

**SFW01-0097 South Fork Fisheries Monitoring Plan
WP3: Ventless Trap Survey
Year 2 Report**

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Summary

The Commercial Fisheries Research Foundation (CFRF), the University of Rhode Island and local fishermen have completed both years of the South Fork Wind Farm pre-development fisheries monitoring ventless trap survey. The survey was designed to collect data on the abundance, distribution and movement of American lobster and Jonah crab. The South Fork Wind Farm development and two nearby reference control areas were sampled twice a month from May-November 2021 and 2022. Each area had ten stations consisting of ten traps with a target soak time of 5 days between samples. The traps at each station consisted of 6 ventless (V) traps and 4 standard (S) traps in the configuration: V-S-V-S-V-S-V-S-V. At each station, the entire catch was speciated and counted at the trap level, then sampled for size and sex. Additional data on water temperature and habitat were also collected. The catch in the survey changed throughout both years of the seven-month sampling periods with rock crab peak abundance in the first two months of the survey, followed by lobster peak abundance in the summer months, and finally Jonah crab peak abundance in the last two months of the survey. Overall in both 2021 and 2022, the eastern control area had the highest abundance of lobster, Jonah crab and rock crab, with decreased and more comparable abundance for all three species in the western control area and South Fork area. Overall, 2022 lobster abundance was lower than 2021, with the largest decrease in the eastern reference area and minimal decrease in the South Fork survey area. Jonah crab 2022 overall abundance was higher than 2021, driven by large increases in abundance in the South Fork and eastern reference survey areas. Finally, 2022 overall rock crab abundance was lower than 2021, with decreases in abundance seen across all three survey areas.

Introduction

The Commercial Fisheries Research Foundation, in partnership with local fishermen and the University of Rhode Island, conducted pre-construction fisheries monitoring surveys of the South Fork Wind Offshore Wind Farm. This monitoring aimed to provide baseline data for one of the primary methods for assessing anthropogenic impacts on natural habitats: the Before-After-Control-Impact design. The ideal design for this experiment requires baseline information before impact in multiple control areas from several points in time. This asymmetrical design is needed not only to evaluate the variation in animals and habitat within impact areas before and after development, but also to ensure changes in variation can be attributed to the anthropogenic impact. Due to the differences in selectivity of different gear types, four different surveys, each using a different gear type, are currently being conducted to collect this information: beam trawl survey, gillnet survey, ventless trap survey, and fish pot survey. The ventless trap survey was designed to collect data on the abundance, distribution and movement of American lobster and Jonah crab in the South Fork Wind Farm development and two nearby reference control areas (Figure 1). This report details the methods of the survey and summarizes the results from the first two years of sampling conducted between May and November 2021 and 2022.

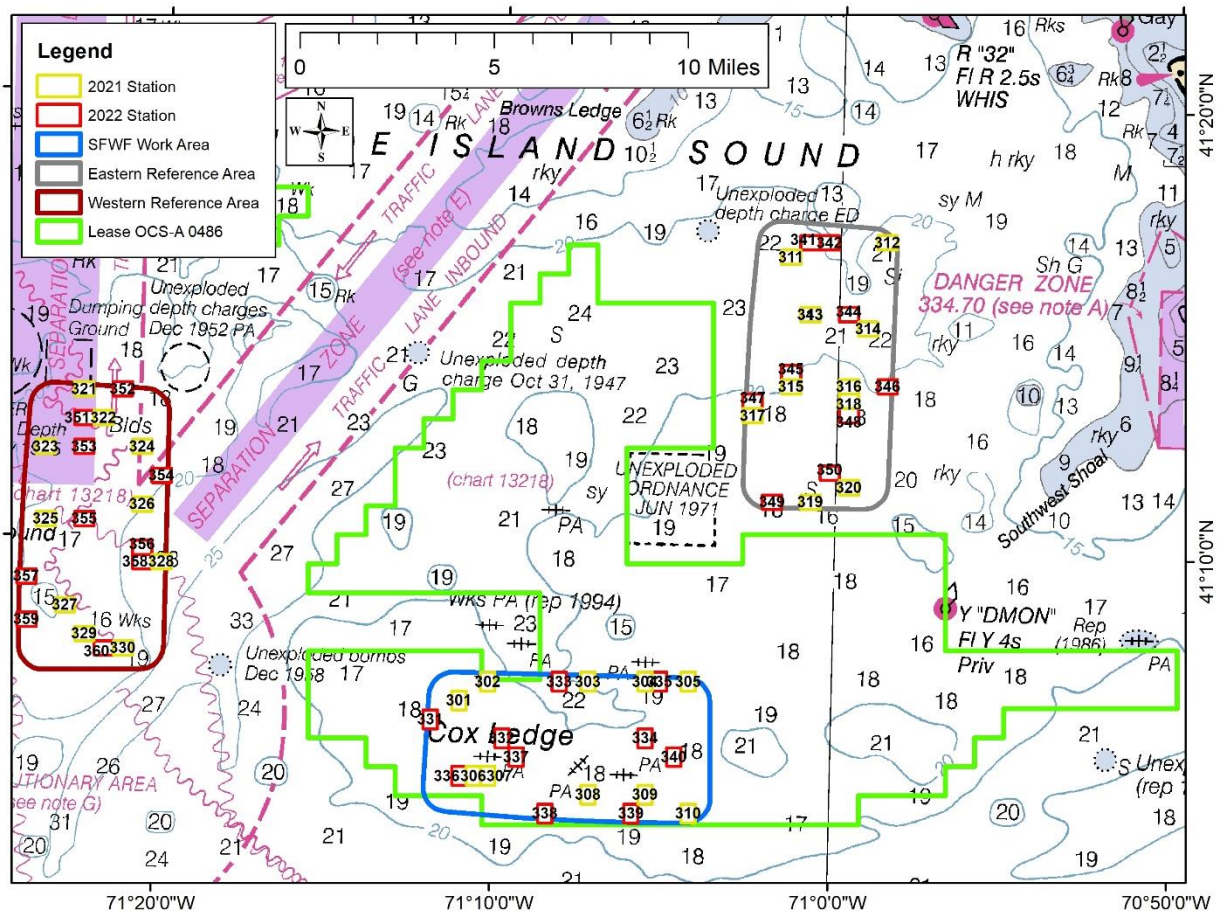


Figure 1. The South Fork Wind Farm (SFWF) development area and two reference control areas monitored by the ventless trap survey. Station 311 in the eastern reference area was moved to

the secondary station for October and November 2021 sampling due to multiple instances of gear conflict at the original primary station.

Methods

The survey followed the protocols of the Southern New England Cooperative Ventless Trap Survey with considerations of consistency with state water surveys. Survey stations were determined using a spatially balanced design. The impact area was divided into ten equally sized grid cells, each cell was then further divided into 16 equally sized aliquots. At the beginning of the sampling season, an aliquot was randomly selected for sampling through the entire season in each of the ten larger grid cells. An alternative aliquot was also selected within each grid cell. The alternative aliquot was only sampled if needed based on local conditions (e.g., to avoid gear conflicts). The same process was repeated for two control areas, and new stations were selected for each year of the survey (Figure 1). The control areas were identified through consultation with local industry members. They reflect locations of known lobster fishing grounds with similar habitat to the development area and the desire to minimize gear conflicts amongst fishermen in the area.

Three partnering commercial fishing vessels were used as research platforms to sample ten stations in each area twice per month from May through November each year. The three vessels that participated in the survey were the F/V Amelia Anne, F/V Ashley Ann II, and F/V Erica Knight, all from Point Judith, RI. At the start of each monthly sampling event, the vessel crews retrieved and baited the traps. Traps were baited with locally available skate for bait. After a target five-day soak period, the traps were hauled, the catch was processed for sampling, and the traps were rebaited for another target five-night soak. The traps at each station consisted of 6 ventless (V) traps and 4 standard (S) traps in the configuration V-S-V-S-V-V-S-V-S-V, with 100' separation between traps. Traps were single parlor, 16 inches high, 40 inches long, 21 inches wide, and constructed with 1-inch square rubber coated 12-gauge wire and 5-inch entrance hoops. A temperature logger was attached to one trap in each trawl to record water temperature continuously throughout the monitoring period.

For each trawl, sampling effort and trap level information on all species encounter was collected using voice recorders. Sampling effort data parameters included:

- Station number
- Start and end latitude and longitude
- Start and end time and date
- Start and end water depth
- Beaufort sea state
- Wind direction

All lobsters, Jonah crab, and rock crabs were counted prior to the collection of data on individuals. All lobster were then sampled for individual data parameters including:

- Carapace Length (Nearest 0.1 mm)
- Sex (Male, Female, Unknown)
- Shell Hardness (New, Paper, Hard, Splitter)
- Cull (Missing Claws, Buds, Regenerating Claws)
- Shell Disease (None, Minor, Moderate, Severe)
- Eggs (Absent, New, Eyed, Tan, Hatching, Spent)
- V-Notch (Present, Absent)
- Mortality (Alive, Dead)

Data collected for all Jonah crabs in one ventless trap per trawl and up ten Jonah crabs in all remaining nine traps included:

- Carapace Width (Nearest 0.1 mm)
- Sex (Male, Female, Unknown)
- Shell Hardness (New, Paper, Hard, Splitter)
- Cull (Missing Claws, Buds, Regenerating Claws)
- Shell Disease (None, Minor, Moderate, Severe)
- Eggs (Absent, Orange, Brown, Black, Hatching, Spent)
- Mortality (Alive/Dead)

Data collected for all rock crabs in one ventless trap per trawl and up ten rock crabs in all remaining nine traps included:

- Width (Nearest 0.1 mm)
- Sex (Male, Female, Unknown)
- Mortality (Alive/Dead)

For all bycatch species data collected included:

- Species (Common Name)
- Length/Width (Nearest 0.5 cm for finfish, nearest mm for invertebrates)
- Sex (Male, Female, Unknown)
- Mortality (Alive/Dead)

In addition to the biological data collected for all lobsters caught in the survey, a total of 1,500 lobsters (500 per area) were targeted to be tagged with uniquely numbered t-bar tags to monitor their movement behaviors. Tagged lobsters were recaptured in the survey sampling, and any tagged lobsters caught by commercial fishermen were also encouraged to be reported to CFRF via the phone number printed on each tag.

All GPS data, temperature logger data, and animal data were imported into an Access survey database and linked to each station sampled. Prior to data submission to INSPIRE Environmental, all data were reviewed and quality checked for accuracy by one of the scientists

who collected the data. Any gear loss or protected species interactions were reported to required federal agencies (Appendix 1).

For each aliquot sampled in the control areas, a video habitat camera sled system was used to collect imagery of the seafloor in each aliquot. The camera sled system consisted of an Applied Microvideo 310 camera which provided video imaging and live video streams during deployment. Video imaging was conducted for a single five-minute drift along the ten-trap trawl at each station. The camera sled was deployed one meter off the seafloor, and two lights illuminated the seafloor.

Preliminary Results

The data in this reporting period covers the second year of the ventless trap survey which took place from May-November 2022. Each trip was conducted as close to the beginning of the month as possible (Table 1). All data for these trips has been entered into the project database; however, quality control procedures are still ongoing for the later months of the survey, and all data has not yet been reviewed by INSPIRE Environmental. Summary figures of the environmental conditions and dominant species composition for the first year is shown in Table 2 and Figures 2-4. The catch in the survey changed throughout the seven-month sampling period with rock crab peak abundance in the first two months of the survey, followed by lobster peak abundance in the summer months, and finally Jonah crab peak abundance in the last two months of the survey. Overall, the eastern control area had the highest abundance of lobster, Jonah crab and rock crab, with decreased and more comparable abundance for all three species in the western control area and South Fork area. Overall, 2022 lobster abundance was lower than 2021, with the largest decrease in the eastern reference area and minimal decrease in the South Fork survey area. Jonah crab 2022 overall abundance was higher than 2021, driven by large increases in abundance in the South Fork and eastern reference survey areas. Finally, 2022 overall rock crab abundance was lower than 2021, with decreases in abundance seen across all three survey areas.

A total of 1,376 lobsters were tagged with t-bar tags in 2021; 429 lobsters were tagged in the South Fork area, 472 lobsters were tagged in the eastern control area, and 477 were lobsters tagged in the western control area. A total of 1,217 lobsters were tagged with t-bar tags in 2022; 495 lobsters were tagged in the South Fork area, 278 lobsters were tagged in the eastern control area, and 444 were lobsters tagged in the western control area. From the 2,593 total lobsters tagged across both years, there were a total of 367 recaptured tags; 229 were recaptured in 2021 and 138 were recaptured in 2022. 85 recaptures were reported by commercial fishermen and 282 were from the ventless trap survey efforts.

Table 1. Monthly sampling summary for all survey areas. A full month of sampling includes 200 traps sampled per area; months with less than 200 traps sampled per area were due to gear loss. The vessel monitoring the South Fork area had a delayed trip on 8/13/2021 due to Covid-19 protocols.

Month	Trip Dates			Traps Sampled		
	Trap Bait and Set	Trap Sampling and Reset	Trap Sampling and Deactivation	West	South Fork	East
May 2021	5/3/2021	5/8/2021	5/13/2021	200	200	200
June 2021	6/1/2021	6/6/2021	6/11/2021	200	200	200
July 2021	7/1/2021	7/7/2021	7/12/2021	200	200	200
August 2021	8/1/2021	8/6/2021	8/10/2021 & 8/13/2021	199	196	199
September 2021	9/3/2021	9/8/2021	9/14/2021	200	200	180
October 2021	10/1/2021	10/6/2021	10/13/2021	200	200	198
November 2021	11/6/2021	11/11/2021	11/17/2021	200	200	200
May 2022	5/6/2022	5/13/2022	5/19/2022	200	200	200
June 2022	6/2/2022	6/7/2022	6/12/2022	200	200	200
July 2022	7/1/2022	7/7/2022	7/11/2022	200	200	188
August 2022	8/4/2022	8/11/2022	8/15/2022	200	200	200
September 2022	9/2/2022	9/9/2022	9/16/2022	200	200	200
October 2022	10/6/2022	10/11/2022	10/16/2022	200	200	200
November 2022	11/3/2022	11/9/2022	11/15/2022	200	200	200

Table 2. Monthly environmental conditions during survey periods for all areas.

Month	Average Temperature (°C)			Average Beaufort Sea State		
	West	South Fork	East	West	South Fork	East
May 2021	7.0	6.8	7.3	2.5	2.3	2.2
June 2021	9.0	9.9	9.9	4.0	4.9	4.6
July 2021	11.0	11.7	12.6	3.0	2.9	3.2
August 2021	12.9	12.7	13.9	2.3	3.7	3.1
September 2021	16.1	17.6	16.7	3.1	2.3	2.6
October 2021	18.9	17.2	18.0	1.7	1.6	2.0
November 2021	15.5	15.2	16.9	2.8	3.2	2.2
May 2022	8.8	8.8	9.2	3	2.6	2.9
June 2022	9.7	9.6	10.0	2	2	2.2
July 2022	10.6	10.6	11.9	2	3	2.5
August 2022	12.7	13.9	14.7	2.4	2	1.2
September 2022	15.4	15.0	15.5	3.5	1.5	4.2
October 2022	16.5	16.1	16.5	2	2	2
November 2022	15.7	15.7	15.5	2.9	1.8	4.4

Table 3. Total number of each species caught by area for the 2021 ventless trap survey.

Species	2021	2022
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	West	South Fork	East	Total	West	South Fork	East	Total
Jonah Crab	9,489	7,568	14,993	32,050	8,398	15,870	23,809	48,077
Rock Crab	4,922	3,086	13,888	21,896	2,624	2,185	7,281	12,090
Lobster	3,934	2,614	5,146	11,694	2,968	2,398	3,115	8,481
Black Sea Bass	928	671	745	2,344	847	1,911	1,194	3,952
Red Hake	361	399	435	1,195	264	1,092	507	1,863
Cunner	650	362	309	1,321	286	927	400	1,613
Scup	136	102	400	638	102	382	629	1,113
Ocean Pout	179	78	259	516	67	83	278	428
Conger Eel	171	59	53	283	118	230	58	406
Sea Raven	29	19	32	80	20	20	36	76
Butterfish	0	0	0	0	0	1	73	74
Longhorn Sculpin	10	7	23	40	7	11	6	24
Cod	5	10	5	20	11	22	5	38
Waved Whelk	48	0	0	48	0	0	7	7
Hermit Crab	4	2	14	20	0	1	2	3
Barrelfish	2	3	1	6	0	6	4	10
White Hake	3	3	0	6	2	7	0	9
Spider Crab	1	0	2	3	0	1	8	9
Moon Snail	0	0	11	11	0	0	0	0
Little Skate	1	0	0	1	1	6	1	8
Northern Sea Robin	1	0	0	1	2	3	3	8
Gray Triggerfish	1	3	2	6	0	3	0	3
Spotted Hake	2	1	4	7	0	0	2	2
Spiny Dogfish	0	1	0	1	2	3	1	6
Blue Crab	0	2	3	5	1	0	1	2
Winter Flounder	3	2	0	5	2	0	0	2
Sea Scallop	5	1	0	6	0	0	0	0
Smooth Dogfish	0	1	0	1	0	0	2	2
Summer Flounder	0	0	1	1	1	0	1	2
Menhaden	1	0	1	2	0	0	1	1
Snowy Grouper	0	0	2	2	0	0	0	0
Surf Clam	2	0	0	2	0	0	0	0
Swimming Crab	0	0	2	2	0	0	0	0
Ocean Quahog	0	0	0	0	1	0	0	1
Striped Sea Robin	0	0	0	0	1	0	0	1
Winter Skate	0	0	0	0	0	0	1	1
Queen Triggerfish	0	0	1	1	0	0	0	0

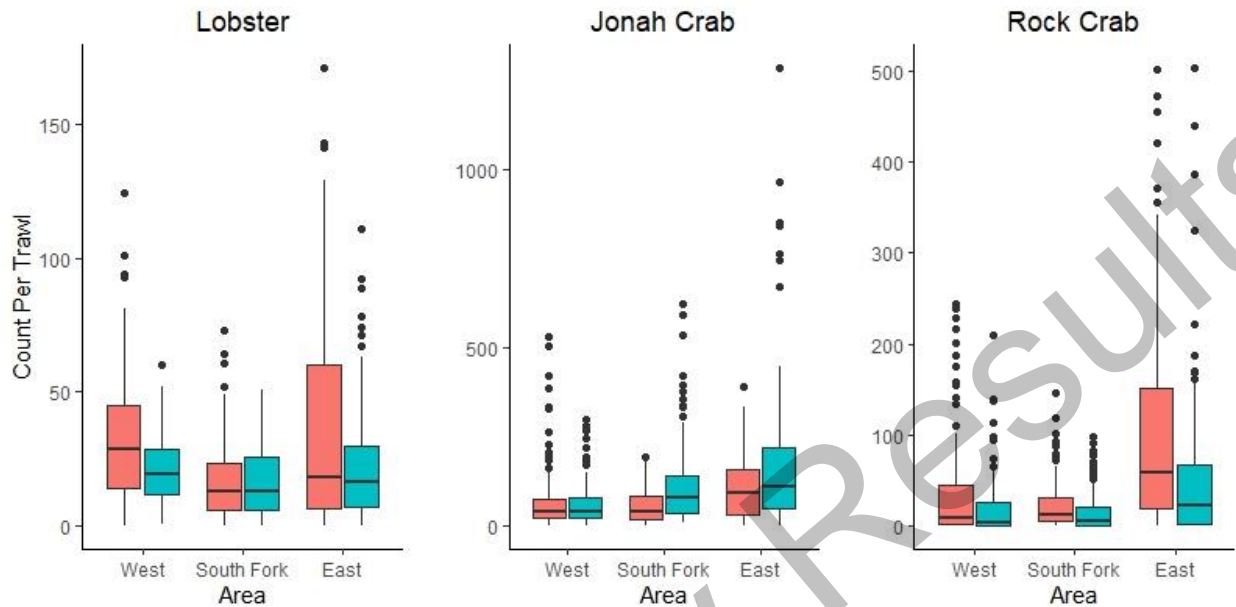


Figure 2. Box plots for counts of the three target species of lobster, Jonah crab, and rock crab per trawl by area for the 2021 (red) and 2022 (green) ventless trap survey.

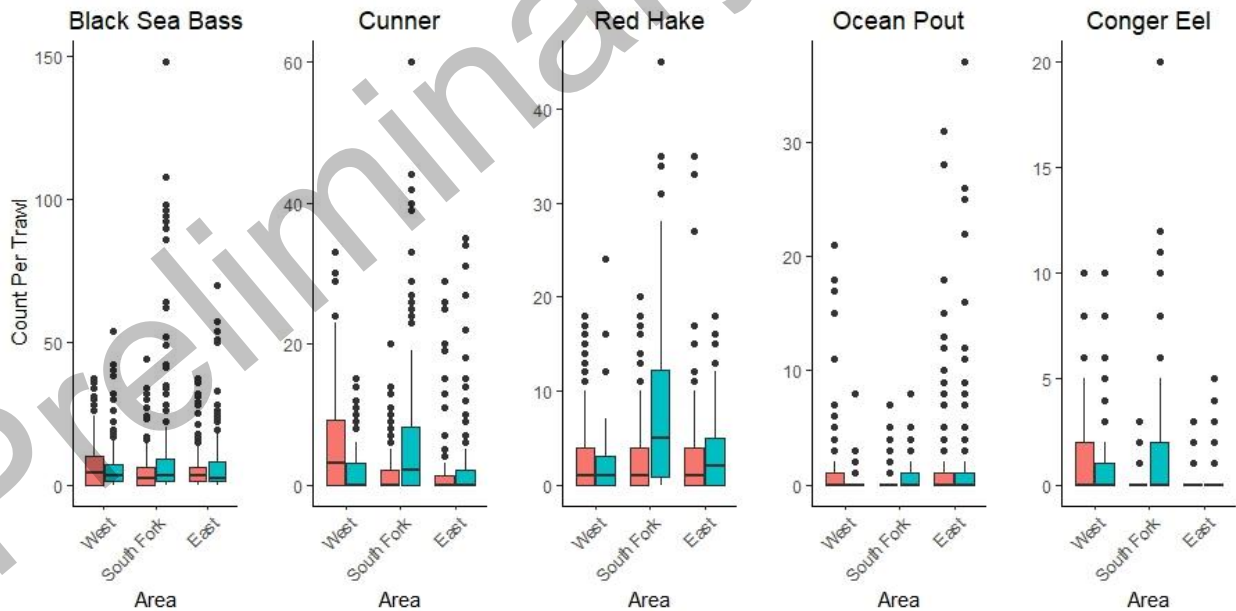


Figure 3. Box plots for counts of the five most abundant finfish species per trawl by area for the 2021 (red) and 2022 (green) ventless trap survey.

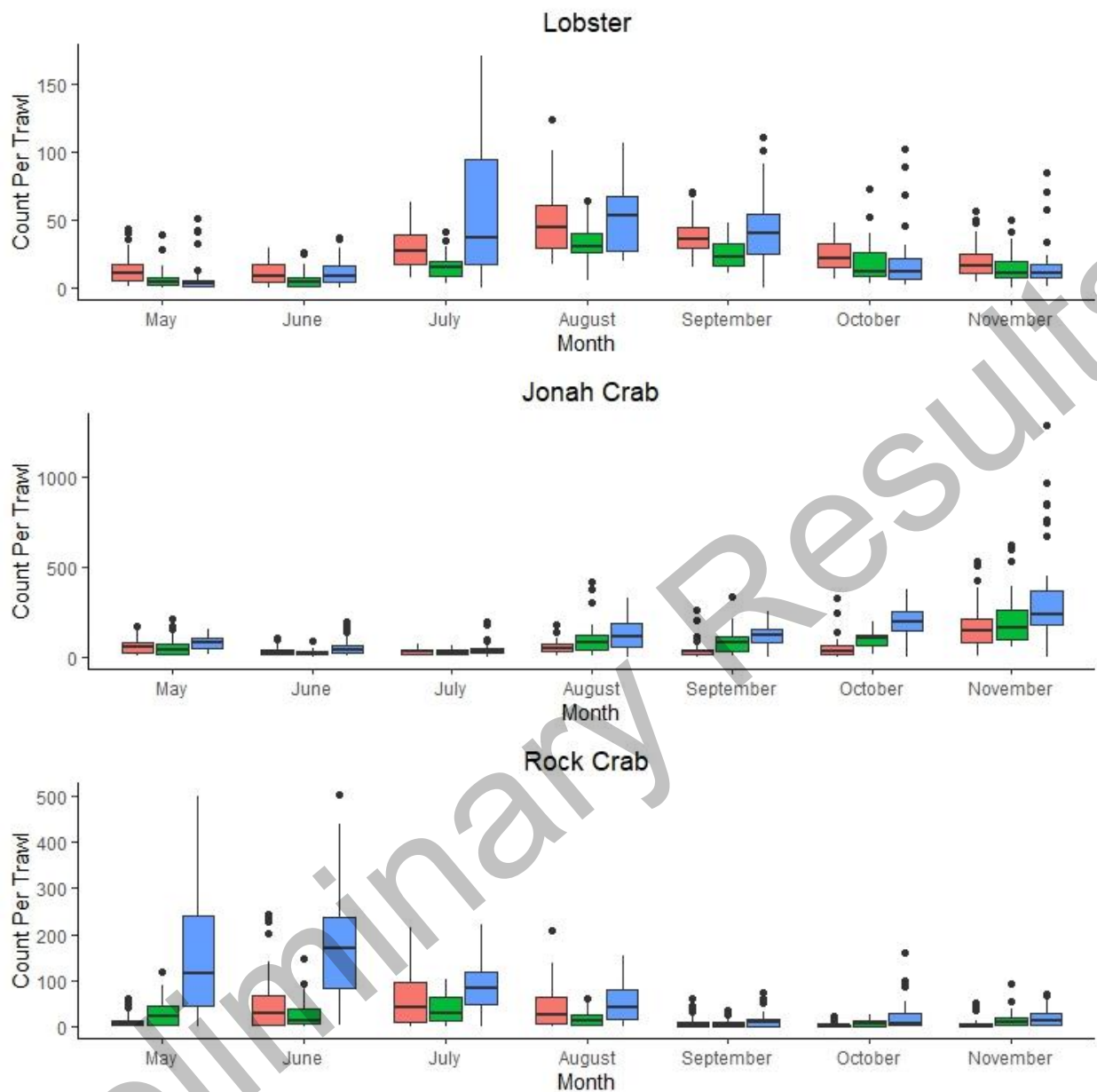


Figure 4. Monthly box plots of lobster, Jonah crab, and rock crab count per trawl by area for the ventless trap survey, 2021 and 2022 data combined. Red = West, Green = South Fork, Blue = East.

Outreach

The CFRF maintains a project website at <https://www.cfrfoundation.org/sfwf-ventless-trap-survey> which gives a general description of the survey. This survey has also been highlighted three times in the CFRF quarterly newsletter ([July 2021](#), [November 2021](#), and [January 2023](#)).