

Design and Test of a Hydrodynamic Scallop Dredge to Reduce Bycatch



Project Partners

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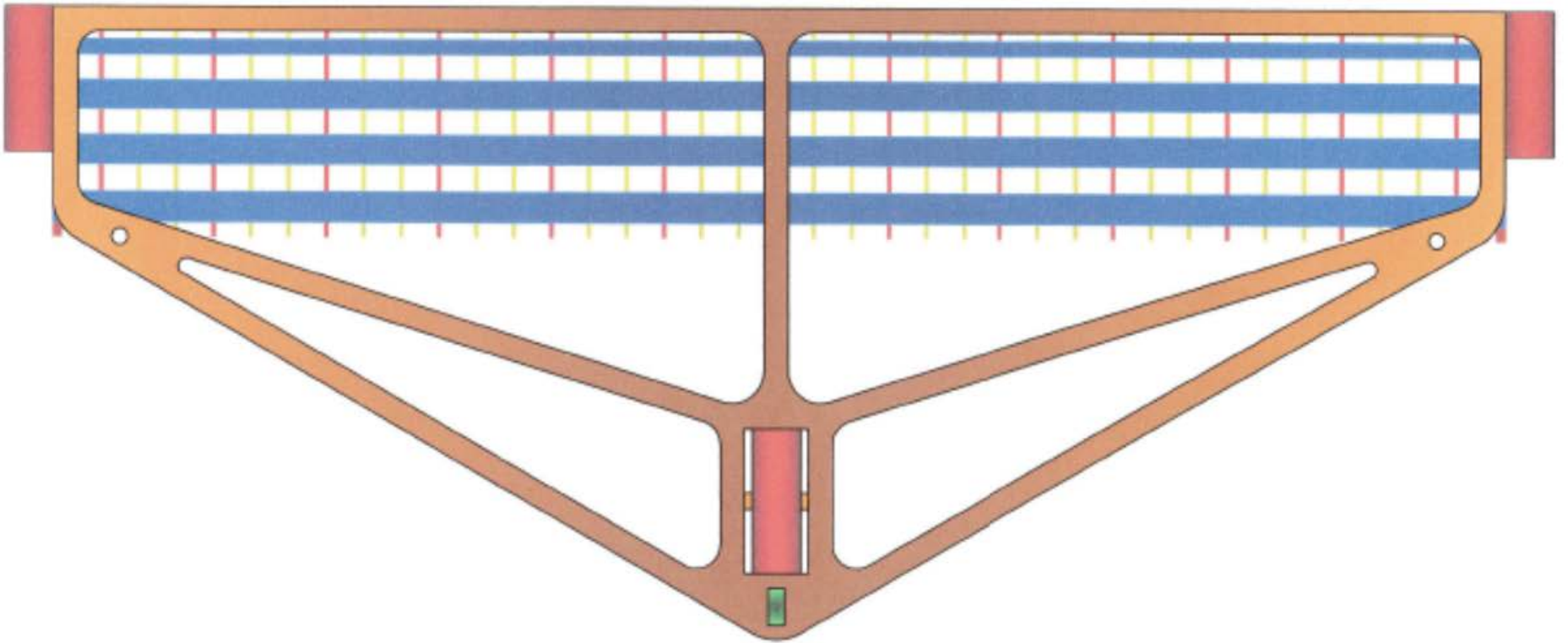
Project Concept

- Refine the conceptual design of hydrodynamic scallop dredge that the industry partner has been developing for the last few years.
- Build a full scale prototype dredge and test it in the Georges Bank scallop fishery onboard the commercial scallop F/V “Endurance” with the industry partner as captain
- Conduct sea trials using a commercial turtle dredge as control
- Conduct underwater observation of the new dredge and control dredge to evaluate and compare their performance

Industry Driven:

Capt. Armando Estudante played key roles in designing the dredge, fabrication, modification and sea trials.

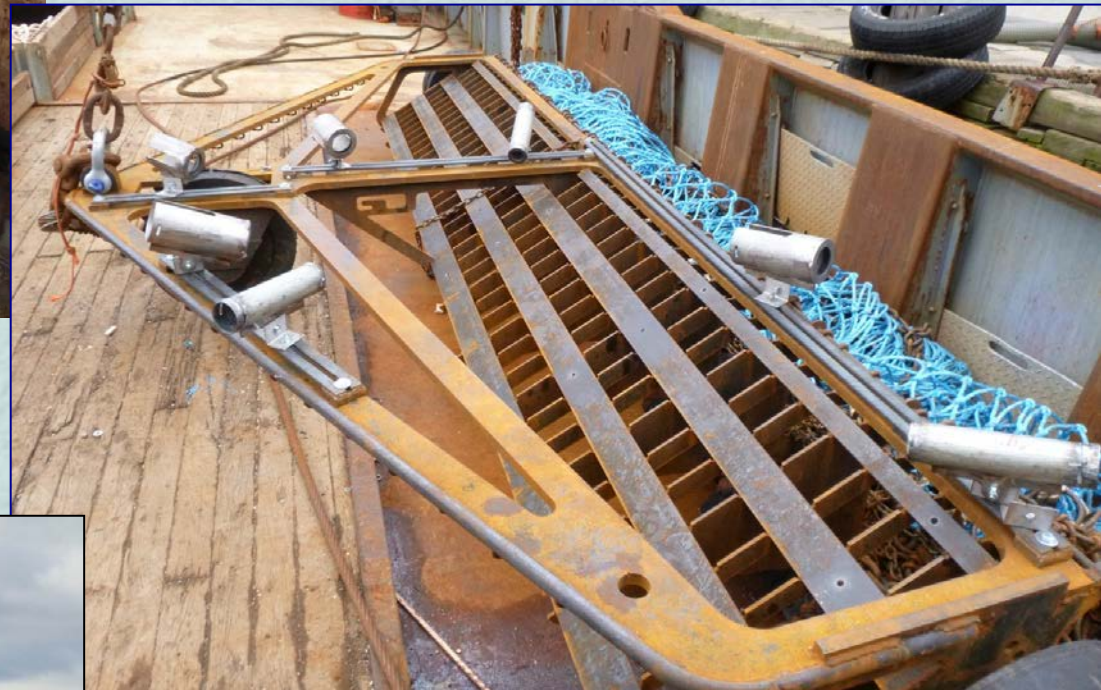
The Prototype Dredge



Feature:

- The frame was machine cut from a plate
- Two rear wheels in addition to the front wheel
- Depressor plates

The Prototype



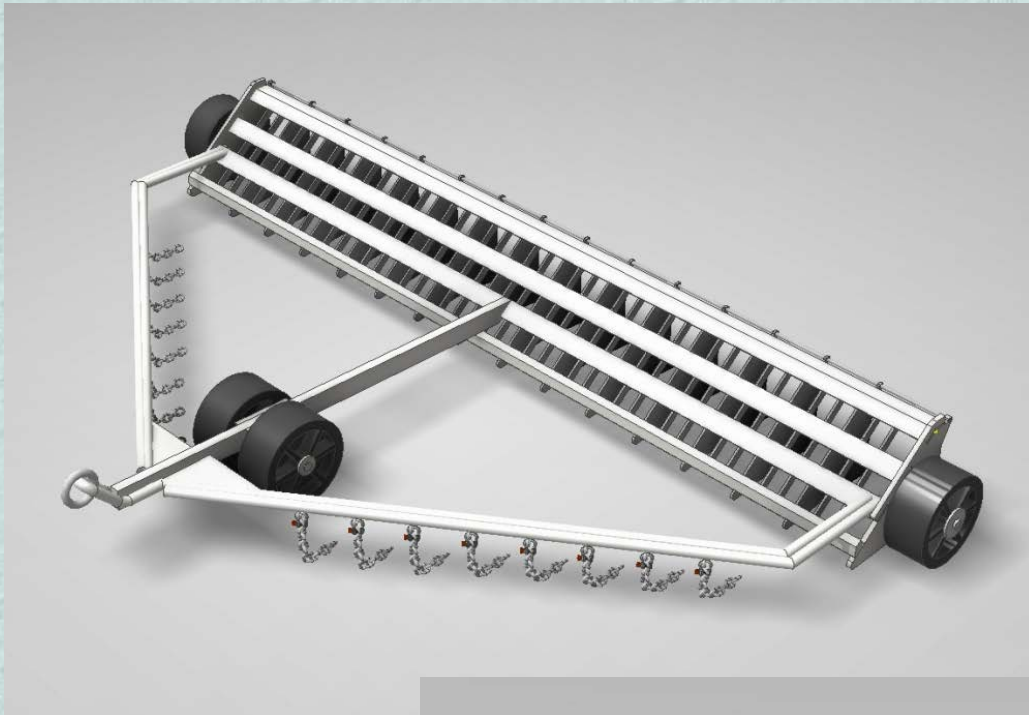
F/V "Endurance"

Damage Was Substantial



Went to drawing board ...

The Modified Dredge



The frames were made of materials similar to commercial dredges



The Modified Dredge



The Modified Dredge

- Wheel sizes: 21" and 18"
- Drop chains: 3/8" and 1/2"
- Camera used to evaluate performance



Catch

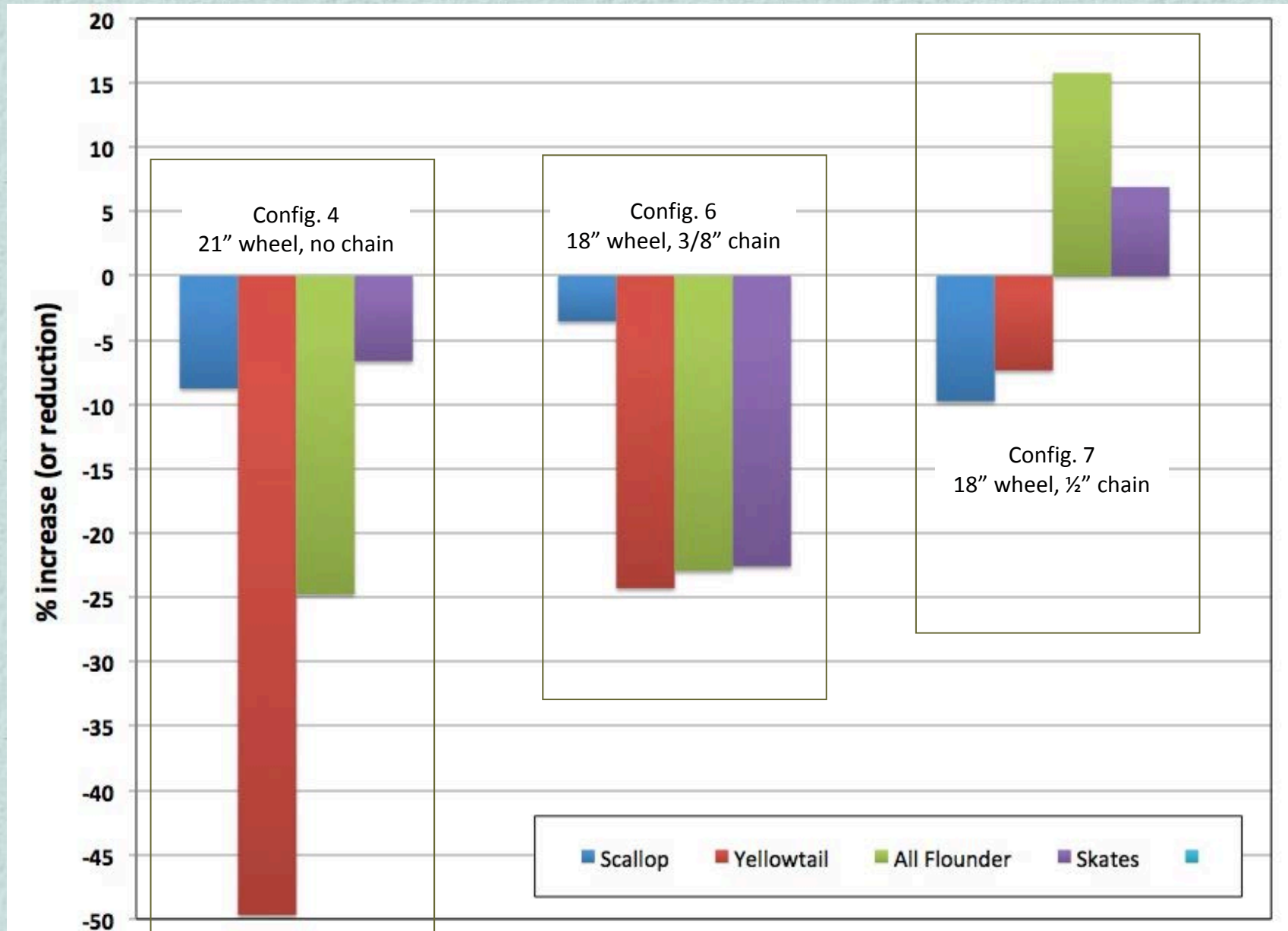
New dredge



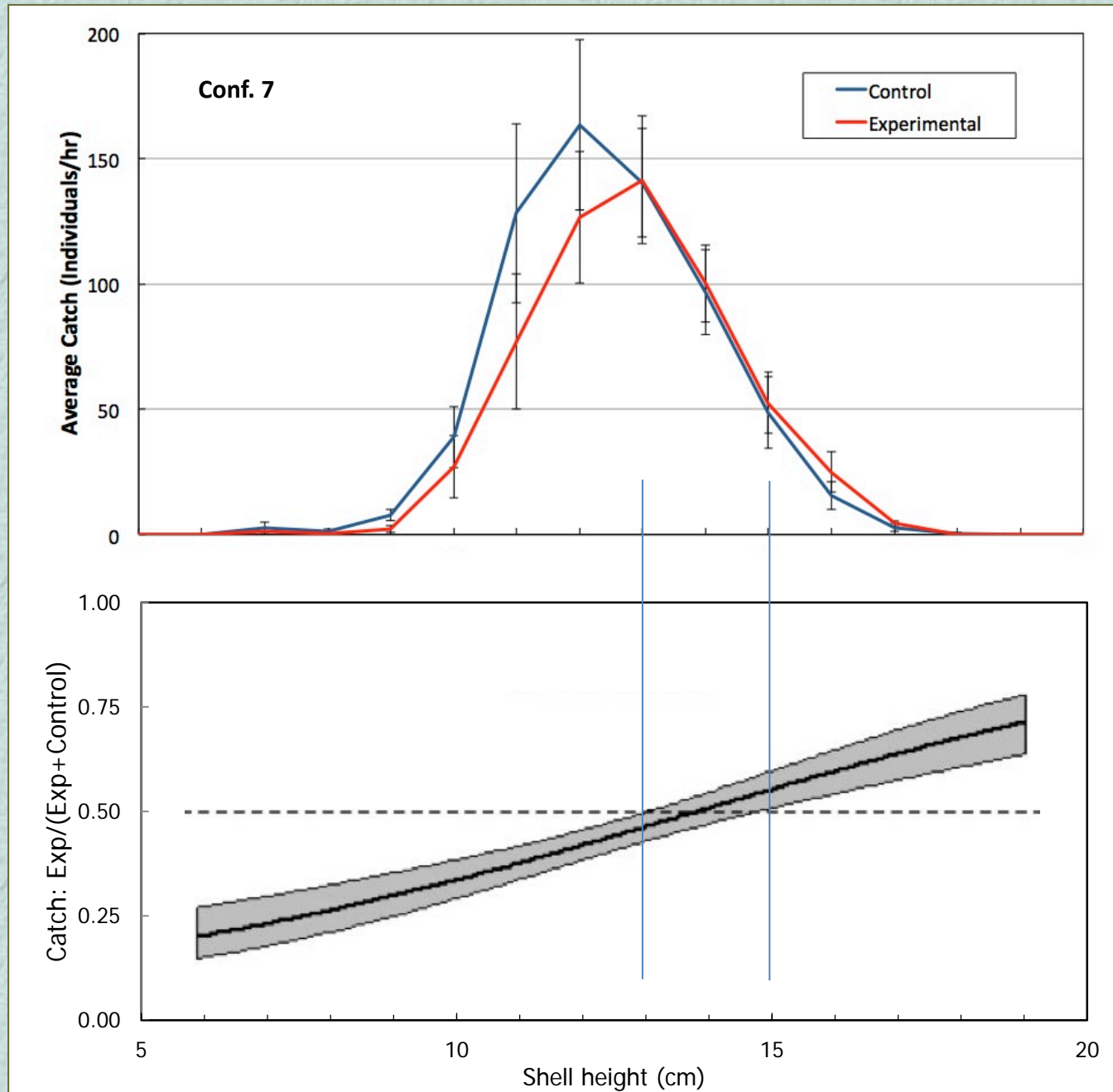
Old dredge

The new dredge was capable of catching large amounts of scallops

Catch and Bycatch

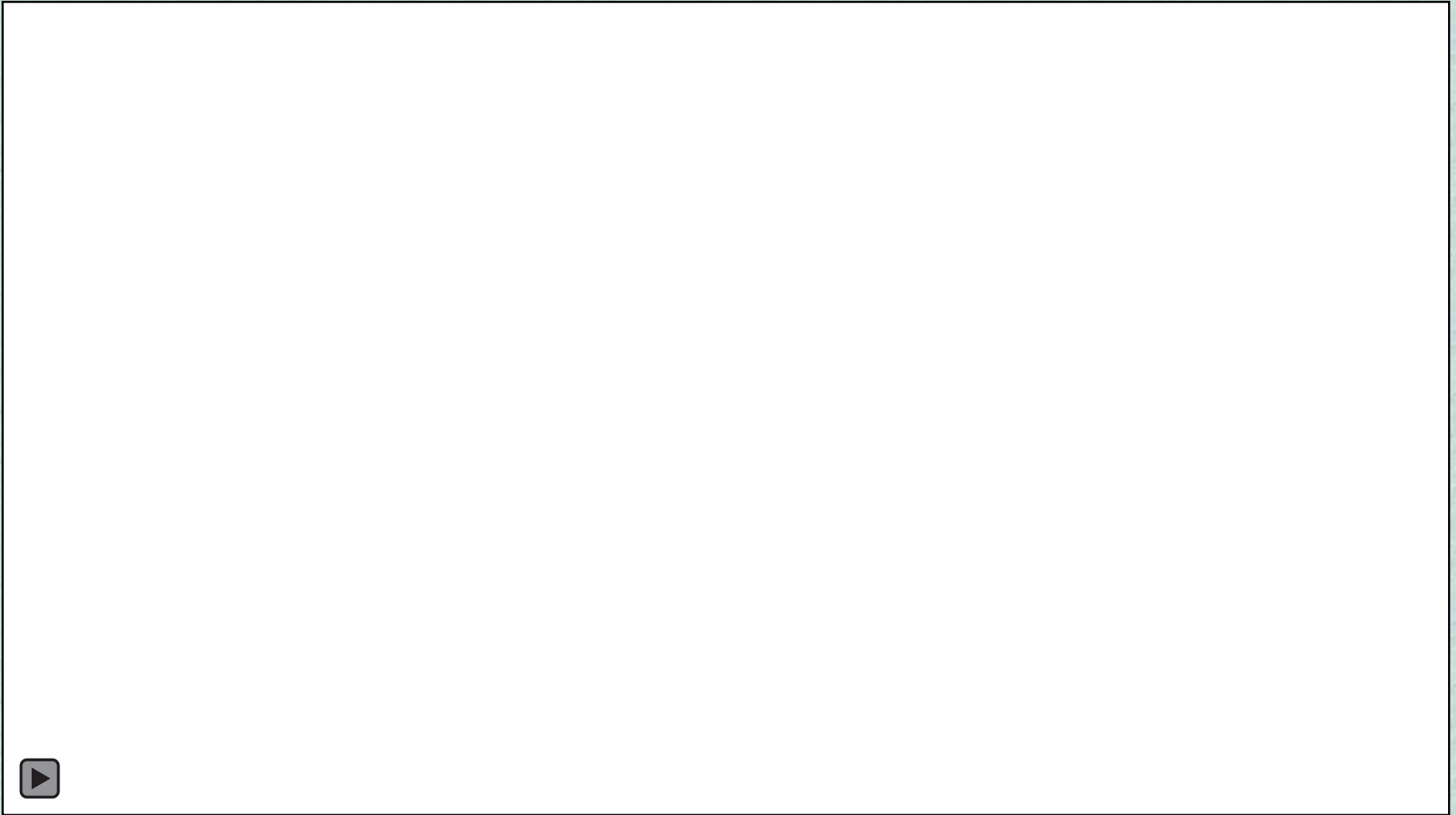


Size-selection: Scallop



Video

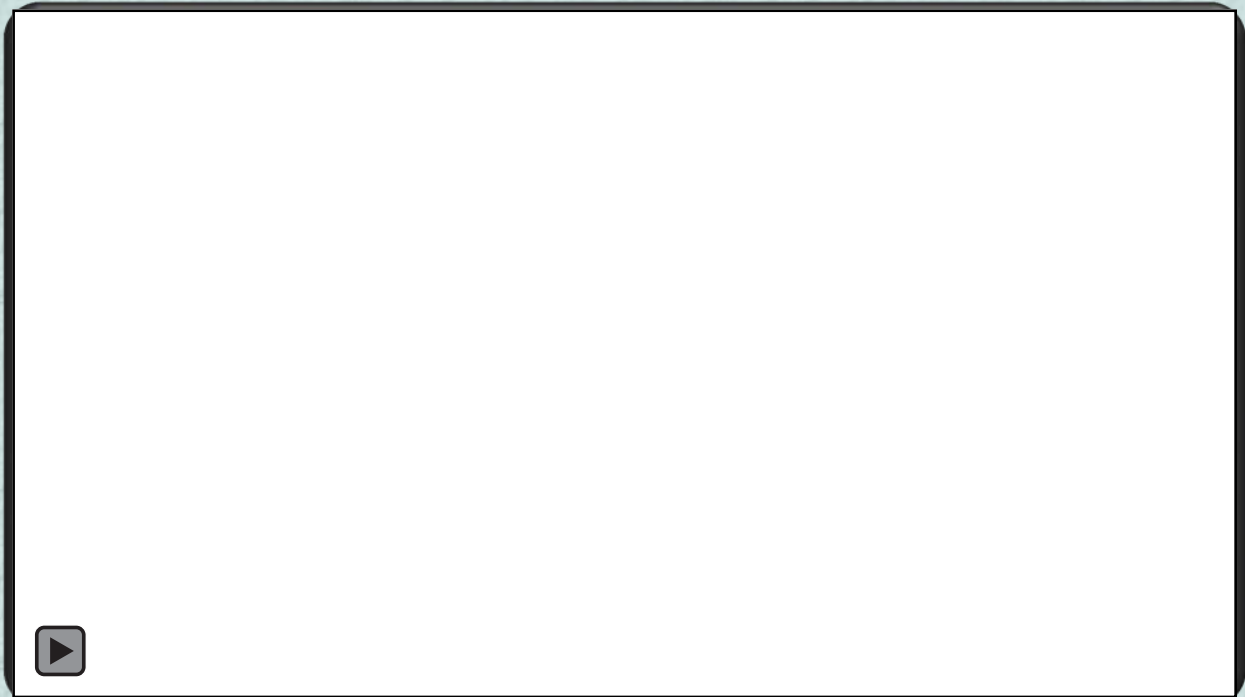
21" wheels, no chains



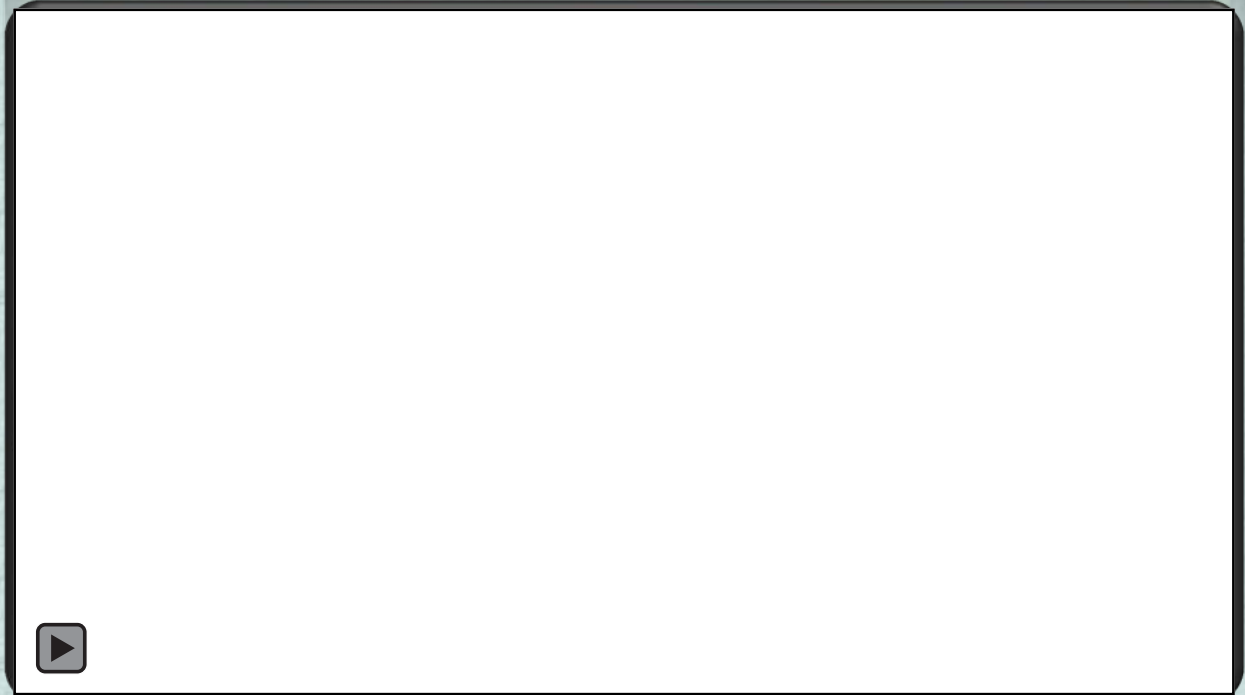
Video

(played at 2/3 speed)

**18" wheels,
3/8" chain**



**18" wheels,
1/2" chain**



Preliminary Conclusions

- Wheeled dredge seems to be able to catch similar amount of scallops (but always a bit less)
- Mechanisms of size selectivity have yet to be explained
- The dredge with 18" wheels with light (3/8") chains seems to function best among all configurations
- Heavier chains intended to alert flounders so that they can swim over the dredge seem not to work as expected
- Video observations are valuable in aiding gear design and modification

Future Work

- Video and data analyses are still continuing
- Future research areas:
 - Towing speed of the dredge may be the main factor that flounders have difficulty in avoiding capture
 - Can we design a slower (and maybe wider) dredge?
 - May have fuel saving advantages
 - May have seabed impact advantage
 - Fuel efficient scallop harvesting benefit the industry and the environment

Thanks