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/full cycles for 3 prototypes.
- Remotely triggered inflation success/successful 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 669 total tests, yielding a 99.1% success rate
- 240 successful acoustic trigger inflation cycles of 240 tests in Cape Code Bay at 80ft-120 ft
- 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

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.

REFERENCES
1. Waring et al, 2006
2. Knowlton et al, 2018

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Please Donate
Donations will support SMELTS important work of reducing entanglements of North Atlantic Right Whales, please donate at SMELTS.org.