



## BREP PROJECT UPDATE

### *Testing Pot Gear Modifications to Reduce Crab Bycatch in Cod and Halibut Fisheries*

#### LAB RESULTS & FIELD WORK

Jan 2021

The Alaska Bering Sea Crabbers (ABSC), Bering Sea Fisheries Research Foundation (BSFRF), and Natural Resources Consultants (NRC), with the support of several partners (listed below), were granted two awards from the NOAA Fisheries Bycatch Reduction Engineering Program (BREP) to conduct lab and field experiments to develop and test the effectiveness of crab bycatch reduction in a variety of pot gear modifications. These projects test pot gear modifications by working with fishermen from the halibut, cod, and crab fisheries, as well as gear manufacturers, to utilize their knowledge and experience when coming up with the design and then applying a scientific protocol to rigorously test its effectiveness. The goal of these projects is to work with the industry to find gear designs effective in reducing bycatch while still catching target species, then encourage the voluntary use of those designs. We do not intend for it to necessarily result in regulatory requirements.

#### **Two Grants**

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We have been awarded two BREP grants to test different pot gear configurations to reduce crab bycatch with one starting in 2019 and the other in 2020. Both grants have lab and field work components. Lab work tests the gear's effectiveness on crab in a controlled environment under observation. The field work tests the gear's effectiveness not only on bycatch but also on target species in real world conditions while actively fishing.

**BREP Grant 1** tests the following gear configurations (see Attachment 1 for images):

1. **Sock tunnel** – Cod fishery sock tunnel, 6" mesh flap with a bungee on the bottom. Two modified versions of cod sock tunnels were altered to fit the needs of the halibut pot fishery ("Dyneema" and "Blacksock").
2. **Neptune trigger** – 2 rows of overlapping orange flexible plastic fingers
3. **Hilty trigger** – Stainless steel with hinged fingers laying across opening and a small bungee to keep the trigger laid down in currents.

#### *Additional option*

- **Slick track** – slick surface added on the ramped entrance leading to the tunnel/trigger



Bering Sea  
Pot Cod  
Cooperative



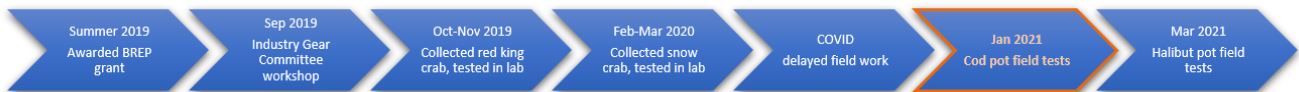
**BREP Grant 2** tests additional gear configurations as follows (see Attachment 2 for images):

1. **Vert wall** – vertical barrier wall 10.5" high at the base of the pot ramp
2. **Semi-slick** – "semi" slick mesh ramp that some industry folks have already been experimenting with in the field; allows more flow of bait scent outside pot to target species
3. **Vert panel** – non-ramped, purely vertical panel
4. **False tunnel** – false-tunnel extending from the base of the tunnel-eye to the outer frame of the pot panel, 14" high off the base of the pot ramp.
5. **Sock tunnel** – variation of the original sock tunnel tested in 2019, with one additional excluder

### ***Project Timeline***

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#### **BREP Grant 1**



#### **BREP Grant 2**



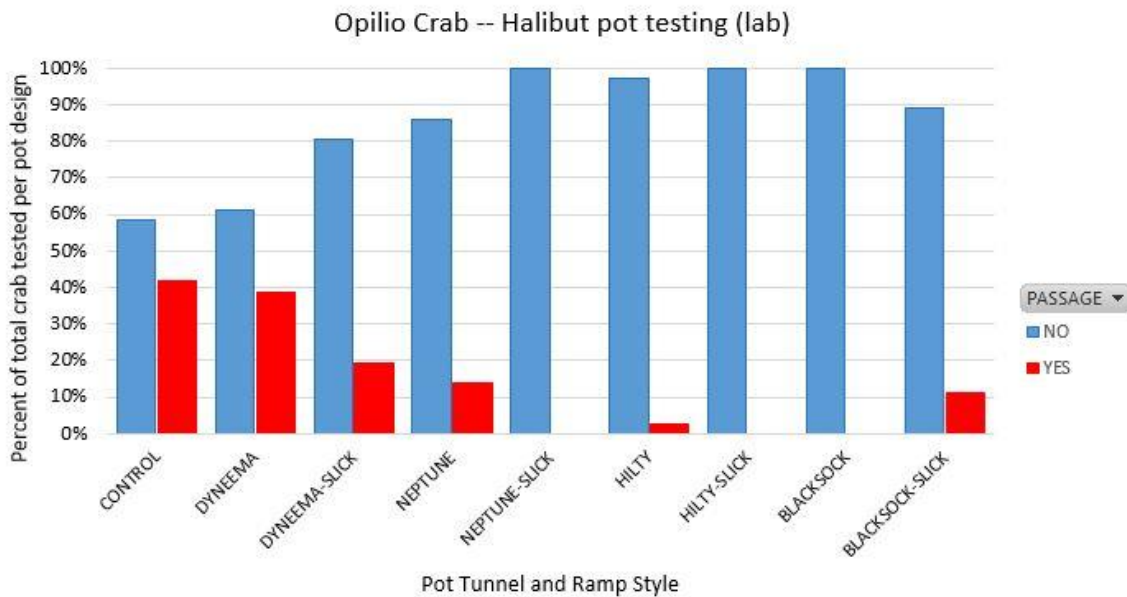
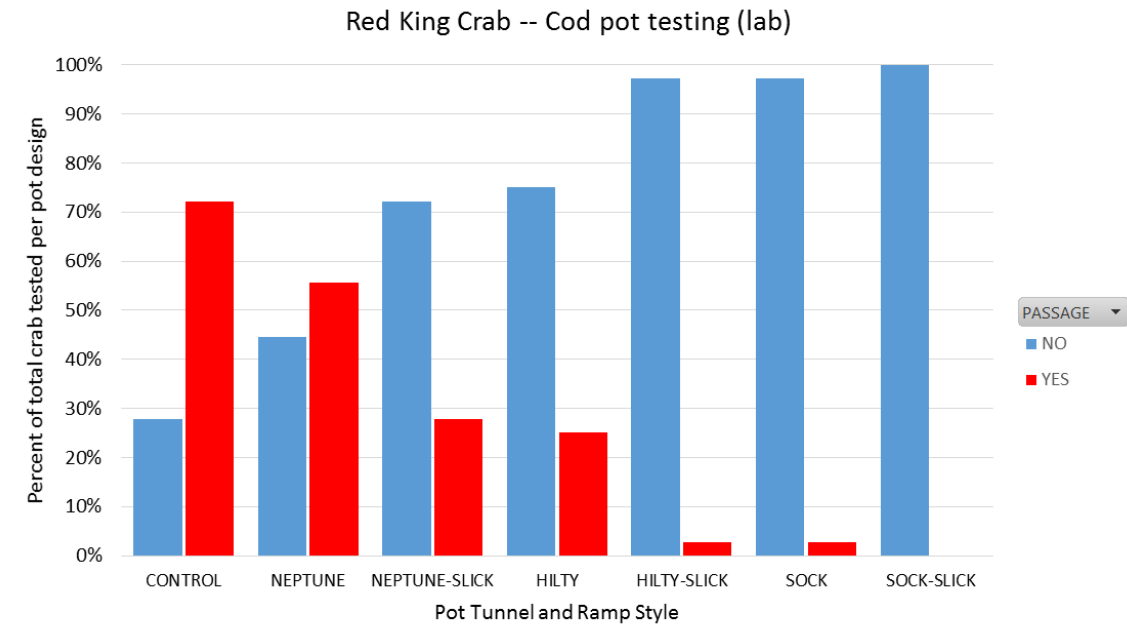
### ***Lab Results***

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Several gear configurations were tested in tanks in the NOAA Fisheries lab in Kodiak using both red king crab and, separately, snow crab over the winter of 2019 and into 2020 for BREP Grant 1 and over the same time period in 2020/2021 for BREP Grant 2. Lab tanks holding crabs were partitioned by test gear panels (a pot entrance test panel) with crab on one side and bait on the opposite side. Test panels that allowed fewer crab to pass through to the bait side of the tank were deemed more efficient at reducing bycatch. The types of gear tested were based on input from industry, gear manufacturers, and managers following the Industry Gear Committee. The lab experiments provided a controlled environment to observe crab behavior with different gear configurations before moving to field experiments in the Bering Sea.

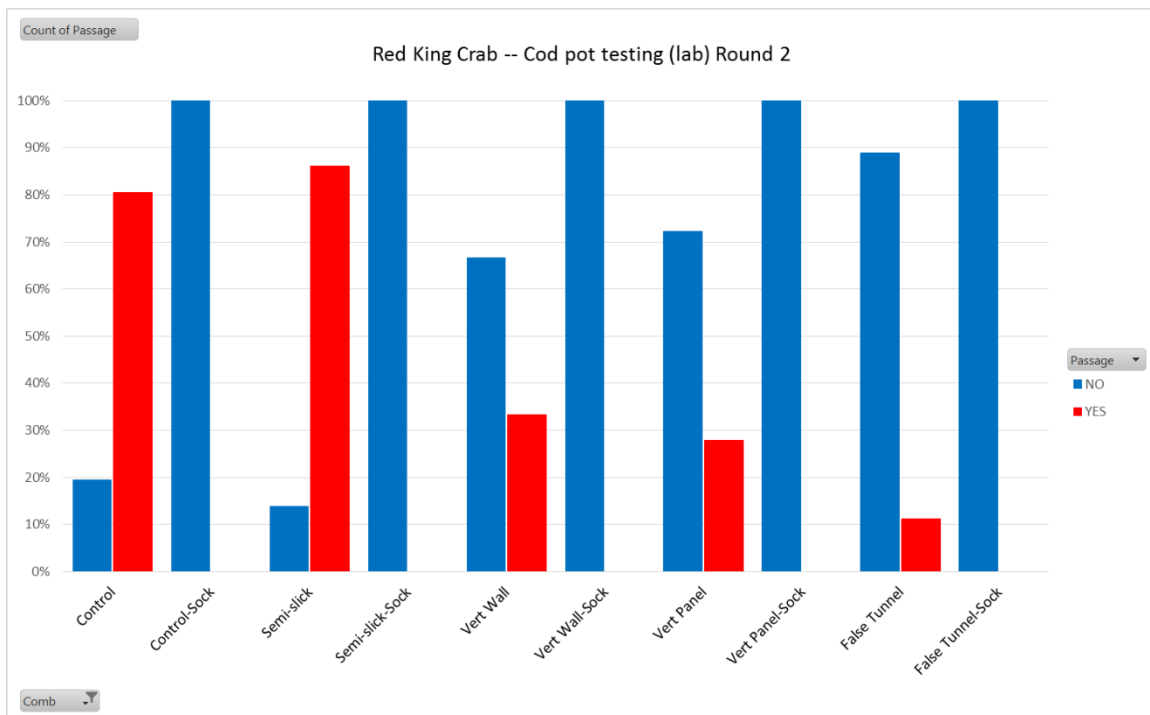
## Preliminary Results from BREP Grant 1

Preliminary lab results were promising. In the cod pots, red king crab (RKC) bycatch reduction effectiveness was greatest in the sock tunnels, followed by the Hilty and Neptune triggers respectively. Bycatch was reduced even further in each tunnel type with the addition of slick ramps (top graph below). Results from the halibut pot testing were less definitive and showed a low level of opilio bycatch in general, with the sock tunnel and the Hilty trigger as the most effective (bottom graph below). A more detailed description of lab methodology and results will be coming soon.



## Preliminary Results from BREP Grant 2

Again, preliminary lab results were promising in the cod pot modifications, with the modified sock trigger being the most efficient at bycatch reduction – allowing the fewest RKC to enter pots. The false tunnel, vertical panel, and vertical wall were all effective in reducing crab entry, with the false tunnel being most effective. In contrast, the semi-slick mesh ramps proved to be ineffective in preventing crab from passing into the pots. When the modified sock trigger was added to pots with these ramp modifications, no crab entered the pots (graph below).



### Field Testing

Once lab work is completed, field testing with the same test gear configurations will be completed in the Bering Sea to better understand bycatch reduction and catching efficiency (CPUE) of target species - Pacific cod and halibut. The first field tests for the BREP Grant 1 were delayed in 2020, in part, due to COVID. Some initial field tests are occurring during the January 2021 Pacific cod season. Since the January cod fishery does not occur on the primary king crab grounds like the September fishery, we expect further field testing to occur during the September 2021 season. Field testing for halibut pots will take place in the Spring 2021.

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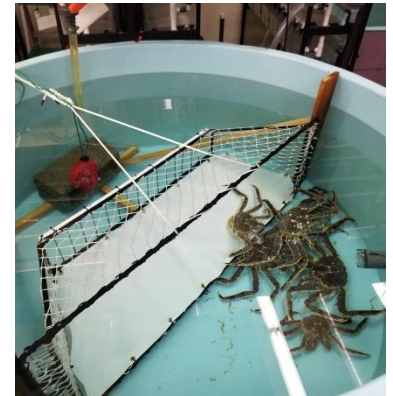


## Attachment 1 – BREP Grant 1

### SOCK TUNNEL



### NEPTUNE TRIGGER



Example lab set-up  
with Hilty trigger  
and slick track

### HILTY TRIGGER





Attachment 2 – BREP Grant 2

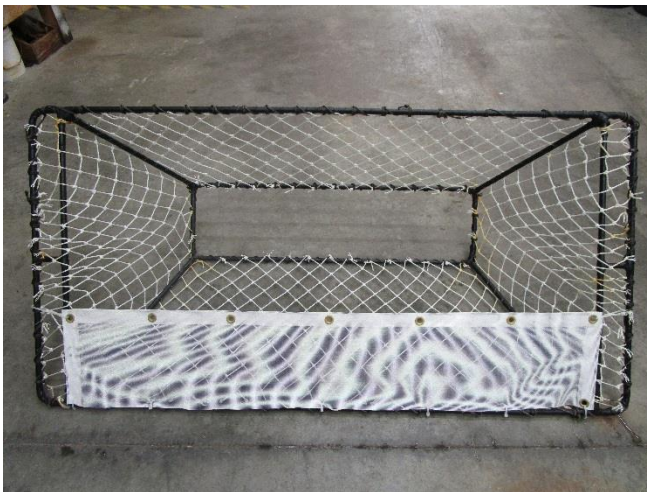
**SOCK TUNNEL**



**SEMI-SLICK RAMP**



**VERTICAL WALL BARRIER**





## VERTICAL PANEL



## FALSE TUNNEL

