

Testing pot gear modifications to reduce crab bycatch in Bering Sea cod and halibut fisheries

BREP Grant Project Summary for NPFMC

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**NOAA
FISHERIES**



**Bering Sea
Pot Cod
Cooperative**



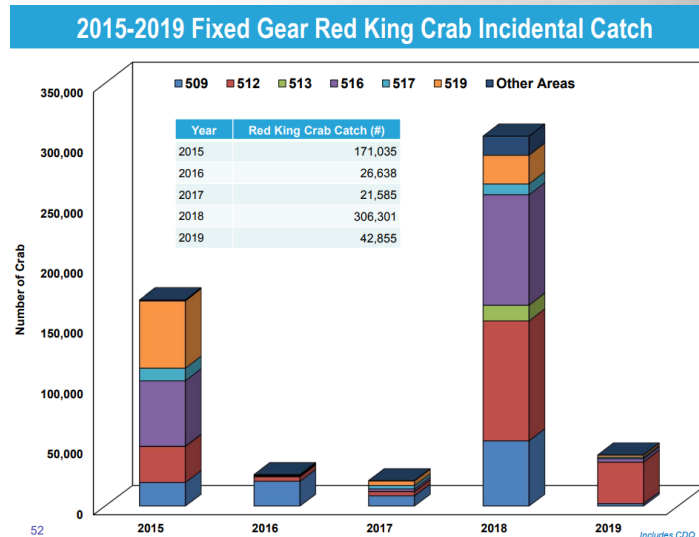
Thanks to our
partners and
collaborators

*"working with fishermen through gear planning,
lab trials, and field work during actual fishing is a
highlight of this project to get to gear options that
help everyone"*

Why?

Periodic high crab bycatch in other pot fisheries

- 2018 high crab bycatch event in pot cod fishery triggered fixed gear industry exploring options
- Focused on gear design to keep crab out as the best choice for bycatch reduction while keeping access to fishing grounds



Project Objectives

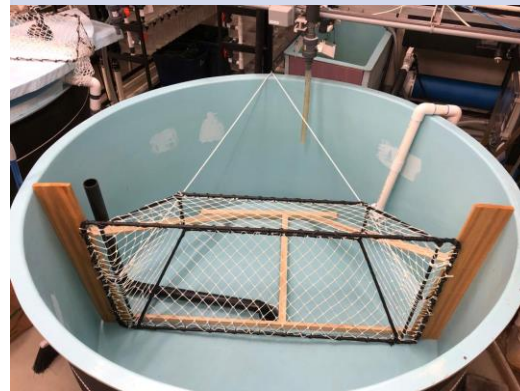
Host

host an industry gear committee meeting and determine gear modifications to be tested,



Conduct

conduct laboratory experiments to determine bycatch reduction effectiveness of pot modifications,



Field

field testing of modifications on fishing grounds, and

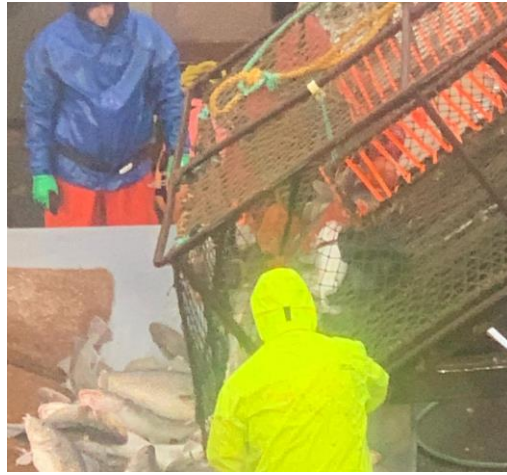


Disseminate

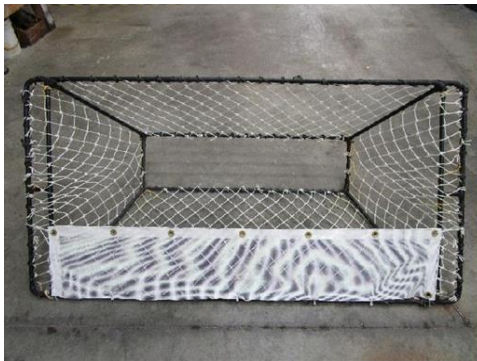
disseminate information.



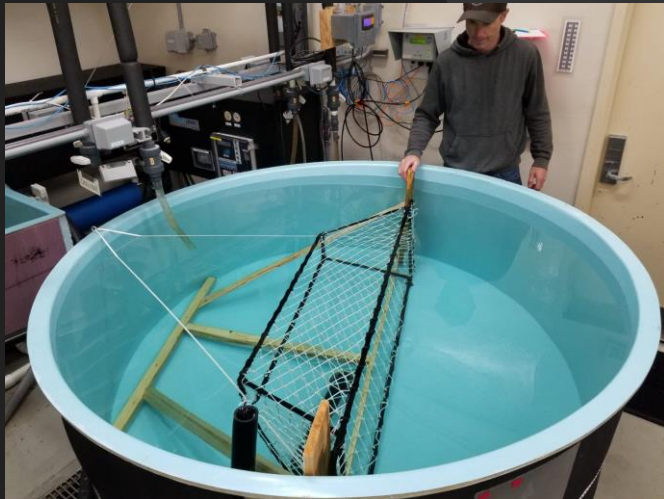
Photos of Gear In the Fishery



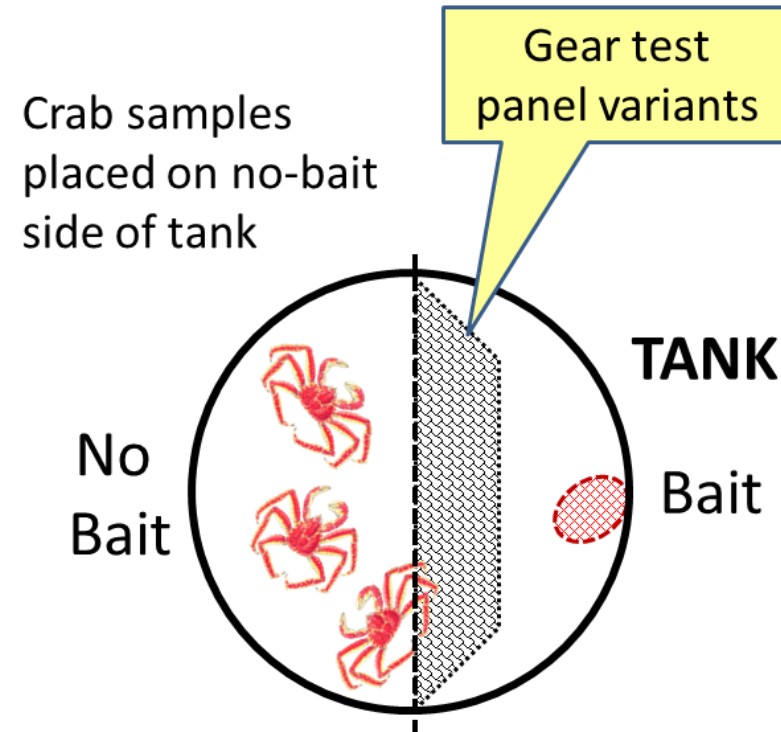
Photos of Test Gear



Methods: Lab & Field Overview



Lab Methods



Basic data recorded:

- pass/no pass through the test panel
- species, size, and sex

Basic controls:

- random draws, # crabs per trial
- bait, soak time, temp

Methods: Lab & Field Overview



Field Methods



Boats chosen – gear placed:

- gear options split among boats
- training/directions for data collection
- recording pot-level fish/crab catches
- fishing activity not prescribed
- distribute test gear among all gear
- record scale of all gear as reference

Adjustments to cover opportunities:

- monitor total test crab catches
- adjust gear options if needed
- adjust seasonal coverage if needed

Other field observations:

- behavioral monitoring with video
- vessel or gear problems
- typical/atypical fleet activity

Methods: Lab & Field Overview



HILTY TRIGGER



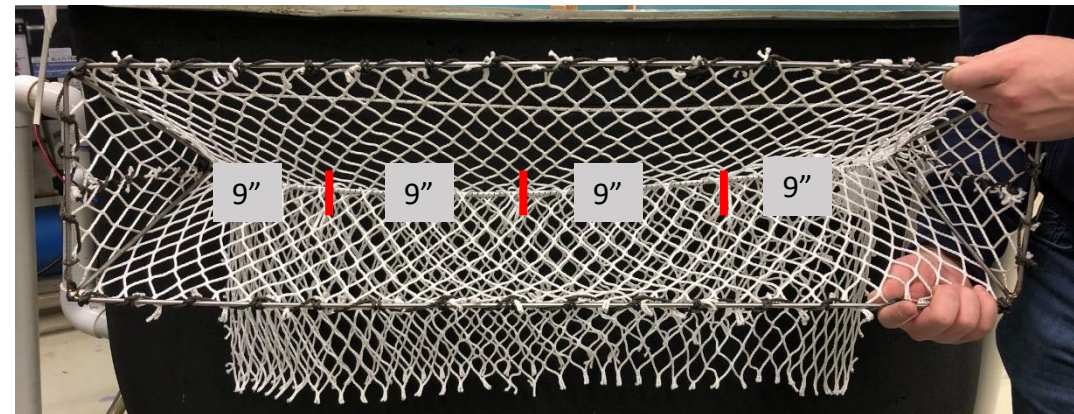
NEPTUNE TRIGGER



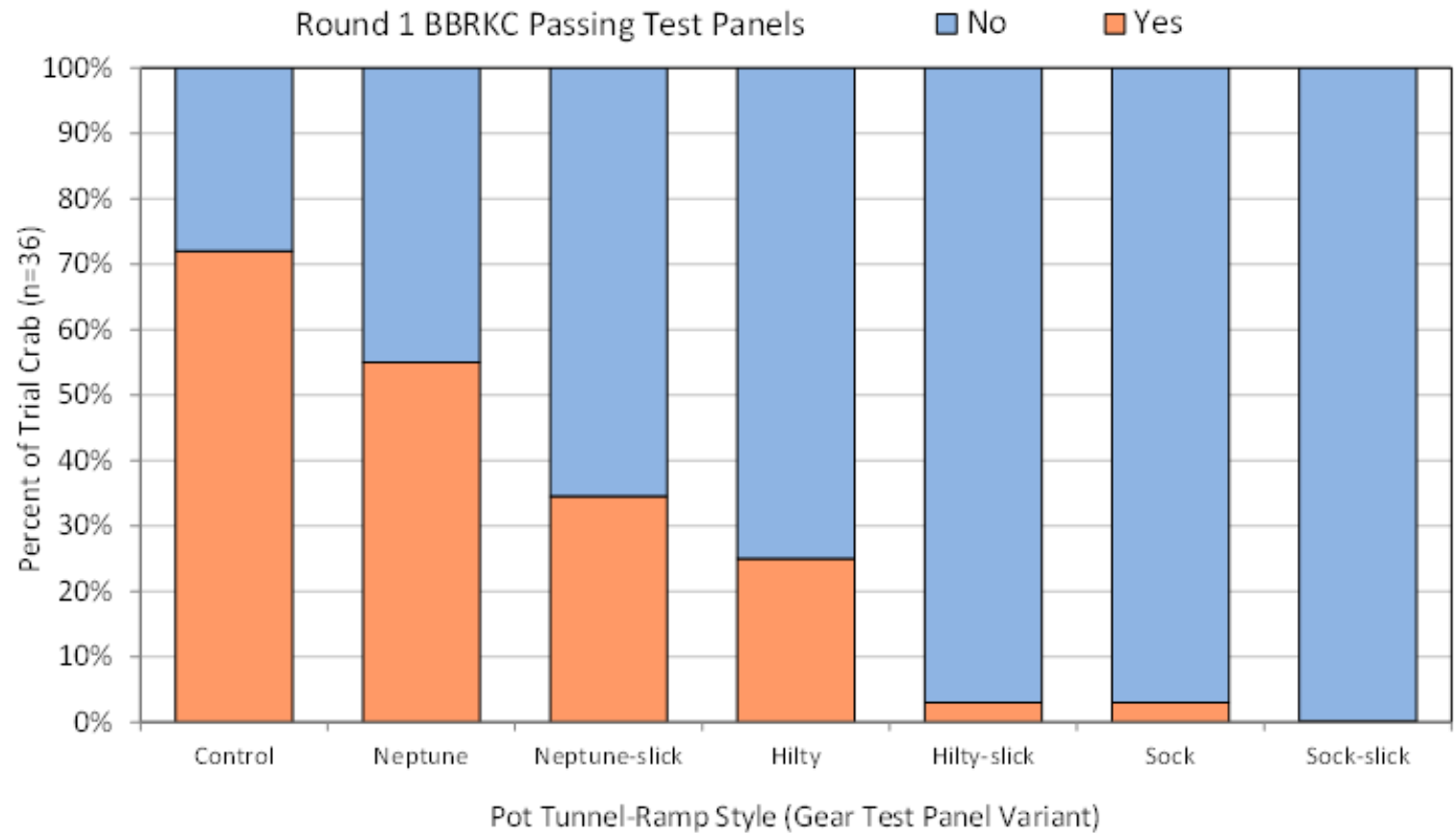
Methods: Lab & Field Overview



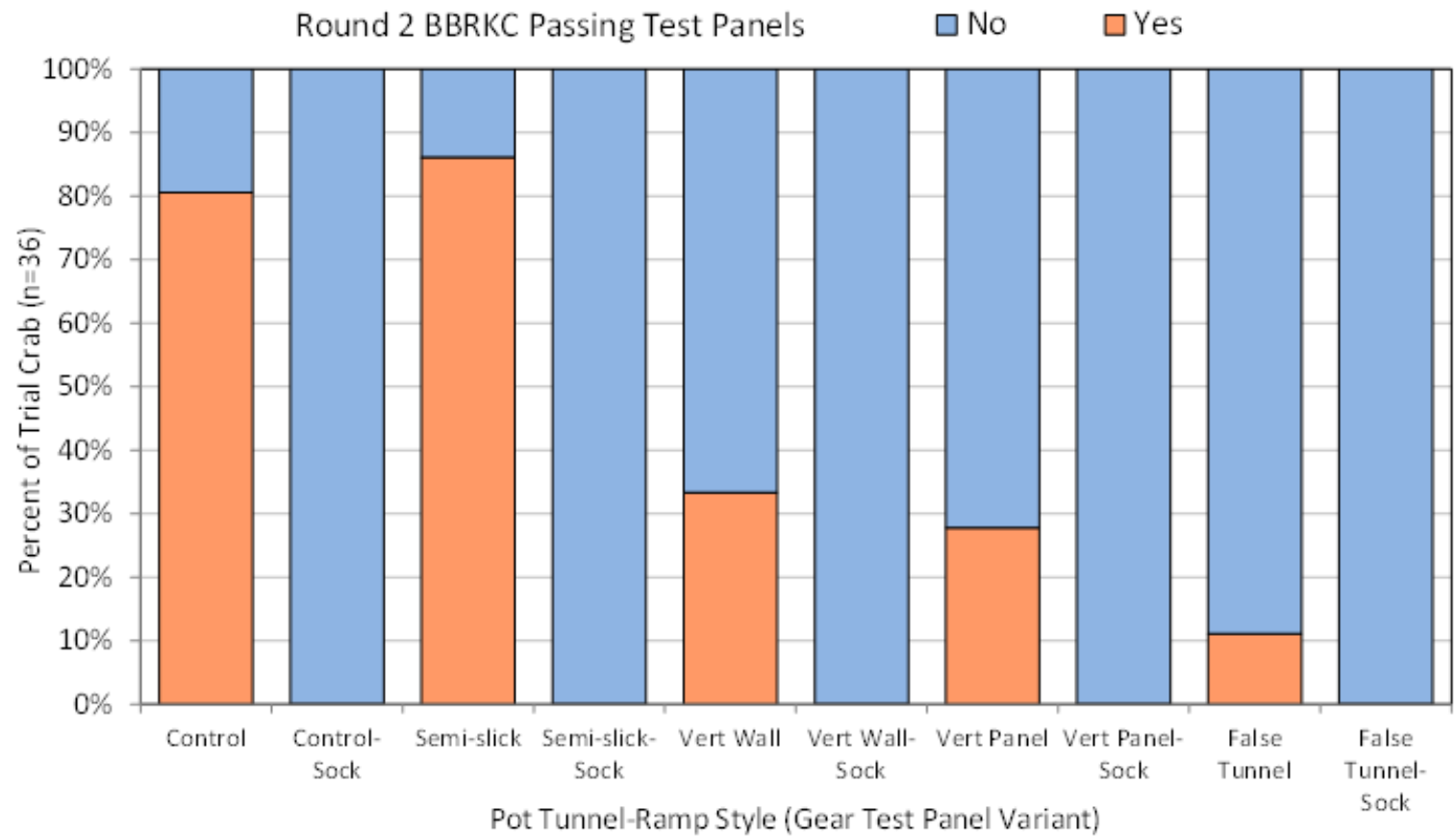
SOCK TRIGGER: with three twine excluders, with approximately 9" between excluders.



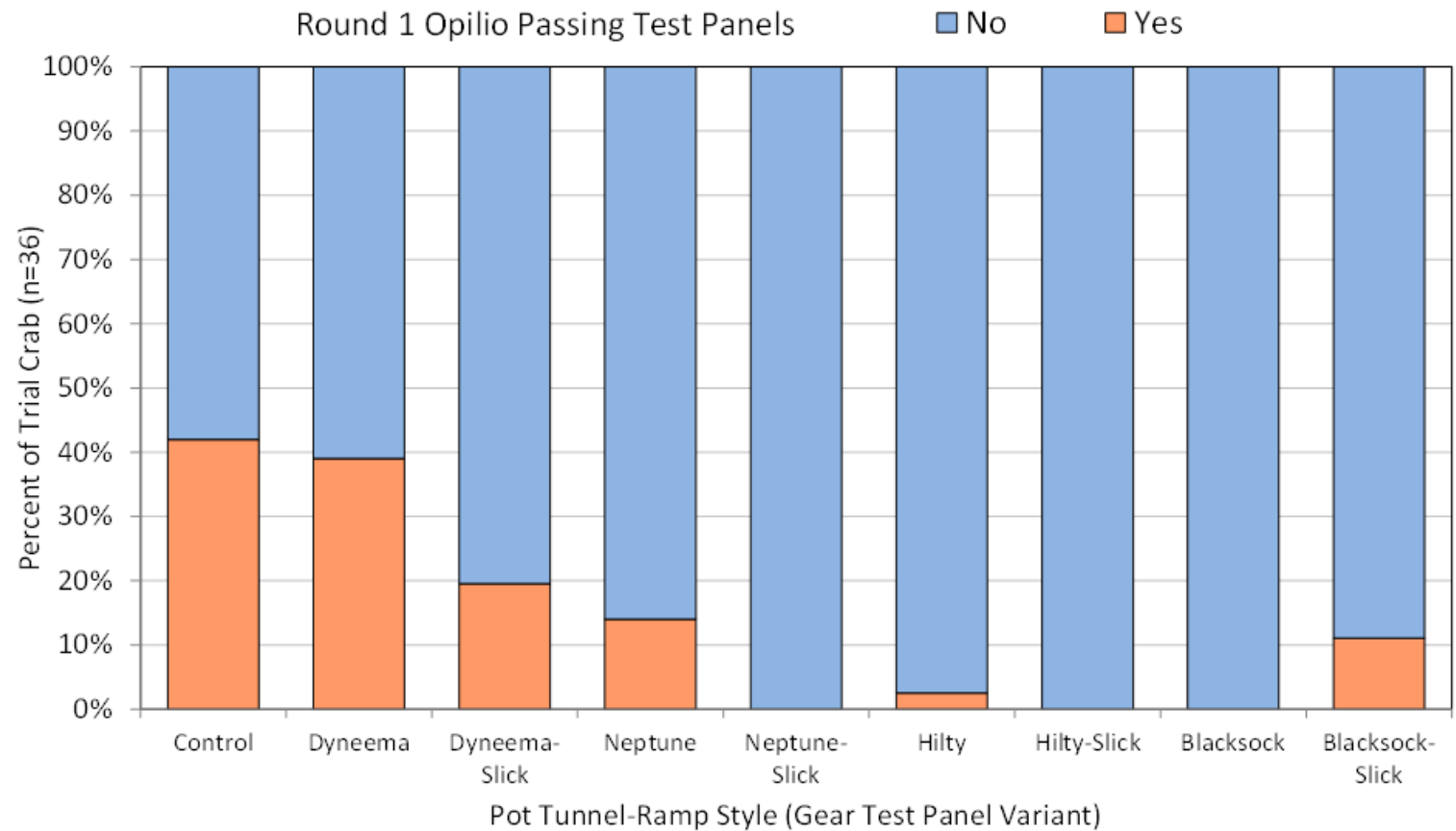
Results RKC LAB Round 1



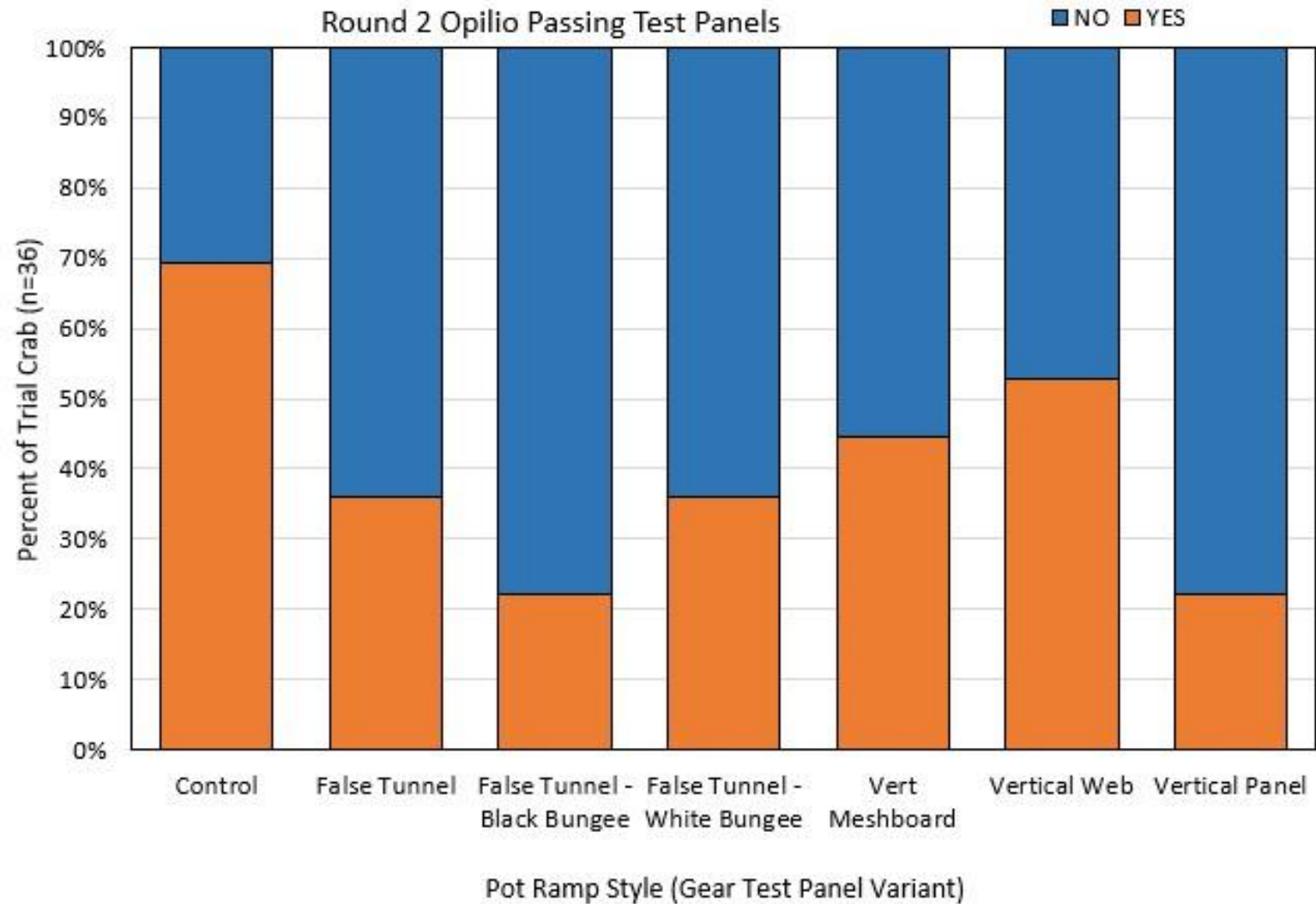
Results RKC LAB Round 2



Results Opilio LAB Round 1



Results Opilio LAB Round 2



Results Halibut Field – SEP 2021 Halibut Pot Fishery



Pilot Testing of Halibut Pots

Ramp Style	Pot Lifts	Halibut ind.	Halibut CPUE	% of Effort
CONTROL	156	82	0.53	85%
False Tunnel	13	3	0.23	7%
Vertical Wall	14	4	0.29	8%
Grand Total	183	89	0.49	100%

Key Takeaway:

- False Tunnel and Vertical Wall appears to reduce halibut CPUE
- Differences in CPUE not significant due to high variability and low sample size
- Fishing was done away from crab grounds
- Challenging to find targeted halibut pot efforts

Results Cod Field 1 JAN 2021 Pot Cod Fishery

(generally away
from crab grounds)

Pilot Testing of Sock and Slick Ramp

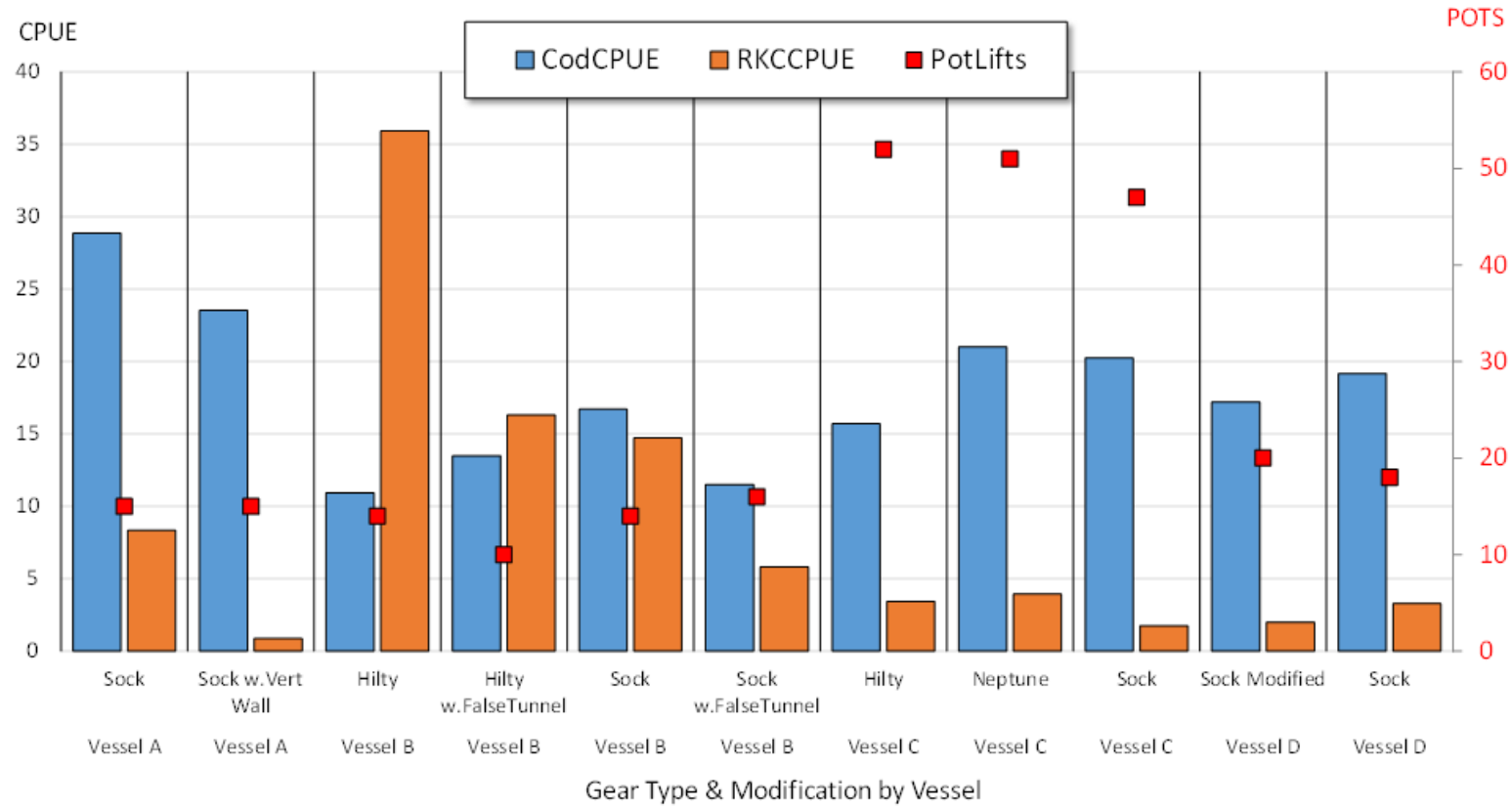
Vessel	Ramp/ Tunnel Style	Pot Lifts	Cod Individuals	Cod CPUE
Vessel A	Hilty	54	595	11.02
	Sock tunnel	54	566	10.48
Vessel B	Control	3,429	30,708	8.96
	Slick Ramp	221	1,171	5.30

Key Takeaway:

- Cod CPUE in Sock and Hilty were essentially the same
- Cod CPUE in pots with Slick Ramp was 59% of CPUE w/out Slick Ramp
- A-season did not occur where crab were present

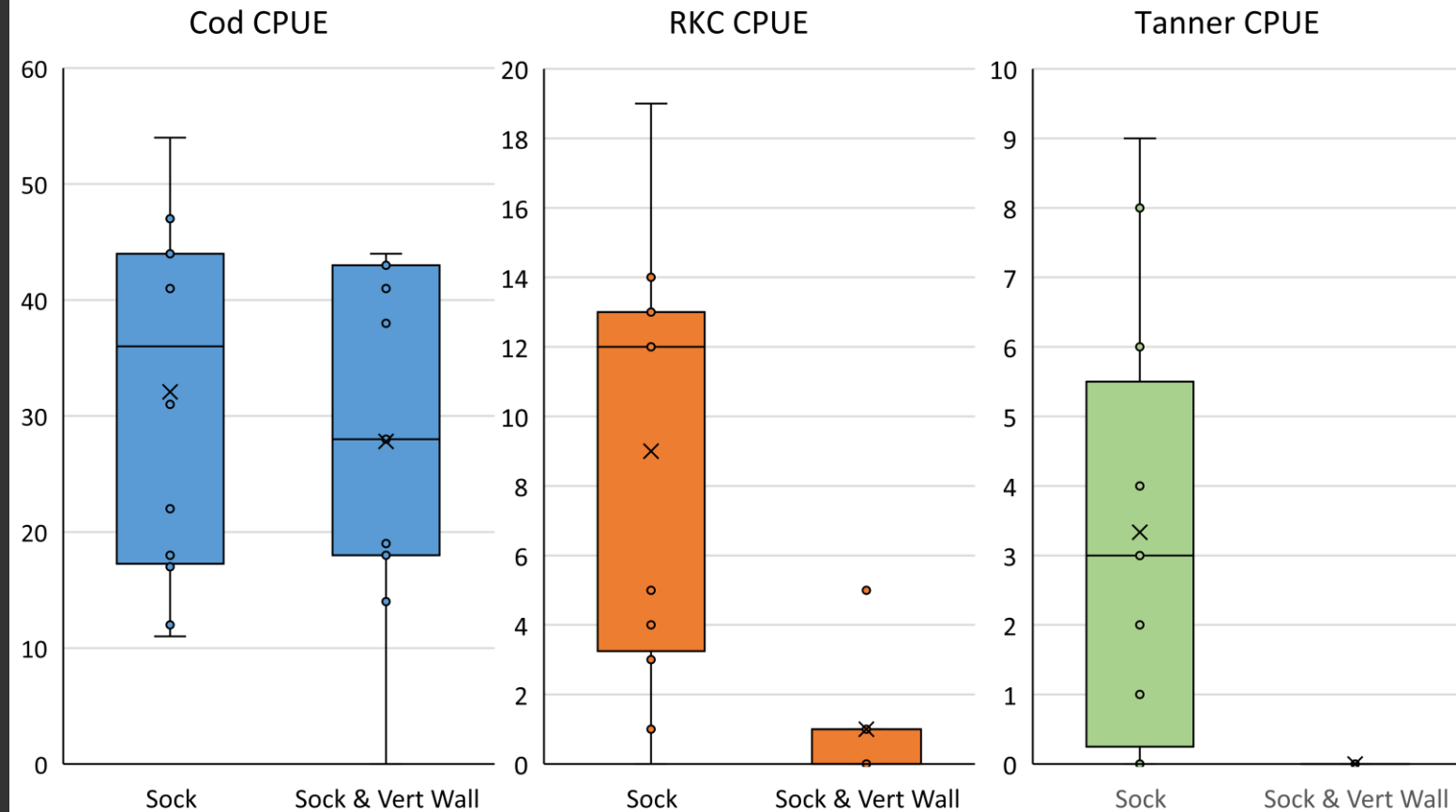
Preliminary Results RKC Field 1 SEP 2021 Pot Cod Fishery

By vessel and gear variant



Results RKC Field 1
SEP 2021
Pot Cod Fishery
Vessel A

Gear Variant: Vertical Wall



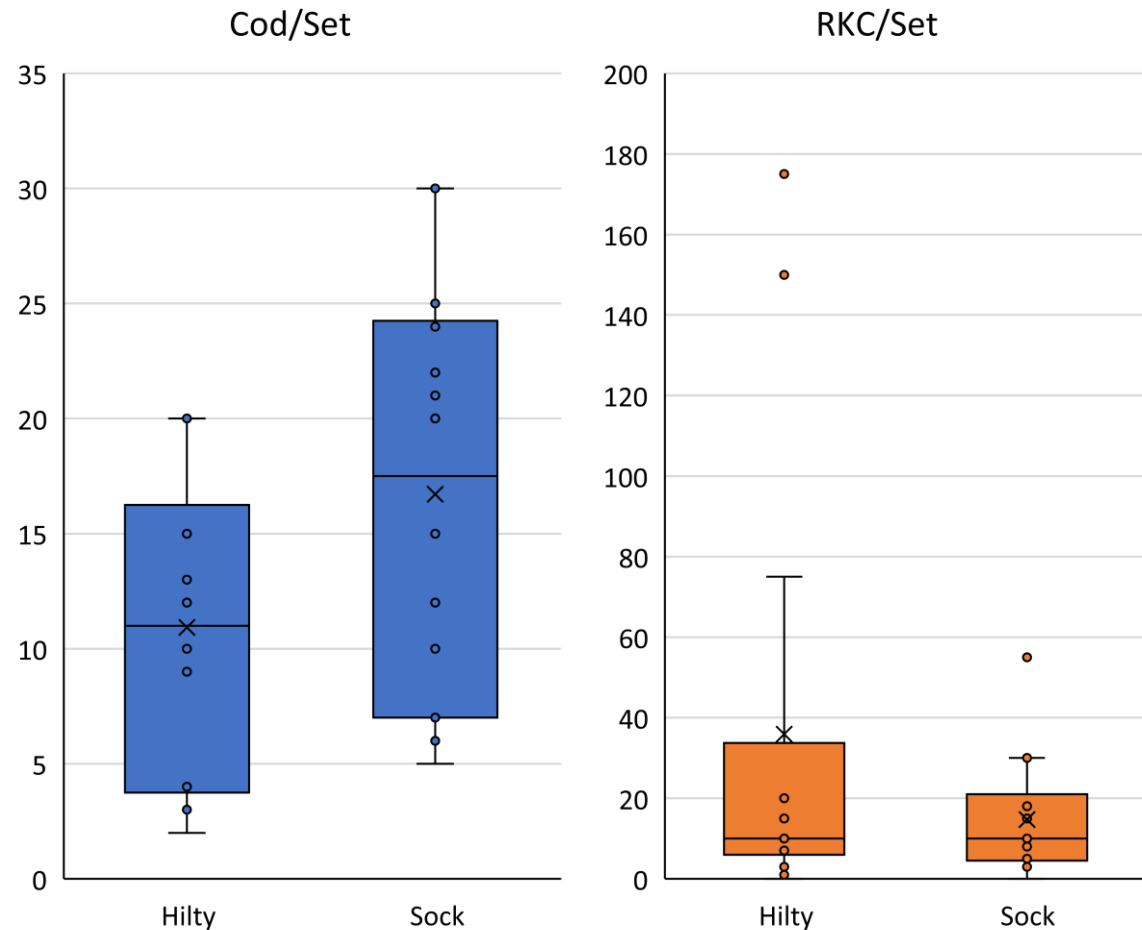
Key Takeaway:

Cod CPUE was not significantly effected by Vertical Wall

RKC and Tanner CPUE significantly decreased with Vertical Wall

Results RKC Field 1
SEP 2021
Pot Cod Fishery
Vessel B

Gear Variant: Hilty (C) v. Sock

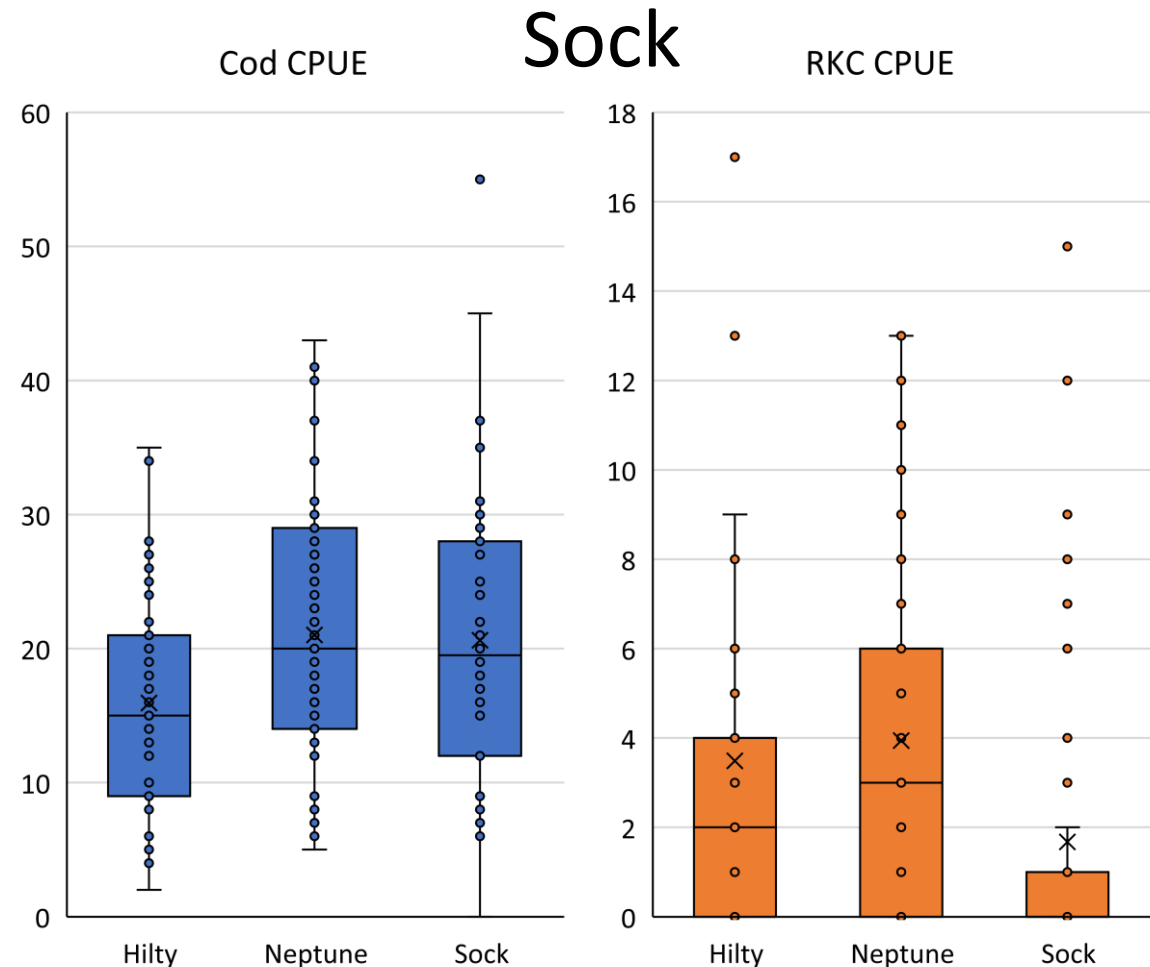


Key Takeaway:

Sock appears to outperform Hilty (C), but no significant difference due to low sample size and high variability

Results RKC Field 1 SEP 2021 Pot Cod Fishery Vessel C

Gear Variant: Hilty(C), Neptune(C), Sock



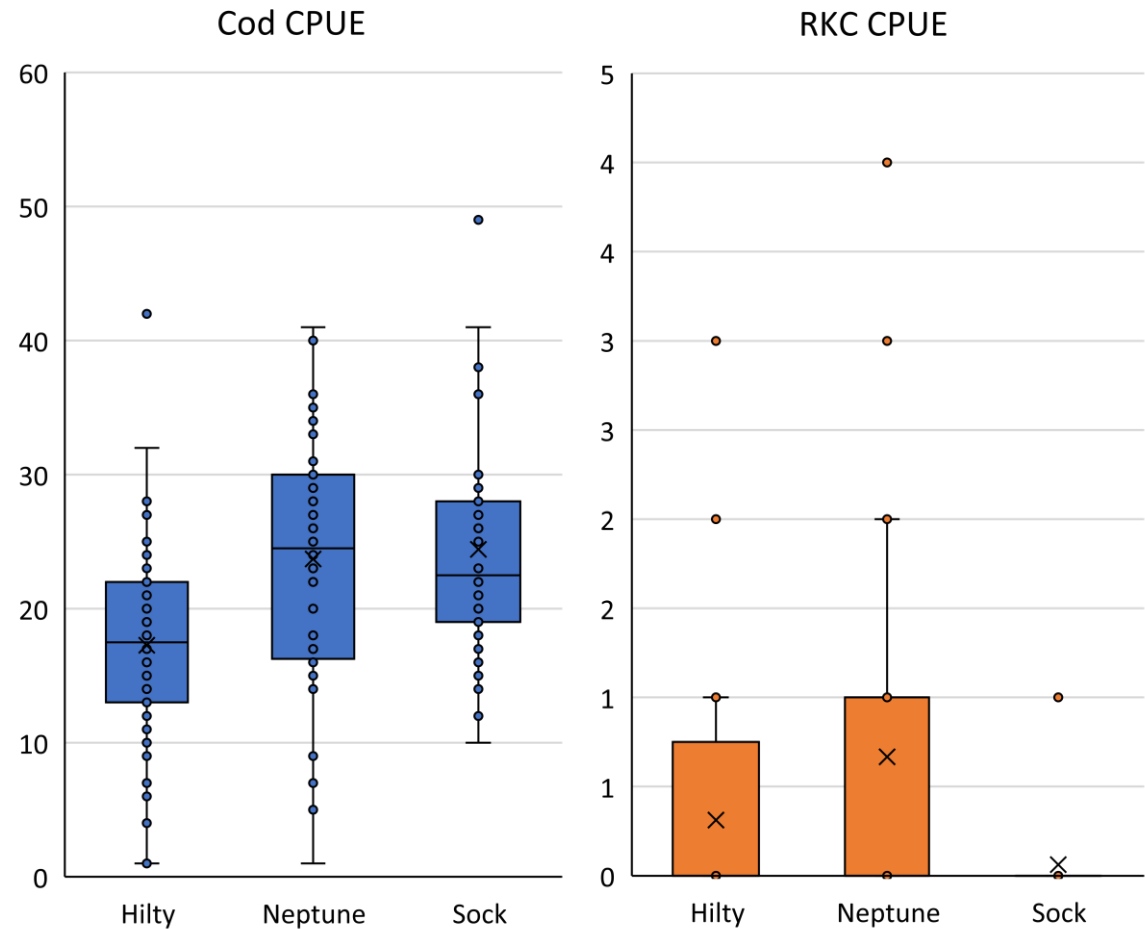
Key Takeaway:

Cod CPUE in Sock is \geq Neptune (C) and Hilty (C)

Red king crab CPUE in Sock is \leq Neptune (C) and Hilty (C)

Results RKC Field 2
SEP 2022
Pot Cod Fishery
Vessel E

Gear Variant: Hilty(c), Neptune(c), Sock



Key Takeaway:

Cod CPUE in Sock is \geq Neptune (C) and Hilty (C)

Red king crab CPUE in Sock is \leq Neptune (C) and Hilty (C)

Findings & Next Steps

- Slick ramps reduced Cod CPUE
- **Vertical walls** reduce crab bycatch, but need robust material to withstand fishing operations
- **Vertical panels** (no ramps) promising lab results, current and future studies in field
- Possible further testing of slinky pots

Key Findings



- RKC CPUE (bycatch) is significantly lower in **Sock Trigger** than in the other triggers commonly used in the fishery
- Cod CPUE in **Sock Trigger** is equivalent, or better than the other triggers commonly used in the fishery

These results are not intended to be prescriptive or lead to regulatory actions, but rather are providing research back-up to fishermen-led gear designs which continue to evolve and improve

A large crab, likely a King Crab, is shown on a dark, wet wooden surface. The crab is the central focus, with its legs and body clearly visible. The background is slightly blurred, emphasizing the crab. The text is overlaid on the image.

THANK YOU

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