



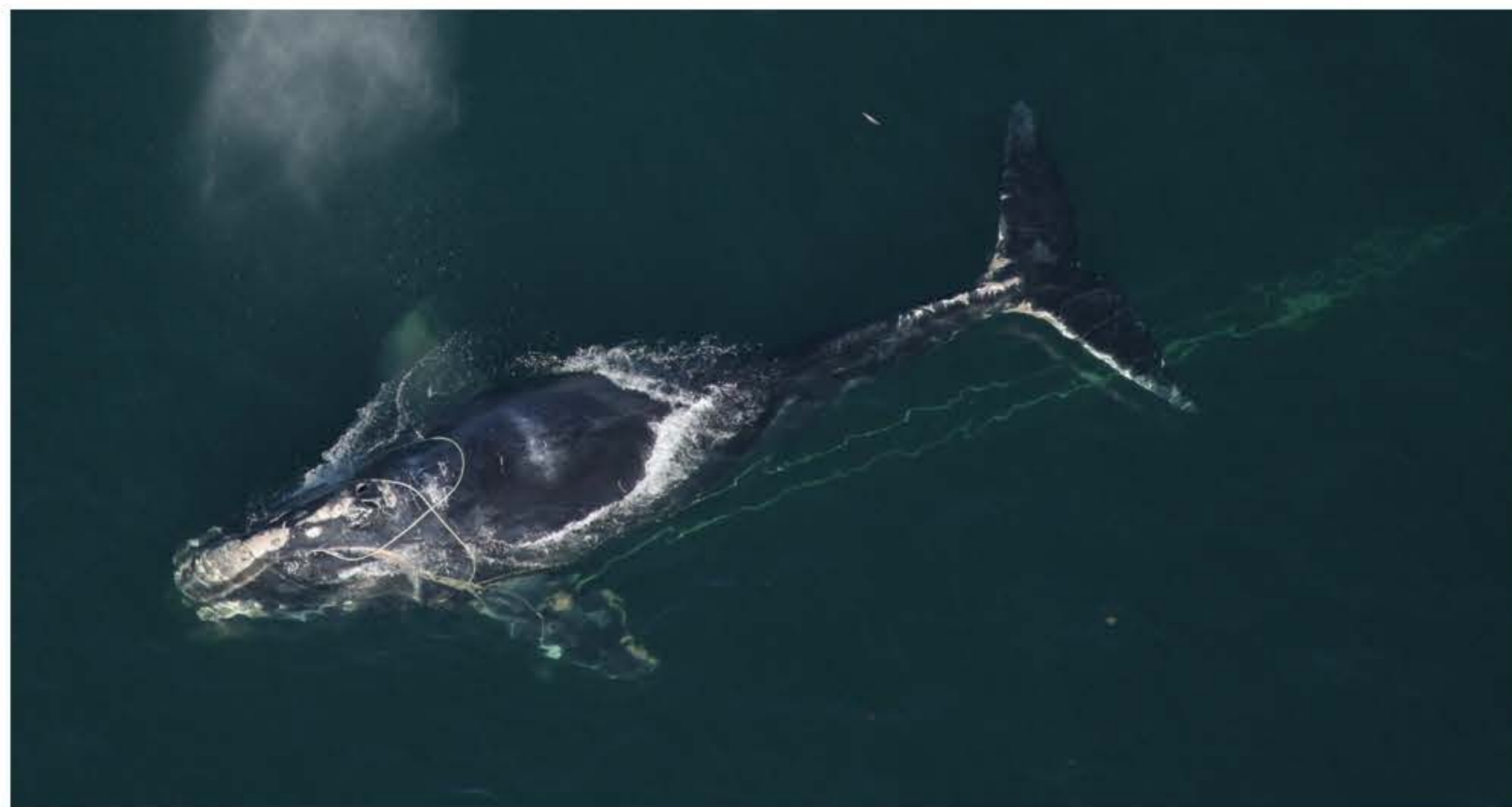
# Development and Testing of Line Free Fishing Gear to Reduce Entanglement in North Atlantic Right Whales



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## BACKGROUND

The North Atlantic Right Whales are in serious decline from entanglement in active fishing gear and ship strikes. Fishing gear entanglements account for 82% of documented right whale mortalities (ref. 1). 83% of all Right Whales bear scars from being entangled at least once in their lives (ref. 2). The vertical buoy line used in trap/pot fisheries entangle and anchor Right Whales and other marine life.



## INTRODUCTION

SMELTS has developed a patent pending, line free fishing system (Lobster Raft™) that integrates variable buoyancy lift bags with a remotely operated WHOI acoustic modem and GPS tracking. The Lobster Raft™ will reduce the hazards of entanglement created by vertical line and buoy systems. This gear can be deployed independent of the pot/trap with a bridle to the trawl or mounted directly to a pot/trap.



## TESTING OBJECTIVE

Evaluate the technical, operational and economic viability of remotely triggered lift bag fishing gear.



## METHODS

### Documented:

- Lift bag inflation success/fail cycles for 3 prototypes.
- Remotely triggered inflation success/fail cycles for acoustic modem in lab control tests and varying depths in ocean environment.
- Air volume used per lift.
- Battery discharge rates.
- Rates of deployment and recovery

### Analyzed:

- Attachment systems for a variety of fishing gear including ground lines, multi-pot trawls and weighted pots.
- Specialized fishing lift bag shapes for location and optimal fishing operations.
- Module housing for ruggedness and ease of operation
- Best practices for deployment and recovery.

## RESULTS

- 605 successful inflation cycles of 609 total tests, yielding a 99%+ success rate
- 240 successful acoustic trigger inflation cycles of 240 tests in Cape Code Bay at 80ft-120ft
- Air tanks performed 6-50 recovery cycles dependent on tank to bag ratio
- AGM 1.2 Ah battery consistently triggered 50-60 valve cycles per charge
- Averaged 4 full ocean deployment and recovery test cycles per hour using a single lift bag module

## ACKNOWLEDGMENTS

Thank you to the Island Foundation for support of this important work.

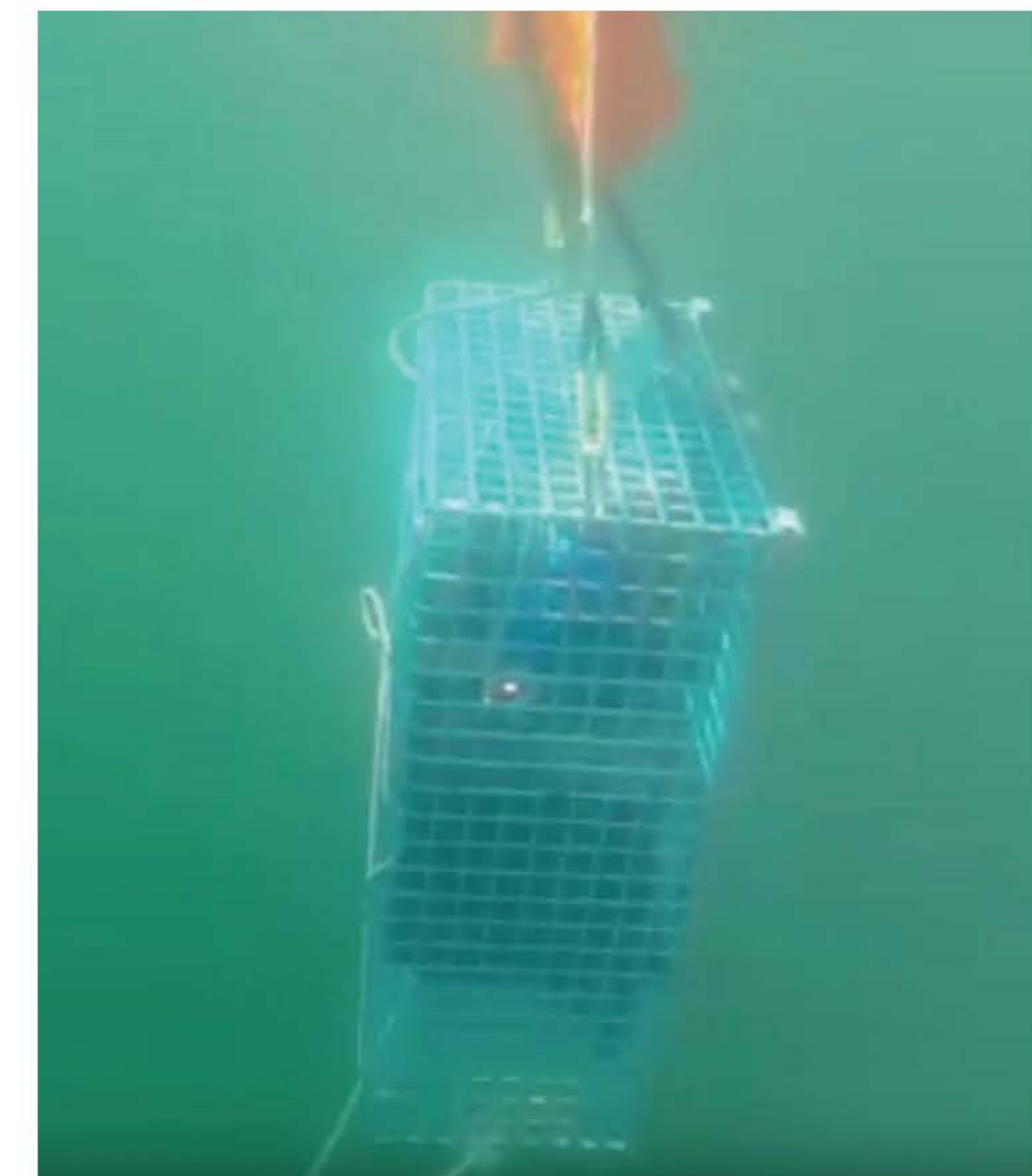


## CONCLUSION

Ongoing testing and development of the Lobster Raft™ lift bag fishing gear has proved highly successful and merits further development.

## NEXT STEPS

Further development of current prototypes to integrate with existing commercial fishing operations.  
Evaluate long term durability in the marine environment.  
Validate offshore capabilities.  
Optimize components and vendor relationships to promote economic viability.  
Expand testing with collaborative commercial fishing partners.  
Continue testing with NOAA and NMFS experimental fishing programs.  
Develop specialized lift bag modules for other bottom gear fisheries.  
Source new funding to ensure this technology can be developed to an economy of scale.



## Please Donate

Donations will support SMELTS important work of reducing entanglements of North Atlantic Right Whales, please donate at [SMELTS.org](http://SMELTS.org).

## REFERENCES

1. Waring et al.2106
2. Knowlton et al 2016