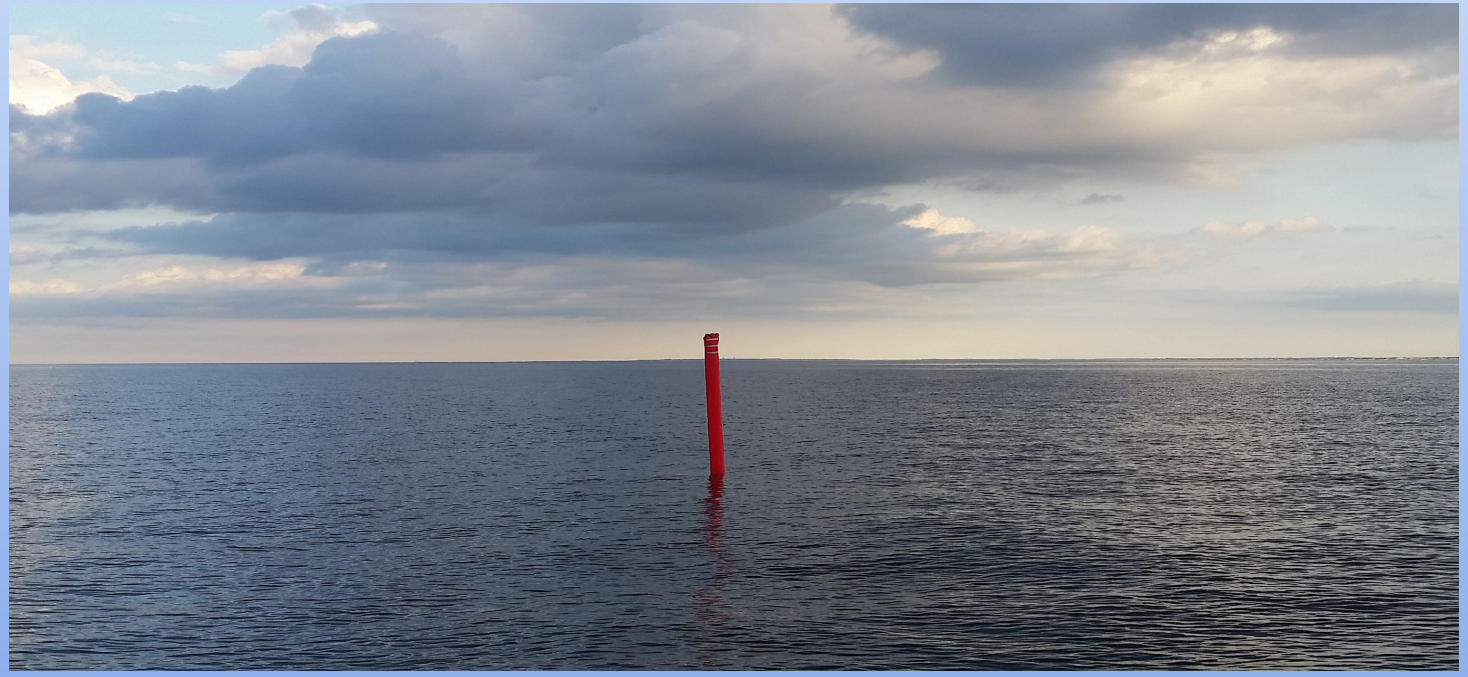
Development and Testing of Line Free Fishing Gear to Reduce Entanglement of North Atlantic Right Whales



Richard P. Riels
November 6, 2018
New Bedford Whaling Museum

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Outline Of Presentation

- Who we are
- What we have developed: acoustically triggered lift bag bottom set fishing gear
- Animated view of gear deployment, enforcement and retrieval.
- How it works
- Testing methods documented and analyzed
- Testing results
- Next steps

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Nonprofit Founded 2014 - Mission:

- Develop engineered solutions to solve marine environmental challenges.
- SMELTS technology is presented to fisheries, regulatory bodies and conservation groups for partnered testing.
- Educate a new generation of students about challenges facing our oceans.

LOBSTER RAFT ™

SMELTS has developed a patent pending, line free fishing system which integrates variable buoyancy lift bags with a remotely operated WHOI acoustic modem and GPS tracking. Rigorous cycles of testing and analysis have been performed and will be repeated to validate ruggedness and reliability that is required to meet the demands of fishermen.

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How SMELTS Lobster Raft™ Works

- Robust cage material houses electronic vessel, acoustic modem and compressed air tank.
- Hydrodynamically engineered bracket securely holds components and guides Lobster Raft up right to the seafloor.
- Retrieval lift bags have variable buoyancy dependant on size. (custom sizes to fit each fisheries needs)
- Fishing lift bags are highly visible due to color, light reflection and strobes they also include surface location features to aid in active tracking.(GPS)

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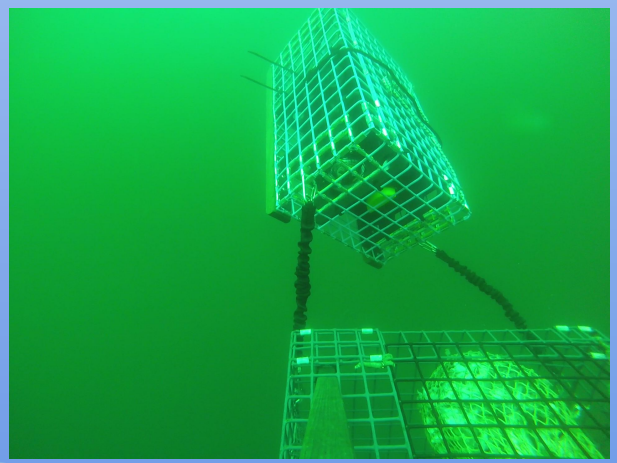
Testing Completed in Cape Cod Bay / Stellwagen Bank 2018



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Testing Methods

Documented:

- Lift bag inflation success / fail cycles using three prototypes.
- Remotely triggered inflation success / fail cycles using WHOI acoustic modem in lab control tests and varying ocean depths.
- Air volume consumed per lift cycle.
- Lift module battery discharge rates.
- Rate of gear deployment and recovery.

Testing Methods

Analyzed:

- Variety of attachment systems for bottom set fishing gear including ground lines, multi-pot trawls and weighted pots.
- Specialized fishing lift bag designs for location tracking, marine enviroment visibility and specific fisheries operations.
- Best practices for deployment and recovery.

Testing Results

- 605 successful inflation cycles of 609 tests, yielding a 99% success rate.
- 240 successful acoustic modem trigger inflation cycles of 240 in Cape Cod Bay at 80-120 ft.
- Compressed air tanks performed 6-50 recovery cycles dependent on tank pressure to lift bag volume 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

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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.
- Source new funding for continued gear development and testing.

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