

Quantification of the Risk of Secondary Entanglement due to Derelict Fishing Gear for Floating Offshore Wind Turbines

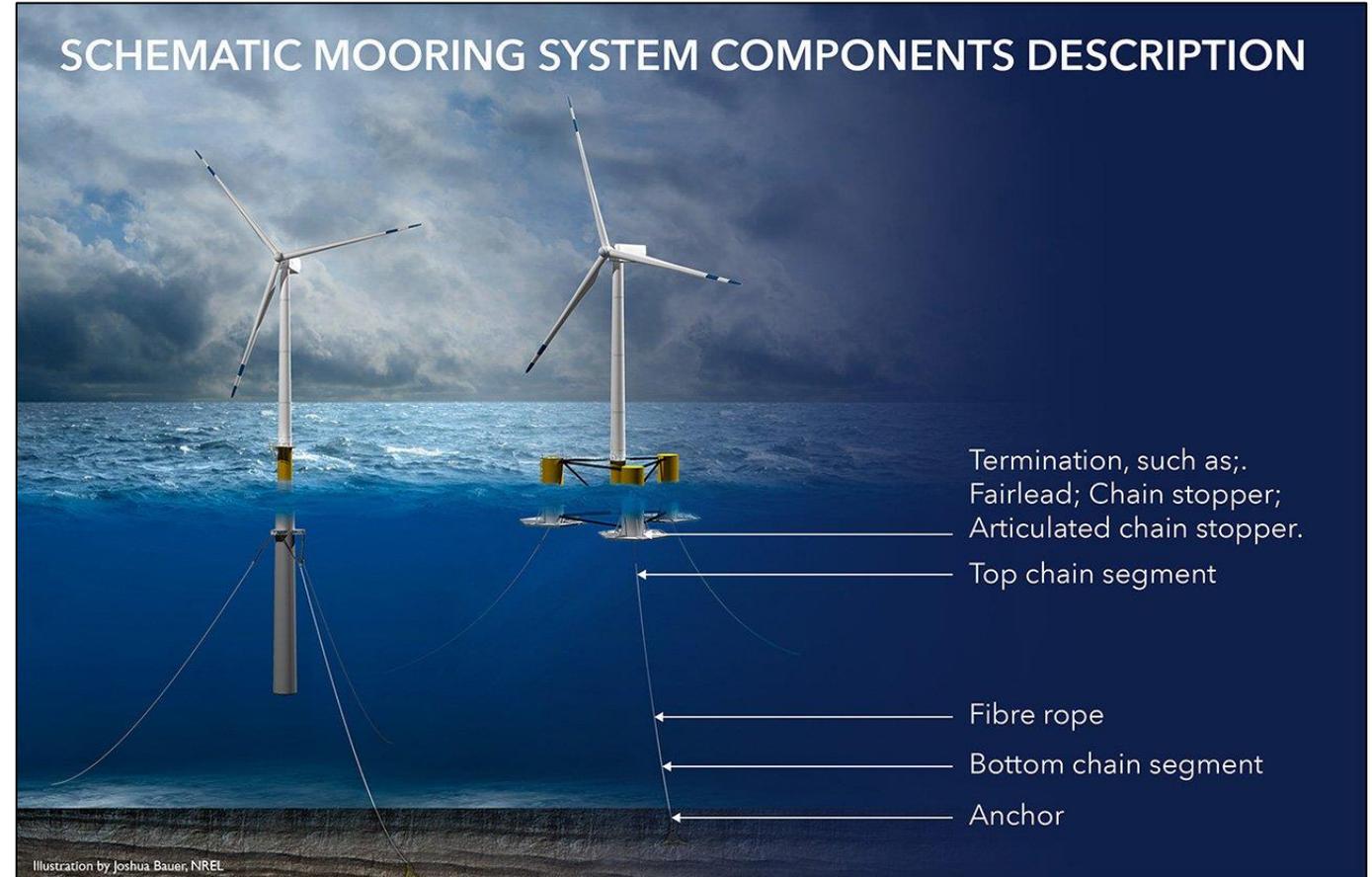
Research Consortium Kickoff Meeting
10/15/2025

Dr. Spencer Hallowell, University of Maine

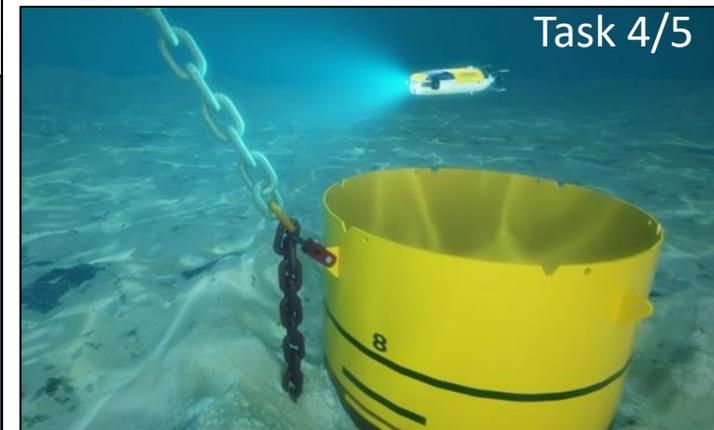
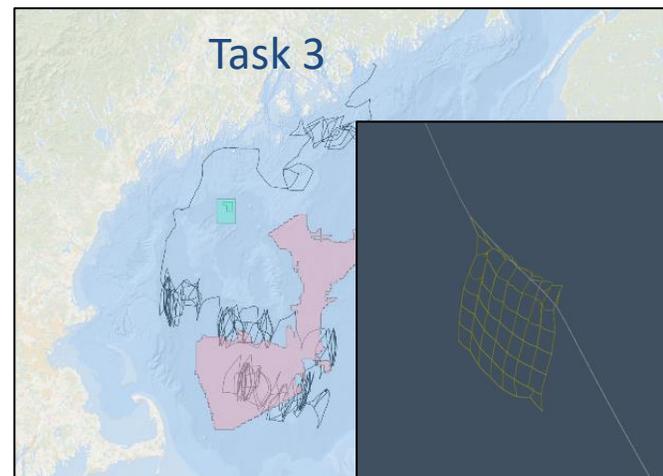
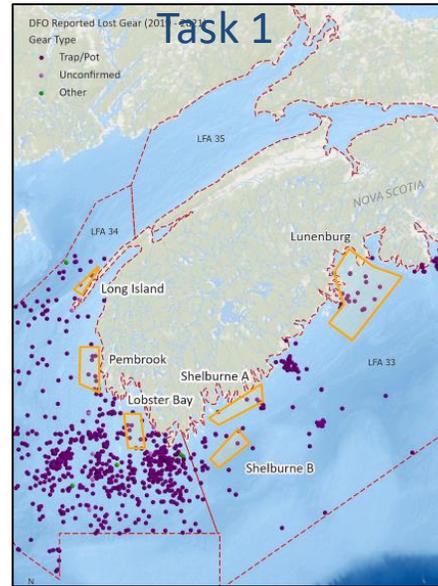
Dr. Damian Brady, University of Maine

Everett Rzeszowski, University of Maine

- The presence of floating offshore wind technology (FOWT) in the Gulf of Maine introduces the risk of secondary entanglement of sensitive marine mammal populations
- Risk is highly dependent on the movement of Abandoned, Lost, or Discarded Fishing Gear (ALDFG) that is in the resource
- This research looks to quantify such risk, by focusing on the process in which ALDFG **ensnares** on FOWT infrastructure



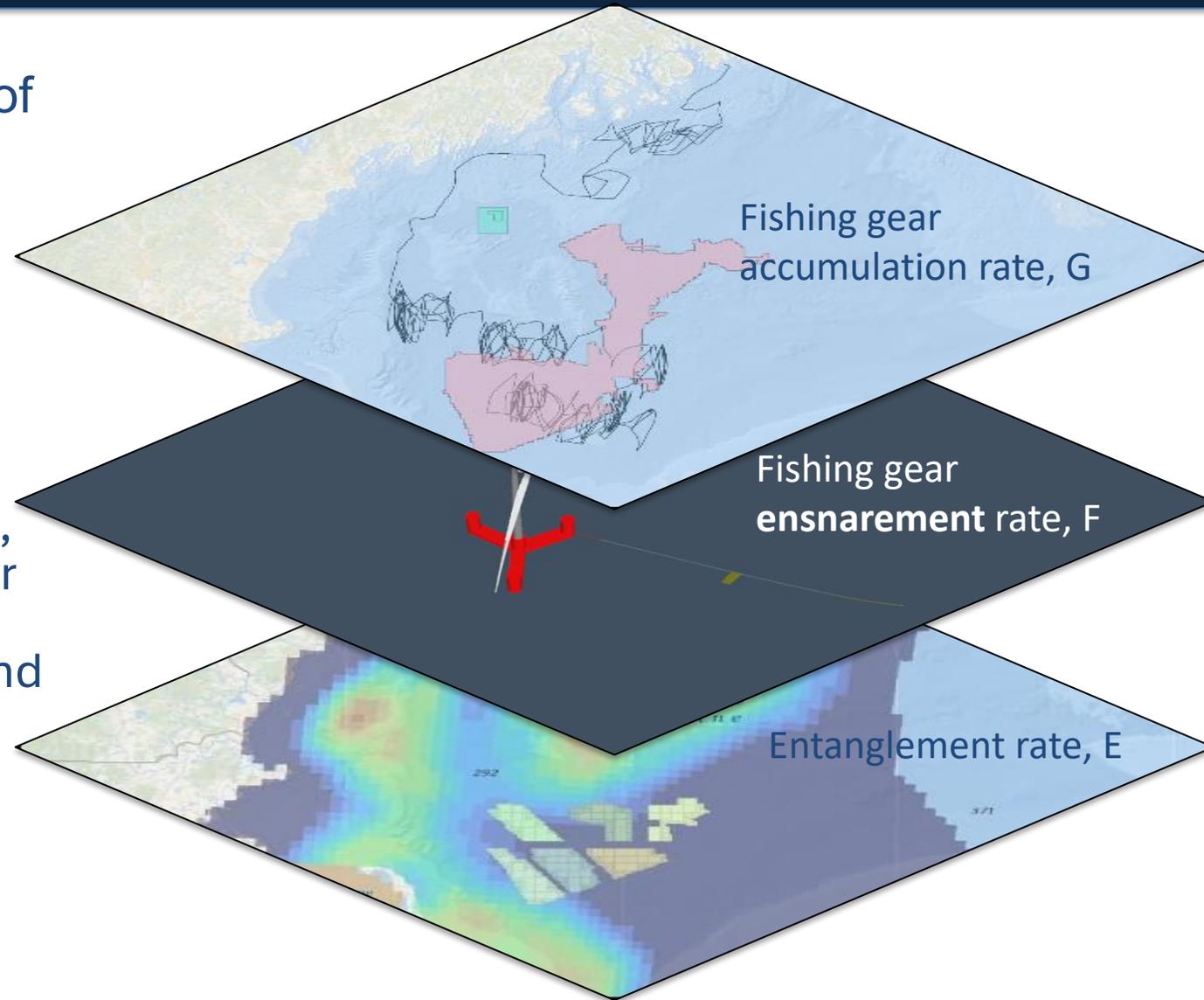
1. Literature Review, Data Collection, and Data Gaps
2. Stakeholder Engagement
3. Desktop Risk Assessment
4. Monitoring Approaches and Technology
5. Retrieval Approaches and Technology



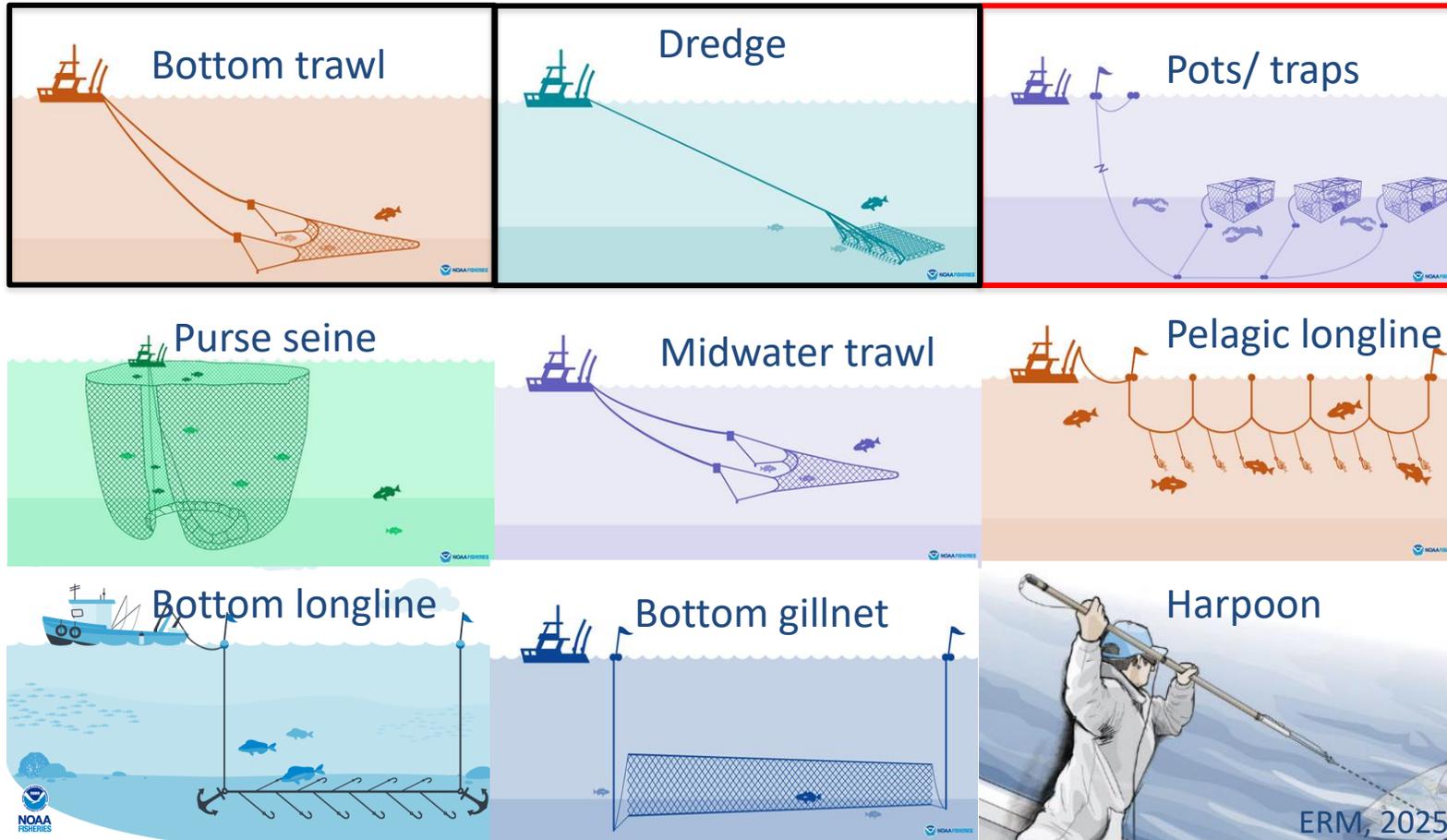
- The probability of entanglement follows:

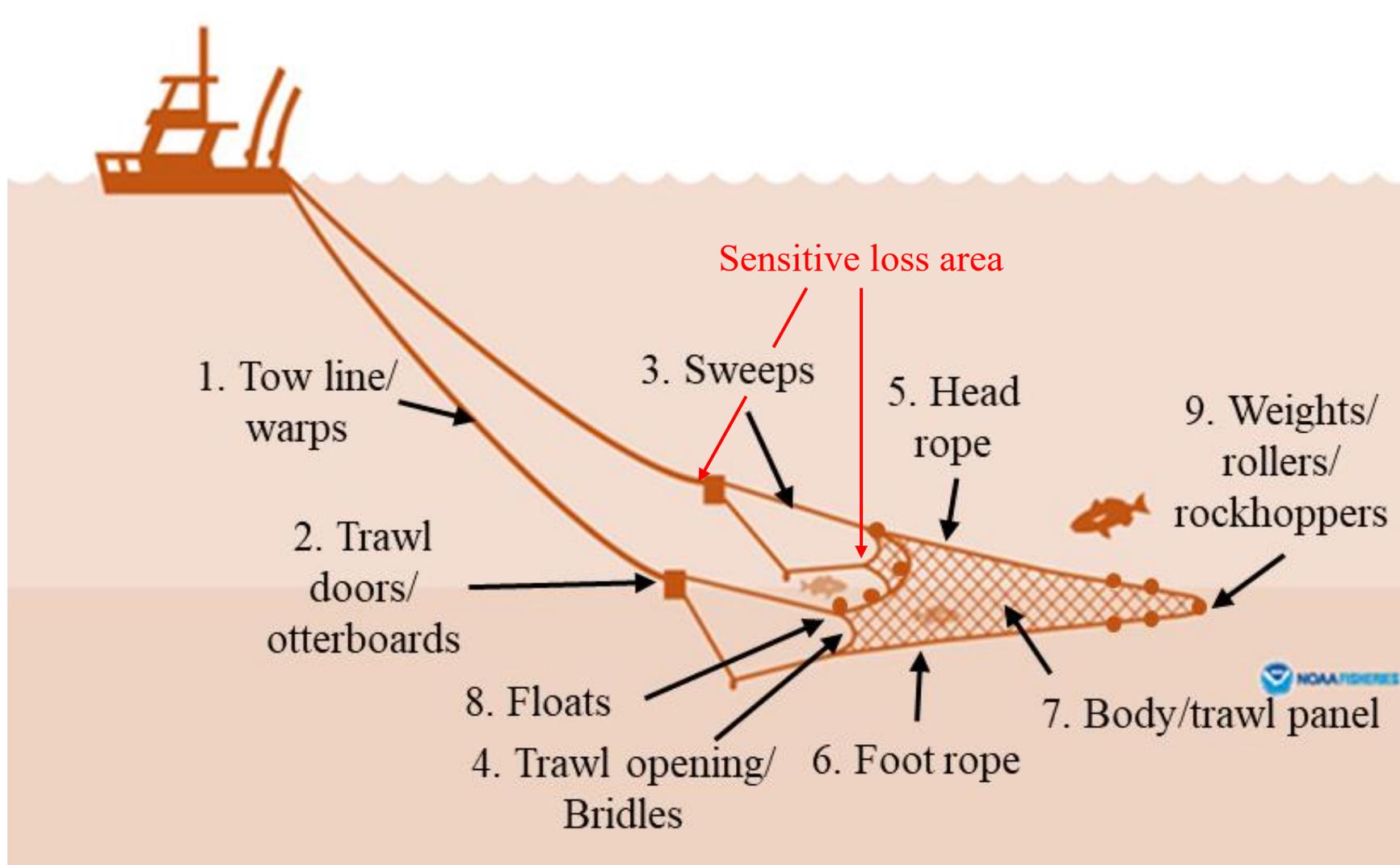
$$P_E = \int EFG$$

- Decouples hazard, demand, and fragility (gear movement, ensnarement, and entanglement)
- Borrowed from seismic and hurricane risk



- Relevant fishing gear types for the Gulf of Maine were identified via Communities-at-sea data (2011-2015), NEFSC fishing footprints (2016-2020) and the ERM-GMRI Fisheries Coexistence Report (2025)
- Images from NOAA Fisheries, and used in marine mammal entanglement identification guides





Component	Name	Material Construction	Buoyancy	Diameters/ Sizes (in)	Lengths (ft)
1	Buoy	Wood/Foam/Plastic	Positive	5"x11" to 8"x15"	N/A
2	Buoy line/Sink line	Synthetic rope (nylon, poly) , sometimes with steel core	Negative	3/8"-1/2"	Varies by water depth 10's-100's of ft
3	Float Line	Synthetic rope	Positive	3/8"-1/2"	Varies 10's-100's of ft
4	Groundline	Synthetic rope, sometimes with steel core	Negative	11/32"-1/2"	10's-100's of ft
5	Gangion	Synthetic rope	Varies	11/32"-1/2"	10's of ft
6	Becket/Bridal	Synthetic rope	Varies	11/32"-1/2"	10's of ft
7	Trap/Pot	Coated steel	Negative	48"x21"x13"	N/A

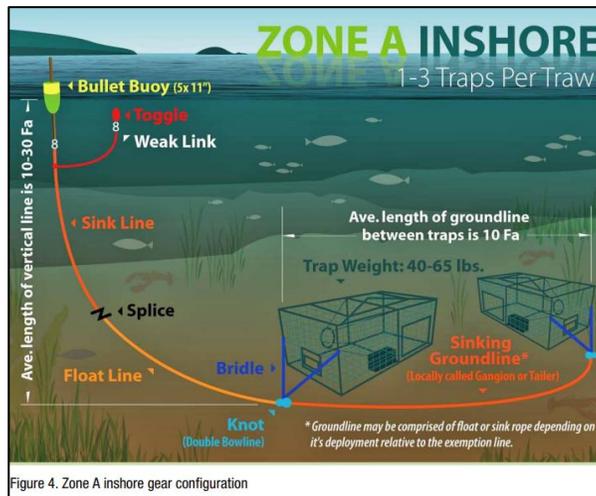


Figure 4. Zone A inshore gear configuration

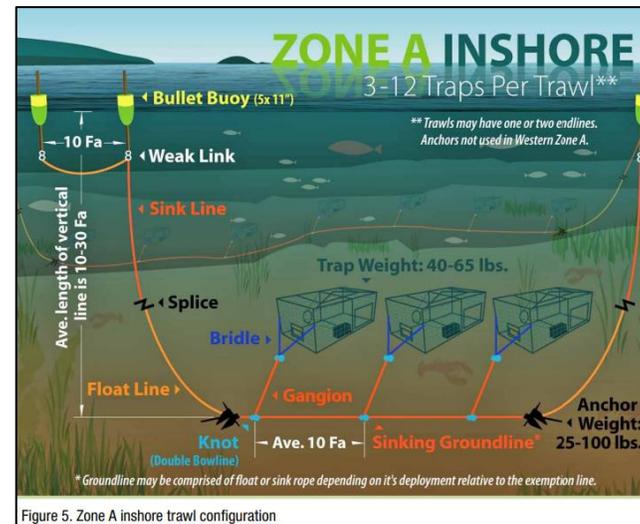


Figure 5. Zone A inshore trawl configuration

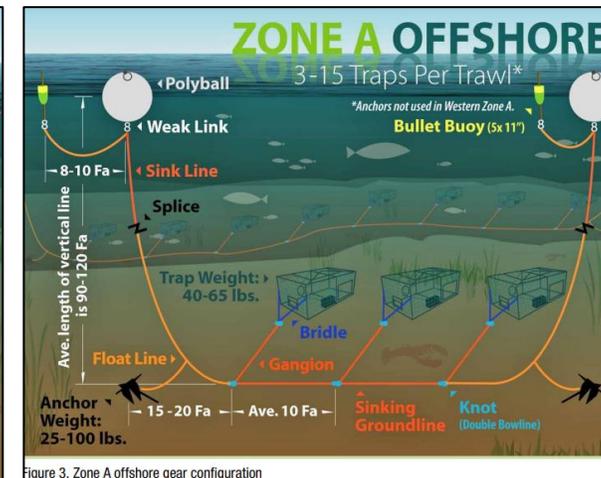


Figure 3. Zone A offshore gear configuration

PHASE	DETAILS	Year 1 Period of Performance													
		Q3		Q4			Q1			Q2			Q3		
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	
		8/25	9/25	10/25	11/25	12/25	1/26	2/26	3/26	4/26	5/26	6/26	7/26	8/26	
1	Task 1: Literature Review, Data Collection, and Data Gaps	Subtask 1.1: Literature review													
		Subtask 1.2: Data compilation and dissemination													
		Milestone 1: Literature review complete													
		Deliverable 1.1: State of the art report													
		Deliverable 1.2: Creation of online data repository													
2	Task 2: Stakeholder Engagement Plan	Subtask 2.1: Stakeholder engagement plan													
		Subtask 2.2: Stakeholder engagement meetings for concept overview													
		Subtask 2.3: Stakeholder engagement meetings for gear loss estimation													
		Subtask 2.4: Stakeholder engagement meetings for risk results, monitoring, and gear retrieval													
		Deliverable 2.1: Stakeholder engagement plan													
3	Task 3: Desktop Risk Assessment	Subtask 3.1: Global-scale model of current flow and gear movement													
		Subtask 3.2: Turbine-scale model of gear impacting FOWT moorings													
		Subtask 3.3: Seasonal likelihood of whale species entering WEAs													
		Milestone 3: Desktop risk assessment complete													
		Deliverable 2.1: Secondary entanglement risk quantification report													
4	Task 4: Monitoring Approaches and Technologies	Subtask 4.1: Literature review and industry survey for monitoring and detecting derelict gear													
		Deliverable 2.2: Secondary risk entanglement toolbox added to Online data repository													
5	Task 5: Retrieval Approaches and Technologies	Subtask 5.1: Literature review and industry survey for retrieving derelict gear													
		Deliverable 4.1/5.1: Summary report for monitoring and retrieval approaches and technology.													
		Milestone 4: Monitoring and retrieval approaches complete													

- Maine Department of Energy Resources
- Maine Offshore Wind Research Consortium
- California Energy Commission and Lawrence Berkeley Labs

- Questions?