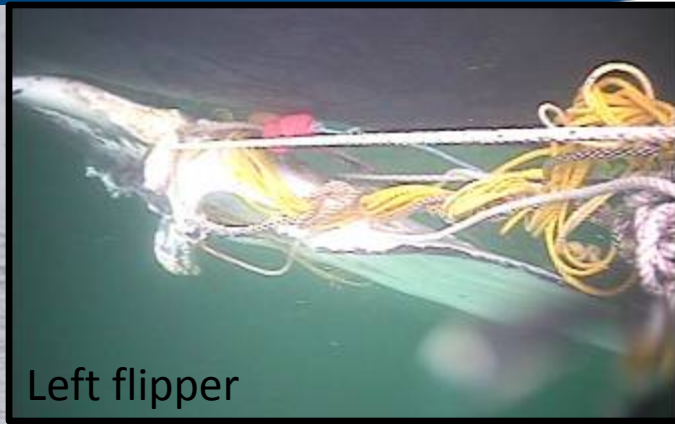
- Entanglement of marine mammals in fishing gear is a global problem
- NMFS has identified large whale entanglement in fishing gear along the US West Coast as a priority management issue
- Entanglement reports
 - Opportunistic sightings from a variety of sources
 - Underestimate of total entanglements (emaciated whales sink quickly)
 - Gap in identification of whale species & gear involved
- **365 whales reported entangled between 2000 and October 2017**
(California, Oregon, and Washington)
 - 179 Humpback whales, 116 Gray whales, 8 Blue whales, 6 Fin whales, 2 Minke whales, 2 Sperm whales, 2 Killer whales, and 50 Unidentified species

What you see above the water . . .



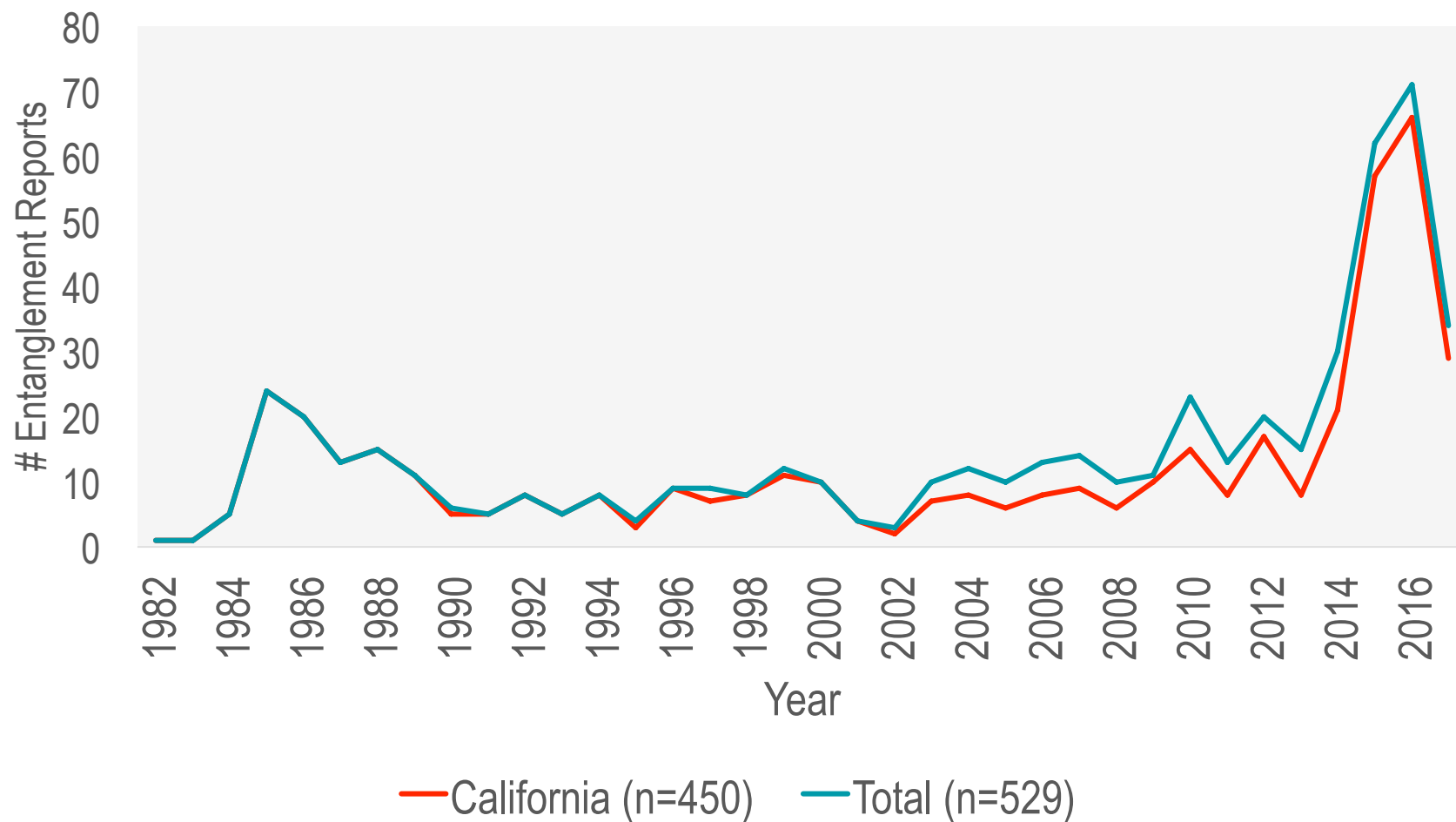
Provincetown Center for Coastal Studies. WR-2009-09. Taken under NOAA permit 932-1489.

What is really happening . . .



Long term trend of whale entanglement reporting

All Whale Entanglement Reports 1982- October 2017



2017 whale entanglement numbers

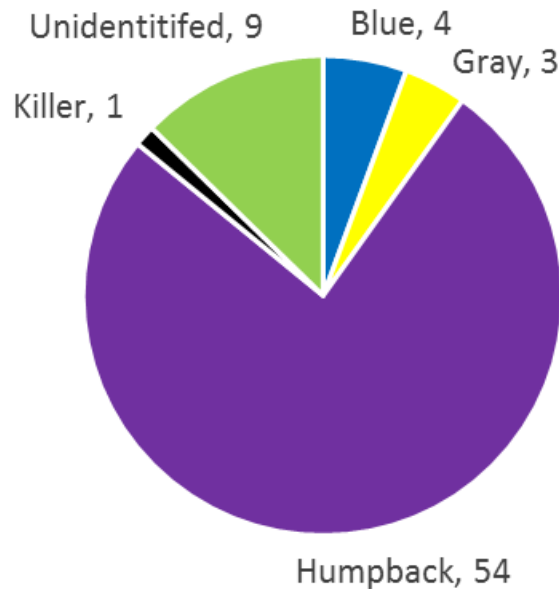
Updated: 10-10-17 ***Data is preliminary and has not been formally reviewed by NMFS***

- **34 whale reports**, 25 confirmed
 - 50 total reports including 16 resights
- **15 gray whales** (9 confirmed), **15 humpback whales** (12 confirmed), **3 blue whales** (3 confirmed), and **1 unidentified**
- 29 whales reported in California (22 confirmed), 1 in Oregon (unconfirmed), 3 in Washington (2 confirmed), and 1 in Mexico (confirmed)
- **Fisheries**
 - CA Dungeness crab commercial: **4**; 1 Gray (January), 2 Humpback (April, June) and 1 Blue (June)
 - CA Dungeness crab recreational: **1**; 1 Humpback (January, from 2016)
 - WA Dungeness crab commercial: **2**; 1 Gray (April), 1 Humpback (July)
 - WA Dungeness crab Tribal: **1**; 1 Humpback (September)
 - Sablefish + Coonstripe shrimp: **1**; 1 Humpback (July)
 - Gillnet: **4**; 4 Gray (1 confirmed in April, 3 suspected in March)*
 - Balloons: **1**; 1 unidentified whale



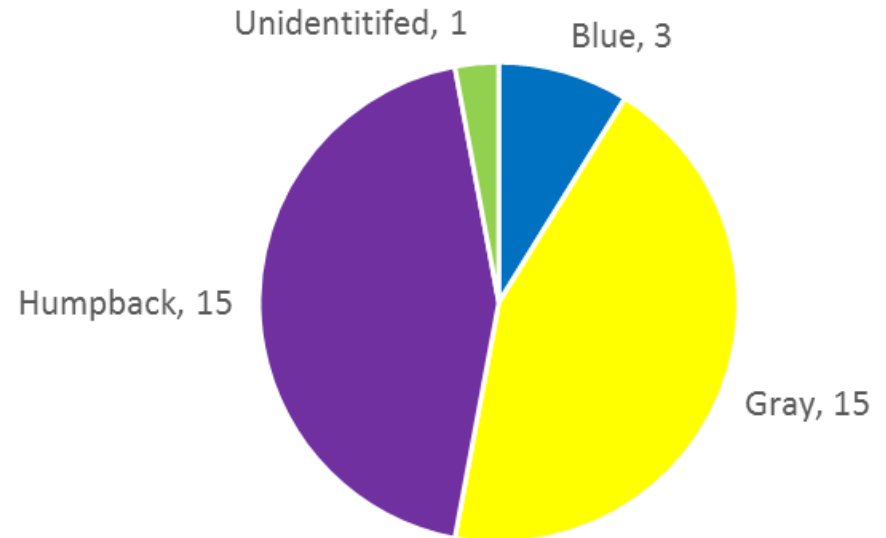
What whales are being reported as entangled?

2016 whale entanglements by species



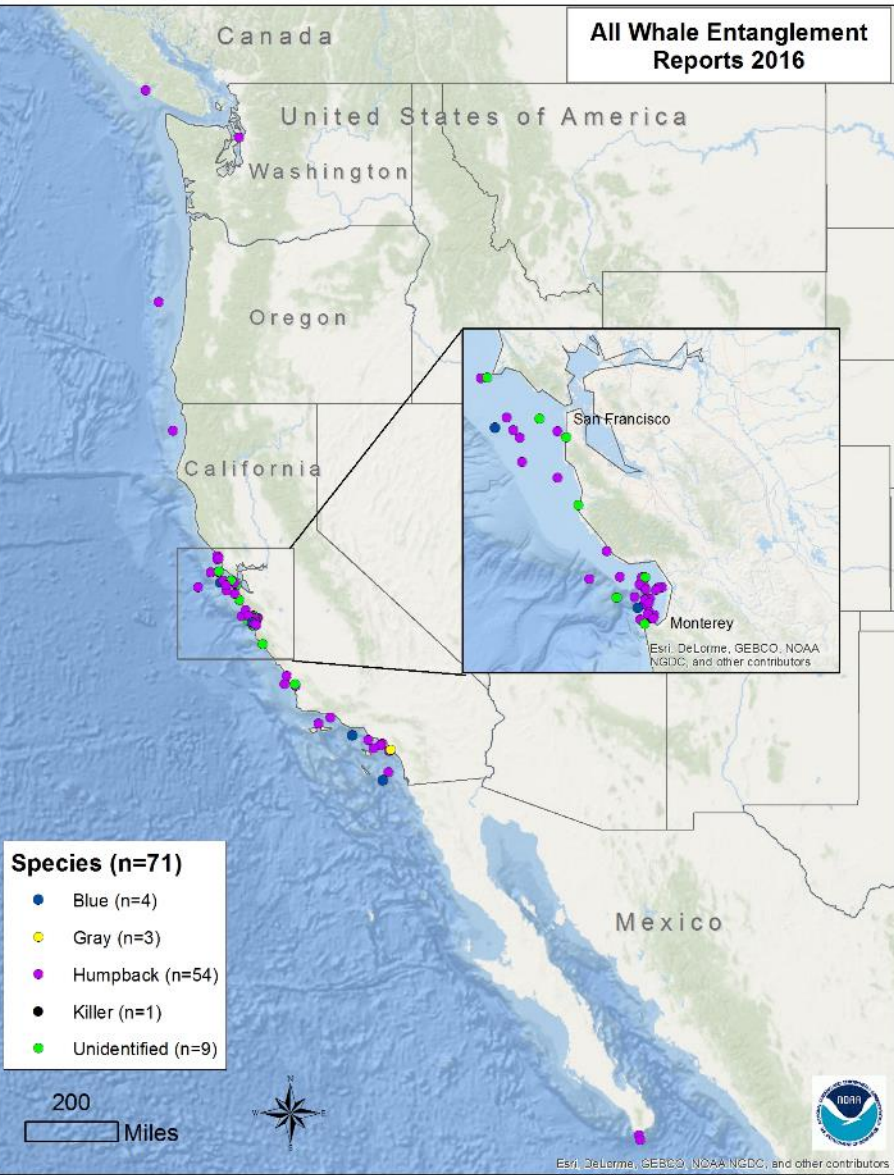
n=71

2017* whale entanglement by species

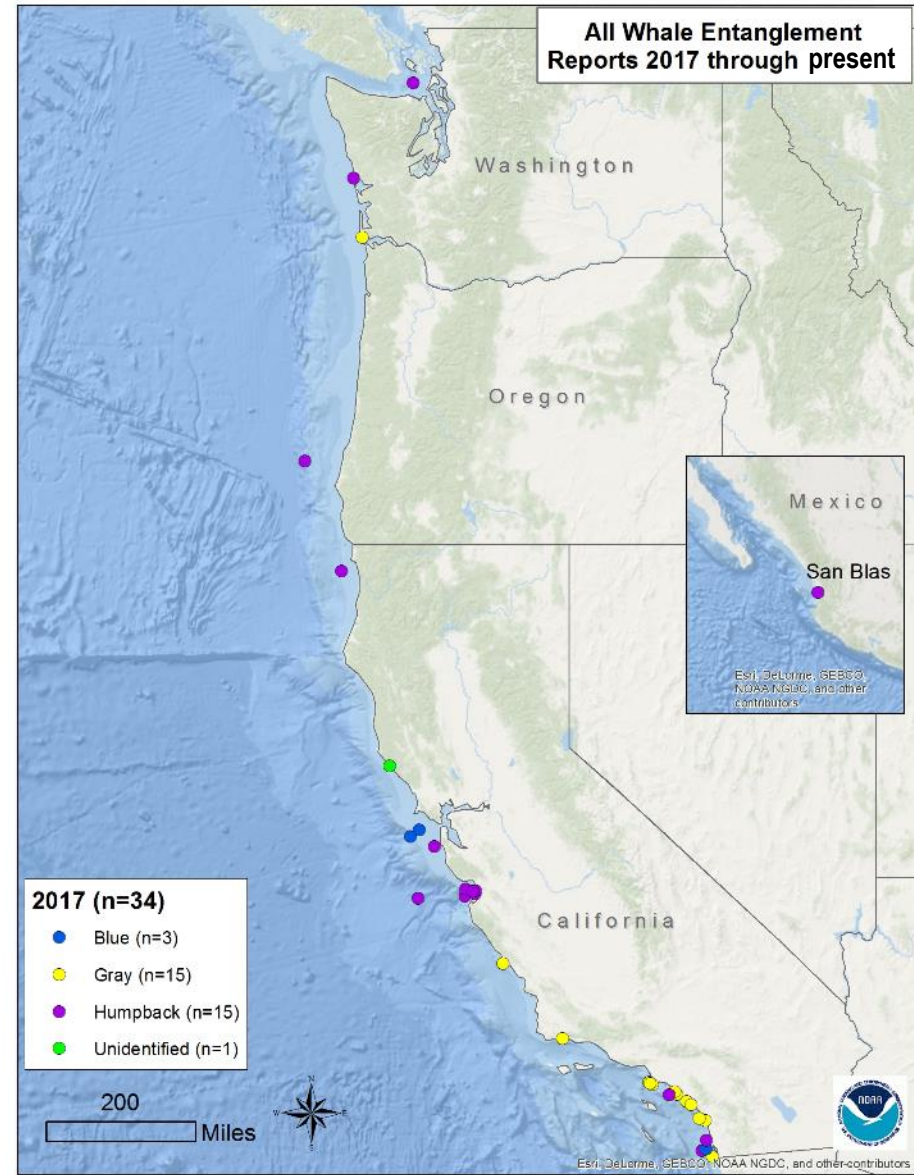


n=34 * through present

All Whale Entanglement Reports 2016

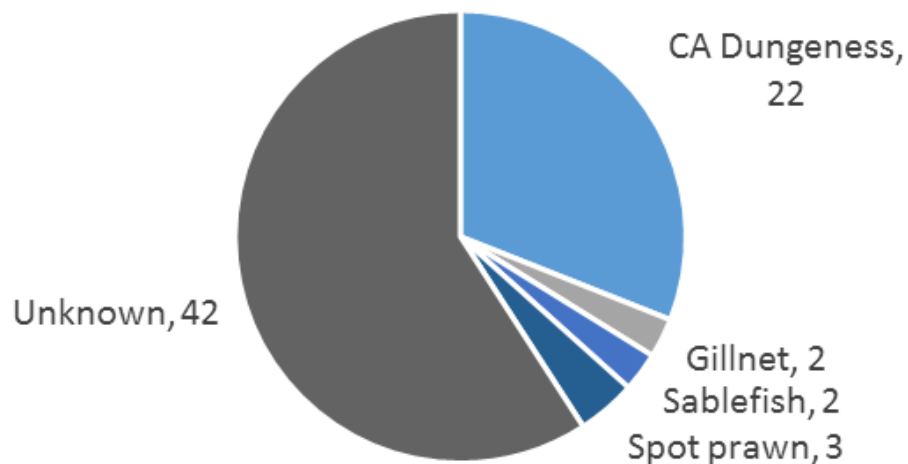


All Whale Entanglement Reports 2017 through present

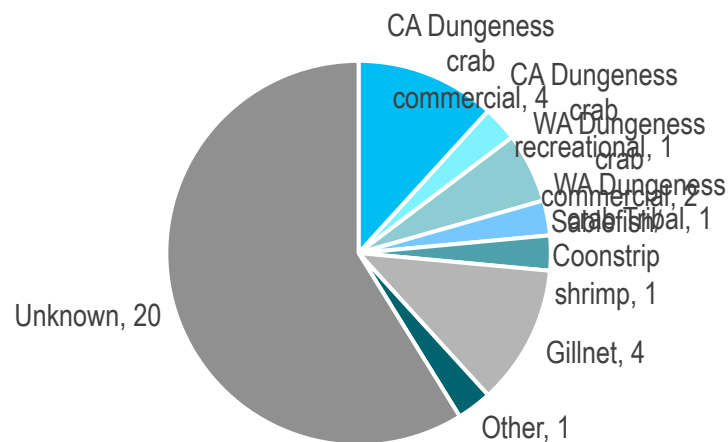


Sources of entanglements 2016 and 2017

2016 Confirmed fishery gear type



2017 confirmed fishery gear type



Dungeness crab entanglements- historic summary

	CA comm.	CA rec.	OR comm.	OR rec.	WA comm.	WA rec.	WA tribal	State unk
2003	1 gray	0	1 gray	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	1 humpback	0	0	0	1 gray	0	0	0
2006	0	0	1 gray	0	1 gray	0	0	1 humpback
								1 gray, 1 humpback, 1 unknown
2007	0	0	0	0	0	0	0	
								1 humpback, 1 unknow
2008	1 humpback	0	0	0	1 humpback	0	0	
2009	0	0	0	0	0	0	0	0
			1 humpback, 1 gray	0	2 humpback	0	0	1 humpback
2010	0	0	0	0	0	1 humpback	0	0
2011	0	0	0	0	0	0	0	0
2012	2 gray	0	1 gray	0	0	0	0	0
2013	3 gray	0	0	0	0	0	1 gray	0
2014	2 humpback	0	1 humpback	0	0	0	0	1 humpback
	1 gray, 1 orca,							
2015	7 humpback	1 humpback	2 humpback	0	0	0	0	0
	1 orca, 2 blue,							
2016	19 humpback	0	0	0	0	0	0	0
	1 blue, 1 gray,				1 gray, 1 humpback			
2017	2 humpback	1 humpback					1 humpback	



*2017 not formally reviewed
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What we know

- NMFS West Coast Region is receiving an **increasing number of whale entanglement reports (especially Humpbacks)**
 - Potentially contributing factors: increased outreach/awareness, changing distributions of whales and fishing effort (Environmental? Economic?)
- **Blue whales** are being reported as entangled! None reported prior to 2015
- Recent (2015-16) increase in entanglements reported in **central California (Whale hotspot? Local Awareness?)**
- Whales can carry gear for long distances



What we know (continued)

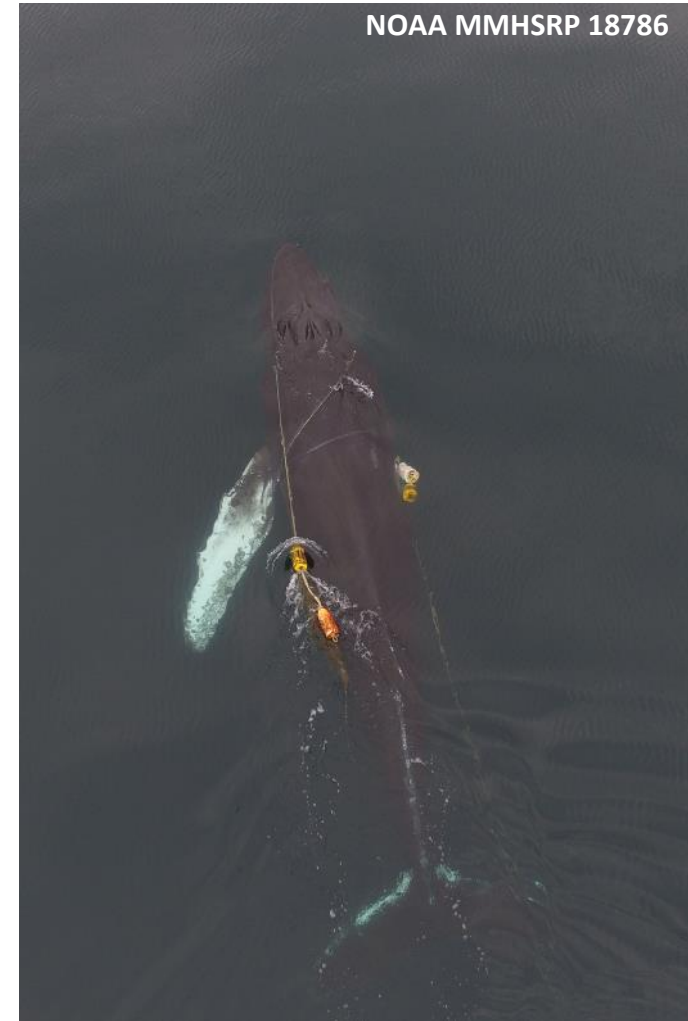
- More detailed documentation/better reporting and increasing response in recent year has **increased ability to identify gear (along with trap tags)**, but still limited
- **Trap/pot fisheries** are being identified as the majority entangling gear (of identified gear types); **commercial Dungeness crab gear** has the highest confirmed entanglement reports
- Dungeness crab is the largest trap fishery off the west coast with the highest number of participants and number of traps/lines:
 - Potential overlap with whale distribution and extent of gear in water
- Whales are getting entangled every way possible, in all types/colors of line – not likely to be one easy fix to solve all problems



What we don't know (data gaps)

Entanglement Data

- Identifying entanglement origins
 - Fishery
 - Locations (site of first entanglement)
 - Timing (where to focus management and research efforts)
- Understanding configurations of gear involved in entanglements
- Knowing the total # of entanglements that occur
- Understanding how whale behavior and gear configuration could make an interaction become an entanglement
- Understanding outcomes of entanglements (long term survival, serious injuries, impacts of reproduction)



What are we (NMFS) doing?

- **Extensive outreach** across the west coast; response training
- **Supporting initiatives** such as the California Dungeness crab Whale Entanglement Working Group (started in 2015)
 - Develop recommendations for industry and management (e.g. Best Practices Guide)
 - Promote gear research, enhanced data collection analysis
- **Review/analysis of whale entanglement documentation**
- Working to **provide/facilitate scientific expertise and developing tools** that can be used by industry, States, others, to help understand and address this issue (e.g. whale models)
- **Funding** (BREP)





Questions?

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For more information, please visit:

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

Where are entanglements reported?

Note: where entanglement were reported is often not where the whale became entangled

State/Region	1982-2013	2014	2015	2016
BC Canada	0	0	0	1*
WA	30	3	3	0
OR	24	6	1	1
CA	278	22	57	66
Mexico	3	0	0	2*

* Indicates that the entanglement involved gear that was confirmed to be from U.S. Dungeness crab fisheries



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Comparing 1982-2013, 2014, 2015 and 2016:

Whale entanglement reports by month

	Humpback			
Month	82-13	2014	2015	2016
January	1	0	2	1
February	1	0	2	2
March	1	0	1	1
April	1	1	0	6
May	11	3	4	8
June	4	3	5	10
July	7	1	5	1
August	20	2	2	12
September	4	7	6	3
October	8	2	6	6
November	5	1	2	1
December	3	0	0	3

	Gray			
Month	82-13	2014	2015	2016
January	26	1	0	0
February	20	0	2	1
March	53	0	4	0
April	50	1	0	2
May	22	2	1	0
June	7	0	0	0
July	9	1	1	0
August	9	0	1	0
September	3	2	2	0
October	4	0	0	0
November	2	0	0	0
December	4	0	1	0

Confirmed Dungeness crab entanglements by month

Month	2014	2015	2016	Total
January	0	1	0	1
February	0	1	0	1
March	0	1	0	1
April	1	1	4	6
May	1	2	4	7
June	1	2	5	8
July	0	1	2	3
August	1	0	4	5
September	0	1	0	1
October	0	1	0	1
November	0	0	1	1
December	0	0	2	2



Comparing report and gear set locations

- 2015 Dungeness crab entanglements:
 - 5 cases with similar report and gear set locations
 - 2 cases with long distance between report location and gear set location (gear from Oregon reported on whales in California)
 - 4 cases with unknown set locations (assumed set within California since it had a CDFW tag)
- 2016 Dungeness crab entanglements:
 - 5 cases with similar report and gear set locations
 - 3 cases with long distance between report location and gear set location (California gear seen on whales in Canada and Mexico)
 - 2 cases with long distances between gear set and report location, within the same state
 - 12 cases with unknown set locations (assumed set within California since it had a CDFW tag)



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What we don't know (data gaps)

Whale data

- Precise understanding of seasonal/annual variability in whale presence and abundance along the west coast, including factors that influence that variability

Fishery Data

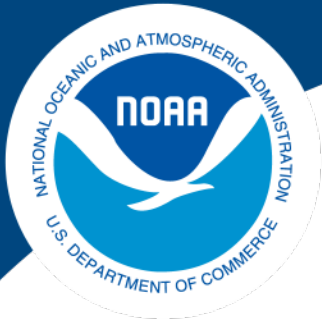
- Precisely where and when (spatial and temporal) crab gear is distributed across the west coast, along with factors that influence variability
- Knowledge of how crab gear is configured across the west coast
- General knowledge of recreational crab fishery

Solutions

- Effectiveness of ideas to reduce risk to are not necessarily clear
- Evaluation of innovations in terms of reducing entanglements may be difficult
 - Require time and coordination across west coast



Preliminary break down of reports where gear type is listed as “Unknown”



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- 2017: 20 reports (of 34) ➡ 2016: 42 reports (of 71)

- *Not formally reviewed*

- Unknown: 3
- Buoy only: 1
- Rope only: 9
- Rope + buoy(s): 4
- Rope + net: 1
- Metal frame: 1
- Scar only?: 1

- ➡ Unknown: 4
- ➡ Buoy only: 1
- ➡ Rope only: 2
- ➡ Rope + 1 buoy: 11
- ➡ Rope + 2 buoys: 11
- ➡ Rope + 3 buoys: 2
- ➡ Rope + polyball: 3
- ➡ Rope + 4-5 buoys: 3
- ➡ Rope + buoy+ high flyer: 1
- ➡ “crab pot”: 1
- ➡ Scar only maybe monofilament?: 3