SNEP Watershed Grants Final Report:

Planning a Ghost Gear Removal Program for Rhode Island

Subaward Number (SNEPWG21-5-CFRF)
Subaward Period (December 31, 2021-December 31,2022)

Subawardee Organization: Commercial Fisheries Research Foundation

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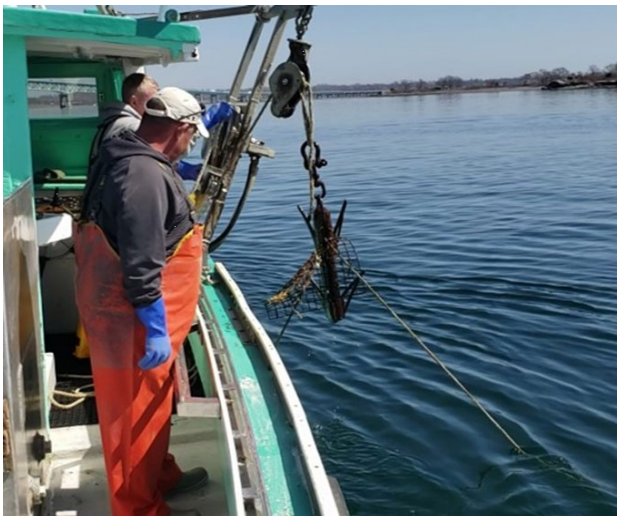
Reporting Period: December 31, 2021-December 31, 2023
Report Type and Number: Final Report



Executive Summary:

Ghost gear, lost or abandoned fishing gear, impacts in coastal waters are acknowledged as a serious problem and ghost gear removal projects have been initiated worldwide. Rhode Island has an active commercial and recreational fisheries that include lobster, quahog, whelk, scup, tautog, and black sea bass. It has historically supported a very active lobster fishery. Fishermen report thousands of abandoned lobster traps and piles of ghost gear near Rhode Island fishing ports and coastal waters. The Commercial Fisheries Research Foundation (CFRF) recently mapped ghost gear locations using fishermen's knowledge and underwater video cameras in Narragansett Bay, revealing the extent of the problem. In Narragansett Bay, ghost gear is often caught in trawl nets and discarded at the end of trawl lines, damaging fishing nets and leaving piles of abandoned gear in channels. Other ghost gear hotspots in Rhode Island are located around islands popular to both commercial fishing and recreational boating and diving activities. Retrieving lost fishing gear can be time consuming and hazardous. With a proper plan, training, and a system in place to retrieve and recycle or dispose of unwanted ghost gear, commercial fishermen and other stakeholders can be at the front line of reducing the problem.

With support from the Southeast New England Program, this project developed a sustainable plan for removing abandoned fishing gear, ghost gear, from Rhode Island waters (Figure 1). To develop this planning document, including a step step-by-step pathway to implementation we:

1. Increased public awareness of ghost gear and the importance of a coordinated effort for removal.
2. Developed partnerships with organizations experienced in ghost fishing gear removal and recycling.
3. Prepared a draft planning document for the implementation of a ghost gear removal program.
4. Hosted a stakeholder's workshop to discuss and improve the planning document.
5. Finalized the planning document.
6. Held a public meeting to present and get feedback on the planning document from the public.

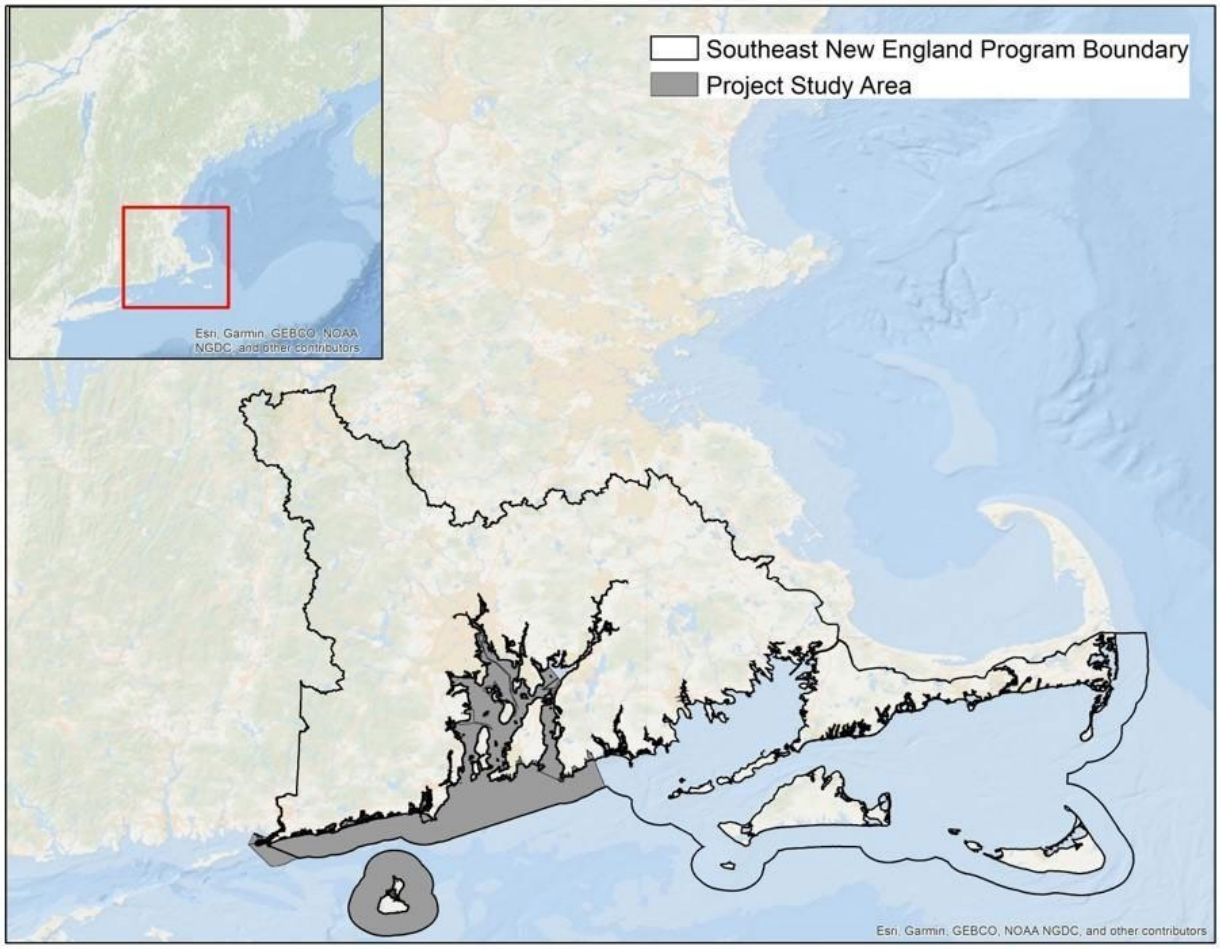


Figure 1. Map of the project area that will be the focus in the removal planning document.

To increase public awareness of the problem of ghost fishing gear in Rhode Island and why the public should be concerned, we developed an extensive outreach program that began with a poster presentation at the SNEP Watershed Grant Announcements on Sept. 9, 2021, to introduce the project. Because many people have heard of ghost gear but are not aware of what it actually is and how it impacts the marine environment, we produced and digitally distributed an informational ghost gear. This brochure provided background information on what ghost gear is and why it is a problem for Rhode Island (Figure 2). CFRF also worked with Clean Ocean Access to develop an experiential education event as part of their Land to Sea Speaker program that included a public seminar on ghost gear followed up by a field trip where the public could talk to three fishermen that had participated in our previous ghost gear project for the event. The participants asked fishermen about their experiences with ghost gear and why they thought it happened as well as basic questions about how they catch different types of seafood. CFRF has a digital platform and network for distributing project information. We developed a project website that provided updates on the project's progress as well as digital outreach and presentation materials. We also highlighting this project in our quarterly newsletters.

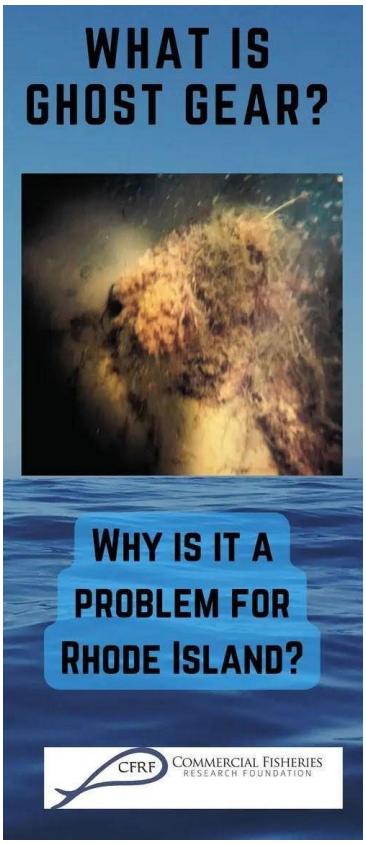


Figure 2. Informational on what ghost gear is and why it is a problem for Rhode Island. Digital Link: **https://simplebooklet.com/ghostgearbrochure**

A ghost gear removal program requires an engaged public and a coordinated stakeholder effort that includes mapping ghost gear locations and deploying a suite of sustainable retrieval and disposal methods. Costs associated with retrieval and disposal can be partially offset by ghost gear recycling companies that purchase ghost gear for repurposing. To ensure our plan represented a coordinated effort, we met with other ghost gear removal programs to discuss their program start up procedures and "lessons learned" during the implementation of their programs. We met with Laura Ludwig of the Center for Coastal Studies, Marine Debris and Plastics Program and built a connection to Erin Pelletier and the Gulf of Maine Lobster Foundation Gear Grab program. We also had the benefit of the Global Ghost Gear Initiative's expertise.

An important component of the removal plan was understanding what permits and letters of agreements (LOAs) are required to conduct the removal work. We, therefore, met with key Rhode Island stakeholders to include their perspectives and knowledge into our plan. This included Rhode Island Department of Environmental Management (RIDEM) to discuss permit requirements for allowing directed retrieval of ghost gear and Port Authority personnel for learning how to obtain permission to set up a sorting area and disposal bins on the docks. We also spoke with representatives from the University of Rhode Island and the Environmental Branch of the Naval Undersea Warfare Center Division of Newport about potential use of sonar data to help us identify areas to target for removal. The Commercial Fisheries Center of Rhode Island worked with us to identify organizations for the removal and recycling of retrieved ghost

gear. Based on these conversations a draft planning document was prepared for review at a stakeholder's workshop. At this time, we also put together an Advisory Group to help guide us and assist us with the final preparation of the planning document. This Advisory Group continues to assist us with the implementation of this plan and is comprised of Fred Mattera (Commercial Fisheries Center of Rhode Island), Erin Pelletier (Gulf of Maine Lobster Foundation Gear Grab Program), Jaclyn McGarry (Global Ghost Gear Initiative), Laura Ludwig, (Center for Coastal Studies, Marine Debris and Plastics Program), Conor McManus (Division of Marine Fisheries, RIDEM) and Dan Costa, (Port Manager, RIDEM).

The workshop brought regulatory representatives, local and international ghost gear removal experts, and recycling companies together with fisherman to review the planning document. The planning document included the following sections for discussion:

1. Ghost Gear Removal
    - Identifying Ghost Gear for Removal
    - Permit Requirements
2. Training
    - At sea training
    - Removal equipment
    - Cost
3. Removal
    - Safety requirements
    - Notification of removal activities
    - Removal Procedures
    - Data Collection
    - Cost
4. Recycling and Disposal
    - Sorting materials
    - Recycling and disposal methods
    - Cost
5. Implementation
    - Program Sustainability (Funding opportunities)
    - Program Evaluation

The planning document was organized into a process for implementing the program. For example, initially we have to identify and prioritize what ghost gear should be targeted. We need to make sure that we have all the regulatory permits in place to conduct the work. It is currently illegal to remove other fishermen's gear (even ghost gear) without a permit. Removing ghost gear can be hazardous and therefore we thought it was important that we include a training component. Commercial fishermen have experience using their on-board grapples to retrieve their gear. There are organizations that develop specialized equipment and retrieval methods for this type of work, and we felt that combining these training techniques with experienced commercial fishermen would provide a safe and effective training program for fishermen wanting to learn these techniques. The next step is hiring commercial fishermen to conduct the removal surveys and notifying the fishing community when and where the removal activities will take place. This is especially important for Narragansett Bay, as there are no scheduled fishing closures in the Bay.

An important part of this program is to collect data on the retrieved gear so that we can learn more about how ghost fishing gear interacts with marine organism. The GGGI, Gulf of Maine Lobster Foundation Gear Grab Program, and Center for Coastal Studies, Marine Debris and Plastics Program all collect data on retrieved ghost gear. We looked at the data from these three organizations and made sure to include their metrics in our data collection. Besides the location, depth and substrate where the gear is found, our data metrics include type of gear, materials, whether tags are present, species in gear (alive or dead), the amount and type of biofouling on the gear, and for ghost traps whether biovents are open or closed. These vents are required on lobster traps and attached to the traps with rings that are supposed to disintegrate and render traps ineffective if they are lost. Any retrieved gear that has a tag, needs to be set aside and the owner contacted and given the opportunity to retrieve their gear.

The goal of the program is to recycle as much of the fishing gear as possible. This requires the fishing gear to be sorted on land into its different components, rope, metal, plastic. We reached out to several different organizations that recycle rope and nets, metal traps, and plastics. Any gear that cannot be recycled will be deposed of by a company called COVANTA the is part of the NOAA Fishing for Energy group. The cost of each component of the plan was considered, as well as methods to raise the funds to sustain the program in the future.

The feedback from this workshop provided significant improvements to the planning document. In particular, there was a lot of discussion on how to reduce and mitigate future ghost gear after removal efforts. We, therefore, included a plan to develop a website where fishermen can report lost or observed ghost gear for retrieval. We also talked about including an outreach effort where fishermen can contact us and drop off any fishing gear they no longer want for disposal or recycling.

Options and proposals for ways to financially sustain the program were debated. Generally, ghost gear removal programs are sustained through grant funding and any funds generated through recycling steel. We proposed several new options including auctioning any retrieved gear that is in good working order and approaching fishing gear manufacturers about including a small fee during purchase for helping to retrieve any lost gear. These proposals were not considered favorably by the workshop participants due to the potential for it to negatively impact the removal programs credibility with stakeholders. It was recommended that these ideas need to be more carefully developed and tested prior to implementation.

The ghost gear removal program was presented to the community during a public meeting at Mary Loontjens Memorial Library in Narragansett. The meeting was well attended and provided positive feedback on the plan. Overall, the participants at the meeting asked insightful questions and had a favorable view of the removing ghost gear from Narragansett Bay. In particular, many wanted to know how the community could help more, including how to increase the number of dumpsters available at different docks for ghost gear found on beaches.

The success of this project relied on the partnerships developed during the preparation of this document. Our original proposal partners; Commercial Fisheries Center of Rhode Island, Global Ghost Gear Initiative, Narragansett Bay Estuary Program, Net you Problem, University of Rhode Island, Rhode Island Department of Environmental Management and Gulf of Maine Lobster Foundation increased to include the Center for Coastal Studies Marine Debris and Plastic program in Cape Cod, Project Oceanology, Save The Sound, Cornell Cooperative Extension (Derelict Lobster Trap Removal Project), Coastal Debris Grappling Inc., the Naval Undersea Warfare Center, and the Rhode Island Coastal Resources Management Council.

Our partnership with Erin Pelletier and the Gulf of Maine Lobster Foundation Gear Grab

program provided us with the unique opportunity to assist the Gulf of Maine Lobster Foundation on a 2-day ghost gear survey. The purpose of the trip was to learn the procedure Gear Grab uses to locate ghost gear and learn from collaborating fishermen how they remove gear from the ocean floor. We also tested our camera method, developed in a previous project, to verify sonar sightings as ghost gear. This project also provided the opportunity for a University of Rhode Island graduate student in oceanography to learn about ghost gear and participate in developing the planning document.

A final component of the project was how to evaluate the success of the removal plan. The main metric considered for success of this project was the implementation of the plan. Following the procedures outlined in this planning document, we started successfully removing ghost gear from Narragansett Bay in February, 2023 (Figure 3).

Figure 3. First set of ghost gear successfully removed from Narragansett Bay, RI following the planning document developed for this project.

The total cost for this project was $24,555. The Southeast New England Program (SNEP) Watershed Grants provided $17,385 for these costs. SNEP Watershed Grants are funded by the U.S. Environmental Protection Agency through a collaboration with Restore America's Estuaries. The additional $7,170 came from matching sources. Significant sources of match included the time of the Advisory Group and commercial fishermen to attend the planning workshop as well as the space the workshop was held in. The Advisory Group volunteered their time throughout the project as they provided guidance at numerous stages. Another important source of matching funds was the University of Rhode Island student's time spent helping coordinate the workshop and participating in the knowledge exchange with the Gulf of Maine Lobster Foundation. This student was a part of CFRF's annual summer intern program supported by The Campbell Foundation.

1. Cover Information

Date. February 27, 2023

Project Name: **Planning a Ghost Gear Removal Program for Rhode Island**
Subaward Number (SNEPWG21-5-CFRF)
Subaward Period (December 31, 2021-December 31,2022)

Subawardee Organization: Commercial Fisheries Research Foundation

Report Contact Person:
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Project Leaders: Susan Inglis, Research Associate & N. David Bethoney, Executive Director

Reporting Period: December 31, 2021-December 31 2023
Report Type and Number: Final Report

2. Project Report Narrative:

Summary: Rhode Island currently has a serious ghost gear problem and no cohesive program to identify, remove and dispose of abandoned fishing gear. This project developed a sustainable plan for removing abandoned fishing gear, ghost gear, from Rhode Island waters. A successful ghost gear program requires an engaged public and a coordinated stakeholder effort. An Advisory Group was formed to assist with the development of the planning document. This Advisory Group was comprised of Fred Mattera (Commercial Fisheries Center of Rhode Island), Erin Pelletier (Gulf of Maine Lobster Foundation Gear Grab Program), Jaclyn McGarry (Global Ghost Gear Initiative), Laura Ludwig, (Center for Coastal Studies, Marine Debris and Plastics Program), Conor McManus (Division of Marine Fisheries, RIDEM) and Dan Costa, (Port Manager, RIDEM). CFRF developed a planning document for ghost gear removal that included local and state permit requirements, funding opportunities, gear removal, disposal and recycling opportunities and steps for implementation. The document was presented at a workshop composed of stakeholders including fishermen and regional resource managers, local and international experts in ghost gear removal, and fishing gear recycling organizations. Following recommendations from the stakeholder workshop, the planning document was modified and presented at a public meeting at Mary Loontjens Memorial Library in Narragansett. The main metric for success for this project beyond the grant period, was the implementation of the plan. Successful ghost gear removal was initiated in Narragansett Bay February 2023.

2A. Project Results

Ghost gear impacts in coastal waters are acknowledged as a serious problem and ghost gear removal projects have been initiated worldwide. This project focused on developing a ghost gear removal program for coastal Rhode Island including Narragansett Bay and Block Island. This area included Narragansett Bay and coastal waters from approximately 41.25, -71.86 and 41.44, -71.10 51.46 shoreward and surrounding Block Island (Figure 1). To develop the planning document including a step-by-step pathway to implementation we:

1. Increased public awareness of ghost gear and the importance of a coordinated effort for removal.
2. Prepared a draft planning document for the implementation of a ghost gear removal program.
3. Hosted a workshop to discuss and improve to the planning document.
4. Finalized the planning document.
5. Held a community meeting to present and get feedback on the planning document from the public.

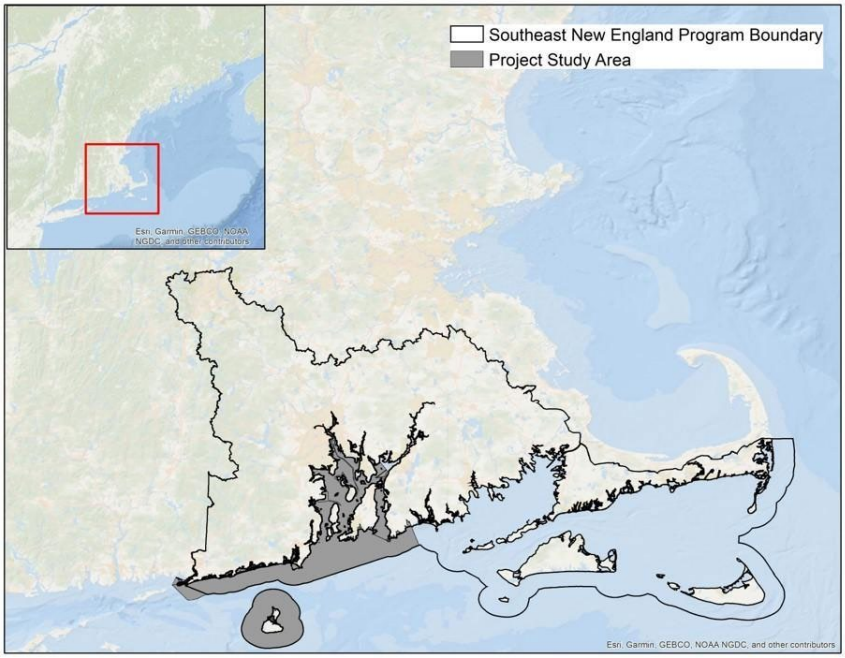


Figure 1. Map of the project area that will be the focus in the removal planning document.

Objective 1: Increasing public awareness of ghost gear and developing partnerships for a coordinated effort for removal.

To increase public awareness of the problem of ghost fishing gear in Rhode Island and why the public should be concerned, we developed an extensive outreach program that began with a poster presentation at the SNEP Watershed Grant Announcements on Sept. 9, 2021, to introduce the project (Supporting Material Item 1). Because many people have heard of ghost gear but are not aware of what it actually is and how it impacts the marine environment, we produced and digitally distributed an informational ghost gear. This brochure provided background information on what ghost gear is and why it is a problem for Rhode Island (viewable here). CFRF also worked with Clean Ocean Access to develop an experiential education event, as part of their Land to Sea Speaker program, that included a public seminar on ghost gear by David Bethoney on January 25th (viewable here, Supporting Material Item 2) followed up by a field trip where the public could talk to three fishermen that had participated in our previous ghost gear project for the event. We assisted in drafting up the announcement and recruited three fishermen that had participated in our previous ghost gear project for the event. The participants asked fishermen about their experiences with ghost gear and why they thought it happened as well as basic questions about how they catch different types of seafood. CFRF has a digital platform and network for distributing project information. We developed a project website that provided updates on the project's progress as well as digital outreach and presentation materials. We also highlighting this project in our March 2022 newsletter quarterly newsletters (Supporting Material Item 3) and provided a link to the project webpage in all other newsletters during the project. We also met with Dan Goulet with Coastal Resources Management Council, RI to view a Marine Debris Trailer and talk about effective ways to communicate marine debris issues to the public and how to adapt some of these strategies to ghost gear. Lastly, we supported a Providence College business student class aimed at developing business solutions for retrieved ghost gear by providing students with an overview seminar and feedback on solutions developed for the course.

Objective 2: Draft a planning document for ghost gear removal.

To ensure our plan represented a coordinated effort, we met with other ghost gear removal programs to discuss their program start up procedures and "lessons learned" during the implementation of their programs. We met with Laura Ludwig of the Center for Coastal Studies, Marine Debris and Plastics Program, who shared insight and documents from their fishing gear recovery program off Cape Cod, Massachusetts. We also built a strong connection to Erin Pelletier and the Gulf of Maine Lobster Foundation Gear Grab program and collaborated in a presentation to Maine lobstermen to discuss ghost gear and introduce our project (Supporting Material Item 4). We also participated in a trip from June 27-28, 2022, to Casco Bay, Maine where we assisted the Gulf of Maine Lobster Foundation on a 2-day ghost gear survey. The purpose of the trip was to learn the procedure Gear Grab uses to locate ghost gear and learn from collaborating fishermen how they remove gear from the ocean floor. They were also interested in testing our camera method to verify sonar sightings as ghost gear (Figure 2). The full write up of the takeaways from the trip are available in the Supporting Material Item 5.

Figure 2. CFRF and Captain of F/V Nomad Casco Bay, Maine testing underwater video technology with sonar sighting of ghost gear (top) and image of ghost gear from survey (bottom).

In addition to these efforts, we contacted Bill Lucey with Save the Sound, and Dave Hudson and Scott Curatolo-Wagemann with the Cornell Suffolk extension who are conducting ghost gear removal in Long Island Sound. Lastly, we also spoke with Tor Vincent from coastal debris grappling about training fishermen to safely retrieve ghost gear.
This project also provided a graduate student in oceanography at the University of Rhode Island, Sarah Ring, a CFRF intern position to learn about ghost gear, help draft an introduction for the removal document, reach out to fishing gear recycling and removal companies to collect information on the procedures and costs associated with supplying Rhode Island ports with ghost gear collection bins and removal, and participate in the Maine survey trip.

Our meetings with other ghost gear removal organizations emphasized the importance of understanding the regulations and permits required for ghost gear removal. We met with key Rhode Island stakeholders to include their perspectives and knowledge into our plan. This included Dr. Conor McManus with the Rhode Island Department of Environmental Management (RIDEM) to discuss permit requirements for allowing directed retrieval of ghost gear and Dan Costa, Port Authority, RIDEM for learning how to obtain permission to set up a sorting area and disposal bins on the docks. We also spoke with representatives from the Environmental Branch of the Naval Undersea Warfare Center Division of Newport about potential use of sonar data to help us identify areas to target for removal as well as complications around removing ghost gear located in waters within the Navy jurisdiction. Fred Mattera, from Commercial Fisheries Center of Rhode Island worked with us to identify organizations for the removal and recycling of retrieved ghost gear.

Based on these conversations a draft planning document was prepared for review at a stakeholder's workshop. At this time, we also put together an Advisory Group to help guide us and assist us with the final preparation of the planning document. This Advisory Group continues to assist us with the implementation of this plan and is comprised of Fred Mattera (Commercial Fisheries Center of Rhode Island), Erin Pelletier (Gulf of Maine Lobster Foundation Gear Grab Program), Jaclyn McGarry (Global Ghost Gear Initiative), Laura Ludwig, (Center for Coastal Studies, Marine Debris and Plastics Program), Conor McManus (Division of Marine Fisheries, RIDEM) and Dan Costa, (Port Manager, RIDEM).

Objective 3: Host a stakeholder's workshop to discuss draft planning document

A stakeholder's workshop was held August 16th, 2022, in Point Judith, RI (Supporting Material Item 6). The workshop brought regulatory representatives, local and international ghost gear removal experts, and recycling companies together with fisherman to review the planning document. The draft planning document, outlined the components of the removal program and areas for discussion at the stakeholder's workshop and included the following sections for discussion:

1. Ghost Gear Removal
    - Identifying Ghost Gear for Removal
    - Permit Requirements
2. Training
    - At sea training
    - Removal equipment
    - Cost

3. Removal
    - Safety requirements
    - Notification of removal activities
    - Removal Procedures
    - Data Collection
    - Cost
4. Recycling and Disposal
    - Sorting materials
    - Recycling and disposal methods
5. Cost Implementation
    - Program Sustainability (Funding opportunities)
    - Program Evaluation

The draft planning document was organized into a process for implementing the program. For example, initially we have to identify and prioritize what ghost gear should be targeted. We need to make sure that we have all the regulatory permits in place to conduct the work. It is currently illegal to remove other fishermen's gear (even ghost gear) without a permit. Removing ghost gear can be hazardous and therefore we thought it was important that we include a training component. Commercial fishermen have experience using their on-board grapples to retrieve their gear. There are organizations that develop specialized equipment and retrieval methods for this type of work, and we felt that combining these training techniques with experienced commercial fishermen would provide a safe and effective training program for fishermen wanting to learn these techniques. The next step is hiring commercial fishermen to conduct the removal surveys and notifying the fishing community when and where the removal activities will take place. This is especially important for Narragansett Bay, as there are no scheduled fishing closures in the Bay.

An important part of this program is to collect data on the retrieved gear so that we can learn more about how ghost fishing gear interacts with marine organism. The GGGI, Gulf of Maine Lobster Foundation Gear Grab Program), and Center for Coastal Studies, Marine Debris and Plastics Program all collect data on retrieved ghost gear. We looked at the data from these three organizations and made sure to include their metrics in our data collection. Besides the location, depth and substrate where the gear is found, our data metrics include type of gear, materials, whether tags are present, species in gear (alive or dead), the amount and type of biofouling on the gear, and for ghost traps whether biovents are open or closed. These vents are required on lobster traps and attached to the traps with rings that are supposed to disintegrate and render traps ineffective if they are lost. Any retrieved gear that has a tag, needs to be set aside and the owner contacted and given the opportunity to retrieve their gear.

The goal of the program is to recycle as much of the fishing gear as possible. This requires the fishing gear to be sorted on land into its different components, rope, metal, plastic. We reached out to several different organizations that recycle rope and nets, metal traps, and plastics. In December, we attended the opening of the New Bedford warehouse facility for Net Your Problem. At this event we learned how to sort different ghost gear materials so they could be recycled. We also participated in a project for a Business Class at the University of Rhode Island. The students were tasked with coming up with ways to recycle ghost fishing gear. Any gear that

cannot be recycled will be deposed of by a company called COVANTA the is part of the NOAA Fishing for Energy group. The cost of each component of the plan was considered, as well as methods to raise the funds to sustain the program in the future.

The feedback from this workshop provided significant improvements to the planning document. In particular, there was a lot of discussion on how to reduce and mitigate future ghost gear after removal efforts. We, therefore, included a plan to develop a website where fishermen can report lost or observed ghost gear for retrieval. We also talked about including an outreach effort where fishermen can contact us and drop off any fishing gear they no longer want for disposal or recycling.

Options and proposals for ways to financially sustain the program were debated. Generally, ghost gear removal programs are sustained through grant funding and any funds generated through recycling steel. We proposed several new options including auctioning any retrieved gear that is in good working order and approaching fishing gear manufacturers about including a small fee during purchase for helping to retrieve any lost gear. These proposals were not considered favorably by the workshop participants due to the potential for it to negatively impact the removal programs credibility with stakeholders. It was recommended that these ideas need to be more carefully developed and tested prior to implementation. Recommendations from the Advisory Group and Stakeholder's Workshop were used to finalize the planning document (Supporting Material Item 7).

Objective 4: Hold a community meeting to present and get feedback on the planning document from the public.

The ghost gear removal program was presented to the community during a public meeting on December 6, 2022 at Mary Loontjens Memorial Library in Narragansett (Figure 3, Supporting Material Item 8). The meeting was well attended and provided positive feedback on the plan. Overall, the participants at the meeting asked insightful questions and had a favorable view of the removing ghost gear from Narragansett Bay. In particular, many wanted to know how the community could help more, including how to increase the number of dumpsters available at different docks for ghost gear found on beaches. We will be holding a follow up meeting at this location following our fist ghost gear removal season.

Figure 3. Susan Inglis, CFRF, presenting our ghost gear removal plan to the community at Mary Loontjens Memorial Library in Narragansett, RI

As described above, all our objectives were met for this project and all deliverables and milestones were completed (Table 1). We did not run into any obstacles or setbacks to complete the project. We were able to use the results from this project to secure funding from the 11th Hour Racing to implement the plan starting January 2023. We were therefore able to meet some long-term objectives as well.

Table 1. Milestone Table for the project "Planning a Ghost Gear Removal Program for Rhode Island".

Timeline	Milestone	Key Deliverable
December-March	Develop digital outreach materials with input from project partners	Digital outreach materials **Completed (See Supporting Materials)**
April-May	Complete Draft of planning document for review	Draft of ghost gear removal document **Completed**
June-July	Form Advisory Group for planning documents implementation from participants	Formation of Advisory Group **Completed**
August-September	Hold workshop with project partners and stakeholders including local and international organizations to review the planning document Revisions to planning document	Workshop report on suggestions for planning document **August 16, 2022** Recommendations from Advisory Group.
October-November	Hold public meetings on ghost gear removal program described in planning document	Public outreach to inform and answer questions about the removal plan **December 12, 2022.**
December	Complete Final Report	Final Report

2B. Next Steps and Recommendations

Our long-term objective and the main metric considered for success of this project was the implementation of the plan. We were able to use the results from this project to secure funding from the 11th Hour Racing to implement the plan starting January 2023. Following the procedures outlined in this planning document, we started successfully removing ghost gear from Narragansett Bay in February, 2023 (Figure 4).

Figure 4. First set of ghost gear successfully removed from Narragansett Bay, RI following the planning document developed for this project.

2C. Compliance
N/A

2D. Project Partners

This project included the assistance of several stakeholder partners. These are the stakeholder partners listed in the proposal and their contributions to the project as well as new partnerships made during the project.

Proposal Partners:
Commercial Fisheries Center of Rhode Island: Advisory Group Member, attended the workshop, met with us to identify potential commercial fishermen for removal surveys and organizations for the removal and recycling of retrieved ghost gear.
Ghost Gear Global Initiative: Advisory Group Member, attended workshop, provided expert one on-one tailored project mentoring support.
Narragansett Bay Estuary Program helped us reach a new audience by distributing our ghost gear brochure on to their email list and suggesting the venue for the community meeting.
Net Your Problem: provided us with information and training on how to sort ghost gear for recycling.
University of Rhode Island, Attended the workshop, assisted us with debris bin funding and had students in business class at the University of Rhode Island tasked with coming up with ways to recycle ghost fishing gear. Discussed assisting in side scan sonar in the future for targeting ghost gear.
Rhode Island Department of Environmental Management, Advisory Group (2 members), attended workshop, met with us to discuss regulatory requirements for retrieving gear and how to

organize debris bin placement and staging area for retrieved ghost gear in harbors, offered to share side scan sonar from surveys of Narragansett Bay for future ghost gear removal.
Gulf of Maine Lobster Foundation; Advisory member, attended workshop, provided us with expert insight on program development, and facilitated direct learning from Maine fishermen.

New Partners:
Center for Coastal Studies, Marine Debris and Plastics Program: Advisory member, attended workshop, provided us with expert insight on program development,
Save the Sound: Public outreach, attended community meeting.
Cornell Cooperative Extension (Derelict Lobster Trap Removal Project): attended workshop, expert advice on ghost gear removal techniques and training.
Coastal Debris Grappling Inc.: attended workshop, expert advice on ghost gear removal techniques and training, developed specialized grappling equipment.
Naval Undersea Warfare Center: met with us to discuss potential use of sonar data to help us identify areas to target for removal, as well as complications around removing ghost gear located in waters within the Navy jurisdiction.
Rhode Island Coastal Resources Management Council. Advice on effective ways to communicate marine debris issues to the public and how to adapt some of these strategies to ghost gear.

2E. Volunteer and Community Involvement

The success of this project relied on the voluntary partnerships developed during the preparation of this document. Our original proposal partners; Commercial Fisheries Center of Rhode Island, Global Ghost Gear Initiative, Narragansett Bay Estuary Program, Net you Problem, University of Rhode Island, Rhode Island Department of Environmental Management and Gulf of Maine Lobster Foundation increased to include the Center for Coastal Studies Marine Debris and Plastic program in Cape Cod, Project Oceanology, Save The Sound, Cornell Cooperative Extension (Derelict Lobster Trap Removal Project), Coastal Debris Grappling Inc., the Naval Undersea Warfare Center, and the Rhode Island Coastal Resources Management Council. The volunteered time of the Advisory Group was key to the success of this project. Please see Section 2A, Objective 4 for details on how the public was engaged.

2F. Outreach & Communications

Outreach and communication were primary parts of two objectives of this project. Please the details of those activities Section 2A, Objective 1 and 4.

3. Project Budget Report

3A. Summary Budget Tables

Summary Budget Table 1: Expenditures by Federal Cost Category

Budget Category	Total Budgeted Funds	Total Budgeted Match	Grant Funds Expended Final Period	Grand Funds Expended Cumulative	Match Funds Expended Final Period	Match Funds Expended Last Period	Match Funds Expended Cumulative	Match Source
Personnel								
DBethoney	$ 5,775	$ -	$ 3,407	$ 5,938	$ -	$ -	$ -	
SInglis	$ 7,800	$ -	$ 4,140	$ 8,163	$ -	$ -	$ -	
Total	$ 13,575	$ -	$ 7,547	$ 14,101	$ -	$ -	$ -	
Fringe	$ 1,222	$ -	$ 607	$ 1,224	$ -	$ -	$ -	
Travel	$ 150	$ -	$ 59	$ 95	$ -	$ -	$ -	
Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Supplies	$ 575	$ -	$ 102	$ 102	$ -	$ -	$ -	
Contracts	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Other	$ -	$ 3,478	$ -	$ -	$ 3,571	$ 1,034	$ 4,605	Summer Intern, Costs for workshop with Fishermen, Pelletier & Ludwig workshop participation
Total Direct	$ 15,522	$ 3,478	$ 8,315	$ 15,522	$ 3,571	$ 1,034	$ 4,605	
Indirect	$ 1,863	$ 2,317	$ 998	$ 1,863	$ 1,617	$ 948	$ 2,565	Indirect & ICRA Rate differential
Total	$ 17,385	$ 5,795	$ 9,313	$ 17,385	$ 5,188	$ 1,982	$ 7,170	

Summary Budget Table 2: Expenditures by Project Task (Grant Funds Only)

Budget Category	Budgeted Grant Funds	Expended Progress Period 1	Expended Progress Period 2	Expended Progress Period 3	Actual Expended to Date
Task 1 – Project Management	$23,180	$660	$9,394	$14,501	$24,550
Task 2 -- Engineering					
Task 3 -- Construction					
Total	$23,180	$660	$9,394	$14,501	$24,550

3B. Budget Narrative

Charges include the wages for CFRF personnel time spent working directly on the project. Match represents reduced project indirect costs from our NICRA approved Indirect Cost Rate (22%) at the time of funding as well as intern salary and travel. Actual expenditures exceeded the budgeted grant funds because more match was project to the project than proposed (See Table 1 Total Budgeted Match vs Match Funds Expended Cumulative).

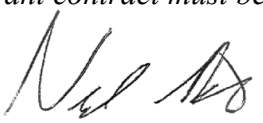
4. Supporting Materials

1.Poster presentation for SNEP Watershed Grant Announcements
2.Clean Ocean Access Land to Sea Presentation
3.CFRF March 2022 Newsletter
4.Maine Lobstermen's Presentation
5.Summary for Casco Bay Survey
6.Stakeholders Workshop Agenda Presentation

7.CFRF Ghost Gear Planning Document
8.Public Meeting Presentation

5. Certification

The undersigned verifies that the descriptions of activities and expenditures in this progress report are accurate to the best of my knowledge; and that the activities were conducted in agreement with the grant contract. I also understand that matching fund levels established in the grant contract must be met.

Grantee Signature: 

Name: N.David Bethoney
Job Title: Executive Director
Date: 2/28/23
Organization: Commercial Fisheries Research Foundation

Planning a Ghost Gear Removal Program for Rhode Island

PROJECT DESCRIPTION

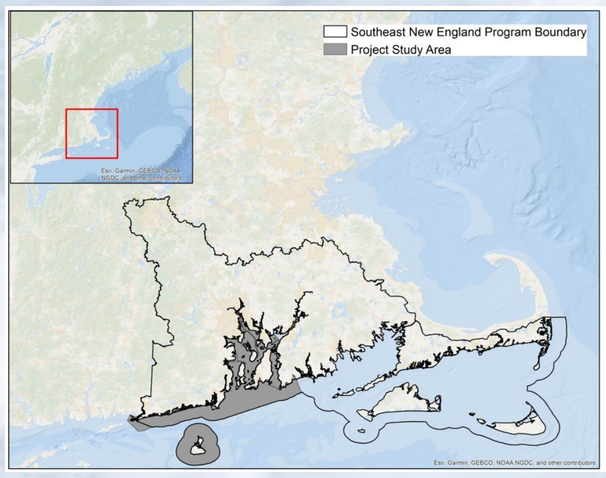
This project develops a sustainable plan for removing abandoned fishing gear, ghost gear, from Rhode Island waters.

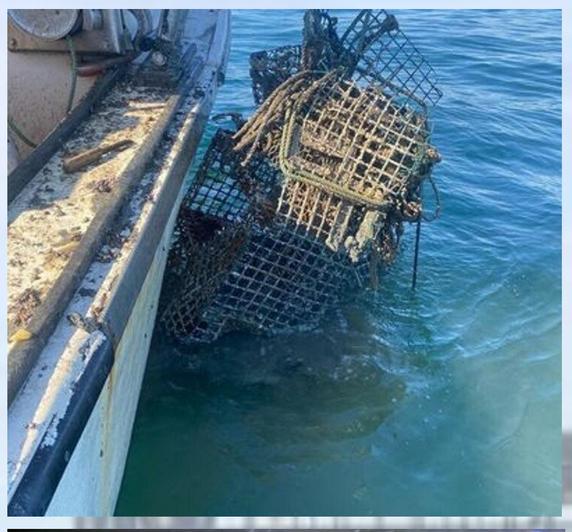
Project Goals

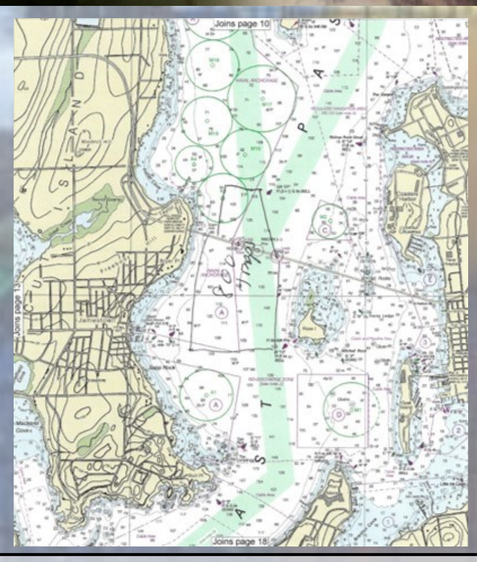
- Inform the public through online materials and community meetings
- Organize regional partnerships
- Produce an action plan
- Host a workshop that will bring together stake-holders, local and international experts, and fishing gear recycling companies.

PROJECT AREA

.

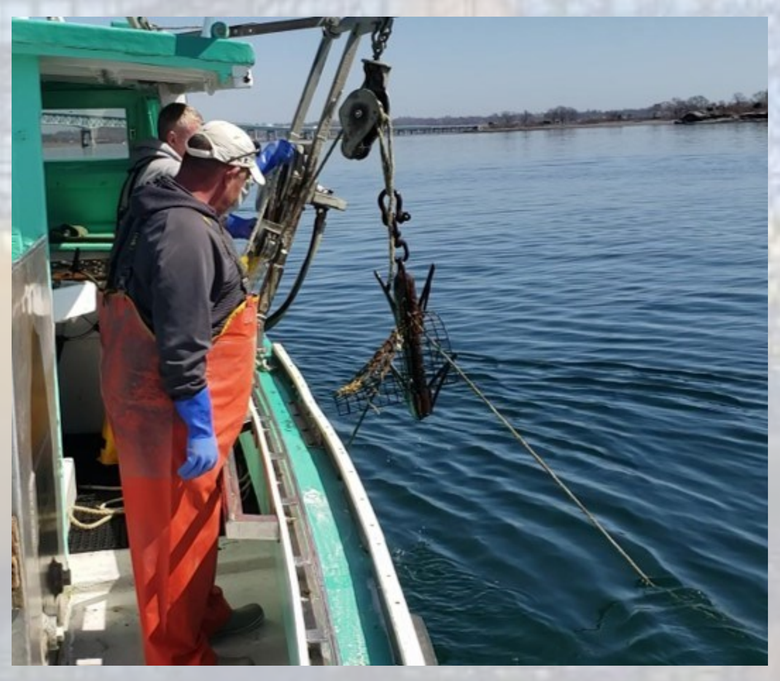






FINAL PRODUCTS

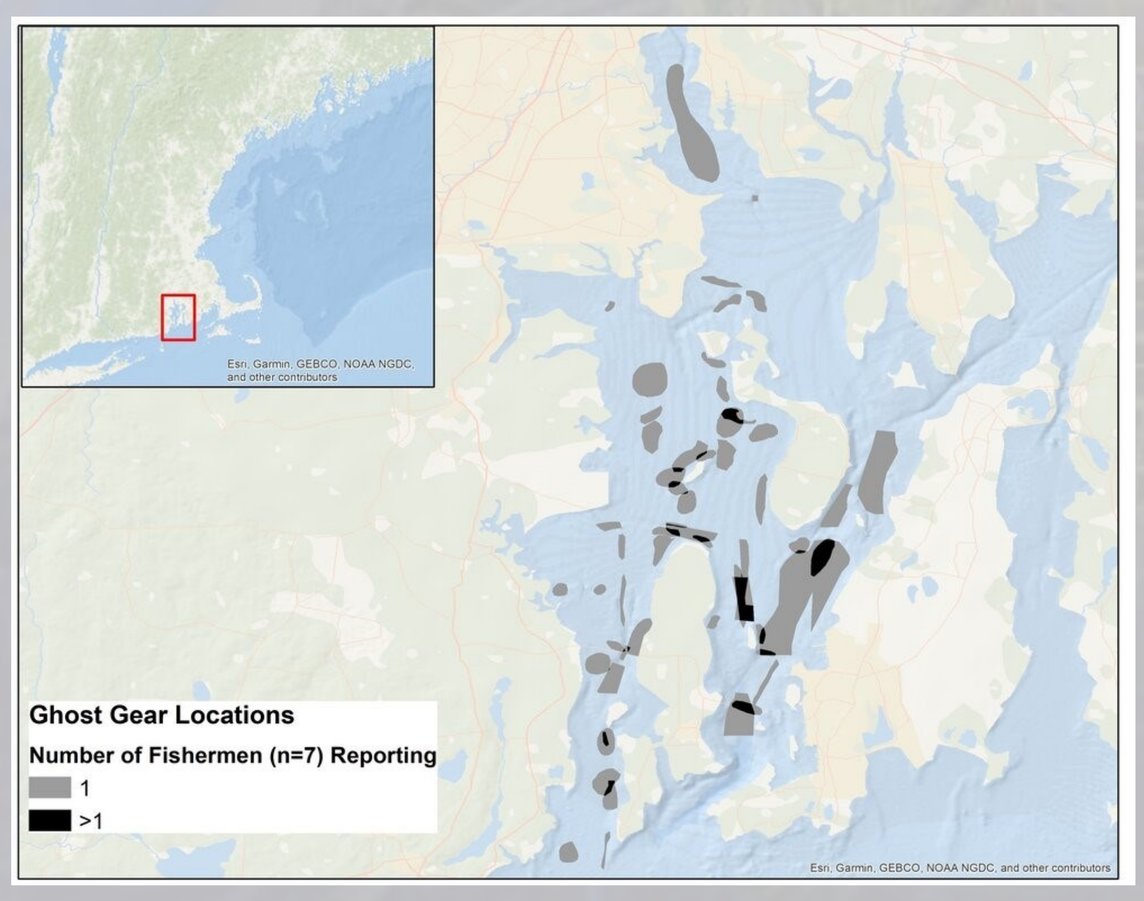
1. Development of online outreach materials on ghost gear problems and solutions
2. A regional planning document describing how to finance, locate, remove, recycle and dispose of ghost gear in Rhode Island and steps for implementation.



BACKGROUND

Discarded or lost fishing gear, ghost gear, is a threat to ocean health and coastal communities. Annually, over 640,000 metric tons of fishing gear may be lost globally. This gear indiscriminately continues to catch and kill animals and the negative ecological effects, as it accumulates on the seafloor, are well documented.

Results from CFRF's project, funded by 11th Hour Racing , using fisher's knowledge to map ghost gear locations in Narragansett Bay illustrate the problem in Rhode Island waters.



PROJECT PARTNERS

- Commercial Fisheries Center of Rhode Island
- Ghost Gear Global Initiative
- Narragansett Bay Estuary Program
- Net Your Problem
- University of Rhode Island
- Rhode Island Department of Environmental Management
- Gulf of Maine Lobster Foundation

Find us on Twitter & Facebook

CONTACT US

Website: www.cfrfoundation.org/ghost-gear/

Email: admin@cfrfoundation.org

Phone: (401) 515-4892

LAND to SEA

Welcome!

Tonight's presentation features:

David Bethoney, Executive Director *at*
Commercial Fisheries Research Foundation

This speaker series is made possible thanks to funding from the **Island Foundation** and **Southeast New England Program!**

Mapping Ghost Gear in Narraganset Bay, Rhode Island

Dr. N.David Bethoney

Land to Sea Speaker Series

January 25, 2022

CFRF COMMERCIAL FISHERIES RESEARCH FOUNDATION

The Mission

A non-profit, private foundation established by commercial fishermen that is dedicated to conducting collaborative research and education projects that inform and promote sustainable fisheries.

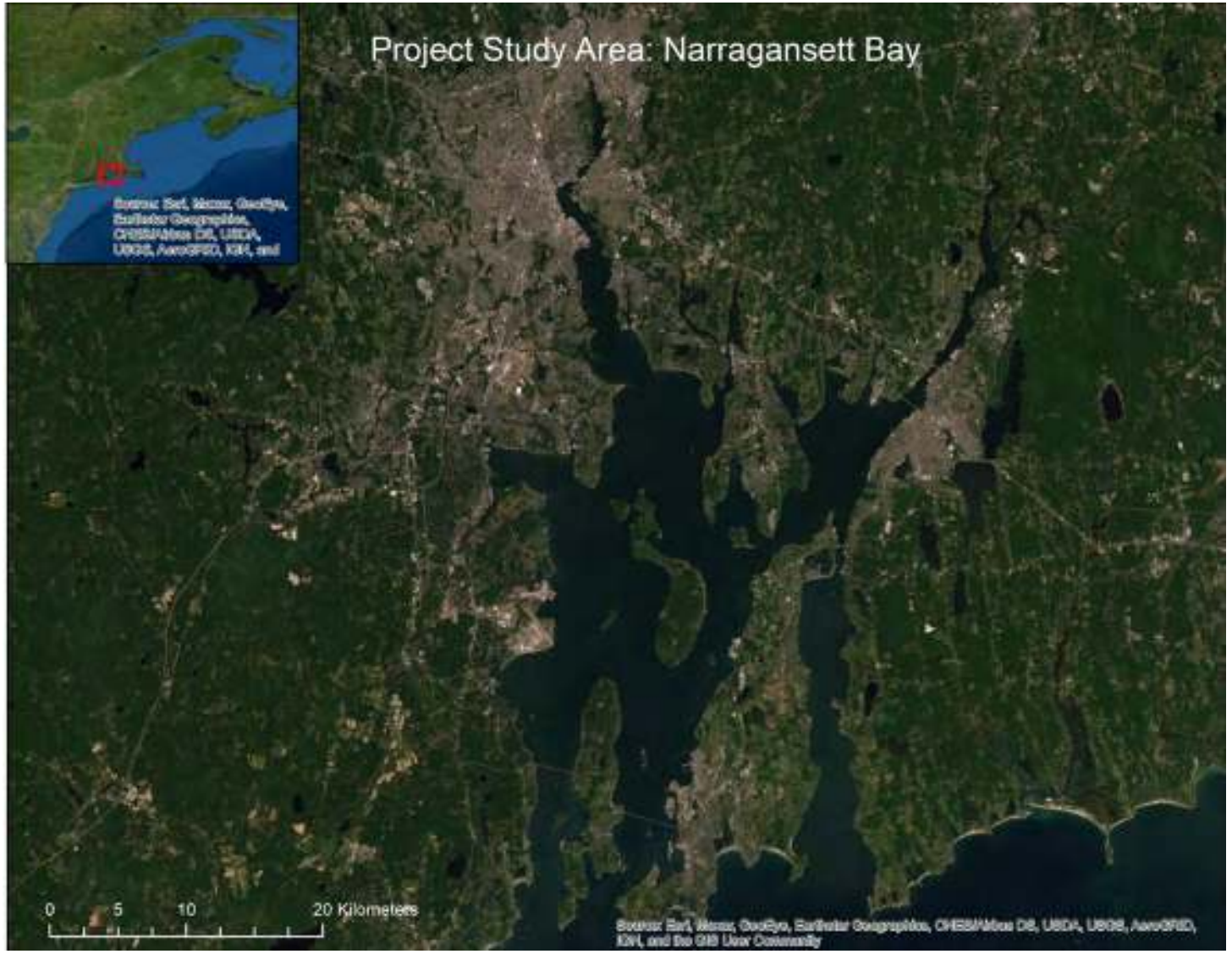
The place

Commercial Fisheries Research Foundation

The place

Narraganset Bay

- Many users
- Important resource for state fisheries
  - Overall decline in lobster and trawl fishermen
- Many issues



Ghost gear overview

- What is it?
  - Derelict fishing gear
- Why
  - Weather
  - Marine traffic
  - Abandonment
- Problems
  - Continues killing
  - Fishing costs
  - It’s plastic trash

Ghost gear overview

- What is it?
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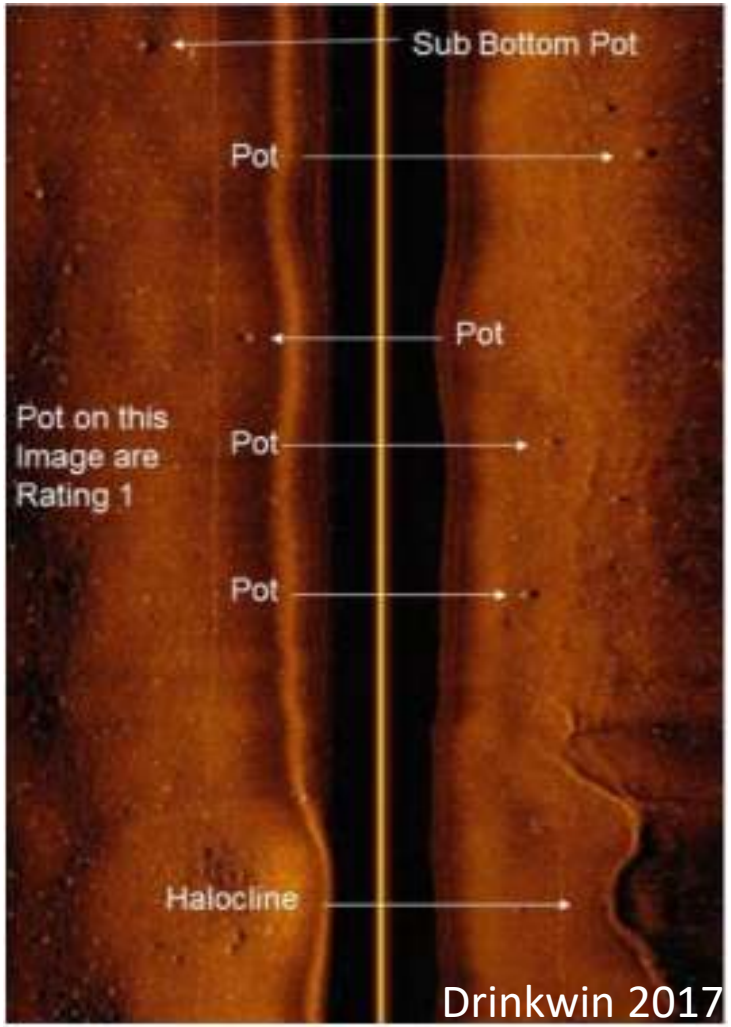
Ghost gear: What can be done

- Prevention
  - Best practices framework
- Removal
  - Mapping
    - Sonar
    - Fishermen's knowledge
    - Divers
  - Extraction
    - Divers
    - Dragging/Grappling



Drinkwin 2017

Ghost gear: What can be done

- Prevention
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Ghost gear: What can be done

- Prevention
  - Best practices framework
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GLOBAL GHOST GEAR INITIATIVE

GEARGRAB

CENTER FOR COASTAL STUDIES PROVINCETOWN

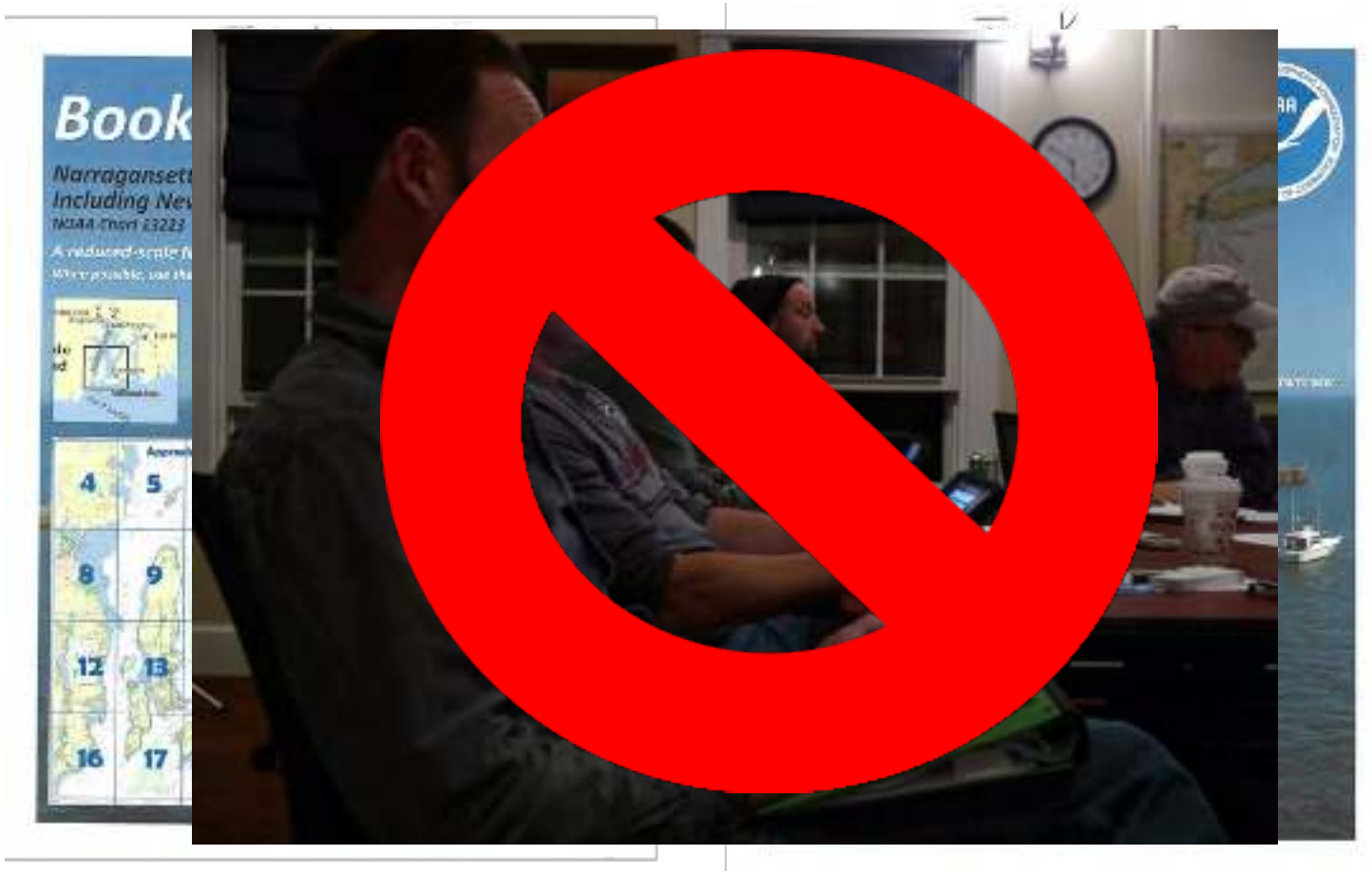
FUNDY NORTH Fishermen's Association

A start for Rhode Island

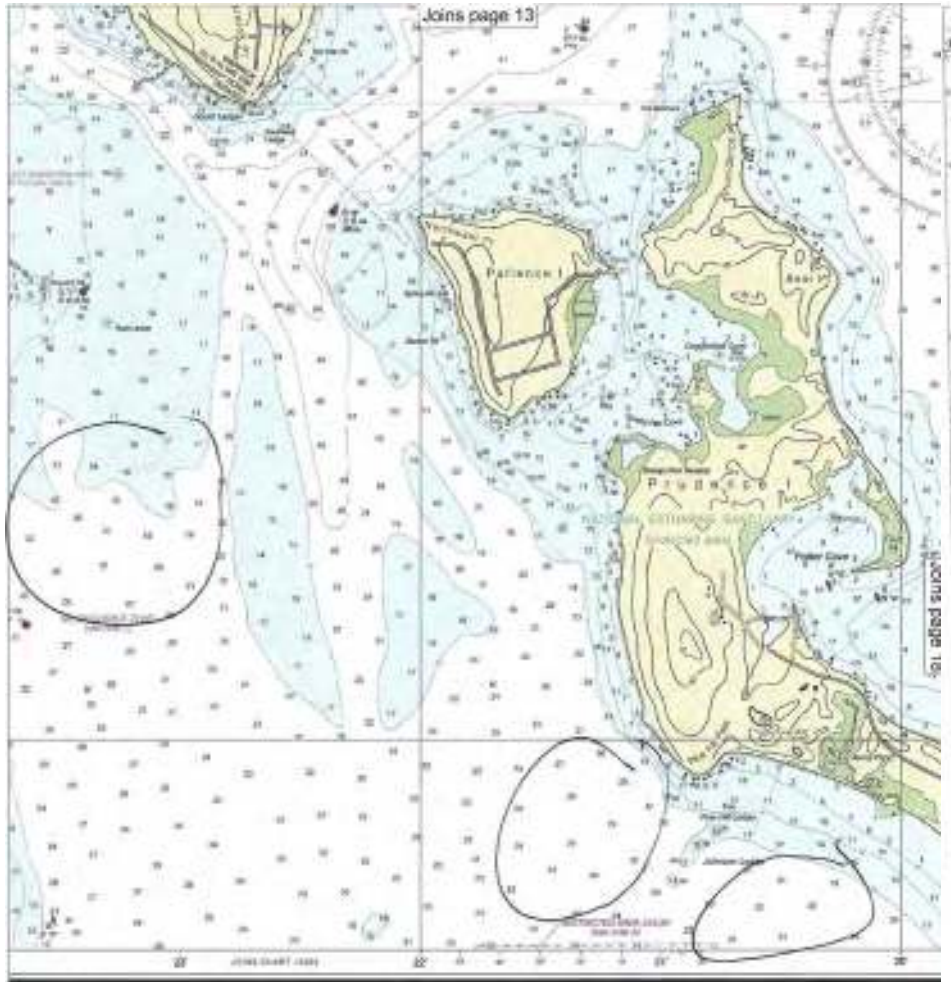
- Fishermen's knowledge to map hot spots
- Needed innovation
  - Drop cameras to refine locations
    - Cheaper, easier to use than sonar
    - Cheaper, safer than divers
  - Reduce grapple dragging
  - Drop camera-grapple?
- Build a collation, launching point

Mapping Ghost Gear

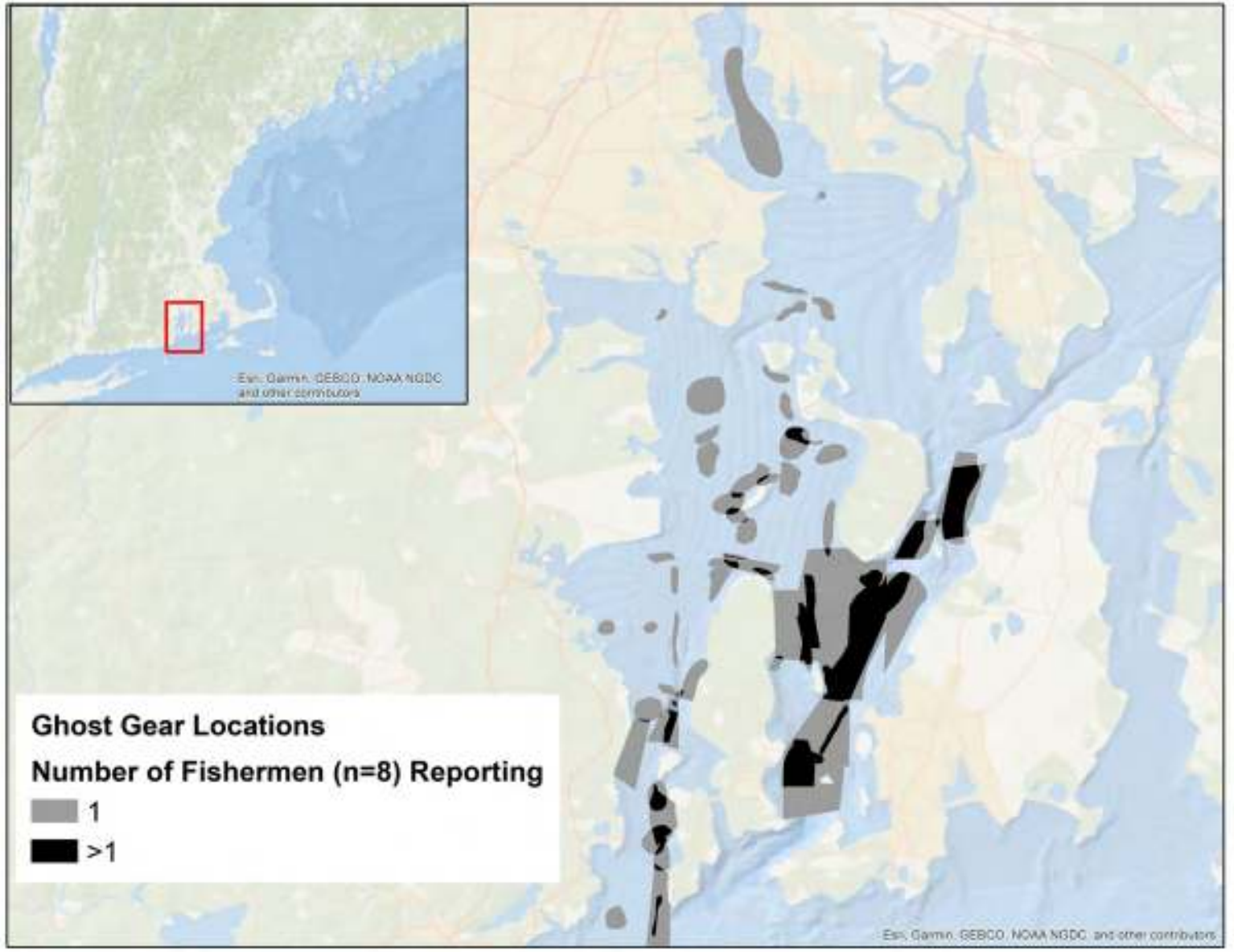
- Steering committee
  - COVID cancelled
- Individual interviews
  - Pocket map
- Combined Map



Mapping Ghost Gear



Mapping Ghost Gear



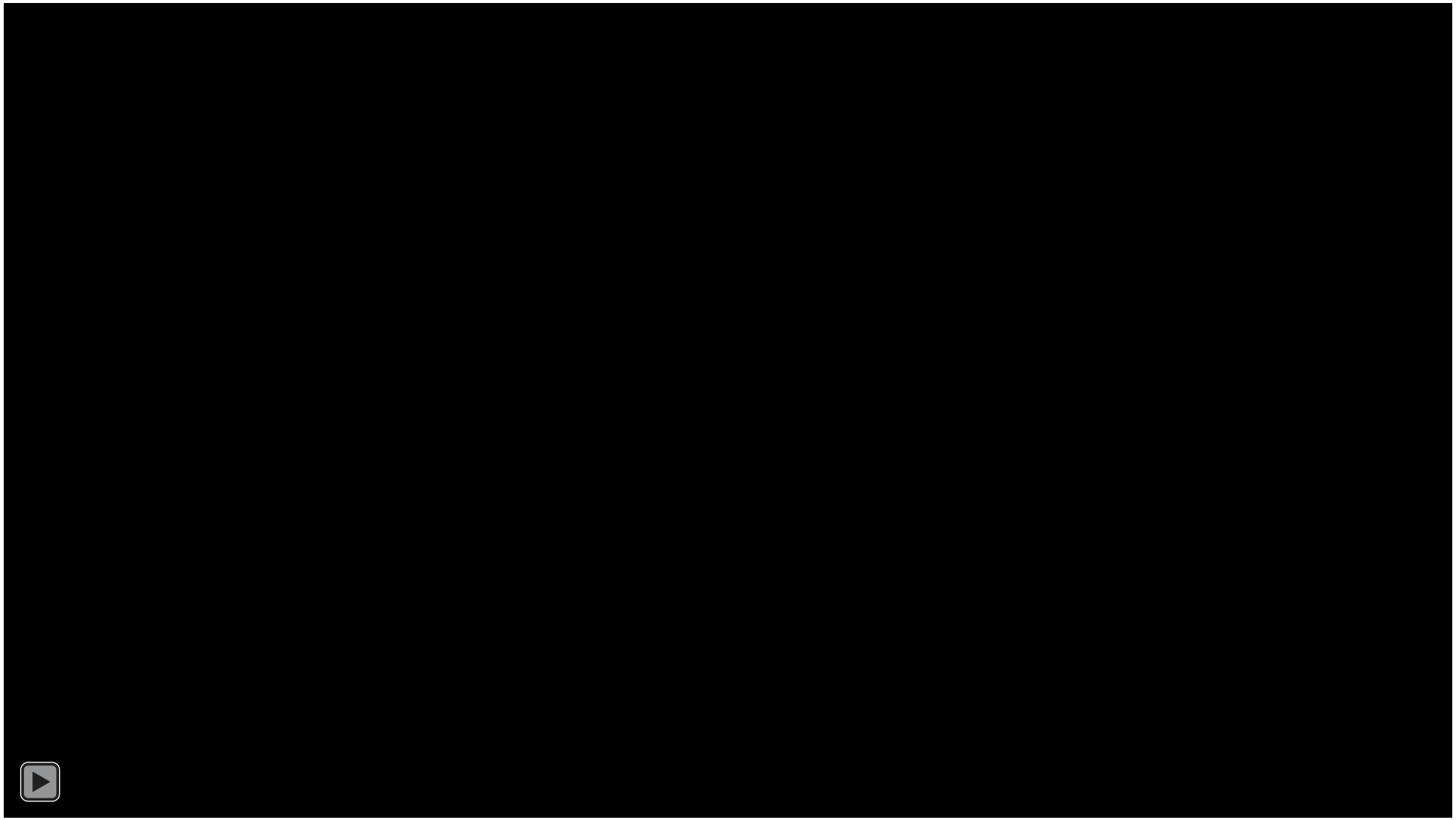
Camera trials

2 trips during slack tide
plus a bonus trip

Camera trials

- Can find ropes and traps
  - Grapple over lat, longs
    - No: Camera and grapple at same
    - Map with targets
  - Return to lat, long: found gear

Camera trials



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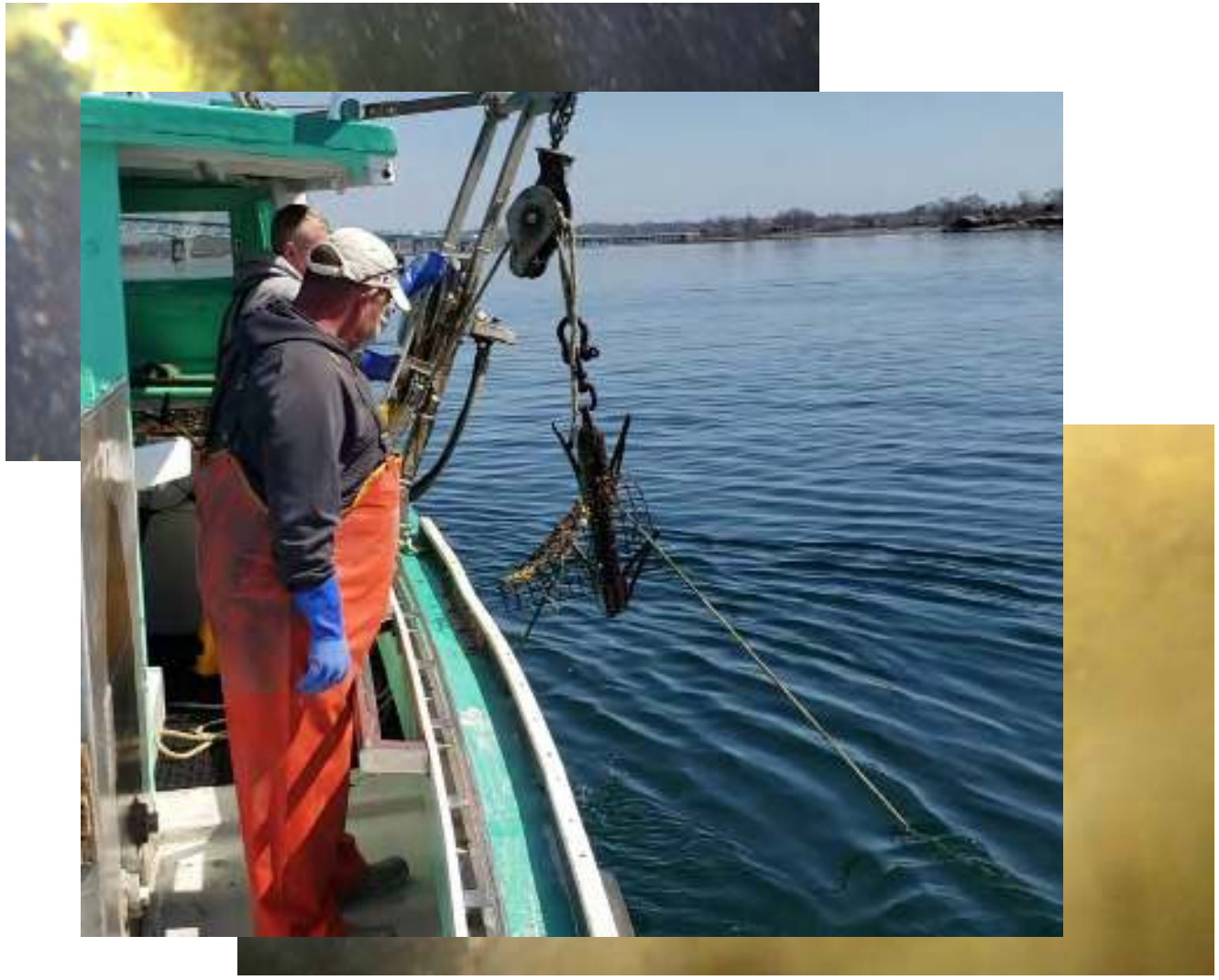

Camera trials

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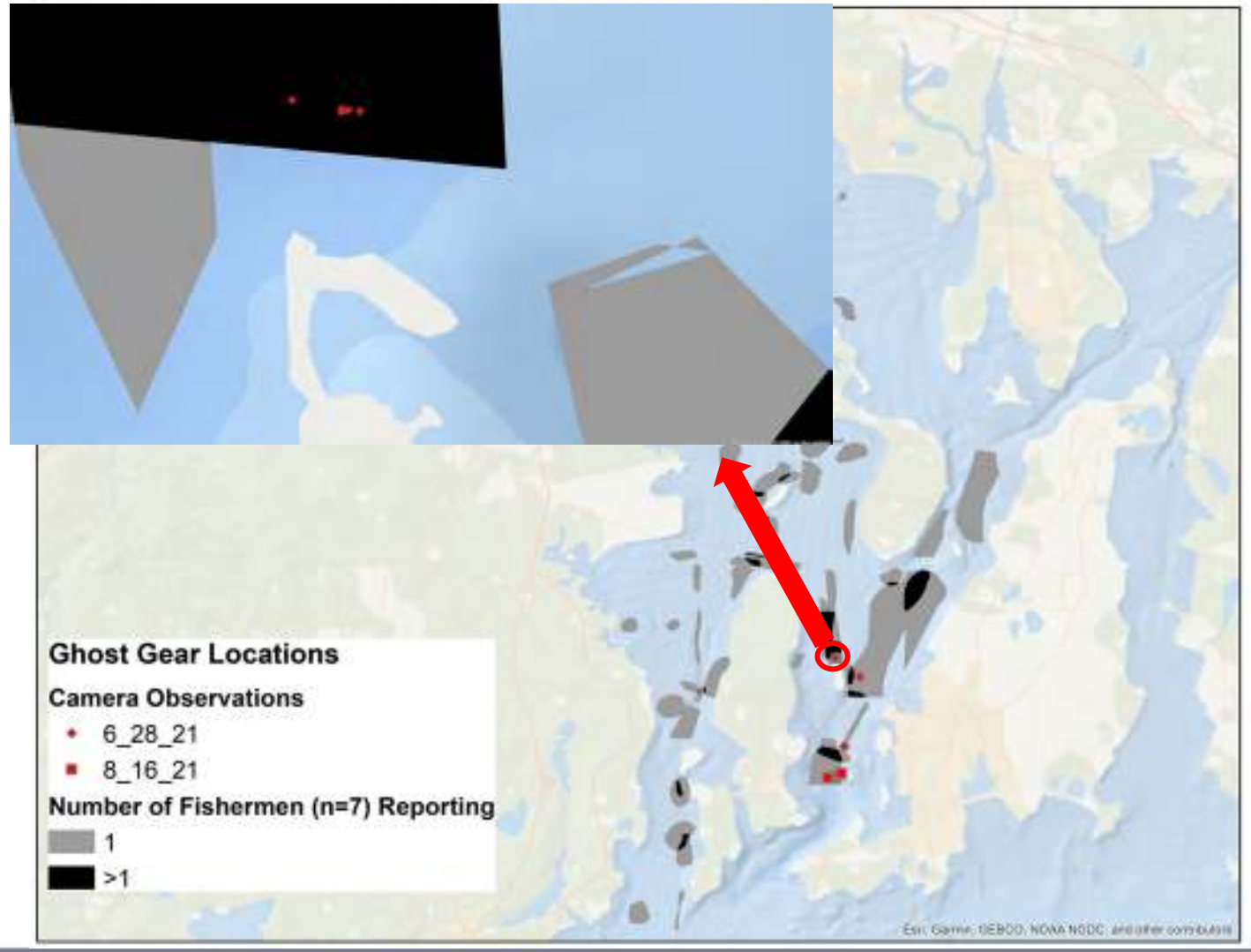
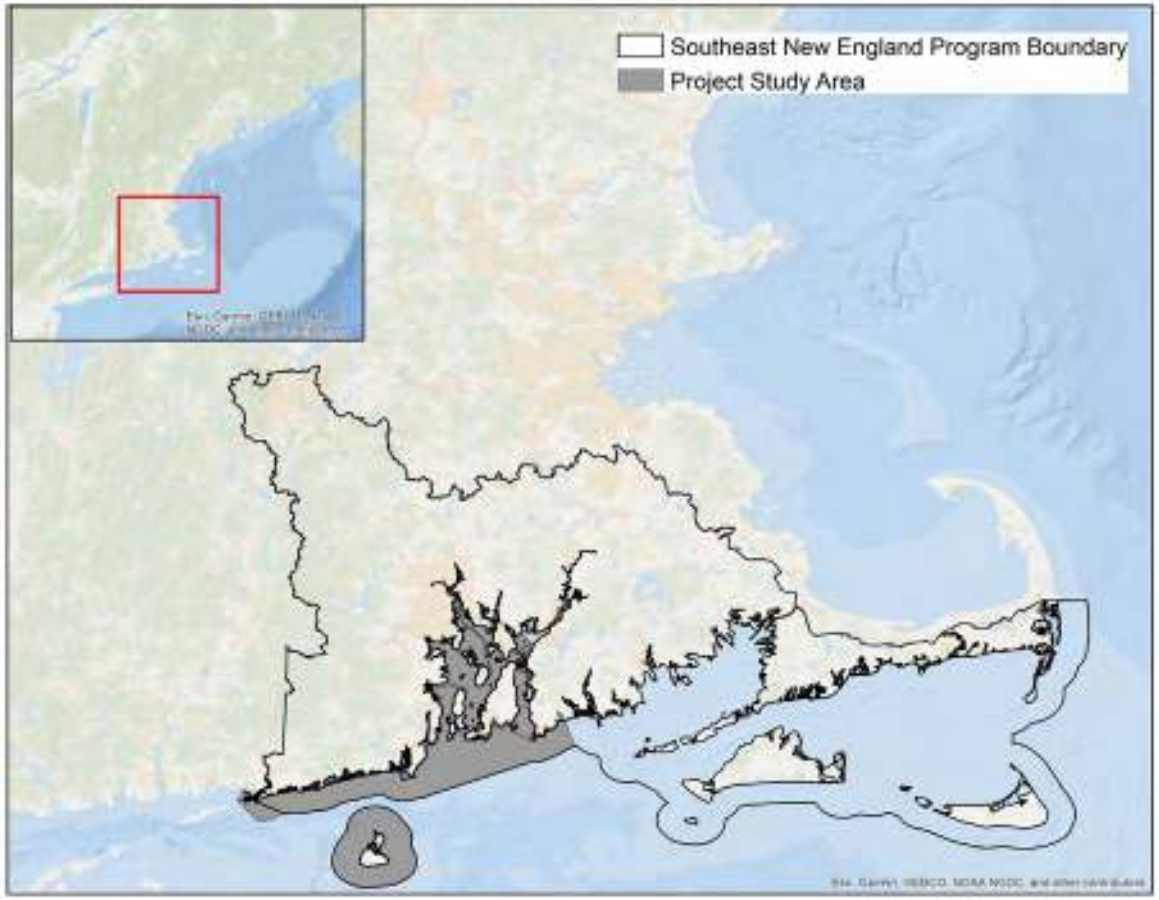


Next steps

- Room for improvement
  - Winter
  - Light, view area
  - ROV but increases costs
  - Efficient?
- Removal plan
  - Southeast New England Program
- Start getting it out
  - With fishermen



Southeast New England Program

Timeline	Milestone	Key Deliverable
January-February	• Develop digital outreach materials with input from project partners	• Digital outreach materials
April-June	• Complete Draft of planning document for review	• Draft of ghost gear removal document
July	• Hold workshop with project partners and stakeholders including local and international organizations to review the planning document • Form Advisory Group for planning documents implementation from participants	• Workshop report on suggestions for planning document • Formation of Advisory Group
August	• Revisions to planning document	• Final planning document
September-October	• Hold public meetings on ghost gear removal program described in planning document	• Public outreach to inform and answer questions about the removal plan.

Southeast New England Program

Clean Ocean Access: Port Visit

- Tentatively April 30th
- Hear from fishermen
- Free Lunch?

Thank you

Fishermen

- Joe Baker
- Ethan Duclos
- Al Eagles
- Jeff Grant
- “Hook”
- Dennis Ingram
- Jon Kourtesis
- Kenny Murgo
- Derek Pascale
- Todd Sutton

Funding

11TH HOUR RACING

SNEP
Southeast New England Program

More Information

- CFRF Staff Lead
  - Susan Inglis
  - singlis@cfrfoundation.org
- Me
  - dbethoney@cfrfoundation.org
- Website
  - cfrfoundation.org/ghost-gear
  - **11th Hour Racing video**

LAND to SEA

This speaker series is made possible thanks to funding from the **Island Foundation** and **Southeast New England Program!**

Upcoming Speakers:

March 8th

Save the Bay and Town of Tiverton Open Space Commission,

Wenley Ferguson and Brian Janes

April 5th

Groundwork Rhode Island,

Amelia Rose

COMMERCIAL FISHERIES RESEARCH FOUNDATION

CFRF NEWSLETTER

March 2021 **ISSUE 14**

COMMERCIAL FISHERIES RESEARCH FOUNDATION

The Commercial Fisheries Research Foundation is a non-profit, private research foundation founded and directed by members of the commercial fishing industry. The CFRF's primary mission is to conduct collaborative research and education projects that assist in the achievement of sustainable fisheries and vibrant fishing communities.

MESSAGE CORNER:

Only a few times in my life have I greatly appreciated a time and place like this new year (graduating high school, birth of my children) and the backside of this Pandemic. Vaccines are being administered to the public, with hope of reaching herd immunity by mid-summer and yearning for a return to normalcy. The CFRF staff are starting to come back into the office eager and motivated, to meet the challenges of our most prolific number of research projects to date. This includes the newest member of the CFRF team, Hannah Verkamp, M.Sc., who I'd like to welcome aboard. The CFRF Board just completed the one-year performance review for Executive Director Dr. David Bethoney with sterling responses from the Board. Currently, David has increased our research capacity to 12 ongoing research projects, 2 new research projects about to start with 4 research proposals pending, an amazing accomplishment and leadership of a dedicated team. Several weeks ago, Dave Spencer and I were reflecting on what CFRF has achieved in the last 15 years and how we are realizing our dream! Thank you ALL! 2021 ROCKS!

Fred Mattera, CFRF President

NEW PROJECT: MAPPING HOTSPOTS AND PILOTING UNDERWATER VIDEO TO IMPROVE GHOST GEAR REMOVAL

Discarded or lost fishing gear left in the marine environment, ghost gear, is a global threat to ocean health as abandoned fishing gear continues to catch animals. It also often damages nets when caught during commercial fishing. The goal of this project is to create a map of ghost gear "hot spots" with Narragansetts Bay and test a drop camera-grapple approach to target and remove ghost gear. The project will use local fisher knowledge to develop the map of ghost gear "hot spots" in Narragansett Bay. Using that map, we will work with commercial fishing vessels equipped with a drop camera to see if the camera can help refine ghost gear locations and aid removal efforts. At each site, the camera will be used to confirm the presence of discarded gear and define the scale of the debris field to help direct targeted grappling efforts to remove the gear. Two different live-feed cameras will be used; a camera designed for underwater use (pictured) and a cheaper system that adapts a GoPro.

Results from this pilot study will be presented to our Ghost Gear Steering Committee made up of fishers with knowledge of where abandoned fishing gear is located for discussion and evaluation. We will also share project results including images, video, and maps through an interactive website. This project is being conducted with support from the Commercial Fisheries Center of Rhode Island, the Global Ghost Gear Initiative, and is funded by 11th Hour Racing. In collaboration with the Global Ghost Gear Initiative, we will host a joint workshop to present results from this pilot study and provide information on the impact of ghost gear and other ghost gear initiatives to the community. Mapping will begin this spring and at-sea trials will run from late spring through summer 2021.Visit the CFRF project webpage www.cfrfoundation.org/ghost-gear for updates and images and videos of our results once the project starts.

Learn more about CFRF at www.cfrfoundation.org

Follow us on Facebook!

Project Update: Black Sea Bass Research Fleet

Over the last 6 months, through the end of the fall and early winter fishery, the Black Sea Bass Research Fleet was able to record catch, effort, and biological data from over 4,500 black sea bass. This sampling effort brings the total number sampled by the Fleet since December 2016 to over 29,000! In November, the CFRF announced an open call for applications to join the Research Fleet. Specifically, the CFRF was hoping to bring in new vessels and expand sampling efforts to the New Jersey fish pot fishery. We are pleased to announce the Black Sea Bass Research Fleet has welcomed three new vessels. The Rhode Island F/V Catherine Ann, lobster vessel owned and operated by Al Eagles, has been brought on board to further expand data collection within the Rhode Island lobster fishery. Representing the New Jersey fish pot fishery, the Fleet has also welcomed F/V Savannah Paige and F/V Saturn out of Cape May, New Jersey. The inclusion of the F/V Savannah Paige and F/V Saturn is a big first step for the Research Fleet expanding outside of the Rhode Island industry. Black sea bass is a fishery of coastwide importance and providing higher quality, larger resolution, data characterizing the fishery and its discards will have coastwide benefits. Visit the project at www.cfrfoundation.org/black-sea-bass-fleet to find more information and an application form.

Project Update: Lobster and Jonah Crab Research Fleet

Despite COVID-19, our Research Fleet continued to sample this winter with over 5,333 lobsters and 3,405 Jonah crabs measured. In total, our fleet has sampled over 166,633 lobsters and 96,395 Jonah crabs since June 2013! The Lobster and Jonah Crab Research Fleet provides biological and environmental data from commercial and ventless traps. Since our last update, the CFRF welcomed another offshore vessel to the fleet: F/V Dilligaf (Scituate, MA) and a few vessels changed ownership but are still involved in data collection. In addition to the normal day to day activities of the Lobster/Crab Fleet, we have several expanded initiatives. First, CFRF is working with Jim Manning at the Northeast Fisheries Science Center to incorporate CFRF's bottom water temperature data into his larger data set. Secondly, CFRF staff are leading analyses to explore the biological lobster/crab data within the Northeast Canyons and Marine Monument and explore if vessels are representative of statistical areas and the rest of the fleet. Stay tuned on these initiatives! The Research Fleet will continue data collection, with support by the Campbell Foundation, the Atlantic Coastal Cooperative Statistics Program, and NOAA's Saltonstall-Kennedy Program and we are looking to bring on additional offshore vessels. Visit the project webpage at www.cfrfoundation.org/jonah-crab-lobster-research-fleet to find more information and an application form..

Project Update: Shelf Research Fleet

Southern New England waters have experienced widespread warming over the past several decades. Since 2014, CFRF and Woods Hole Oceanographic Institution (WHOI) have engaged Rhode Island commercial fishermen in the collection of oceanographic data along the continental shelf to study these changes and the impact on fisheries. As of March 9th, over 696 water column profiles using wireless conductivity, temperature, and depth instruments were collected by the Shelf Research Fleet. In December, a strong bottom intrusion related to a warm core ring was observed by our Research Fleet. During this event, the temperature in the bottom intrusion was 58 °F, which was a 4-degree Fahrenheit jump, and had a salinity of 34.9 ppt. Our fishing partners relayed observations to the project team that Jonah crab catch shut off, as well the high presence of jellyfish (pictured). As a result, WHOI's communications team interviewed Rob Walz, a fleet member of the CFRF/WHOI Shelf research Fleet, and Glen Gawarkiewicz, senior scientist at WHOI, about this event. You can listen to the audio story on our website. Finally, in March, CFRF hosted our virtual Shelf Fleet/Ocean Conditions meeting which involved a great discussion between members of the commercial fishing industry, scientists and academia. A huge thank you to those who joined us, and if you missed the meeting, you can find the presentation on our website www.cfrfoundation.org/shelf-research-fleet.

Project Update: South Fork Wind Farm Fisheries Monitoring—Beam Trawl Survey

The South Fork Wind Farm beam trawl survey is well underway with six months of data collected on the benthic communities of the South Fork windfarm development area and two nearby reference areas. The beam trawl is designed to primarily target scallops and groundfish, however it is outfitted with a 2.4 cm knotless nylon liner to document all sizes of the benthic species present. The catch from each monthly survey has been relatively consistent with the eastern reference area dominated by crabs and skate and a handful of flatfish; the western reference area was rocky with many small invertebrates with high catches of scallop and skate with a few summer and winter flounder; and finally, the wind farm proposed area was predominantly little skate, scup, sea robins and a few scallops. In the colder months, with a few big storms moving though the area, we have seen a slight downturn in catch, particularly in finfish through the winter. Stay tuned to see what the warmer waters bring this spring as well as the beginning of our gillnet, ventless trap, and fish pot surveys each designed to target slightly different fisheries species in this area Visit the project webpage at www.cfrfoundation.org/sfwf-beam-trawl-survey to stay up to date with the catch information from this survey.

New Project: Catalyzing the Restoration and Conservation of the Bay Scallop

CFRF has teamed up with the Rhode Island Chapter of The Nature Conservancy and the Rhode Island Department of Environmental Management on a project that will help develop a restoration plan for bay scallops in Rhode Island. Once an important commercial fisheries resource, bay scallop populations drastically declined in the 1980s as a result of widespread brown tide algal blooms. This crash led to an effective collapse of the fishery coastwide, including Rhode Island, and populations have not recovered since. Many factors, such as reduced seagrass meadows and impaired water quality, likely play a role in keeping bay scallop populations below their historic levels. In addition, the high mortality of larval bay scallops likely contributes to this limited recovery is as bay scallop larvae are particularly vulnerable and fragile compared to other local bivalve species. The goal of this project is to identify areas in Point Judith Pond, RI that have historically supported bay scallop populations and that are suitable for future restoration efforts. This project will synthesize relevant information on bay scallop ecology and past restoration efforts to develop site-specific strategies that can be used in each area identified to maximize restoration success. Once complete, we hope it will be incorporated into the state's shellfish restoration program to facilitate implementation. For more information on this project visit www.cfrfoundation.org/catalyzing-bay-scallop. This project is funded by the Sarah K. de Coizart TENTH Perpetual Charitable Trust.

Project Results: River Herring Bycatch Avoidance Program

After over a decade of collaboration the River Herring Bycatch Avoidance Program has come to an end. The program, representing the work of CFRF, the University of Massachusetts Dartmouth School for Marine Science and Technology, the Massachusetts Division of Marine Fisheries, the commercial fishing industry, and contributions from several other organizations, fundamentally improved the understanding of river herring bycatch and how to reduce it in the Atlantic herring and Atlantic mackerel fisheries. It increased portside sampling of relevant vessels in Massachusetts and Rhode Island by over 100% at times. The data collected though portside sampling supported scientific publications, management decisions, and was the primary information source for near-real time communications of river herring bycatch. These communications positively influenced fishing habits and played a role in the approximate 60% decrease in total bycatch and 20% decrease in the bycatch rate prior to the establishment of river herring catch limits. Once river herring catch limits were established, the program helped the industry stay under these limits more often than what was expected by managers. Through the course of the project 26 vessels contributed data. This included 8 fishing companies and their 13 mid-water trawl vessels, representing the majority of Atlantic herring and mackerel catch in U.S., that were cornerstones of the program. The program was started with funding from the National Fisheries Wildlife Foundation, strengthened with funding from The Nature Conservancy, and then sustained by the Atlantic Herring Research-Set Aside Program. Cuts to the Atlantic herring quota made funding through the Research-Set Aside Program untenable and, along with the closure of near shore areas, reduced the need for the program. Thank you to all who supported and contributed to this program. More information can be found at www.umassd.edu/smast/bycatch/.

More On-Going Projects:

- **Salinity Maximum Intrusions:** This project maps intrusions of warm, salty water that may influence fish distributions in Southern New England. Information on this project can be found at www.cfrfoundation.org/salinity-max.
- **Development of a Marketable Seafood Product from Scup:** This project is developing a frozen scup fillet product that meets consumer, fisherman, fish processor, and chef needs. More information can be found at www.cfrfoundation.org/scup-fillet.
- **Piloting A Low-Bycatch Commercial Squid Jig Fishery In Southern New England:** In partnership with The Town Dock, this project pilots the use of automatic jigging gear as a low bycatch method to harvest squid. Information on this project can be found at www.cfrfoundation.org/automatic-squid-jig.

Office Location:

2nd Floor, Building #61B
Commercial Fisheries Ctr of RI
East Farm Campus, URI
Kingston, RI 02881
Phone: *(401) 515-4892*
Fax: *(401) 515-3537*

More On-Going Projects:

- **A Pro-Seafood Climate Action Agenda:** A group of Rhode Island and Massachusetts fishing organizations initiated a process to craft a narrative on climate solutions that places wild seafood production at its core. Contact Mike Roles (mtroles@gmail.com) and Sarah Schumann (schumannsarah@gmail.com) for more information.
- **Assessing the Vulnerability of the Atlantic Sea Scallop Social-Ecological System:** This project looks at how vulnerable sea scallop fishing communities are to ocean acidification and warming water temperatures, and develops recommendations on how to build resiliency to these changes. Information on this project can be found at www.cfrfoundation.org/atlantic-sea-scallop-socialecological-system.
- **Piloting a N-VIRO Dredge in the Southern New England Scallop Fishery:** This project seeks to pilot a dredge which could reduce bycatch, minimize habitat impacts, and improve fuel efficiency in the sea scallop fishery. Information on this project can be found at www.cfrfoundation.org/piloting-novel-dredge-type.

Education and Outreach:

- In March, Michael Long presented results from the N-VIRO project "Piloting the Fuel Efficient, Low Bycatch, and Habitat Friendly N-Viro Dredge in the Southern New England Sea Scallop Fishery" at the National Shellfisheries Association Meeting.
- The impacts of COVID-19 on CFRF's Research Fleets was presented at the NEFSC Cooperative Research Branch webinar "Cooperative Research: Facing the Challenges of COVID-19"
- An informational brochure for the Atlantic sea scallop social-ecological system project was distributed in March and can be viewed on our website along with other press releases at www.cfrfoundation.org/atlantic-sea-scallop-socialecological-system .
- The Pro-Seafood Climate Action Agenda team put together a sign-on letter for RI fishermen in response to NOAA's solicitation for input on climate resilient fisheries. Go to http://bit.ly/RI-Climate-Resilient-Fisheries-Sign-On to sign on.

Recent Releases, Publications, Awards and Upcoming Events:

- The CFRF Scup project was featured in the National Fishermen March Edition,"Northeast scup: With abundant biomass, fishermen look to expand market post-pandemic." Visit www.cfrfoundation.org/news-releases to read the article.

CFRF
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RESEARCH FOUNDATION
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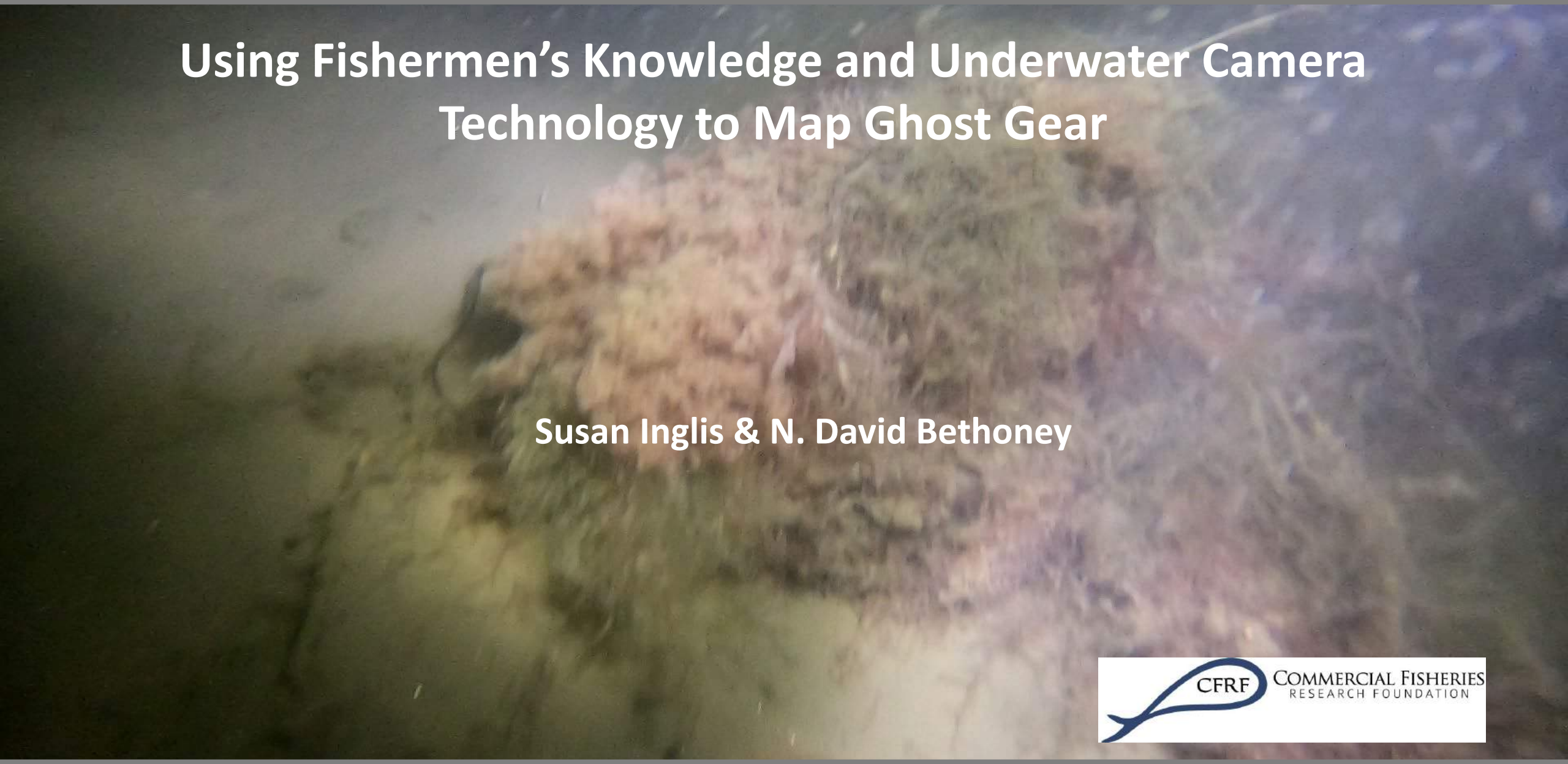
www.cfrfoundation.org

Using Fishermen's Knowledge and Underwater Camera Technology to Map Ghost Gear

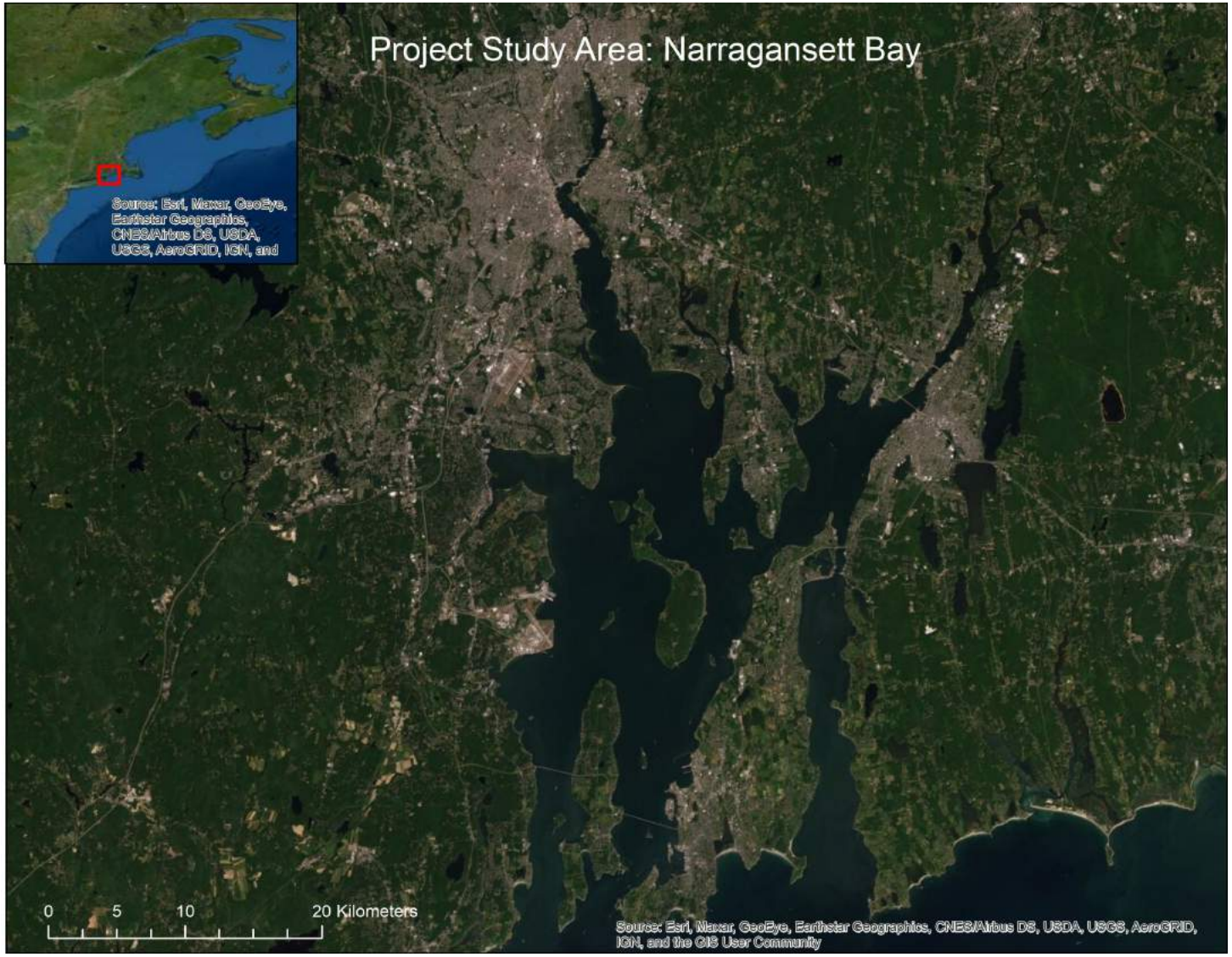
Susan Inglis & N. David Bethoney



CFRF Commercial Fisheries Research Foundation

Narragansett Bay

- Many users, many issues
- Important resource for state fisheries
  - Overall decline in lobster and trawl fishermen
- Ghost gear
  - Fishermen came to us to say there was a problem



A start

- Fishermen's knowledge to map hot spots
- Innovation
  - Drop cameras to refine locations
    - Cheaper, easier to use than sonar?
    - Cheaper, safer than divers ?
  - Reduce grapple dragging area
  - Drop camera-grapple?
- Build a collation, launching point

Partnerships increased significantly since we started program

Mapping Ghost Gear

- Steering committee
  - COVID cancelled
- Individual interviews
  - Pocket map
- Combined Map

Interviewing Captains for hotspots

COMMERCIAL FISHERIES RESEARCH FOUNDATION
P.O. Box 278, Saunderstown, RI 02874
Phone: (401) 515-4892 | Fax: (401) 515-3537
www.cfrfoundation.org

Mapping Hotspots and Testing Underwater Video Technology for Ghost Gear Removal in Narragansett Bay

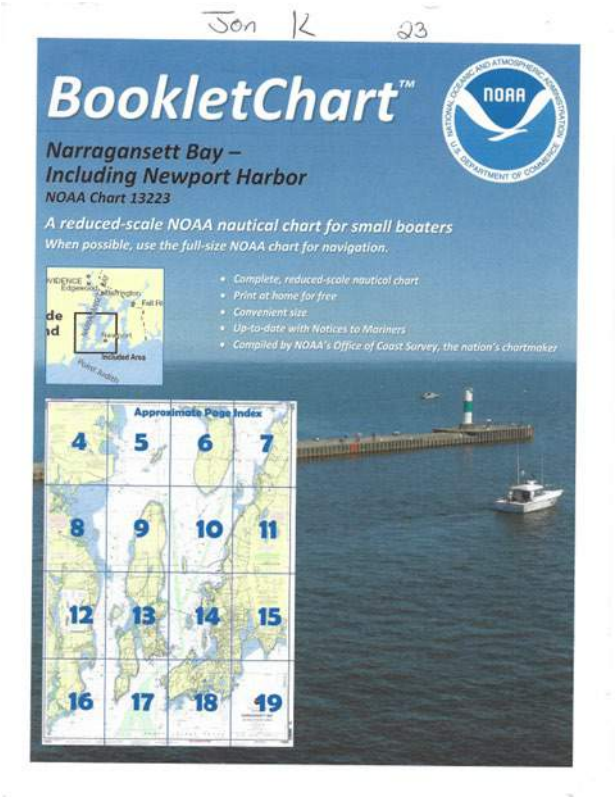
Thank you for your help with the Ghost Gear Mapping project!

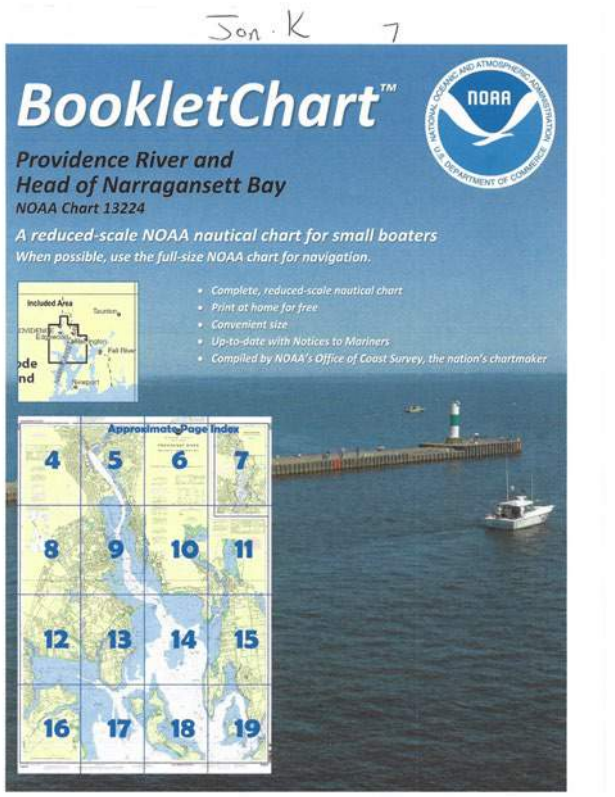
Enclosed are two charts for Narragansett Bay. Please circle all locations of ghost gear that you know of on the charts and if possible, the year you observed it. Also, please star the locations that you would consider as "piles" or ghost gear hotspot areas.

We are planning to use the information from this pilot project in proposal submissions for a larger Ghost Gear Program for Rhode Island.

When you are finished mapping your ghost gear locations on the charts, please either call or text me at: Susan Inglis, (508) 817-7023 and I will drive over to pick it up.

Thank you again for your help and if you have any questions, please contact me at the number above.





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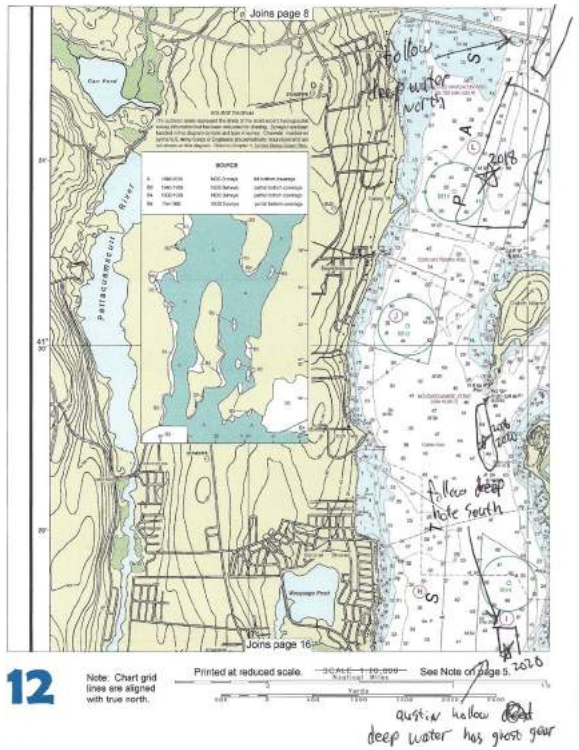
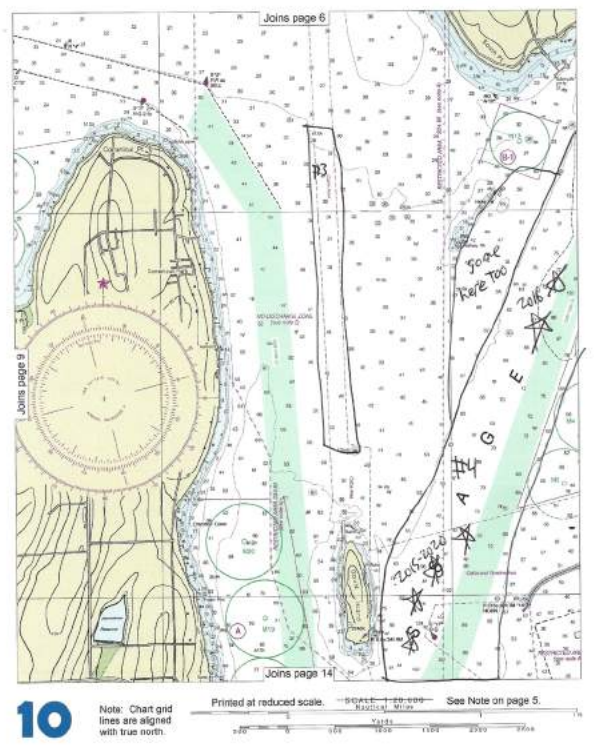
Mapping Ghost Gear

- Areas outlined on charts are digitized into GIS map
- This method highlights areas of overlap between Captains





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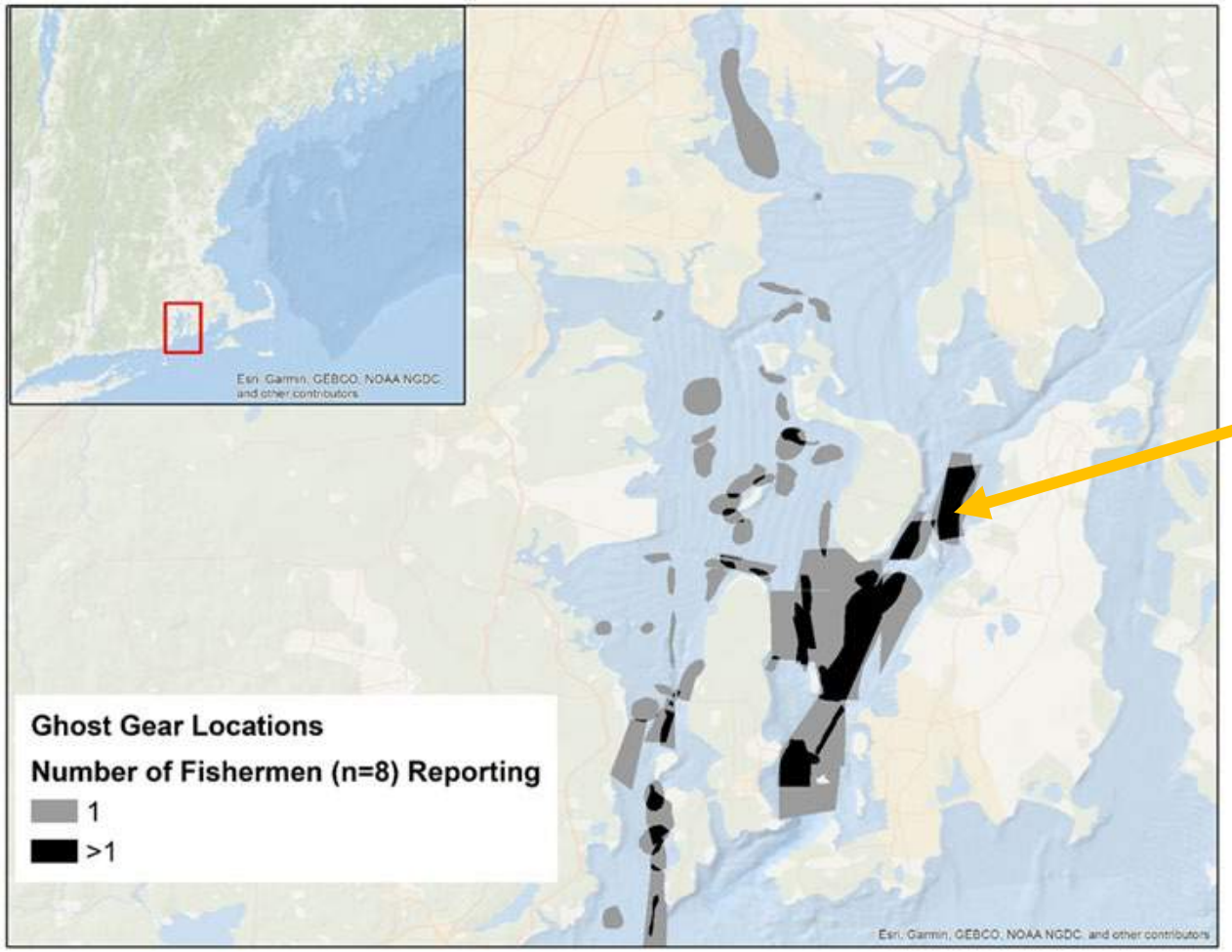
Results from trawl, lobster and fish pot Captains



Areas to target for survey

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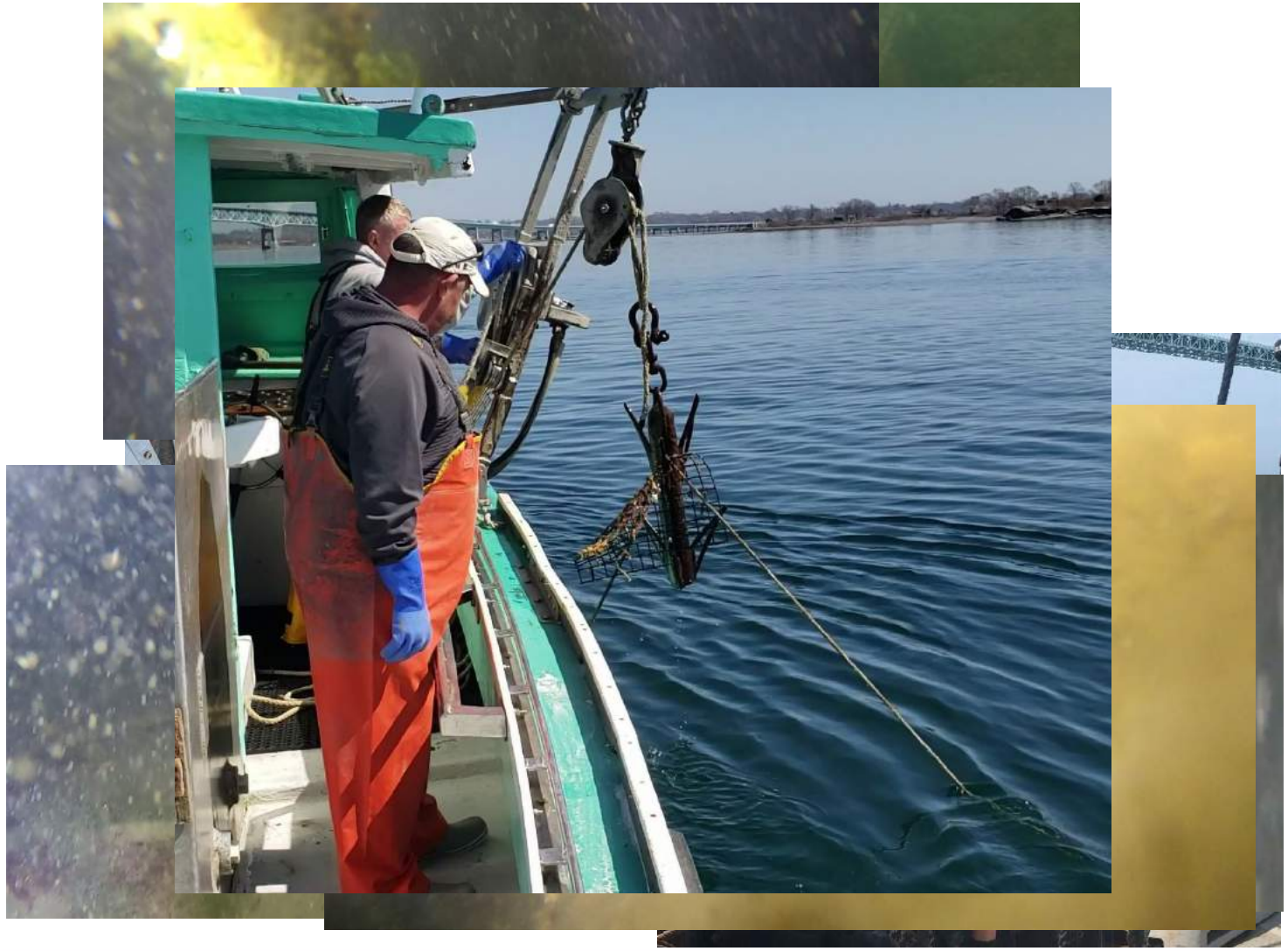
Camera trials

- 2 trips during slack tide
  - Can find ropes and traps
  - Grapple over lat, longs
    - No: Camera and grapple at same
    - Map with targets
  - Return to lat, long: found gear
- GoPro wins



- Video entered into VLC media player for analysis
- Ghost gear is marked (snapshot) and the video time stamp recorded
- GPS waypoint for recorder time stamp used for lat and long.

FV Catherine Ann 8.9.21								
Video ID	**Recorder**	**Waypoint**	**Ghost**	**Latitude**	**Longitude**	**Comments**	**Images**	
Splash Camera						Video is not as clear as GoPro. Hard to identify GG		
V0116_24	0:32	62	Y	41 29.824	71 20.666	rope	V0116_24_02.30	
	8:11	66	Y?	41 29.821	71 20.698	trap	V0116_24_08.11	
V0116_34	0:32	83	Y?	41 29.758	71 20.743	steel rod	V0116_34_00.32	
GoPro Camera								
GH01	5:09	68	Y	41 29.795	71 20.758	old trap	GH01_05.09	
GH02	3:06	69	Y	41 29.824	71 20.684	rope	GH02_03.06	
GH03	5:32	71	Y	41 29.859	71 20.619	TRAPS (Great Images)	GHO3_05.32	
	5:34					Series of images of same traps	GHO3_05.34	
	5:36					"	GHO3_05.36	
	5:37					"	GHO3_05.37	
	5:38					"	GHO3_05.38	
	5:40					"	GHO3_05.40	
	5:42					"	GHO3_05.42	
	5:43					"	GHO3_05.43	
	5:46					"	GHO3_05.46	
	5:48					"	GHO3_05.48	
	5:49	71	Y	41 29.859	71.20.619	Series of images of same traps	GHO3_05.49	
GH04	0:34	74	Y?	41 29.866	71 20.611	old trap	GH04_00.34	
	6:14	76	Y	41 29 763	71 20.911	2 ropes leading to trap	GH04_06.14	
	6:20	77	Y	41 29 763	71 20.911	Trap image from ropes	GH04_06.20	
	7:05	78	Y	41 29 762	71 20.916	Trap in RHC of image (hard to see)	GH04_07.05	
	10:36	80	Y	41 29.758	71 20.930	Algae covered trap hanging from rope caught on camera	GH04_10.36	location original hook up
	10:43		Y			Image of trap (can't see well) dropped back down as trying to get camera free	GH04_10:43	
	11:42		Y			Another picture of trap hanging as tried to get camera free	GH04_11.42	
Went to previous survey site			Y			No Image but same old rope and ghost gear trap location***		
		85	Y	41 32.480	71 20.724	June Survey Location; 41 32.482 ; 71 20.724		

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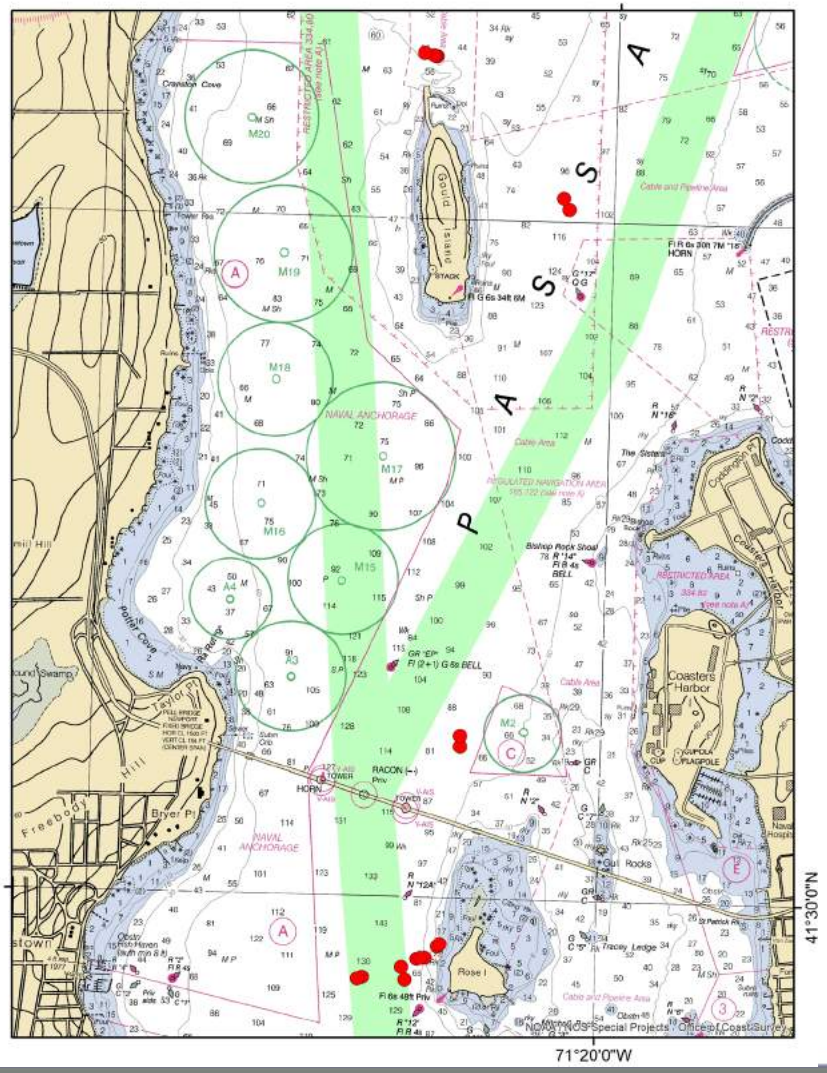
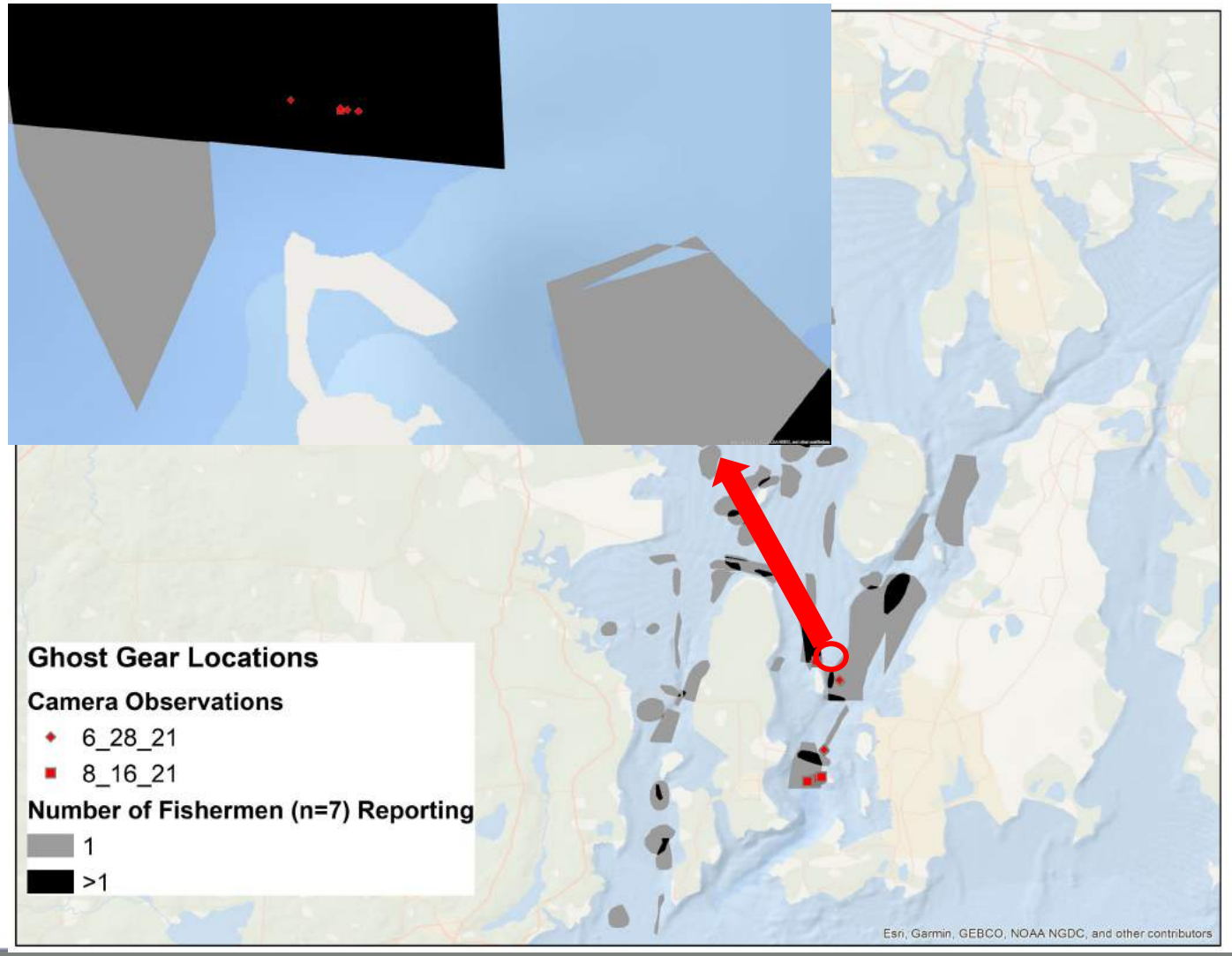
Camera trials

Fishermen's knowledge effective at targeting ghost gear locations





Gulf of Maine, Casco Bay Survey on FV Nomad

Testing underwater cameras to verify sonar findings

Next steps

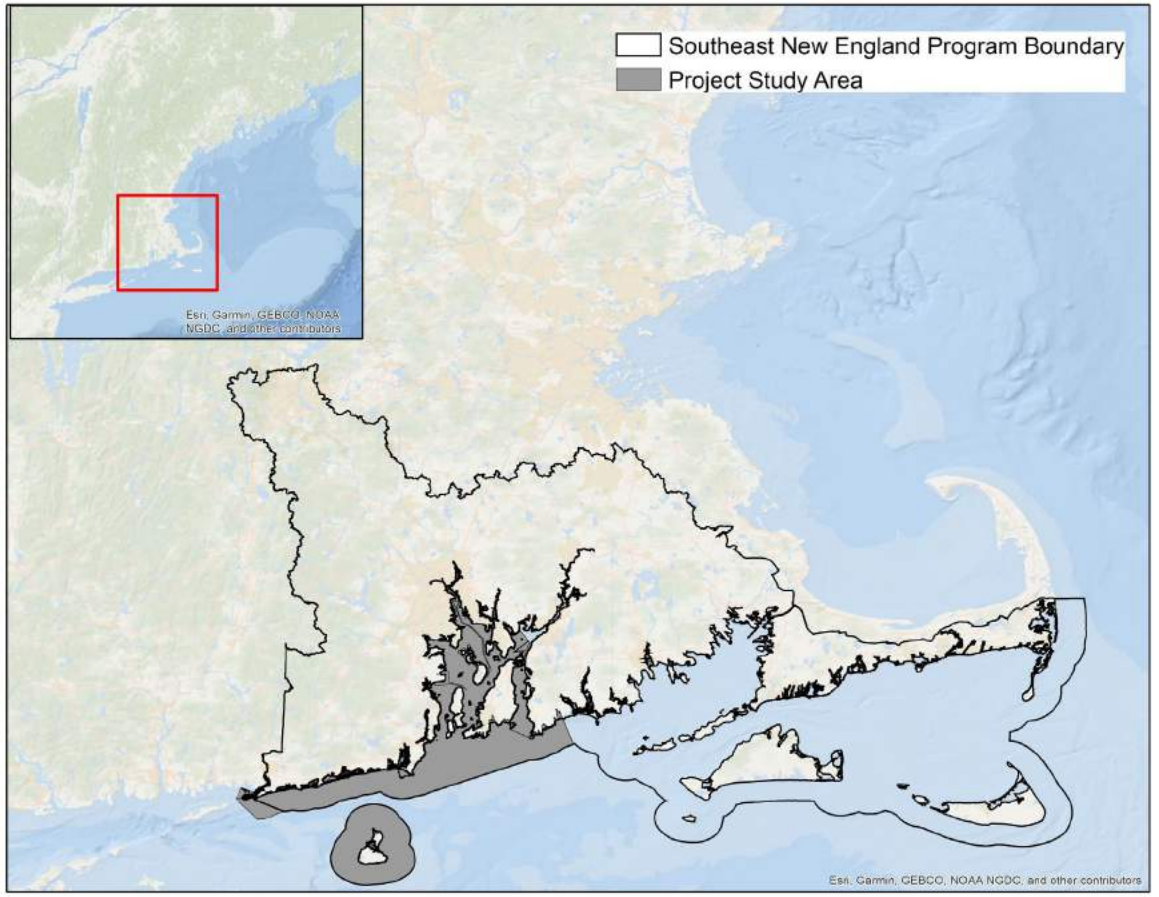
- **Room for improvement for camera**
  - Winter
  - Improve light, view area
  - Cannot control movement (drift over area)
  - Problems in muddy, silty bottom
  - ROV but increases costs
  - Efficient? (promising tool but needs refinement)

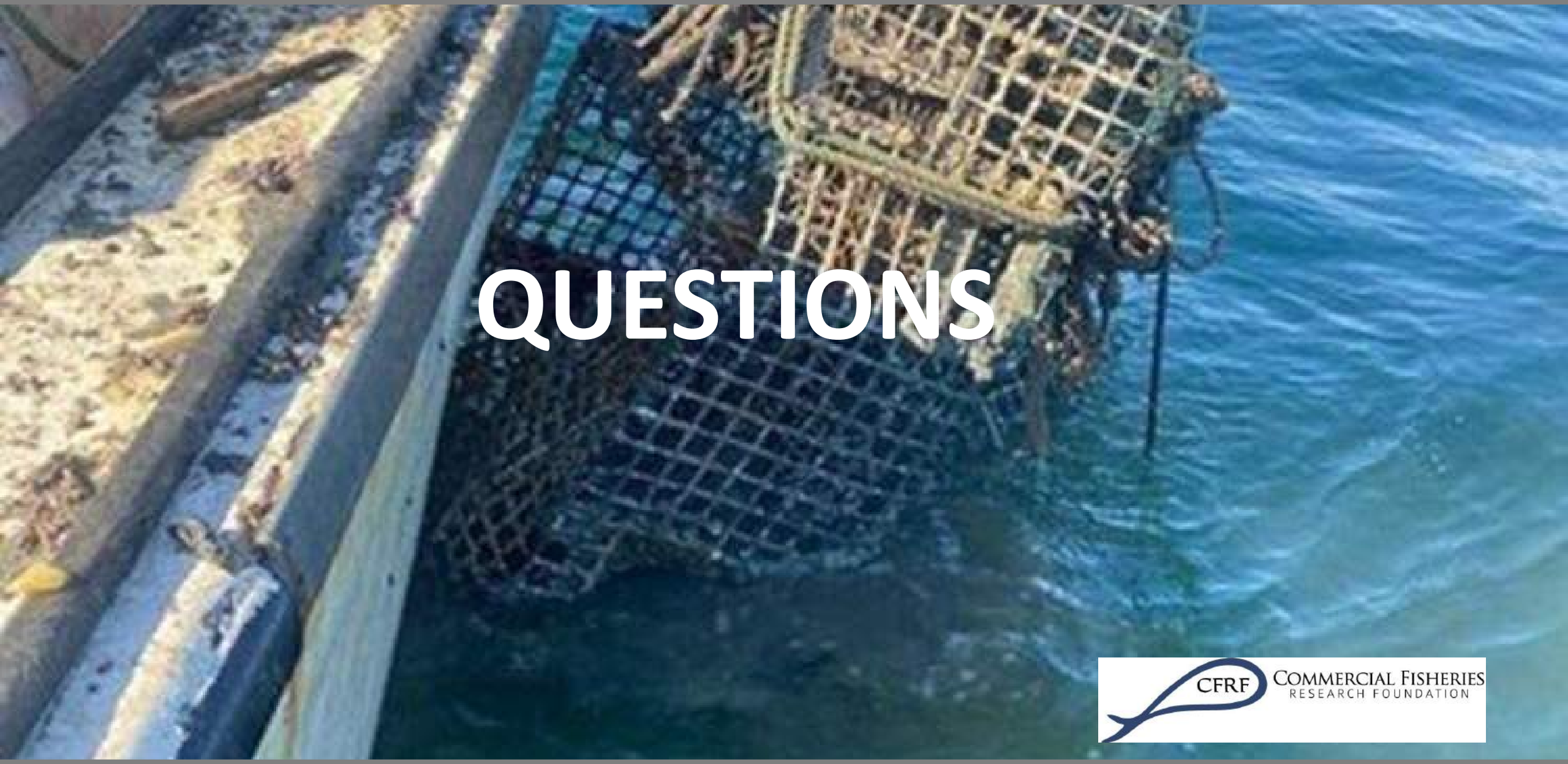
- **Removal Plan for Rhode Island**
  - Southeast New England Program

SNEP
Southeast New England Program

  - Planning workshop with stakeholders and experts August 16th.
    - Includes program to report lost gear
    - Outreach to reduce future ghost gear

- Start getting it out !
  - With fishermen




QUESTIONS
CFRF
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Gulf of Maine, Casco Bay Summary by Sarah Ring

On June 28, 2022 three members of the Commercial Fisheries Research Foundation, Susan Inglis, David Bethoney, and Sarah Ring, traveled to Portland, Maine for field research and equipment testing in Casco Bay. CFRF is interested in starting a project similar to what Erin Pelletier has set up through the Gulf of Maine Lobstermen Foundation. Erin connected us with one of the local fishermen and we spent the next two days on the fishing vessel Nomad as we looked for ghost gear inside of and just beyond the harbor.

Jim, captain of the Nomad, is an experienced fisherman and considered a local expert on the topography of Casco Bay. He created a system in which he uses a form of sonar to see the sea floor, and then marks on digital charts using different symbology where he suspects there to be piles of ghost gear. When the fishermen in the area find abandoned gear, they will drag it into larger designated piles. Jim took us to these areas so we could test our equipment and confirm his suspicions.

Our equipment was a system of two technologies combined. David had rigged a GoPro camera inside of a waterproof casing with 150ft of chord to a portable monitor, which could be plugged into the power system of the boat. We were able to drop the camera into the water and see on the screen, with a few seconds of lag, what the GoPro was recording. This system worked better than just the underwater camera and monitor, as the GoPro was able to capture higher quality video. With a little practice and careful maneuvering by Jim, we were able to control the camera fairly well using just the chord it was attached to.

Our first attempts in the harbor were difficult; the silty mud bottom was easily disturbed and created clouds of particulate matter in the water column. We didn't find much evidence of ghost gear, but we did see a flounder which was neat. Knowing of ghost gear in areas farther away from the docks, Jim drove us out by Fort Gorges. Here, the water was less consistently disturbed and cooler, allowing the water column to stay clear. From here on, there were many times where we dropped the camera overboard and were able to verify ghost gear. Some marks on Jim's map turned out to be a singular abandoned lobster trap, while others were anywhere between 10 and 20 traps entangled with rope, netting, and other gear.

The videographer for our trip, Rich, had also brought an underwater drone. This device was controlled by a wireless hand console, very similar to a play station controller with a screen in the middle, and a cable. The drone was able to move vertically and horizontally with propellors on either side of it. While the drone fun to use, it was very difficult to control its movements. It was quite buoyant and would float to the surface if not being regularly directed downwards. It often went beyond the range of the controller and had to be pulled back in by the cable it was attached to. Eventually a rock became wedged in one of the propellors, making it impossible to maneuver. For future field work, a design for the GoPro casing including a similar steering mechanism would be the ideal solution to the difficulties we experienced.

On the second day of our research Rich came prepared to dive. We went significantly farther outside the harbor this time, the farthest point being close to Richmond Island. Many places had confirmed ghost gear, while others proved to be large masses of seaweed, or what appeared to be accumulations of ballast from a shipwreck. Once we had located what Jim thought to be one of the largest areas of ghost gear, Rich dove into the water and located our camera. He guided it along the entanglement showing an uncountable number of traps, nets, floats, rope and more. Rich was able

to show us nearly the full extent of pile, which wouldn't' have been possible without someone to guide the camera. Over the two days we spent filming in Casco Bay, there were 32 confirmed ghost gear sights.

Overall, the field work in Casco Bay was successful. While the Gulf of Maine Lobstermen Foundation has clearly made an impact on the amount of derelict gear, we were still able to identify at least three areas of significant accumulation. With the decision to try and move away from active divers, the GoPro camera set up worked well and can be used as a reliable method of confirming ghost gear accumulation.

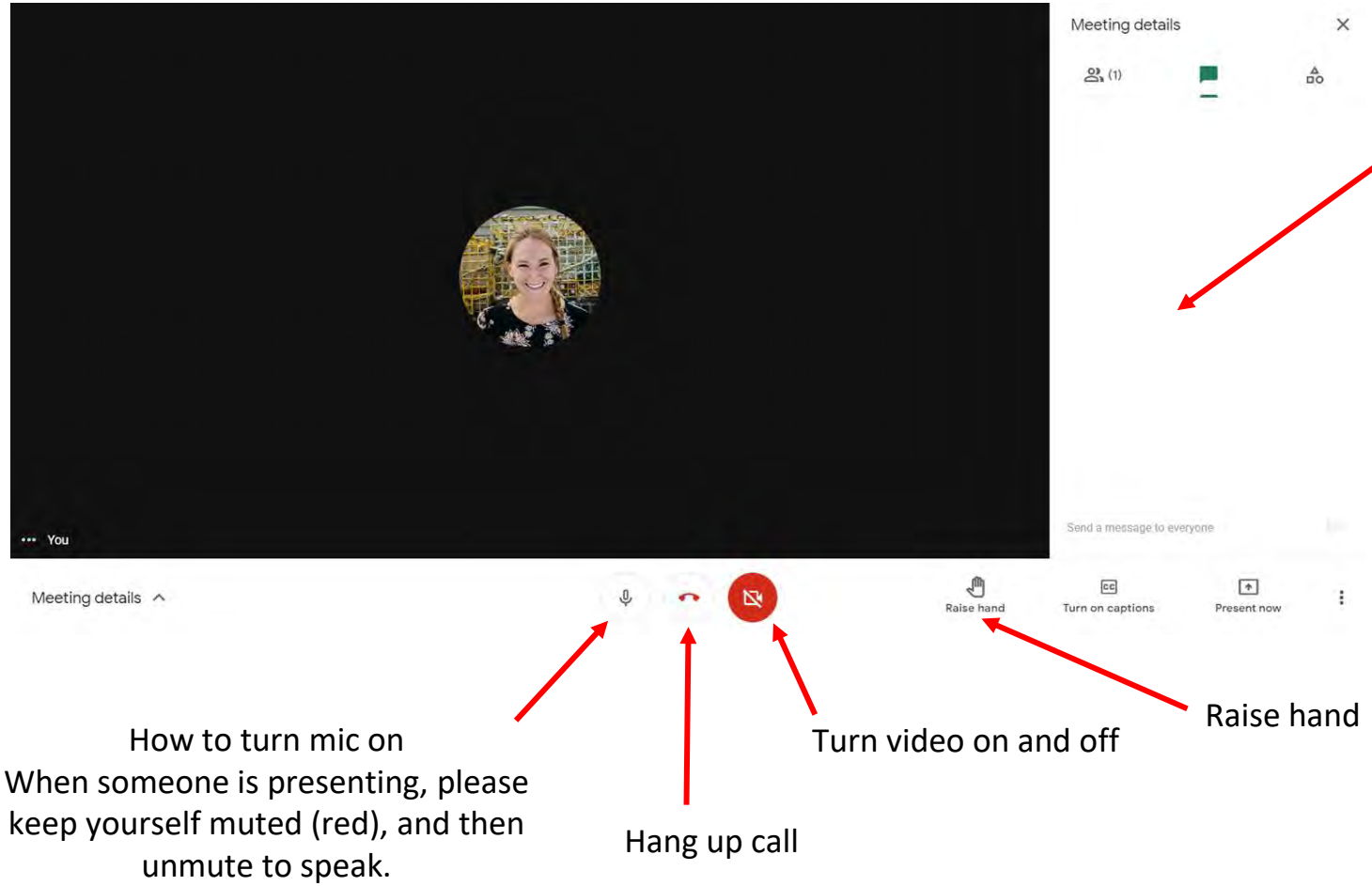
Rhode Island Ghost Gear Removal Planning Workshop

August 16, 2022

Point Judith, RI

CFRF Commercial Fisheries Research Foundation

Housekeeping for Google Meets



- You can enter questions in chat box. This will be seen by everyone

Agenda

- Introductions
- Workshop Objective
- Introduction of Problem in Rhode Island
- Removing Ghost Gear
- Break 3:30-3:45
- Program Sustainability
- Advisory Group
- Closing Remarks

Workshop Objective

The removal plan will be developed with the with the input and support of commercial fishermen, other ghost gear removal programs, local stakeholder groups, educational institutions, and state agencies.

The purpose of this workshop is to review and receive recommendations on key components of the removal plan.

Gain insight from your knowledge, experience and lessons learned

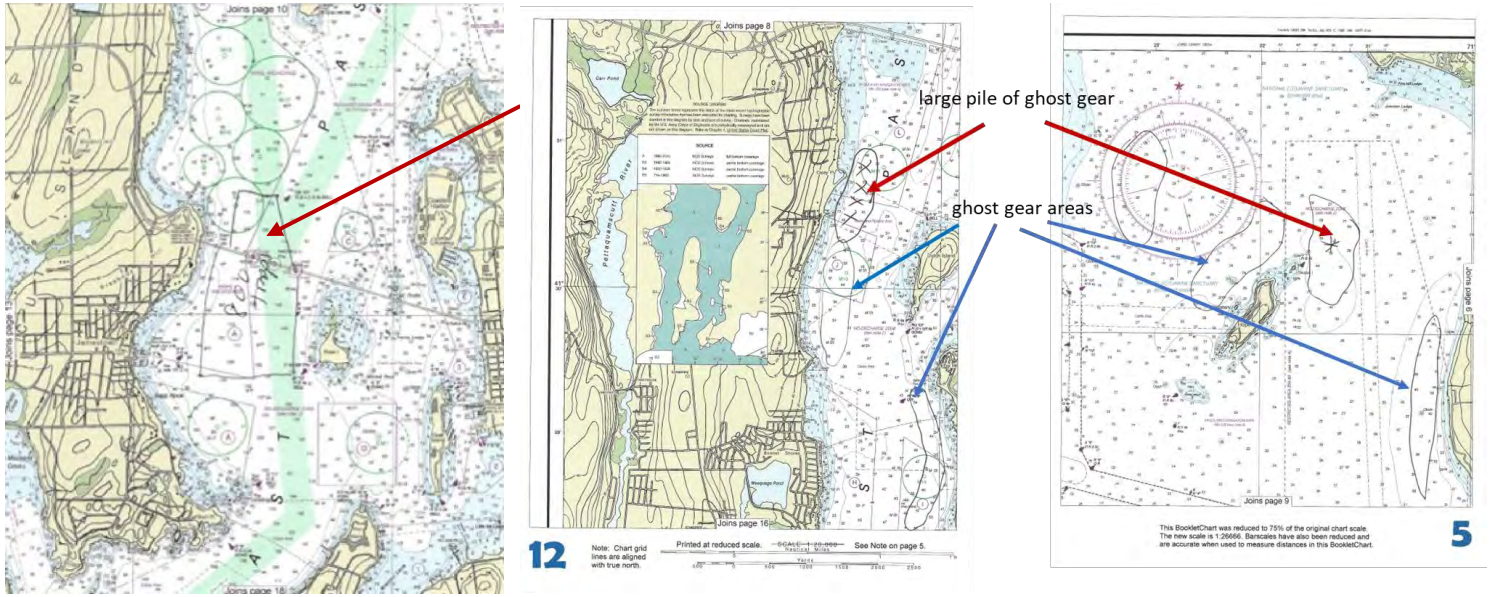
Results will be incorporated into the draft planning document for final review by the Program Advisory Group

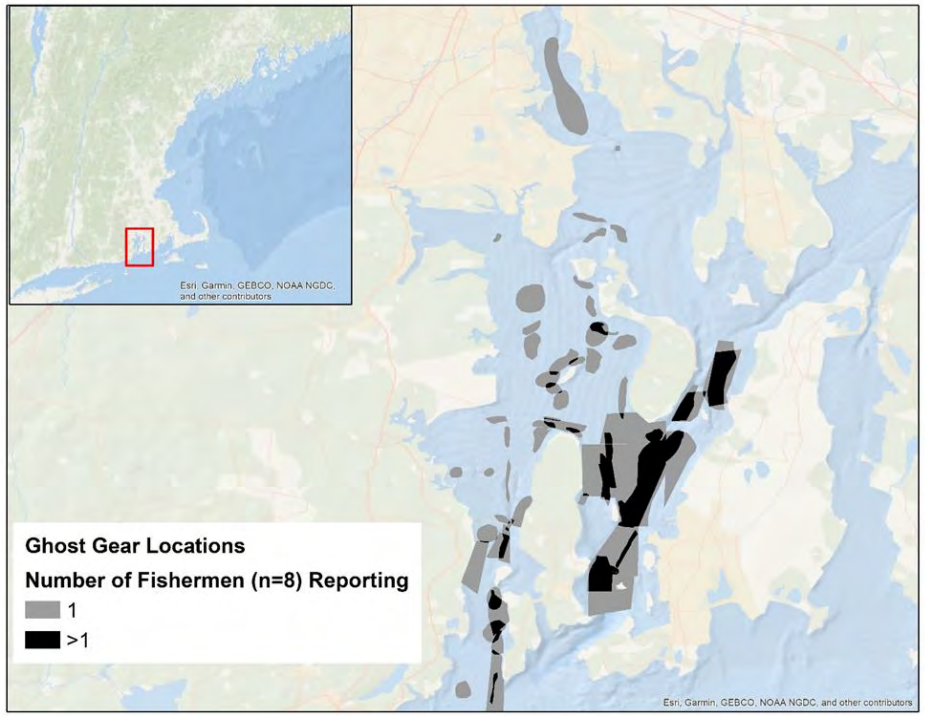
Introduction of problem in Rhode Island

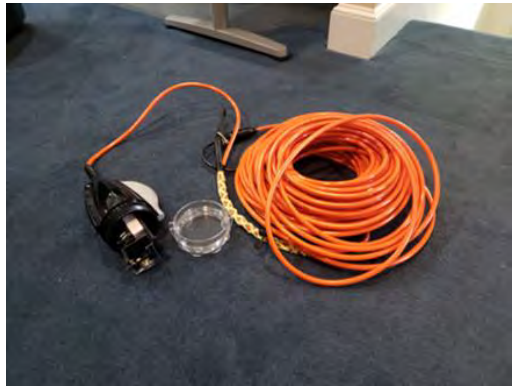
Fishermen contact us about ghost gear in Narragansett Bay

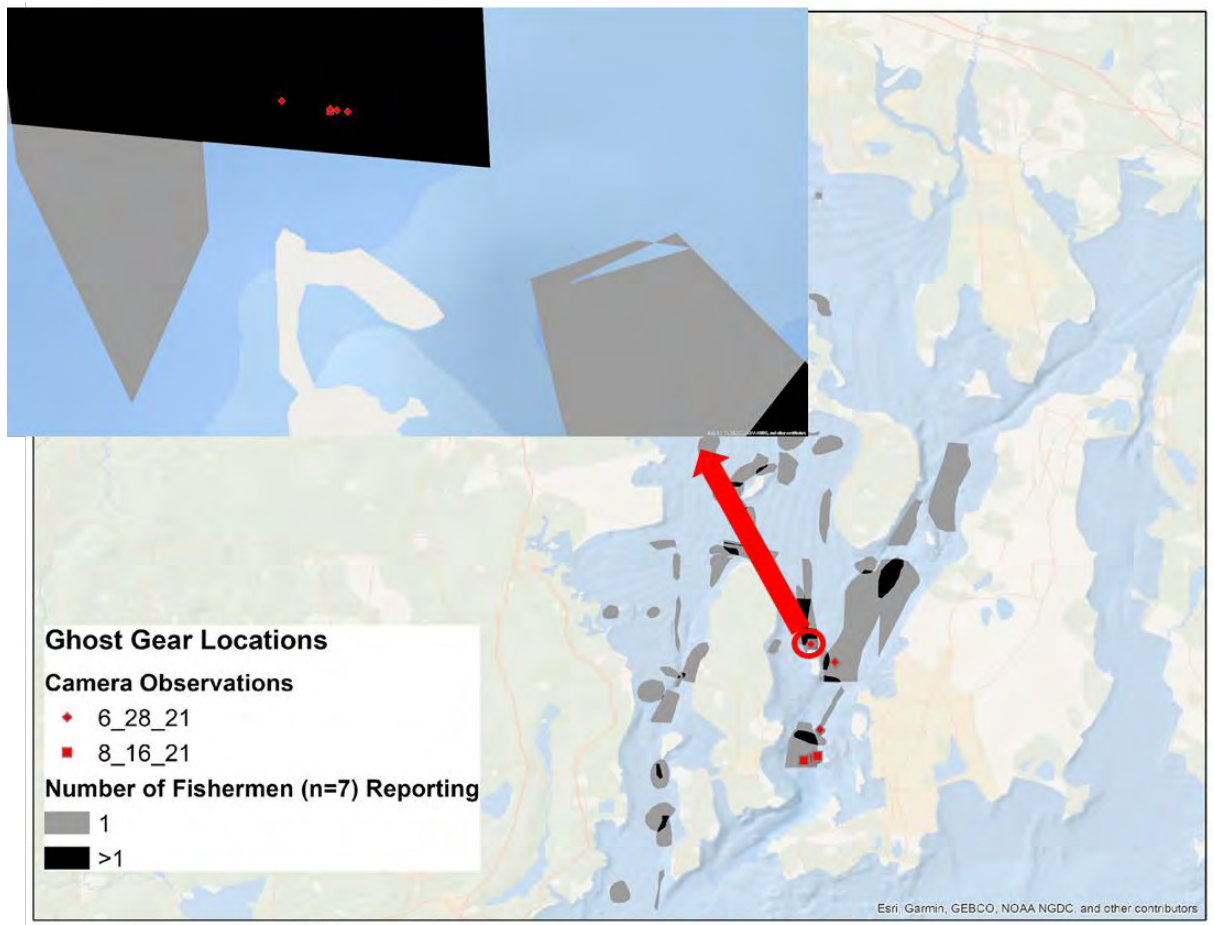
Mapping Hotspots And Testing Video Technology For Ghost Gear Removal In Narragansett Bay

11th Hour Racing Grant







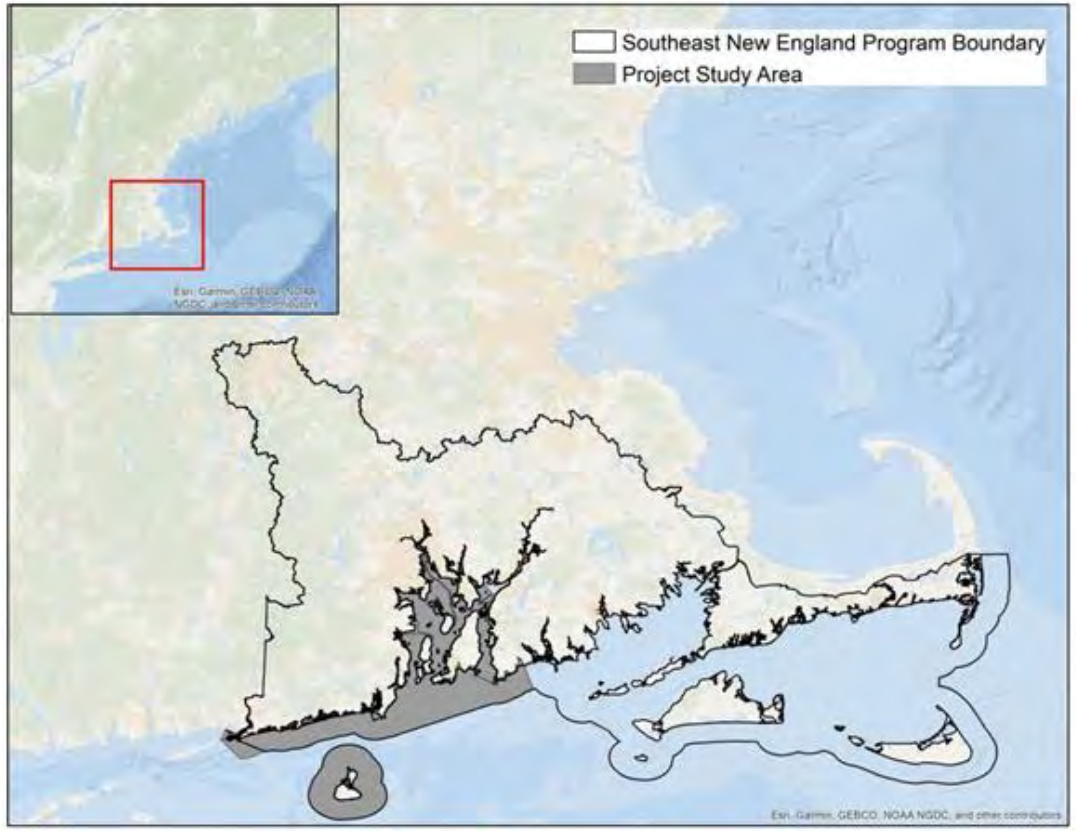


2 trips during slack tide

- Can find ropes and traps
- Return to lat, long: found gear
- Grapple over lat, longs?

Planning a Ghost Gear Removal Program for Rhode Island

Southeast New England Program 2021 Watershed Grant



Initial removal efforts will focus on Narragansett Bay where CFRF has identified multiple target areas.

Removing Ghost Gear

a) Identifying gear for removal

- ❑ Prioritizing removal
  - large piles
  - gillnet gear

- System set up for fishermen to report lost gear /found ghost gear

- Fishermen's knowledge to supply initial map (nets)
- RI DEM map of know ghost gear locations
- Side sonar, underwater camera to refine area
- Divers

b) Permits

- Permit requirements

- DMF, DEM signature letter of authority
  2 branches-DEM regulations, enforcement police
- NOAA permission for federal waters
- RI Newport Naval Base: Gould Island

- Communication with enforcement

- Enforcement protocols for handling collected debris
- Collection of tagged gear for return to owner

c) Training

- At sea training
  - At sea training using on board grapples or specialized equipment
  - Video training to use for future training
  - Net ghost gear?

- Removal equipment
  - Specialized grapples?

d) Removal procedure

Special fleet for ghost gear removal?

1. Documentation
2. Safety requirements
    - Check Coast Guard requirements
    - Activity classification
3. Notification of removal activities
    - Send out an industry poll for recommendation on when and where to start removal activities
    - Press release (1 month before collection to inform industry where we will be working)
    - Notification to fishermen's organizations (e.g., Commercial Fisheries Center of Rhode Island (1 month before collection to inform industry where we will be working)
    - Mariner's brief sent out week prior to any removal activities

4. Removal procedures

- ❑ Timing:
  - Meet with commercial fishermen to determine timing and area for removal activities
  - Proposing January-February
- ❑ Order tags for found gear with successive numbers.
  Used to tag all retrieved gear, for density and location of all retrieved gear
- ❑ Recovery program for tagged gear
- ❑ Procedures and equipment for removing large balls of ghost gear

5. Data collection

- ❑ As part of the ghost gear removal protocol, we will collect data on the fishing gear retrieved for submission to the Global Ghost Gear Initiative (GGGI) lost fishing gear database as well as other local ghost gear removal databases.
- ❑ Results from the ghost gear retrieval cruises (number and types of gear) will be posted on the CFRF website project page, including an interactive map where the gear was removed from.

GGGI Data Card

LOCATION & ENVIRONMENT

Record number	Date	Time	Lattitude	Longitude	Country	Name of location	Environment	Depth (m)
1	6.28.2021	10:08	41.507467	-71.3425	USA	Narragansett Bay, RI	Marine	27

GEAR ATTRIBUTES - BASIC

Fishing Gear Present?	Gear Class [Net, Pot, Line, FAD etc.]	Gear type [e.g. "Gill net"]	Mass of gear
Y	Rope		

IF POT/TRAP - CHARACTERISTICS

Pot or Trap primary material	Pot or Trap diametre / width
	See Comments

IF FAD - CHARACTERISTICS

Commercial / Artisinal FAD	FAD Identifier

WILDLIFE ENTANGLEMENT - DETAILS

Organisms present?	Dead or alive?	Species known?	Specify	Total count of fish	Total count of mammels	Total count of Invertebrates	Total count of birds	Total count crustaceans

GOMLF/DMR Ghost Gear Retrieval Logbook

Port ______________ Date: __________

Fisher:

Tow #	Start of tow area (if no gear recovered)		Tow Time	Depth (fa)	Tag #	Tag Year	Trap Count	BioVents Open?	Live or Dead?	Species	LOBSTER IN TRAP?					Comments
	Latitude	Longitude									Sex	short	legal	over	Vnotch	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
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								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	

Ghost Gear At-Sea Retrieval Log

Date: **Encounter #:** _____

GPS: ° N ° W Depth: fa Tow Time: min

Where? (Local Name): _____ **Bottom Type:**

Found: Mud Sand

Total # of Traps: Rope Type: Other Debris: Gravel Boulder

Cobble Bedrock

Comments: _____

Trap Information:					**Biological Info:**	**Lobster**				
					Closed with?	Short	Legal	Over	Crab	Fish (species?)
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						

No Tag?: **or** Crushed?:

COMMENTS: _____

Encounter #: _____ GPS: ° N ° W Depth: fa Tow Time: min

Where? (Local Name): _____ **Bottom Type:**

Found: Mud Sand

Total # of Traps: Rope Type: Other Debris: Gravel Boulder

Cobble Bedrock

Comments: _____

Trap Information:					**Biological Info:**	**Lobster**				
					Closed with?	Short	Legal	Over	Crab	Fish (species?)
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						
Tag #:		Tag Year:		BioVent Open?: Y / N						

No Tag?: **or** Crushed?:

COMMENTS:

Previous data collection form

Ghost Gear At-Sea Retrieval Log Page ___ of ___

___/___/2021 Vessel: _____ Captain: _____ Recorder: _____ Start Time / End time

Encounter #: _____ GPS: ____°____N ____°____W

Where? (Local Name): _____

Found: **Scope:** _____ Depth: _____ fm / ft (circle units)

Total # of Traps: Rope Type: _____ Other Debris: _____ **Bottom Type:**

Mud Sand Gravel Boulder Cobble Bedrock

Comments: _____

Trap Information:

	Crushed? Y / N	Tag #	Year	BioVent Open? Y / N	Closed with?	*Photo Info Number** *Top*	*Side*	*Side 2*	Trap comments (anoxic, type of biofouling etc)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Biological Info:

	Lobster Short	Legal	Over	Crab	Fish (species?)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

COMMENTS:

*Please take photo of top, one short side, and one long side of each trap, including biovent if possible; include ruler or other scale reference in frame, record frame #/time

New data collection form

6. Cost

- ❑ Compensation for commercial fishermen.
  - What amount expected?
- ❑ Staff/DEM time for removal (permit holders)
- ❑ Equipment purchases
  - (nets vs traps/pots)
  - Initial
  - Maintenance
- ❑ Special insurance needed for removal?
- ❑ Cranes/vessels to transport large, heavy balls of ghost gear

Other Costs?

e) Recycling and disposal

- Sorting
  - At-dock sorting of traps in good shape, junk traps, rope and “junk”, plastics vs metals
  - Any gear with tags needs to be set aside and owner of gear contacted to see if they want it back
  - Need to get help with the sorting-volunteers, students?
  - Dept of Public Works: letter of support
- Recycling and Disposal methods
  - Material for artists or schools?
  - Traps to Treasure-Ocean wide project
  - Recycling companies

BIN LOCATIONS?

  - Schnitzer Northeast: steel for scrap metal
  - COVANTA

- Fishing Gear Recovery Program
  - For tagged retrieved gear

- Cost
  - What is the procedure for getting bins in place and is there a cost for the bin ?
  - Procedure to collect gear for fishing gear recycling companies
  - Cost for taking away bin/fishing gear?
  - How often is it collected? Do we need to call when it is full?
  - Amount of staff time for sorting

➢ **We are suggesting providing compensation stipends to commercial fishermen to help us manage the disposal bins.**

Other Costs?

Program Sustainability

a) Funding

- ❑ Grants
- ❑ Selling (auction) unclaimed gear?
- ❑ Producer Responsibility – cost added to sales for proper disposal

  For example: $1.00 added to gear sales to be donated.

b) Reducing future ghost gear

- ❑ How to reduce lost gear?
  - Gear technology
  - Outreach
  - System set up for fishermen to report lost gear /found ghost gear
- ❑ GGGI fishing gear best management practices
  - This document includes a risk analysis of different fishing gear and recommends options for preventing, mitigating, and remediating ghost gear
  - Advisory Group will review to determine best options for Rhode Island

c) Steps for implementation

1. Procure/establish funding for program component costs
2. Request permits for ghost gear removal activities
3. Establish training program
4. Assign retrieval contracts
5. At sea training for fishermen
6. Establish recycle and disposal facilities and staff for sorting
7. Removal activities
   - Begin with a pilot removal project to test the logistics of our plan
   - *Narragansett Bay where we have already located target areas*
   - Evaluation of retrieval by participating commercial fishermen
8. Recycle and Disposal
9. Disseminate the data
10. Public Outreach
11. Program Evaluation

d) Program evaluation

- The main components of this program that we will be evaluating are:

1. the fishermen's at-sea training program
   Survey fishermen following training (CFCRI)

2. the protocol for removing ghost gear
   Assessing the success at retrieving gear, with the safety, time and effort for retrieval

3. the methods for recycling/disposal of collected gear
   The amount of ghost gear removed and how successfully it was disposed of
   How easy it is for fishermen to dispose of collected ghost gear

4. the sustainability of the program
   Cost analysis

Advisory Group

Small group (6)

- Includes stakeholders
- Will review and edit the final planning document
- Help implement, evaluate and recommend changes to improve the program
- Assist in helping us find funding to sustain the program

Closing Remarks

Tor Vincent coastaldebrisgrappling

When a site is selected it should be defined as a rectangle, if possible, parallel to Lat/Long grid helps. The best would be to have the active gear removed using closed seasons or temporary area closures. The fishing community should be well informed in advance and agree on the closed area. Grapple equipment should be custom sized for the participating vessels. Depending on the vessel, lanes should be plotted to develop a complete coverage plan. There are some formulas but no need to get specific here. Tags such as the annual license tags for lobster traps should be ordered with successive numbers. As each vessel makes a tow in their lane the tags should be put on the gear recovered and logged from that tow. Some method, hopefully a website, should hold this data for the property owners. This will provide both a density study and give the owners the location that their lost property came from. Many problems we have seen in the past will be fixed by this sort of accounting. At the dock the tags will be helpful to define the recovery project property from any other traps that may be laying around. The clarity will be a huge benefit to all that are interested in the success of the project.

TRAPS AND POTS

Susceptibility to loss: Like gillnets, the loss of traps and pots is often linked to conflict with towed gears, as well as with other inshore water vessels and even large aquatic mammals. They are also particularly susceptible to theft and accidental loss through storms and other events. The increased use of GPS and other navigational devices, even by smaller vessels, has reduced the incidence of accidental trap loss. Longer pot strings may be easier to recover, while individual pots may be less so.

Impact of ALDFG: Pots and traps also tend to pass through a progressive process of ghost fishing. As they are usually baited when they are set, if the pot is lost, over time the bait or lost catch attracts scavengers. These scavengers may become entrapped and subsequently die, forming new bait for other scavengers. Entrapped animals may escape over time. Animals captured in abandoned, lost or discarded traps die from starvation, cannibalism, infection, disease, or prolonged exposure to poor water quality (i.e., low dissolved oxygen). A key point is that catching efficiency depends on gear design, species behavior and seasonality. A second key risk of this gear is entanglement of large aquatic mammals with connecting ropes and lines, which can occur both when the gear is under control or is abandoned, lost or discarded.

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Ghost Gear Removal Program for Rhode Island

Dr. Susan Inglis

Dr. N. David Bethoney

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Executive Summary

Ghost gear impacts in coastal waters are acknowledged as a serious problem and ghost gear removal projects have been initiated worldwide. Rhode Island has an active commercial and recreational fishery that includes lobster, quahog, whelk, scup, tautog, and black sea bass. It has historically supported a very active lobster fishery. Fishermen report thousands of abandoned traps and piles of ghost gear near Rhode Island fishing ports and coastal waters. The Commercial Fisheries Research Foundation (CFRF) recently mapped ghost gear locations using fishermen's knowledge and underwater video cameras in Narragansett Bay, revealing the extent of the problem. In Narragansett Bay, ghost gear is often caught in trawl nets and discarded at the end of trawl lines, damaging fishing nets and leaving piles of abandoned gear in channels. Other ghost gear hotspots in Rhode Island are located around islands popular to both commercial fishing and recreational boating and diving activities. Retrieving lost fishing gear can be time consuming and hazardous. With a proper plan, training and a system in place to retrieve and recycle or dispose of unwanted ghost gear, commercial fishermen and other stakeholders can be at the front line of reducing the problem. This document outlines how to implement a ghost gear removal program in Rhode Island waters. It was developed with input from the CFRF ghost gear program Advisory Group, which is comprised of local and international ghost gear removal experts, commercial fishermen representation, and state resource and port managers. The document also includes recommendations from a Stakeholders Workshop that was held in August, 2022 in Point Judith, RI to review the draft planning document. This workshop included participation from commercial fishermen, local and international ghost gear removal programs, local stakeholder groups, fishing gear recycling companies, educational institutions, and state agencies. The document is formatted into summary sections of the different program components to consider, and recommendations for implementation. This is a "living document", that will be modified and adjusted as the plan is implemented for ghost gear removal activities in coastal Rhode Island waters.

Introduction

Ghost gear is a major environmental problem causing negative impacts in several different ways. Annually, over 640,000 metric tons of gear are lost or discarded globally. It is estimated that somewhere between 5 and 30% of fish stocks are impacted by ghost fishing gear around the world (https://www.ghostgear.org). Severely endangered and protected marine species can become entangled in the gear, especially gill nets, further damaging their chance of recovery. More recent fishing gear is made of synthetic materials and can be a large contributor of plastic waste in the ocean. As ghost gear breaks down into microplastics, it can bioaccumulate and move up through the food chain, further disrupting the health and lifecycles of marine species. For fishermen, it entangles their active gear, causing damage and loss of their equipment.

Rhode Island has an active commercial and recreational fishery that includes lobster, quahog, whelk, scup, tautog, and black sea bass. In particular, it has historically supported a very active lobster fishery. However, since the 1990's, Narragansett Bay has seen a dramatic decrease in benthic species, specifically lobster Compounding the effects of population decline, the North Cape oil spill created a disruption in the fishery. The pollution from the oil caused an outbreak of lobster shell disease, which negatively impacted the market. Rhode Island fishermen had to shift to working in Rhode Island Sound, where the waters are much rougher and experience more aggressive storms. Gear from the fishermen can easily become entangle in the nooks and crannies of the sound. Lost gear causes financial loss for the fishermen, while also creating more ghost gear.

Fishers report thousands of abandoned traps and piles of ghost gear near Rhode Island fishing ports and coastal waters. CFRF recently mapped ghost gear locations using fishermen's knowledge and underwater video cameras in Narragansett Bay, revealing the extent of the problem. In Narragansett Bay, ghost gear is often caught in trawl nets and discarded at the end of trawl lines, damaging fishing nets and leaving piles of abandoned gear in channels. Other ghost gear hotspots in Rhode Island are located around islands popular to both commercial fishing and recreational boating and diving activities.

Engaging fishers in the process of removing ghost gear has been used successfully in several ghost gear removal projects. Fishermen comment that they are unable to effectively remove and dispose of ghost gear they encounter. Retrieving lost fishing gear can be time consuming and hazardous, but with training and a system in place to retrieve and recycle or dispose of unwanted ghost gear, commercial fishermen can be at the front line of reducing the problem. This regional ghost gear removal planning document describes how to finance, locate, remove, recycle and dispose of ghost gear in Rhode Island the steps for implementation. The removal plan is developed with the with the input and support of commercial fishermen, other ghost gear removal programs, local stakeholder groups, educational institutions, and state agencies.

Removal Area

This program will remove ghost gear from the coastal state waters of Rhode Island. This area includes Narragansett Bay, and coastal waters from between approximately 41.25, -71.86 and 41.44, -71.10 51.46 shoreward and surrounding Block Island (Figure 1). Initial removal efforts will focus on Narragansett Bay where CFRF has identified multiple target areas.

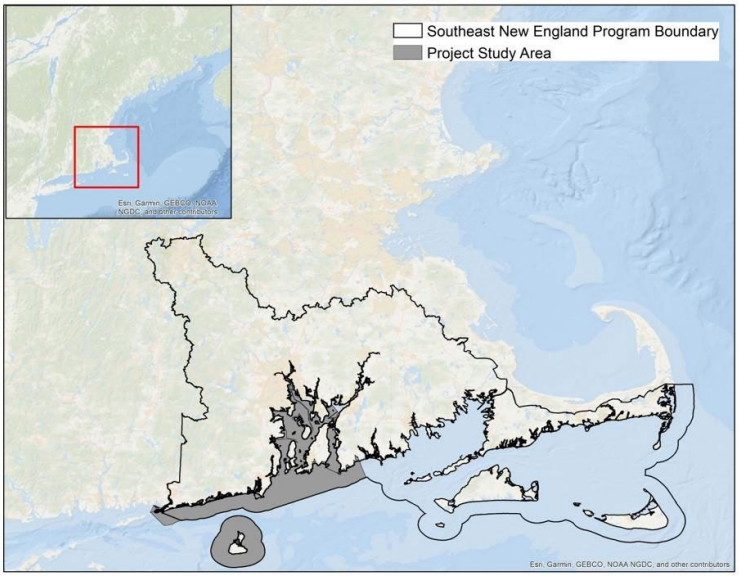

Figure 1. Planning area for ghost gear removal activities for Rhode Island.

Part I

Identifying Ghost Gear for Removal

Ghost gear in Rhode Island is mainly comprised of fish pots, lobster traps, gillnets, and trawl nets. While the problem exists across many gear types, traps and pots and their associated lines and buoys are often found in coastal waters and left to soak unattended. They are therefore very susceptible to damage and loss due to marine traffic, and tidal and storm events. This gear targets crustaceans and benthic fish. Once lost or abandoned they may indiscriminately continue to catch and kill both targeted and non-target species (bycatch) for a period of time and the negative ecological effects, as they accumulate on the seafloor, are well documented. In Narragansett Bay, ghost gear is often caught in trawl nets and discarded at the end of trawl lines, damaging fishing nets and leaving piles of abandoned gear in channels. The removal activities will initially be focused in Narragansett Bay before moving offshore is subsequent years.

There are several methods deployed to find ghost gear targets for removal that include using fishermen's knowledge and side scan sonar to determine general areas, as well as scuba diving and underwater video for verification and refinement. This program will focus on the initial use of fishermen's knowledge, followed by side scan sonar data. Underwater video will primarily be used to verify the target type and size so logistical considerations can be made for the removal of large piles of gear. We will plan to use scuba diving only when underwater video cannot provide the information needed to safely retrieve large piles of gear.

CFRF recently mapped ghost gear locations using fishermen's knowledge and underwater video cameras in Narragansett Bay (www.cfrfoundation.org) (Figure 2). Ghost gear target areas were verified using undertaker water cameras and recording the latitude and longitude. We will use this map to initially target areas for removal. The Rhode Island Department of Environmental Management (RIDEM) will also provide a map of ghost gear locations from their regular surveys of coastal waters once we have completed removal of these target areas.

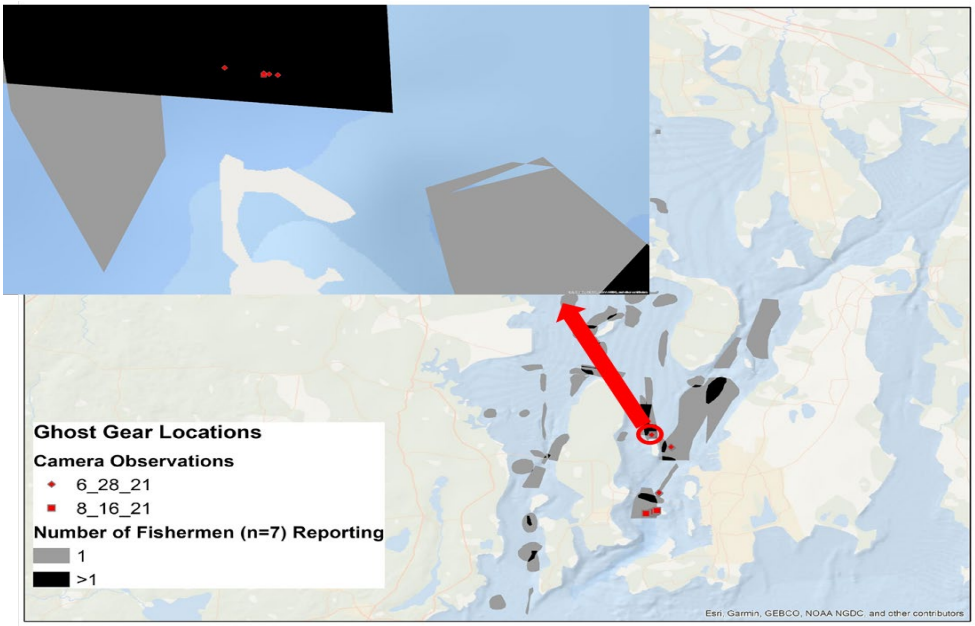

Figure 2. Ghost gear target map for Narragansett Bay using fishermen's knowledge and underwater video technology for verifying and refining the location.

For future offshore removal targets, we will use a combination of fishermen's knowledge and side scan sonar data from RI DEM, University of Rhode Island, and Windfarm construction. Windfarm companies have discussed providing our ghost gear removal program with their side scan sonar data for offshore targets.

We do not anticipate a large cost associated with collecting target areas for ghost gear removal. The information will mainly be provided as support for the program. CFRF already has the underwater camera required for target verification but there may be some replacement costs in the future and there will be some cost associated with scuba divers if we do not use volunteers.

Summary:

1. Fishermen's knowledge
    a. CFRF database and hotspot map for Narragansett Bay
    b. RI DEM map of known ghost gear locations

2. Side-scan sonar data
    a. Commercial vessel sonar
    b. URI side sonar
    c. Environmental Branch of the Naval Undersea Warfare Center Division of Newport
    d. Windfarm cable and construction side scan sonar data

3. Underwater camera verification
    a. Only use scuba divers if necessary

4. Cost
    a. Considered minimal to obtain target areas for removal.
    b. Only potential costs are hiring scuba divers and replacing camera equipment

Permits and Enforcement

It is illegal in Rhode Island state waters to remove any fishing gear that is not your own. Therefore, we will need to apply for a Letter of Authorization (LOA) with the RI DEM marine fisheries branch to conduct fishing gear removal. This LOA will need to accompany the CFRF team on the commercial fishing vessel during removal activities. We will also need to apply for permission on state docks to land and sort retrieved gear and request space for placement of a debris bin. A proposal for space use on docks will need to be sent to the Port Authority DEM office for approval.

As it is illegal to handle other fishermen's gear, all ghost gear must be checked for tags that will provide information on who owns the gear. Any gear with a tag on it will be reported to RI DEM so they can contact the owner and provide them with the opportunity to retrieve the gear prior to disposition.

Summary:

1. Permit requirements (RI state waters)
    a. DMF, DEM signature letter of authority

2. Communication with enforcement
    a. Enforcement protocols for handling collected debris
    b. Collection of tagged gear for return to owner
    c.
3. Cost
    a. There is no cost associated with these regulatory documents

Training

Retrieving ghost gear can be hazardous work. Commercial fishermen have experience using their on-board grapples to retrieve their gear. There are also organizations that develop specialized equipment and retrieval methods for this type of work. For this program we feel that combining new training techniques with experienced commercial fishermen would provide a safe and effective training opportunity for fishermen wanting to learn these techniques. We have identified two at sea training programs for fishermen that would like to be trained using this specialized equipment and technique. Ghost gear is generally removed by fishermen using a single on-board grapple technique (Figure 3). The heavy grapple is sent down using a hauler and then towed on the bottom until it snags gear or lines. Grapple equipment specialized for ghost gear removal is usually made up a series of grapples that are towed on the bottom, increasing the tow area (Figure 4).

Since Narragansett Bay does not have scheduled fishing closures, ghost gear removal activities may take place around active fishing gear. To reduce possible interactions, we will initially use single grapple techniques to remove known targeted areas of ghost gear. Meanwhile, we will train a subset of fishermen to use the specialized equipment and techniques to conduct ghost gear removal offshore, and "clean up" of areas in Narragansett Bay. Any grapple equipment should be customed to the vessel conducting the removal activities. We will video experienced commercial fishermen using their single grapple technique as well as fishermen using the specialized grapples as part of the ghost gear removal training program.

The costs associated with this component of the program will initially be low as fishermen will use their own onboard grapples for removal. We have estimates of approximately $2,000.00/day for at sea training and use of specialized grappling gear and methods.

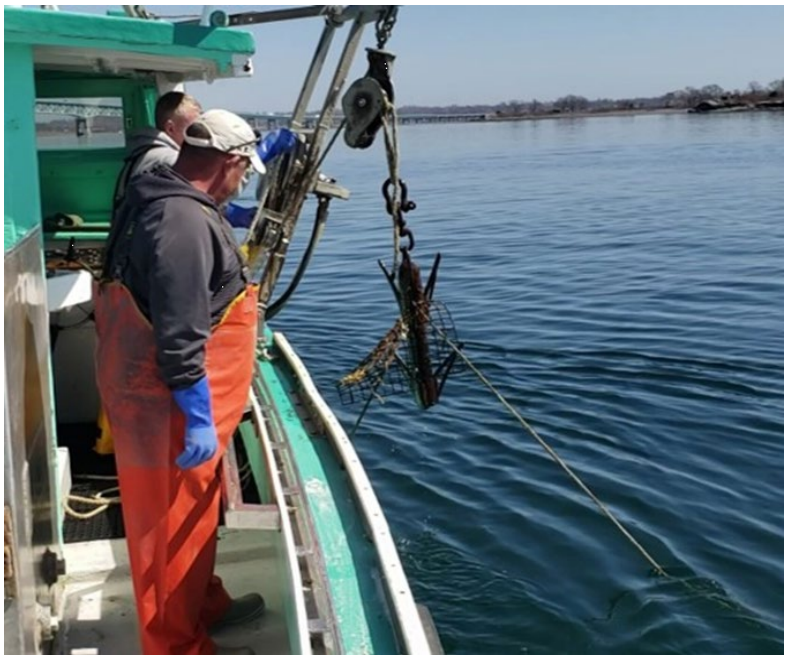

Figure 3. Example of commercial fishing vessel grapple equipment for retrieving lost gear.

Figure 4. Example of specialized grapple equipment for removing ghost traps . Tor Vincent, Coastaldebrisgrappling Inc;

Summary:

1. At sea training

    - Two organizations identified:
        a) Tor Vincent: Long Island Sound; coastaldebrisgrappling
        At sea training using specialized equipment

        b) Video training to use for future training

        c) Cornell Suffolk extension in New York
        Training program.
2. Removal equipment
        a) Specialized grapples and training methods
3. Costs
        b) Approximately $2,000.00/day for at sea training and use of specialized equipment

Removal

CFRF will send out an announcement to the commercial fishing industry for vessels interested in applying to take part in ghost gear removal activities. An example of an application document and the vessel and crew requirements is found in the Appendix 1. CFRF will carry a certificate of liability for this activity.

Since we cannot time the removal activities around fishing closures, we reached out to RI commercial fishermen and were advised that generally the months of January-March are the best time for removal activities. Several weeks prior to removal, we will send out a notice to the fishing community through the RIDEM and/or as a coast guard mariners brief where and when we will be conducting removal activities. As with the removal timing, this is an important step in reducing the likelihood of interacting with active gear.

We will initially focus on single trap or trawl removal from Narragansett Bay. Ghost gear can be made up of single traps and nets, or trap trawls of multiple traps, or a large ghost gear "ball". The occurrence of these balls of gear are often found at the end of trawl lines. When ghost gear gets caught in trawl nets, they are cut out at the end of the tow. Removing large balls of ghost gear requires special logistical procedures, including the use of a barge and crane. Therefore, if a ghost gear target is found to be comprised of a large heavy ball of gear the target will be marked with a buoy for later retrieval.

As described in the previous section, commercial fishermen have a lot of experience retrieving gear using their onboard grapple and hauler. This method will be used when targeting known gear locations. Another method for targeting more generally an area of potential ghost gear, or searching, is to set out a grid pattern defined as a rectangle. As described by Tor Vincent of coastaldebrisgrappling, depending on the vessel, lanes should be plotted to develop a complete coverage plan. Each vessel makes a tow in their lane to cover the grid area and record the ghost gear retrieved from the tow. In this way, you can estimate a density of the ghost gear in that area.

An important part of this program is to collect data on the retrieved gear so that we can learn more about how ghost fishing gear interacts with marine organism and share data with other ghost gear removal databases. The Global Ghost Gear Initiative (GGGI), Gulf of Maine Lobster Foundation Gear Grab Program, and Center for Coastal Studies, Marine Debris and Plastics Program all collect data on retrieved ghost gear. Examples of GOM Gear Grab and Center for Coastal Studies logs can be viewed in the Appendices 2 and 3. The GGGI data portal can be viewed on their website https://www.ghostgear.org. We looked at the data collection logs from these three organizations and made sure to include their metrics in our data collection. Besides the location, depth and substrate where the gear is found, our data metrics include type of gear, materials, whether tags are present, species in gear (alive or dead), the amount and type of biofouling on the gear, and for ghost traps whether biovents are open or closed. These vents are required on lobster traps and attached to the traps with rings that are supposed to disintegrate and render traps ineffective if they are lost. An example of the CFRF ghost gear data collection logs are in Appendix 4. Any retrieved gear that has a tag, will to be set aside and the owner contacted and given the opportunity to retrieve their gear.

As part of our public outreach for this program, results from the ghost gear retrieval cruises (number and types of gear) will be posted on the CFRF website project page, including an interactive map where the gear was removed from.

This component of the program will be the costliest. It will require funds to pay fishermen for their time and expenses at sea for the removal activities. We expect this to run around $2,000-$3,000 per day.

Summary:

1. Removal Contracts

2. Notification of removal activities

    a) Send out an industry poll for recommendation on when and where to start removal activities

    b) Notification to fishermen's organizations (e.g., Commercial Fisheries Center of Rhode Island (1 month before collection to inform industry where we will be working)

    c) RIDEM and Mariner's brief sent out week prior to any removal activities

3. Removal procedures
    a) Identify and mark any large piles of ghost gear for later retrieval
4. Data collection
    a) See CFRF developed data logs in Appendix
5. Cost breakdown
    a) Pay commercial fishermen with an offset for fuel costs and time

Recycling and Disposal

The goal of the program is to recycle as much of the ghost fishing gear collected as possible. This requires the fishing gear to be sorted on land into its different components. All retrieved gear will be landed at the dock and sorted into traps in good shape, junk traps, rope and "junk", plastics vs metals. Any traps that are tagged will be set aside and the owner of the gear contacted. Traps without tags that fishermen consider in good shape will be set aside as part of a fund raising program. The rest of the gear will be broken down into its constituents.

Sorting gear can also be hazardous, as participants will be working with rusty and sharp gear removing ropes and plastics. Any volunteers participating in this activity will be required to sign a waiver. CFRF will carry a certificate of liability for this activity.

We reached out to several different organizations that recycle rope and nets, metal traps, and plastics. We attended the opening of the New Bedford warehouse facility for Net Your Problem where we learned how to sort different ghost gear materials so they could be recycled. Currently our plan is to let artists know when ghost gear is being sorted and allow them to take any rope or nets, they may want. The remainder of the rope and netting will be set aside for delivery to Net Your Problem or Plastics Extruders for recycling (Figure 5).
All remaining metal traps will be crushed and placed in a bin for steel. There are several companies that pay for scrap metal, Mid City Steel and Schnitzer Northeast. Funds from the scrap metal will go towards supporting the program. Any gear that cannot be recycled will be deposed of through the NOAA Fishing for Energy group. Fishing for Energy is a partnership between the NOAA Marine Debris Program, Covanta, the National Fish and Wildlife Foundation (NFWF), and Schnitzer Steel Industries, to prevent and reduce the impacts of derelict fishing gear in the marine environment.

This part of the program will focus on funding opportunities for the program. Scarp metal companies will place bins for a nominal fee (~$250.00) and will retrieve the bin without cost and pay you for the weight of the scrap metal. There is also the potential to re purpose fishing gear in good shape through an anonymous auction process.

Figure 5. Examples of final products from recycled nets (Net Your Problem)

Summary:

1. Sorting
    a) At-dock sorting of traps in good shape, junk traps, rope and "junk", plastics vs metals
    b) Any gear with tags needs to be set aside and owner of gear contacted to see if they want it back
    c) RIDEM: letter of support
2. Recycling and Deposal methods
    a) Material for artists or schools?
    b) Traps to Treasure-Ocean wide project
    c) Recycling companies
    d) Schnitzer Northeast or Mid- City Steel for scrap metal
    e) COVANTA
3. Cost
    a) Charge for placing bins for scrap metal

Reducing Future Ghost Gear

GGGI has developed a Best Practice Framework for the management of ghost fishing gear (https://www.ghostgear.org.). Our program will use these recommendations as a template. On a local scale, to try and reduce new ghost gear, we plan to develop a website where fishermen can report lost or observed ghost gear for retrieval. We also plan an outreach effort where fishermen can contact us and drop off any fishing gear they no longer want for disposal or recycling.

Part II

Steps for Implementation

This document has been formatted as steps for implementation. As such the steps are as follows:

1. Procure/establish funding for program component costs
2. Request permits for ghost gear removal activities
3. Establish training program
4. Assign retrieval contracts
5. At sea training for fishermen
6. Establish recycle and disposal facilities and staff for sorting
7. Removal activities
   Begin with a pilot removal project to test the logistics of our plan
   Site: Narragansett Bay where we have already located target areas
   Evaluation of retrieval by participating commercial fishermen
8. Recycle and Disposal
9. Disseminate the data
10. Public Outreach
11. Program Evaluation

Program Sustainability

Although not mentioned in the previous sections of the document, one of the major costs associated with the program are CFRF administrational and management costs. The contracts to remove the gear is another major cost for the program. However, there are may opportunities for donations and trying to recover some funds through recycling. We will be working on developing these ideas.

Options and proposals for ways to financially sustain the program were debated amongst our stakeholders and Advisory Group. Generally, ghost gear removal programs are sustained through grant funding and any funds generated through recycling steel. We initially proposed several new options including auctioning any retrieved gear that is in good working order, approaching fishing gear manufacturers about including a small fee during purchase (Producer Responsibility Fee) and an industry research set aside. Generally, these proposals were not considered favorably by the workshop participants due to the potential for it to negatively impact the removal programs reputation with stakeholders. In particular, it was expected that any producer responsibility fee would be paid for by the fishermen. The idea of auctioning usable ghost gear was more favorably received, but it was emphasized that is would need to be a very transparent and carefully organized program so that the process was considered fair by all participants. The idea of an Industry Research Set Aside to remove ghost fishing gear would require buy in from the fishermen. We will be working on developing these ideas prior to implementation.

Summary:

1. Funding opportunities
   - Grants: NOAA Marine Debris, Fishing for Energy, NFWF, 11th Hour Racing, GGGI, SNEP
   - Industry Program (research set aside)?
   - Payment for scrap steel
   - Auction unclaimed fishable gear that is retrieved?

Program Evaluation

This is a "living" documents that will be modified and adjusted as we implement the program. To determine where changes are needed, we need to have an evaluation process.

Below are the main components of the program we will be evaluating and how they will be evaluated.

1. the fishermen's at-sea training program
    - Survey fishermen following training (CFCRI)
2. the protocol for removing ghost gear
    - Assessing the success at retrieving gear, with the safety, time and effort for retrieval
3. the methods for recycling/disposal of collected gear
    - The amount of ghost gear removed and how successfully it was disposed of
    - How easy it is for fishermen to dispose of collected ghost gear
4. the sustainability of the program
    - Cost analysis

Appendices

Appendix 1: Example of application for fishermen to apply for ghost gear removal contract.

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Vessel Application
Ghost Gear Removal Project

(PLEASE PRINT)
(All Information will be kept confidential)

Application Information:

Name (Fishing Vessel Owner): _____

Captain (If different than fishing vessel owner): _____

Company Name (If Applicable): _____

Residential Address: _____

_____

Mailing Address (If different than residential address):

_____

_____

E-mail Address: _____

Home Phone Number: _____

Cell Phone Number: _____

Vessel Information:

Fishing Vessel Name: _____

Home Port: _____

Vessel Length: _____

Vessel Width: _____

Vessel Horsepower: _____

Number of Dedicated Crew (including captain): _____

Do you have a hauler and grapple available/onboard? YES NO

Enclosed cabin (please circle)? YES NO

Appendix 2: Example of data collection log for Center for Coastal Studies, Marine Debris and Plastics Program

Ghost Gear At-Sea Retrieval Log Page ___ of ___

___/___/2021 Vessel:_____ Captain:_____ Recorder:_____ Start Time _____ End time _____

Encounter #: _____ GPS: _____°_____N _____°_____W

Where? (Local Name):_____

Found: **Scope:** _____ Depth:_____ fm / ft (circle units)

Total # of Traps: _____ Rope Type:_____ Other Debris:_____ **Bottom Type:**

Mud _____ Sand _____
Gravel _____ Boulder _____
Cobble _____ Bedrock _____

Comments: _____

Trap Information:

	Crushed? Y / N	Tag #	Year	BioVent Open? Y / N	Closed with?	*Photo Info Number** *Top*	*Side*	*Side 2*	Trap comments (anoxic, type of biofouling etc)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Biological Info:

	Lobster: Short	Lobster: Legal	Lobster: Over	Crab	Fish (species?)	COMMENTS:
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

*Please take photo of top, one short side, and one long side of each trap, including biovent if possible; include ruler or other scale reference in frame, record frame #/time

Appendix 3: Example of data collection log for Gulf of Maine Lobster Foundation Gear Grab Program

GOMLF/DMR Ghost Gear Retrieval Logbook

Port ______________ Date: __________

Fisher:

Tow #	Start of tow area (if no gear recovered)		Tow Time	Depth (fa)	Tag #	Tag Year	Trap Count	BioVents Open?	Live or Dead?	Species	LOBSTER IN TRAP?					Comments
	Latitude	Longitude									Sex	short	legal	over	Vnotch	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
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								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	
								Y / N	Y / N						Y / N	

Appendix 4: CFRF data collection logs for ghost gear removal surveys.

FV _____ *Take Photo of grapple equipment*

Date _____

Trawl #	Start time	Waypoint	Start Lat	Start Long	Stop Lat	Stop Long	Stop Time	Speed (av. Knots)	GG (Y/N)

_____

Ghost Gear At-Sea Retrieval Log: Nets

Date: **Encounter #:**

Depth: fm / ft (circle units) Start min End time

Encounter #:

Location GPS: ° Lat ° Long

Vessel: ° Lat ° Long

Where Found: (Local Name):

Bottom Type: (circle predominate)

Mud Sand

Total # of Nets: Rope Type: Other Debris: Gravel Boulder

Cobble Bedrock

Comments:

Net Information:

Type: (e.g. gill net) No Tag?: One piece or parts

Strand

Tag #:			Tag Year:		Mass		Height of		Mesh		Twine		
Tag #:			Tag Year:		Mass		Height of		Mesh		Twine		
Tag #:			Tag Year:		Mass		Height of		Mesh		Twine		

Twine Dia		Knot		Material (natural/synthetic)		Attachments (e.g. floats)		Net Color	
Twine Dia		Knot		Material (natural/synthetic)		Attachments (e.g. floats)		Net Color	
Twine Dia		Knot		Material (natural/synthetic)		Attachments (e.g. floats)		Net Color	

COMMENTS:_____

Biological Info:

Organisms present (Y/N)

Net ID #	Species	Dead or

Specify

Fish #	Invert. #	Crust #	Bird #	COMMENTS:

Ghost Gear At-Sea Retrieval Log (Traps)

Date: _____/_____/2023 Vessel:_____ Captain:_____ Start Time _____ End time _____

Trawl #: _____

Location: GPS: _____°_____Lat _____°_____Long Depth: _____ fm / ft (circle units)

Vessel: _____ °_____Lat _____ °_____Long

Where Found? (Local Name):_____

Total # of Traps: _____ Rope Type:_____ Other Debris:_____
(e.g. trawl with 5 traps or single (1 only))

BOTTOM TYPE (circle predominate)
Mud
Gravel
Bedrock
Cobble
Sand
Boulder

Comments: _____

Trap Information:

*** take photo of top, one short side, and one long side of each trap, including biovent; include ruler or other scale reference in frame, record frame #/time**

	Crushed? Y / N	Material	Tag #	Year	BioVent Open? Y / N	Height	*Length*	*Width*	**Comments** (what closed with, photo info)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Biological Information: Take photo of all organisms

Y=yes
N=no

LOBSTER S= severe

Trap	Sex	short	legal	over	Vnotch	Disease	Alive/	COMMENTS: (inlcude image ID)
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		
					Y / N	Y / N / S		

Trap	CRAB	Length	Alive/	Disease
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S
				Y / N / S

FISH	Length	Alive/	COMMENTS: (Include image ID)

Rhode Island Pilot Ghost Gear Removal Program

Community Meeting

Maury Loontjens Memorial Library
December 6, 2022

CFRF Commercial Fisheries Research Foundation

CFRF COMMERCIAL FISHERIES RESEARCH FOUNDATION

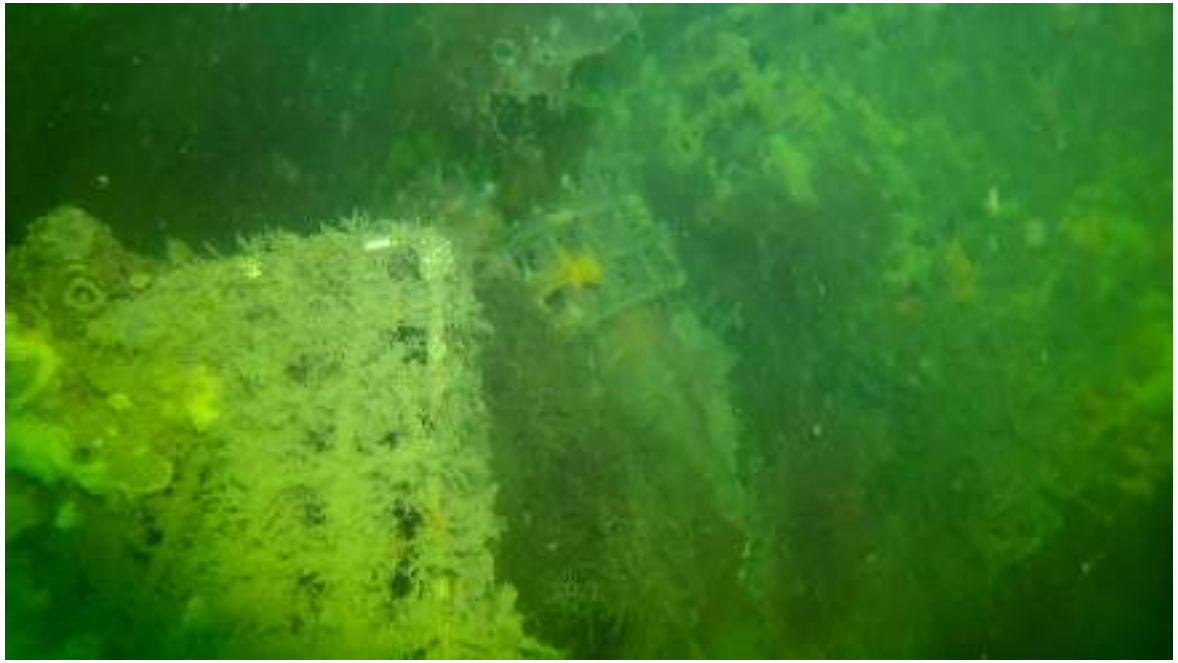
A non-profit, private foundation established by commercial fishermen that is dedicated to conducting collaborative research and education projects that inform and promote sustainable fisheries.

What is Ghost Gear?

Lost or discarded fishing gear

- Storms, fishing gear and/or vessel interactions

Annually, over 640,000 metric tons of fishing gear may be lost globally



Impacts

Negative ecological and fisheries effects

- Plastics pollution, changes substrate characteristics

Can cause navigational hazards

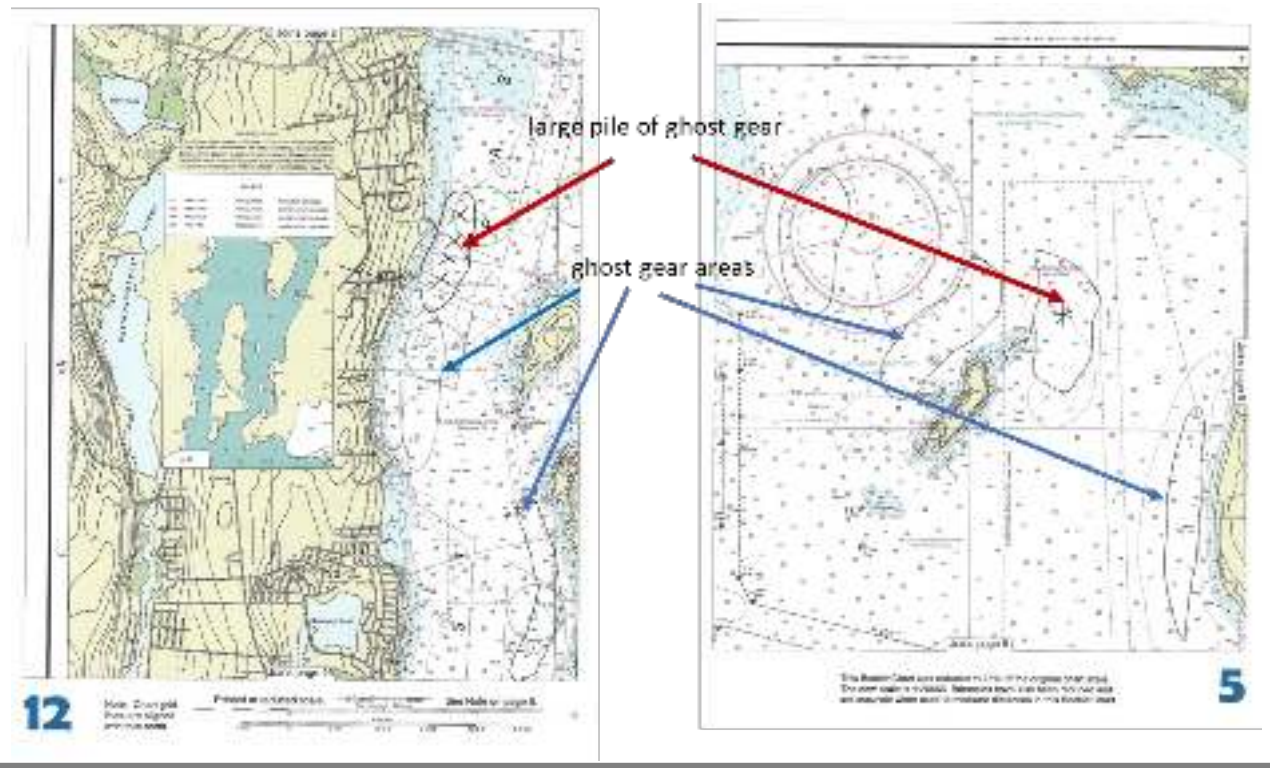
Gets caught in active fishermen's gear damaging nets and lines.

PART 1 Introduction of problem in Rhode Island

Fishermen contact us about ghost gear in Narragansett Bay

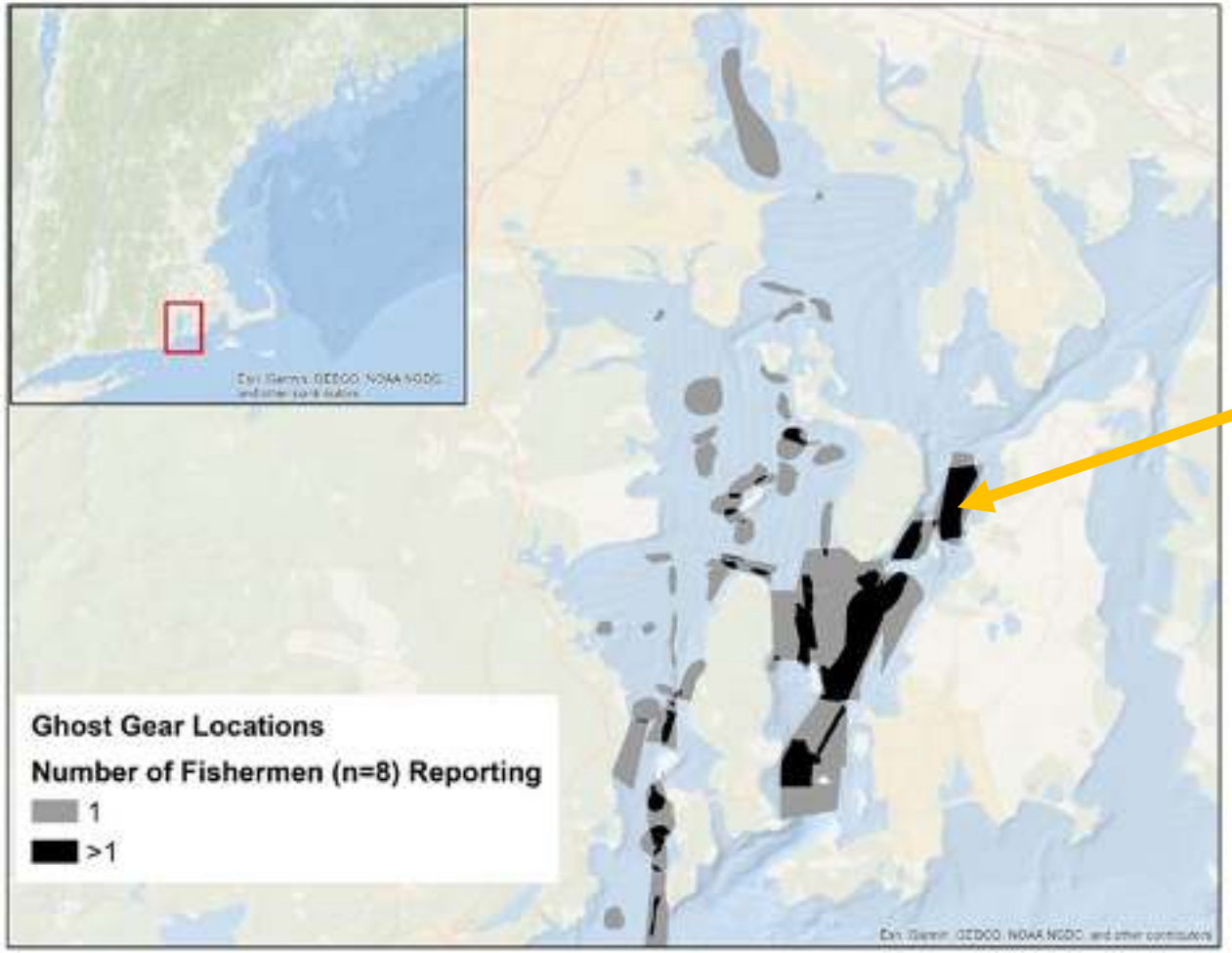
Mapping Hotspots And Testing Video Technology For Ghost Gear Removal In Narragansett Bay

11th Hour Racing Grant



- Interviewed fishermen on their knowledge of ghost gear locations in Narragansett Bay

Results from trawl, lobster and fish pot Captains

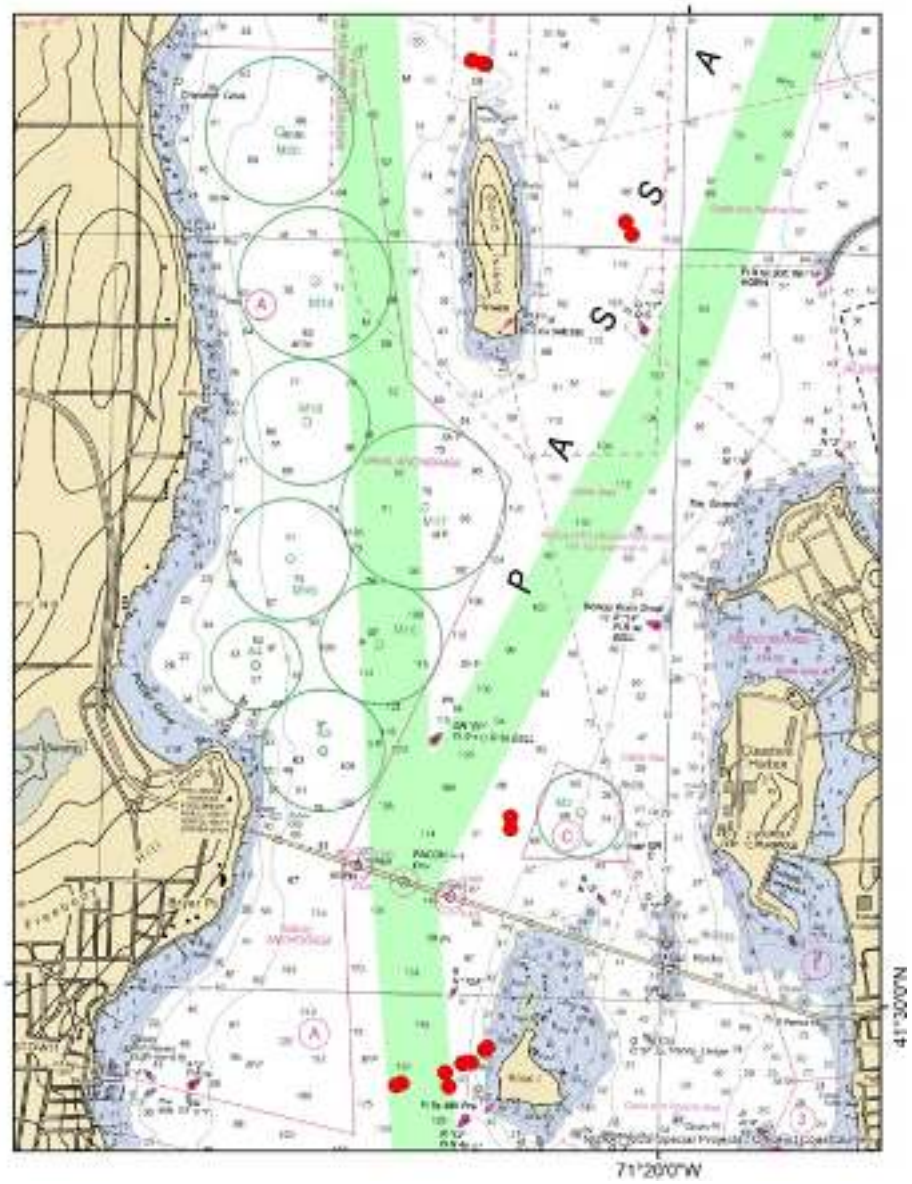


Areas to target for video survey

CFRF COMMERCIAL FISHERIES RESEARCH FOUNDATION

2 survey trips in 2021 on commercial vessels

- Found ropes and traps and confirmed locations using underwater cameras for future removal

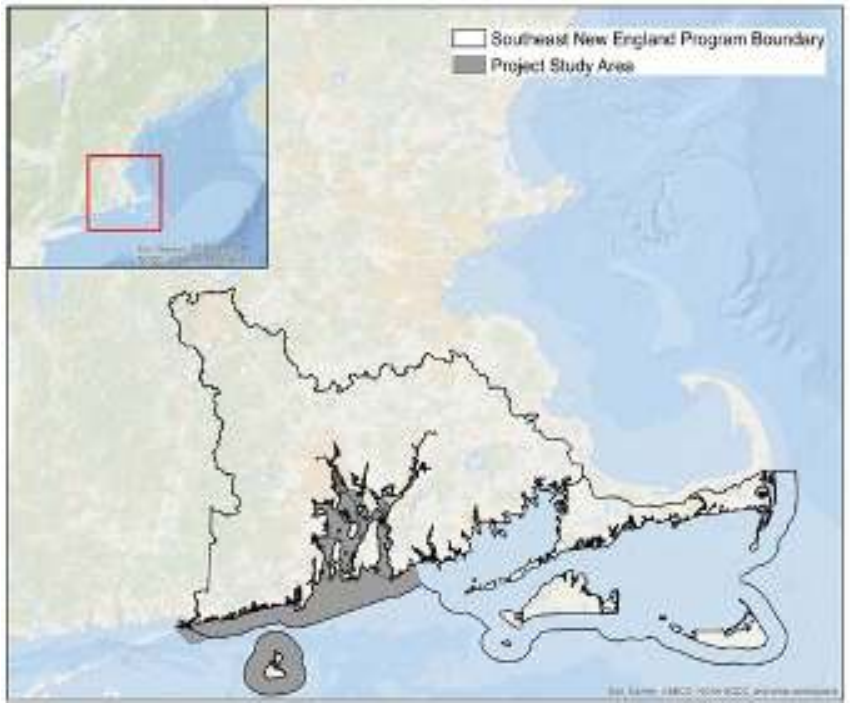


PART 2

Planning a Ghost Gear Removal Program for Rhode Island

Southeast New England Program 2021 Watershed Grant

- Develop a Ghost Gear Removal Planning Document for Rhode Island



Advisory Group

Planning document developed with assistance from Advisory Group comprised of individuals from:

1. Commercial Fisheries Center of Rhode Island
2. RI Dept of Environmental Management (Permits)
3. RI Dept of Environmental Management (Port activities)
4. Global Ghost Gear Initiative *
5. Gear Grab- Gulf of Maine Lobster Foundation *
6. Center for Coastal Studies (Cape Cod) -Marine Debris & Plastics Program *

(*Organization highly experienced in ghost gear removal and setting up ghost gear removal programs)

Removing Ghost Gear

Steps for implementation (FROM planning document)

1. Procure/establish funding for program component costs
2. Request permits for ghost gear removal activities
3. Establish training program
4. Assign retrieval contracts with local fishermen
5. At sea training for fishermen-ghost gear retrieval can be dangerous and logistically difficult
6. Establish recycle and disposal facilities and staff for sorting
7. **Removal activities**
   - **Begin with a pilot removal project to test the logistics of our plan**
   - **Evaluation of retrieval by participating commercial fishermen**
8. Recycle and Disposal
9. Disseminate the data
10. Public Outreach
    - This is the first community meeting.
    - Will follow up with another in early summer to go over results from pilot removal project
11. Program Evaluation

PART 3

Planning Document

Initiating the removal of ghost gear from Rhode Island waters

11th Hour Racing Grant

Initial removal efforts will focus on Narragansett Bay where CFRF has identified multiple target areas

This is a pilot project for removing ghost gear from Narragansett Bay. We will be learning and adapting

What is Happening Now:

Retrieval contracts with local fishermen (start with 3 this year)- December 2022

Permits

Training

- January-February 2023
  - Experienced expert will come to Rhode Island
  - At sea training and knowledge exchange
  - Tools already used by fishermen or specialized equipment

Removing Ghost Gear

Identifying gear for removal: **January 2023**

- ❑ Prioritizing removal for pilot program
  - Traps in soft bottom from initial map
  - Underwater camera confirmed
- ❑ Future removal and area identification
  - System for fishermen to report lost gear /found ghost gear
  - Further mapping of fishermen's knowledge
  - RI DEM map of known ghost gear locations
  - Side scan sonar
  - Leveraging other benthic mapping
    - Cable laying from offshore wind?

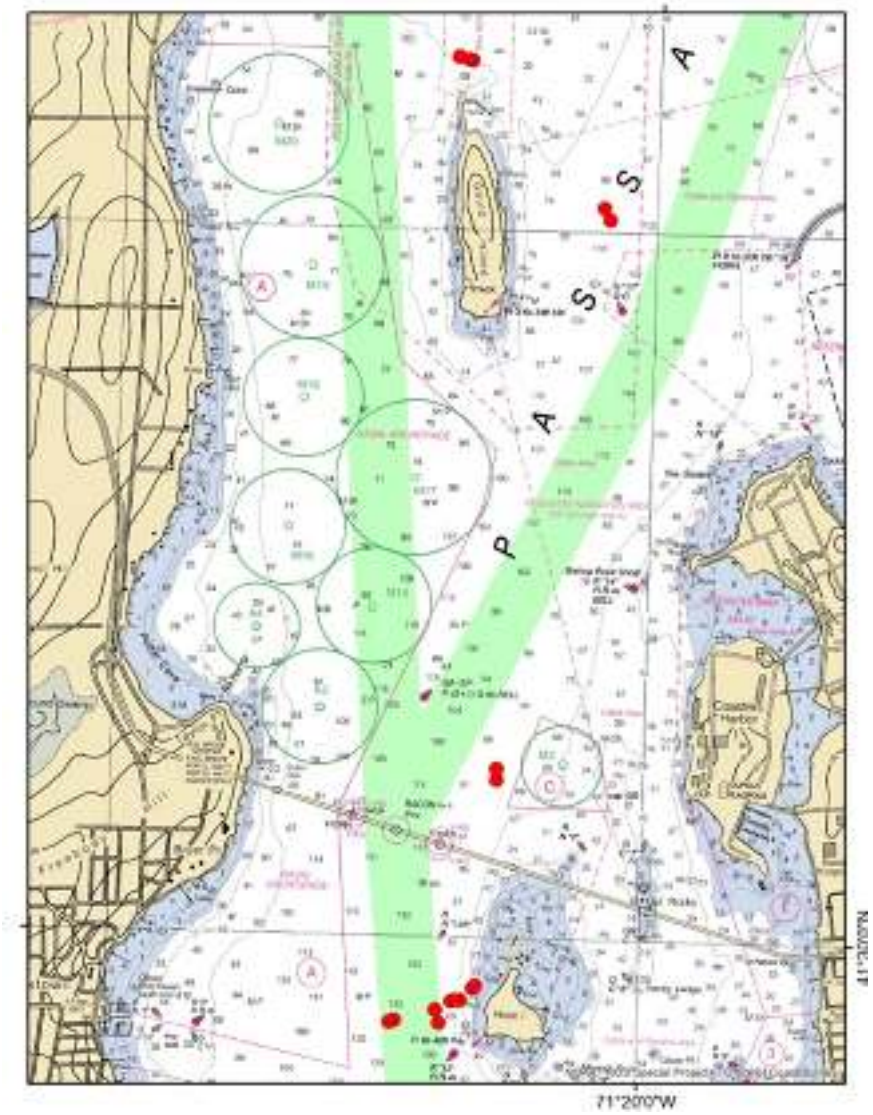
Removing Ghost Gear

Prior to Removal:

Notification of removal activities

- Notification to fishermen's organizations e.g., Commercial Fisheries Center of Rhode Island (1 month before collection to inform industry where we will be working)

- Mariner's brief sent out week prior to any removal activities



Removal procedures

- ❑ Timing:
  - February-March
  - Less interaction with active fishing activities

Data collection

For Example:

- location, number, type of gear retrieved
- condition of gear
- biological interactions

- ❑ Results from the ghost gear retrieval cruises (number and types of gear) will be posted on the CFRF website project page, including an interactive map showing where the gear was removed from.

- ❑ Share results with the Global Ghost Gear Initiative (GGGI) lost fishing gear database as well as other local ghost gear removal organizations.

Recycling and disposal

- Sorting
  - At-dock sorting of traps in good shape, junk traps, rope and “junk”, plastics vs metals
  - Any gear with tags will to be set aside and owner of gear contacted to see if they want it back

- Recycling and Disposal methods
  - Material for artists or schools
  - e.g. Traps to Treasure-Ocean Wide Project
  - Recycling companies
  - Engaging researchers and entrepreneurs

DISPOSAL BIN LOCATION (Newport)

  - e.g. Schnitzer Northeast: steel for scrap metal
  - e.g. COVANTA
- Fishing Gear Recovery Program
  - For tagged retrieved gear

Pilot Removal Project Evaluation

- The main components of this program that we will be evaluating are:

  - The fishermen's at-sea training program
    - Survey fishermen following training
  - The protocol for removing ghost gear
    - Assessing the success at retrieving gear, with the safety, time and effort for retrieval
  - The methods for recycling/disposal of collected gear
    - The amount of ghost gear removed and how successfully it was recycled or disposed of
    - How easy it is for fishermen to dispose of collected ghost gear
  - The sustainability of the program
    - Cost analysis

Reducing Future Ghost Gear

- ❑ How to reduce lost gear?
  - Outreach-talk to fishermen and other stakeholders on ideas on how to reduce lost gear
  - System set up for fishermen to report lost gear/found ghost gear

- ❑ GGGI fishing gear best management practices
  - This document includes a risk analysis of different fishing gear and recommends options for preventing, mitigating, and remediating ghost gear
  - Advisory Group will review to determine best options for Rhode Island


QUESTIONS
CFRF
COMMERCIAL FISHERIES