Expansion Project to Modernize Pot Fishing for the Southeast Commercial Black Sea Bass (BSB) Pot Portion of the Snapper-Grouper Fishery Using Subsea Buoy Retrieval Systems[1]

Date of Application:

05/23/2022

Extent of Time EFP requested:

May 1, 2022 – April 30, 2025

Applicant's name, mailing address, telephone number, e-mail, and fax number, if available:

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[1] Subsea Buoy Retrieval Systems are also known as "ropeless", "lineless", "pop-up", and "on-demand" fishing systems. For the purpose of the application, the all-inclusive term SBRS will be used for all devices, regardless of release type. (Galvanic, Timed, Acoustic).

Introduction:

We are requesting this modified EFP to allow for adequate preparatory periods during the regular fishing season for new project participants. We had a number of unforeseen delays at the beginning of the currently approved EFP which delayed some of this planned early work. We have also obtained full funding for both projects that were outlined in the initial application, and have had some excellent feedback from fishers training this spring on gear configuration changes that will make fishing these gear types easier for their operations. These fisher-led adaptations are precisely the kind of insight our work hopes to share with management for consideration in future rulemaking. We are also asking for a longer sampling time frame to make up for the delays, cover the extent of the recently acquired grant funding, and to ensure a sufficient sample size for review. The only requested change in scope is permission to test the experimental gear during the open fishing season, as well as the currently approved allowance during the seasonal closure.

Identification of Problem:

Traditional pot fishing gear include vertical end lines and buoys which stay in the water column for hours or days while the gear is deployed, presenting an entanglement risk to cetaceans and other protected species. Fishery closures meant to prevent interactions between vertical lines and endangered cetaceans have negative economic impacts on fishermen who are unable to access the resources on which they make their living. Subsea Buoy Retrieval Systems (SBRS) [1] are innovative gear types which store buoys and their retrieval devices at depth, existing in the water column only when fishers are present. SBRS or "ropeless" systems have been utilized in fisheries and in many other marine applications worldwide for over twenty years and have been extremely reliable (>99%) in tests done internationally (Shester, 2018; Terhune et al., 2018; Baker and Specialist, 2019; Flagg, 2019; Morris and MacEachern, 2019; Stevenson, 2019) (See Appendix 2). Fishing grounds in the Black Sea Bass (BSB) pot portion of the snapper-grouper fishery off the coast of Georgia and Florida are currently closed in the winter when North Atlantic right whales (NARW) migrate to the area for calving. Adaptation of ropeless systems for this style of pot fishing could remove nearly all risk to these whales and other marine animals that suffer entanglements, while still allowing fishermen to access the BSB fishery.

For fisheries management to determine if these devices could be relied upon in an area currently closed to pot fishing when NARW mothers and calves are present, a detailed performance analysis is required that examines the refinement and successful use of SBRS in this pot fishery. Our first fisher-funded pilot project conducted under a NMFS Exempted Fishing Permit showed the eight types of ropeless gear we tested to be 100% reliable when properly trained, experienced researchers and fishermen were operating the devices. Our research also highlights the importance of fisher input and expertise in making the gear more adaptable (and profitable) for those wishing to fish a SBRS.

During our reliability testing in the initial pilot, researchers worked with ten fishermen on three vessels testing various gear configurations. To assess issues of safety, reliability of devices, efficiency, fishability and researcher and fisher learning curve, we collected trap interior and

exterior recordings, active and passive deck and dockside operations recordings, and aerial video of retrievals and repacking/stowing activities on deck. At the conclusion of our first trial fishing season (fishing single pots), we demonstrated a 99.4% success rate of the devices (n=804 deployments). In February 2022, our group was granted a second EFP, this time to perform fishing and testing activities during the time-area closure. In trials conducted from February and March 2022, our second fisher-funded project has shown all ropeless gear tested to be 100% reliable (n=144) when properly trained, experienced researchers and fishermen were operating the devices. Fishermen report < 1% occurrence of human error when setting control gear (Buff and Ogg, pers comm). These operational failures caused the line and buoys to be retained in their containment devices, so no gear was "accidentally released" or "unexpectedly" triggered at any time.

The positive experience of our project participants has gained further interest from other black sea bass pot endorsement holders. To minimize the occurrence of human error while operating ropeless systems during the right whale calving season, these additional fishers will need to be trained during the regular black sea bass fishing season, which requires an exempted fishing permit. Our project participants wish for additional time to train and test with the gear, to perform configuration adjustments, and to liaise with manufacturers on modifications that might best suit this pot fishery. Some of our fishers have also configured a "2DF" trap configuration that is easier than the 4BY configuration for those fishing without crew. We are also requesting to trial timed releases during overnight soaks.

Research Objectives and Methodology:

This project includes two detailed research components. The first component evaluates SBRS devices, while the second component evaluates the economics of SBRS gear. It is our intent that this work will,

(1) Allow for expansion of our initial pilot to the Georgia black sea bass pot fishery (funded by a current GA Sea Grant award) ***during both the closed and the allowable fishing season*** to examine basic functionality, reliability, and feasibility of ropeless fishing gear and alternative rigging configurations,
(2) Expand our alternative gear project to additional fishers in North Carolina, South Carolina, and Florida ***during both the closed and the regular and allowable fishing season*** to examine basic functionality, reliability, and feasibility of ropeless fishing gear and alternative rigging configurations for the BSB pot fishery,
(3) Collect data regarding upfront, implementation, and maintenance costs for gear types,
(4) Survey past and current Snapper-Grouper permit holders,
(5) Conduct an economic analysis of ropeless black sea bass pot fishing using empirical data from these trials and our pilot trial; and
(6) Supply "whale-safe" BSB products to wholesale and retail partners to gather relevant data about expected revenues for this niche product.

During Years One, Two, and Three, gear efficiency data will be collected during regional field-testing by the applicants. Various ropeless gear and pot configurations will be tested on a

combination of vessels, during which time "experimental" gear and configurations will be tested against controls for set-up, soak, haul times, fisher-learning curves, and catchability. Catch will be retailed according to our wholesale partner's marketing schemes, with values reported at the conclusion of the project.

In **Years Two and Three,** we will examine a critical variable cost in the development of a commercial ropeless fishery; ***the cost to enter the market***, which requires the purchase of technologies that incorporate 1) a galvanic time release (GTR), 2) a time-date system, and/or 3) an acoustic release system; paired with an air bag lift or rope management system. While some systems bear significant upfront financial costs to the user, some carry more moderate costs that will likely be commensurate with existing gear and seasonal maintenance expenditures, which will likely decrease over time and as market demand increases. We have developed an analytical tool to allow comparisons of the projected costs of acquiring and operating ten ropeless gear solutions in development or commercially available. Stakeholders can use this framework to evaluate the economic feasibility of (and multiple scenarios for) an industry-wide transition and can be adapted to accommodate any present-day pot fishery's needs.

The second year will also focus on performing outreach to Snapper-Grouper permit holders. We will collect BSB fishery-relevant information for inclusion in the economic analysis through review, field research, outreach, and surveys. The surveys will gather information on decision-making schemes concerning offshore winter pot fishing, focus shifts to other species, and archival, current, and future costs of status quo winter fishing efforts.

Finally, we will calculate the net present value of net revenues for adopting each system over 1, 5-, 10-, and 20-year cycles, and include the cost of annual expendables and replacements for worn or end-of-life units. Further, we will assign a scoring schema to deal with perceived social benefits with non-monetary values that fishers indicate are important during the survey process. We will return scenarios to management and fishers that they can use to make informed decisions about maintaining or changing. The project will provide critical information for all partners and will yield lessons for other fisheries facing similar conflicts and resultant economic difficulties, such as the New England lobster fishery, and the West Coast dungeness crab fishery.

We are collaborating with other stakeholders in a meaningful fashion; Marine Extension and GA Sea Grant (GASG) for outreach and education to consumers and fishers, Southeast Regional Office Protected Species Branch for considering measures to mitigate impacts to NARW, and the South Atlantic Fishery Management Council. We are also working collaboratively with Georgia Conservancy, the University of Massachusetts-Dartmouth, and GA DNR.

Data will be collected from the date of issuance until April 30, 2025 with ropeless devices (if issued an EFP) in the BSB pot fishery through an ongoing and collaborative effort of several BSB pot endorsement holders, multiple SBRS manufacturers, our wholesale and retail partners, the Georgia Conservancy, the University of Georgia’s Marine Extension and Georgia Sea Grant.

Objectives and Fishing Methods

The research described in this EFP application specifically seeks this exempted fishing permit to determine:

- If the SBRS gear will continue to show a greater than >99% successful deployment and retrieval rate,
- If SBRS gear significantly increases time or expense for retrieval and recovery versus the current fishing method such that it might affect profitability,
- If SBRS gear significantly increases time or expense for repacking of gear for redeployment versus the current fishing method such that it might affect profitability,
- If bycatch rates for a modified BSB pot design ("4BY" or "2DF") are greater than the traditional single pots,
- If the harvest of BSB in the preferred inshore areas (currently closed), will still yield enough catch to offset the cost of SBRS fishing gear and modifications.

The first phase of our work will be to familiarize the fishers with SBRS gear, using mock-up traps (with no entrances for fish) as allowable by law, during a knowledge exchange in Townsend, GA in September 2022. We have arranged this event with long-standing members of the BSB pot fishing community to ensure that our fishers are utilizing the similar fishing methods across all ropeless fishing efforts, as well as to introduce crew members to the SBRS and train them at one time. We intend to use our "Learning-Teaching-Mastery" plan during our fisher dockside training and fishing trials to quantify and understand learning curves for the various devices. This information is essential for future research, development, and regional adoption plans for SBRS gear. Our learning exchange will also test and refine our "Six Rights for Ropeless" quick start and troubleshooting guide.

This will yield basic data about the ease of adaptation to the experimental buoy designs and success of acoustic deployments and retrievals. We will also gain valuable fisher-provided feedback on our virtual gear marking software, as well as those products that accompany the various SBRS.

Our pilot work has shown that fishers (and manufacturers) benefit from the process of configuring their own SBRS set-ups based on their individual fishing styles. Many of the SBRS devices can be effectively utilized with gear (buoys, line, hardware) that is readily available and locally obtained, which helps with initial and ongoing implementation and cost reduction. This process also assists understanding common adaptations for individual gear types made within and across pot fisheries.

Figure 1. TR4RT configurations a) Cowdrey, 2022 (Longsoaker Guardian and SSS hybrid), b) Phillips, 2020, c) Hull, 2022.

During the configuration process, we ensure that these modified systems will operate at 100% reliability. Initial configuration test traps will be tested no less than 10 times consecutively with safety lines as well as lines and buoys stored at depth using timers and/or GTRs in place as back-up releases. These configurations have been used successfully in other regions of the United States, the United Kingdom, and Canada. Camera and film recordings of fish, trap, SBRS, and participant behavior will be utilized to ensure safety of both intended target catch and sub-legal species as well as nearby marine animals and participants.

We propose to fish with each identified fisher applicant for up to 10 days each year in supervised field trials. Fishers will then perform unsupervised fishing trials and collect data aboard permitted commercial vessels during periods allowable in the EFP to evaluate the performance of SBRS with both the experimental and standard BSB pot configurations.

BSB pots will be fished as singles, 2DFs, or 4bys in inshore areas; this will be done during the closure periods to compare against control pots. Data will be collected on the time expended to retrieve and rebait traditional traps as well as experimental traps. Catchability of pots rigged with traditional and SBRSs gear will also be compared. These experimental gears and configurations of BSB pots will be fished on live bottom with SBRS and without ***persistent*** vertical end lines and buoys and recorded with virtual GPS gear marking applications and software. Virtual gear marking (marking of gear deployment location with chartplotters, GPS, and manufacturer-provided software) will be utilized and evaluated, with analysis of the interoperability of systems being shared with fishery management partners.

The selected styles of SBRS gear and pot configurations can be seen in Figures 2-12 and are detailed later in the EFP. Back-up releases will be used to ensure that gear is not lost due to catastrophic failure of the SBRS gear.

Any gear modifications or alterations in rigging will be made through consultation with regional and federal management agencies and in collaboration with individual fishers and industry partners. Fishers participating in this initiative are assumed to be receiving grant funding and/or self-funding the work. To ensure coverage under the MMPA by the Marine Mammal Authorization Program, they will keep and sell all legal catch so that it meets the definition of a

commercial fishery. We will consult with NOAA Fisheries to ensure our research design and fishing activities are in congruence with NARW conservation measures currently in place.

An overview of each product's gear type, working method, and development status is presented in Table 1.

Table 1 Summary of current ropeless systems available.

Manufacturer	Line Storage Method	Release Method	Status	Field-tested	Web site
Desert Star Systems	Multi or Bag	Acoustic	Mature design 20+ yr. product	Yes	http://www.desertstar.com
Ashored	Cage	Acoustic	Solid Prototype	Yes	https://ashored.ca/
EdgeTech	Cage	Acoustic	Mature design since 1965	Yes	https://www.edgetech.com
Fiomarine	Spool	Acoustic Timer	Mature design 20+ yr. product	Yes	http://fiomarine.com
International Fishing Devices	Multi	GTR	Mature Design	Yes	https://www.undersearelease s.com
Lobster Lift	Air	Acoustic& Timer	Solid Prototype	Yes	https://www.lobsterlift.com
Longsoaker	Mesh	GTR	Solid Prototype	Yes	http://longsoaker.com
Puget Buoy	Line Cannister	Timer	Prototype	Yes	https://pugetbuoy.com

Manufacturer	Line Storage Method	Release Method	Status	Field-tested	Web site
Ropeless Riser	Air	Acoustic	Solid Prototype	Yes	https://www.Ropeless Riser.org
Sub Sea Sonics	Multi	Acoustic Timer	Mature Design and Solid Prototype	Yes	https://www.subseasonics.com
Resqunit* *retrieval device for catastrophic failure*	Tag line puck	Timer	Solid Prototype	Yes	https://www.resqunit.com/

Black Sea Bass Pot Modifications

BSB pot fishers are limited to 35 traps per endorsement, and they must return to the dock at the end of each fishing trip. Many pot fisheries utilize trawls (traps connected by a ground line) to increase their fishing efficiency and reduce the number of vertical buoy lines needed for hauling. Because trawls are not allowed in this region during parts of the season, we collaborated with endorsement holders to conceive a method that connects four regulation-sized pots for our pilot project. This configuration, referred to as the 4BY, was done with wire connecting clips (hog rings) and required only one SBRS gear device to retrieve the four pots. Our experimental design ensured that all sides of the pots and configurations of pots used a mesh size of >2.00" to allow maximum opportunity for the release of unintended species and sub-legal conspecifics (Rudershausen *et al.*, 2016). This experimental design also reduced the total entrances from eight to four (Fig 2 and 3). Modifying the configuration in this way reduces gear setting and resetting time and is being investigated as a method to improve return on investment for fishermen since fewer SBRS devices are required to fish the same number of pots.

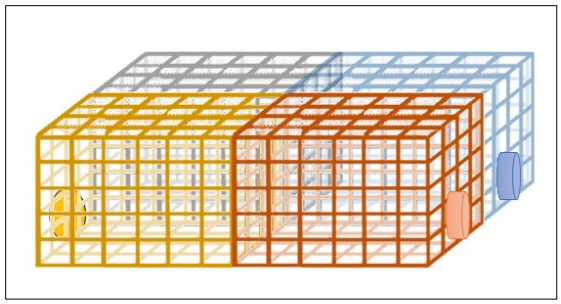


Figure 2 4BY Configuration

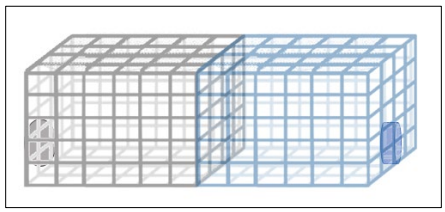


Figure 3 2DF Configuration

This same gear will be trialed with some fishers in this project to 1) reduce the number of SBRS devices needed to haul gear to reduce expense for gear and 2) test the feasibility of targeting a large group of BSB at one time, improving the efficiency of gear while reducing the amount of time required by fishers in winter to set and haul and, 3) reduce the number of individual gear deployments during the closure. Traditionally, fishing 32 pots would require 32 deployments; our method requires a minimum of eight deployments to achieve this same number of pots fished. It is important to note that the interior dimensions of these configurations are the same as required by law. This modification aims to examine ways to reduce procurement and implementation costs associated with SBRS while ensuring catch rates that are similar or greater than those in single-pot configurations.

In addition to this configuration, we will also test a new adaptation, which is a simplified version of the "4BY" design in which only two traps are connected, allowing for both a normal number of trap entrances as well as 50% trap entrances, as described above. The "2DF" configuration was conceived by Captain Cowdrey, who frequently fishes without crew, and found the 4BY difficult to service singlehanded.

Amount of gear to be used: 35 total pots per vessel

Average Number of gear hauls: <2500 per endorsement

Average soak time: 90 minutes for strike fishing, occasional overnight soaks.

Sampling months/time of year: January 1 - December 31, including November 15 – April 30 closed season

Sampling locations (including depth): See Fig 4 and description to follow.

Study Area:

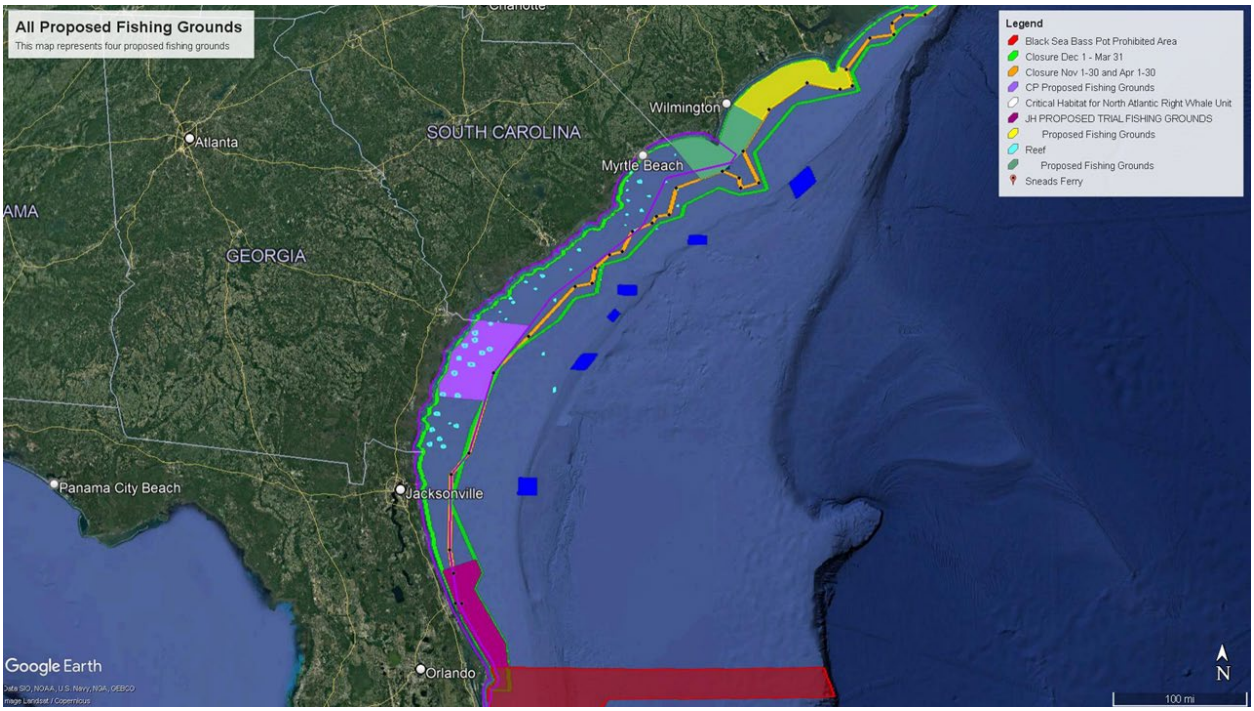


Figure 4 Proposed Fishing Areas for SA BSB ropeless pot fishery 2022-2024

Fishing will take place inshore, in waters between 20 and 65 meters per the map above (Fig 3). The area indicated in yellow would be a combined opportunity region for Captain Michael Cowdrey, Captain Charles Locke, and Captain Jeffrey Oden. The area indicated in dark green would be a combined opportunity region for both Captain Cowdrey as well as Captain Scott Buff and crew. The area indicated in light green would be the primary fishing grounds utilized by Captain Buff and crew, but outreach is underway to recruit additional trial participants off the South Carolina Coast. The area highlighted in purple will be those grounds available for gear trials to Captain C. Phillips and crew, and lastly, the area indicated in maroon will be the area utilized by Captain J. Hull. Outreach is ongoing to recruit an additional fisher for the northern opportunity area in Florida.

Fishermen participating in the work will advise PI if any changes to arrangements with opportunity regions are needed during the project period. PI will consult with NMFS to ensure that changes are compliant with EFP.

We will not fish in Special Management Zones (SMZs) or the North Atlantic Right Whale Critical Habitat Area or those areas listed in CRF 50 §622.182 Gear-restricted areas ((a)(1)(i) through (ii).

Detailed Sampling Areas and coordinates are listed below.

Exemptions required by the project:

This project requires exemptions from the following regulations:

1. Gear identification
    a. 50 CFR § 622.177(a)(2)
    b. 50 CFR § 622.177(a)(4)
2. Area and seasonal closures
    a. 50 CFR 622.183(a)(1)(ii)(E)
    b. 50 CFR 622.183(a)(2)(vii)(E)
    c. 50 CFR 622.183(b)(6)
3. Pot Configuration Requirements
    a. 50 CFR § 622.189 (b)
    b. 50 CFR § 622.189(e)(1)
    c. 50 CFR § 622.189 (g)

Details on why these exemptions are required are documented below.

50 CFR § 622.177 (a)(2) Sea bass pots and associated buoys

(2) Associated buoys. In the South Atlantic EEZ, buoys are not required to be used, but, if used, each buoy must display the official number and color code assigned by the RA so as to be easily distinguished, located, and identified.

We require exemption from this rule because our SBRS gear (inclusive of buoys or lift bags) is borrowed gear and using the official color code and number prescribed by the RA would not be possible without permanently defacing the gear. Additionally, these buoys are submerged at depth. We will ensure that any buoys which are utilized during the regular season are marked appropriately.

50 CFR § 622.177 (a)(4)

(4) Unmarked sea bass pots or buoys. An unmarked sea bass pot or a buoy deployed in the EEZ where such pot or buoy is required to be marked is illegal and may be disposed of in any appropriate manner by the Assistant Administrator or an authorized officer.

We require exemption from this rule because our SBRS gear (inclusive of buoys or lift bags) is borrowed gear and using the official color code and number prescribed by the RA would not be possible without permanently defacing the gear. Additionally, these buoys are submerged at depth. We will ensure that any buoys which are utilized during the regular season are marked appropriately. We will use virtual gear marking to track our deployments, as well as a coordinated fishing plan (see attached) to avoid gear interactions with other participants.

50 CFR 622.183(a)(1)(ii) (E)

A crustacean trap, golden crab trap, or sea bass pot cannot be baited. All buoys must be disconnected from the gear; however, buoys may remain on deck.

We require exemption from this rule because SBRS gear (inclusive of buoys or lift bags) may not always be easy or possible to disconnect from traps, particularly those that are fixed or spliced into the bridle system of singles or 4BYs. No pots will be baited during transit through MPAs.

50 CFR 622.183(a)(2)(vii)(E)

A crustacean trap, golden crab trap, or sea bass pot cannot be baited. All buoys must be disconnected from the gear; however, buoys may remain on deck.

We require exemption from this rule because SBRS gear (inclusive of buoys or lift bags) may not always be easy or possible to disconnect from traps, particularly those that are fixed or spliced into the bridle system of singles or 4BYs. No pots will be baited during transit through SMZs.

50 CFR 622.183(b)(6)

Seasonal closure of the commercial black sea bass pot component of the snapper-grouper fishery.

The closed area is that area and time period described in paragraphs (b)(6)(i) and (b)(6)(ii) of this section, respectively. During the applicable closure, no person may harvest or possess black sea bass in or from the closed area within the South Atlantic EEZ either with sea bass pots or from a vessel with sea bass pots on board, except that a vessel with a valid commercial permit for snapper-grouper with a sea bass pot endorsement that is in transit and with black sea bass pot gear appropriately stowed as described in paragraph (b)(6)(iii) of this section may possess black sea bass. In addition, sea bass pots must be removed from the water in the applicable closed area within the South Atlantic EEZ before the applicable time period and may not be on board a vessel in the closed area within the South Atlantic EEZ during the applicable closure, except for such sea bass pot gear appropriately stowed on board a vessel in transit through the closed area. See paragraph (b)(6)(iii) of this section for black sea bass pot transit and gear stowage requirements through the closed areas.

50 CFR 622.183(b)(6)(i): From November 1 through November 30 and from April 1 through April 30, no person may harvest or possess black sea bass in or from the closed area within the South Atlantic EEZ either with sea bass pots or from a vessel with sea bass pots on board in the South Atlantic EEZ inshore of the rhumb lines connecting, in order, the following points:

Point	North lat	West long	Point	North lat	West long	Point	North lat	West long
1	35°15′	State/EEZ boundary	13	33°44′	77°38′	25	32°34′	79°23′
2	35°15′	75°09′	14	33°25′	77°27′	26	32°25′	79°25′
3	35°06′	75°22′	15	33°22′	77°40′	27	32°23′	79°37′
4	35°06′	75°39′	16	33°28′	77°41′	28	31°53′	80°09′
5	35°01′	75°47′	17	33°32′	77°53′	29	31°31′	80°33′
6	34°54′	75°46′	18	33°22′	78°26′	30	30°43′	80°49′
7	34°52′	76°04′	19	33°06′	78°31′	31	30°30′	81°01′
8	34°33′	76°22′	20	33°05′	78°40′	32	29°45′	81°01′
9	34°23′	76°18′	21	33°01′	78°43′	33	29°31′	80°58′
10	34°21′	76°27′	22	32°56′	78°57′	34	29°13′	80°52′
11	34°25′	76°51′	23	32°44′	79°04′	35	29°13′	State/EEZ boundary
12	34°09′	77°19′	24	32°42′	79°13′			

Our work requires exemption from this rule as it would not be possible to fish SBRS gear in any other area and return pertinent data on the economic viability of this gear for this fishery without access to the resource, which is in greatest abundance, is most valuable, and easiest to access in the winter closure area and closure period. We have already tested the experimental gear, as well as the control gear for reliability in a previous pilot project. We will take all available safety precautions necessary including turning off the permitted fishing vessels to look and listen for whales in the area for 15 minutes prior to triggering release of the devices. Further, before leaving the dock for all fishing activities, we will suggest that fishermen check the Whale Alert App or consult this sightings map:

https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html.

For areas off NC and SC, we will advise our participant vessels to transit 10 knots or less within a 5 nautical mile radius of a right whale sighting for 3 days post the initial sighting. For areas off GA and FL, we will advise our participant vessels to transit 10 knots or less within a 5 nautical mile radius of a right whale sighting for 14 days post that sighting.

50 CFR 622.183(b)(6)(ii): From December 1 through March 31, no person may harvest or possess black sea bass in or from the closed area within the South Atlantic EEZ either with sea bass pots or from a vessel with sea bass pots on board in the South Atlantic EEZ inshore of the rhumb lines connecting, in order, the following points.

Pt	North lat	West long	Pt	North lat	West long	Pt	North lat	West long	Pt	North lat	West long
1	35°15′	State/ EEZ bdry	8	34°12′	77°00′	15	33°01′	78°38′	22	30°58′	80°47′
2	35°15′	75°08′	9	33°43′	77°30′	16	32°40′	79°01′	23	30°13′	81°01′
3	34°58′	75°41′	10	33°21′	77°21′	17	32°36′	79°18′	24	29°32′	80°39′
4	34°49′	75°50′	11	33°18′	77°41′	18	32°19′	79°22′	25	29°22′	80°44′
5	34°47′	76°05′	12	33°22′	77°56′	19	32°16′	79°37′	26	28°50′	80°22′
6	34°31′	76°18′	13	33°12′	78°20′	20	32°03′	79°48′	27	28°21′	80°18′
7	34°20′	76°13′	14	33°05′	78°22′	21	31°39′	80°27′	28	28°21′	State/ EEZ boundary

Our work requires exemption from this rule as it would not be possible to fish SBRS gear in any other area and return pertinent data on the economic viability of this gear for this fishery without access to the resource, which is in greatest abundance, is most valuable, and easiest to access in the winter closure area and closure period. We have already tested the experimental gear, as well as the control gear for reliability in a previous pilot project. We will take all available safety precautions necessary including turning off the permitted fishing vessels to look and listen for whales in the area for 15 minutes prior to triggering release of the devices. We will take all available safety precautions necessary including turning off the permitted fishing vessels to look and listen for whales in the area for 15 minutes prior to triggering release of the devices. Further,

before leaving the dock for all fishing activities, we will suggest that fishermen check the Whale Alert App or consult this sightings map:

https://apps-nefsc.fisheries.noaa.gov/psb/surveys/MapperiframeWithText.html.

For areas off NC and SC, we will advise our participant vessels to transit 10 knots or less within a 5 nautical mile radius of a right whale sighting for 3 days post the initial sighting. For areas off GA and FL, we will advise our participant vessels to transit 10 knots or less within a 5 nautical mile radius of a right whale sighting for 14 days post that sighting.

50 CFR 622.183(b)(6)(iii): For the purpose of paragraph (b)(6) of this section, transit means non-stop progression through the area; fishing gear appropriately stowed means all black sea bass pot gear must be out of the water and on board the deck of the vessel. All buoys must either be disconnected from the gear or stowed within the sea bass pot. Disconnected buoys may remain on deck.

We require exemption from this rule because SBRS gear (inclusive of buoys or lift bags) may not always be easy or possible to disconnect from traps, particularly those that are fixed or spliced into the bridle system of singles or 4BYs. No pots will be baited during transit.

50 CFR § 622.189 (b) Configuration restriction.

In the South Atlantic EEZ, sea bass pots may not be used or possessed in multiple configurations, that is, two or more pots may not be attached one to another so that their overall dimensions exceed those allowed for an individual sea bass pot. This does not preclude connecting individual pots to a line, such as a "trawl" or trot line.

Our work requires exemption from this rule because it would not be possible to test our 4BY trap configurations with the fishers who elect to try them. These trap configurations would make transition to SBRS gear more affordable and is a critical element of our research.

50 CFR § 622.189(e)(1) Requirements for pot removal.

A sea bass pot must be removed from the water in the South Atlantic EEZ, and the vessel must be returned to a dock, berth, beach, seawall, or ramp at the conclusion of each trip. Sea bass pots may remain on the vessel at the conclusion of each trip.

Our work requires exemption from this rule because it would not be possible to test traditional soak times and approaches by some fishers who have historically used these methods. Combining SBRS, new trap configurations, and traditional soak times would make transition to SBRS gear more affordable for those wishing to use the pots as a passive fishing approach and is a critical element of our research.

50 CFR § 622.189 (g) Sea bass pot buoy line marking requirement.

In addition to the gear marking requirements specified in 50 CFR 229.32(b), from November 15 through April 15, each year, in the Southeast U.S. Restricted Area North as described in 50 CFR 229.32 (f) and from September 1 through May 31, each year in the Offshore Trap/Pot Waters Area

and the Southern Nearshore Trap/Pot Waters Area, as described in 50 CFR 229.32(c)(6) and (9), respectively, the buoy line must be marked with a purple color band. The colored band must be clearly visible when the gear is hauled or removed from the water, including if the color of the rope is the same as, or similar, to the colored band. The purple band must be marked directly onto the line and adjacent to the buoy line markings specified in 50 CFR 229.32(b), that is, at the top, middle, and bottom of each buoy line deployed by, or on board, the vessel. Each of the three purple bands must be a 12-inch (30.5 cm) color mark. In marking or affixing the purple band, the line may be dyed, painted, or marked with thin colored whipping line, thin colored plastic, or heat-shrink tubing, or other material.

Our work requires exemption from this rule and requests a different color for our line marking so that our experimental fishing is discernible from other fisheries and gear types.

Systems being tested by this project

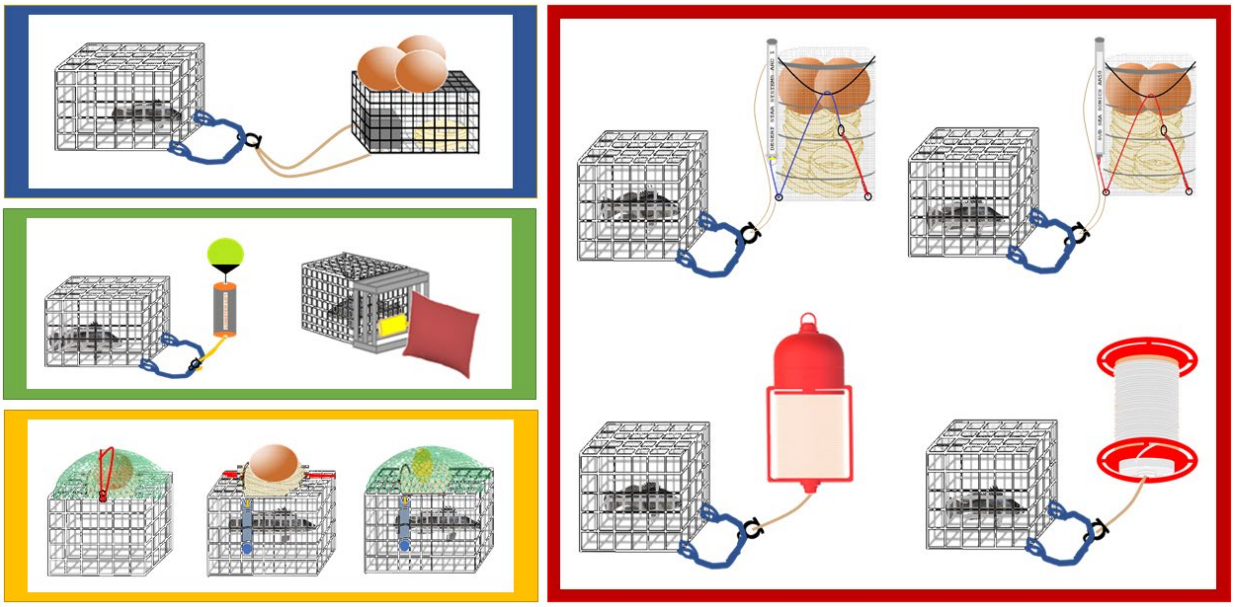
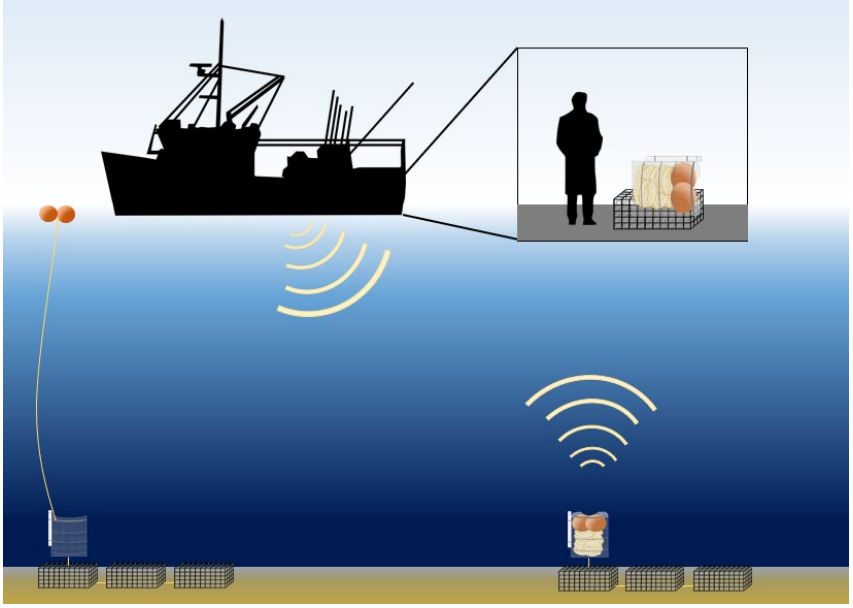


Figure SBRS Gears to Be Tested (from L to R, top to bottom: EdgeTech 5112, Sub Sea Sonics AR 50, Desert Star Systems ARC-1XD, LobsterLift , Ropeless RISER, Puget Buoy, Fiomarine-FioBuoy, Longsoaker Guardian - GTR, Sub Sea Sonics - TR4RT, Longsoaker Guardian & Sub Sea Sonics TR4RT hybrid. Sawicki &Toth, 2021.

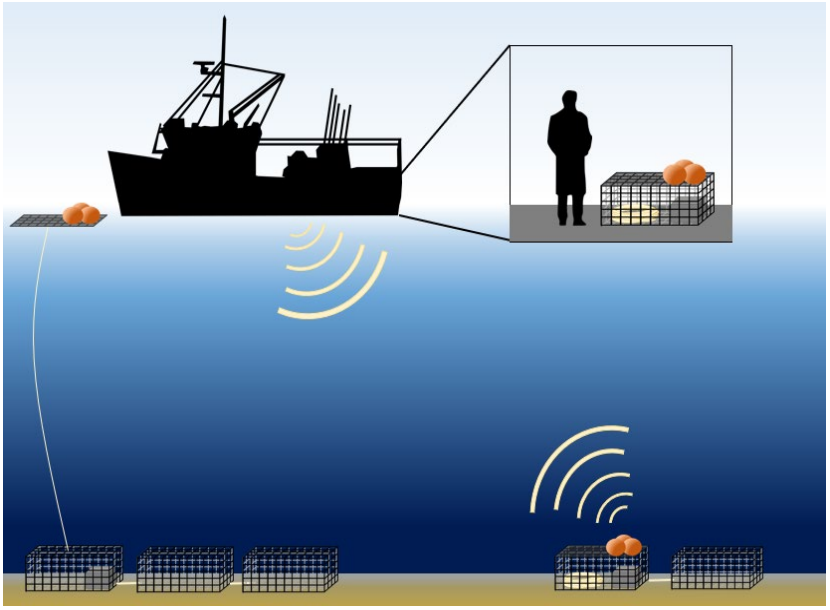
Product Name:
Desert Star ARC-1XD
Manufacturer:
Desert Star Systems
Release Type:
Acoustic Release
Line Management Style:
Rope Release Bag
Field Tested: Yes
Available for Purchase: Yes
Website:
http://www.desertstar.com
Video Demonstration:
Desert Star Systems



The Desert Star ARC-1 is a modular acoustic release system produced by Desert Star Systems that can be paired with any rope management systems (Figure 5). As seen in Figure 5, the buoys and rope are contained in a mesh bag with an acoustically triggered release mechanism attached to the side, which is placed with the rest of a fisherman's regular gear. The release mechanism is a small magnesium wire that disintegrates when it receives an acoustic command. Once released, the buoys and line ascend out of the bag and are available for retrieval at the surface. The gear is then hauled as normal, and the line is repacked for another deployment. The rope storage method can and has been customized to fishermen's needs according to their geographic regions. This release system has existed and been in use by fishermen in New South Wales (Australia) for many years and is available for purchase on Desert Star Systems' website. This device will require weight to be added to the trap to fully submerge the bag.

This system has been successfully tested and used by fishers in Australia, New South Wales, South Africa, New Zealand, Scotland, Canada, California, Maine, Massachusetts, Georgia, and North Carolina for use in fishing applications and had a reliability of 100% during our pilot project.

Product Name:
EdgeTech 5112
Manufacturer:
EdgeTech
Release Type:
Acoustic Release
Line Management Style:
Cage System
Field Tested: Yes
Available for Purchase: Yes
Website:
https://www.edgetech.com
Video Demonstration:
Cage System

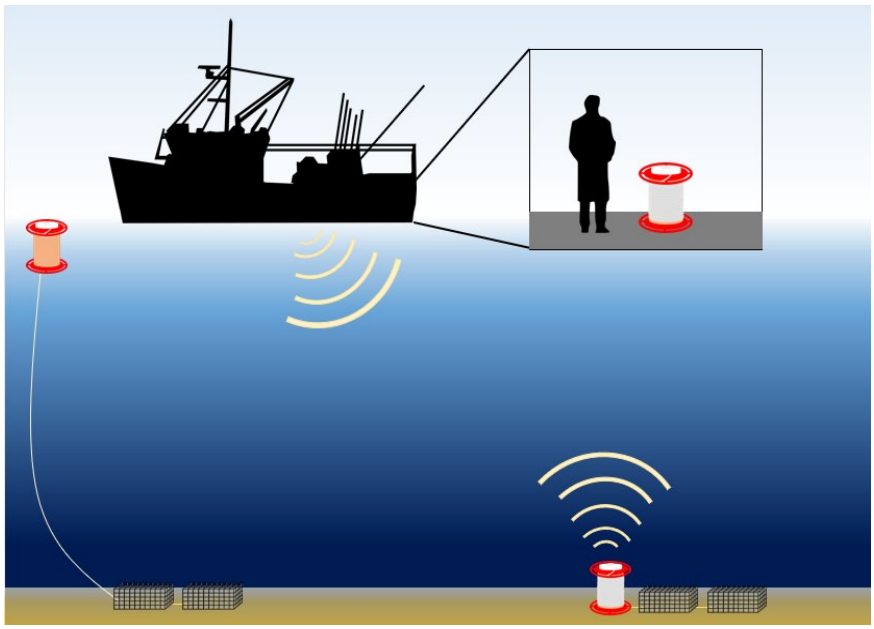


The EdgeTech 5112 system is an acoustic command and control system developed by EdgeTech. The system consists of a modified lobster trap, which comes in a variety of sizes and rugged acoustic release (Figure 6). The release cage has two sections and a top cover with flotation. One section holds up to 650 feet of ⅜ line, and the other section contains the acoustic release. The top cover includes the floatation that detaches and floats to the surface when the acoustic release is actuated. It is deployed like any other lobster trap but without the need for surface rope and buoy. The unit can be deployed in water depths down to 500 meters and handle a load of 500 pounds (release load 250 pounds) while enduring underwater for up to one year (two years on lithium batteries). The acoustic release is constructed of nickel aluminum bronze alloy that protects against corrosion. When communicating with one of the 5112 deck boxes, the system will provide shipboard operators information such as battery life status, tilt information, and release information and confirmation. This system was designed from the ground up with the input of lobster fishermen and is available for purchase on EdgeTech's website. This device will not require weight to be added to the trap.

This system has been successfully tested by fishers in Canada, California, Maine, Massachusetts, Georgia, and North Carolina for use in fishing applications and had a reliability of 100% during our pilot project.

Product Name:
(Fiobuoy® AC100)
Manufacturer:
Fiomarine
Release Type:
Acoustic Release
Line Management Style:

Spool Design
Field Tested: Yes
Available for Purchase:
Yes
Website:
http://fiomarine.com
Video Demonstration:
Spool design



The Fiobuoy® is an integrated smart buoy system comprised of a spool of rope, acoustic modem, floatation, and release mechanism affixed to a subsea object (Figure 4). Each unit has a unique identification code to allow security to the fleet and provide an integrated system management capability for enhanced fisheries operations and oversight. The code management capability can be configured to allow only the buoy to operate in areas open for fishing. If there were an attempt to launch the system within a closed zone, the release jaws would not close on the surface. This system capability prevents the deployment of the system when configured for this functionality. The Fiobuoy mechanical release is activated upon receiving an acoustic command from the surface vessel, a master code for enforcement personnel is also designed into the system. There are also two failsafe release backups in the Fiobuoy; a time/date trigger and a low battery trigger. Once the mechanical jaws are released, the Fiobuoy floats to the surface as the line unspools. Recovery operations remain the same as traditionally marked surface float fixed gear traps. This configuration removes the surface float and the vertical line in the water column until a release is triggered. This device will not require weight to be added to the trap unless fast moving currents are present.

This system has been successfully tested by fishers in Australia, New Zealand, Scotland, California, Maine, Massachusetts, Georgia, and North Carolina for use in fishing applications and had a reliability of 100% during our pilot project.

Product Name: Galvanic Timed Release
Manufacturer:
International Fishing Devices
Longsoaker Fishing Systems
Gear Type: GTR
Field Tested: Yes
Available for Purchase: Yes
Website: http://neptunemarineproducts.com
Product Page: GTRs

Galvanic Timed-Releases (GTR) are a low-cost option in widespread use in the marine industry and in multiple pot fisheries globally. (Figure 11) (Salvador *et al*., 2006). A GTR device uses two dissimilar metals that corrode at a predictable rate. The corrosion releases the link, which then allows a float and line to rise to the surface for recovery. GTR's must be used in saltwater. Their corrosion rate depends on the water's salinity and temperature at the depth being used.

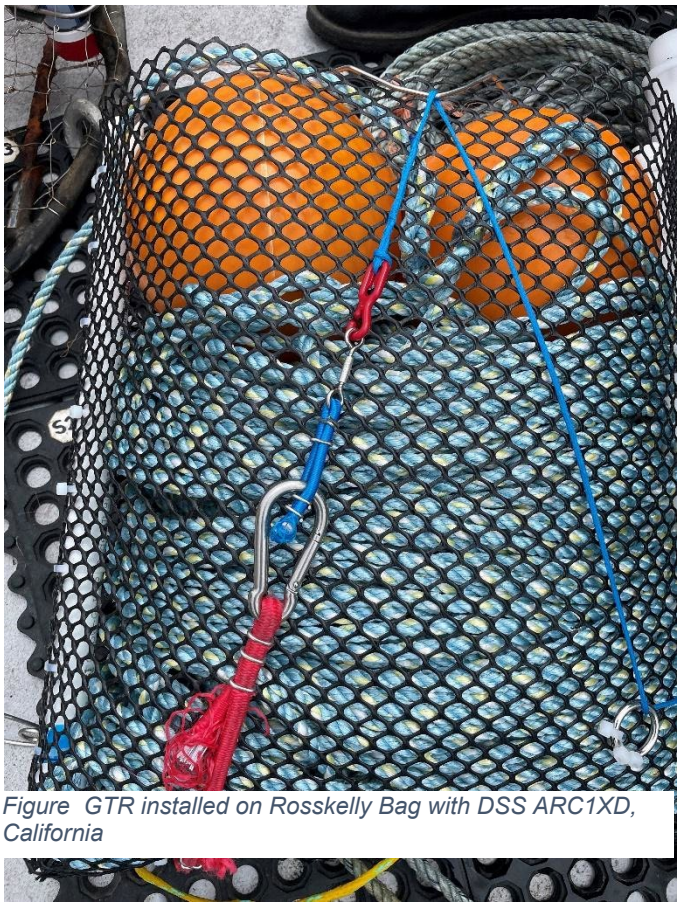


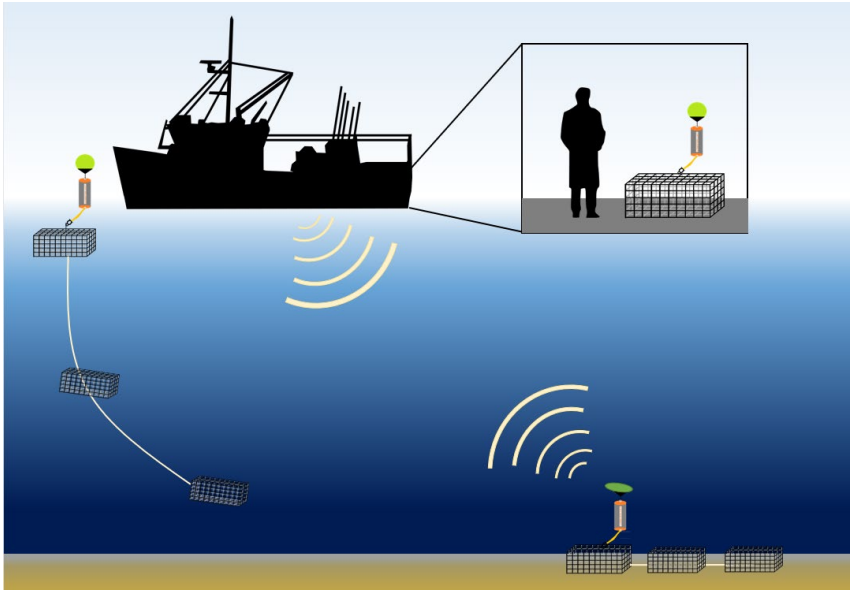
Figure GTR installed on Rosskelly Bag with DSS ARC1XD, California

GTR releases offer approximate release timing, which varies with water temperature, salinity, current speed, and fouling. Thus, GTR-equipped ropeless systems will still leave the rope in the water column some percentage of the time.

The primary purpose of these releases in this trial is to ensure a "back-up" method of retrieval for the SBRS systems in case of catastrophic failure of the acoustic systems or timers. This is the method required by California Dungeness Crab Risk Assessment Mitigation Program (RAMP) Gear Authorizations. We are utilizing this back up system in other fishing projects as well, in California, Scotland, Canada, and Maine.

Product Name:
LobsterLift
Manufacturer:
Lobster Lift
Release Type:
Acoustic Release
Line Management Style:
Lift Buoy
Field Tested: Yes
Available for Purchase: No – solid prototype
Website:
https://www.lobsterlift.com
Video Demonstration:

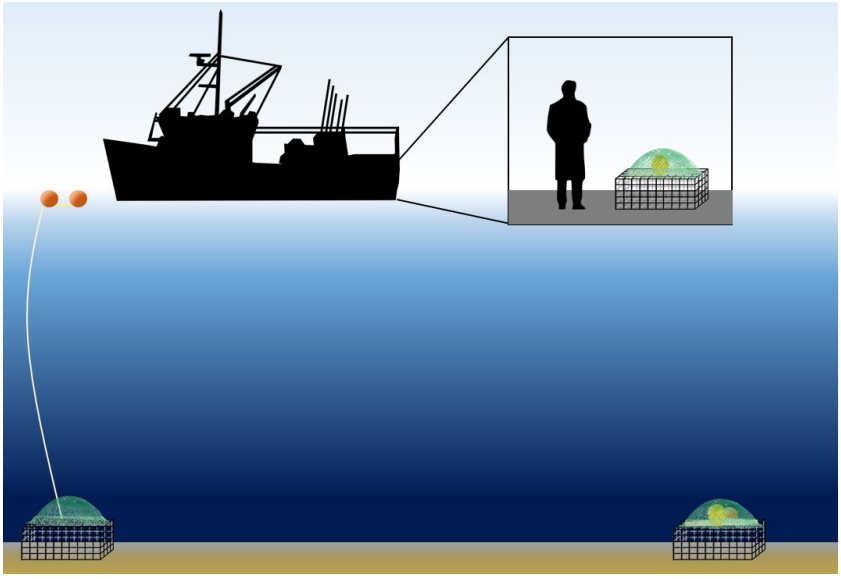
LobsterLift



LobsterLift is a lineless, self-surfacing modular lobster trap retrieval system. Traps utilizing LobsterLift technology sit on the seafloor and are raised when needed, either through acoustic signal or through GTR (Figure 7). To retrieve a trawl, a fisherman sends an acoustic signal from the boat to a module attached to the trawl. Alternatively, the unit can be fitted with a GTR, which would allow the release of nitrogen from a tank to inflate an attached buoy. The buoy increases in size until it can float the trap to just below the surface (4-8 ft. below the waterline). The buoy is then hauled, the traps are retrieved, removed from their catch, and re-baited. This method uses no vertical endline but does use rope between traps and would require slight modification to work with GTR to protect catch, animals, and gear. This device will not require weight to be added to the trap.

This prototype has been successfully tested by fishers in Maine, Massachusetts, Georgia, and North Carolina for use in fishing applications and had a reliability of 100% during our pilot project.

Product Name:
Guardian
Manufacturer:
Longsoaker Fishing Systems
Release Type:
Time/Date Hybrid or GTR Release
Line Management Style:
Net
Field Tested: Yes
Available for Purchase: Yes
Website:
https://longsoaker.com/
Video Demonstration:
Longsoaker Guardian

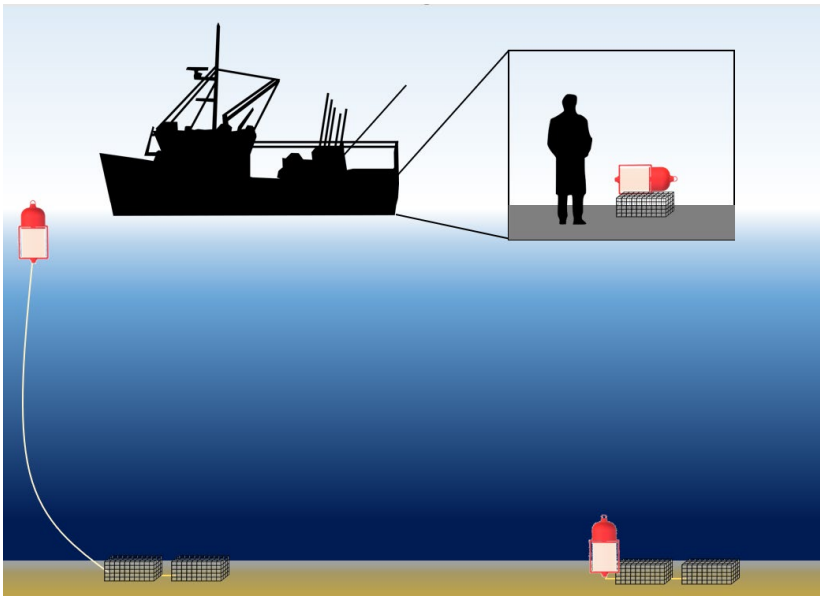


The Longsoaker Guardian is a fishing trap retrieval system. Traps utilizing the Guardian technology sit on the seafloor and are raised when a timer is set (Such as the SSS TR4RT) or appropriately timed GTR is selected. The Longsoaker gear generally consists of a net and a GTR device which, once dissolved, allows the release of a coiled line and buoy from the top of a standard pot or trap. A standard hard buoy is used and is submerged for most of the soak time (Figure 11). It is not visible on the surface until the selected galvanic release dissolves and releases the buoy and line. The buoy is then hauled, the traps are retrieved, removed of their catch, and re-baited.

Retrieval time is the same as with regular gear, as long as the regular operational line was coiled and stored in a reasonably orderly manner. Line coilers with industry-standard hard-lay lines are recommended. Most fishermen will be able to use their existing buoy lines and deck gear. This gear can be easily modified to meet specific fishing requirements for different locations and regulations. When not in use, the retrofit is out of the way and does not require de-rigging, removal, or storage.

This system has been successfully tested by SST staff in the presence of California Fish and Wildlife Division personnel for use in fishing applications and had a reliability of 100% during our most recent outreach work.

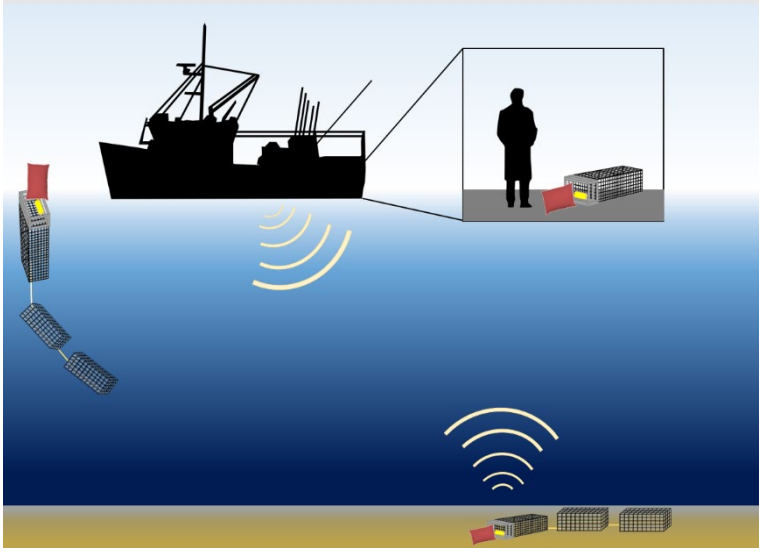
Product Name:
Puget Buoy
Manufacturer:
Puget Buoy
Release Type:
Time Date Release
Line Management Style:
Line Cannister
Field Tested: Yes
Available for Purchase: No – solid prototype
Website:
https://pugetbuoy.com
Video Demonstration:
Puget Buoy



Puget Buoy is a self-surfacing modular pop-up buoy retrieval system compatible with most pots used for crab and lobster. Traps utilizing Puget Buoy technology sit on the seafloor and release to the surface through an onboard pre-programmed digital timer. (Figure 1).Before dropping the pots to soak, the captain uses an existing smartphone or tablet to interface wirelessly with the Puget Buoy and set a scheduled release time for the Puget Buoy to surface at a later time. When soaking, the Puget Buoy stays connected to the trap floating just above the seafloor. When the pre-programmed time is reached, the buoy and line are automatically released to the surface where it is visible by the fisherman. The buoy is then hauled, the trap is retrieved, removed from their catch, and re-baited. This device will not require weight to be added to the trap. However, depending on the fishery and the trap you are using, the buoy-to-trap buoyancy ratio would need to be adjusted by selecting a Puget Buoy with the proper floats.

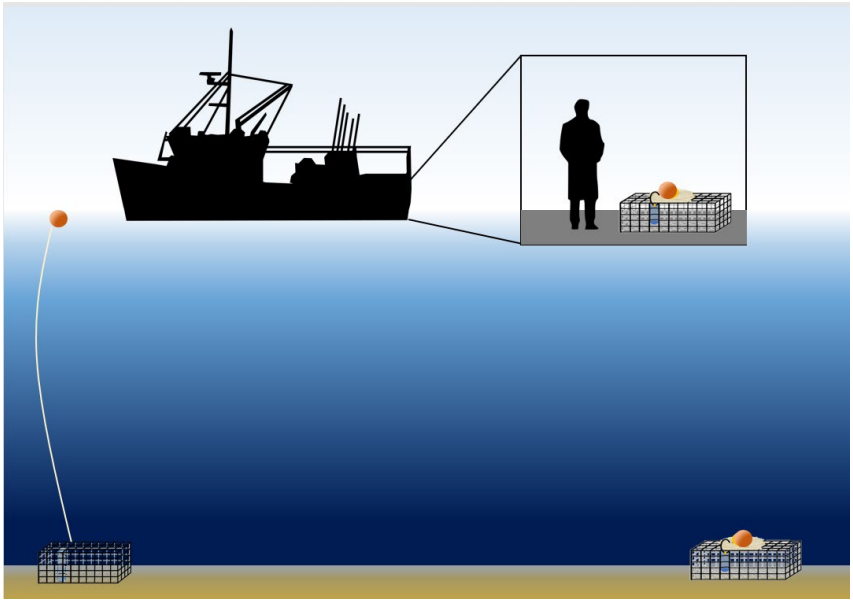
This prototype has been successfully tested by the Puget Buoy team in Washington State for use in fishing applications and had a reliability of 100% during our pilot tests. As we continue to expand testing in North America, we will be updating the reliability estimates to be more comprehensive.

Manufacturer:
Ropeless Systems
Product Name: Ropeless Riser
Release Type:
Acoustic Release
Line Management Style:
Inflatable Lift Bag
Field Tested: Yes
Available for Purchase: No – solid prototype
Website: www.ropeless.us
Video Demonstration:
Ropeless Systems Ropeless Riser



Ropeless Systems (Ropeless Riser) is located in Maine and has developed a lift bag retrieval system that is operated remotely using an acoustic modem. The Ropeless Riser lift bag does not employ any vertical line; instead, an acoustic modem, release electronics, and a compressed air cylinder are contained in an aluminum frame mounted to a fishing trap. (Figure 7). When the release system receives an acoustic signal, the compressed air cylinder fills the lift bag on top of the trap with air to bring the traps to the surface. The system is negatively buoyant which offers the best protection from gear loss or movement during storms. No buoyancy is generated until recovery is required and then various amounts of buoyancy (tens to hundreds of pounds) can be generated. The lift bags utilized are rugged and are often used to lift vehicles and airplanes on land and are the same used for ocean science and military applications. The Ropeless Riser lift bag system has been tested in engineering and fishing trials in Narragansett, Massachusetts, Scotland, Maine, and Canada. This device will not require weight to be added to the trap.

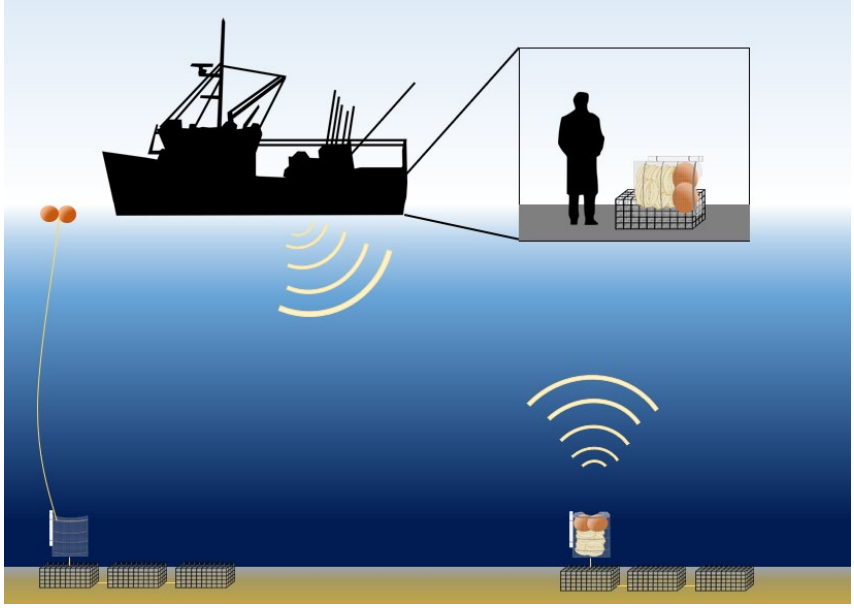
Product Name:
TR4RT
Manufacturer:
Sub Sea Sonics
Release Type:
Timed Release
Line Management Style:
Multi
Field Tested: Yes
Available for Purchase:
Yes
Website:
www.subseasonics.com
Video Demonstration:
Sub Sea Sonics TR4RT



The TR4RT system is a programmable timed-release developed by Sub Sea Sonics. The system was developed primarily for use with fishing traps but can be used in any suitable application. The system consists of an underwater housing, a rotating release and programming cam, and a release line retainer. The system works on the principle of "Time Until Release" (TUR). Using the cam, the user programs the unit with a specified TUR. The user then arms the system and deploys the equipment. After the specified TUR duration has elapsed, the cam rotates 180 degrees and to activate the release. For most systems, this releases a coil of line and float that are secured to the trap, and the float comes to the surface and the equipment can then be retrieved. The line handling system works by securing the normal trap line (in a coil) and float to the top of the trap with a three-point tie-down system that consists of a bungee and release loop that is secured to a cam on the timer. The unit is constructed from Delrin (cam) and PVC (housing) and has a clear window for the programming display. The TR4RT is generally attached to the wire mesh of the trap using off-the-shelf, corrosion-resistant plastic or stainless-steel clamps. The cam is capable of supporting release line tensions up to about 15 kg. The operating depth is 0 to 150 meters, and the battery life is approximately 6 months assuming the release is activated every three days during that period. For short deployments, biofouling can be quickly removed with a soft-bristle brush, while for longer deployments, the unit can be easily protected from biofouling using a wrap of standard packaging tape that can be removed and discarded at the end of the deployment.

This release system was designed with fishermen on the West Coast using a BREP grant (2018) has been successfully tested by NOAA for use in fishing applications and had a reliability of 100% during our pilot project.

Product Name:
AR50
Manufacturer:
Sub Sea Sonics
Release Type:
Acoustic Release
Line Management Style:
Multi
Field Tested: Yes
Available for Purchase: Yes
Website:
www.subseasonics.com



The Sub Sea Sonics AR50 is a modular acoustic release system produced by Sub Sea Sonics that can be paired with any rope management system. As seen in Figure 12, the buoys and rope are contained in a mesh bag with an acoustically triggered release mechanism attached to the side, which is placed with the rest of a fisherman's regular gear. This release unit is deployed underwater and contains the receiver plus a microcomputer and batteries and holds a release link with a screw-on retainer cap for link replacement. It turns on automatically when it is placed in the ocean by means of water contact to the link and the coil contacts. It has a unique 4-digit identification number that has been assigned to it by the factory. This identification number is entered into the topside acoustic release interrogator (ARI-50) when a command is sent. When the release command is received the unit applies its full battery voltage to the link (pos) and the 'coil' (neg) for 15 minutes. This causes the small hoop of metal to erode, affecting the release. There is a checkout command that can be sent to cause the unit to switch on the erosion voltage for only 10 seconds which is useful for checkout. (Note: This release works in ocean water and typical bay water. It will not work in fresh water since the electrolytic erosion will not occur at a fast enough rate)

Once released, the buoys and line ascend out of the bag and are available for retrieval at the surface. The gear is then hauled as normal, and the line is repacked for another deployment. The rope storage method can and has been customized to fishermen's needs according to their geographic regions. This release system has existed since the 1990's and has been successfully tested by NOAA for use in fishing applications and had a reliability of 100% during our pilot project. This device will require weight to be added to the trap to fully submerge the bag.

The species (target and incidental species must be clearly differentiated) expected to be harvested and/or discarded under the EFP

Target Species: Centropristis striata, Black Sea Bass

Incidental Catch Species: Centropristis striata (Sub-legal conspecifics), a small number of a variety marketable species including octopus.

The number or weight, by species, of such harvest and/or discard anticipated to occur during the exempted fishing, regardless of whether it is retained for sale.

Black Sea Bass: We expect to harvest a total of approximately 10,000 pounds whole weight per year per fisher for a total of 40,000 pounds whole weight per year.

Incidental species will be harvested if allowable by law and is expected to be less than 10% of total catch, or 1,000 pounds whole weight each year, per endorsement. For those non-permitted or non-exempted fish that show signs of barotrauma, we will use decompression techniques including descending gear devices and/or venting prior to being returned to the water.

The expected disposition of all regulated species harvested under the EFP (e.g., what will be done with the fish once it is caught).

It will be sold.

Any anticipated impacts on fisheries, marine mammals, endangered species, or Essential Fish Habitat.

No detrimental impacts are anticipated.

The total deployments required for statistical significance of research for SBRS are detailed in the power analysis. (See Appendix 1)

Detailed Sampling Areas

All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

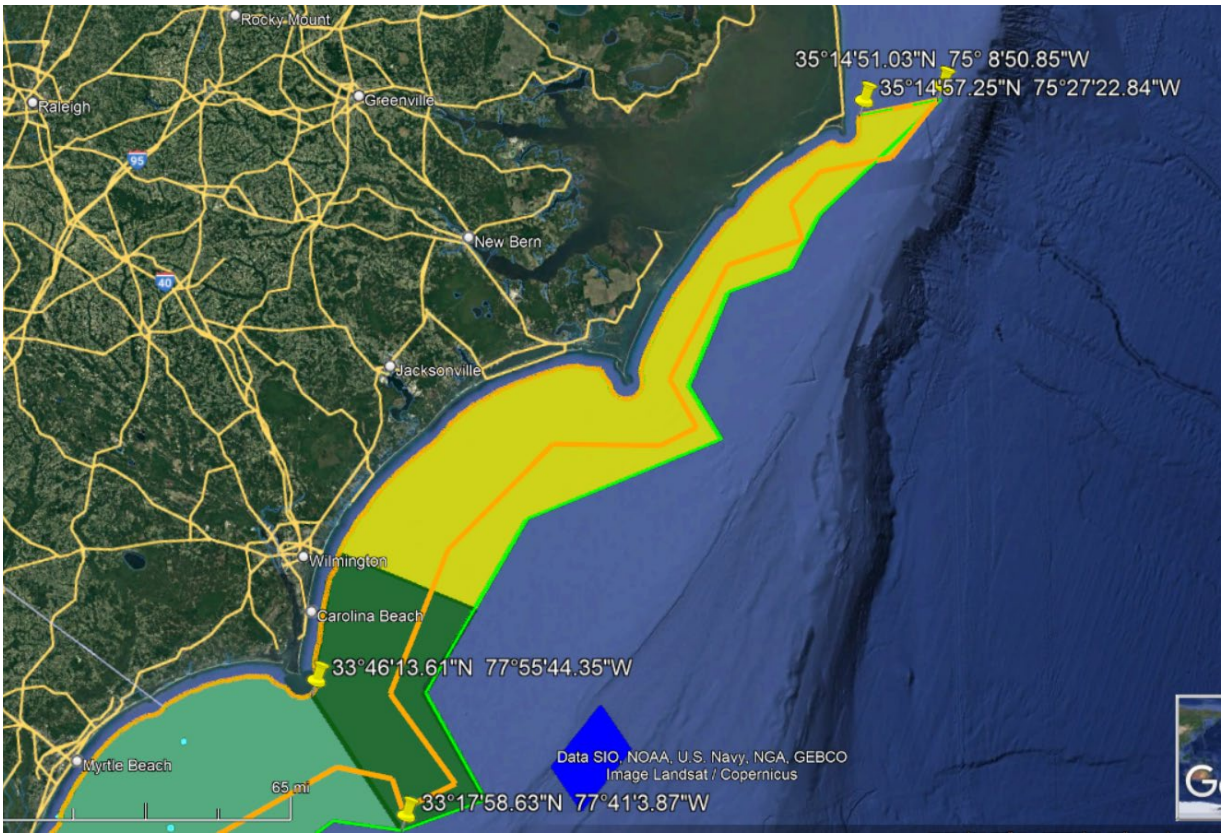
Yellow: Captains Michael Cowdrey, Charles Locke, and Jeff Oden
NW 35°14'57.25"N 75°27'22.84"W
NE 35°14'51.03"N 75° 8'50.85"W
SW 33°46'13.61"N 77°55'44.35"W
SE 33°17'58.63"N 77°41'3.87"W

Dark Green: Captain Michael Cowdrey and Captain Scott Buff and Crew
NW 34°11'59.18"N 77°43'38.80"W
NE 33°57'14.55"N 77°15'30.84"W
SW 33°46'13.61"N 77°55'44.35"W
SE 33°17'58.63"N 77°41'3.87"W

Light Green: Captain Scott Buff and Crew
NW 34°11'59.18"N 77°43'38.80"W
NE 33°57'14.55"N 77°15'30.84"W
SW 32° 2'10.98"N 80°44'43.14"W
SE 32° 3'6.68"N 79°48'4.17"W

Purple: Captain Charlie Phillips and Crew
NW 32° 2'10.98"N 80°44'43.14"W
NE 32° 3'6.68"N 79°48'4.17"W
SW 30°42'22.90"N 81°20'39.32"W
SE 30°42'25.28"N 80°49'31.98"W

Maroon: Captain Jimmy Hull and Crew
NW 30°42'22.90"N 81°20'39.32"W
NE 30°42'25.28"N 80°49'31.98"W
SW 28°34'53.31"N 80°30'24.21"
SE 28°35'0.64"N 80°20'34.58"W



Yellow (Mixed1): Captains Michael Cowdrey, Charles Locke, Jeff Oden
All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

NW 35°14'57.25"N 75°27'22.84"W
NE 35°14'51.03"N 75° 8'50.85"W
SW 33°46'13.61"N 77°55'44.35"W
SE 33°17'58.63"N 77°41'3.87"W

Dark Green (Mixed 2): Captain Michael Cowdrey, Charles Locke, Jeff Oden
All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

NW 34°11'59.18"N 77°43'38.80"W
NE 33°57'14.55"N 77°15'30.84"W
SW 33°46'13.61"N 77°55'44.35"W
SE 33°17'58.63"N 77°41'3.87"W
We will not fish in Special Management Zones (SMZs) Marine Protected Areas (MPAs) or the North Atlantic Right Whale Critical Habitat Area or those areas listed in CRF 50 §622.182 Gear-restricted areas (a)(1)(i) through (ii).

F/V Lady Kay (SBPE-9) VID: 587674
Sneads Ferry, North Carolina

Vessel owner information:
Michael Cowdrey
PO Box 598
Sneads Ferry, NC 28460-0598
(910) 340-9801
michaeldcowdrey@gmail.com

Vessel captain information and primary project participants –
Captain Michael Cowdrey
Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He, Captain Tom Burgess
SST Staff: Lucy McGinnis, Rohan Burne, Bradford Sawicki

F/V Second Wind (SBPE-13) VID: 913385
Hatteras, North Carolina

Vessel owner information:
Slash Creek Waterworks
Jeff Oden
57198 Islington Court
Hatteras, NC 27943
(252) 475-0973
slshcrkwtrwks@aol.com

Vessel captain information and primary project participants –
Captain Jeff Oden
Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He
SST Staff: Lucy McGinnis, Rohan Burne, Bradford Sawicki

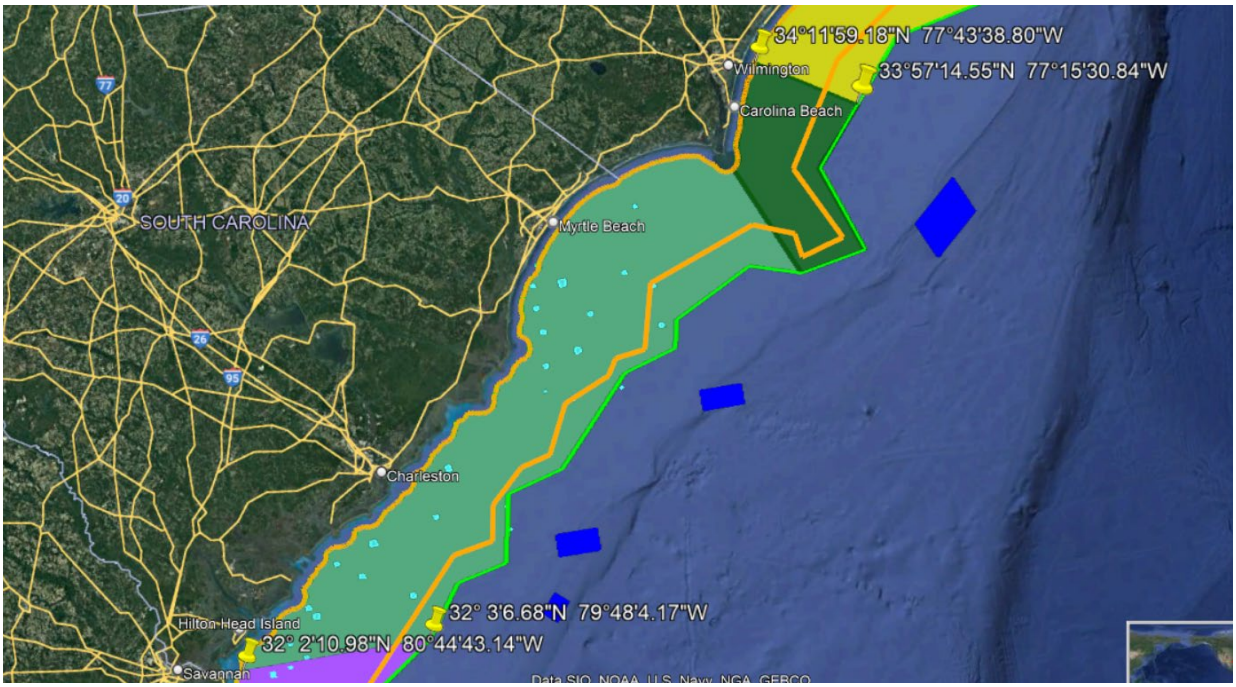
F/V Salvation (SBPE-16) VID: NC-1043-DC
Wanchese, North Carolina

Vessel owner information:

Charles Thomas Locke
PO Box 761
Wanchese, NC 27981-0761
(252) 982-6488
obxlocke@aol.com

Vessel captain information and primary project participants –

Captain Charles Locke
Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He
SST Staff: Lucy McGinnis, Rohan Burne, Bradford Sawicki



Dark Green: Captain Scott Buff and Crew
All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

NW 34°11'59.18"N 77°43'38.80"W
NE 33°57'14.55"N 77°15'30.84"W
SW 33°46'13.61"N 77°55'44.35"W
SE 33°17'58.63"N 77°41'3.87"W

Light Green: Captain Scott Buff and Crew
All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

NW 34°11'59.18"N 77°43'38.80"W
NE 33°57'14.55"N 77°15'30.84"W
SW 32° 2'10.98"N 80°44'43.14"W
SE 32° 3'6.68"N 79°48'4.17"W
We will not fish in Special Management Zones (SMZs) Marine Protected Areas (MPAs) or the North Atlantic Right Whale Critical Habitat Area or those areas listed in CRF 50 §622.182 Gear-restricted areas (a)(1)(i) through (ii).

F/V Reel-M-N (SBPE-4) VID: NC6637DS
Southport, NC

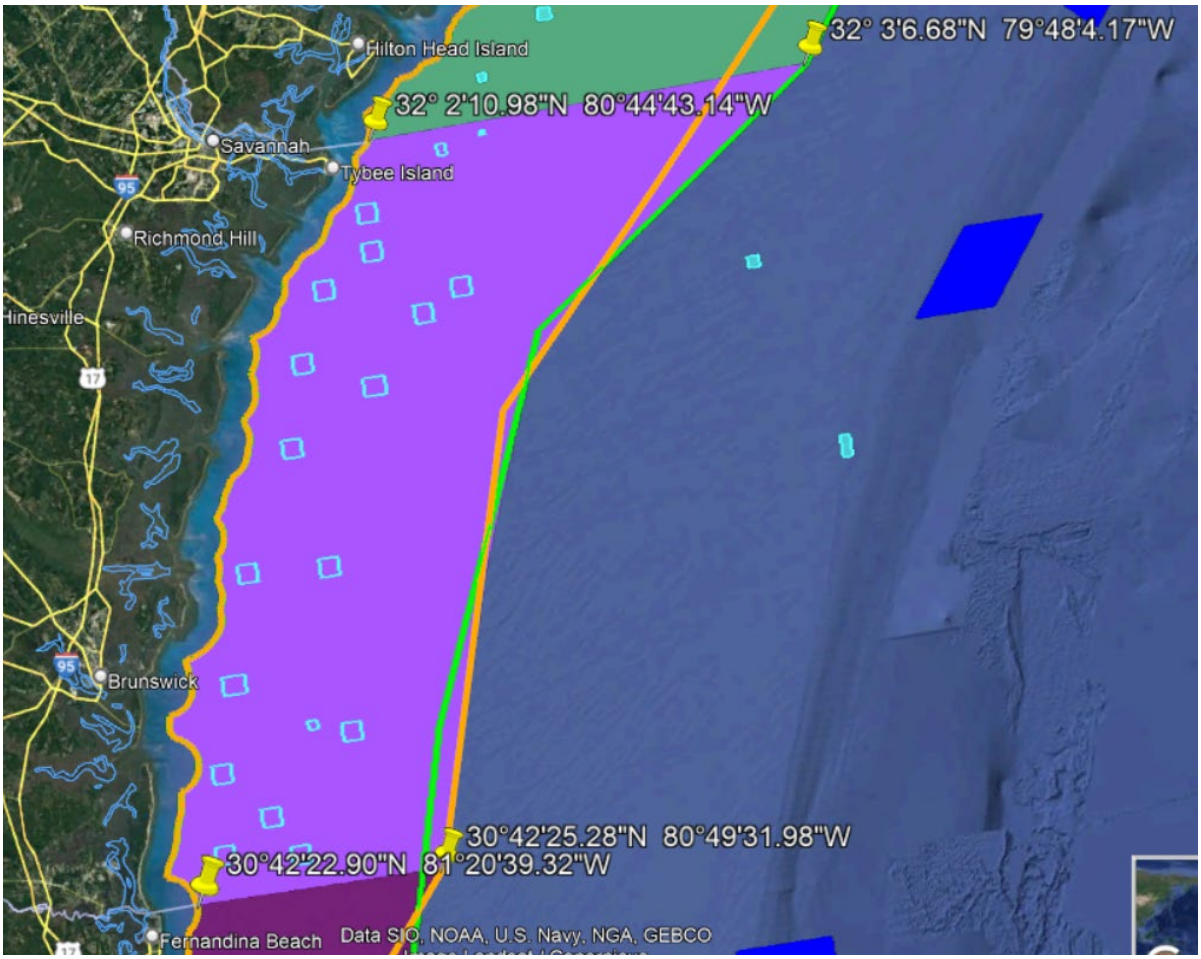
F/V Wire Nut (SBPE-31) VID: NC7908DC
Oak Island, NC

Vessel owner information:

Brian Scott Buff
4888 Coastal Dr Se
Southport, NC 28461-8722
(910) 294-1463
scott@buffbuilders.com

Vessel captain information and primary project participants –

Captain Scott Buff and designated crew (Captains: Al Dosher, Chris Jenkins, and John Porter)
Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He
SST Staff: Lucy McGinnis, Rohan Burne, Bradford Sawicki



Purple: Captain Charlie Phillips and Crew

All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

NW 32° 2'10.98"N 80°44'43.14"W
NE 32° 3'6.68"N 79°48'4.17"W
SW 30°42'22.90"N 81°20'39.32"W
SE 30°42'25.28"N 80°49'31.98"W

We will not fish in Special Management Zones (SMZs) Marine Protected Areas (MPAs) or the North Atlantic Right Whale Critical Habitat Area or those areas listed in CRF 50 §622.182 Gear-restricted areas (a)(1)(i) through (ii).

F/V Fish Hound (SBPE-18) VID: 693851
Townsend, Georgia

F/V Captain Lynn (SBPE-20) VID: 542775
Townsend, Georgia

Vessel owner information:

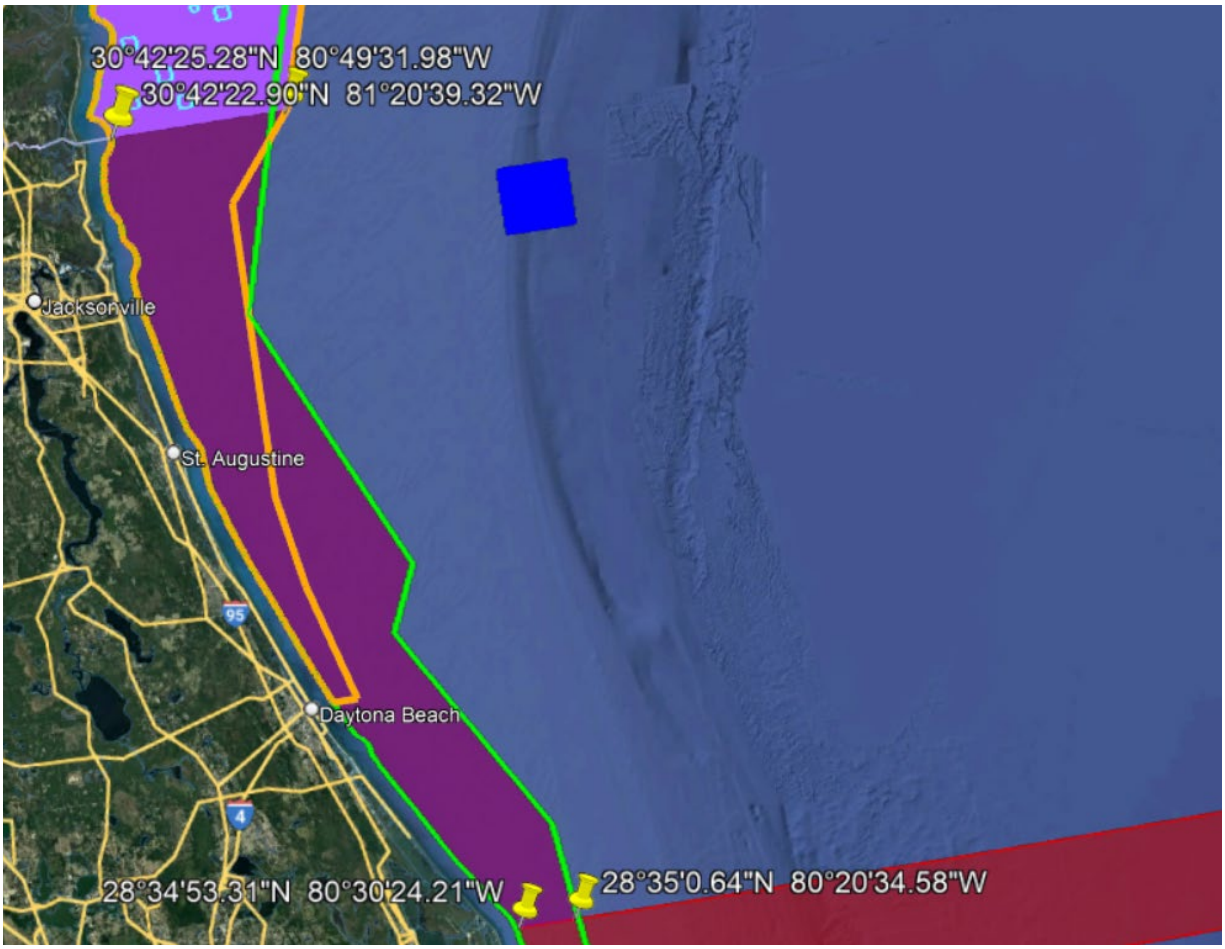
Charles Phillips
1418 Sapelo Avenue NE
Townsend, GA 31331
(912) 832-4423
GA_Capt@yahoo.com

Vessel captain information and primary project participants –

Captain Charlie Phillips and designated crew
During Outreach Fishing Events:
Captain Jimmy Hull
Captain Scott Buff and designated crew
Captain Michael Cowdrey
Captain Tom Burgess
Captain Oscar Navarrete
Captain Eric Meagley

Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He

SST Staff: Lucy McGinnis, Rohan Burne, Bradford Sawicki



Maroon: Captain Jimmy Hull and Crew
NW 30°42'22.90"N 81°20'39.32"W
NE 30°42'25.28"N 80°49'31.98"W
SW 28°34'53.31"N 80°30'24.21"
SE 28°35'0.64"N 80°20'34.58"W

All areas bounded by the following approximate coordinates, and recognized as the inshore time area closure under 50 CFR 622.183(b)(6)(i) and (ii)

We will not fish in Special Management Zones (SMZs) Marine Protected Areas (MPAs) or the North Atlantic Right Whale Critical Habitat Area or those areas listed in CRF 50 §622.182 Gear-restricted areas (a)(1)(i) through (ii).

F/V Work-a-Hull-ic (SBPE-7) VID: 1094408
Ormond Beach, FL

Vessel owner information:

Jimmy Hull
Southport Angler Inc
111 W Granada Blvd
Ormond Beach, FL 32174-6303
(386) 547-1254
hullsseasfood@aol.com

Vessel captain information and primary project participants –

Captain Jimmy Hull and crew
Researchers: Kim Sawicki, Bryan Fluech, Charles McMillan, Chris Rillahan, Dr. Pingguo He
SST Staff: Lucy McGinnis, Rohan Burne

Signature of applicant.

Kim Sawicki
President, Sustainable Seas Technology

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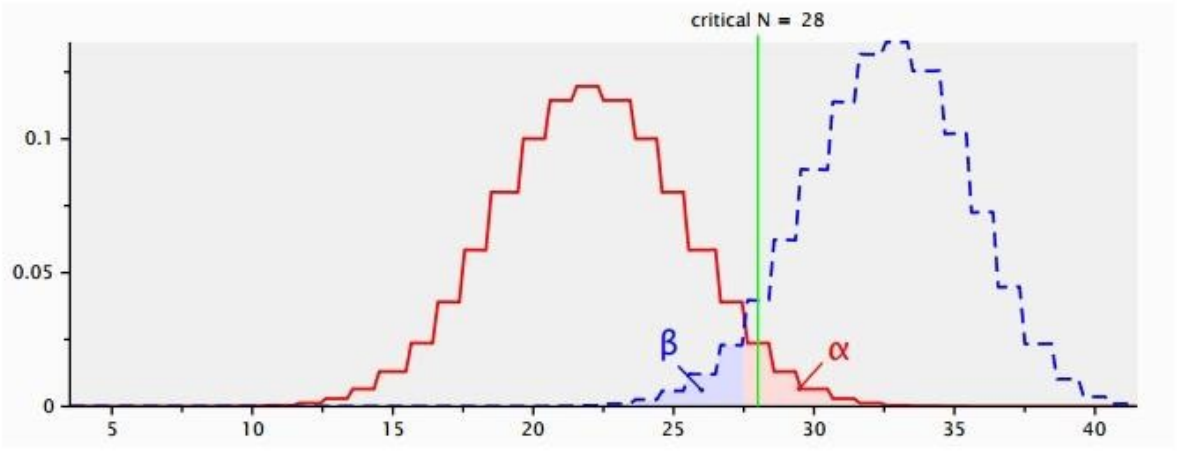
Appendix 1. Power Analysis for SBRS Fishing Sample Size

[1] -- *Friday, July 19, 2019 -- 21:52:40*

Exact –	Proportion: Sign test (binomial test)		
Analysis:	A priori: Compute required sample size		
Input:	Tail(s)	=	One
	Effect size g	=	0.24
	α err prob	=	0.05
	Power (1−β err prob)	=	0.95
Output:	Lower critical N	=	28.0000000
	Upper critical N	=	28.0000000
	Total sample size	=	44
	Actual power	=	0.9550476
	Actual α	=	0.0480709

Exact –	Proportion: Sign test (binomial test)		
Analysis:	A priori: Compute required sample size		
Input:	Tail(s)	=	One
	Effect size g	=	0.24
	α err prob	=	0.01
	Power (1−β err prob)	=	0.99
Output:	Lower critical N	=	55.0000000
	Upper critical N	=	55.0000000
	Total sample size	=	87
	Actual power	=	0.9903537
	Actual α	=	0.008913776



Appendix 2

Testing of Ropeless Fishing Gear = In the past 20 years, more than 30 research projects have tested ropeless concepts and ropeless retrieval systems, with more planned and ongoing.

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In 1998, the U.S. National Marine Fisheries Service (NMFS) issued a federally funded contract to "design, develop, and evaluate ... a cost-effective prototype acoustic release system for the buoy endline of offshore lobster trap gear." Since this first initiative, a considerable amount of testing of ropeless retrieval systems has taken place. A comprehensive overview of all the research to date indicates a total of 32 ropeless technology projects. Overall, this testing has served to drive the evolution from a technical concept to a working prototype to an operational system and finally to an established product with commercial viability.

Testing of Ropeless Concepts

Since 1998, at least 11 research projects that funded conceptualization of ropeless gear were developed in the U.S. Six of these were based on acoustic release technology, the innovation at the heart of many ropeless retrieval systems. Table 1 outlines the full scope of conceptual research over the last twenty years in the U.S., which led to the creation of fully operational ropeless systems. The table describes the gear style, sample size (when available), location, funding source, and type of project. The types of projects are very diverse, including the creation of a ropeless prototype, lab testing of ropeless gear, demonstrations of gear, and using gear for fishing (Table 2).

Testing and Use of Ropeless Systems

Results and ideas generated from the conceptual projects detailed above led to the development of full-blown operational systems available for further testing and daily use. These tests have produced iterative improvements to gear and brought several systems to commercial viability. Equally important, testing has generated helpful data on how well ropeless systems work.

Table 2 gives an overview of 21 testing projects (or demonstrated use) of ropeless retrieval systems, several in "at-sea" conditions. For these tests, testers deployed the gear, virtually marked its location, virtually relocated it, and then retrieved it. It describes gear style, sample size, type of testing, and location of testing for each project. Tests of ropeless gear have been conducted all around the world, including in Australia, Canada, New South Wales, Scotland, and Massachusetts.

Table 2 Research on ropeless concepts in the United States since 1998

Year	Project author and citation	Type of project	Location	Sample size (n)	Gear style and name	Funding source
1999	(DeAlteris, 1999)	Prototype and Testing	RI	10	Acoustic releases (Benthos 875, EdgeTech AMD)	NOAA
1999	(Turner *et al.*, 1999)	Concept, Built, and Lab Tested	NH	N/A	Acoustic release Buoyless Lobster Trap	NH Sea Grant
2013	(Partan and Ball, 2016)	Research and concept	MA	N/A	ORE (EdgeTech) line canister, Desert Star, FioBuoy, WHOI concept	NOAA
2007	(Allen and DeAlteris, 2007)	Prototype and Test	RI	129	Acoustic	NFWF
Before 2010	NOTUS (ALWTRT, 2010)	Built	NJ	NA	Notus Acoustic Release	NMFS
2012	(PFC, 2012)	Test and used for Fishing	ME	386	GPS and Grapple (not recommended)	NMFS
2012	Gwinn Grapple	Test and used for Fishing	MD	30	GPS and Grapple (not recommended)	NMFS
2014	(Hopkins *et al.*, 2014)	Concept, Built, and Lab Tested	NH	UNK	Acoustic release	NH Sea Grant
2015	(Basque *et al.*, 2015)	Concept, Built, and Lab Tested	NH	N/A	Acoustic release buoyless trap	NH Sea Grant
2018	(Biedron, 2018)	Trial	MA	N/A	Desert Star	IFAW
2018	(Shester, 2018)	Demonstration	CA	8	FioBuoy, Desert Star	Oceana

Table 3 Testing of ropeless gear systems from 1996 – November 2021

Year	Project author and citation	Type of testing	Location	Sample size (n)	Gear style and name
1996-2019	FioBuoy, FioMarine (pers. comm.)	Internal Test	AUS	206	FioBuoy
2000-2019	Multiple Customers (pers. comm. Ridd *et al.* multiple dates and McCrindell)	Active Use	AUS	N/A	FioBuoy Line spool, timer or acoustic release
1999	(DeAlteris, 1999)	Prototype Test	RI	50	Acoustic release
2005	(Hopkins and Hoggard, 2005)	Prototype Test	MS	N/A	Subsea Sonics AR 50
2007	(Allen and DeAlteris, 2007)	Prototype Test	RI	129	Acoustic
2011	FRDC, (Liggins, 2012)	Test used for fishing	NSW AUS	>100	Acoustic release line storage bag
2018	CWLA, (Terhune *et al.*, 2018)	Used for fishing	CAN	94	Desert Star ARC-1
2018	Acadian Crabbers Assn (DFO, 2018; Gies, 2018)	Used for fishing	CAN	UNK	Desert Star ARC-1
2019	(CWLA, 2019)	Tested	CAN	ongoing	Ashored MOBI
2011	(Porter, 2018) for MLA	Used for fishing	NSW	active use	Desert Star
2018	SMELTS and NOAA (Milliken, 2018; Riels, 2018)	Test	MA	50	SMELTS
2018	WHOI/NOAA(Milliken, 2018; Ball, *et al*., 2018)	Test	MA	50	WHOI Spool
2019	Acadian Crabbers Assn (DFO, 2018)	Used for fishing	CAN	ongoing	Ashored MOBI Edgetech5112 SMELTS
2019	Lobster Lift (C. McCarthy pers. comm.)	Internal Test	MA	>50	Lobster Lift Prototype
2019	EdgeTech/NOAA (E. Matzen pers. comm.)	Used for fishing	MA	>12	EdgeTech 5112
2019	SMELTS/ NOAA (pers. comm.)	Used for fishing	MA	>12	SMELTS Lobster Raft
2016-2019	(Partan and Ball, 2016, 2018; Ball *et al.*, 2018)	Test	NE AL	42 proposed	Line spool, acoustic release
2017-2019	SMELTS (Riels, 2018)	Internal Test	PNW, NE AL	608	SMELTS
2018-2019	Ashored (M. Poole, pers. comm.0029	Internal Test	CAN	>100	Ashored MOBI
2018-2019	EdgeTech (R. Morris, pers. comm.)	Internal Test	MA	>100	EdgeTech 5112
2019-2021	(Sawicki, ongoing)	Test, Used for fishing	Scotland, UK	>100	Desert Star ARC-1 Fiobuoy
2020-2021	(Sawicki, ongoing)	Test, Used for fishing	USA	>1500	All listed in this application