



NOAA Fisheries MMHSRP permit #18786

Slater Moore



NOAA FISHERIES MMHSRP PERMIT # 18786-03

Serious Injury and Mortality of West Coast Whale Entanglements

Dan Lawson and Lauren Saez
NMFS West Coast Region
Protected Resources Division

West Coast Whale Entanglement SI/M

- Flow of information - report to WCR Marine Mammal Stranding Program to Entanglement Team to **SWFSC** (*SI/M assessment*) to public to SARs annually
- Criteria for SI – formal national guidance based on types of injuries reported
- Definition of SI – “more likely than not” to result in mortality, or any injury that presents a greater than 50 percent chance of death to a marine mammal.
 - Outcome of death not necessary to prove



NOAA Fisheries MMHSRP permit #18786



NOAA Fisheries MMHSRP permit #18786



NOAA FISHERIES

Utility of SI/M for Monitoring WCR Whale Entanglements

- Expectations for **future SI/M rates** of entangled whales for predicting the population-level impacts
- Preliminary expectations for entanglements as they occur to support **in-season actions** and/or spur implementation of new management measures
- Baseline of historic impact rates to monitor the **effectiveness of any management measures or changes in fishing practices** that are implemented
- Help **design new measures** to reduce the number or severity and outcomes of entanglements



NOAA Fisheries MMHSRP permit #18786

Julia O'Hern | Sea Goddess Whale Watch

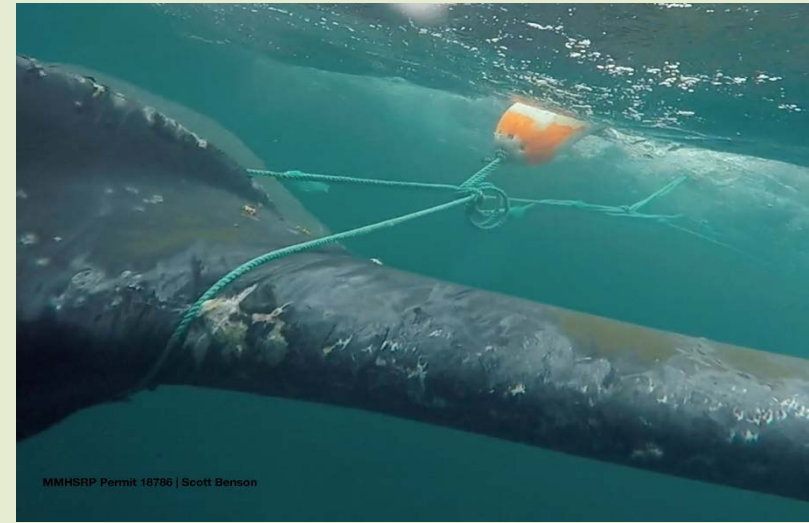
Analysis of Assigned SI/M for WCR Whale Entanglements

- 219 confirmed entanglements (ents.) reported from 2013-2018 (SI/M from Carretta et al. 2019, 2020, Delean et al. 2020)
 - 146 humpbacks, 52 grays, 7 blues, 3 fins, 11 unid., 2 transient killer whales
- Straight forward steps:
 - Define a category (e.g., all humpback whales in Dungeness crab gear)
 - Add up assigned SI/M (initial and final)
 - Calculate a “rate” for each category
 - All cases (SI/M rate) vs live whales (SI rate)
 - Impact of human intervention by using initial assessments vs final assessments
- Average **final SI/M rates** ~0.6-0.8, centering ~0.7
 - ↓ for humpback whales than gray, blue whales
 - potential bias of severe ents. if blues release from less severe and/or complicated entanglements more easily
- Removing **dead whales** - final SI rate for live whales not much different (~8% of all confirmed ents.)
- Ents. with **multiple trap gear** ↓ **final SI/M rates** (0.44) than other gear types (**removal/release of gear** ↑).
 - Initial SI/M rates ≈ (few cases, self releases)
- **Initial SI** for humpback ents. with Dcrab: coastwide (0.80); in the PNW (0.95) ↑ compared CA (0.76)
 - Severity + observation bias?



NOAA Fisheries MMHSRP permit #18786

Impact of Human Intervention on SI/M



MMHSRP Permit 18786 | Scott Benson

- Removal/release of gear from HI occurs ~20% of entanglement cases.
 - ↑ rate of gear removal/release from cases where gear is identified
- Removal or release of gear reduces the final SI for a case by ~50%
- final SI rates for humpback ents. with Dcrab with no HI (0.75) vs all humpback Dcrab ents. including with HI (0.63)
- Removal/release rate is especially high in entanglements known to have originated in multiple-trap (strings) fishing gear (62%)
 - Easier to detect (if anyone there), respond (if available) to anchored whales

Back to Utility – What Could We Do With These Results

- Instances of gear removal/release can lower the expected SI/M rates for most categories of entanglements by 50% or more.
 - Increase response capabilities, consider innovations to help release (weak links)
- Switch from one trap per line toward use of multiple-trap setups?
 - if the reduced numbers of lines = reduced co-occurrence = reduced entanglements.
 - overall SI/M rates may only be marginally higher than entanglements with only one trap per vertical line assuming no gear was or would be removed.
 - appears even shorter strings of gear with at least 2 traps with one vertical line (where appropriate) could reduce the overall SI/M
 - assumptions about detection and the severity of injuries should be further evaluated and/or closely monitored