2024 Spring Scallop Survey Report

Maine Department of Marine Resources

www.maine.gov/dmr/science/species-information/scallop

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Maine Spring Scallop Survey Report

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Updates to the Survey Design

The goals for the spring scallop survey were redefined in 2024 as:

1. Estimate density and describe the scallop populations for the upcoming season.
2. Monitor historic scallop beds or potential scallop habitat with low fishing pressure.
3. Evaluate density and size structure of scallops in priority areas on an annual basis.

To accomplish these goals our survey domain was modified so that rather than matching our rotational management footprint we created 60 individual survey areas based upon historic scallop survey data, landings data, depth contours and local oceanographic features (i.e. enclosed bays, substrate, etc.; Fig 1).

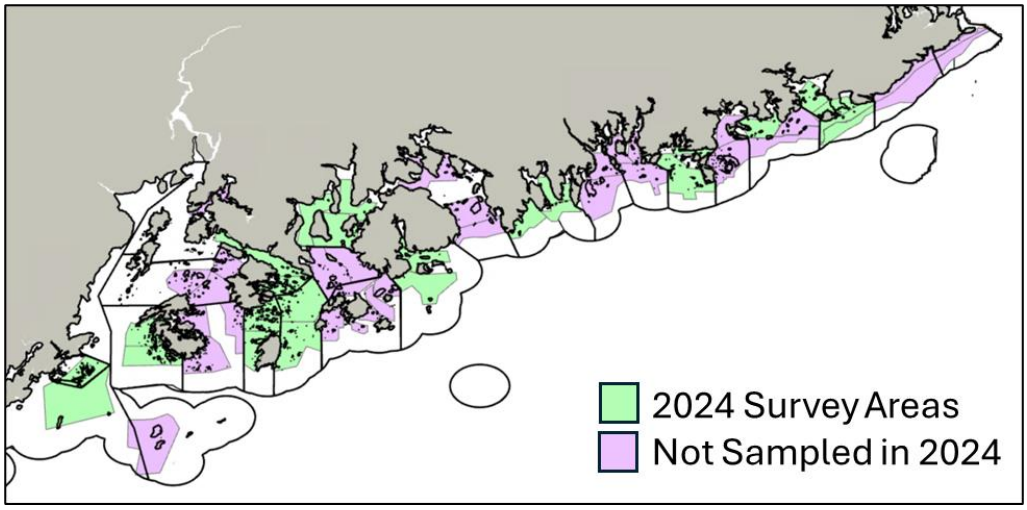


Figure 1. *Map of the new survey domain used for the 2024 scallop survey. The areas in green were sampled for 2024 and the areas in purple are areas to be surveyed in future years. The thick black lines represent the current scallop management lines.*

Our station selection process remains the same where a 500m grid is overlaid over these survey areas. Past survey work and interviews with fleet members have identified grids which are either not towable or that are poor scallop habitat, and these have been removed from our domain. The remaining grids are either identified as a high-density or low-density area. The high-density grids were selected as areas where previous survey tows caught above the survey average of scallops or by high concentrations of landings reports. These grids were then reviewed with local fleet members and modified as necessary. Improving our survey grid is an ongoing process, for those interested in helping reach out to carlton.j.huntsberger@maine.gov. The stations which are sampled each year are randomly selected from the available survey grid.

Spring Scallop Survey Methods

The annual spring scallop survey sampled 267 stations in Scallop Management Zone 2 and the eastern portion of Zone 1, between April 10th and May 1st, 2024, aboard the F/V Miss Sarah. All survey areas inside Rotation C (Fig 5), scheduled to be open in the 2024-2025 season, were sampled. To provide additional information to inform management Sand Bay, Eastern Moosabec Reach, Cranberry Isles, Isle au Haut Bay area, and a small portion of Zone 1 were also surveyed.

Each station was sampled following the same methods used since 2016 with our standardized 7-foot survey drag, rigged with 2-inch rings and a 5-inch twine top. This survey dredge and our tow specifications are designed to catch representative samples of the entire size range of scallops older than 2 years, not to maximize the catch of harvestable scallops. At each station, the drag is towed for a target time of 2.5 minutes covering approximately 300m (0.16 nautical miles).

The total volume and composition of the catch are recorded, then the scallops are counted and measured. For each rotational area, a representative sample of the scallops are selected for meat weights and quality measurements during which the scallops are visually screened for specific diseases (Fig 2).

Figure 2: *Meat quality categories used for analysis (left) and an example of a scallop collected from outside of Maine with evidence of a bacterial infection (right).*

The data in this report are standardized for the number of legal scallops per square meter. Fishable densities of scallops are generally considered to be above 0.1 scallops/m^2. A typical 7-foot commercial dredge towing in a density of 0.25 scallops/m^2 can catch approximately 5 bushels in a 10-minute tow. For more information on the sampling details contact the DMR Scallop Research Program.

2024 Spring Survey Summary

Within Rotation C, the Spring 2024 Scallop Dredge Survey caught a total of 4,624 scallops, approximately 11% fewer than during the 2021 spring survey (prior to the previous opening of this rotational area (Fig. 3A). This decrease was primarily observed in the sublegal (3-4 inches) and seed (<3 inch) scallops. Despite the slight decrease in the number of legal scallops, and the decrease in larger scallops, the average meat yield of scallops was higher than 2021, resulting in a 2% overall increase in the weight of the abductor muscle for legal scallops (Fig 3B & 3C). Across the survey domain, 1,004 scallops were measured for meat yield and visually examined for quality, of which 6 (0.6%) were fair quality and 2 (0.2%) were poor quality.

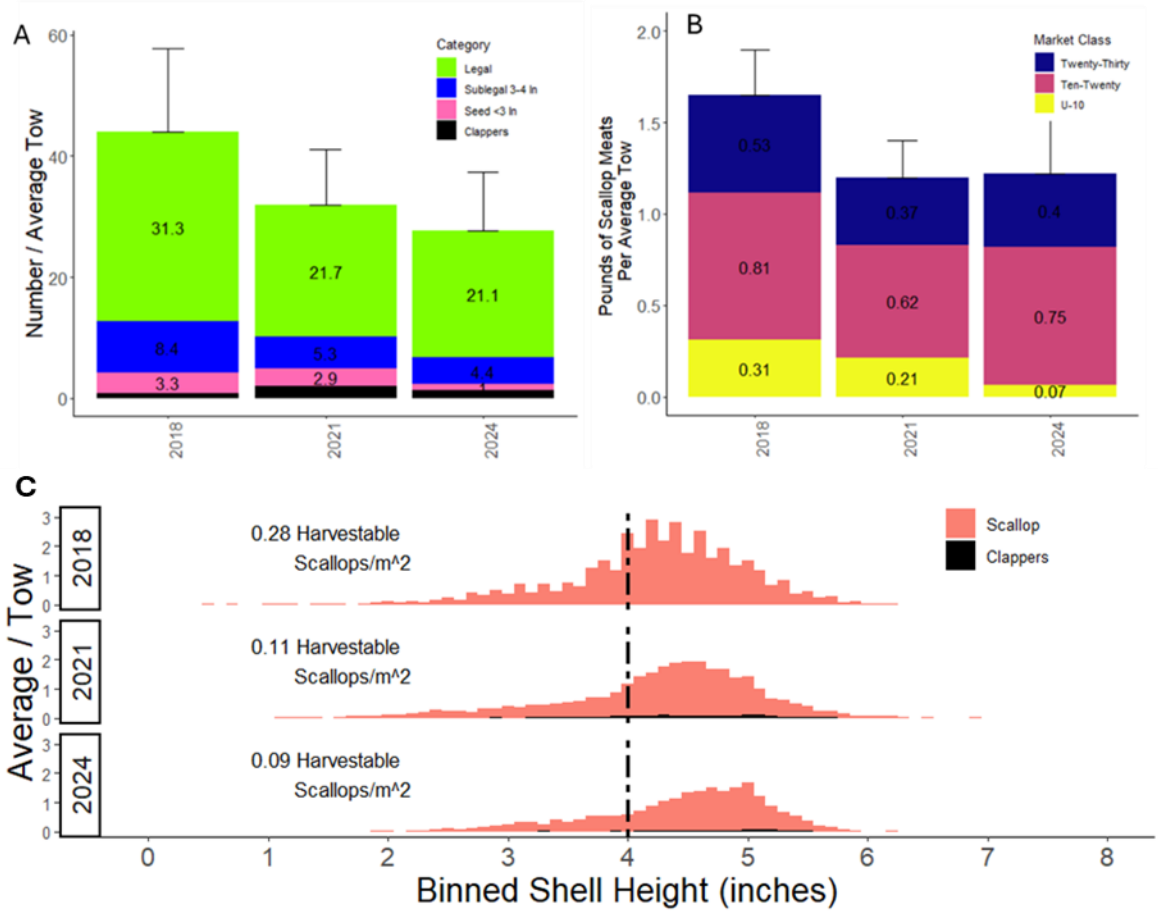


Figure 3. *The height of each bar in the left figure (A) represents the average number of scallops caught for all tows of the past three surveys in Rotation C, the color represents the size class of the shell, where pink are seed scallops <3 inches, blue are sublegal scallops between 3 and 4 inches and green are legal scallops >4 inches. The height of each bar in the right figure (B) is the average estimated weight of scallop meat caught per tow for the past three surveys in Rotation C, the color represents the proportion of each market class. The bottom figure (C) is the size of scallops (orange) and clappers (black) for an average tow shell height frequency binned into 0.1 inch groups for each survey year).*

Since the start of the rotational management plan, the number of stations with high (>0.25 scallops/m^2) and moderate (0.1-0.25 scallops/m^2) densities of scallops has decreased as the number of stations with few scallops has increased, particularly in the eastern areas (Fig. 4).

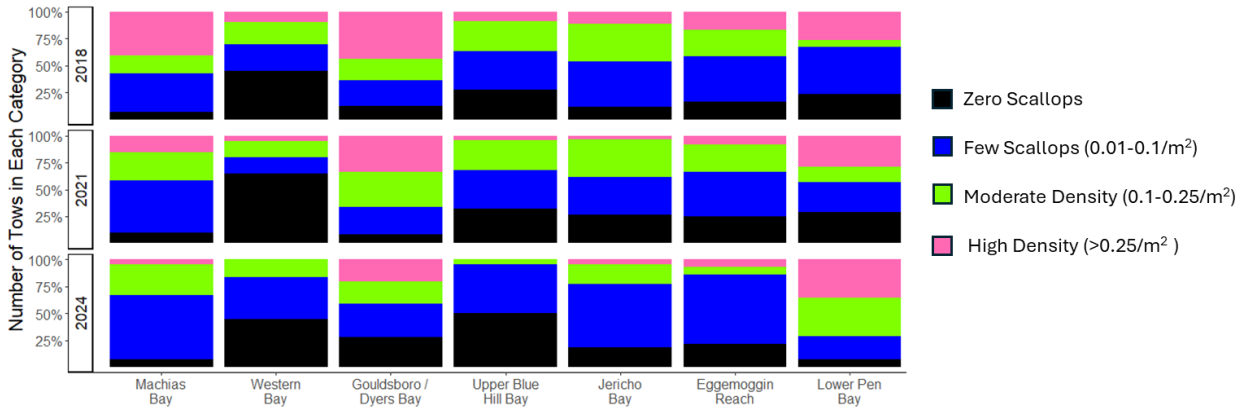


Figure 4. *Percent of survey tows catching either zero (black), few (blue), a moderate amount (green) or many (pink) scallops for the past three years of surveys in rotation C.*

The typical tow for this survey included a mixture of scallops, crabs and shell. Lobsters, sea cucumbers, starfish, flounders and tunicates (sea squirts) were the other most commonly observed species. Despite only catching tunicates at 14% of the stations, by volume they were the dominant non-target species. Tunicates were observed between Isle au Haut Bay and the Cranberry Isles with the large catches primarily in Upper Blue Hill Bay and the northern part of Lower Jericho Bay.

In general for Rotation C, the number of legal scallops is similar to the numbers observed from the same areas in the 2021 Spring Survey, despite not observing a strong signal of newly settled scallop seed since 2018. Yield estimates from this survey continue to support the growth information for Zone 2. In general for Zone 2, once scallops reach approximately 4.5 inches, the growth of the shell slows, but the size of the meat increases at a faster rate. Despite relatively few scallops caught in the two areas sampled in Rotation B (last opened in the 2022-2023 fishing season), the scallops that were near legal size in 2022 have not yet grown past 4.5 inches (Figs 14-15). If the Rotation B areas were opened in the 2024-2025 season, the estimated yield would be 20 count. If these areas remained closed as previously scheduled until the 2025-26 season, the anticipated yield would increase by approximately 20% to around 16 count.

Fleet Reported Landings

The daily reported landings from fleet members were grouped into each rotational area using the reported positions from the landings data. These data were then used to calculate the total pounds harvested, the maximum boats fishing in that area for a given day, and the total days fished by all fleet members for each rotational area. These data are only as reliable as the information provided by the fleet.

For the entire rotation C the most recent season observed a decline in the total number of boats fishing and equivalent reductions in the total days and landed pounds (Fig 6.) In these plots if the line is higher than the bar than the average reported pounds per vessel is less than 100 pounds.

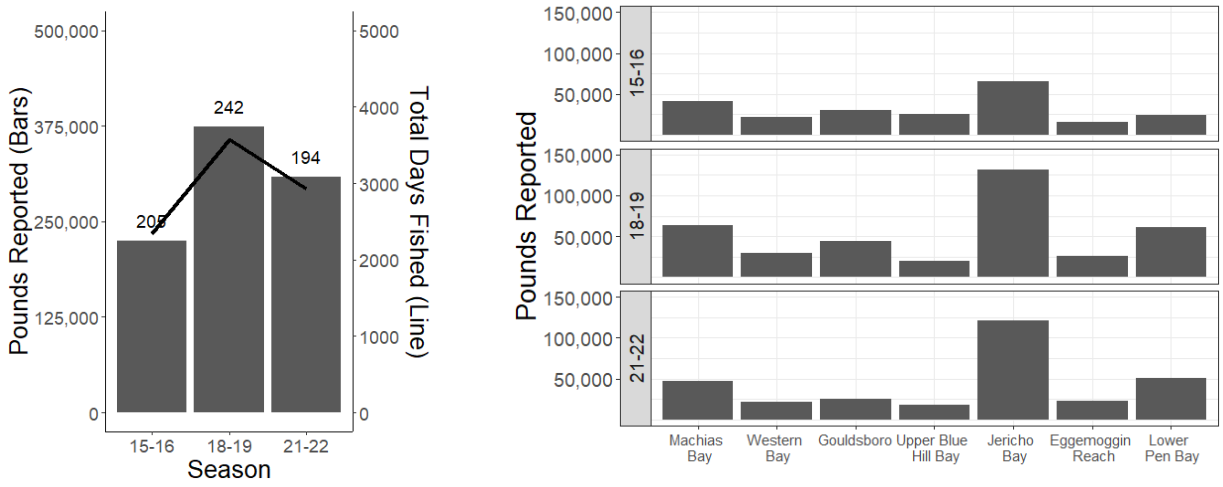


Figure 5*. Total Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters for all areas in rotation C (Left). Total Harvester Reported pounds by season for each subarea in rotation C (Right).*

Rotation Area Specific Survey Results

Average density of legal scallops for each rotational area was calculated for the survey areas highlighted in green in the maps on pages 6-15 (Table 1). For Machias Bay, Gouldsboro, and Jericho Bay, some survey areas were excluded for comparison of density between years. In Machias Bay and Gouldsboro, the areas were excluded because they were only surveyed for Objective 2, to monitor low density areas. In Lower Jericho Bay, there was poor survey coverage in previous years in the southern portion.

Table 1. *Average density of the weight of legal scallops for each year surveyed in Rotation C (Fig 5) for stations within the Rotation C (green) survey areas shown in the maps of figures 7-15.*

Area	2018 g/m2	2021 g/m2	2024 g/m2
Machias	1.81	1.6	2.35
Western Bay	1.58	2.19	0.9
Gouldsboro	4.38	2.43	3.08
Upper Blue Hill	2.62	2.13	0.7
Lower Jericho	2.59	1.81	0.92
Egg Reach	2.45	2.13	1.71
Western Pen Bay	3.13	3.11	4.11

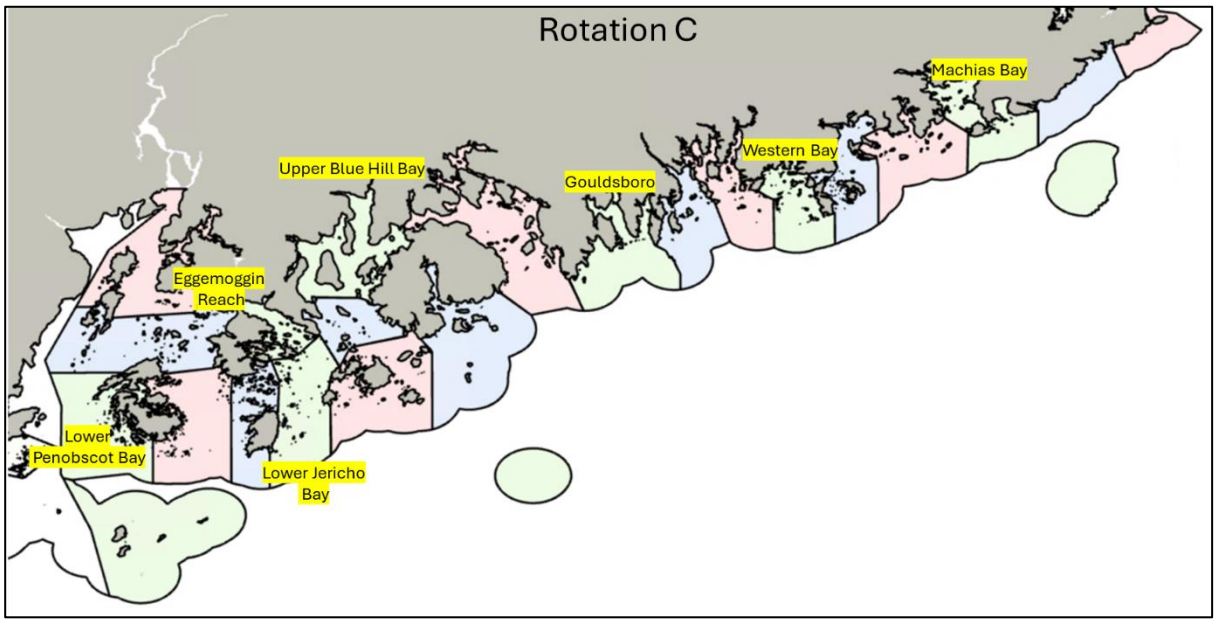
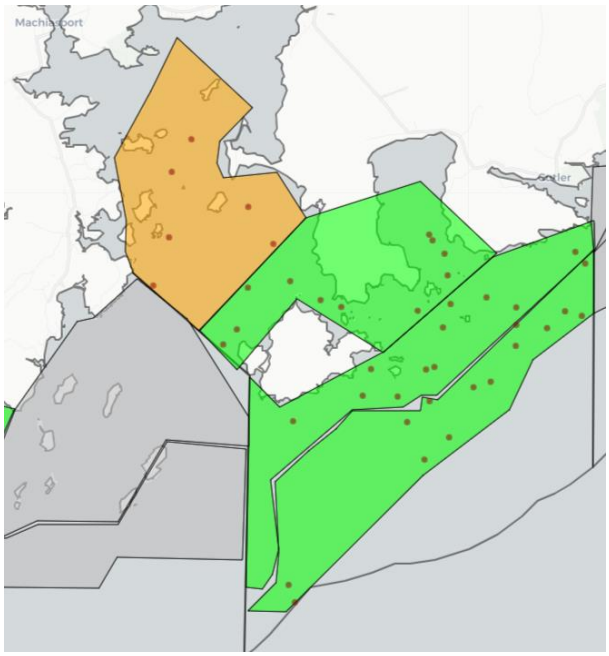
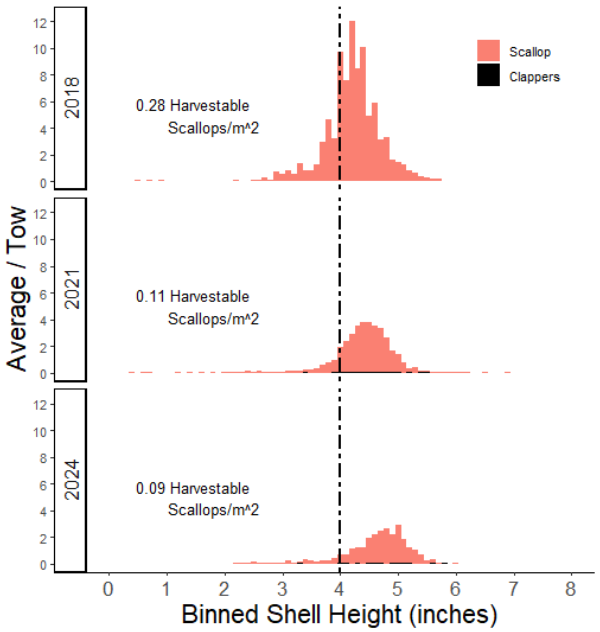


Figure 6. *Map of the Zone 2 Rotation Areas. Rotation C (green and labeled) areas are scheduled to be open for dragging in the 2024-25 fishing season.*

Machias Bay Rotational Area





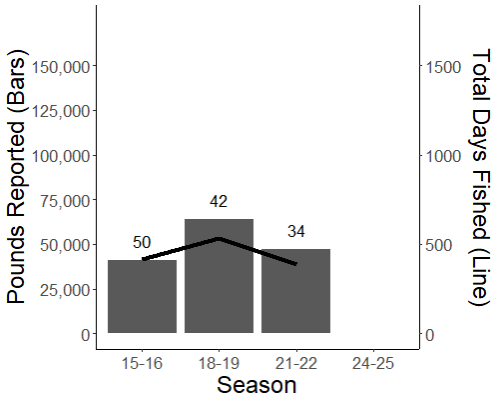


Figure 7. *Map of the 2024 survey domain for Upper Machias Bay (top left). Areas in green were used to calculate density estimates for the rotational area while the survey areas in orange were not included in the density estimates. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

Upper Machias Bay historically has had a high density of scallops but has not appeared to recover since the 2018-2019 season. Due to the recent low densities in this survey area, the area was not included in the analysis of average density when comparing survey results with prior years. We are also recommending that a portion of upper Machias Bay be closed for the upcoming season since, in addition to the low density, 35% of the scallops observed in the northern area were sublegal. The inshore areas of this rotation are unlikely to support increased fishing pressure compared to recent open years. Despite slightly lower densities, the scallops in the deeper water had a higher meat yield than previous years. Few seed or sublegal scallops were observed south of Cross Island, but there were moderate densities of seed and sublegal scallops further inshore.

Western Bay/West Moosabec Reach

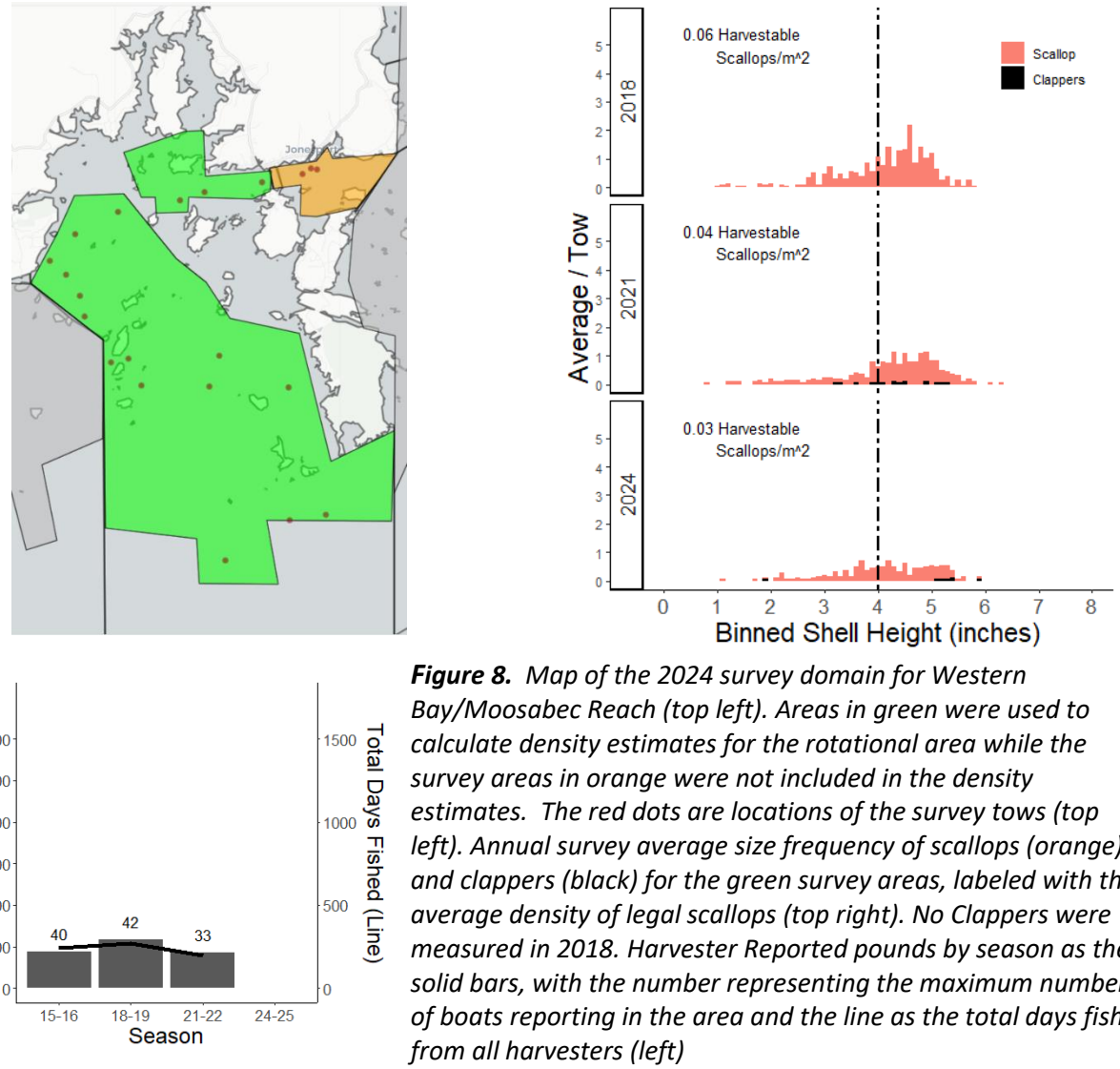
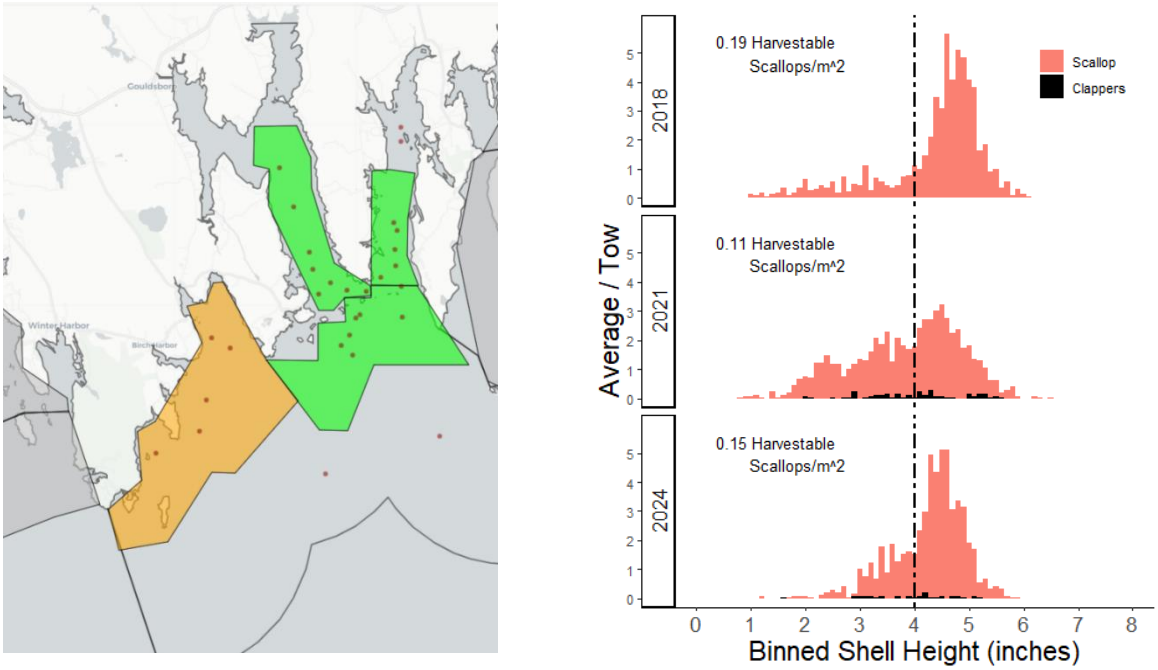


Figure 8. *Map of the 2024 survey domain for Western Bay/Moosabec Reach (top left). Areas in green were used to calculate density estimates for the rotational area while the survey areas in orange were not included in the density estimates. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

Over the past three rotations there has been a decrease in density in the Western Bay/ West Moosabec Reach. West of the Jonesport bridge, the scallop densities in the reach are notably lower than to the east. Overall, there was a notable decrease in the density of legal scallops in this area where sublegal scallop densities remained the same. Besides the east Moosabec Reach (not scheduled to be opened), no high-density tows were observed during the 2024 spring survey in this area. Only 44% of the scallops in the east Moosabec Reach were legal, 36% were sublegal (3-4 inches) and 20% were seed (<3 inches).

Gouldsboro



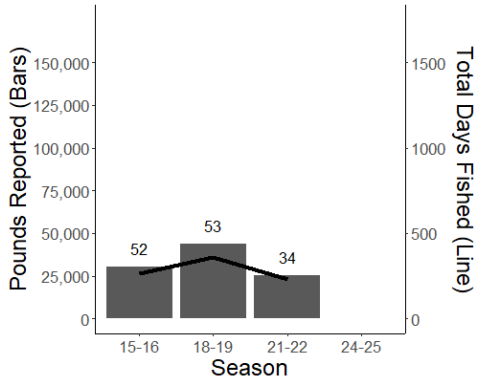
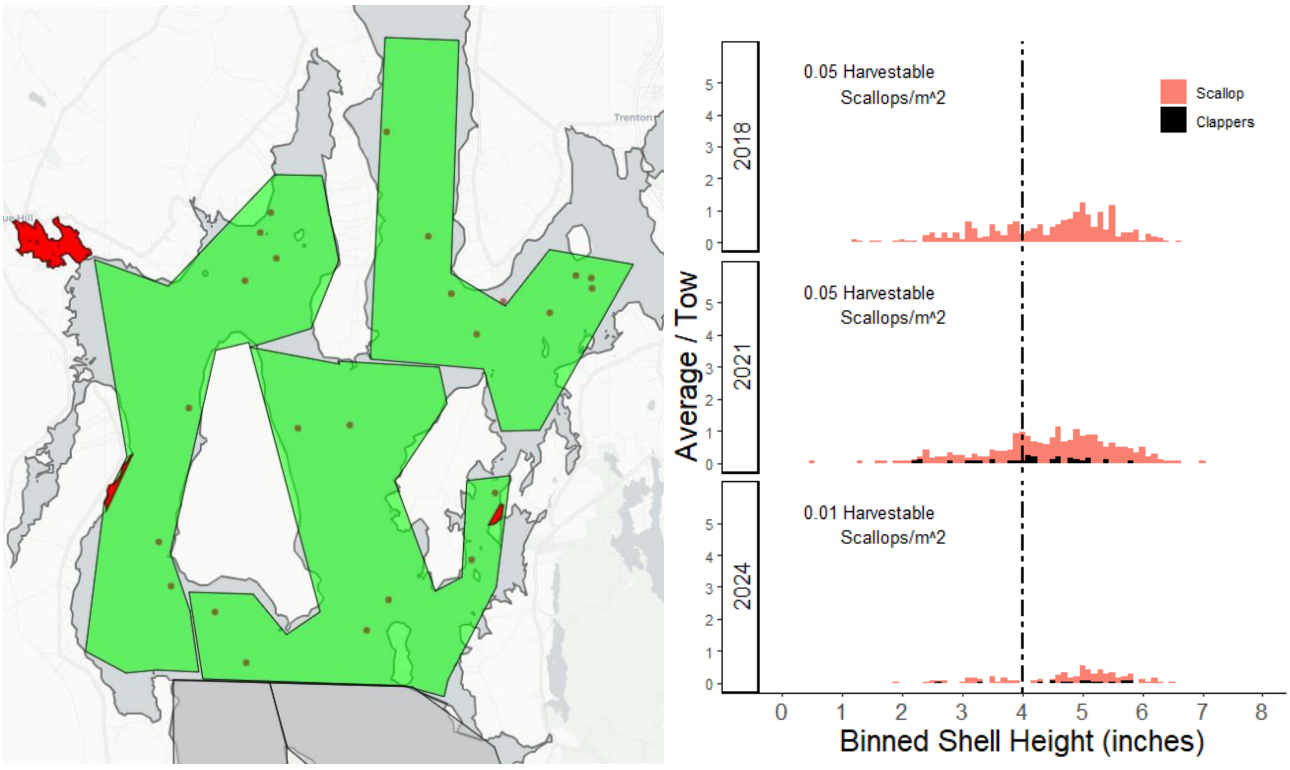


Figure 8. *Map of the 2024 survey domain for Gouldsboro (top left). Areas in green were used to calculate density estimates for the rotational area while the survey areas in orange were not included in the density estimates. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

In previous years, the survey did not extend into the western part of the Gouldsboro Rotational Area, so those stations in orange area were not included in the comparison of density between years. Most of the stations in the orange area were jagged bottom and were not towable, however some scallops were observed with an average density of 0.02 scallops/m^2. Two exploratory stations were added outside our survey area to the south but there was heavy lobster gear in this area making it difficult to sample.

Despite there being fewer scallops larger than 5 inches this year, the average density of legal scallops increased from the 2021 survey and was equal to the 2018 survey. There was a slight decline in density of scallops in Dyers Bay and a slight increase in Gouldsboro Bay proper. Most of the smaller scallops were located inside Gouldsboro Bay, but there was no noticeable change in the sublegal scallops between 3-4 inches yet a clear decrease in the scallops less than three inches. The meat yield was nearly identical to the previous rotation.

Upper Blue Hill Bay



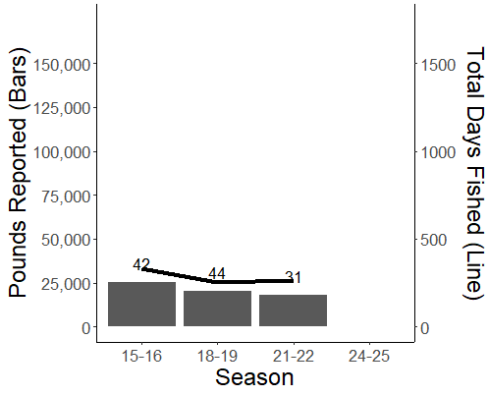
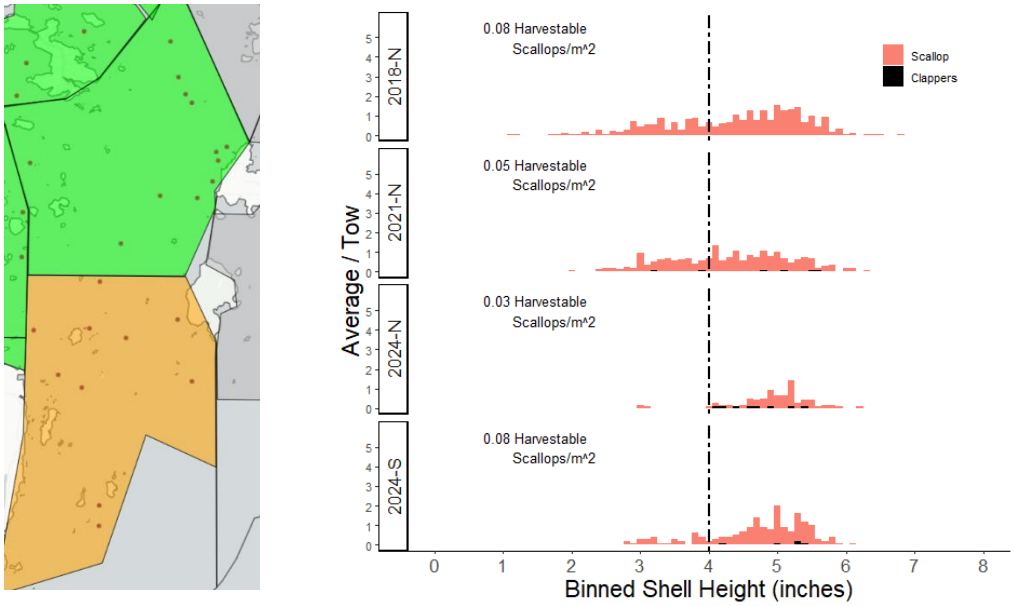


Figure 9. *Map of the 2024 survey domain for Upper Blue Hill Bay (top left). Areas in green were used to calculate density estimates for the rotational area. Areas in red were not sampled and represent mooring closures. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

Few scallops were observed in Upper Blue Hill Bay with a clear decline in survey results from previous rotations. Local fleet members have indicated that the resource is patchy in this area and our survey may not have captured the density of scallops effectively. There was also a very poor signal of sublegal and seed scallops. In general, the total catch for each site was low with many tunicates throughout the area, with one site catching approximately 5 bushels of tunicates, likely *Accidiella aspersa.*

Lower Jericho Bay



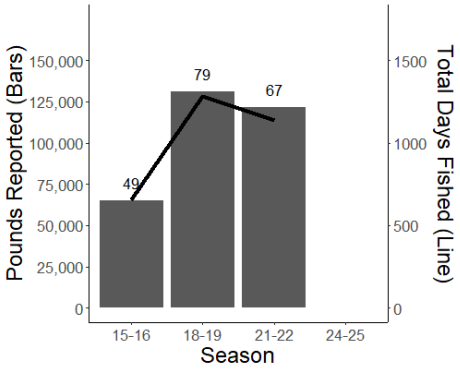


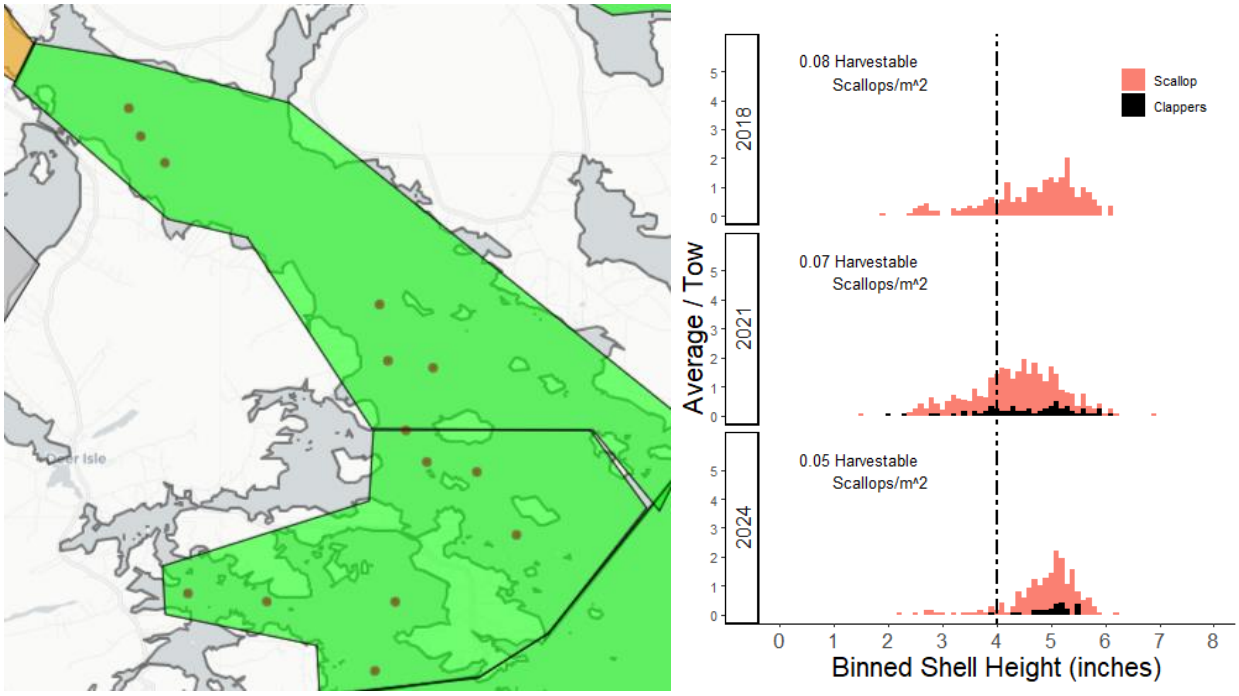
Figure 10. *Map of the 2024 survey domain for Lower Jericho Bay (top left). Areas in green were used to calculate density estimates for the rotational area, while the survey areas in orange were not included in the density estimates. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

Southern Jericho Bay (orange area) did not have sufficient stations in past years to compare the data observed in the Spring 2024 Survey. Anecdotal information from the fleet and landings reports identified that effort has been higher in these southern areas in the 2021-22 and 2018-19 seasons. In 2024, this southern area had a decent density of scallops with one high density site. The northern stations have observed a continued decline in the legal density the past three rotations with little evidence of seed since 2018. Meat yield was lower than previous rotations in the northern stations.

At the stations to the north, the survey caught many tunicates with two tows catching more than 5 bushels, and only a few scallops present. To the south, the stations were more of a mix of rocks, scallops, and old shell.

Scallops were tagged and released in this area in 2023 as part of an ongoing growth study. If a tagged scallop is captured, please write down the date and location, and save both shells with the tag to return to the DMR.

Eggemoggin Reach



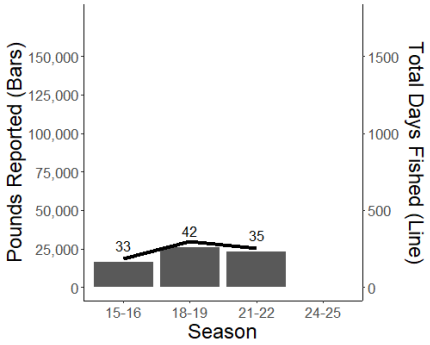
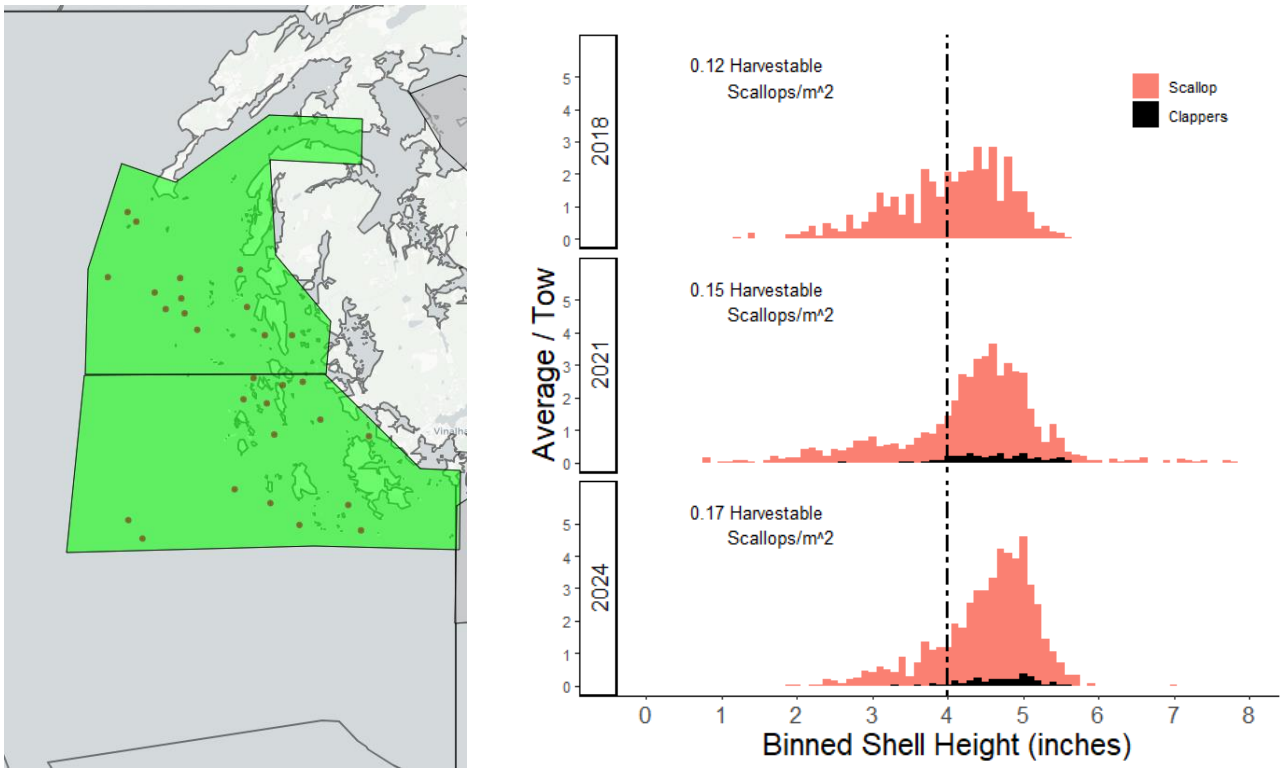


Figure 11. *Map of the 2024 survey domain for Eggemoggin Reach (top left). Areas in green were used to calculate density estimates for the rotational area while the survey areas in orange were not included in the density estimates =. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

Sites inside the Eggemoggin Reach Area have experienced a decrease in density where Southeast Harbor observed a slight increase. There was little evidence of sublegal or seed in this rotation area, despite observations of seed from divers this past season. It is possible that the seed may be too small for the survey dredge two-inch rings. There was a relatively high density of clappers in all size classes observed in the 2021 Survey, but the density of clappers returned to normal levels for the 2024 Survey. Despite similar densities, meat yield was lower than previous survey years. There were many rocky tows in this area with some tunicates, crabs, and sea cucumbers mixed in.

Lower Penobscot Bay



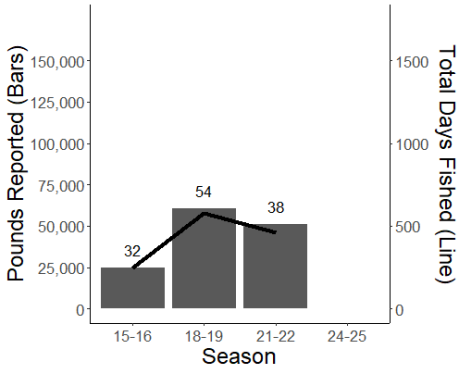


Figure 12. *Map of the 2024 survey domain for Lower Penobscot Bay (top left). Areas in green were used to calculate density estimates for the rotational area. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas for each year, labeled with the average density of legal scallops (top right). No Clappers were measured in 2018. Harvester Reported pounds by season as the solid bars, with the number representing the maximum number of boats reporting in the area and the line as the total days fished from all harvesters (left)*

There were multiple areas of high and moderate density in Lower Penobscot Bay. The meat yield was similar to previous survey years. The overall density of legal scallops increased, but there was little signal of new seed. The density of sublegal scallops has remained relatively constant with no evidence of new settlement in this current rotation. There were no tunicates observed in this area with many rocky stations outside the islands. Scallops were tagged and released in this area in 2020 as part of an ongoing growth study. If a tagged scallop is captured, please write down the date and location, and save both shells with the tag to return to the DMR.

Zone 1: Metinic and Green Islands

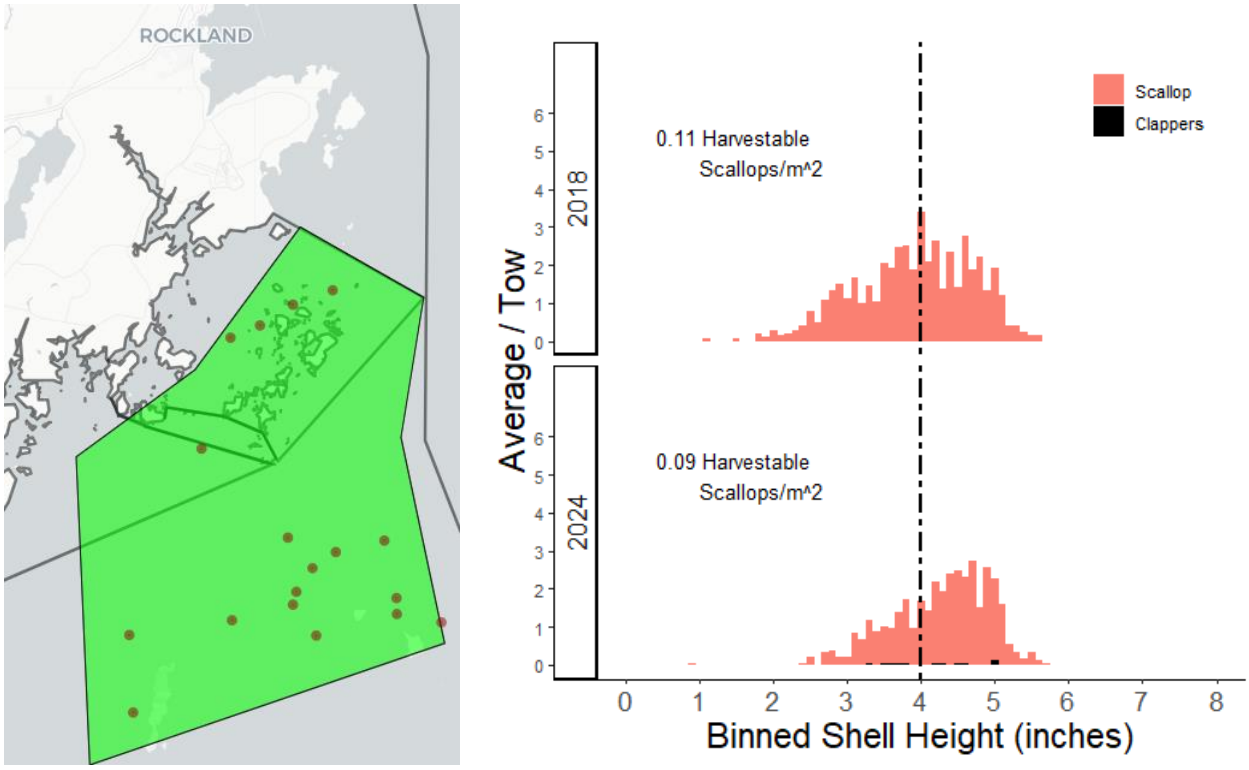


Figure 13. *Map of the 2024 survey domain for Zone 1 Metinic and Green Islands (top left). Areas in green were used to calculate density estimates for the rotational area. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right).*

The 2024 Spring Survey extended into Zone 1 around Metinic and the Green Islands up to the Mussel Ridge. This area was also surveyed in 2018. There were moderate densities of scallops in this area. The size frequency shows seed present in 2018 with clear exploitation of the scallops above 5.5 inches. In the 2024 Survey there was not much seed observed and the exploitation signal was for smaller scallops closer to 5 inches.

Rotation B: East Isle au Haut Bay

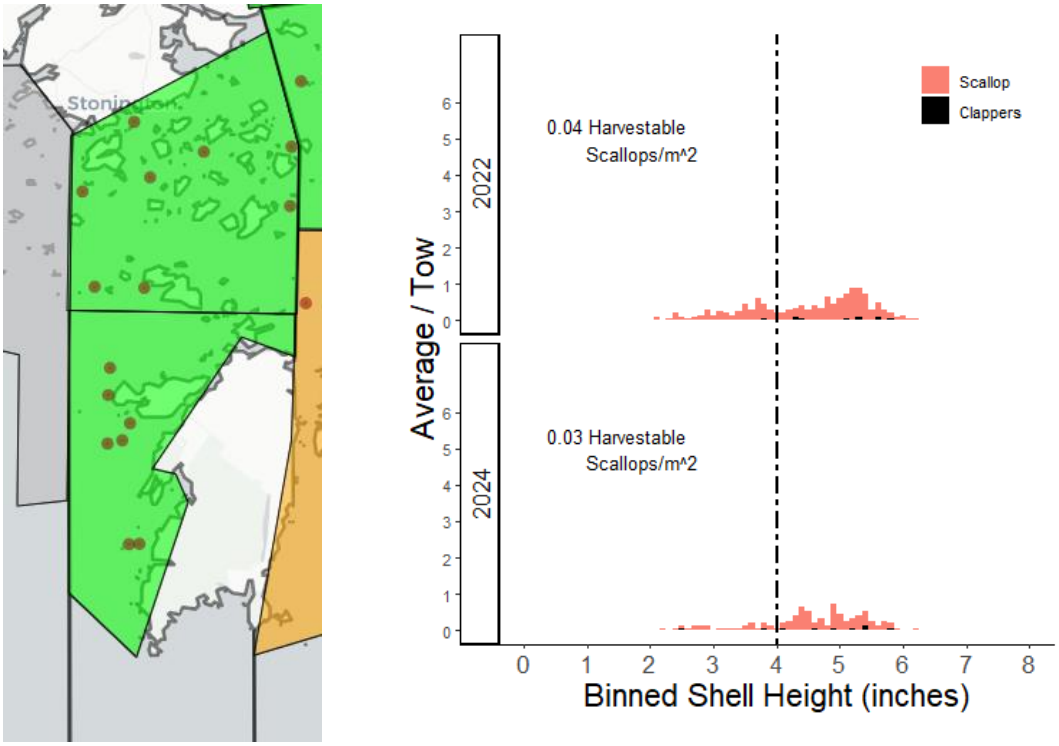


Figure 14. *Map of the 2024 survey domain for Rotation B: East Isle au Haut (top left). Areas in green were used to calculate density estimates for the rotational area. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right).*

East Isle au Haut Bay is in Rotation B and was last open to fishing in the 2022-2023 season. This area was added to the 2024 Survey to provide additional management information about the rotational plan. This area has traditionally been one of the lowest areas of scallop harvest in Zone 2. The 2024 Survey observed a couple of sites with moderate densities of scallops but continued overall low densities. The 2024 size frequency suggests the sublegal scallops grew as expected into the legal-size range around 4.5 inches. The number of scallops above 4.5 inches is lower than the survey prior to the 2022-2023 season where the area was surveyed after a 2-year closure rather than only one year.

Rotation B: Cranberry Isles

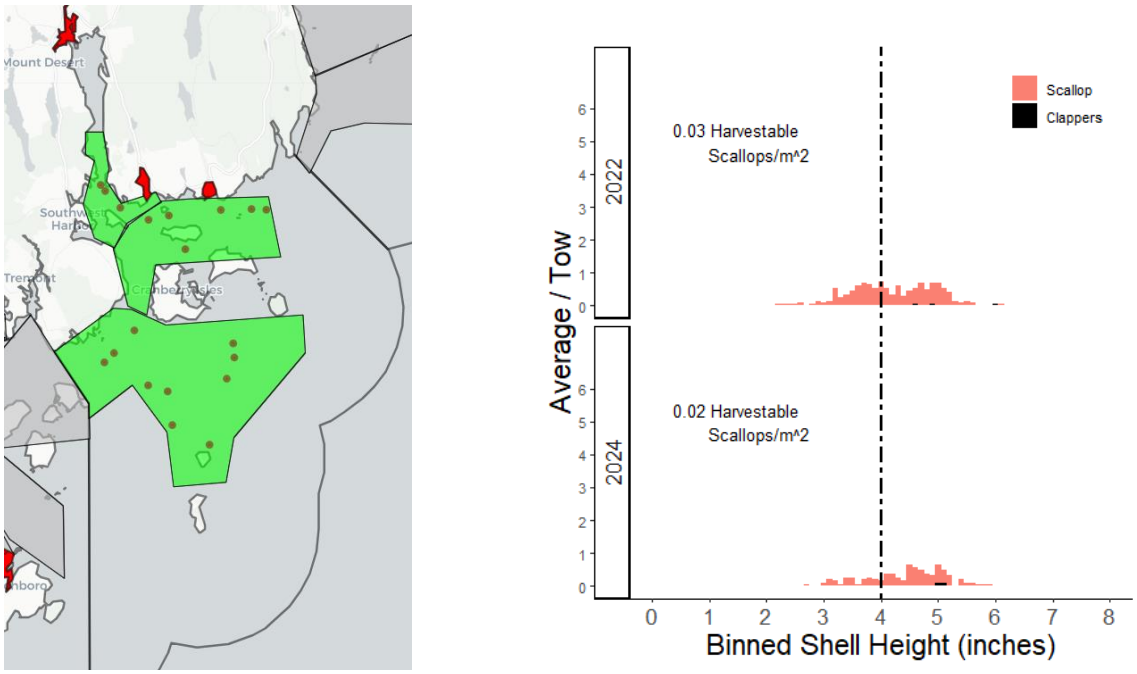


Figure 15. *Map of the 2024 survey domain for Rotation B: Cranberry Isles (top left). Areas in green were used to calculate density estimates for the rotational area, while red areas represent mooring closures and were not sampled. The red dots are locations of the survey tows (top left). Annual survey average size frequency of scallops (orange) and clappers (black) for the green survey areas, labeled with the average density of legal scallops (top right).*

Cranberry Isles is part of rotation B and was last opened to fishing in the 2022-2023 season. This area was added to the 2024 Survey to provide additional management information for the rotational plan. This area has traditionally been a moderate effort and scallop density area with reported landings between 20,000 and 40,000 pounds/season since the start of the rotational management plan. The 2024 Survey results observed very limited numbers of sublegal or seed scallops. The sublegal scallops observed in the 2022 Survey appeared to have grown as expected and there was a similar size distribution of legal scallops despite a decrease in the total number.