C3b Pelagic trawl gear innovation discussion paper

Anita Kroska

Advisory Panel

June 3, 2025

Action by Council

- Review the discussion paper
- Action as necessary

Council motion C2
BBRKC closure areas
February10, 2024

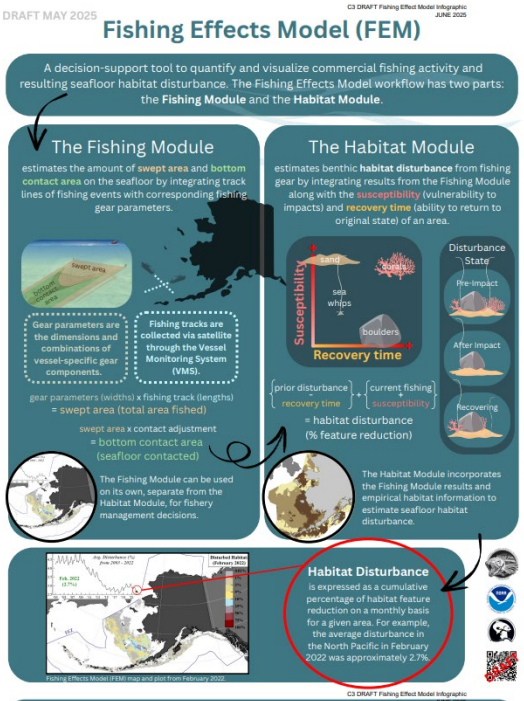
2. The Council tasks staff with a discussion paper to inform options for incentivizing pelagic trawl gear innovation with the following objectives:

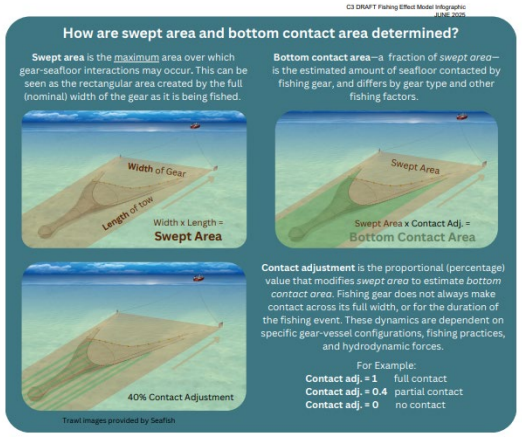
    - minimizing bycatch to the extent practicable
    - minimizing the impacts of pelagic trawl gear on sensitive benthic habitat and unobserved mortality of stocks that rely on such habitat
    - improving or maintaining fishing efficiency
    - flexibility for trawl gear innovation within the constraints of other objectives (e.g., adapting to new technologies)

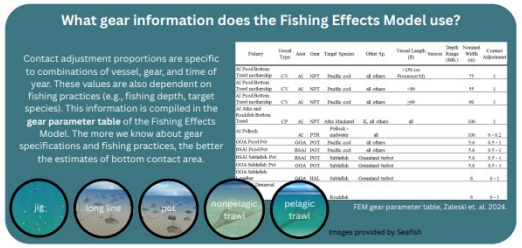
    The discussion paper should detail:

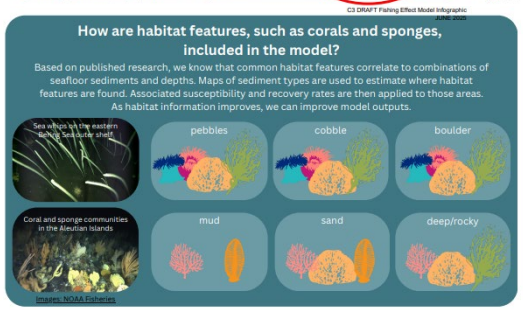
    - the current limitations to gear innovation and modification (e.g., technological or enforcement constraints)
    - the process for such gear revisions (e.g., EFP)
    - examples of how past changes to gear definitions have been moved through the Council process (e.g., elevated sweeps on nonpelagic trawl gear)
    - management tools that could be used to inform metrics to achieve these objectives (e.g., EFH and Fishing Effects model)
    - downstream impacts to the management objectives of the various regulatory provisions that use the current definition of pelagic trawl gear and have been built upon the previous actions (if applicable)
    - potential displacement and spillover impacts from any potential changes (e.g., PSC or target species catch)

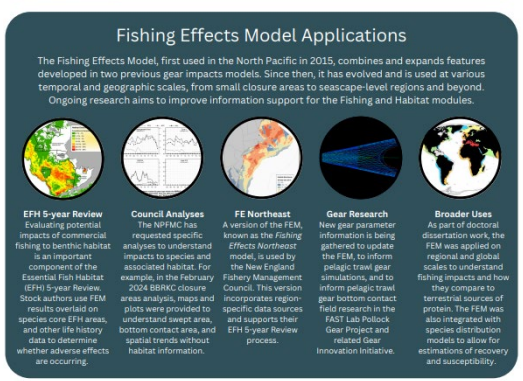
The Council will review options for changes to the performance standard following this work.











Fishing Effects Model Infographic

C3 DRAFT

Collaborative effort: FAST Lab, NOAA AKRO HCD, Council staff

Format: four-page glossy, 8.5 x 11" handout. Front two pages can also be stand-alone. Will also anchor a Council (interactive) webpage with additional information, glossary, and related resources.

Target audience: general participant in the Council process; high-level overview of model elements and applications

Content: Currently trawl-focused to support ongoing pelagic trawl gear analyses. Looking at ways to incorporate more information on other gear types. Will also help support future EFH 5-Year Review work.

Timeline to finalize: end of summer for glossy and first draft of webpage. Staff will work over longer timeline to expand webpage and make interactive.

Feedback: Please provide any feedback to Anita Kroska (NPFMC staff) by the end of June.

What's the difference?

Definition EA/RIR

- Clarify current regs, allow enforcement to clearly & consistently identify legal and noncompliant gear, remove outdated text
- Updates may facilitate process to incentivize innovation (e.g., clarity, allowances for bycatch excluders, metallic instrumentation)

Innovation DP

Motion: The Council will review options for changes to the performance standard <u>following</u> this work.

~~Trawl performance standards~~

✓ Current state of knowledge

- Innovations & research
- Regulatory, enforcement, and technological limitations
- Regulatory processes for gear revision
- Management tools

- Framed within Council objectives

Working definitions

Innovation

A process or opportunity for flexibility, improvement, or change to existing fishing behaviors, sensor technologies, or gear, with variable implementation timelines

Incentive

Reason or motivation that stimulates, persuades, or encourages action or a desired outcome

pgs. 7-8

Regulatory limitations: specificity, clarity

Increased specificity = decreased flexibility, innovation

Increased generality = greater risk of ambiguity or enforcement uncertainty

Increased clarity = increased benefits and advancements from innovation

Feedback:
What do we innovate toward? What does the Council want limited?
What are specific objectives and metrics?

Increased clarity in objectives, expectations, and possible incentives could help foster an environment for collaborative development of gear modifications and innovations.

pgs. 9-10

Regulatory limitations: consistency

State

"a pelagic trawl is a trawl where the net, or the trawl doors or other trawl-spreading device, **do not operate in contact with the seabed**, and which does not have attached to it any protective device, such as chafing gear, rollers, or bobbins, that would make it suitable for fishing in contact with the seabed."

5 AAC 39.105(10)(C)

Federal

"No person trawling in any GOA area limited to pelagic trawling under §679.22 may allow the footrope of that trawl to be in contact with the seabed for more than **10 percent of the period of any tow**."

50 CFR 679.24(b)(3)

Where possible, gear restrictions should also be consistent across State and Federal boundaries to reduce complexity and ease compliance and enforcement.

pgs. 10

Performance standards

Outcomes that must be achieved without prescribing specific means. To be effective, some specificity still required.

Ex:

Current pelagic trawl performance standard: discourage bycatch and seafloor contact by limiting the number of crab at any given of a certain carapace width – Trawl Performance Standard Workshop (Oct 2023)

(50 CFR 679.7(a)(14))

Ex:

"No person trawling in any GOA area limited to pelagic trawling under §679.22 may allow the footrope of that trawl to be in contact with the seabed for more than **10 percent of the period of any tow**."

50 CFR 679.24(b)(3)

pgs. 9-10

Enforcement constraints

- Sensor technology (e.g., bottom contact sensors)
  - not currently allowed via definition but can be complementary tool (e.g., VMS, EM monitoring)
  - Additional future considerations (training, data review, tech issues, point at which data is enforceable)
- Simple, accessible indicator of gear compliance
- **Include enforcement early in process**

Enforcement Committee Precepts (2015)

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Table 5

Feature	Common Use	Sea	Air	EM
Discs, bobbins, or rollers	Protection from bottom contact; Bycatch reduction; Aggregation of bottom fish *(sweeps)*	X	X**	X
Chafe protection gear attached to the footrope or fishing line	Protection from bottom contact	X	X**	X
Mesh tied to the fishing line, headrope, and breast lines with less than 20" between knots **Requires measurements*	Bycatch reduction; Hydrodynamics	X		
Stretched mesh sizes **Requires measurements with gauge*	Bycatch reduction; Hydrodynamics	X		
Parallel lines spaced closer than 64" from all points on the fishing line, headrope, and breast lines **Requires measurements*	Aggregation of bottom fish *(includes tickler chains)*, sink trawl to depth	X		
Configuration intended to reduce required stretched mesh sizes	Non-compliance with mesh size requirements	X	X***	X***
Flotation other than floats capable of providing up to 200 lb of buoyancy to accommodate the use of a net-sounder device;	Maintain net shape/opening at slow speeds	X	X	X
Weighted lines on the bottom of the trawl between the wing tip and fishing circle	Aggregation of bottom fish *(includes tickler chains)*; Maintain net shape/opening; Sink trawl to depth	X	X**	X
Metallic components aft of fishing circle and forward of 5.5" mesh **Requires measurements*	Maintain net shape/opening at slow speeds; Sink trawl to depth	X		

**Observable by aircraft primarily when setting/hauling gear.
***Observable only if such configurations have been previously documented, otherwise would require measurement

Cost and timeline mismatches

- Sources: industry, grants, regulated fee structures (Trawl EM program, §679.56)
  - Variable timing, availability, priorities may not align with gear research
  - Timeline: can be years (planning, application, pilot data, testing, analysis, reporting)
  - Ex: ActSel, funded via NOAA Bycatch Reduction Engineering Program (BREP) (ongoing; Rose and Barbee, 2022)
- Feedback: costs can be prohibitive to improve daily operations

pgs. 13-14

Current research & limitations - outline

- **Seafloor or bottom contact detection methods**
  - Model-based (e.g., FEM)
  - Tilt sensors
  - Physical wear (e.g., footrope chain)
  - Acoustic sensors (e.g., trawl sonar)
  - Cameras
  - Other innovation
- **Unobserved mortality**
- **Bycatch reduction**

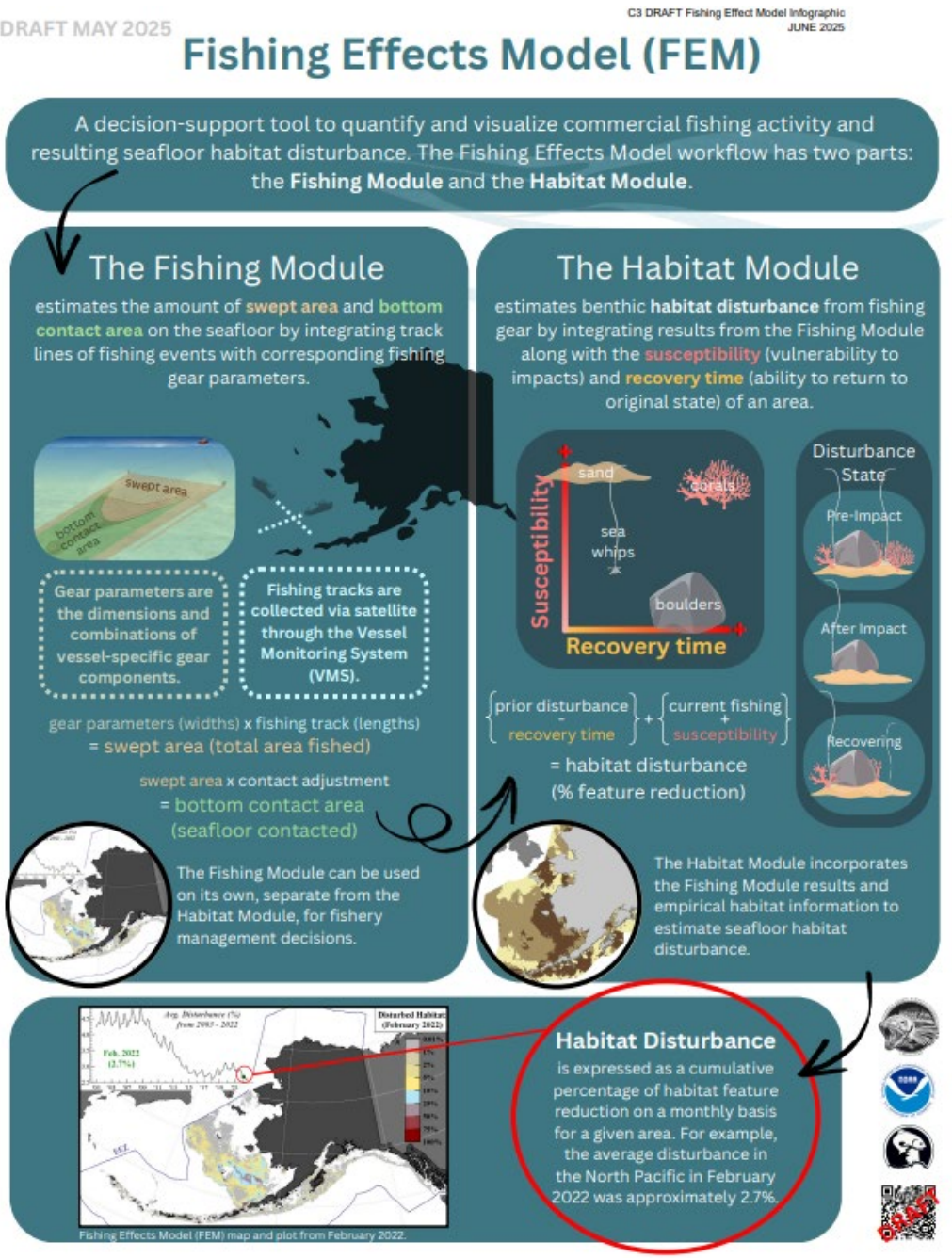
pgs. 15-24

Model-based: Fishing Effects Model

- Fishing Module & Habitat Module -> habitat disturbance
- FEM incorporates the following information:
  - Spatial distribution of habitat types
  - Spatial extent of fishing effort from NMFS Catch-in-Areas database
  - Gear parameter table – vessel, gear, season, depth, target, and contact adjustment values (trawl and fixed gear)
  - Habitat feature susceptibility and recovery
- Habitat disturbance – ex: North Pacific, avg 2.7% (Feb 2022)

***See C3a presentation**

***See C3 DRAFT FEM infographic**



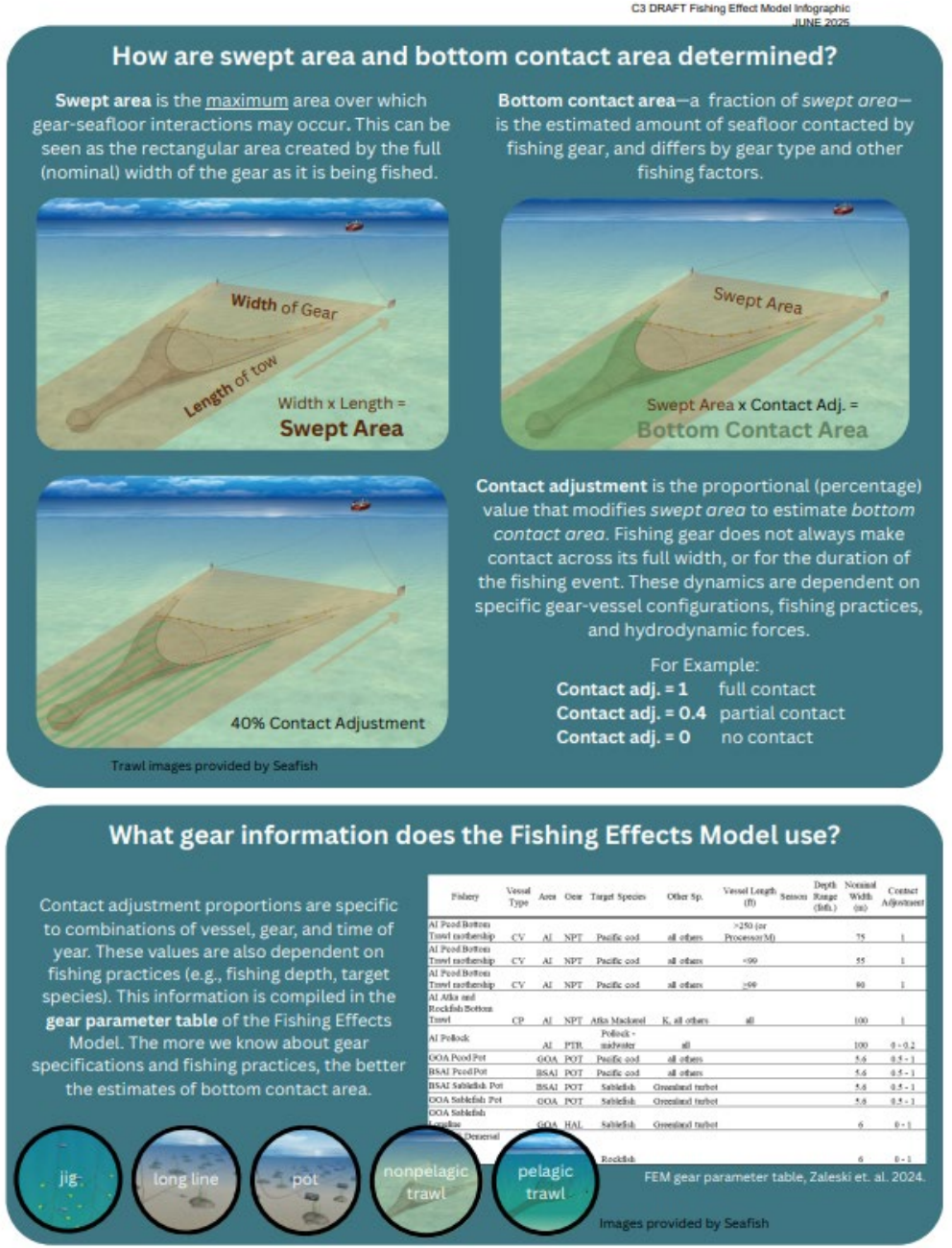
Model-based: FEM limitations

- Model results
  - provide the best available estimate of the impacts of Alaska federal fisheries on Essential Fish Habitat
  - do not provide real-time bottom contact detection
  - Contact adjustment values are estimations and are currently not tow or vessel specific
  - Fishing Module swept area and bottom contact area – can recognize fishing patterns and hotspots, but obscures other factors, not useful for understanding habitat disturbance
- Future improvements – additional data on gear, net behavior, field measurements of bottom contact, and improved habitat information

***See C3a Innovations development presentation**

***C3 DRAFT FEM infographic**

pgs. 20



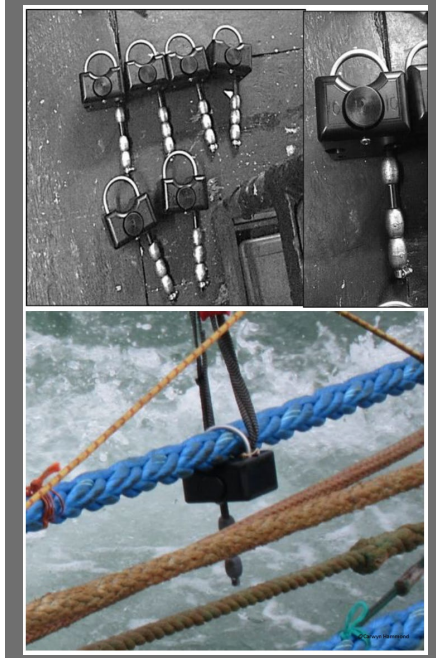
Tilt sensors – bottom contact w/ trawl gear

NOAA Bottom Trawl Survey
Currently deployed

Nonpelagic

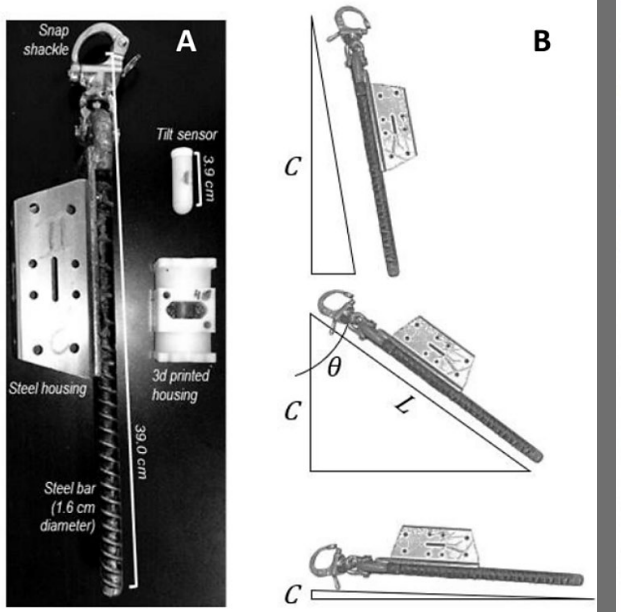
Images provided by FAST Lab, 2025

Alt. Groundgear Materials
NPRB Proj. 1319
(Rose et al., 2016)



Pelagic

Contact Sensor Performance
CV Gear Study (King et al., 2019, Harris et al., *In Prep*)



Pelagic

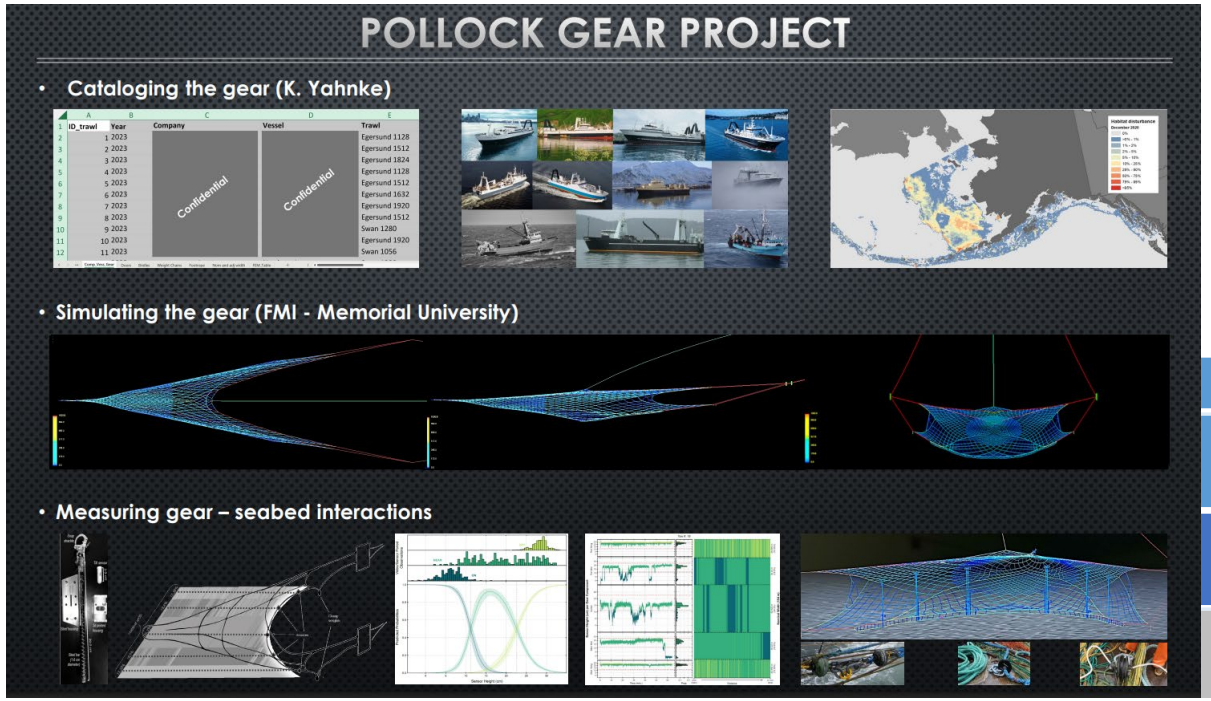
Quantifying and reducing interactions between fishing gear and the seabed in New Zealand (Wilson et al., 2023)

Nonpelagic

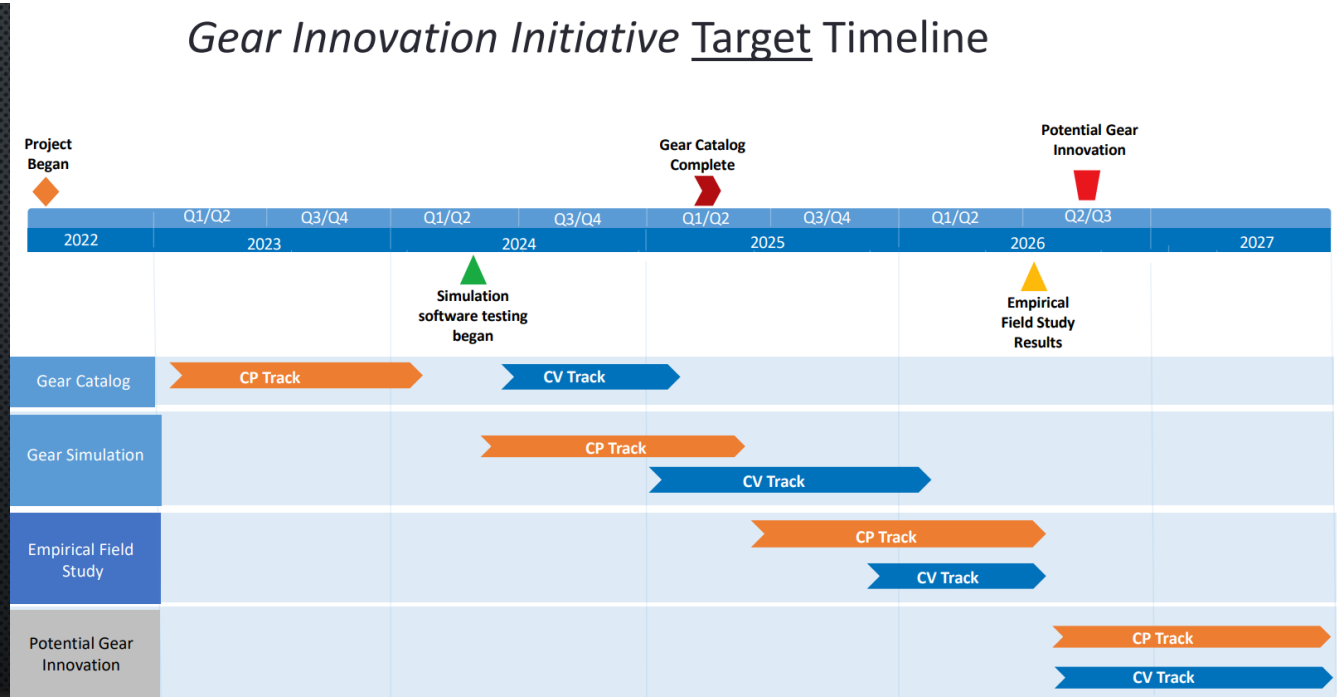
Improving Estimates of Bottom Contact and Recovery (McGonigle et al., 2025)

Nonpelagic

Pollock Gear Project & Gear Innovation Initiative



February 2024



October 2024

***See C3a Industry/research update presentation**

***C3 DRAFT FEM infographic**

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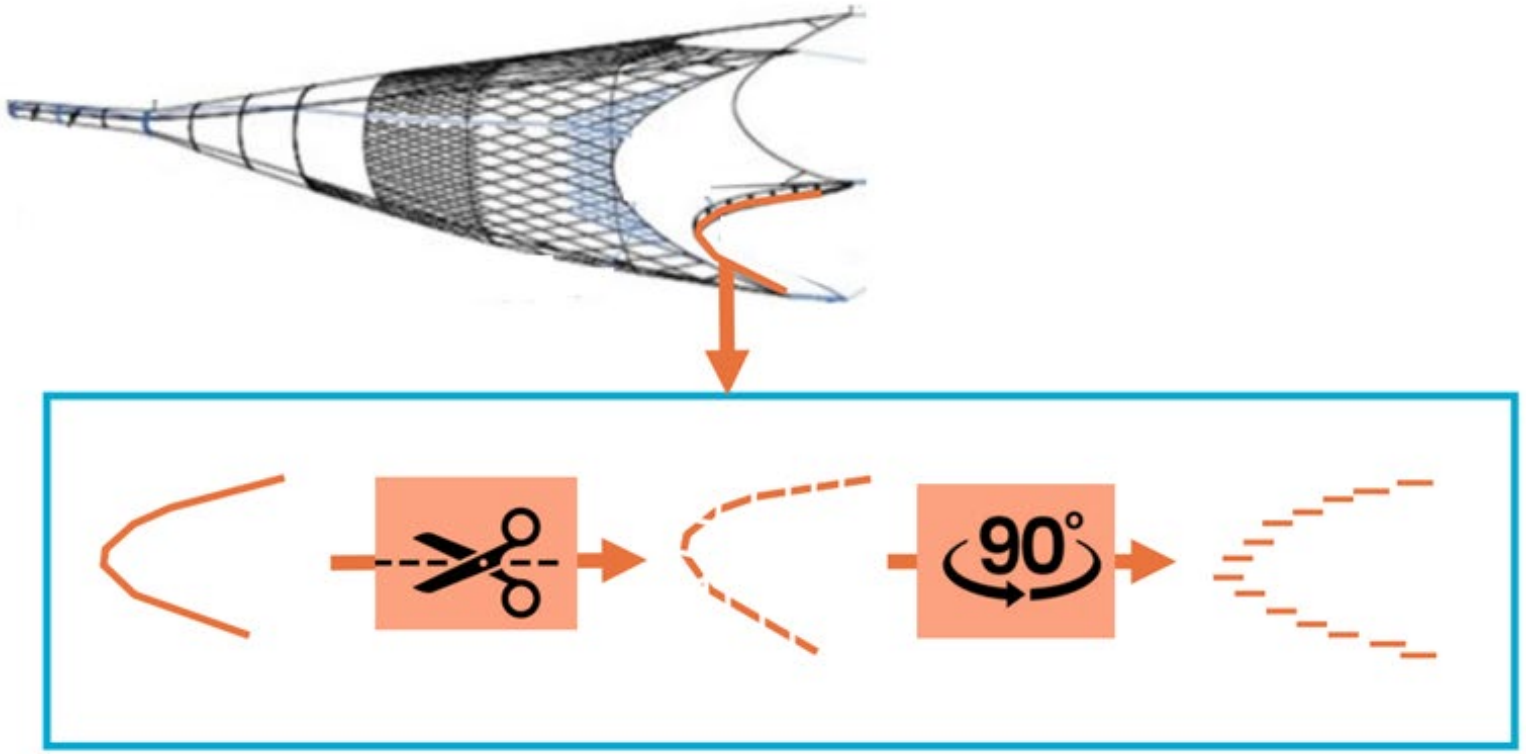
Physical wear - Pelagic trawl gear footrope EFP



(Trident EFP presentation, October 2024).

pgs. 16, 17, 22

Acoustic sensors


Simrad FS80 Trawl sonar

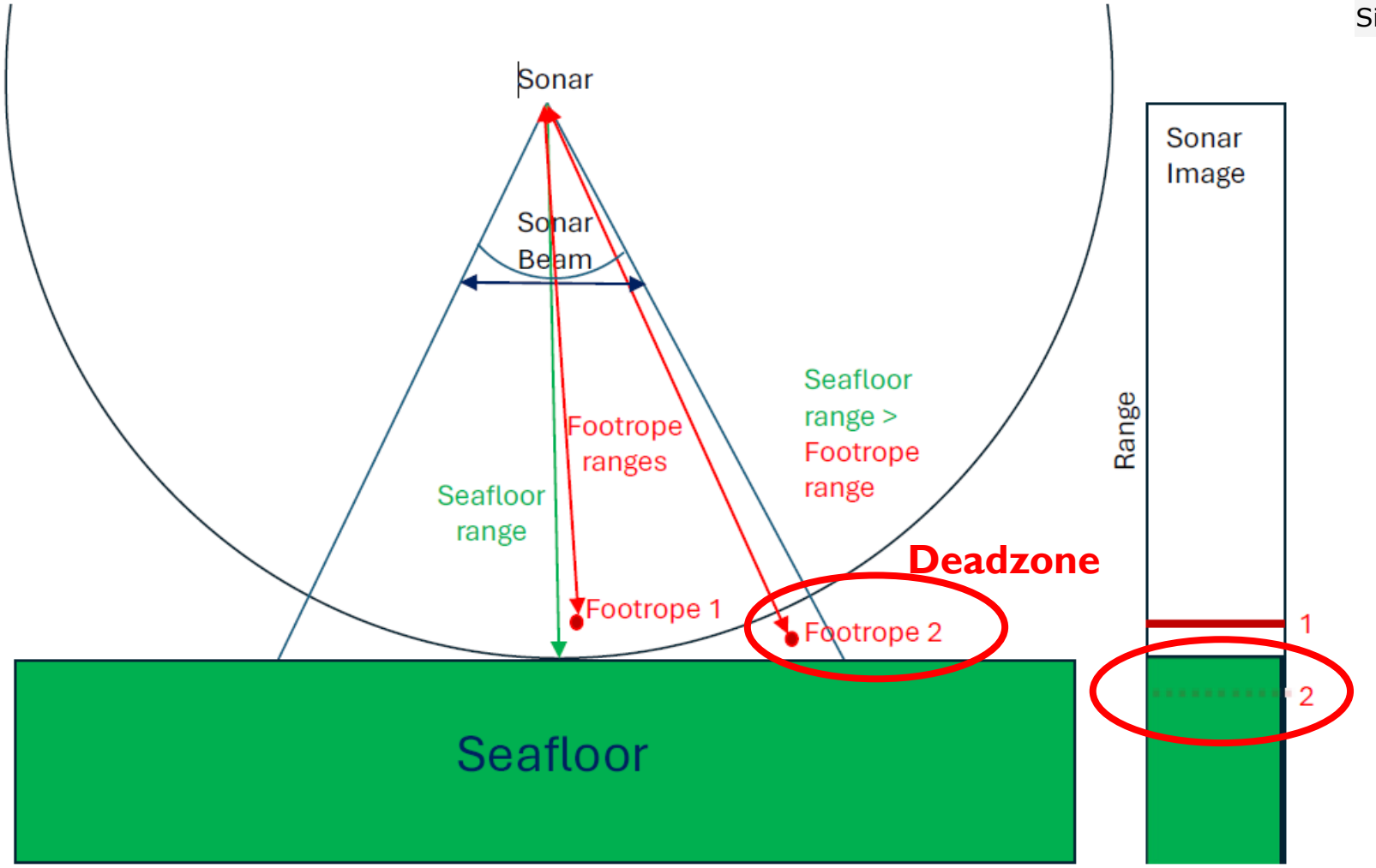


Image: C. Rose

pgs. 18-19

Cameras

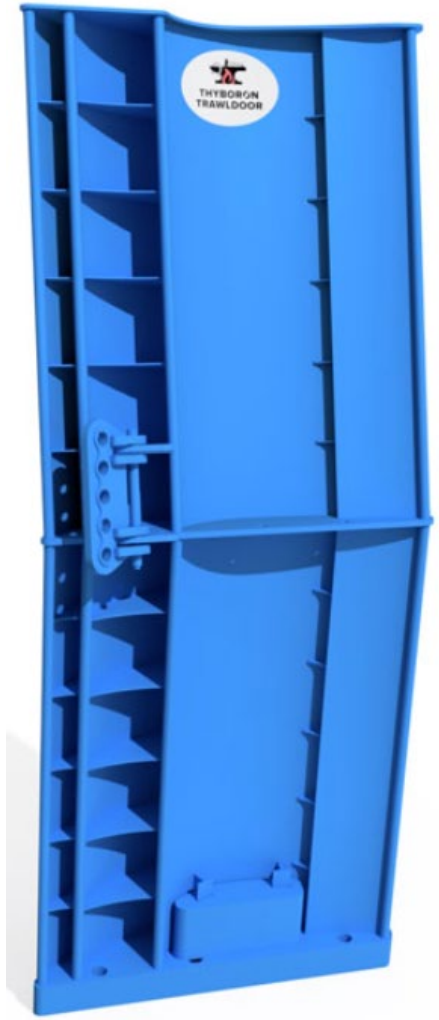
- Electronic monitoring for catch accounting
- Live feed cameras (third, forth, or wireless system) to observe fish and net behavior
- Verification of tilt angle or footrope position or net behavior
- Turbidity challenges from mud, sand, particulate matter in the water column (NOAA bottom trawl survey modernization gear testing; tilt sensor bottom contact studies; FAST Lab bottom contact projects)

Ex: live feed camera system, Simrad FX80 camera and light

pgs. 19-20

Seafloor contact innovation - Other examples

- Midwater door adoption – widely used across nonpelagic and pelagic fleets
- Live feed camera system + manufacturer net plans – optimize spread and minimize contact by watching results in camera feed
    - under- or overspreading, camera clouded with turbid water, correct spread, camera view clear



Ex: Thyboron Type 15 VF pelagic trawl door

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Unobserved crab mortality

Gear Type (# of configs)	Information Type	Individual Event (e.g., pot/trawl) Level			Population Level	
		Bottom Contact Area	*Time on Bottom*	*"Lethality" of gear*	*Total # of Events (pot lifts/trawls)*	*Overlap with Crab*
Pots (2)	*Magnitude*	10^1 m²	Hours to Days	High	10^5	High
	Data Available	Yes	Yes	No	Yes	Yes
	Research Needed	Data mining	Data mining	Field exp'ts	Data mining	Data mining
	Priority	Low	Low	Low	Low	Low
	Timeline (years)	0.5-1	0.5-1	3-5	0.5-1	0.5-1
Lost Pots (2)	*Magnitude*	10^1 m²	Months to Years	Medium	Unknown	High
	Data Available	Yes	Some	Some	Some	Some
	Research Needed	Data mining	Field expt's	Field expt's	Data mining/Field expt's	Data mining
	Priority	Low	Medium	Medium	Medium	Low
	Timeline (years)	1-2	3-5+	1-3	3-5	0.5-1
Hook-and-Line (3)	*Magnitude*	10^4 m²	Hours to Days	Low	10^4	Medium
	Data Available	Yes	Yes	No	Yes	Some
	Research Needed	Data mining	Data mining	Field expt's	Data mining	Crab Dist.
	Priority	Low	Low	Low	Low	Low
	Timeline (years)	0.5-1	0.5-1	3-5	0.5-1	0.5-1
Non-Pelagic Trawl (13)	*Magnitude*	10^6 m²	Minutes	High	10^4	Medium
	Data Available	Yes	Yes	Some	Yes	Some
	Research Needed	Data mining	Data mining	Field Exp'ts	Data mining	Crab Dist.
	Priority	Medium	Medium	Medium	Low	Medium
	Timeline (years)	0.5-1	0.5-1	3-5	0.5-1	1-5
Pelagic Trawl (30)	*Magnitude*	10^5 m²	Minutes	High	10^4	Medium
	Data Available	Yes	Yes	No	Yes	Some
	Research Needed	Data mining	Data mining	Field Exp'ts	Data mining	Crab Dist.
	Priority	Medium	Medium	High	Low	Medium
	Timeline (years)	0.5-1	0.5-1	3-5	0.5-1	1-5

Table 1, UFMWG Final Report, June 2024

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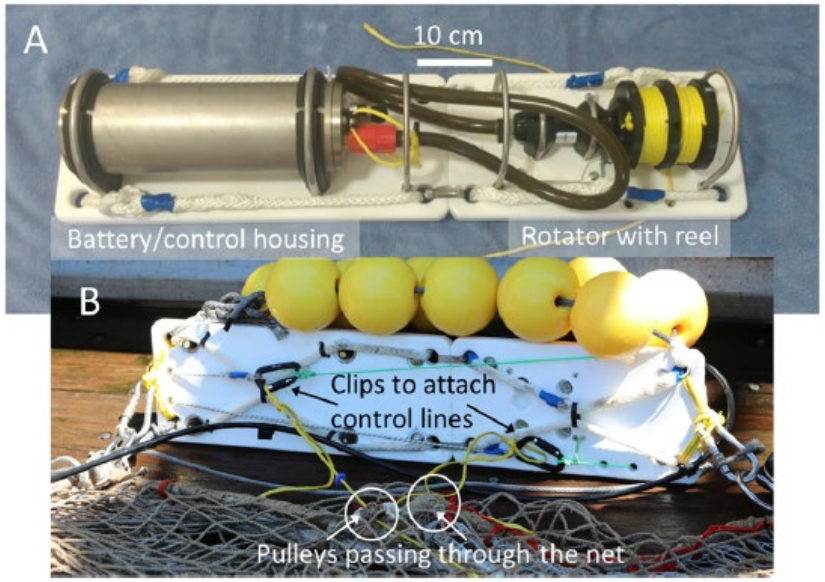
Bycatch reduction

Active Selection (ActSel)



Rose and Barbee 2022

Custom TIMEZERO

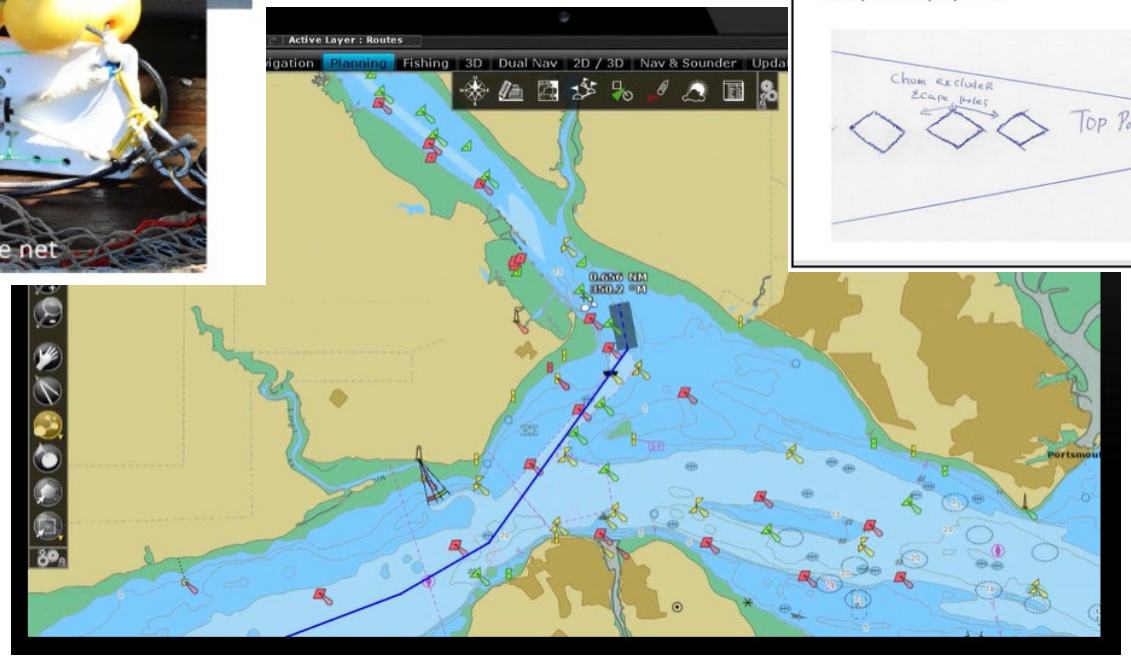
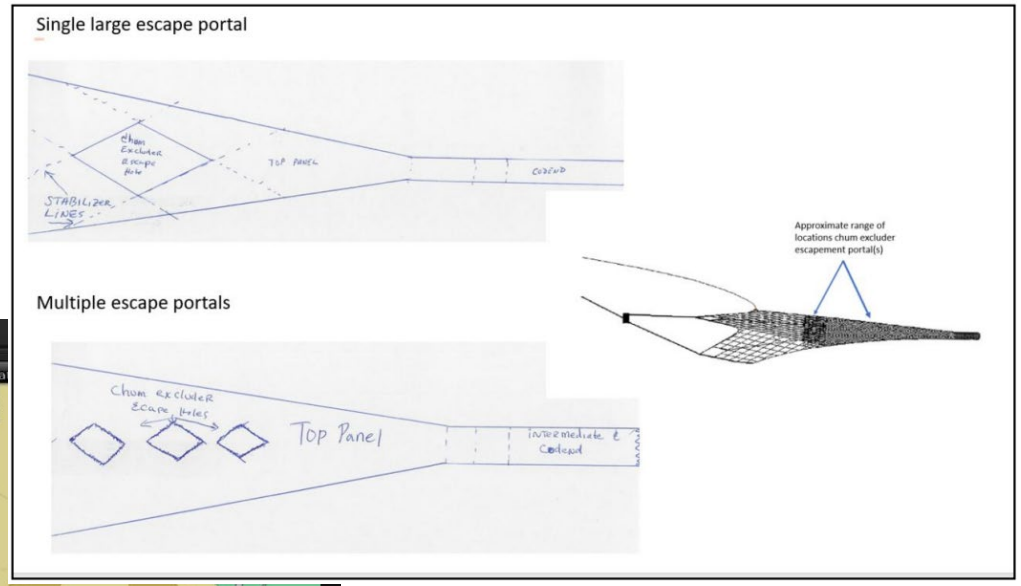


*image copied from TIMEZERO, not an actual depiction

Chum excluder EFP 2025-01



NPFRF, Gauvin 2025

pgs. 23-24

Gear revision process – Trawl sweeps

Trawl sweep modification to nonpelagic trawl gear

- BSAI FMP Amendment 94 (6 yrs) and subsequent extension - GOA FMP Amendment 89, 3 more years
- Incentive: reopen a portion of Northern Bering Sea Research Area (NBSRA) once trawl gear modification was implemented

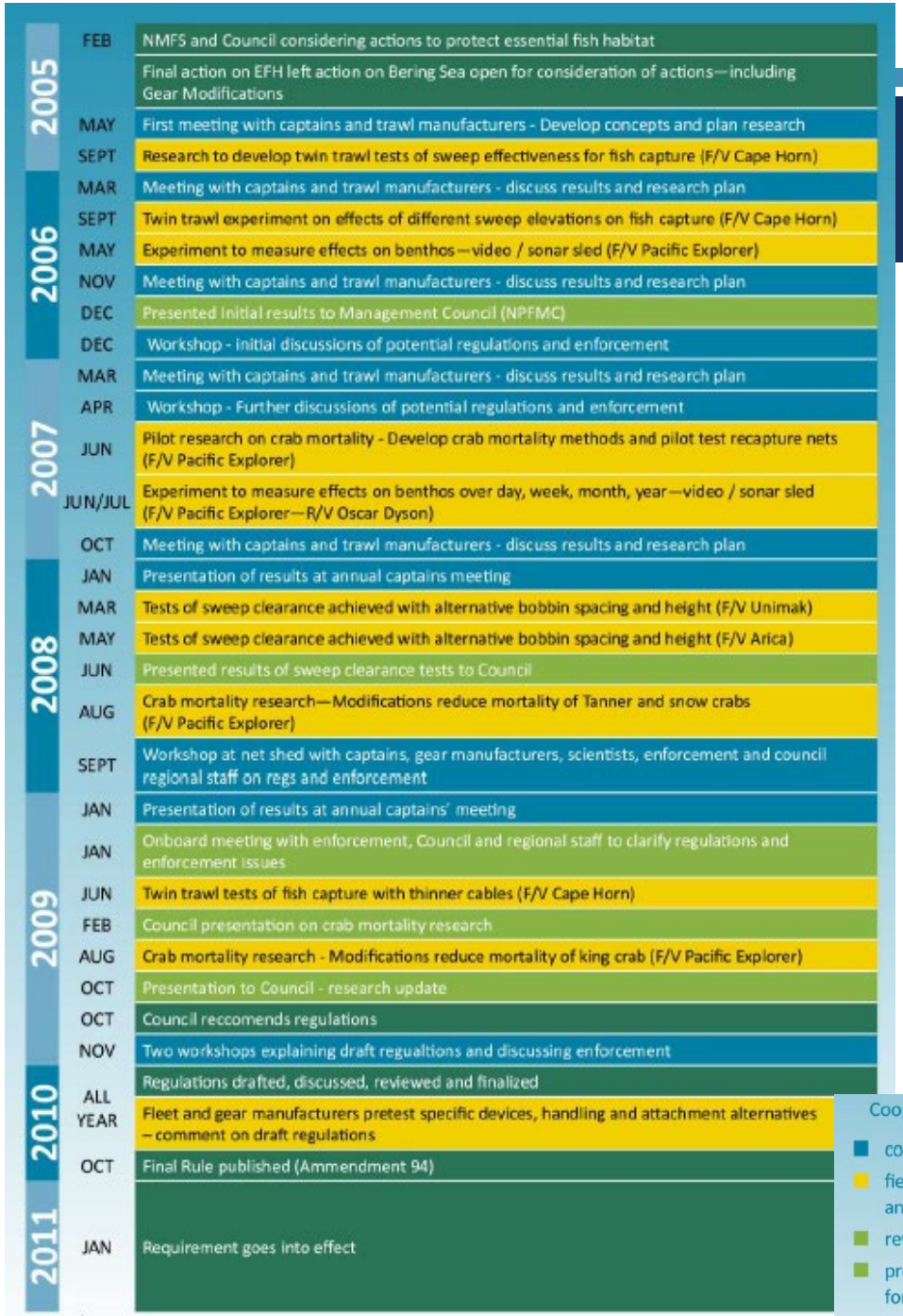
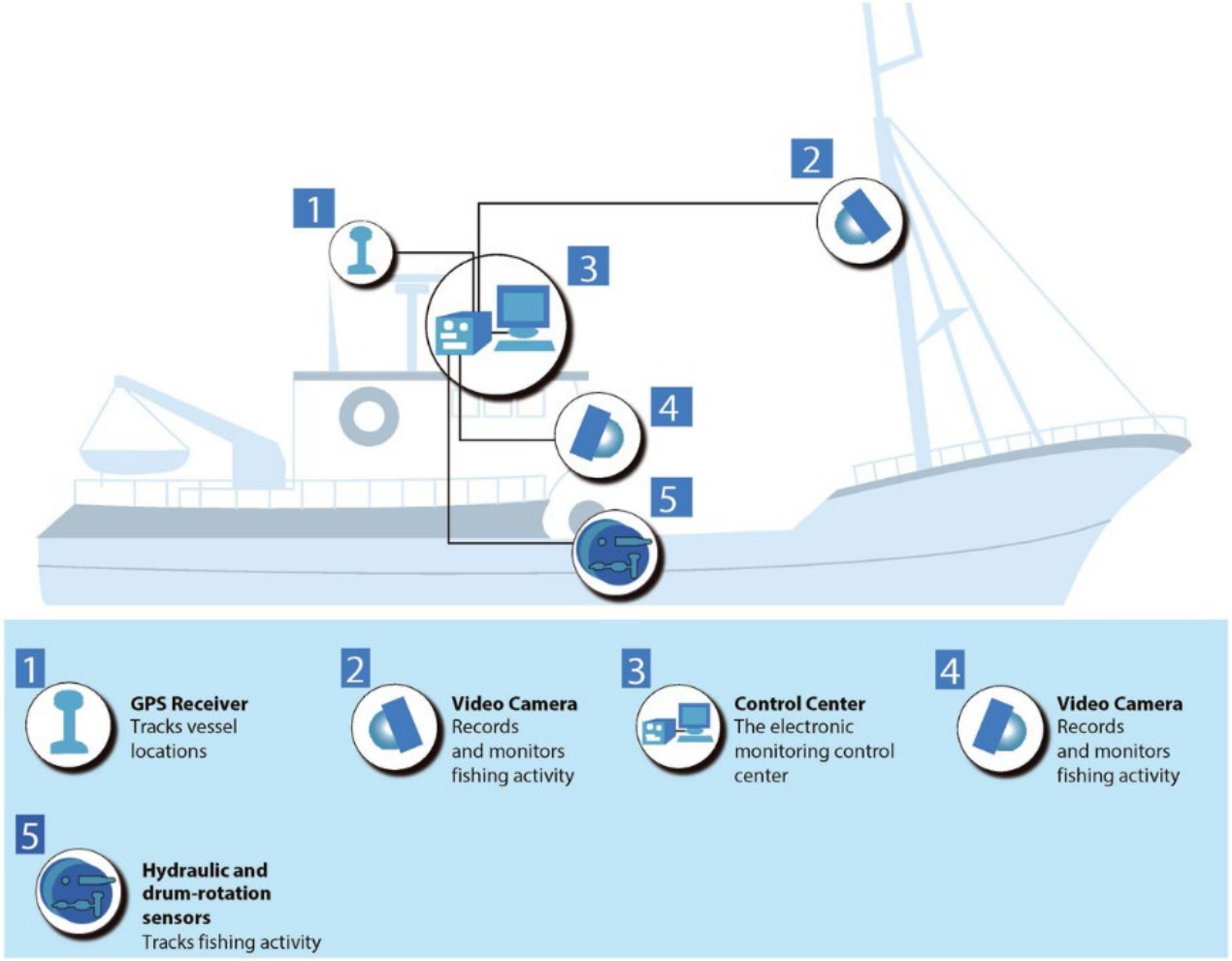


Figure 6

pgs. 25-28

Gear revision process – Trawl EM



NOAA: https://www.fisheries.noaa.gov/feature-story/implementing-electronic-monitoring-alaska-fisheries

- BSAI FMP Amendment 126, GOA FMP Amendment 114
- Applies to: Catcher vessels, pelagic gear, tender vessels delivering pollock
- 2018 – pilot testing w/ volunteers
- 2019 – EFP w/ 79 CVs
- 2022 – draft EA/RIR
- 2024 – final rule published in August

pgs. 25-28

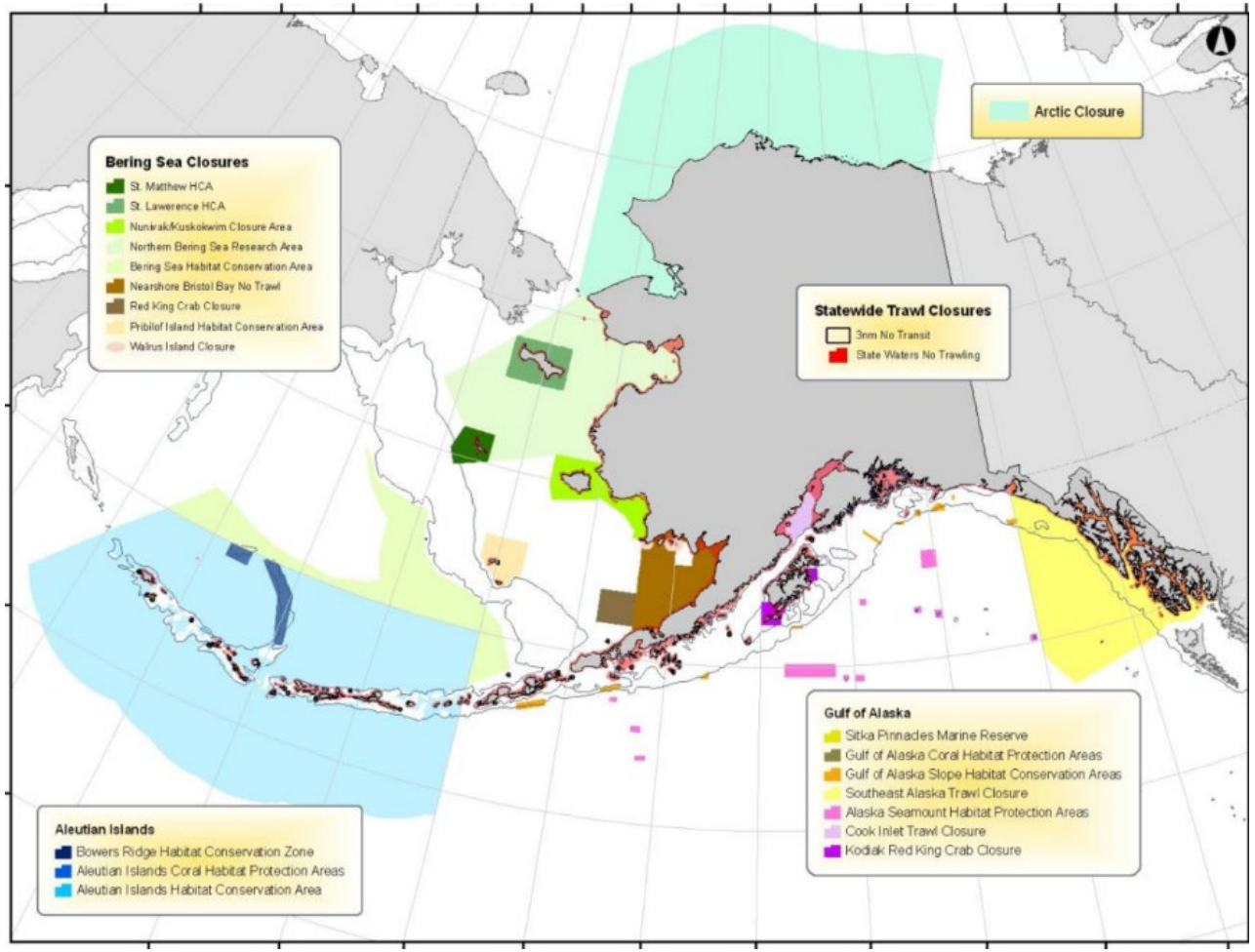
Management tools to inform metrics to achieve Council objectives

- **EFP** – allow for testing
- **EFH 5-year Review** – determination of adverse effects (Component #2; 50 CFR 600.815(a)(2))
- **FEM** – currently our best tool to determine habitat disturbance from commercial fishing gear
- **Ad hoc committees** – e.g., UFMWG in 2023
- **IPAs** – salmon bycatch avoidance
- **Performance standards**
- **Outreach** – e.g., workshops, webinars

pgs. 29-30

Future considerations

- Closure areas, gear limitations - Several regs rely upon definition
- Displacement/spillover – e.g., changes to CPUE or PSC rates



NPFMC Conservation Areas Summary

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*See C3c EA/RIR analysis to modify PTR definition for complete list

Council action at this meeting

- Expanded discussion paper
- Move to analysis:
  - Establish Purpose and Need, alternatives for analysis
- No further action

Thank you!