



ESA Section 7 Biological Opinion on the Continuation of the Pacific Coast Groundfish Fishery

NMFS WCR Protected Resources Division

Introduction

Consultation initiated in Spring 2024 due to:

- New humpback whale interactions reported in the midwater trawl fishery and the hook-and-line fishery
- New actions related to gear marking and risk reduction

Species/Stocks:

- Humpback Whale Mainland Mexico DPS; CH
- Humpback Whale Central America DPS; CH (same for both DPSs)
- Leatherbacks (globally listed, but focus on Western Pacific Population); CH

PCGF Gear Types Analyzed:

- Pot
- Hook-and-Line
- Midwater Trawl

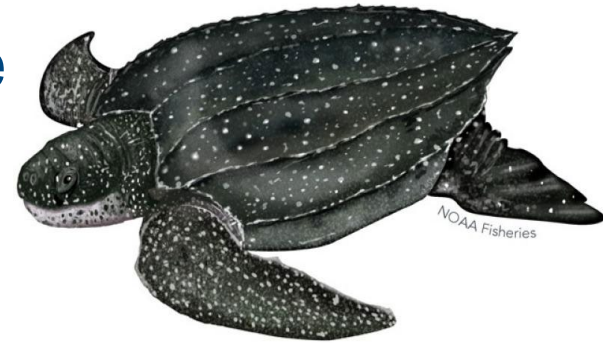
Status of Species - Humpbacks



- ESA DPS vs MMPA stocks
 - Mexico DPS: Threatened
 - 7,500 whales
 - Central America DPS: Endangered
 - 1,496 whales
 - Mainland Mexico - West Coast stock:
 - 3,477 whales; PBR = 43 whales in USA waters
 - Central America/Southern Mexico - West Coast stock:
 - 1,496 whales; PBR = 3.5 whales in USA waters
- Abundance increasing off U.S. West Coast, but not at same rate for both DPSs
- Variable proportion of populations along U.S. West Coast in CA/OR versus WA
- Key Threats:
 - Domestic and international fisheries bycatch
 - Ship strikes
 - Anthropogenic noise

Status of Species - Leatherbacks

- Significant long-term decline for decades, including off the West Coast - limited observations in recent PNW surveys
- Preliminary info indicates nesting numbers are showing some signs of stabilizing
- Western Pacific Population: 1,054 nesting females
- Key Threats:
 - International commercial fisheries
 - Coastal development and habitat degradation
 - Limited impacts in U.S.; tracking with decreasing abundance



Approach to Effects Analysis

1. Incorporated relevant entanglement history with bycatch estimates (WCGOP)
2. Co-Occurrence Analysis:
 - a. Analyzed fishing gear and species models separately to see how they differ throughout the year and amongst years (2014-2023)
 - i. Pot and hook-and-line as sets; trawl as hours
 - b. Overlay fishing effort with SDMs by multiplying co-occurring layers
3. Incorporated spatial and temporal overlap “risk” to apportion effects to different DPSs (humpbacks)
4. M/SI rates averaged from past interactions with the same or similar gear configuration
5. Considered new PCGF actions and their effects
6. Quantify amount of prey caught annually by the PCGF that aligns with PBFs of CH

PCGF Bycatch Record

Humpbacks

- Three observed entanglements in the LE (2) and OA (1) sectors of the sablefish pot fishery
 - Three additional opportunistic reports = six total interactions, with five occurring after 2011
- One unconfirmed interaction in the OA HKL fishery in 2021
- Two observed confirmed interactions in the Hake midwater trawl fishery - one in 2023 & 2024
 - Two other unconfirmed interactions in 2020

Leatherbacks

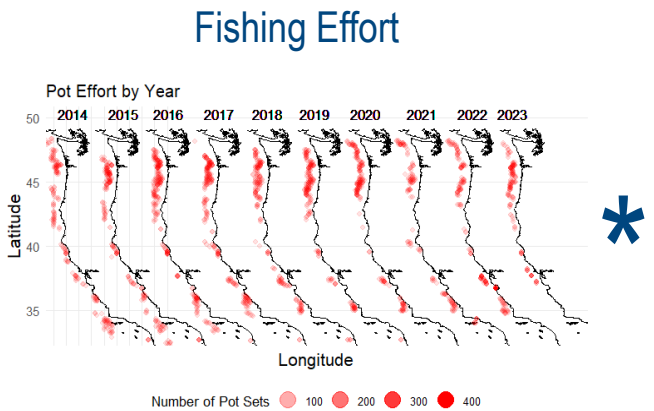
- One entanglement in the OA pot fishery in 2008

Sablefish Pot Bycatch Estimates from WCGOP

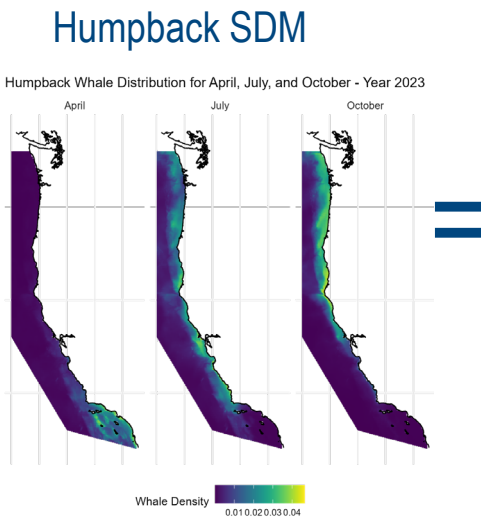
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Humpback LE Estimate	0.13	0.11	0.14	1.14	0.09	0.06	0.15	0.07	0.13	0.17	0.21	0.13	1.20
Humpback OA Estimate	1.53	0.76	0.43	0.89	1.36	2.22	1.19	1.00	0.90	0.39	0.53	1.57	1.37
Leatherback OA Estimate	1.05	0.88	0.51	0.73	0.91	0.90	0.94	0.82	.57	.31	0.51	1.67	1.08



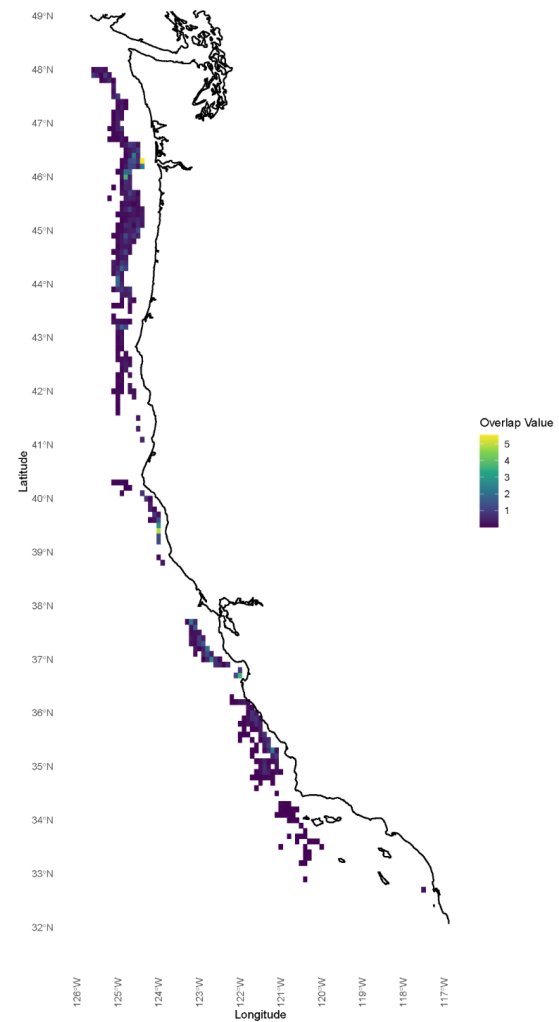
Co-Occurrence Example: Pot Effort X Humpbacks



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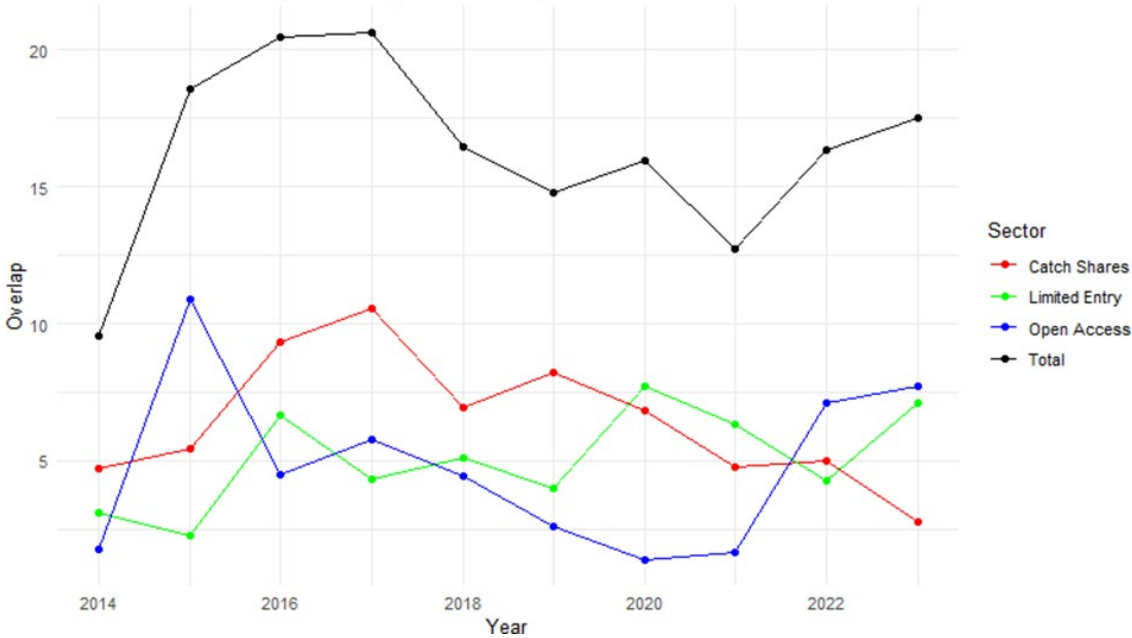




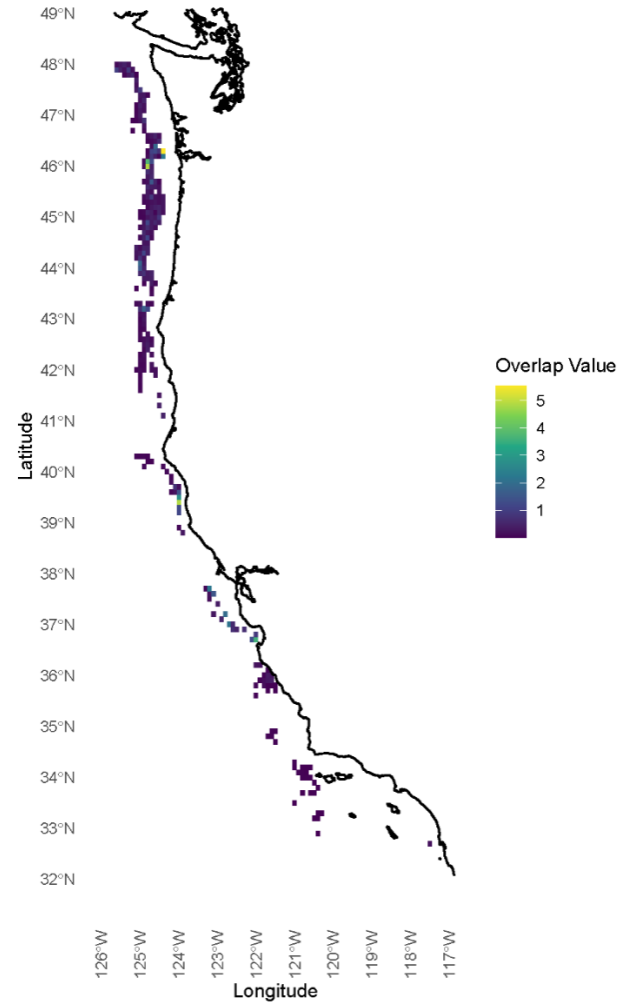
Results

Results: Co-Occurrence Pot X Humpbacks

Estimated Pot Overlap with Humpback Density

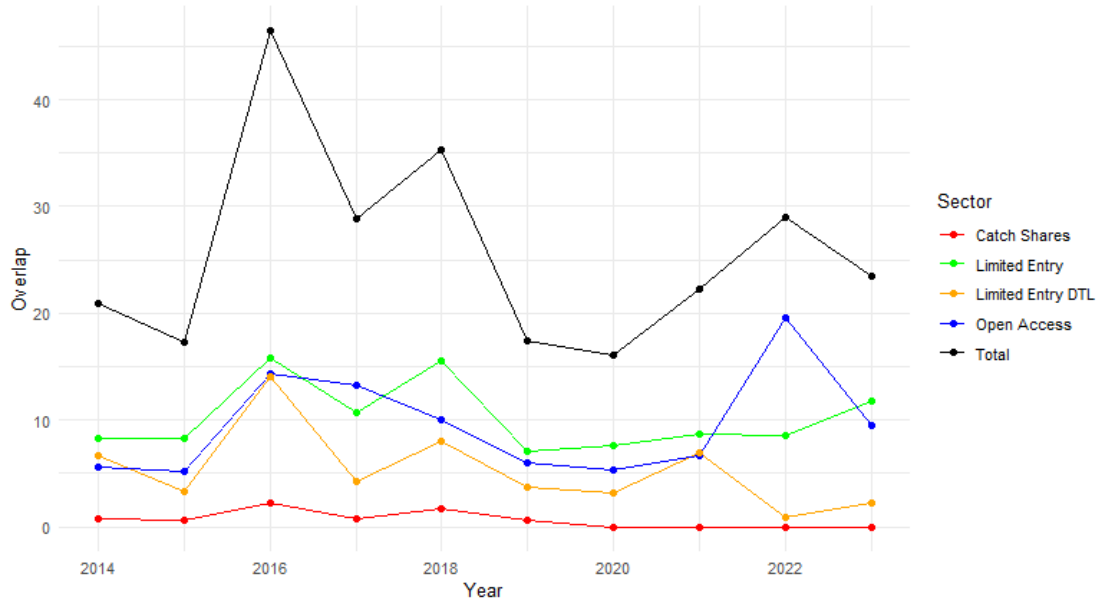


Pot Sets Overlap with Humpback Density

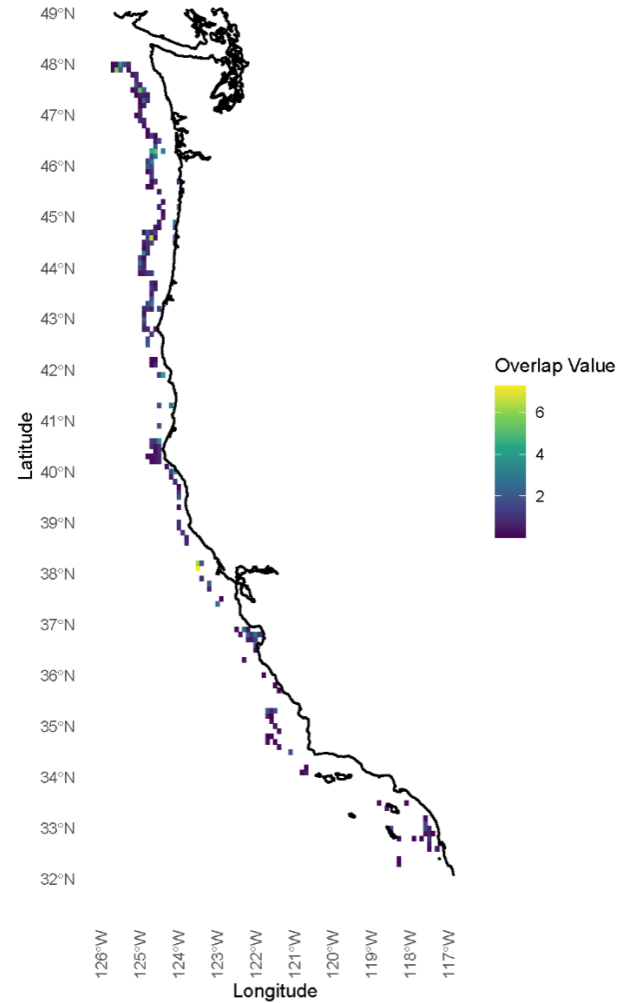


Results: Co-Occurrence Hook-and-Line X Humpbacks

Estimated Hook-and-Line Overlap with Humpbacks

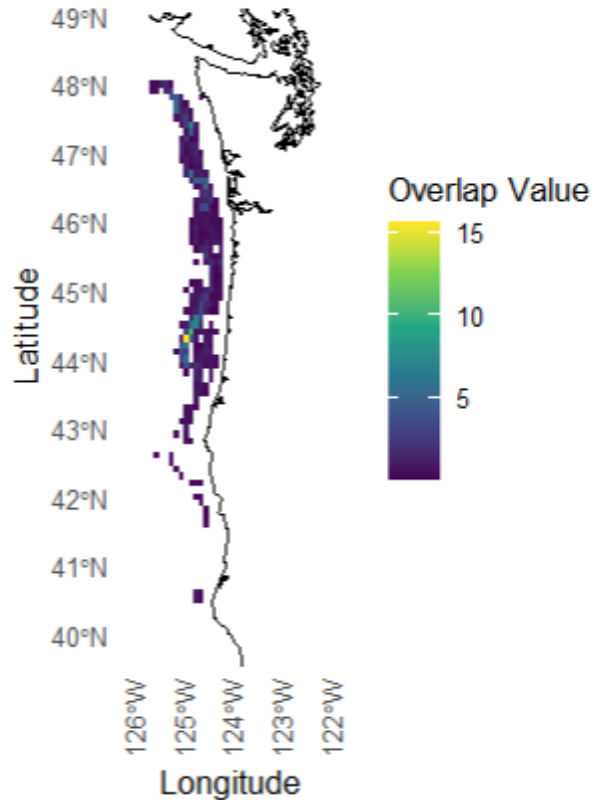


Hook-and-Line Sets Overlap with Humpback Density

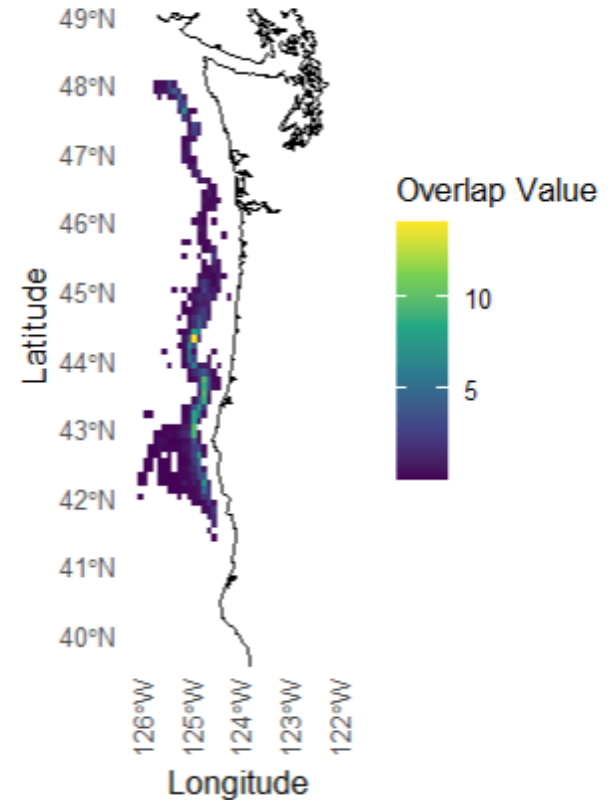


Results: Co-Occurrence Midwater Trawl X Humpbacks

SS Midwater Trawl Overlap with Humpback Density

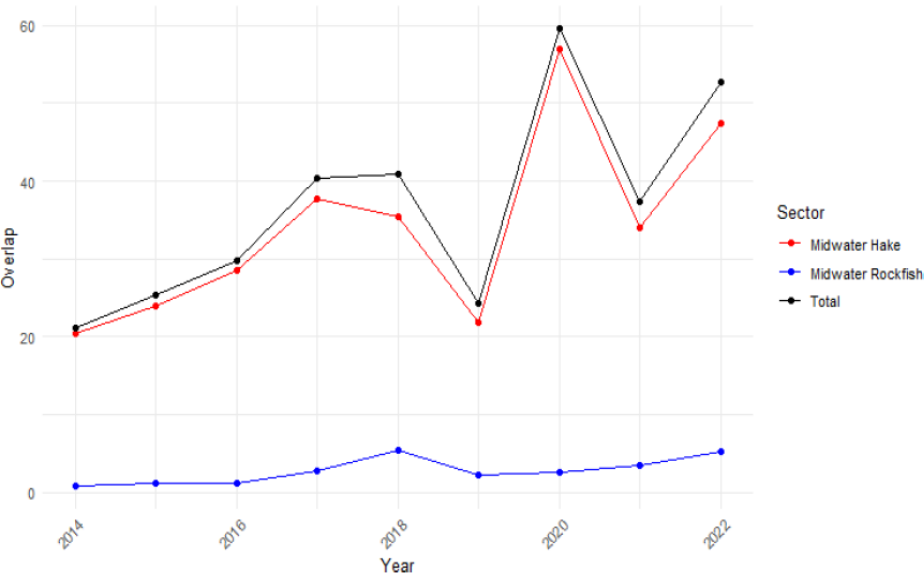


AS Midwater Trawl Overlap with Humpback Density

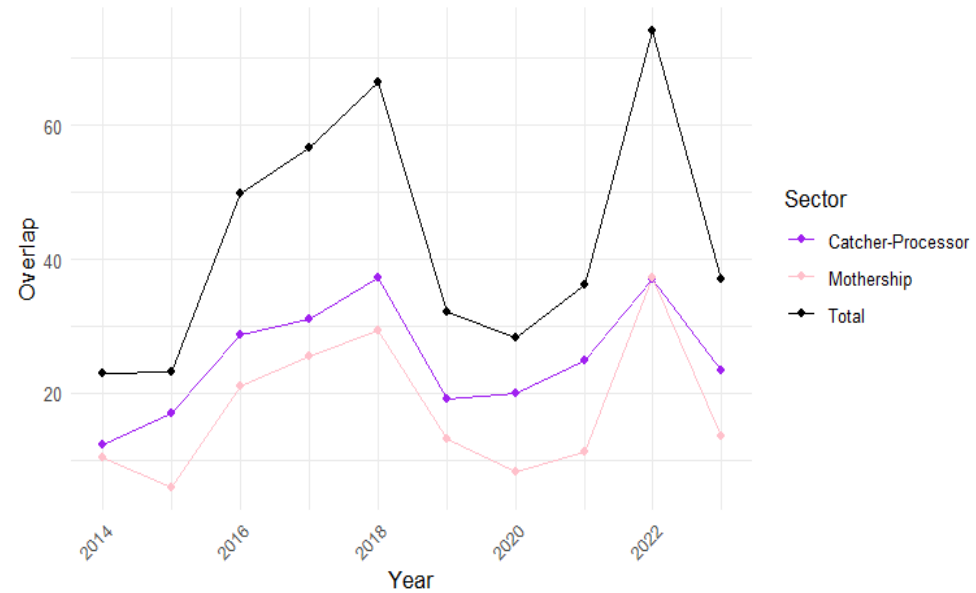


Results: Co-Occurrence Midwater Trawl X Humpbacks

Estimated Shoreside Trawl Overlap with Humpback Whale Density

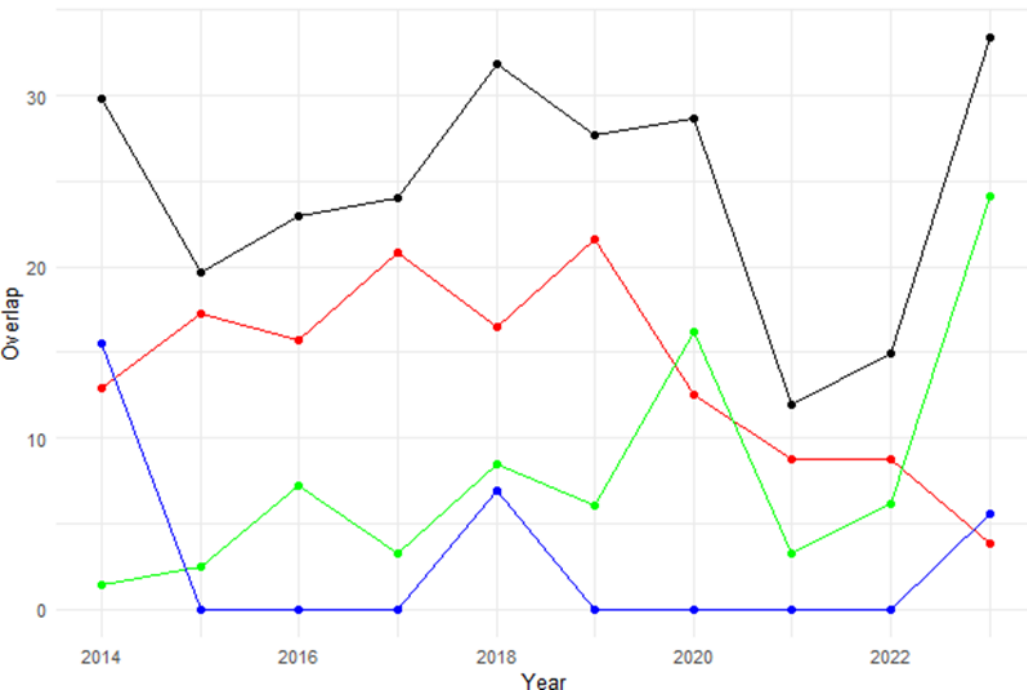


Estimated AS Midwater Trawl Overlap with Humpback Whale Density

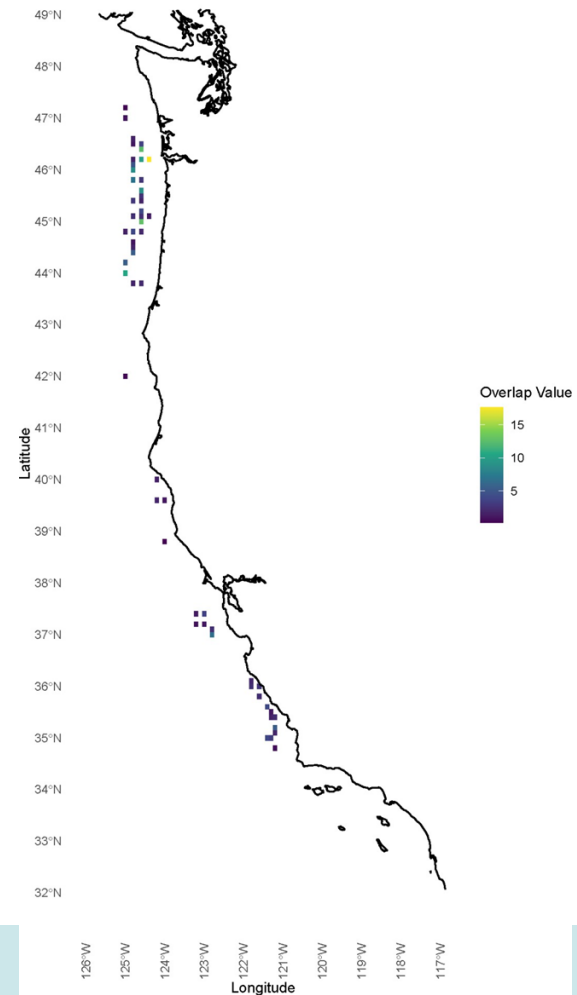


Results: Co-Occurrence Pot X Leatherbacks

Estimated Pot Overlap with Leatherback Habitat Suitability



Pot Sets Overlap with Leatherback Habitat





Anticipated Take and Incidental Take Statement

Anticipated Take for Humpback Whales

Pot

- Used max annual and 5-year avg. bycatch estimates 2011-2023
- Up to **4.62 whales to be taken in any one year**; not to exceed **2.07 individuals on average over a 5-year period.**

Hook and Line

- Only been one unconfirmed event in PCGF; monofilament line present in several entanglement interactions; risk is ≥ 0
- Anticipated **one interaction as an annual maximum; no higher than a 0.2 5-year running average**

Midwater Trawl

- Given the recent interactions, anticipated no more than **one interaction annually**, with no more than a **0.4 whales 5-year running average**

Anticipated Take for Humpback Whales cont.

- Each total estimate of mortality for all fisheries was apportioned to the specific DPSs based on the movement probabilities in the table from the SARs and the proportion of overlap that occurred in CA & OR versus WA
- Mortality rates were determined as the average M/SI from the same gear type and fishery

Stock	Location of MSI	
	California or Oregon	Washington
Central America/Southern Mexico - CA/OR/WA	0.423 (CV=0.23)	0.059 (CV=0.935)
Hawai'i	0.00	0.688 (CV=0.13)
Mainland Mexico – CA/OR/WA	0.577 (CV=0.169)	0.254 (CV=0.278)

ITS-Humpback Whales

Mexico DPS

Central America DPS

	Annual Max	Max 5-year Running Avg	Annual Max	Max 5-year Running Avg
Total Bycatch in PCGF Sablefish Pots	2.29	1.03	1.55	0.69
Anticipated M/SI in PCGF Sablefish Pots	2.11	0.95	1.43	0.63
Total Bycatch in Commercial PCGF HKL	0.47	0.10	0.29	0.06
Anticipated M/SI in Commercial PCGF HKL	0.47	0.10	0.29	0.06
Total Bycatch in PCGF Hake Midwater Trawl	0.52	0.21	0.37	0.15
Anticipated M/SI in PCGF Hake Midwater Trawl	0.52	0.11	0.37	0.08

Total Bycatch in the PCGF	3.28	1.34	2.11	0.90
Anticipated M/SI in the PCGF	3.10	1.16	2.09	0.77

Anticipated Take for Leatherback

- WCGOP bayesian bycatch estimates
 - We used the maximum annual and 5-year average estimates between 2011-2023 to represent the annual maximum for the OA sector
- All take is assumed to be of Western Pacific population
- Mortality risk determined to be high based on recent entanglements of leatherbacks and nature of PCGF pot gear

ITS-Leatherback Sea Turtles

	Annual Maximum	Maximum 5-year Running Avg
Total Bycatch in PCGF Sablefish Pots	1.67	0.86
Anticipated M/SI in PCGF Sablefish Pots	1.67	0.86



Terms & Conditions and Conservation Recommendations

Terms and Conditions

- 1. Observer Coverage & Bycatch Estimates**
 - a. Ensure scientific monitoring of humpback whale & leatherback turtle bycatch in PCGF fixed gear pot, hook-and-line, and midwater trawl sectors.
- 2. Gear Marking Regulations (Implementation by 2026)**
 - a. Support monitoring of PCGF fixed gear pot & bottom longline gear markings.
 - b. Assess effectiveness after three years & confer with NMFS PRD for improvements.
- 3. Fixed Gear Set Configurations**
 - a. Track usage of single vs. double vertical end lines (voluntary risk reduction measure).
 - b. Determine the extent of different pot types and gear configurations.
 - c. Evaluate if gear configuration data can refine bycatch estimates
- 4. Hook-and-Line Effort Monitoring**
 - a. Investigate feasibility of independent effort & observer tracking by hook-and-line gear types.
- 5. Biennial Reporting on PCGF Effort & Bycatch**
 - a. Fixed gear pot sets & hook-and-line sets (by sector & gear type), Midwater trawl tow hours (by sector)
- 6. Incidental Take Reporting**
 - a. Documented humpback whale & leatherback sea turtle bycatch should be reported ASAP after data review & observer debriefing.

Conservation Recommendations

1. **Engagement & Best Practices:** Work with PFMC & industry to encourage adoption of risk reduction measures through best practices.
2. **Slinky vs. Traditional Pots:** Assess potential differences in entanglement/injury risks associated with different types of pots.
3. **Testing of Pop-Up/On-Demand Gear**
 - a. Support testing alongside voluntary single end-line use.
 - b. Evaluate feasibility & strategies to prevent gear loss and improve recovery.
4. **Humpback Whale & Midwater Hake Trawl Overlap**
 - a. Analyze 2023–2024 data on whale interactions in hake trawl fisheries.
 - b. Provide recommendations to PFMC on reducing future interactions (if/when available).
5. **Refining Bycatch Estimates**
 - a. Investigate improved methods for estimating bycatch of leatherback sea turtles & ESA-listed humpback whales in PCGF fisheries.
6. **Scientific Tools & Frameworks for Risk Reduction**
 - a. Explore predictive models & real-time environmental data to assess/predict humpback whale concentrations, forage conditions, and habitat compression.
 - b. Use data to predict fishing effort patterns & identify high-risk areas.
 - c. Monitor co-occurrence with PCGF fisheries for adaptive/dynamic management.



Questions or Comments?