Evaluation of the Large Mesh Belly Panel in Small Mesh Fisheries as a Method to Reduce Yellowtail Flounder Bycatch on Southeast Georges Bank

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Project Purpose

- The project addressed yellowtail and windowpane flounder bycatch concerns on Georges Bank by evaluating the effectiveness of a standard net modified with a large mesh belly panel to reduce bycatch of these species in deep water while targeting squid and whiting

- The project was proposed by GB small mesh fishermen as means to pursue gear certification to be used for yellowtail and windowpane bycatch avoidance in GB small mesh fisheries when Accountability Measures are triggered.
- Based on similar inshore work conducted by CCE and funded through CFRF

Project Summary

- F/V Karen Elizabeth (Point Judith, RI), a twin-trawl vessel, was chartered to conduct all at-sea research.

- The vessel towed the control trawl (3-bridle 4-seam standard box trawl) and experimental trawl (box trawl modified with the large mesh belly panel) simultaneously. Comparisons were based on paired differences in catch by species.

- Four species were analyzed including yellowtail flounder, windowpane flounder, squid and whiting

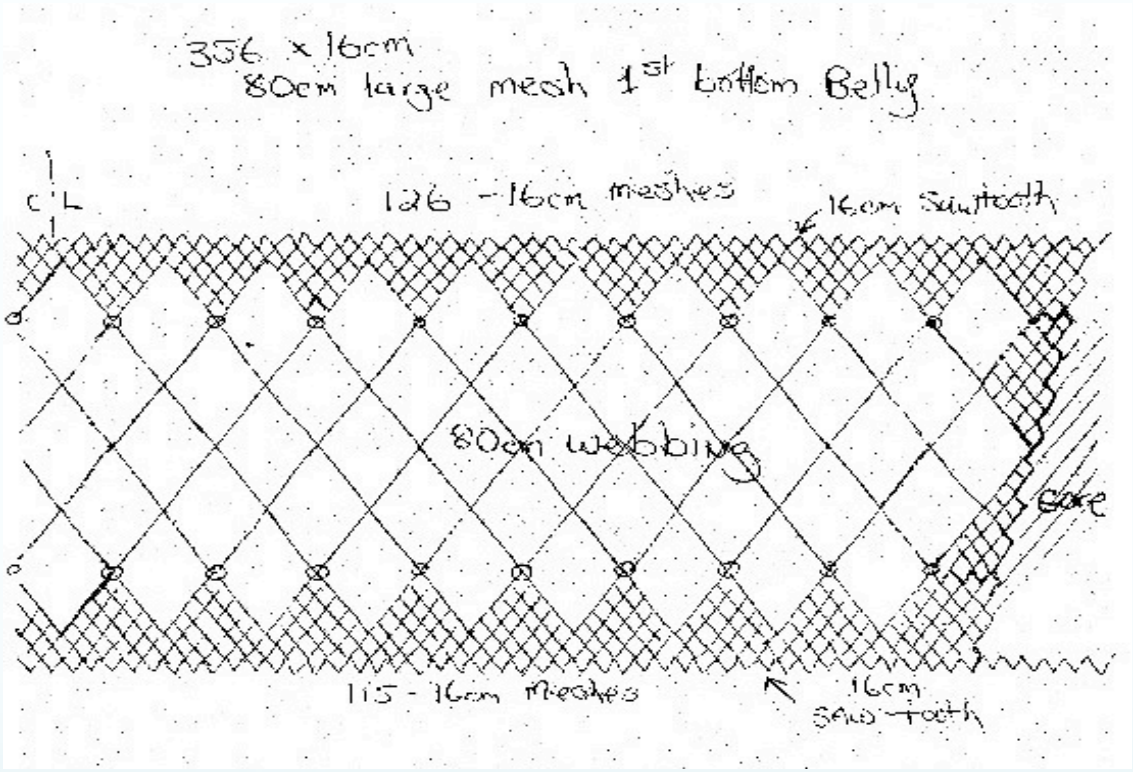
Similar Gear Research Performed by CCE

- Use of A 12” Drop Chain Sweep To Reduce Winter Flounder Bycatch in the Longfin Squid Fishery
- Use of a Large Mesh Belly Panel to Reduce Winter Flounder Bycatch in the Longfin Squid Fishery
- Gear Trials - Evaluation of the 12” Drop Chain Sweep and the Large Mesh Belly Panel to Reduce Winter Flounder Bycatch in the Whiting Fishery

CCE tested and evaluated the gear concepts above as a means to reduce winter flounder bycatch in small mesh fisheries. Avoidance of winter flounder catch during the lucrative squid fishery is imperative to assist in the rebuilding of the winter flounder stock. Both gear adaptions significantly reduced winter flounder bycatch.

Gear Modification	Fishery	Winter Flounder Bycatch Reduction	Significant Reduction in Target Species
12” Drop Chain Sweep	Longfin Squid	78% Reduction	NO
Large Mesh Belly Panel	Longfin Squid	88% Reduction	NO
12” Drop Chain Sweep	Whiting	25% Reduction	NO
Large Mesh Belly Panel	Whiting	44% Reduction	NO

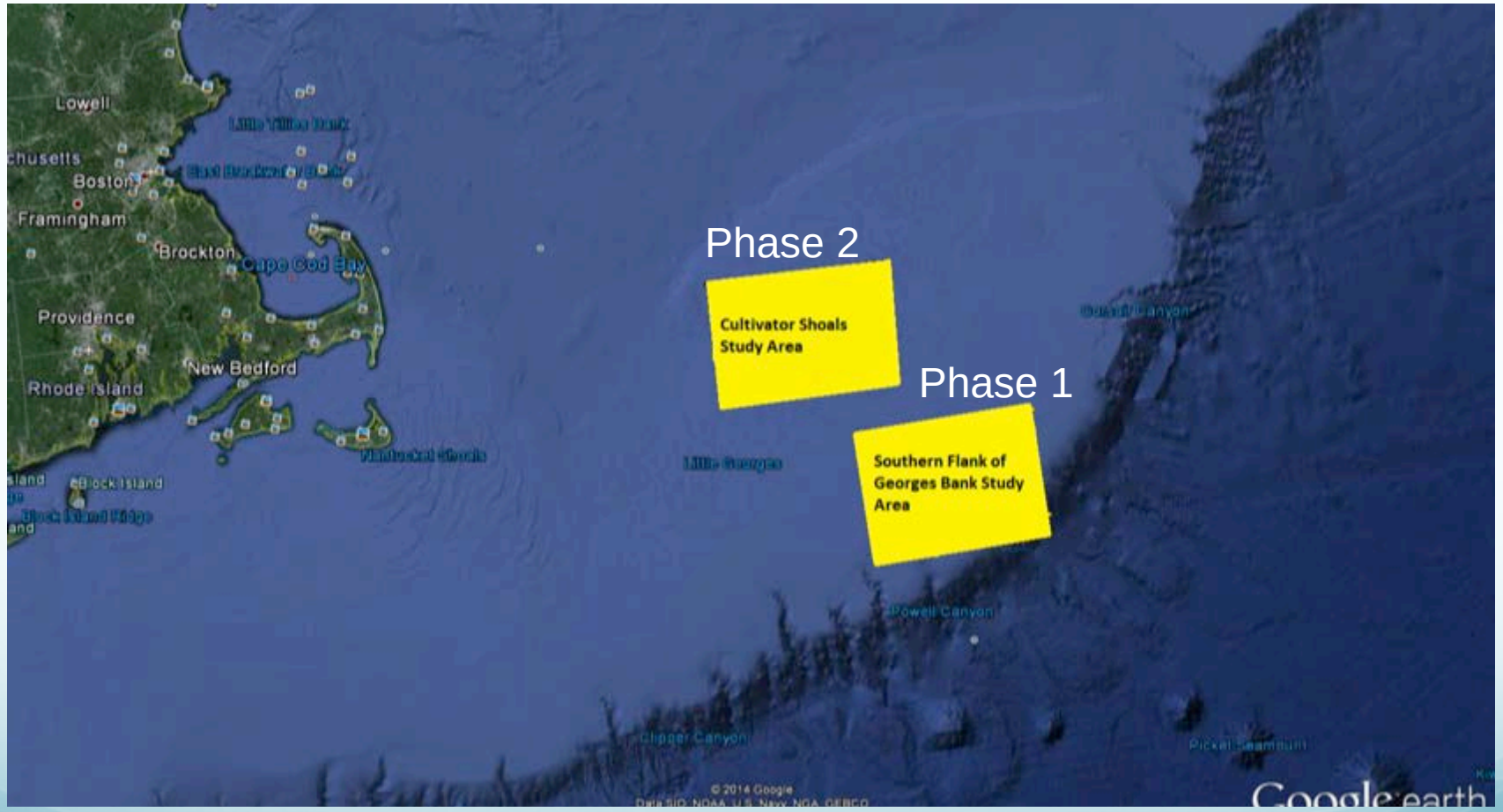
Sketch of Large Mesh Belly Panel Configuration



The large mesh panel was made of 80cm (32”) mesh 6mm poly webbing, 2 meshes deep X 16 meshes wide sewn into the standard 16cm (6”) mesh of the belly. With the ‘saw-toothing’ of the 16cm mesh, this yields an effective opening of 3 full meshes deep, a total of about 8’ of large mesh. The panel attaches five 16cm meshes (approximately 2.5’) behind the footrope and goes from gore to gore (22 meshes wide or approximately 30’).

Large Mesh Belly Panel

Project Locations



Phase 1 Summary

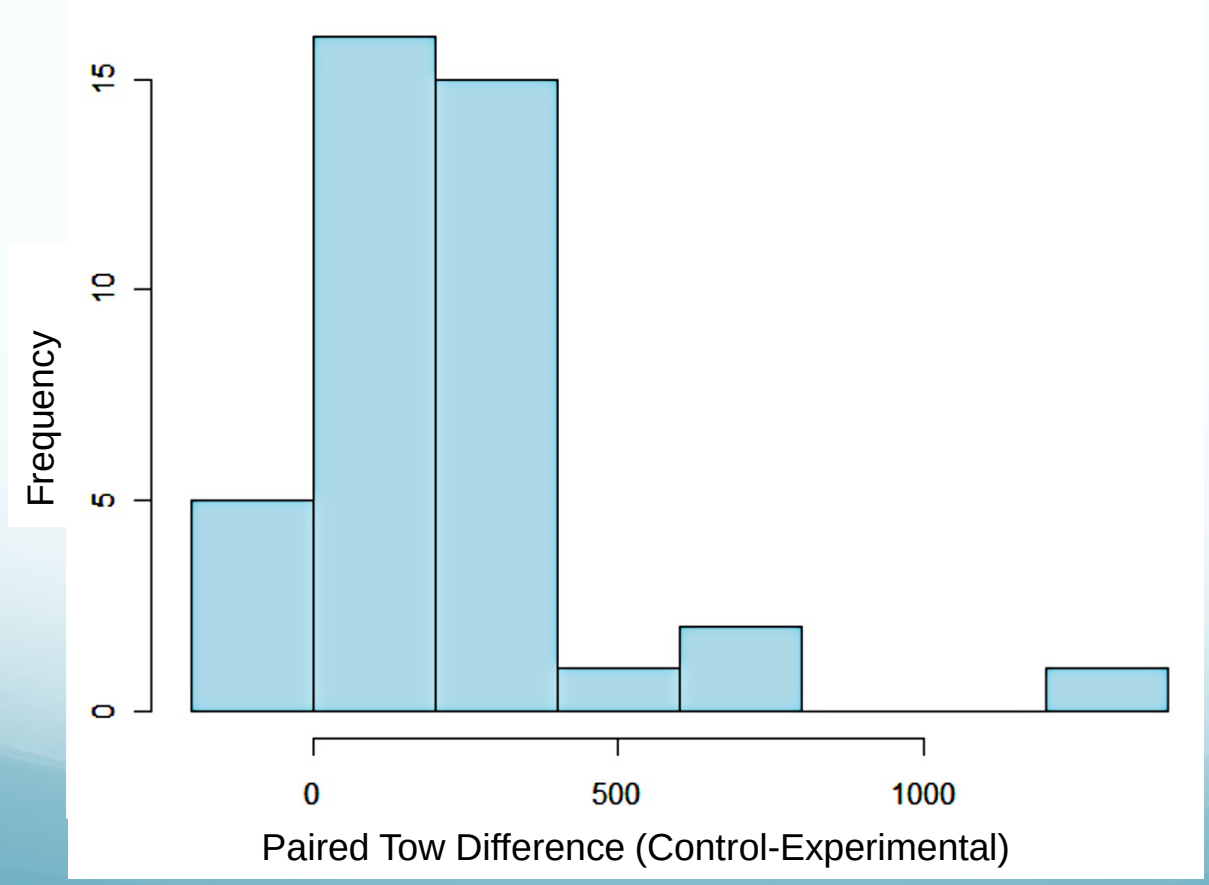
- Phase 1 of the project was conducted in January 2014 at the Southern Flank of Georges Bank, near Munson Canyon
- 40 paired tows were completed in one 6-day trip
- Squid was the target species
- All tows were 30 minutes in length
- Tows occurred during both the day & night

Phase 1 Results – Yellowtail Flounder

The large mesh belly panel significantly reduced the quantity of yellowtail bycatch.

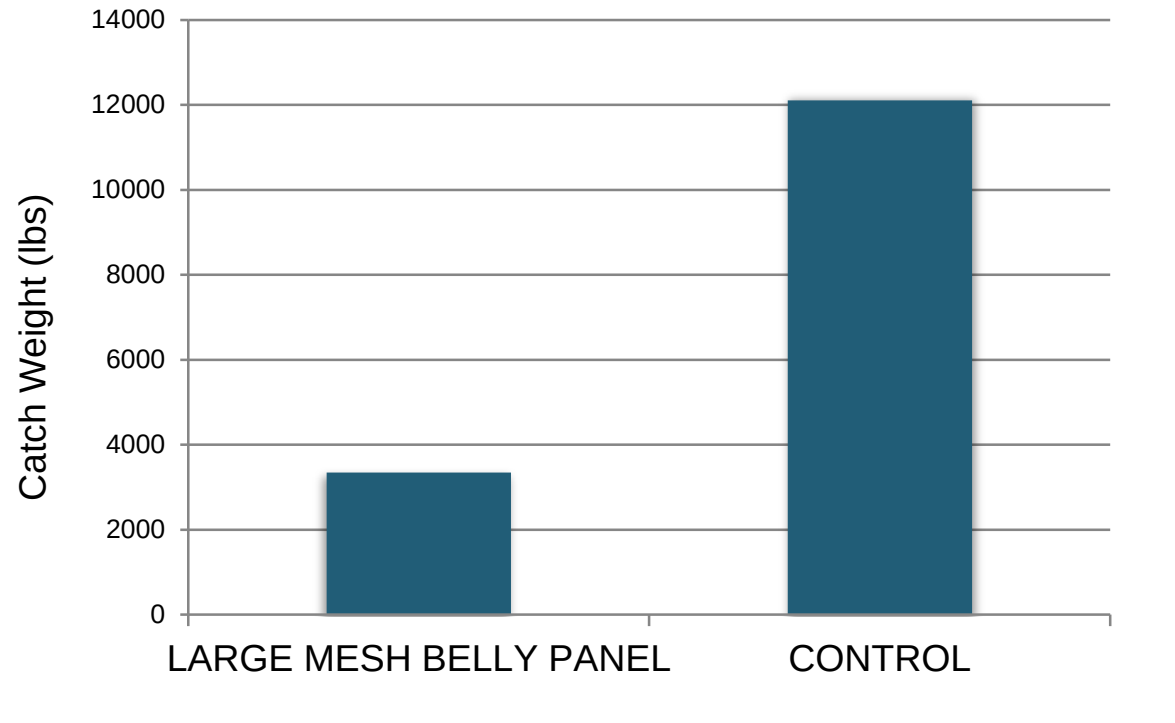
Paired t-test results showed a significant difference in catch weight between the control and experimental net (**p=<0.0001**).

Distribution of Paired Tow Differences for Yellowtail Flounder



Phase 1 Results – Yellowtail Flounder

Total Catch Weight of Yellowtail Flounder (lbs) in the Experimental and Control Net for All Tows Combined



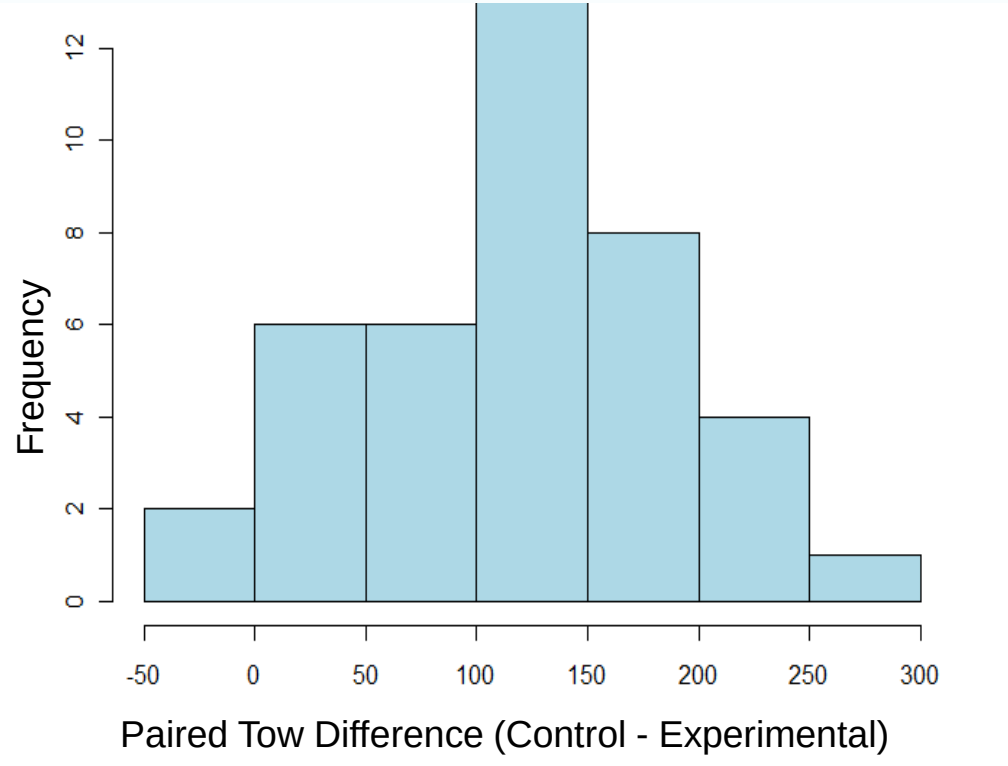
The large mesh belly panel reduced yellowtail flounder bycatch by **72.3%**.

Phase 1 Results – Windowpane Flounder

The large mesh belly panel significantly reduced the quantity of windowpane bycatch.

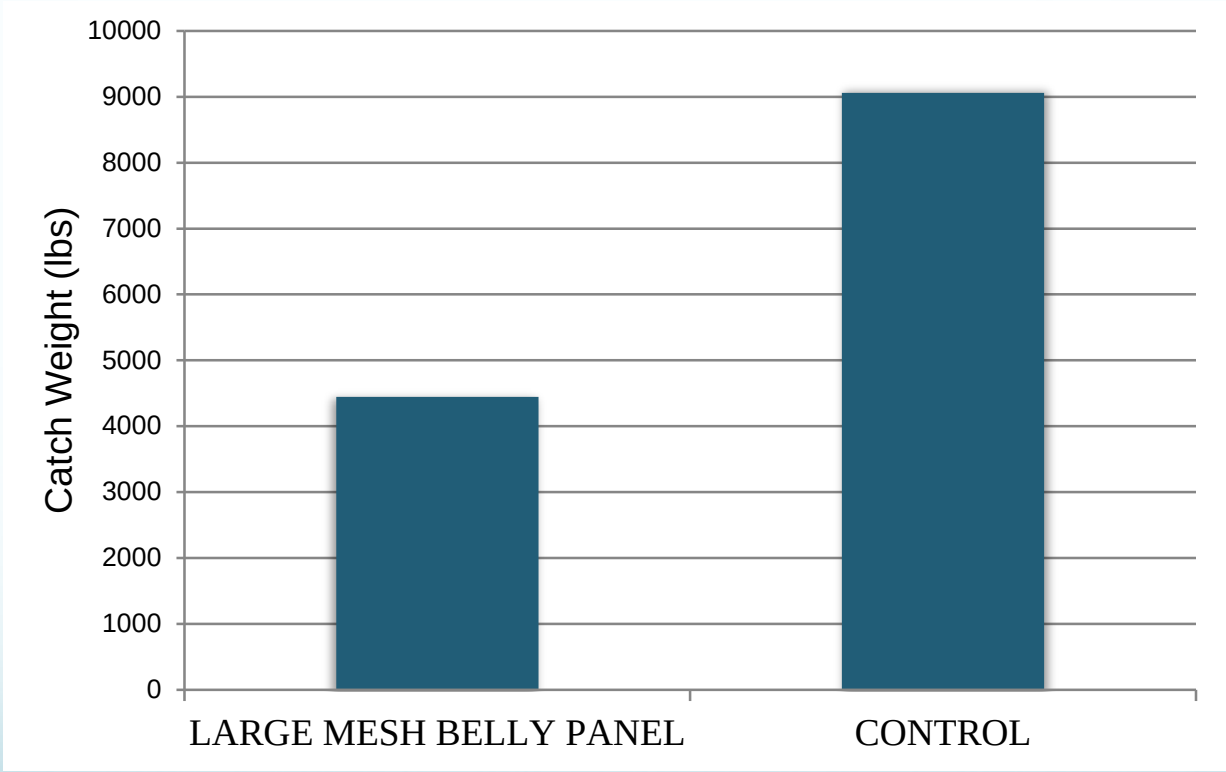
Paired t-test results showed a significant difference in catch weight between the control and experimental net (**p=<0.0001**).

Distribution of Paired Tow Differences for Windowpane Flounder



Phase 1 Results - Windowpane Flounder

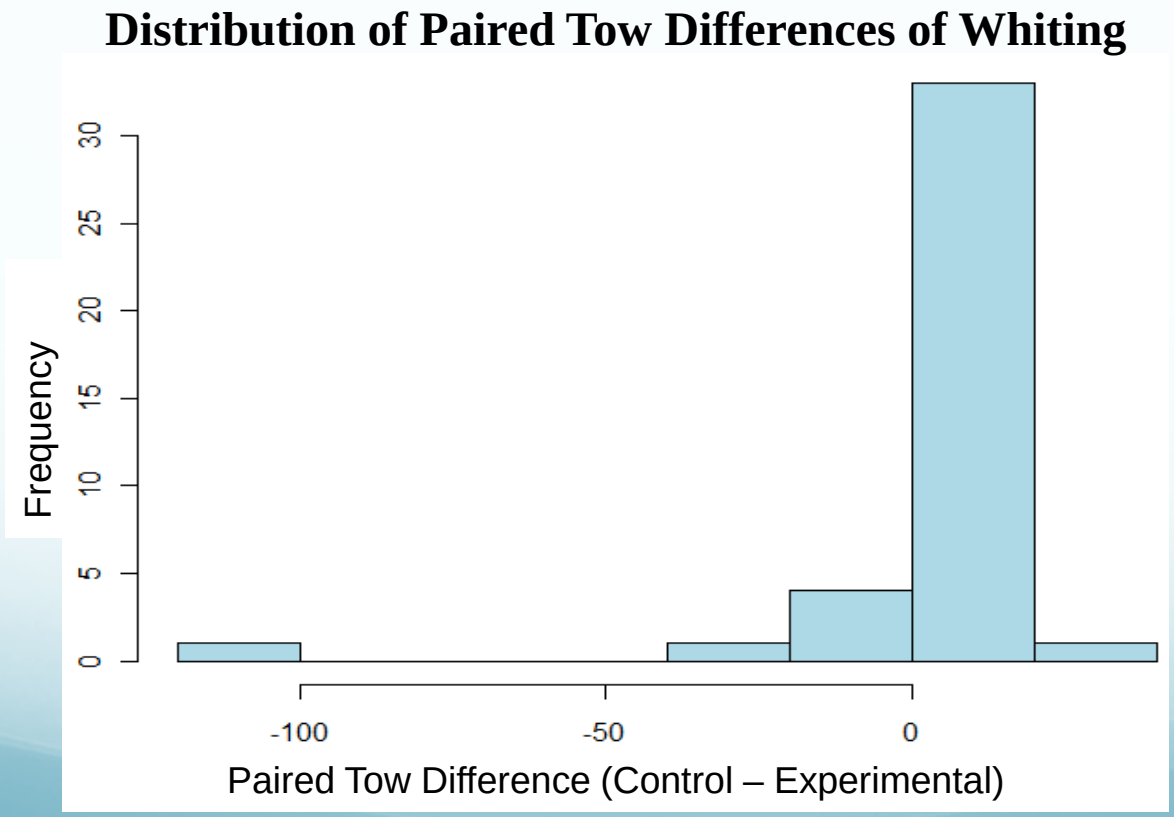
Total Catch Weight of Windowpane Flounder (lbs) in the Experimental and Control Nets for All Tows Combined



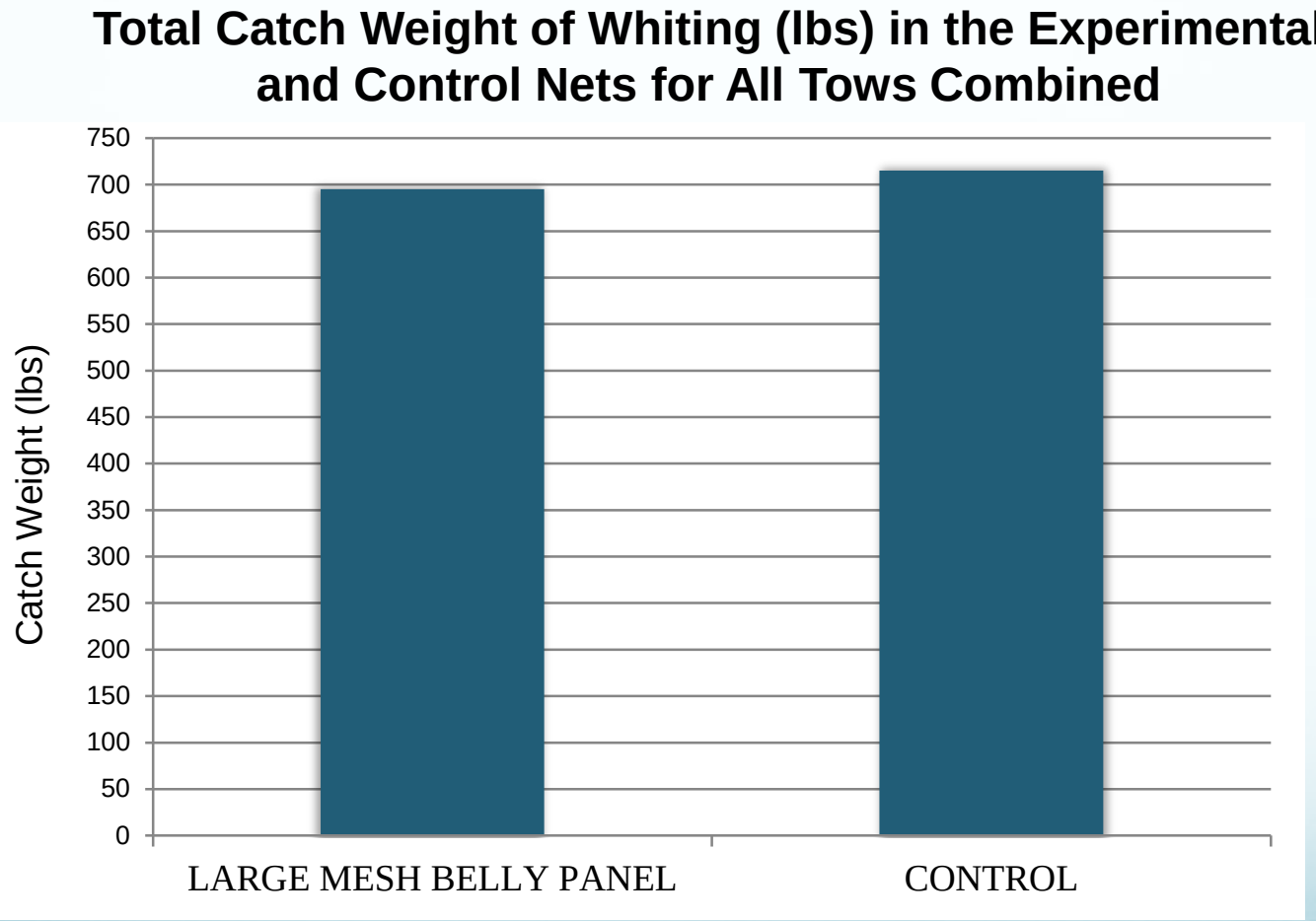
The large mesh belly panel reduced windowpane flounder bycatch by **50.9%**.

Phase 1 Results - Whiting

Paired t-test results showed no significant difference in whiting catch between the control net and the net modified with the large mesh belly panel **(p=0.8817)**.



Phase 1 Results - Whiting



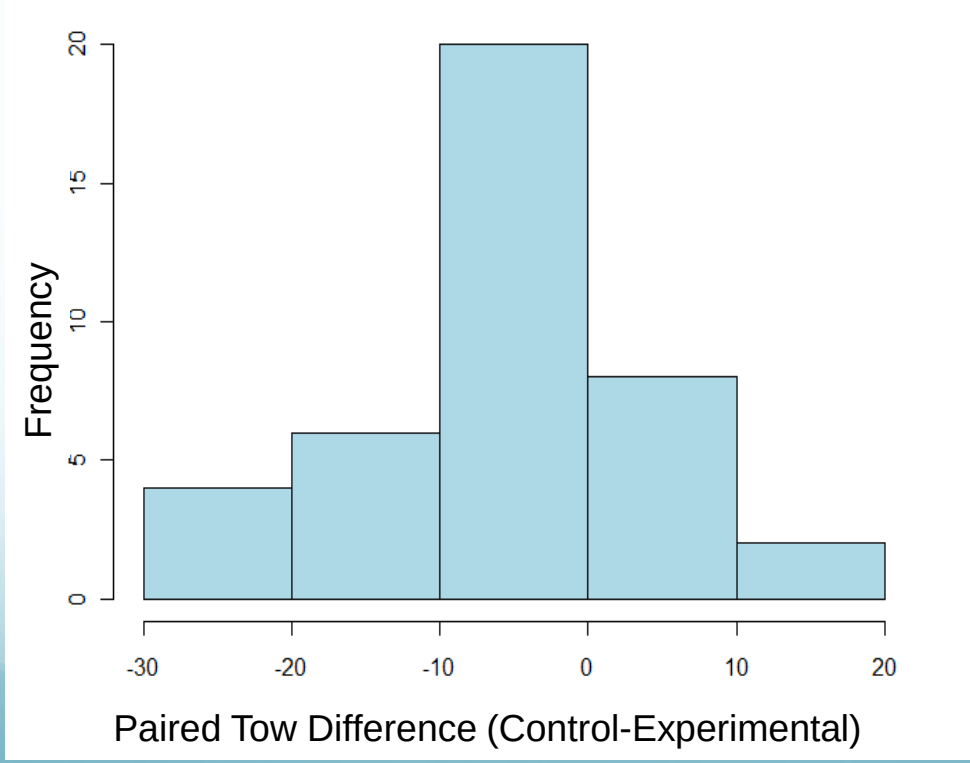
Retention of whiting was maintained using the large mesh belly panel net.

Phase 1 Results - Squid

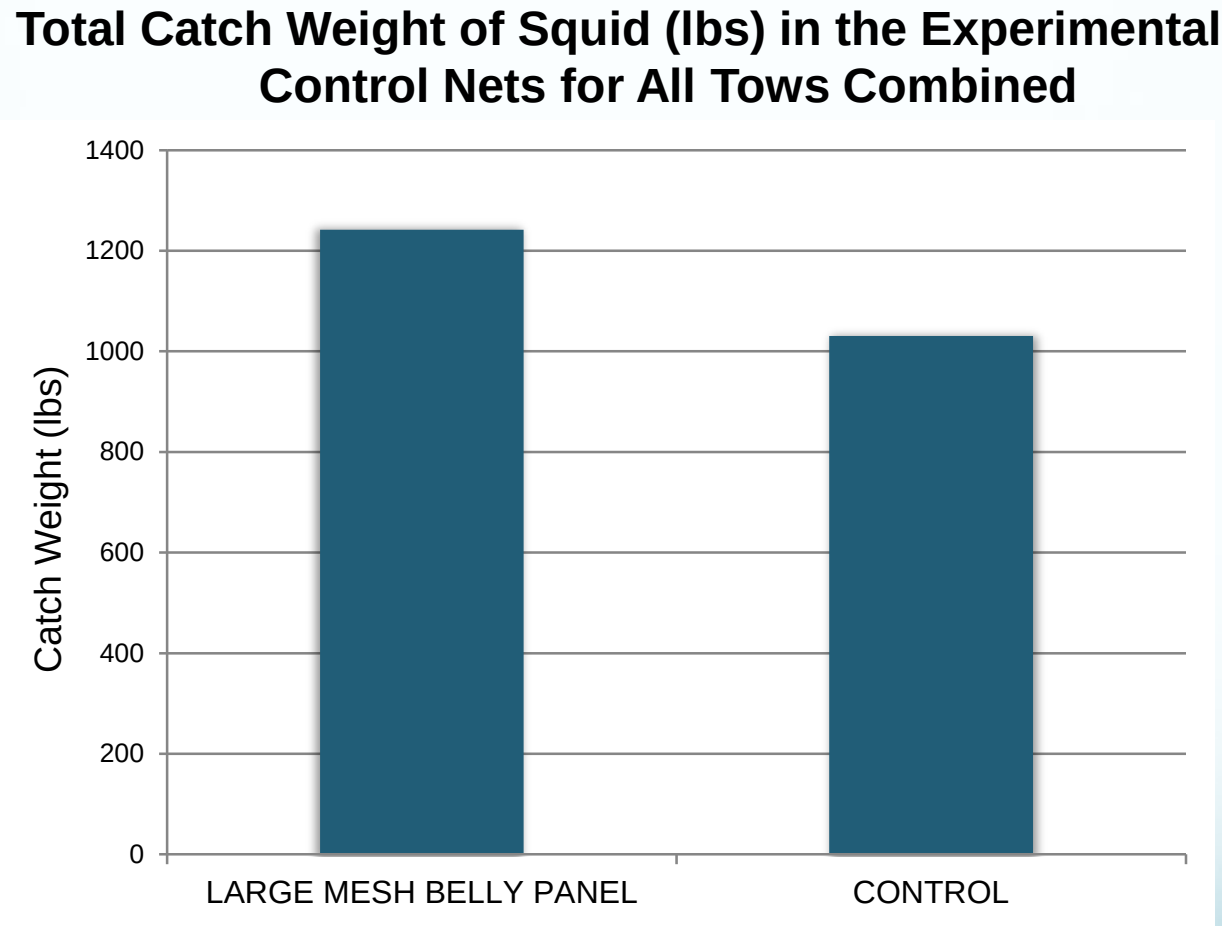
Paired t-test results showed a significant difference in the catch weight between the control and experimental net (**p = 0.0022**).

The experimental net retained significantly more squid than the control net.

Distribution of Paired Tow Differences for Squid



Phase 1 Results - Squid



The experimental net actually retained 20% more squid compared to the control net.

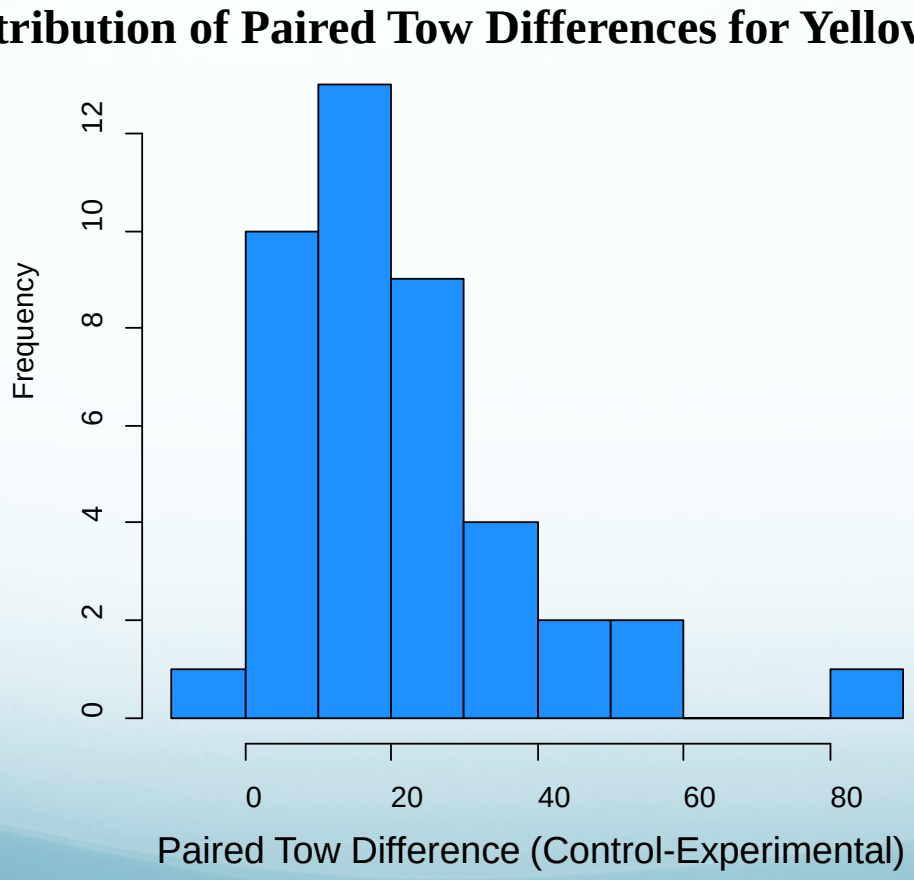
Phase 2 Summary

- Phase 2 of the project was conducted in August 2014 on the Northern Area of Georges Back designated as Cultivator Shoals
- 42 paired tows were completed in one 5-day trip
- Whiting was the target species
- Tows were 15 minutes in length and occurred during both the day & night

Phase 2 Results – Yellowtail Flounder

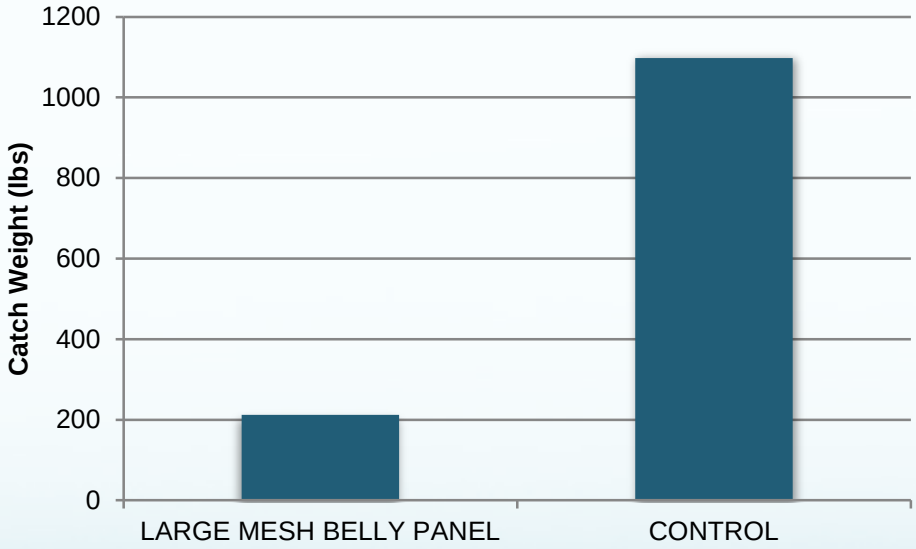
The large mesh belly panel significantly reduced the quantity of yellowtail bycatch.

Paired t-test results showed a significant difference in catch weight between the control and experimental net (**p=<0.0001**).



Phase 2 Results – Yellowtail Flounder

Total Catch Weight of Yellowtail Flounder (lbs) in the Experimental and Control Net for All Tows Combined

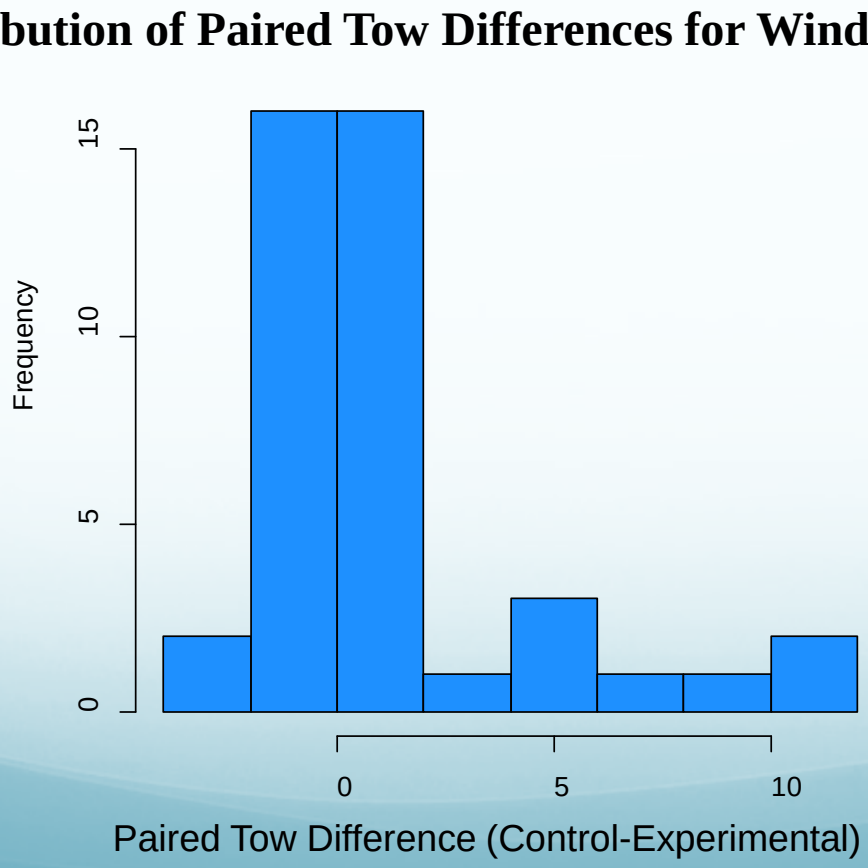


The large mesh belly panel reduced yellowtail flounder bycatch by **80.7%**.

Phase 2 Results - Windowpane Flounder

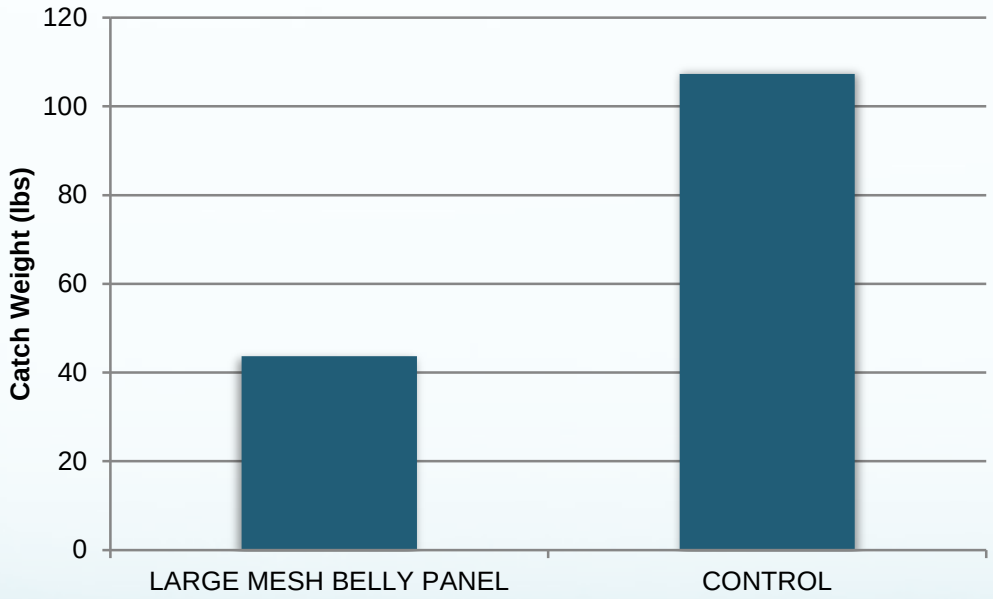
The large mesh belly panel significantly reduced the quantity of windowpane bycatch.

Paired t-test results showed a significant difference in catch weight between the control and experimental net (**p=0.0023**).



Phase 2 Results - Windowpane Flounder

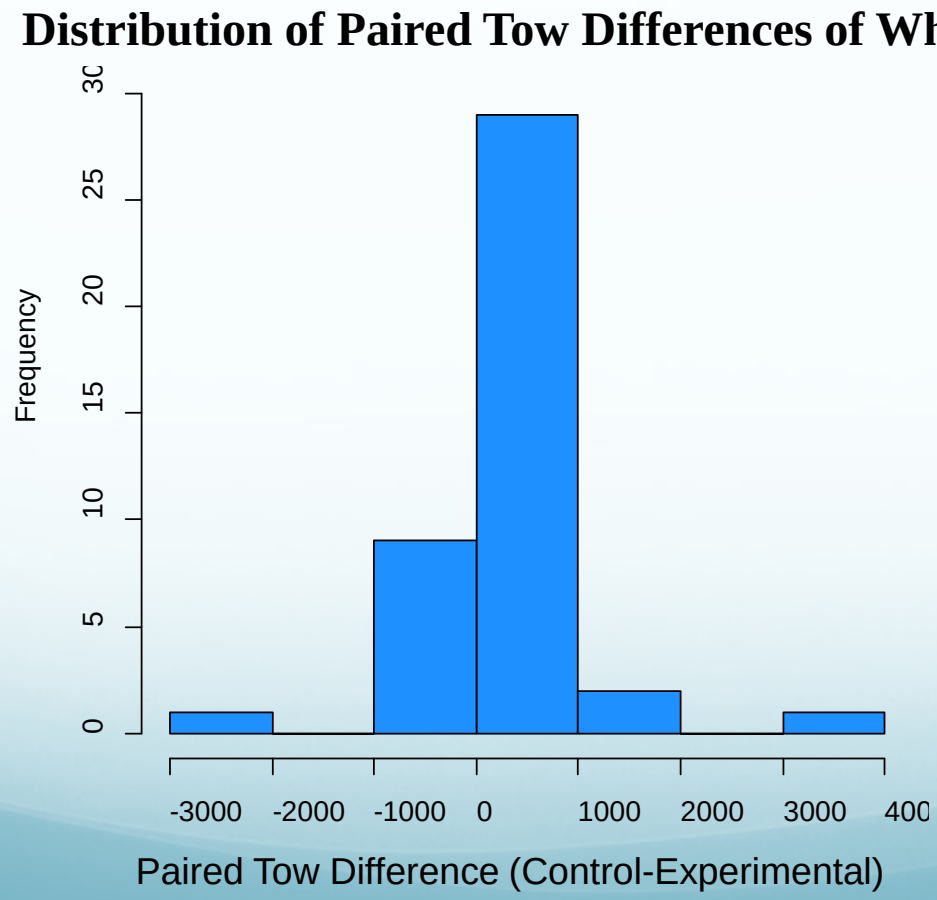
Total Catch Weight of Windowpane Flounder (lbs) in the Experimental and Control Nets for All Tows Combined



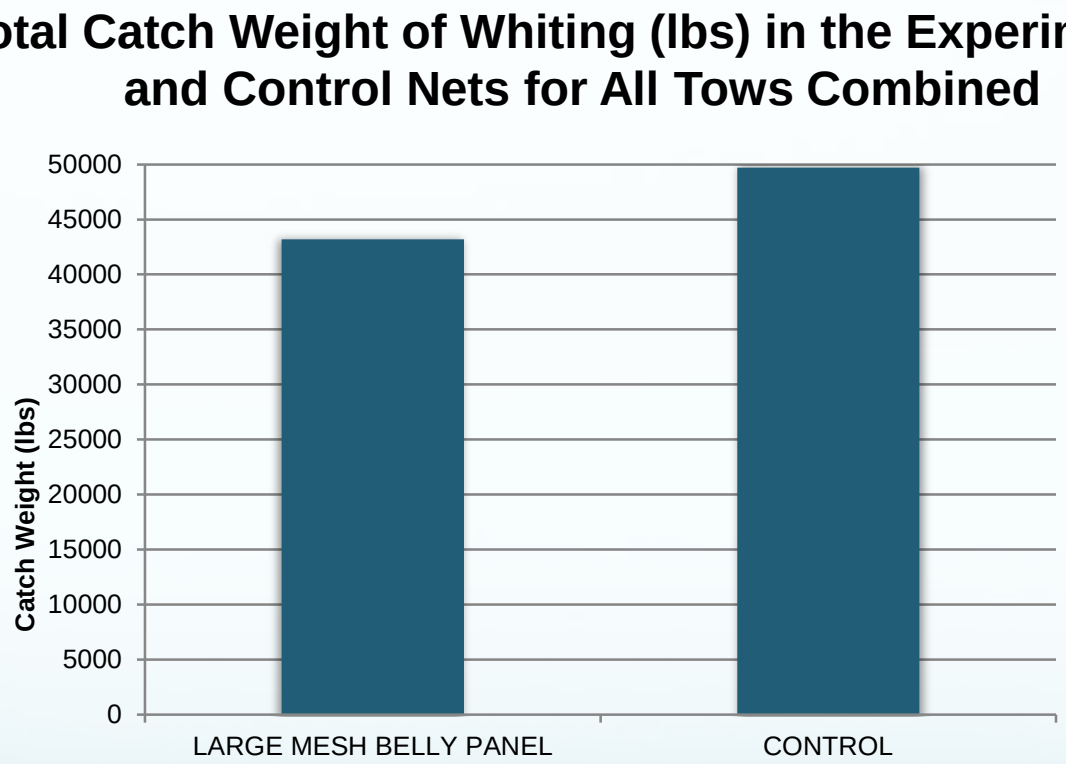
The large mesh belly panel reduced windowpane flounder bycatch by **59.3%**.

Phase 2 Results - Whiting

Paired t-test results showed no significant difference in the catch weight between the control and experimental net (**p = 0.1787**).



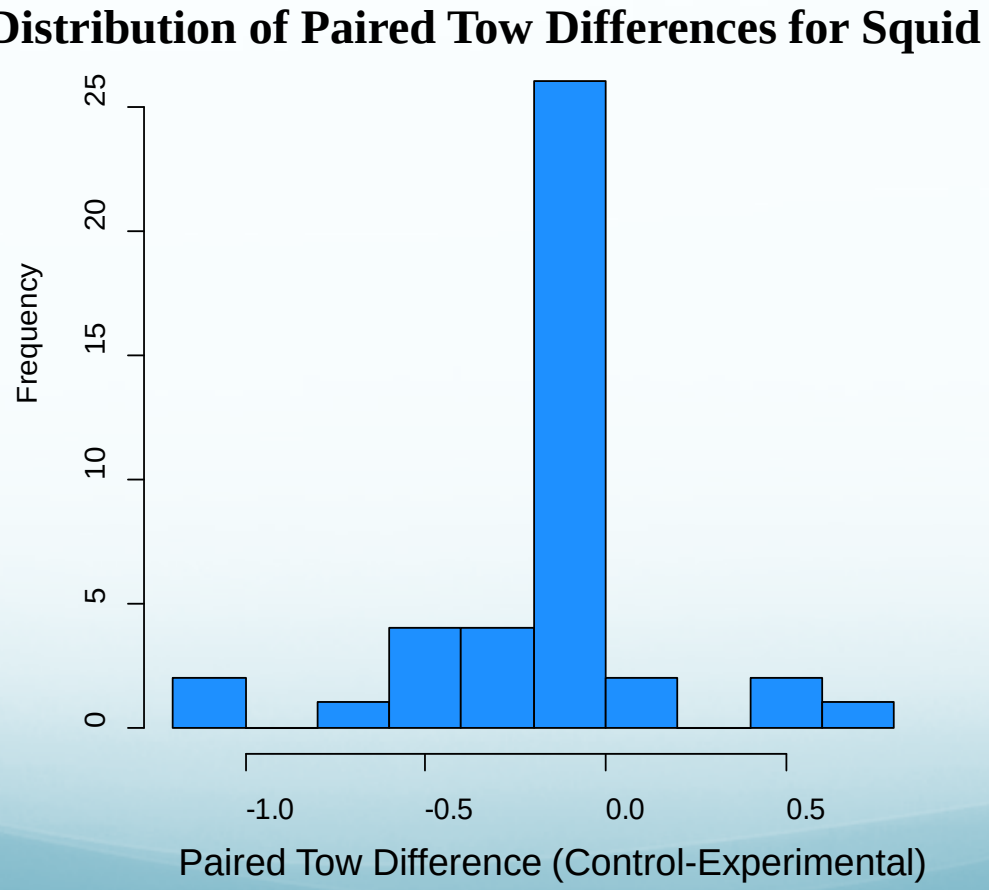
Phase 2 Results - Whiting



Retention of whiting was maintained using the large mesh belly panel net.

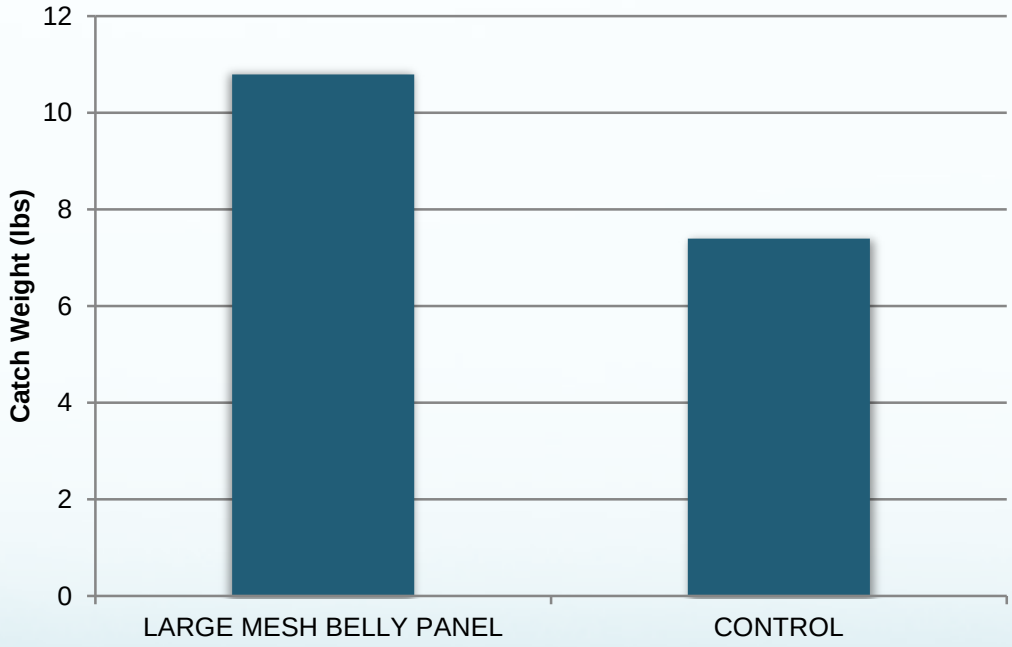
Phase 2 Results - Squid

Paired t-test results showed no significant difference in the catch weight between the control and experimental net (**p = 0.1339**).



Phase 2 Results - Squid

Total Catch Weight of Squid (lbs) in the Experimental and Control Nets for All Tows Combined



Retention of squid was maintained using the large mesh belly panel net.

Summary of Results

Species	Phase 1	Phase 2
Yellowtail Flounder	Significant reduction (72.3%)	Significant reduction (80.7%)
Windowpane Flounder	Significant reduction (50.9%)	Significant reduction (59.3%)
Whiting	No Statistical Difference in catch between control and experimental nets	No Statistical Difference in catch between control and experimental nets
Squid	Significant increase (20%)	No Statistical Difference in catch between control and experimental nets

Based on these results, should the large mesh belly panel gear technology be approved as an Accountability Measure in the small mesh Georges Bank fisheries?

Acknowledgements

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