WCR Whale Entanglements

- Dramatic increase in reports since 2014
- Driven by humpback whales, but now including blue whales
- High demand for updates and evaluation of incoming data
- Quality of reporting improving
Sources of Confirmed Whale Entanglements 2015-2017

**All whales**
- CA Dungeness crab commercial: 36
- CA Dungeness crab recreational: 12
- OR Dungeness crab commercial: 3
- WA Dungeness crab commercial*: 3
- CA Spiny lobster: 2
- Sablefish fixed gear: 2
- Sablefish & coonstripe shrimp: 1
- Spot prawn: 1
- Nets, including gillnet*: 3
- Unk: 2

**Humpback whales**
- CA Dungeness crab commercial: 30
- CA Dungeness crab recreational: 5
- OR Dungeness crab commercial: 3
- WA Dungeness crab commercial*: 1
- CA Spiny lobster: 2
- Sablefish fixed gear: 2
- Sablefish & coonstripe shrimp: 2
- Spot prawn: 1
- Nets, including gillnet*: 1
- Unk: 2

**Blue whales**
- CA Dungeness crab commercial: 4
- Unk: 3

**Gray whales**
- CA Dungeness crab commercial*: 1
- WA Dungeness crab commercial: 7
- Nets, including gillnet*: 2
- Unk: 14
2018 summary thus far
**considered preliminary, data through 5/29/2018**

- 16 confirmed entangled whales, 20 total reports
  - Gray whales: 10 confirmed, 12 total
  - Humpback whales: 5 confirmed, 6 total
  - Fin whales: 1 confirmed, 1 total
  - Unidentified: 0 confirmed, 1 total
- Confirmed fisheries associated with entanglements: 9 reports
  - Commercial Dungeness crab: 6 total
    - 3 WA (2 gray whales, 1 humpback whale)
    - 1 OR (1 gray whale)
    - 1 OR and CA (1 humpback)
    - 1 WA tribal (humpback whale)
  - Gillnet: 3 (gray whales)
- Reporting location
  - California: 10 confirmed reports, 14 unconfirmed
  - Washington: 6 confirmed reports
What we think is going on

- Complex relationship between whale distribution/abundance/behavior, environmental variability/prey distribution, fishing effort distribution, public awareness

- Better documentation and increasing response has **increased ability to identify gear (along with trap tags)**, but still limited

- **Trap/pot fisheries** identified as the majority entangling gear (when known); Dungeness crab fishery = large co-occurrence

- Whales are getting entangled every way possible, in all types/colors/arrangements of gear – not likely to be easy fix
What we don’t know (data gaps)

Entanglement Data

• Identifying entanglement origins (when/where to focus research/management)
• Knowing the total # of entanglements that actually 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)
Entanglement Mortality and Serious Injury – PRELIMINARY*

- 136 humpback whale entanglement records evaluated 2007-2016 (draft); ~94 M/SI = 69% M/SI rate

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<th>2017 draft SARs: average M/SI for 2011 - 2015</th>
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- Disentanglement “saved” ~13 humpbacks 2012-2016
- Blue whales: 1 M/SI in 2015; 3.5 in 2016 (draft)
What Other Issues Are Entanglements Creating?

- Management under MMPA – Potential Biological Removal for CA/OR/WA humpback whales is 11 seriously injured or killed per year; CA/OR/WA blue whales 2.3 seriously injured or killed per year
- Humpback and blue whales are protected by the ESA
- Public perception of entanglements and associated fisheries is unpopular – market concerns
- Increased pressure on disentanglement response – inherently dangerous and not a solution
What Can We Do To Reduce Entanglements?

- Reduce the co-occurrence of whales and fishing gear (and debris)
- Improve the gear to make it less likely to entangle whales (and other things)
- Improve the gear to make entanglements less severe and/or more likely whales can escape from gear
- Deterrence and Avoidance
- Get smarter – fill in knowledge gaps (e.g., gear marking)
Ecosystem Approach?

1A: Compile existing NOAA survey data on whale prey and whales (e.g., juvenile rockfish survey data, 2002-2016)

Identify and incorporate other existing whale data into model development and validation, including:
- Photo ID data
- Satellite tagging
- Aerial surveys
- Other data (e.g., whale watching)

1B: Extract existing oceanographic data and indices to match 1A.

1C: Forecast distributions of krill & forage fish

2: Fine-scale forecast of whale distribution and density


To validate and improve initial models

4. Analyze fishing effort data:
- PacFIN, logbook, VMS
- Build vertical line models

5: Risk Assessment / Management Strategy Evaluation

GOAL: Model outputs and forecasting tools for management (e.g., State entanglement working groups, Agencies, NMFS)

Partial progress on steps 1A, 1B, 1C and 2 in CA. These efforts are ongoing but will require some additional support for evaluation and improvement as new data sets become available.