Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

PRE-FISHERY STOCK ASSESSMENT
LOUGH FOYLE NATIVE OYSTER FISHERY

Autumn 2020

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1. Executive Summary

A pre-fishery stock assessment was conducted on the commercially active oyster beds in Lough Foyle during autumn 2020.

The total biomass of oysters in the population has been estimated at 1,055 tonnes. This is a large increase in the population size relative to the previous survey in spring 2020. This increase can be attributed to the increase in representation of 2 year old oysters which settled during the heavy spatfall in 2018. The harvestable biomass (oysters >80mm) within the population is estimated to be 69 tonnes, with a total of 222 tonnes of the population over 70mm which should recruit into the fishery in 2021/22.

There was no unusual mortality recorded on any of the oyster beds nor were there any significant numbers of invasive species recorded.

It is recommended that the fishery does not remove the total harvestable biomass in the 2020/21 season. This will help to prevent the loss of an effective spawning stock for the 2021 spawning period and help retain sufficient stock to support a sustainable fishery for 2021/22.

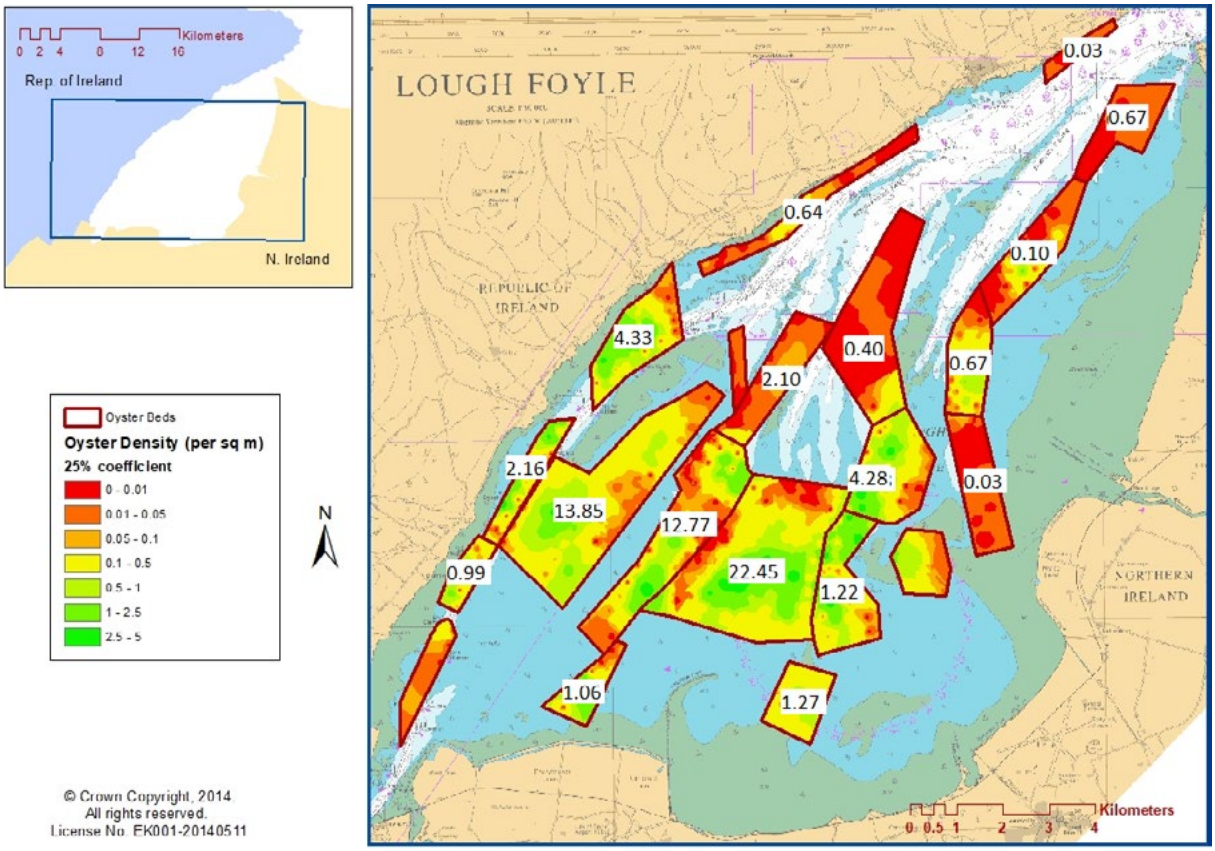

Figure 1 Estimated Biomass (tonnes) of oysters >80mm on Foyle Oyster Beds Autumn 2020

2. Introduction

A pre-fishery survey of the native oyster beds in Lough Foyle took place during the period September/ October 2020. This survey was conducted by Loughs Agency staff on-board a local fishing vessel.

3. Methods

A dredge survey was carried out in Lough Foyle using a local fishing vessel. Scientific staff from Loughs Agency assessed the population distribution and abundance by analysing dredge contents from each sample location (Figure 2A-B). Oyster density is calculated by dividing the area dredged (m2) by the total number of oysters in each age class after adjusting for dredge efficiency (25% for adults, 12.5% for 1 year olds, 5% for spat) and any sub-sampling. Dredge efficiency has been taken from the work done in Lough Foyle during the Baseline Survey of Shellfish Resources conducted by Cefas in 2006.

Oyster density is interpolated across the oyster beds using a six point Inverse Distance Weighting (IDW) method and this allows a biomass figure to be calculated based on the area (m2) of the oyster bed within each density category (see Appendix I for full calculations). This follows the approach of similar work in Irish oyster fishery stock assessments conducted by the Marine Institute. The average weight of the oysters in each size class on each bed is used to factor up to an overall biomass based on mean density within each bed. Any fresh dead oysters are recorded as a measure of recent mortality (these exhibit no fouling on the inner surface of the shell valves). Oyster spat (<30mm) presence or absence was recorded at each sample point, as was total number of spat per dredge sample.

Figure 2 Methods Used During Survey: (A) Analysing and Recording Dredge Contents. (B) Oysters Are Measured For Length Frequency Analysis

4. Adult Oyster Density

Adult oyster (>50mm) density was calculated for each of the sample stations (Figure 3). The mean density for all beds is 0.48 oysters/m2. This figure is high relative to the results from previous years and is attributable to the recruitment into the adult stock of juvenile oysters from the 2018 settlement in the past year (Figure 4). The maximum density recorded was 4.14 oysters/m2 which was observed on the Perch Bed.

Oyster density recorded from each dredge tow has been represented as point data and then interpolated using a 6 point IDW methodology. The interpolation has been performed only in areas of the oyster beds that were surveyed and have point data present. A barrier feature has been placed within the interpolation between the oyster beds in or to the north of the navigation channel and all beds on the east of the navigation channel to help replicate the impacts of a natural barrier (a sandbank) between the beds in this area.

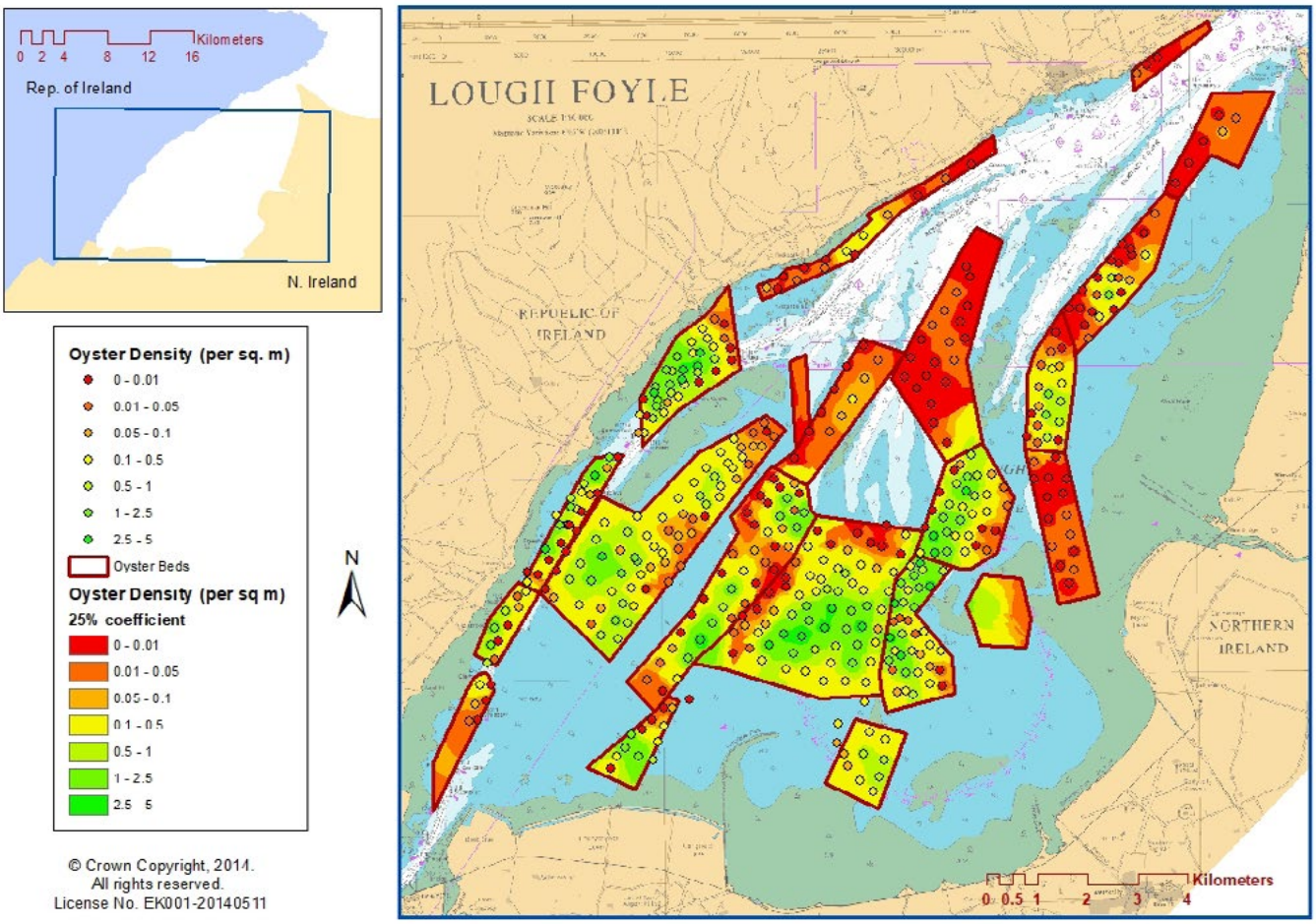

Figure 3 Interpolated Oyster Density Lough Foyle Autumn 2020

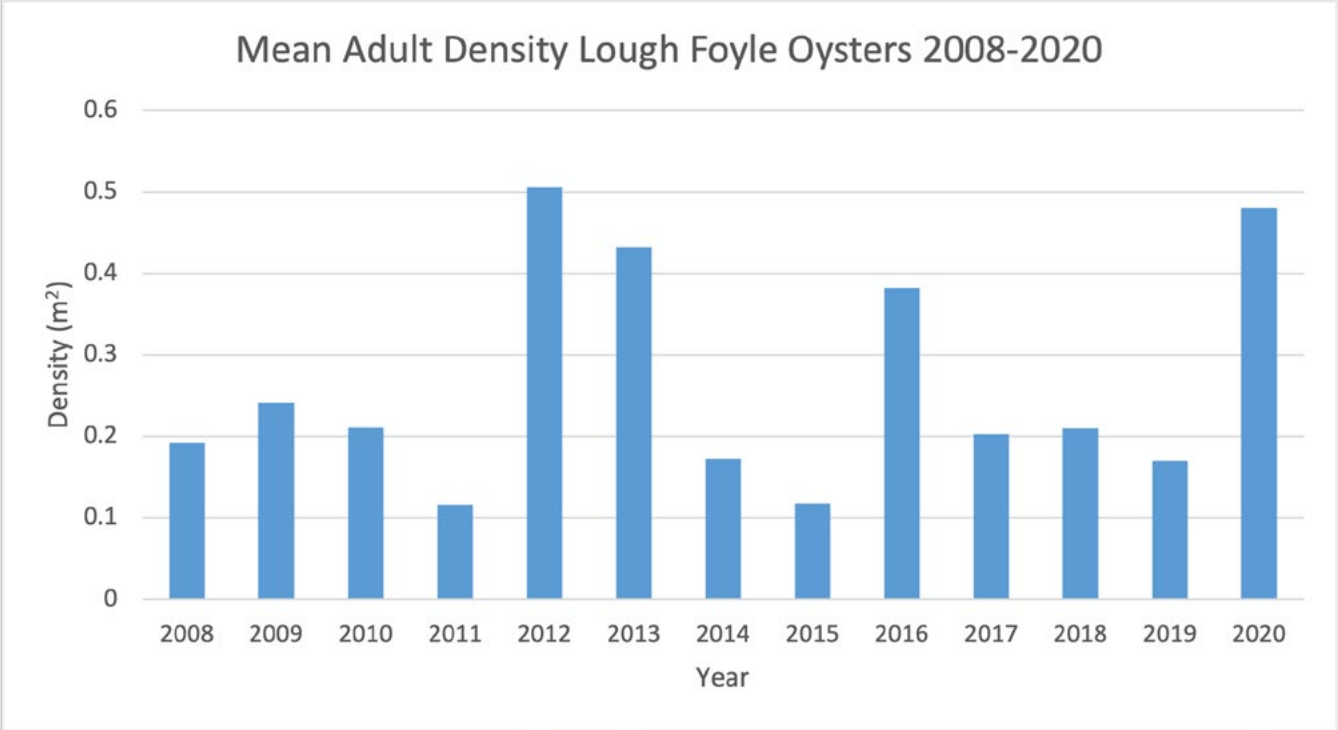

Figure 4 Mean Density Lough Foyle from Autumn Surveys 2008-2020

5. Biomass Estimate

The estimated total oyster population biomass is 1,055 tonnes (Table 1). This is an increase from the estimated biomass of 378 in spring 2020 and 479 tonnes in autumn 2019. Total stock biomass over 80mm is currently estimated to be 69.7 tonnes and biomass over 70mm is estimated to be 222 tonnes.

The total stock biomass is low relative to previous years (Figure 5) and this is likely due to the series of poor recruitment years from 2015-2017. The 2014 cohort that has sustained the fishery over the past number of seasons has largely been removed by the fishery and this year's fishery will remove the majority of the remaining individuals from this cohort.

The previous biomass estimates have correlated well with the observed landings in the fishery (Figure 6). Note that on this graph the survey estimate is that of the pre-season (autumn) survey and the landings figure is taken from logbook returns made by fishermen on a continuous basis throughout the season. On one occasion (2013/14) the stock assessment was not completed on all beds prior to the commencement of the fishery and the landings made prior to the survey being completed were separated for the comparison.

Table 1 Oyster Biomass Per Oyster Bed In Lough Foyle Spring 2020

Bed name	Area (ha)	Mean Weight (g)	Bed Total (t)	Total (t) >80mm	Total (t) >70mm
Barney's Bank	200	40	0.96	0.71	0.81
Black Ghee	236	37.6	1.08	0.03	0.20
Drumskellan	91	39.3	21.85	0.99	2.39
Flat Ground	936	42.58	311.65	22.45	72.23
Glenburnie	133	40	0.20	0.03	0.06
Great Bank	824	46.1	126.33	13.85	31.96
McGhee	167	39	25.39	1.27	6.59
Middle North	228	45	2.83	2.10	2.38
Middle South	531	44.1	125.26	12.77	35.79
Moville	250	38.01	5.81	0.10	0.84
Peak	208	39.8	22.66	0.67	4.35
Perch	276	41.8	108.02	4.33	22.85
Quigley's Pt	139	38.8	46.83	2.16	5.18
Redcastle	141	40	6.48	0.64	1.29
Sandy Ridge	474	40	4.39	0.40	0.80
Shooting Range	81	36.2	44.49	1.06	5.10
Southside North	312	38.01	100.77	4.28	12.83
Southside South	297	39.5	100.22	1.22	16.08
Total	**5524.22**	**40.32**	**1055.24**	**69.07**	**221.72**

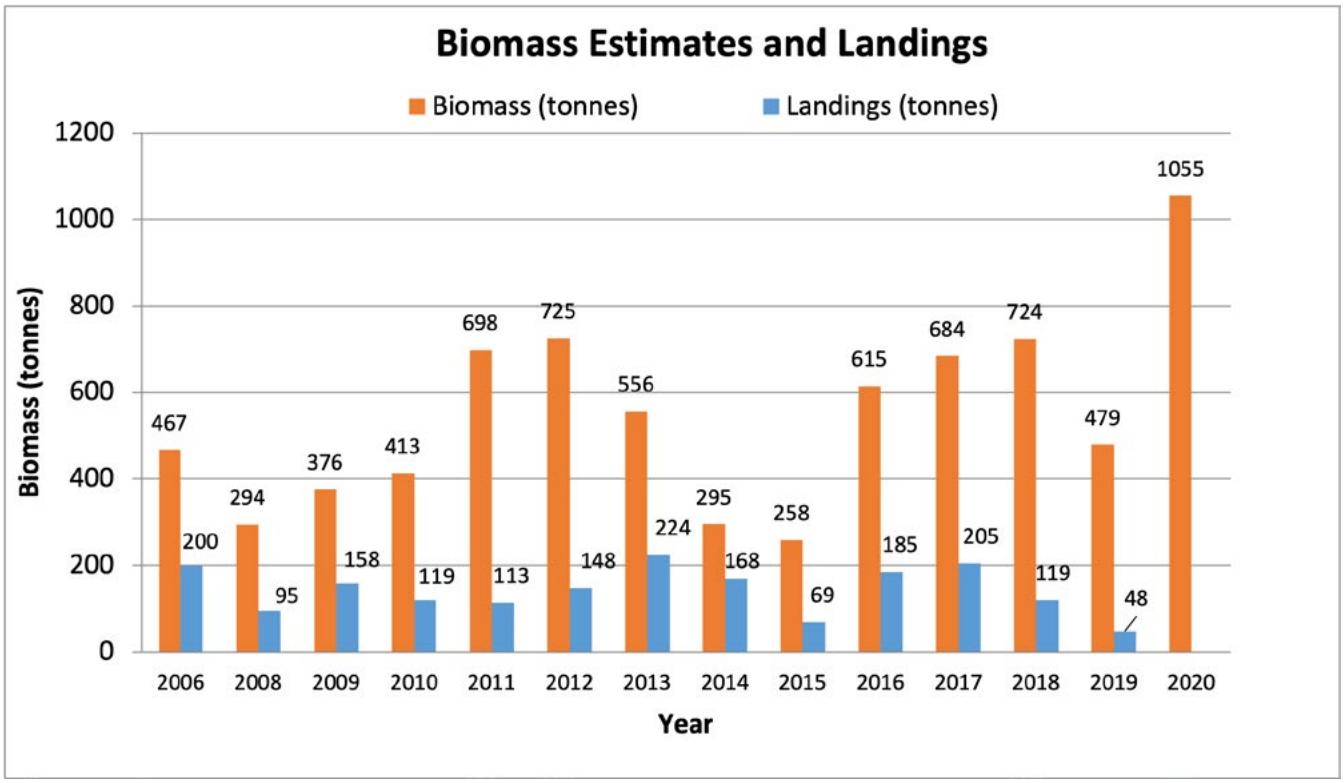

Figure 5 Historic Pre-Season Biomass Estimates and Landings Lough Foyle

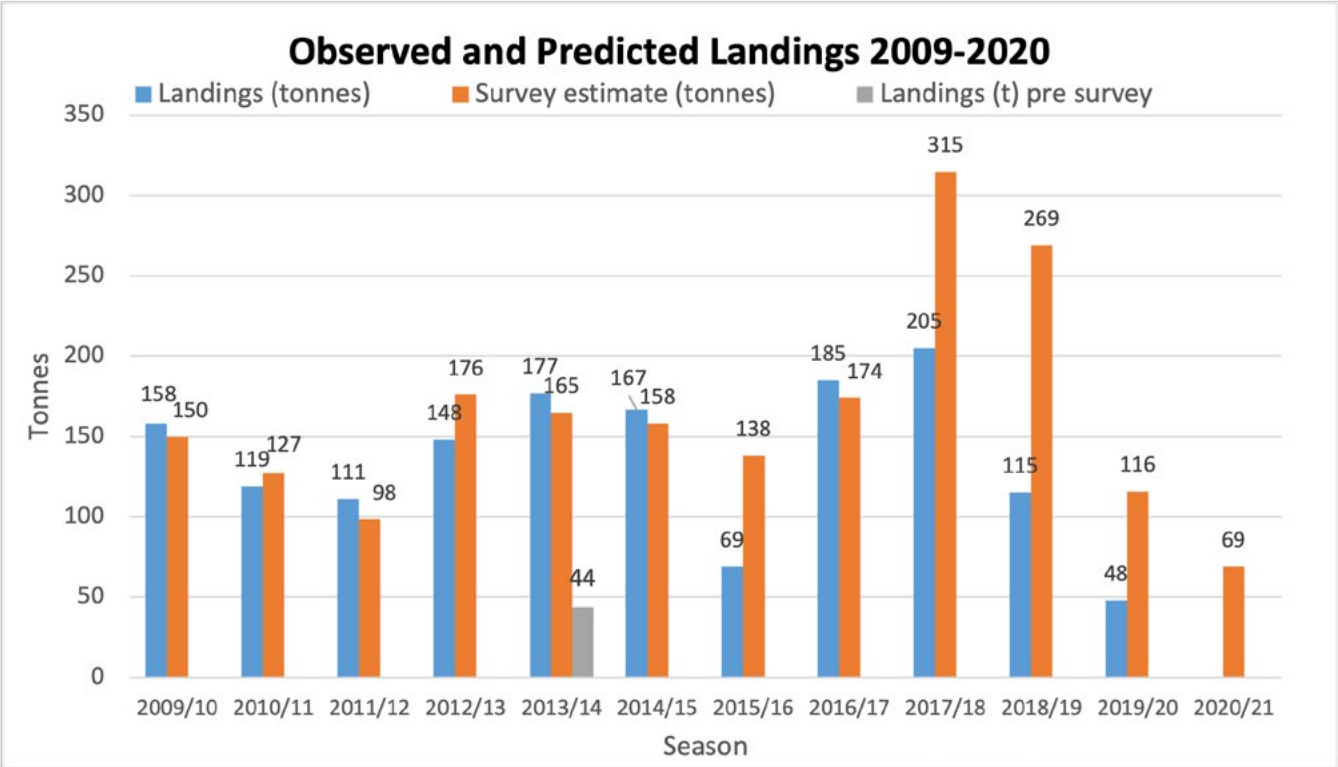

Figure 6 Observed and Estimated Landings from Lough Foyle

6. Spatfall

Oyster spawning and larval survival is thought to be heavily dependent on good environmental conditions throughout the spring and summer and the threshold water temperature values being exceeded for a minimum period of time, usually 15-16°C for 2-4 weeks. If these conditions do not occur it is expected that spawning will be limited to a small percentage of the stock on each bed and the numbers of juveniles will be minimal. Spawning is also limited by oyster density and proximity of each individual oyster to another has an impact on fertilisation success. Removal of oysters during the fishing season reduces the oyster density.

A limited spat settlement event appears to have occurred in 2020 on the highest density oyster beds with 21% of the stations sampled having spat present (Figure 7 and 8). The majority of the spat recorded is between 12.5-27.5mm in size suggesting that it settled out early in the summer period.

Mean spat density recorded was 0.12/m2 which is relatively high compared to many previous years. The historic trends show that spawning has been relatively consistent in the stock in the past 3 years than at any time previous with spat density and abundances remaining relatively high during this period.

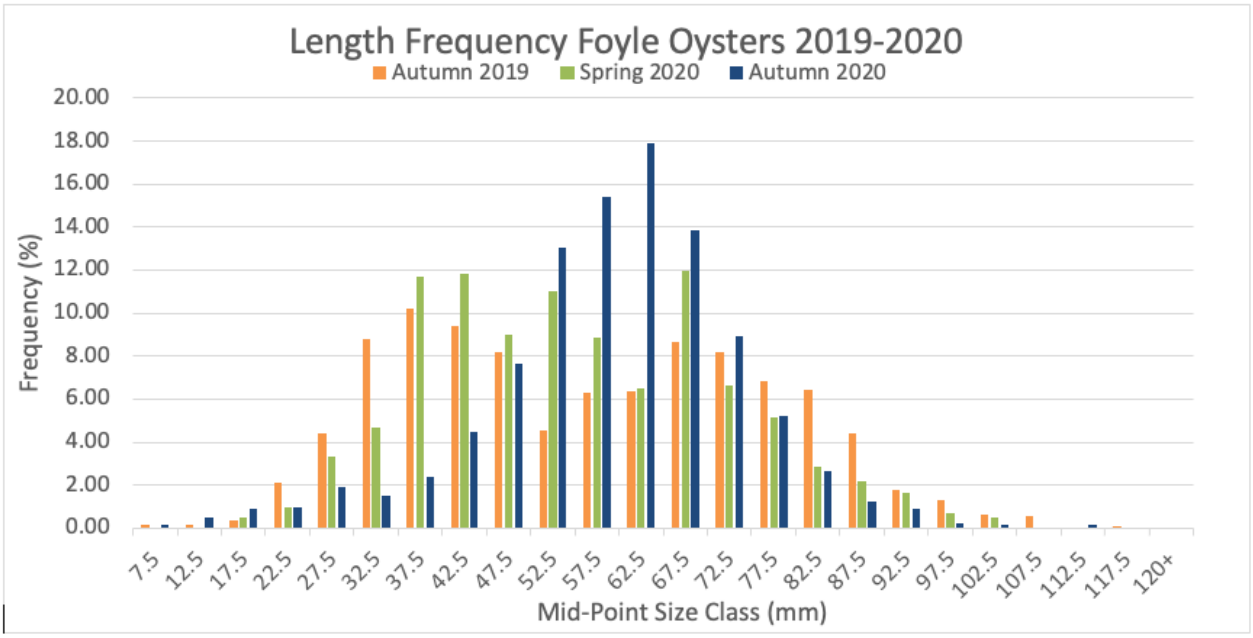

Figure 7 Length Frequency of Oysters in Lough Foyle 2019-2020

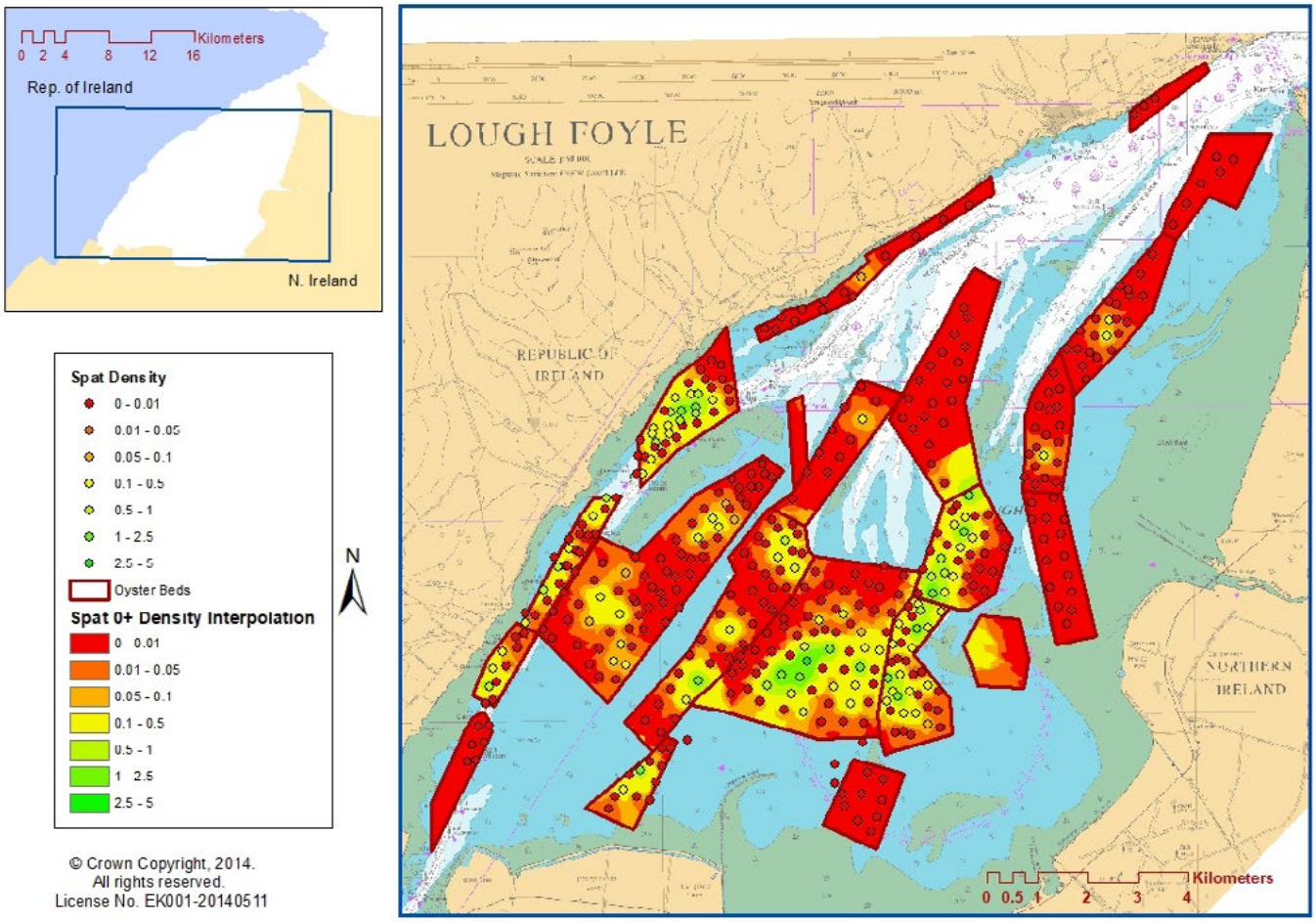

Figure 8 Oyster Spat Density in Lough Foyle Autumn 2020

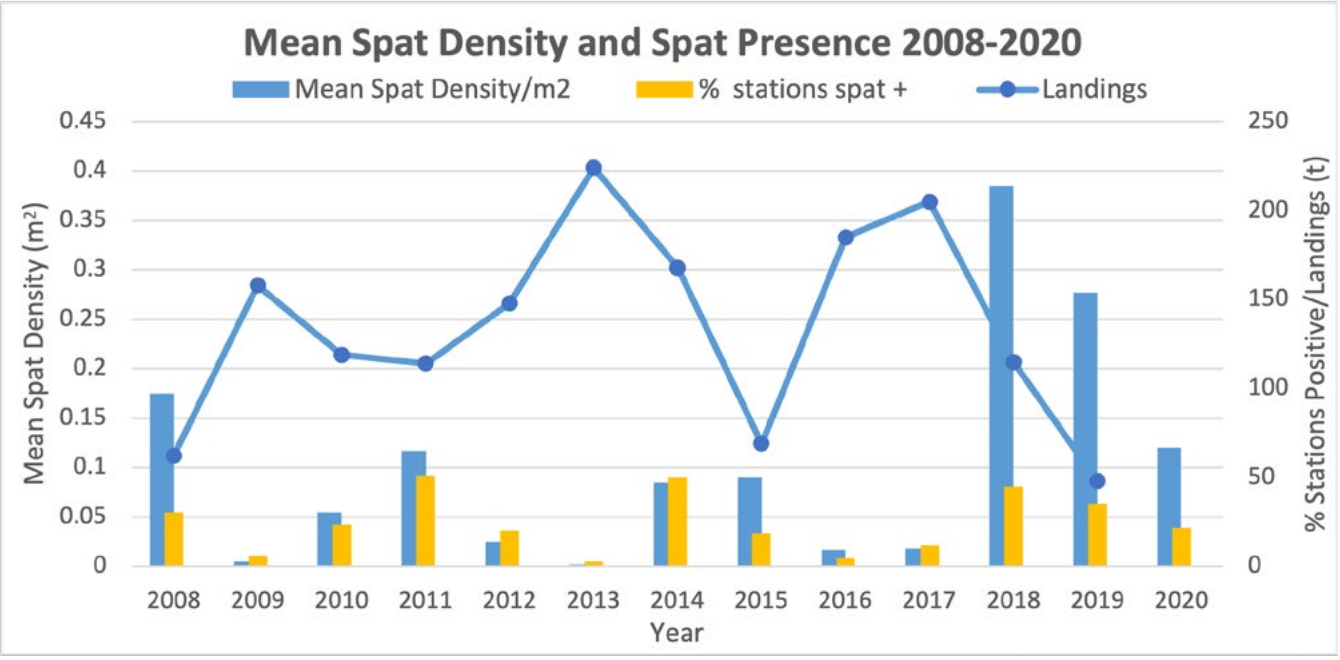

Figure 9 Historic Spat Density And Presence Lough Foyle (Autumn Survey Data Only)

7. Mortality Levels

There was very limited evidence of recent mortality on the oyster beds (Figure 10). Mortality was recorded in 5.7% of the samples taken and the majority of this appeared to be due to natural causes.

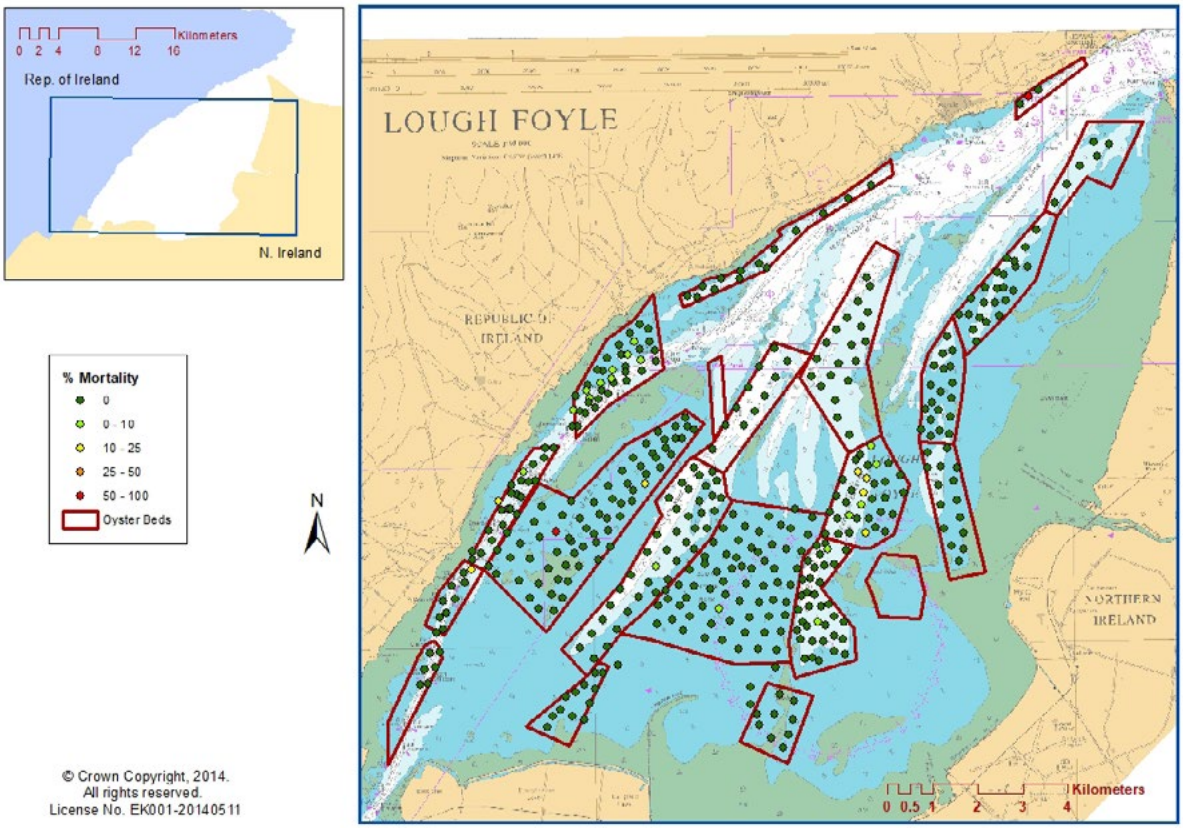

Figure 10 Oyster Mortality Observed in Lough Foyle Autumn 2020

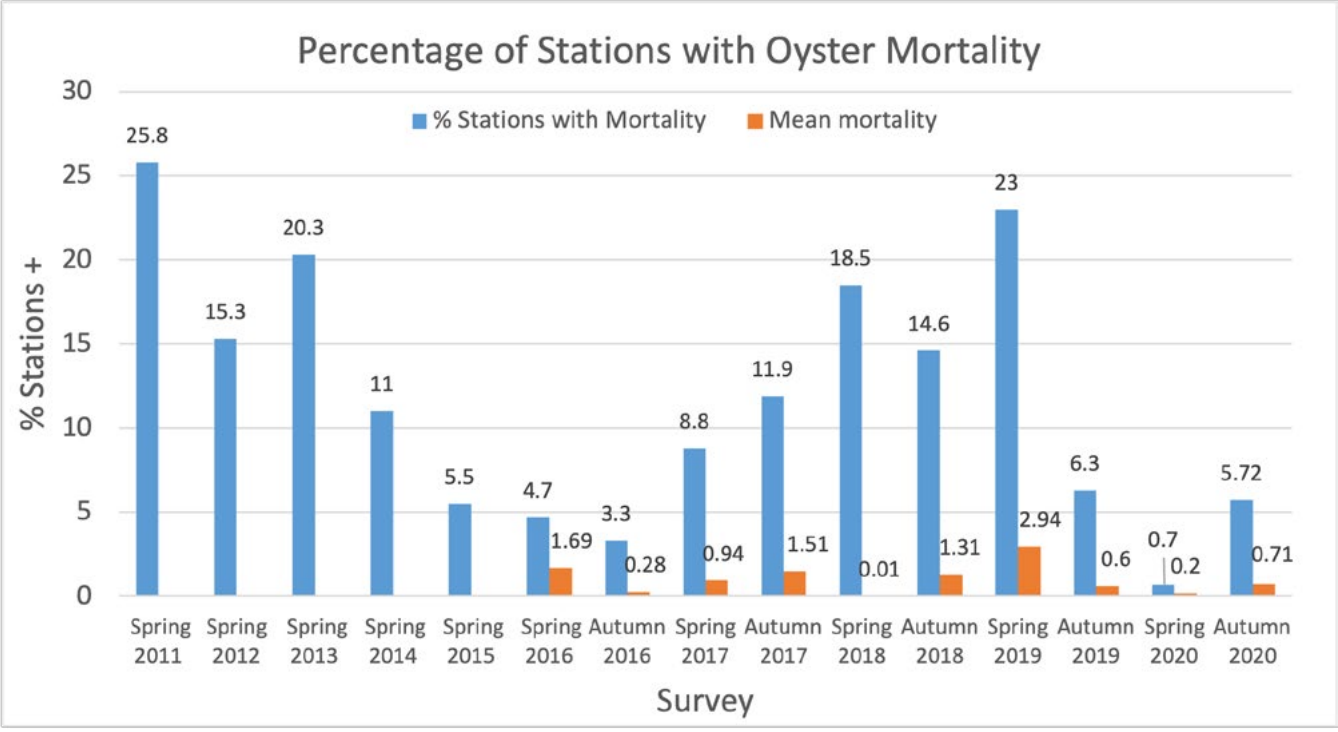

Figure 11 Oyster Mortality Levels Lough Foyle 2011-2020

8. Population Structure and Invasive Species

The length frequency of the stock shows a relatively normally distributed population with representation of most age classes within the population. The reduction in the proportion of oysters above 80mm in the stock is a direct result of the removal of these size classes by the fishery. These size classes have been dwindling over the past number of seasons as there was little recruitment of new cohorts into the fishery due to poor settlement of juveniles during 2015-2017.

The larger oysters are an important resource within the population. These size classes constitute the majority of the spawning stock biomass. Although oysters as small as 35mm are capable of spawning, the larger oysters are capable of producing large quantities of larvae for the fishery, and are therefore of great importance. If there is a higher percentage of large oysters present in high enough densities in the population, along with suitable environmental conditions, there is a greater chance of spawning success. The overall sampled population consists of 56% above 70mm.

The spawning event observed in 2018 has helped to begin to shift the balance with more evidence of 2 year old oysters in the population (Figure 12). These oysters will help to sustain the population in the coming years and are likely to recruit into the fishery in 2021/22 at the earliest. This cohort is currently between 45-65mm in size and makes up a large proportion of the stock.

The limited spawning observed during 2019 and 2020 will also help to bolster the population and contribute oysters towards the fishery in the future. These cohorts are not as abundant as the 2018 cohort however they will contribute to production eventually. The oysters in these 2 cohorts are ranging between 7.5mm and 45mm.

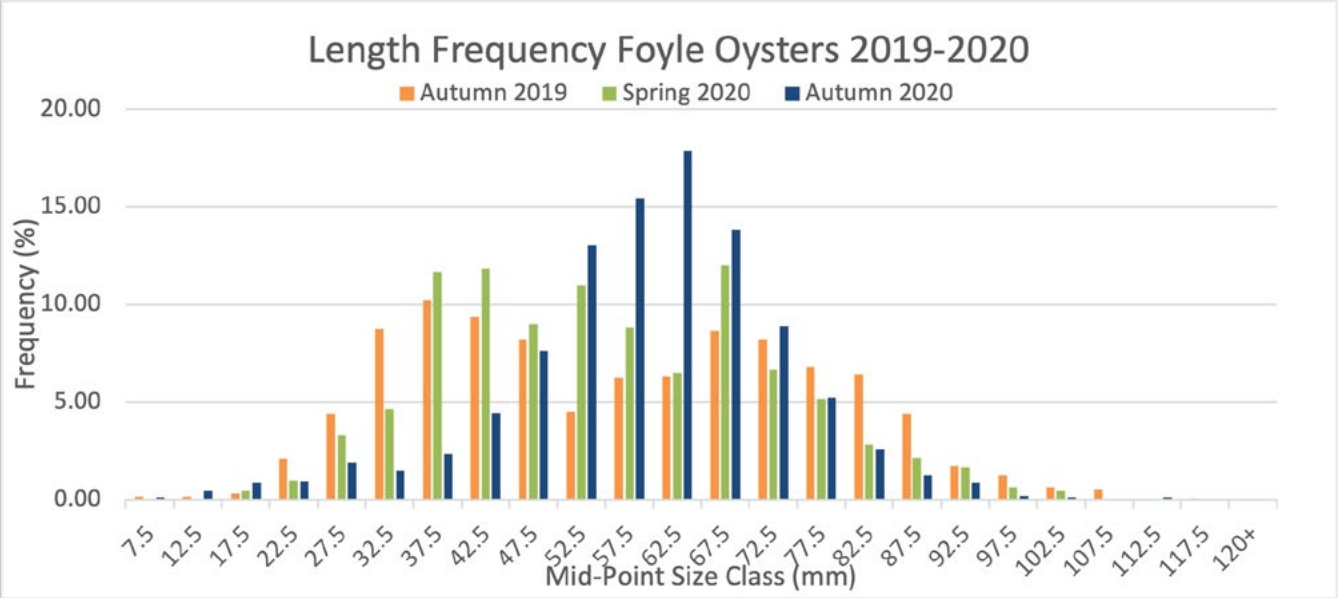

Figure 12 Length Frequency of Lough Foyle Oysters 2019- 2020

The cumulative length frequency (Figure 13) shows the reduction in the proportion of oysters in the larger length classes as a result of fishing removal and the large increase in the proportion of the stock less than 50mm as a result of the spat settlement in 2018.

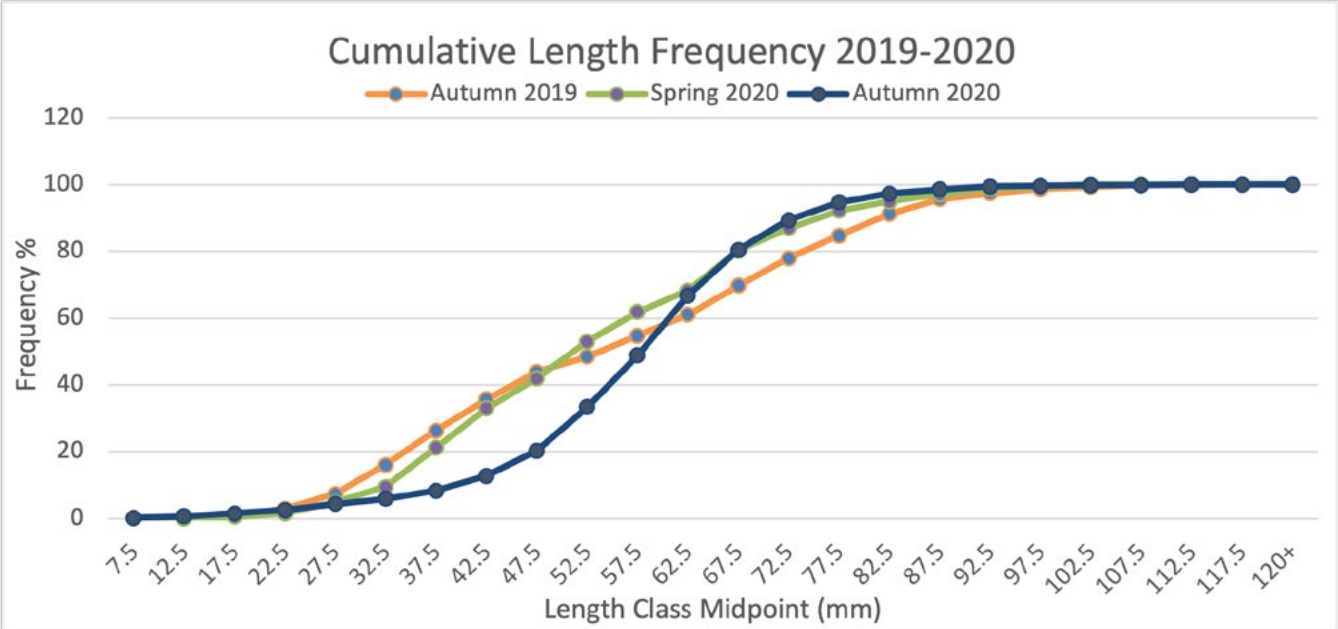

Figure 13 Cumulative Frequency Across All Oyster Beds in Lough Foyle 2019-2020

The pie chart in Figure 14 shows a better representation of smaller size classes than had been evident in the past 3 years. The spawning event in 2018 has increased the numbers of oysters in the 30-50mm sizes classes with the majority of the newly settled 2019 spat falling into the 1-20mm size class.

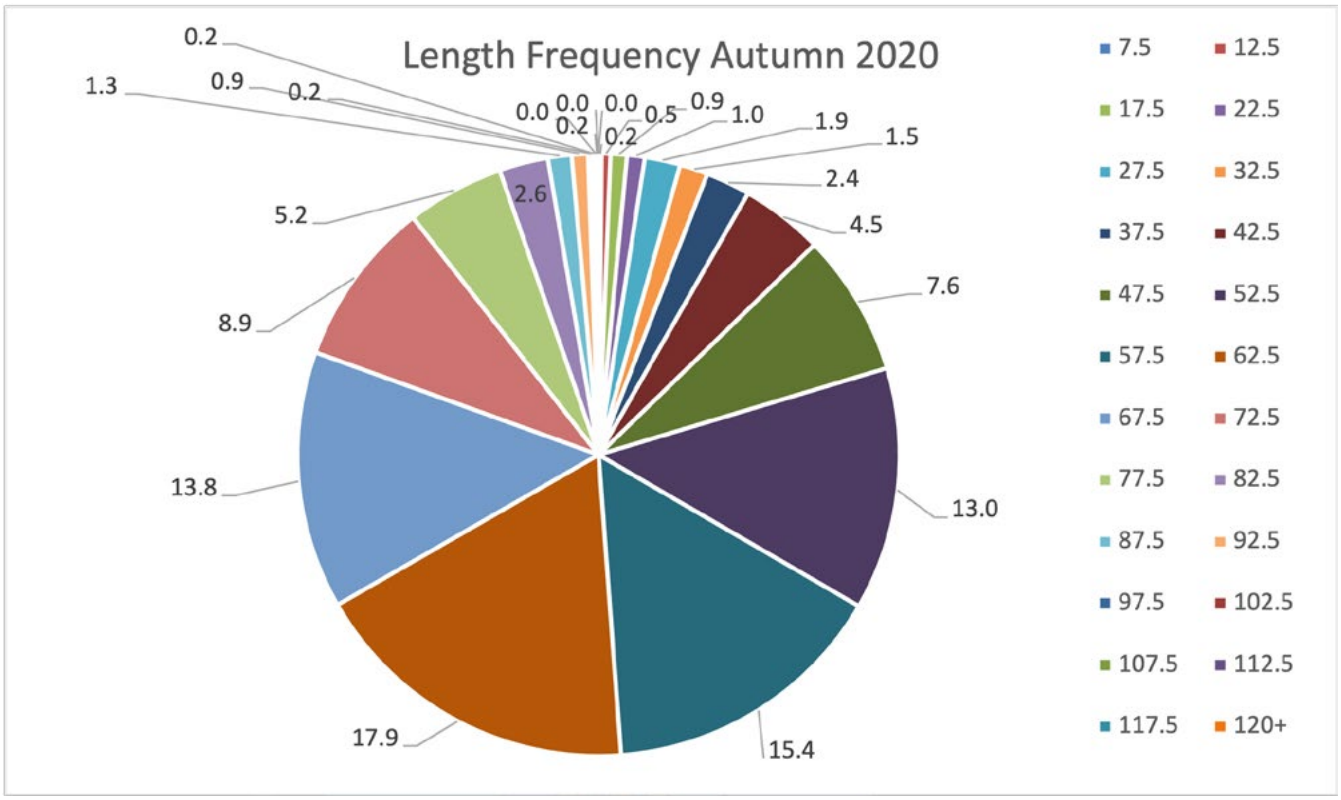

Figure 14 Length Classes on Oyster Beds Lough Foyle Autumn 2020

Figure 15 illustrates the percentage of each length class on the oyster beds in Lough Foyle. This chart highlights the differences between beds in terms of the health of their stock structure. The beds which consistently produce commercially important quantities of oysters (Middle Bed, Perch and Flat Ground) have good representation of length classes from 61-101mm+. This chart shows the strong evidence of the 2018 spatfall on the flat Ground, Southside and Perch beds with high percentages of the stocks on these beds less than 50mm.

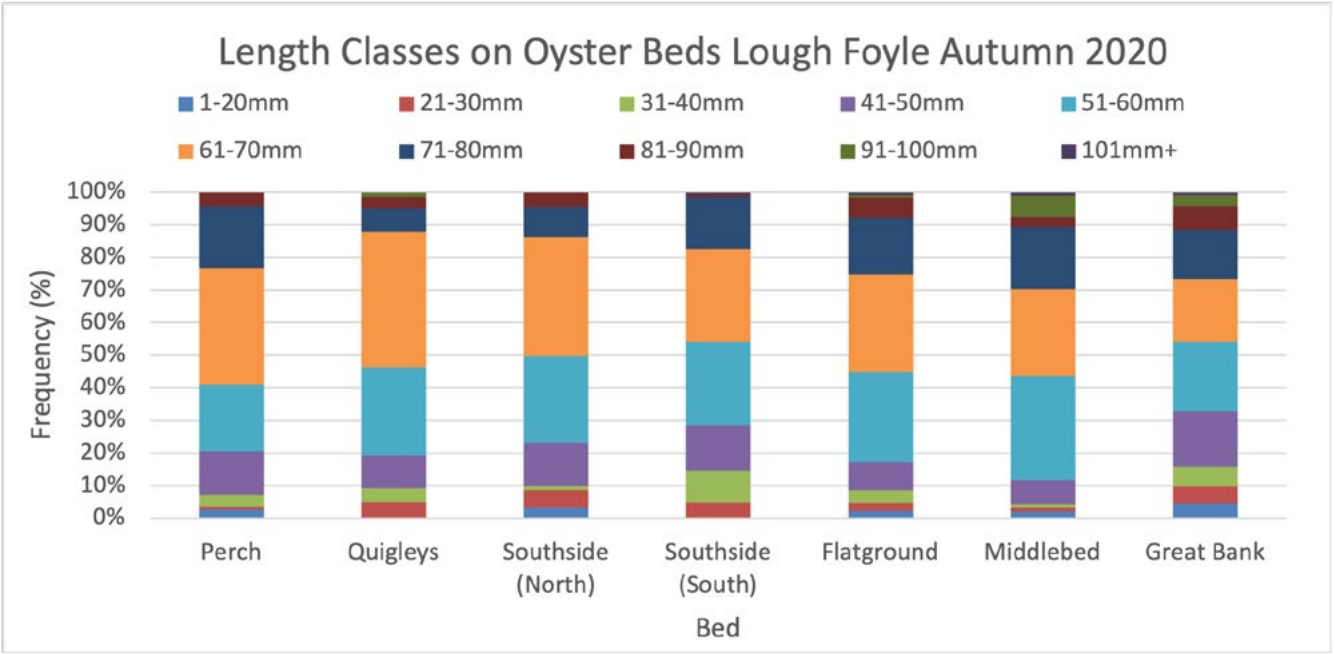

Figure 15 Size Class on Each Bed in Lough Foyle Autumn 2020

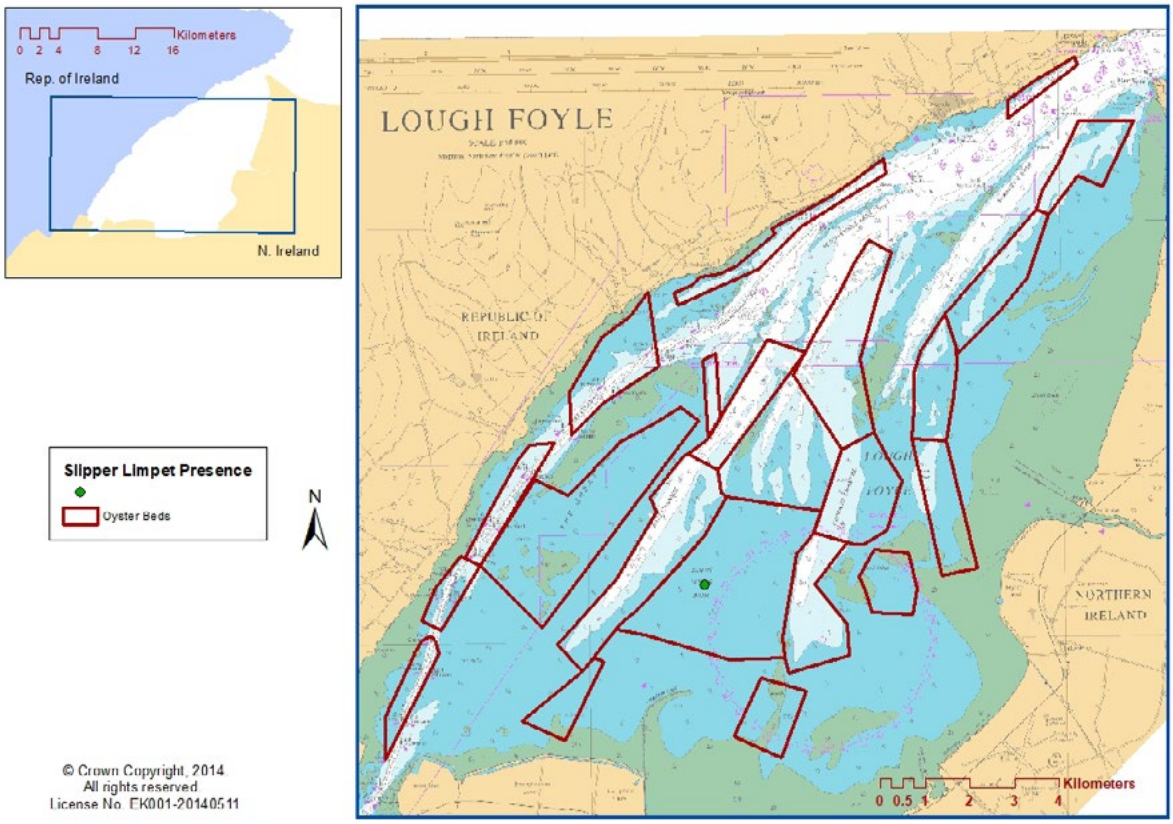

Figure 16. Location of Dredge Samples with Slipper Limpet Present

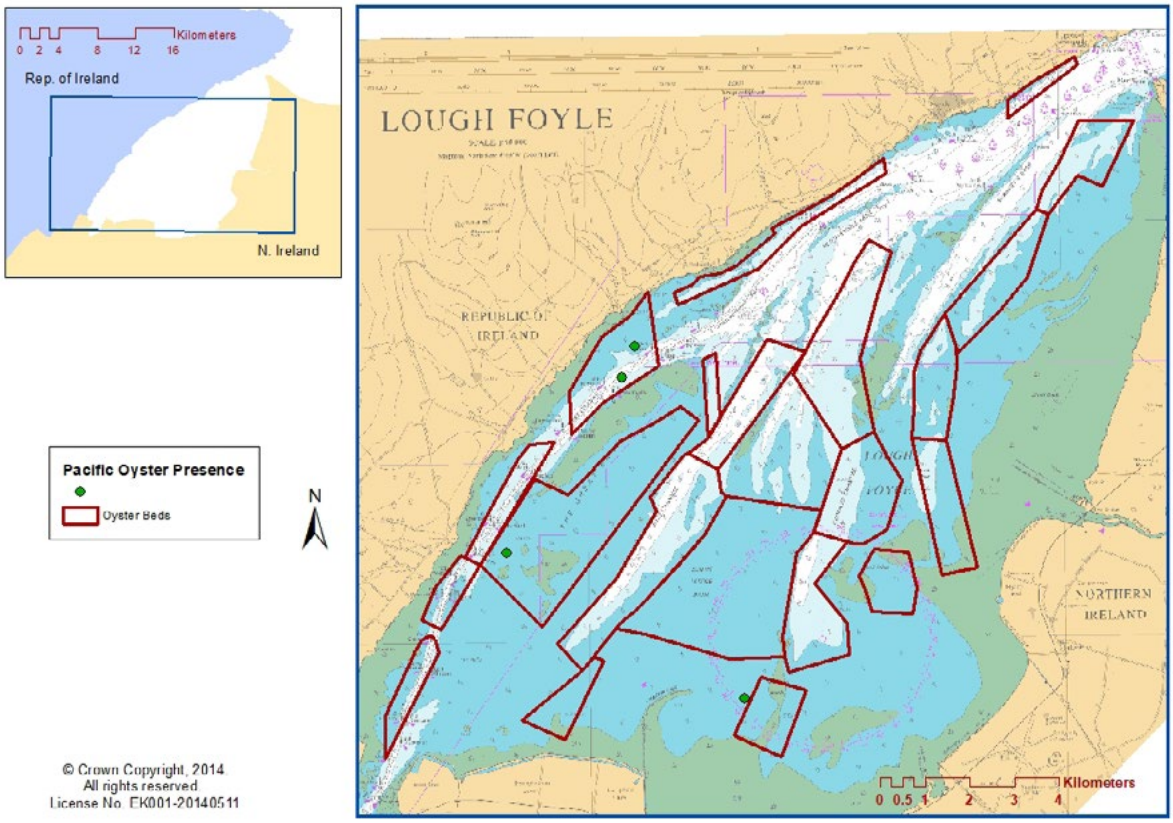

Figure 17. Location of Dredge Samples with Pacific Oyster Present

Slipper limpets were recorded on the Flat Ground Bed once again in the autumn 2020 survey. There was 1 individual in total observed. Slipper limpets were first recorded in Lough Foyle during the autumn 2018 stock assessment and they have been observed in multiple locations since however the highest density appears to be in the south-eastern portion of the Flat Ground Bed.

Feral Pacific oysters were also recorded on 3 oyster beds during the survey although their numbers were much reduced from what was observed up until 2012 in the fishery. A total of 4 individuals was recorded ranging in size from 77-152mm.

9. Oyster Bed Review

9.1 The Perch

Table 2 Summary Information: The Perch

Bed Name	Perch
Area (h)	276
Total Biomass (t)	108.02
Biomass (t) >80mm	4.33

The Perch is one of the 5 main commercially fished oyster beds with the highest density in Lough Foyle and it covers an area of 276 hectares. The overall biomass estimated for this bed is 108.02 tonnes, 4.33 tonnes of that figure is currently over 80mm and should be available to the fishery. The length frequency for the Perch shows less evidence of the new spat settlement from summer 2020 with a small quantity of spat in the 7.5-12.5mm size classes. The large recruitment of juveniles into the stock on this bed in the 2018 spawning season is evident from the proportion of oysters in the 45-65mm size classes.

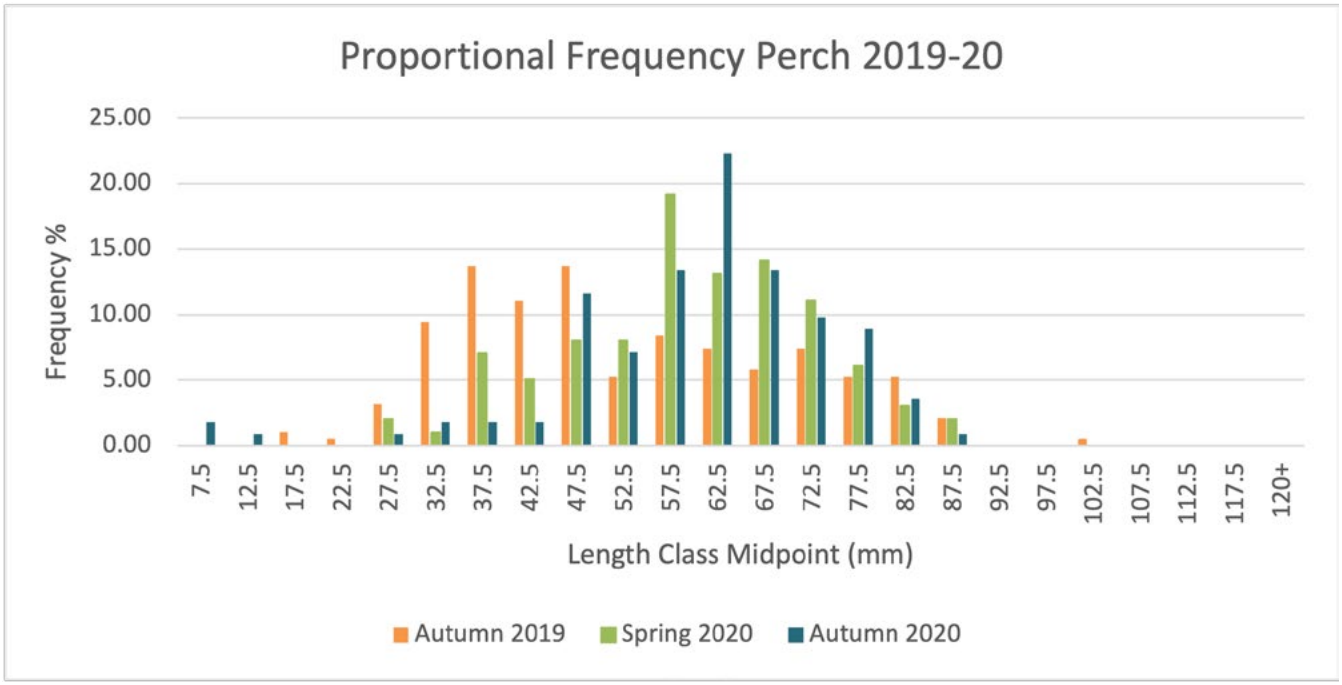

Figure 18 Proportional Length Frequency: The Perch 2019-20

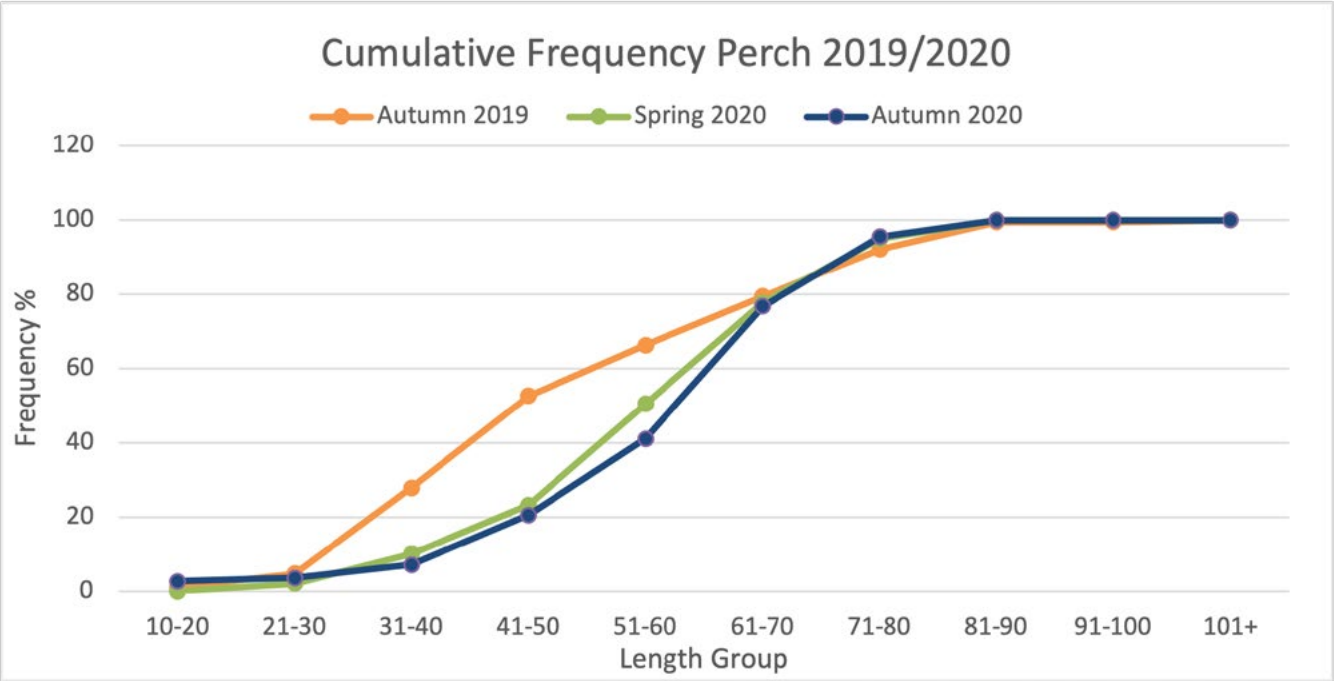

Figure 19 Cumulative Frequency: The Perch 2019-2020

The cumulative frequency of the stock on the Perch Bed shows little change from the spring 2020 results, however there is a slight movement right in the curve in the 45-65mm size classes resulting from the growth of the 2018 cohort during the summer period.

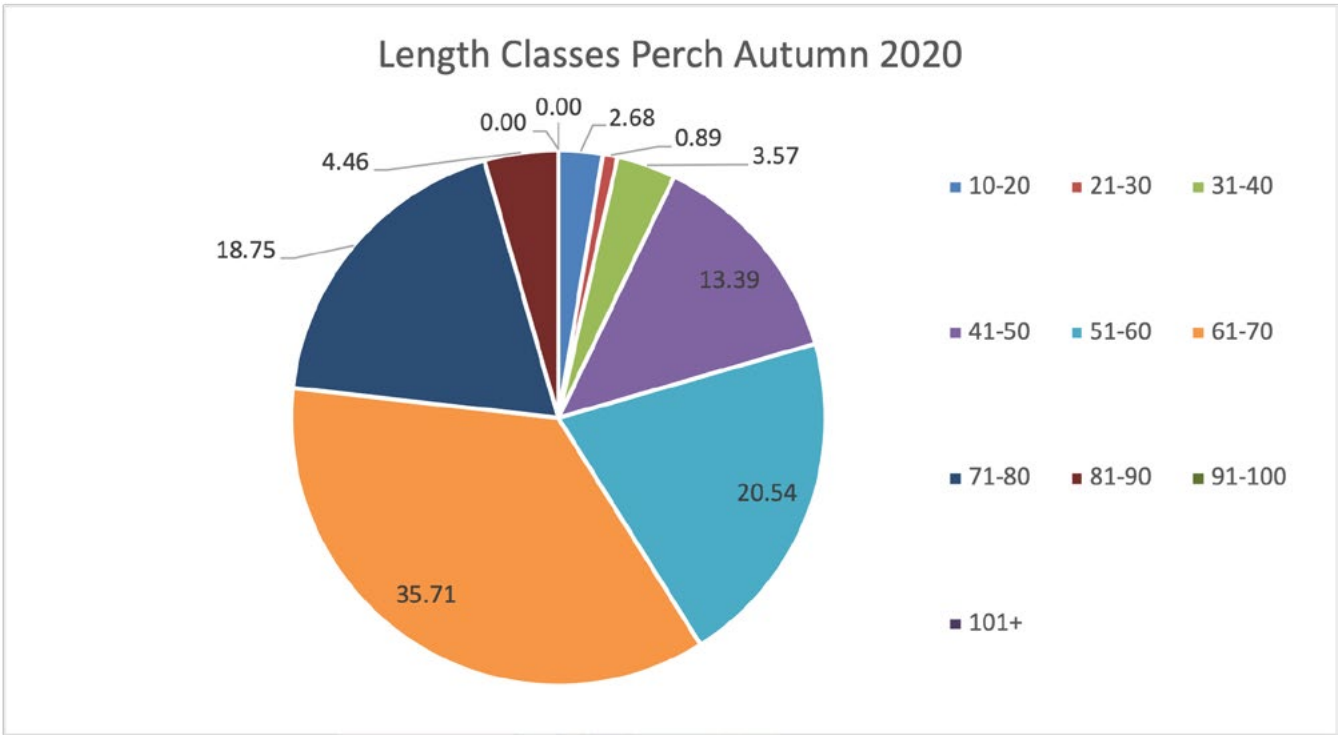

Figure 20 Length Classes: The Perch Autumn 2020

The length class structure is beginning to improve on the Perch Bed with a series of spat settlements in the past few years resulting in more evidence of oysters in the 30-70m size classes.

9.2 The Flat Ground

Table 3 Summary Information: The Flat Ground

Bed Name	Flat Ground
Area (h)	936
Total Biomass (t)	311.65
Biomass (t) >80mm	22.45

The Flat Ground covers an area of 936 hectares. Total stock biomass for this bed is estimated to be 311.65 tonnes. 22.45 tonnes of the stock on this bed is greater than 80mm in size and therefore will recruit into the fishery in 2020/21.

The length frequency (Figure 21) shows good evidence of the 2018 spatfall (45-65mm) that was recorded during the survey on most oyster beds. This cohort has survived well over the past year and show average growth of around 15-20mm since the spring 2020 observations when they averaged 30-50mm. The poor recruitment onto the bed in the 2015-2017 spawning seasons is evident from the poor representation of oysters in the 80mm+ size classes. The decline in the proportion of oysters above 80mm was expected and will have an impact on spawning potential on the bed.

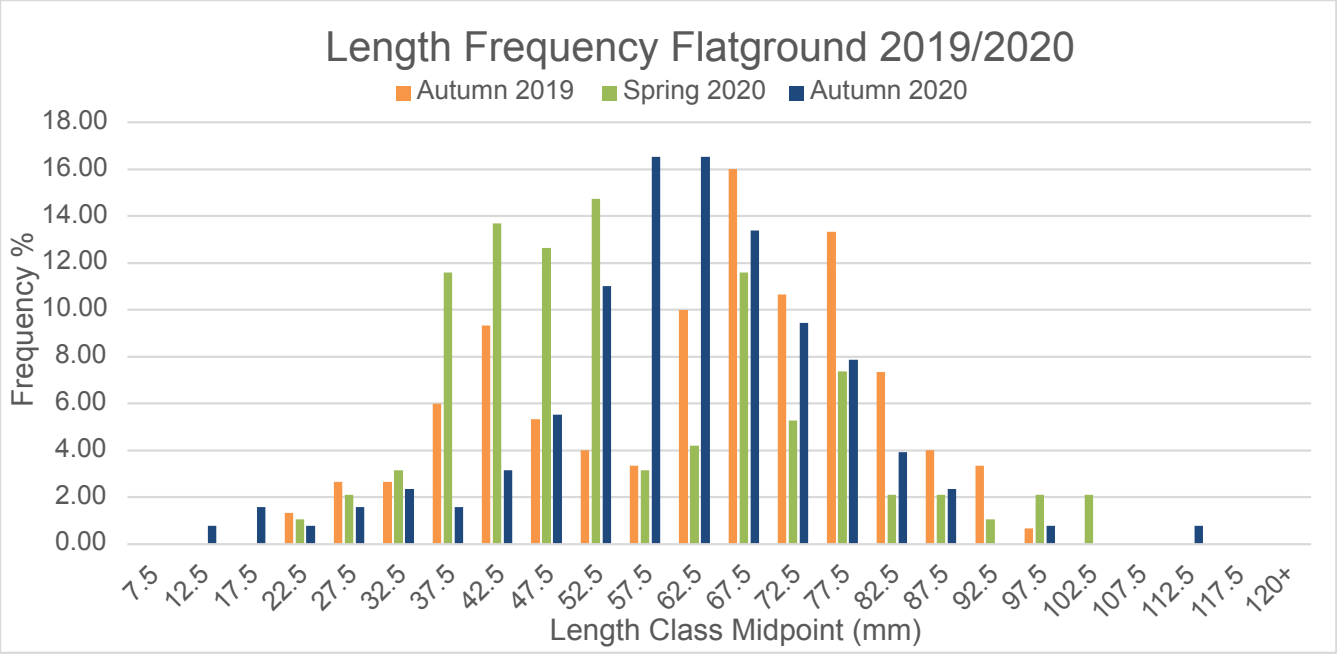

Figure 21 Proportional Length Frequency: Flat Ground 2019-20

The cumulative frequency (Figure 22) for the stock on the Flat Ground shows the continued growth of the 2018 cohort through the size classes from the 30-50mm range to the 45-65mm range.

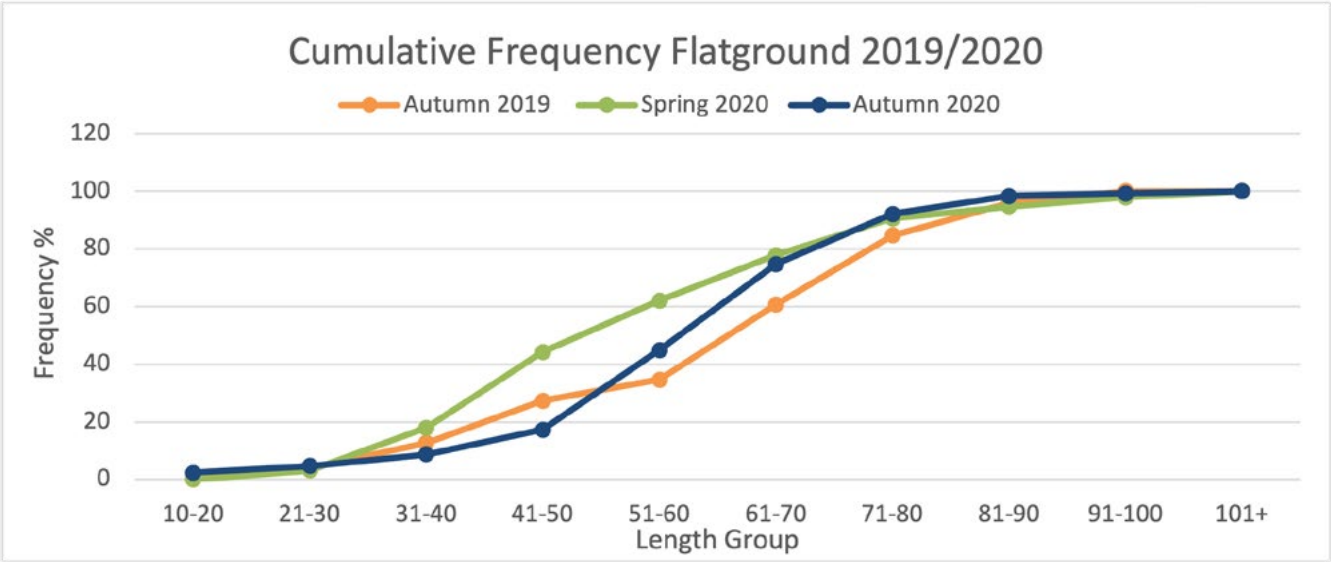

Figure 22 Cumulative Frequency: Flat Ground 2019-2020

The pie chart (Figure 23) also shows evidence of the large spat settlement in 2018 on this bed with over 65% of the stock in the 40-70mm size classes.

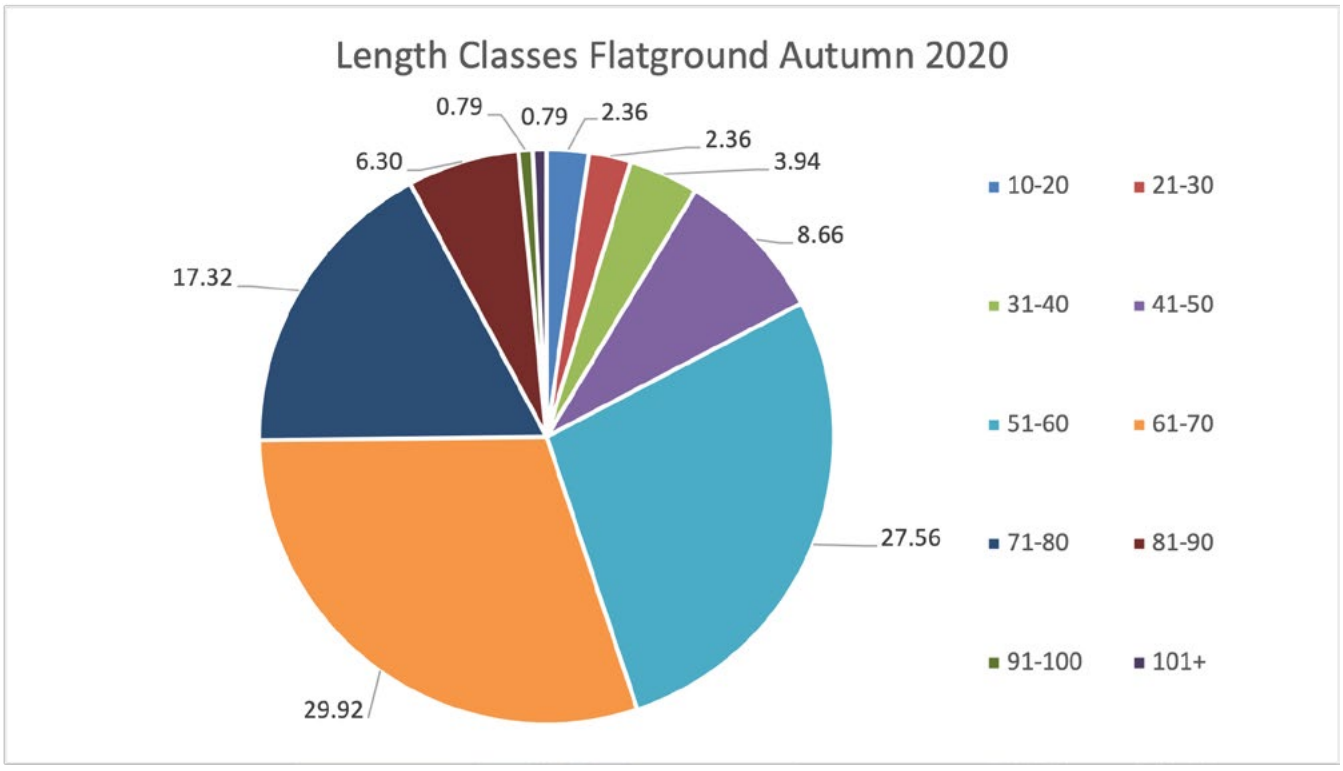

Figure 23 Percentage of Each Length Class: Flat Ground Autumn 2020

9.3 Middle Bed South

Table 4 Summary Information: Middle Bed South

Bed Name	Middle Bed South
Area (h)	531
Total Biomass (t)	125.26
Biomass (t) >80mm	12.77

The south section of the Middle Bed covers an area of 531 hectares. There is an estimated total biomass of 125.26 tonnes on this bed and 12.77 tonnes of that figure is greater than 80mm which should be available to the 2020/21 fishery.

The length frequency for the Middle Bed South (Figure 24) shows that the majority of oysters on this bed are now over 50mm, indicating poor juvenile recruitment during 2015-2017. There was some good evidence of a spatfall in 2018 with good numbers of oysters in the 45-65mm size classes observed during the survey.

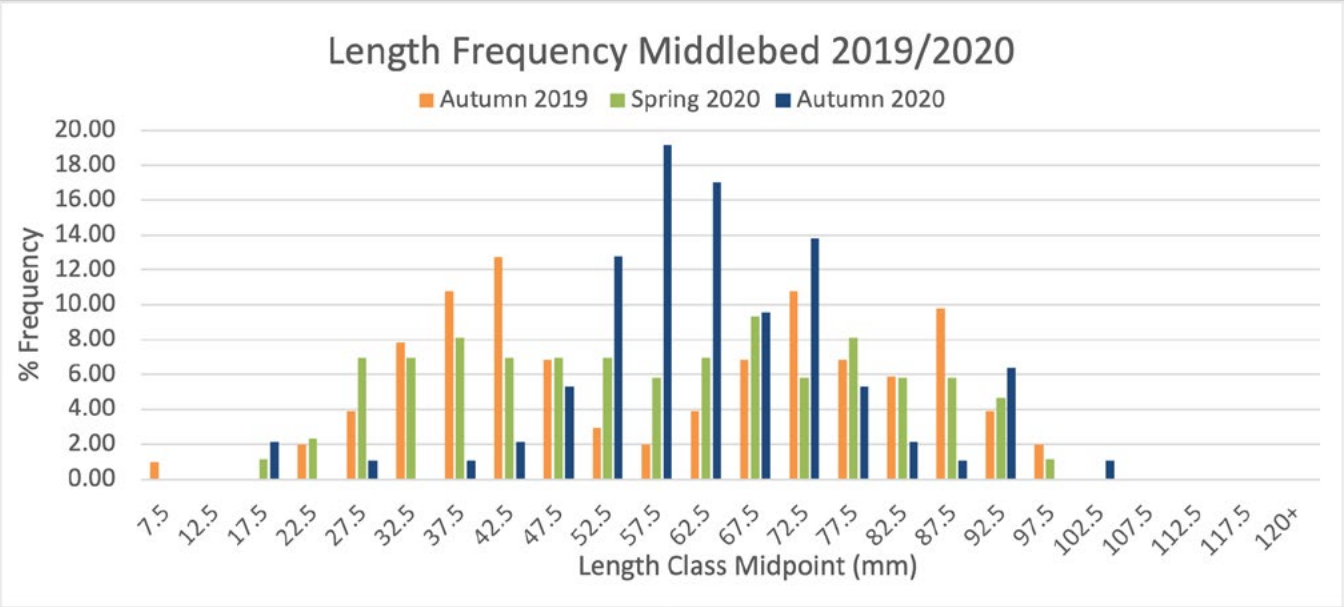

Figure 24 Proportional Length Frequency Middle Bed 2019-20

The cumulative frequency (Figure 25) shows a decrease in the proportion of smaller length classes since the spring 2020 survey resulting from a lack of settlement on this bed in the past 2 seasons. The curve reflects the progression of 2 year old oysters through the population from the 2018 spatfall.

The pie chart (Figure 26) shows evidence of a reduction in the larger size classes above 80mm and an increase in the proportion of oysters from 40-70mm.

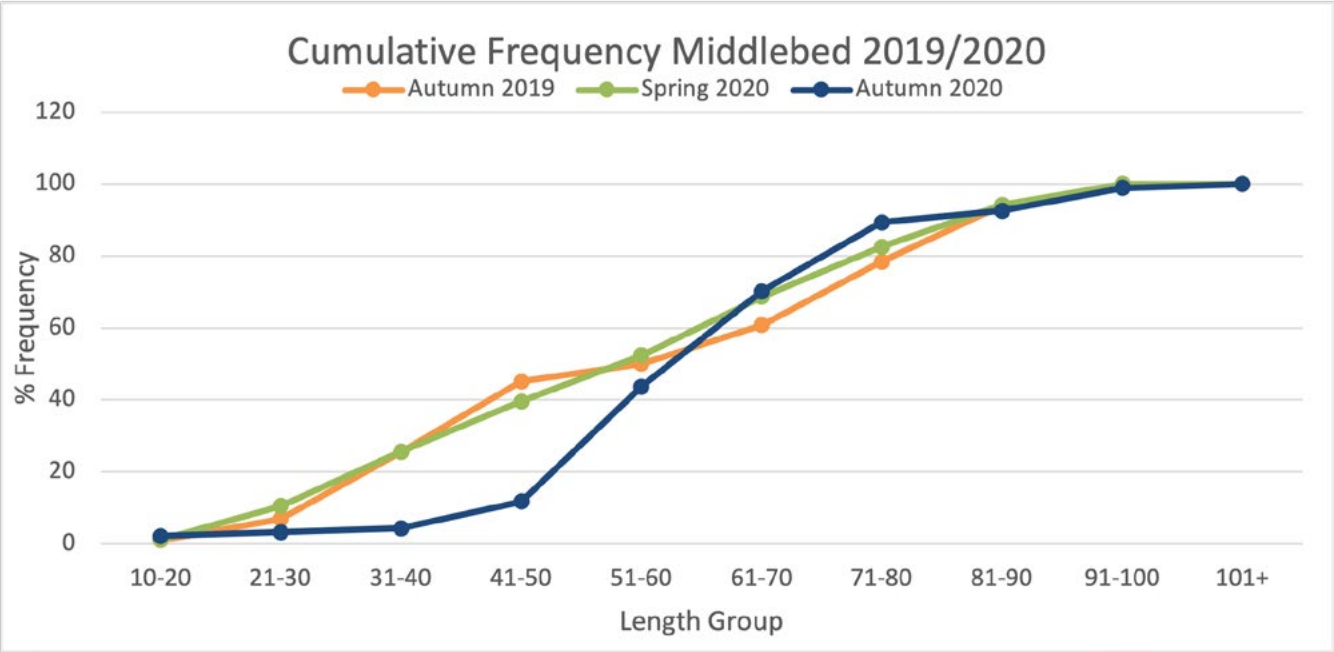

Figure 25 Cumulative Frequency Middle Bed 2019-2020

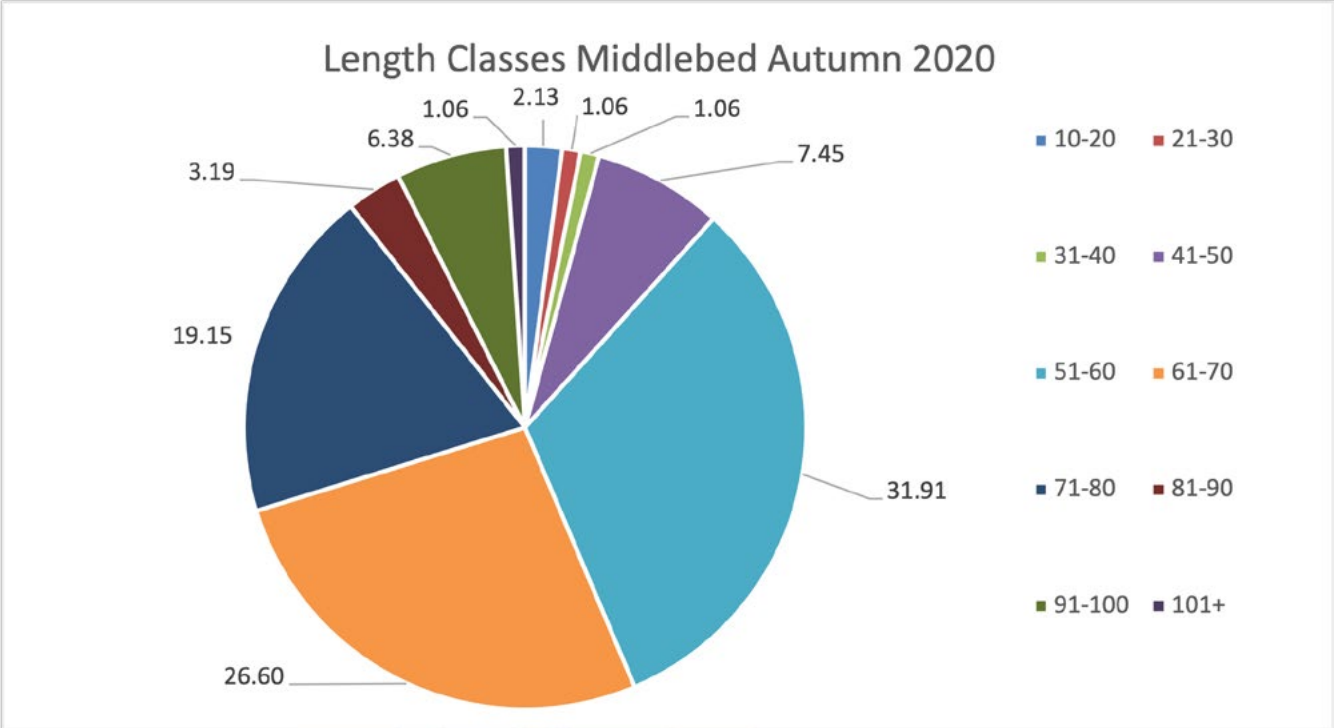

Figure 26 Percentage of Length Classes Middle Bed Autumn 2020

9.4 Southside North

Table 5 Summary Information: Southside North

Bed Name	Southside North
Area (h)	312
Total Biomass (t)	100.77
Biomass (t) >80mm	4.28

The northern portion of the Southside Bed covers an area of 312 hectares. The overall biomass on this bed is estimated to be 100.77 tonnes, 4.28 tonnes of this figure represents oysters over 80mm in length.

The length frequency (Figure 27) continues to show strong evidence of a late settlement in 2018 with a very large proportion of the stock in the 45-65mm size classes. This widespread settlement on the bed should help sustain the stock in the future provided that survival is good over the next few seasons. There is evidence of some limited settlement having taken place during 2019 and 2020 with oysters recorded in the 12.5-40mm size classes.

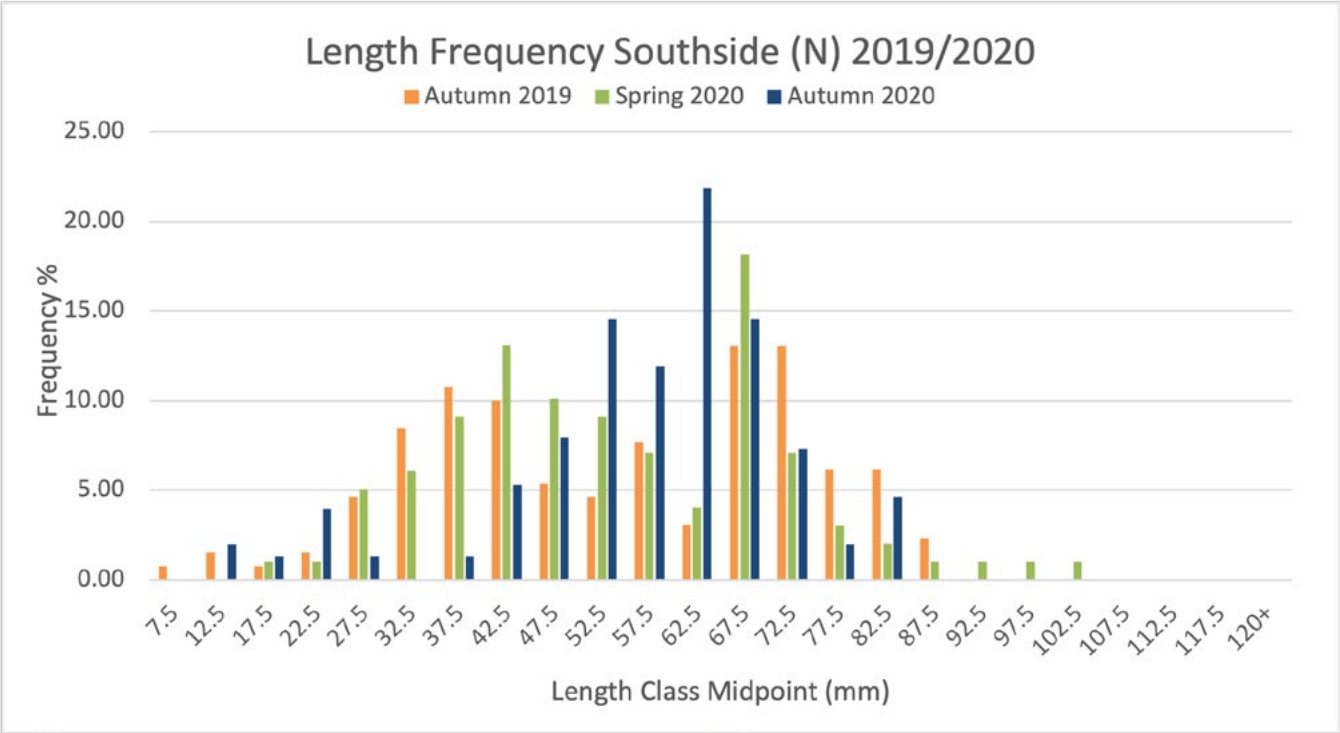

Figure 27 Proportional Length Frequency Southside (N) 2019-20

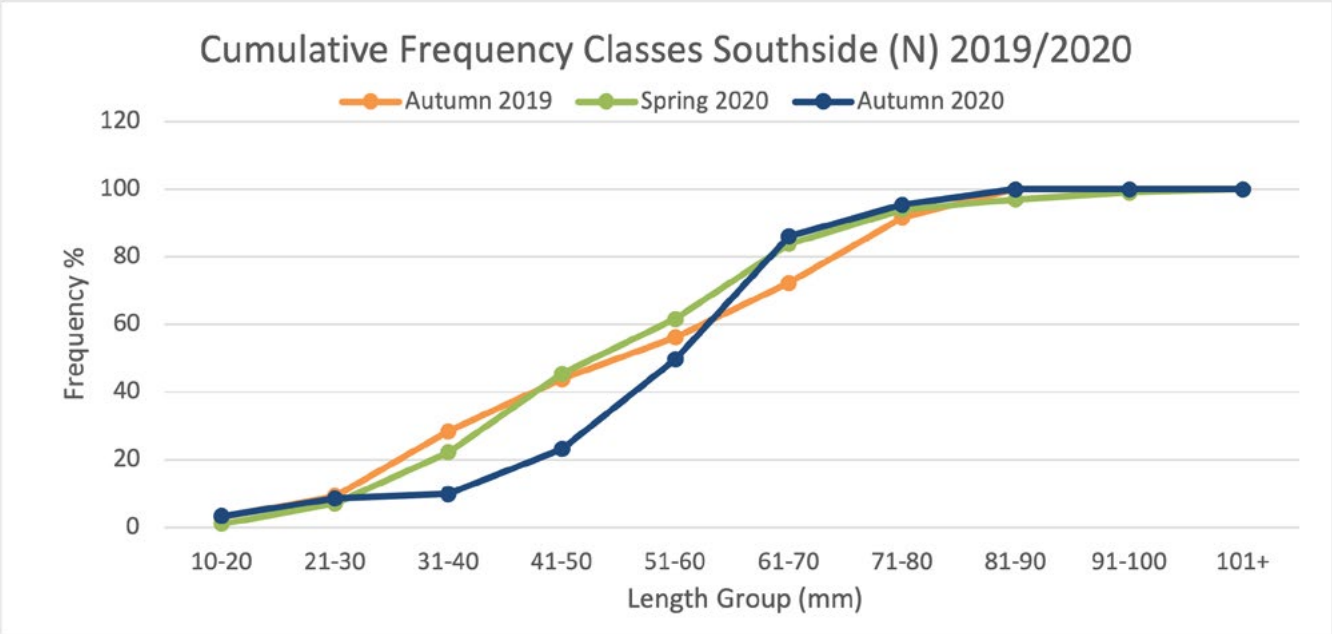

Figure 28 Cumulative Frequency Southside (N) 2019-2020

The cumulative length frequency is dominated by the gradual movement of the cohort from the 2018 season into the 45-65mm size classes.

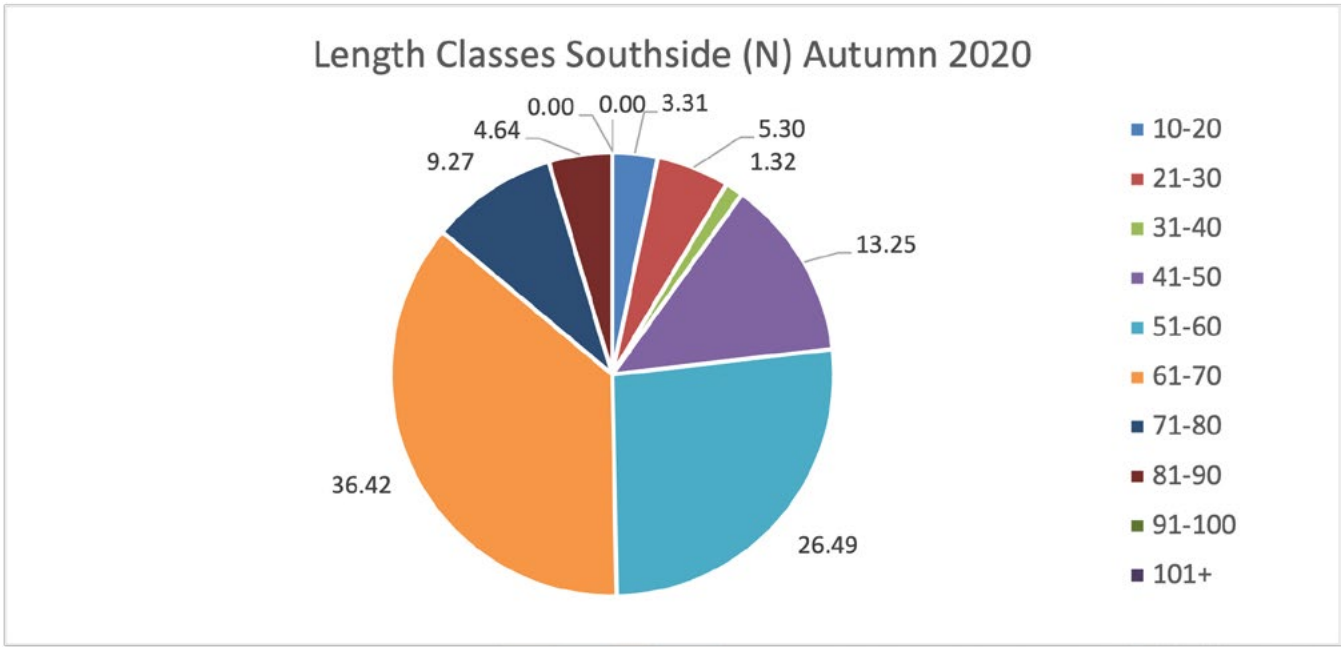

Figure 29 Percentage of Length Classes: Southside (N) Autumn 2020

Over 75% of the stock on this bed is in the 40-70mm size classes showing just how strong the spat settlement was in 2018. There was some evidence of newly settled spat from the 2019 spawning season in the 10-30mm size classes.

9.5 Southside South

Table 6 Summary Information: Southside South

Bed Name	Southside South
Area (h)	319
Total Biomass (t)	100.22
Biomass (t) >80mm	1.22

The south section of the Southside Bed covers 319.0 hectares in total. The overall biomass of oysters calculated during the survey is 100.22 tonnes and 1.22 tonnes of this figure is currently above 80mm and therefore is available to the fishery for the 2020/21 season.

Again, like the length frequency for the northern section of the Southside there was widespread evidence of 2 year old oysters (45-65mm) recorded during this survey. There was a reduction in the proportion of oysters in the 90mm-120mm size classes which is expected given the fishing removal of these size classes over the past number of seasons and the poor recruitment in the period 2015-2017.

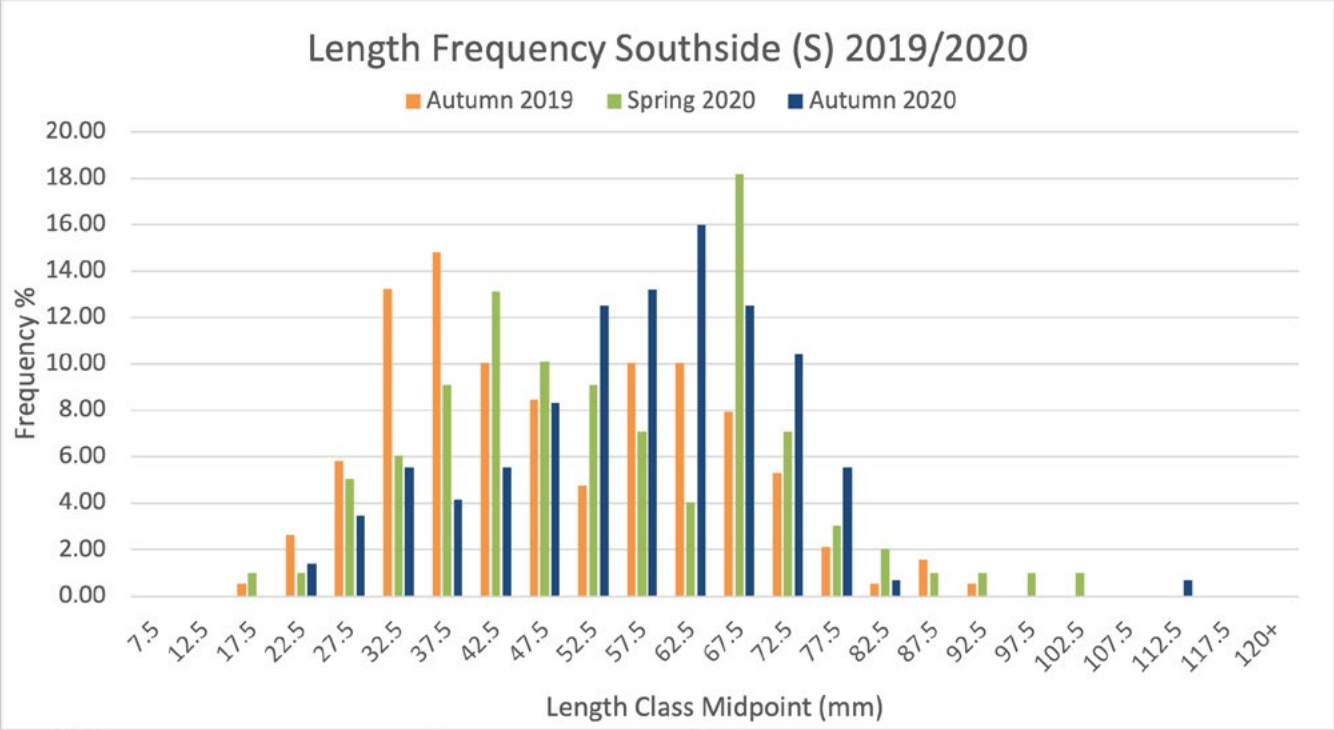

Figure 30 Length Frequency Southside (S) 2019-20

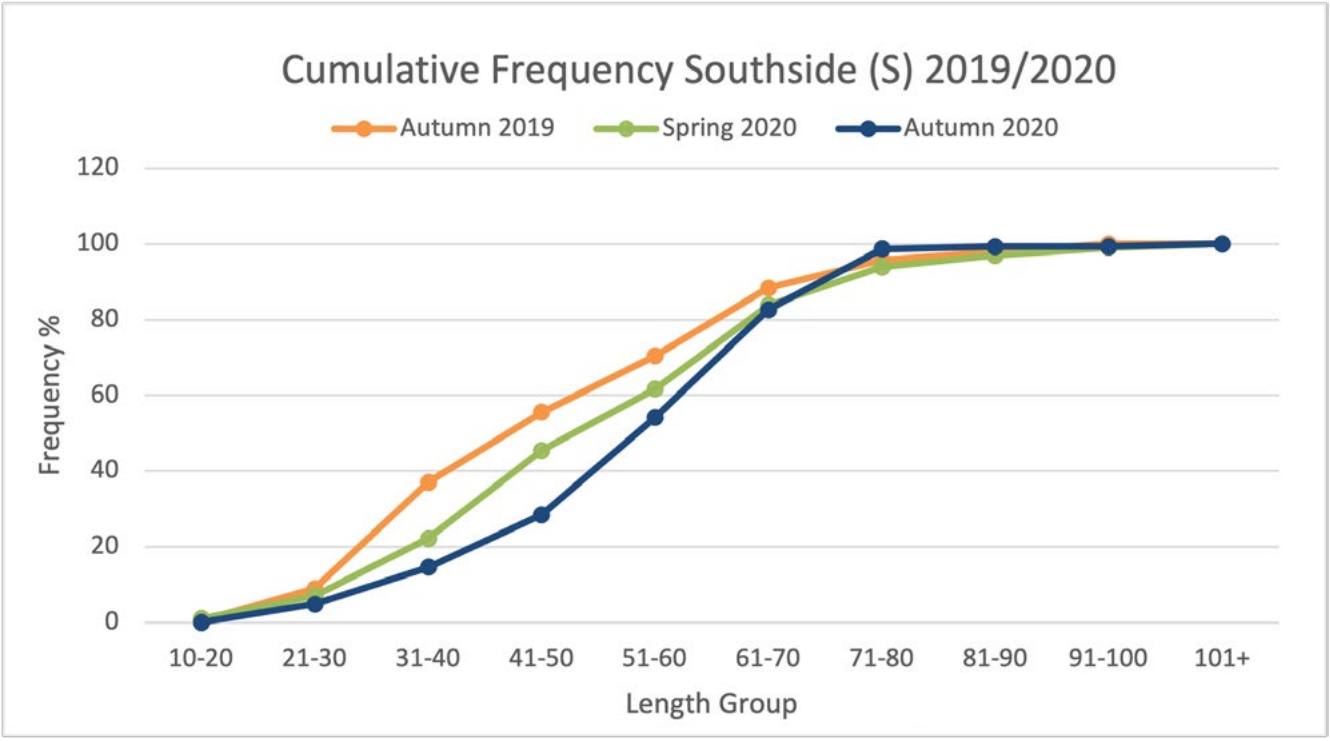

Figure 31 Cumulative Length Frequency Southside (S) 2019-2020

The cumulative length frequency shows the movement in the 2018 cohort through the size classes from 20-50mm in spring 2020 to the 45-65mm size classes in autumn 2020. This is reflected in the pie chart below which shows that 68% of the stock is in the 40-70mm size classes.

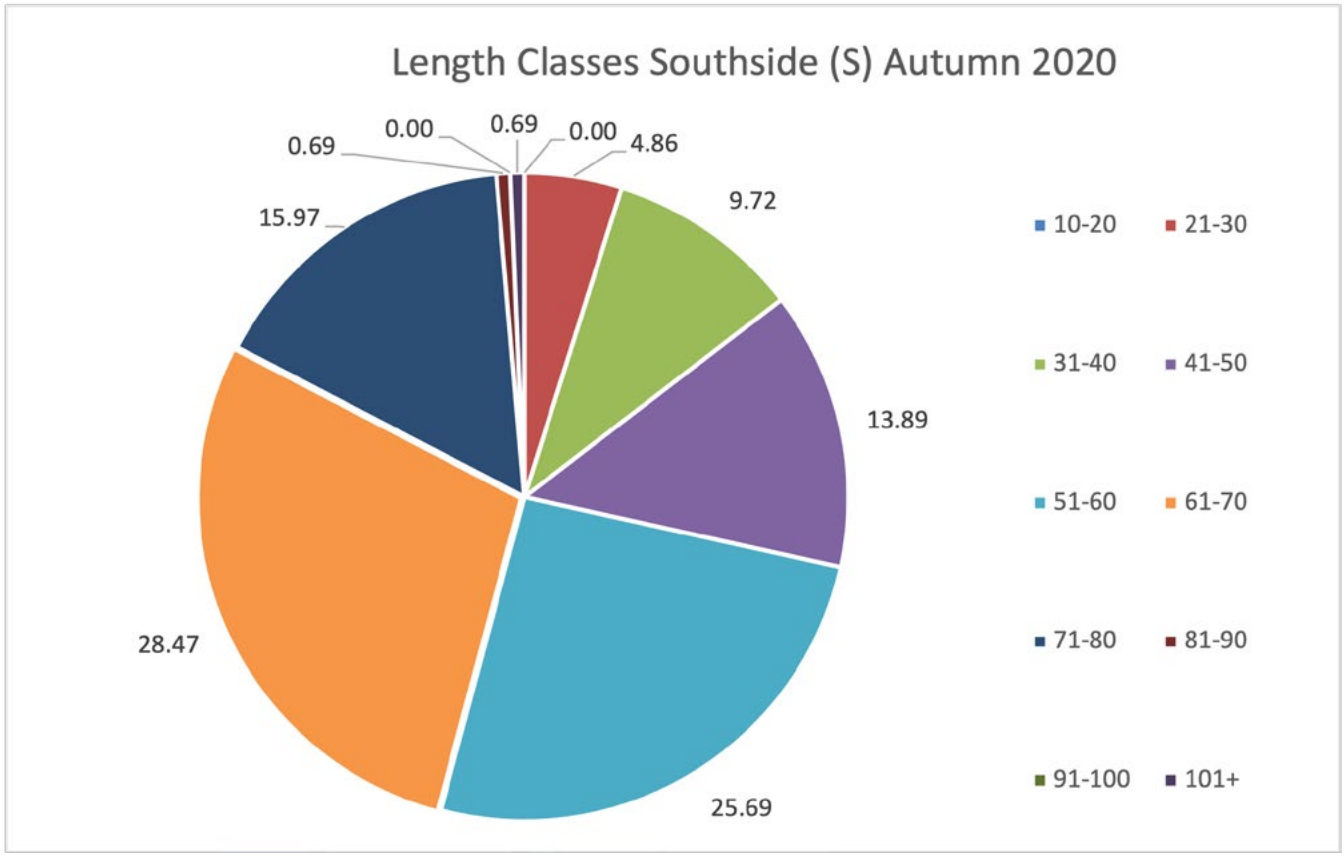

Figure 32 Percentage of Length Classes: Southside (S) Autumn 2020

9.6 Great Bank

Table 7 Summary Information: Great Bank

Bed Name	Great Bank
Area (h)	824
Total Biomass (t)	126.33
Biomass (t) >80mm	13.85

The Great Bank Bed has an area of 824 hectares. The overall biomass of oysters calculated during the survey is 126.33 tonnes and 13.85 tonnes of this figure is currently above 80mm and therefore should be available to the fishery for the 2020/21 season.

There was evidence of a limited spatfall on this bed during 2020 with oysters from 17.5-30mm recorded during the current survey

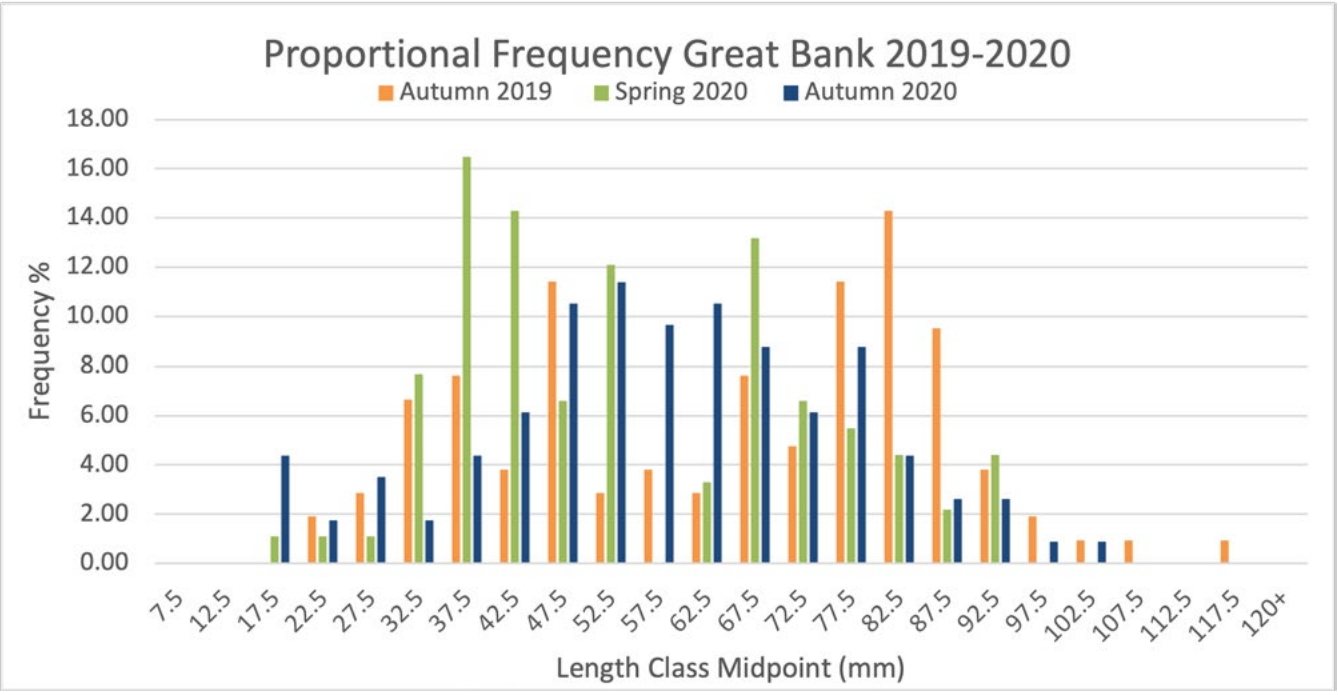

Figure 33 Length Frequency Great Bank 2019-20

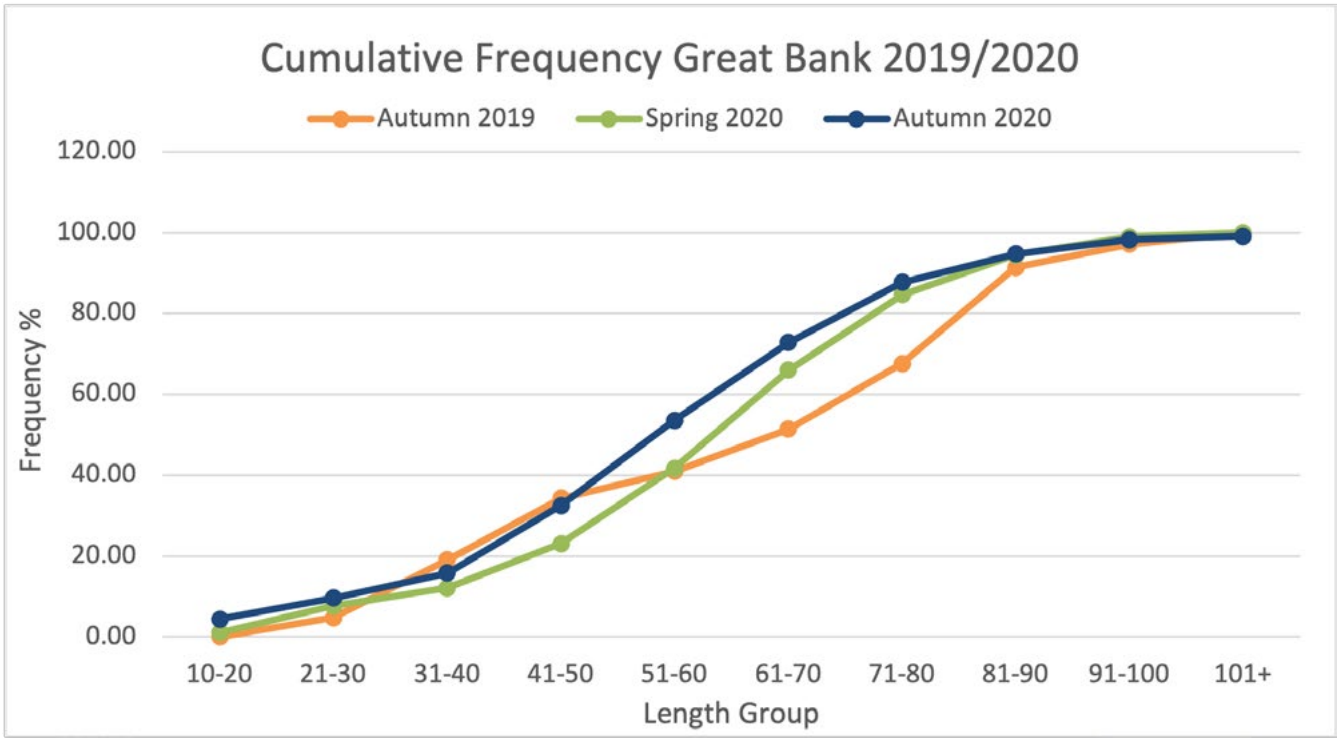

Figure 34 Cumulative Length Frequency Great Bank 2019-2020

Cumulative length frequency for the great bank shows evidence of the spatfall with an increase in the representation of the 10-30mm size classes. This new settlement is also represented in the pie chart below.

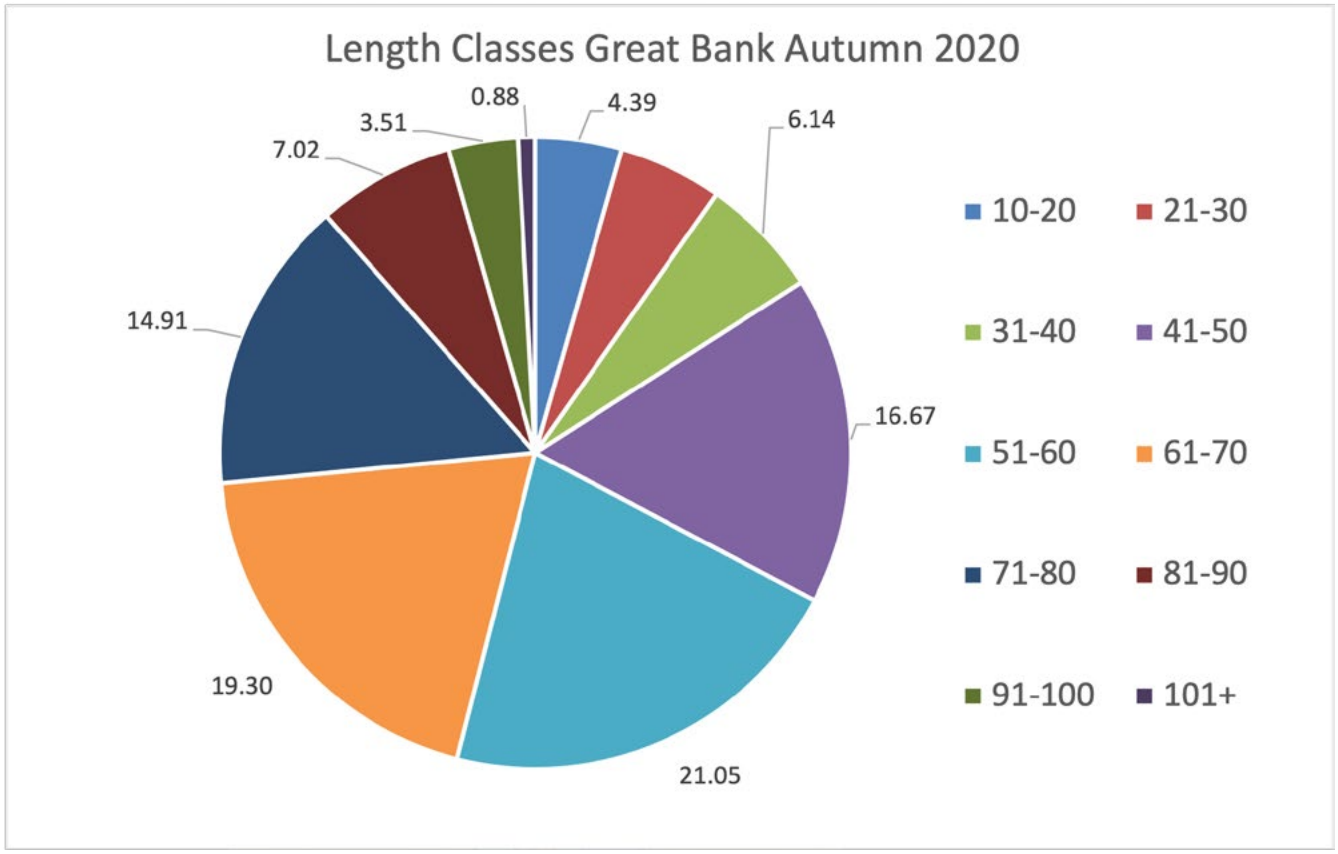

Figure 35 Percentage of Length Classes: Great Bank Autumn 2020

10. Conclusions

The total biomass estimated for the stock has been estimated at 1,055 tonnes. This is a large increase on the standing stock biomass for the population estimated over the past few years. There has been evidence of good survival of the widespread spatfall which was observed in 2018 and this is positive for the fishery with the likelihood that this spat will add to the broodstock biomass and recruit into the fishery from 2021 onwards.

There is evidence of a limited spatfall in 2020 however not as widespread as the 2018 or 2019 events. The biomass above the minimum landing size of 80mm is estimated to be 69 tonnes. There is an estimated 153 tonnes of stock between 70-80mm and this should recruit into the fishery in the 2021/22 season and the biomass should increase in line with annual growth rates. The rate of mortality remains in keeping with natural mortality levels and there was no evidence of any unusual mortality levels on any oyster bed. The presence of slipper limpets within the native oyster beds is a worrying development and this should be monitored closely over the coming seasons.

11. Recommendations

Consider partial removal of the harvestable stock biomass to help alleviate pressure on the stock from fishing activity and help sustain an effective spawning broodstock and a viable fishable stock for 2021/22.

Appendix I

Table 8 Raw Data on Oyster Density and Biomass Estimates

Bed name	Density Class Range	N	Mean Weight (g)	Mean Density (Ind/m2)	No. of Oysters	Total Biomass (tonnes)
Barneys	0 - 0.01000	4	40	0.00	1,013	0.04
Barneys	0.01001 - 0.05000	1	40	0.02	21,444	0.86
Barneys	0.05001 - 0.10000	1	40	0.07	8,479	0.06
Barneys	0.10001 - 0.50000	0	40	0.00	0	0.00
Barneys	0.50001 - 1.00000	0	40	0.00	0	0.00
Barneys	1.00001 - 2.50000	0	40	0.00	0	0.00
Barneys	2.50001 - 5.00000	0	40	0.00	0	0.00
Drumskellan	0 - 0.01000	2	39.3	0.00	2	0.00
Drumskellan	0.01001 - 0.05000	2	39.3	0.03	597	0.02
Drumskellan	0.05001 - 0.10000	1	39.3	0.05	3,720	0.15
Drumskellan	0.10001 - 0.50000	1	39.3	0.30	129,337	5.08
Drumskellan	0.50001 - 1.00000	2	39.3	0.84	235,927	9.27
Drumskellan	1.00001 - 2.50000	2	39.3	1.46	137,460	5.40
Drumskellan	2.50001 - 5.00000	0	39.3	0.00	0	0.00
Flat Ground	0 - 0.01000	14	42.58	0.00	768	0.03
Flat Ground	0.01001 - 0.05000	3	42.58	0.02	17,736	0.76
Flat Ground	0.05001 - 0.10000	7	42.58	0.07	36,349	1.55
Flat Ground	0.10001 - 0.50000	25	42.58	0.26	875,308	37.27
Flat Ground	0.50001 - 1.00000	6	42.58	0.78	1,326,480	56.48
Flat Ground	1.00001 - 2.50000	8	42.58	1.71	3,400,314	144.79
Flat Ground	2.50001 - 5.00000	6	42.58	3.09	1,101,152	46.89
Black Ghee	0 - 0.01000	10	37.6	0.00	1,638	0.06
Black Ghee	0.01001 - 0.05000	5	37.6	0.03	21,891	0.82
Black Ghee	0.05001 - 0.10000	0	37.6	0.05	3,246	0.12
Black Ghee	0.10001 - 0.50000	0	37.6	0.10	1,040	0.04
Black Ghee	0.50001 - 1.00000	0	37.6	0.00	0	0.00
Black Ghee	1.00001 - 2.50000	0	37.6	0.00	0	0.00
Black Ghee	2.50001 - 5.00000	0	37.6	0.00	0	0.00
Great Bank	0 - 0.01000	7	46.1	0.00	119	0.01
Great Bank	0.01001 - 0.05000	10	46.1	0.02	22,069	1.02
Great Bank	0.05001 - 0.10000	12	46.1	0.07	63,059	2.91
Great Bank	0.10001 - 0.50000	21	46.1	0.25	936,006	43.15
Great Bank	0.50001 - 1.00000	11	46.1	0.76	1,522,360	70.18
Great Bank	1.00001 - 2.50000	5	46.1	1.15	1,374	0.06
Great Bank	2.50001 - 5.00000	1	46.1	3.02	90,741	4.18
Middle (north)	0 - 0.01000	6	40	0.00	990	0.04
Middle (north)	0.01001 - 0.05000	2	40	0.03	22,751	0.91
Middle (north)	0.05001 - 0.10000	2	40	0.08	32,025	1.28
Middle (north)	0.10001 - 0.50000	1	40	0.10	14,275	0.57
Middle (north)	0.50001 - 1.00000	0	40	0.00	0	0.00

Bed name	Density Class Range	N	Mean Weight (g)	Mean Density (Ind/m2)	No. of Oysters	Total Biomass (tonnes)
Middle (north)	1.00001 - 2.50000	0	40	0.00	0	0.00
Middle (north)	2.50001 - 5.00000	0	40	0.00	0	0.00
Middle (south)	0 - 0.01000	14	44.1	0.00	688	0.03
Middle (south)	0.01001 - 0.05000	7	44.1	0.03	23,034	1.02
Middle (south)	0.05001 - 0.10000	4	44.1	0.07	46,598	2.05
Middle (south)	0.10001 - 0.50000	3	44.1	0.27	427,884	18.87
Middle (south)	0.50001 - 1.00000	2	44.1	0.85	558,444	24.63
Middle (south)	1.00001 - 2.50000	7	44.1	1.83	1,438,801	63.45
Middle (south)	2.50001 - 5.00000	1	44.1	3.44	236,947	10.45
Moville	0 - 0.01000	14	38.01	0.00	1,031	0.04
Moville	0.01001 - 0.05000	4	38.01	0.02	13,058	0.50
Moville	0.05001 - 0.10000	1	38.01	0.09	34,462	1.31
Moville	0.10001 - 0.50000	2	38.01	0.13	56,437	2.15
Moville	0.50001 - 1.00000	1	38.01	0.59	35,164	1.34
Moville	1.00001 - 2.50000	1	38.01	1.14	8,678	0.33
Moville	2.50001 - 5.00000	0	38.01	0.00	0	0.00
Peak	0 - 0.01000	5	39.8	0.00	248	0.01
Peak	0.01001 - 0.05000	4	39.8	0.02	5,482	0.22
Peak	0.05001 - 0.10000	3	39.8	0.08	24,039	0.96
Peak	0.10001 - 0.50000	2	39.8	0.29	237,941	9.47
Peak	0.50001 - 1.00000	3	39.8	0.70	291,975	11.62
Peak	1.00001 - 2.50000	2	39.8	1.03	3,281	0.13
Peak	2.50001 - 5.00000	0	39.8	0.00	0	0.00
Perch	0 - 0.01000	7	41.8	0.00	40	0.00
Perch	0.01001 - 0.05000	2	41.8	0.03	10,067	0.42
Perch	0.05001 - 0.10000	2	41.8	0.06	11,450	0.48
Perch	0.10001 - 0.50000	10	41.8	0.27	205,507	8.59
Perch	0.50001 - 1.00000	5	41.8	0.76	404,829	16.92
Perch	1.00001 - 2.50000	6	41.8	1.74	1,380,912	57.72
Perch	2.50001 - 5.00000	5	41.8	3.29	343,832	14.37
Quigley's Point	0 - 0.01000	8	38.8	0.00	24	0.00
Quigley's Point	0.01001 - 0.05000	0	38.8	0.01	708	0.03
Quigley's Point	0.05001 - 0.10000	2	38.8	0.07	7,398	0.29
Quigley's Point	0.10001 - 0.50000	5	38.8	0.25	121,370	4.71
Quigley's Point	0.50001 - 1.00000	2	38.8	0.70	231,555	8.98
Quigley's Point	1.00001 - 2.50000	3	38.8	1.94	649,841	25.21
Quigley's Point	2.50001 - 5.00000	2	38.8	2.99	101,284	3.93
Redcastle	0 - 0.01000	7	40	0.00	739	0.03
Redcastle	0.01001 - 0.05000	3	40	0.03	9,336	0.37
Redcastle	0.05001 - 0.10000	2	40	0.06	12,015	0.48
Redcastle	0.10001 - 0.50000	2	40	0.36	140,378	5.62
Redcastle	0.50001 - 1.00000	0	40	0.00	0	0.00
Redcastle	1.00001 - 2.50000	0	40	0.00	0	0.00
Redcastle	2.50001 - 5.00000	0	40	0.00	0	0.00
Roof Isles	0 - 0.01000	0	67.3	0.00	0	0.00
Roof Isles	0.01001 - 0.05000	0	67.3	0.00	0	0.00

Bed name	Density Class Range	N	Mean Weight (g)	Mean Density (Ind/m2)	No. of Oysters	Total Biomass (tonnes)
Roof Isles	0.05001 - 0.10000	0	67.3	0.00	0	0.00
Roof Isles	0.10001 - 0.50000	0	67.3	0.00	0	0.00
Roof Isles	0.50001 - 1.00000	0	67.3	0.00	0	0.00
Roof Isles	1.00001 - 2.50000	0	67.3	0.00	0	0.00
Roof Isles	2.50001 - 5.00000	0	67.3	0.00	0	0.00
Sandy Ridge	0 - 0.01000	15	45	0.00	3,606	0.16
Sandy Ridge	0.01001 - 0.05000	5	45	0.03	17,529	0.79
Sandy Ridge	0.05001 - 0.10000	0	45	0.05	6,550	0.29
Sandy Ridge	0.10001 - 0.50000	0	45	0.10	34,991	1.57
Sandy Ridge	0.50001 - 1.00000	0	45	0.50	26,452	1.19
Sandy Ridge	1.00001 - 2.50000	0	45	0.00	0	0.00
Sandy Ridge	2.50001 - 5.00000	0	45	0.00	0	0.00
Southside North	0 - 0.01000	7	38.01	0.00	79	0.00
Southside North	0.01001 - 0.05000	3	38.01	0.03	11,619	0.44
Southside North	0.05001 - 0.10000	2	38.01	0.08	15,159	0.58
Southside North	0.10001 - 0.50000	8	38.01	0.27	246,904	9.38
Southside North	0.50001 - 1.00000	5	38.01	0.74	569,046	21.63
Southside North	1.00001 - 2.50000	4	38.01	1.81	1,300,423	49.43
Southside North	2.50001 - 5.00000	3	38.01	3.36	302,524	11.50
Southside South	0 - 0.01000	2	39.5	0.00	22	0.00
Southside South	0.01001 - 0.05000	5	39.5	0.03	3,460	0.14
Southside South	0.05001 - 0.10000	3	39.5	0.07	11,818	0.47
Southside South	0.10001 - 0.50000	10	39.5	0.25	273,920	10.82
Southside South	0.50001 - 1.00000	4	39.5	0.79	478,637	18.91
Southside South	1.00001 - 2.50000	7	39.5	1.38	1,116,969	44.12
Southside South	2.50001 - 5.00000	5	39.5	3.69	482,081	19.04
McGhee Bank	0 - 0.01000	0	39	0.00	0	0.00
McGhee Bank	0.01001 - 0.05000	0	39	0.01	0	0.00
McGhee Bank	0.05001 - 0.10000	3	39	0.08	2,645	0.10
McGhee Bank	0.10001 - 0.50000	5	39	0.30	372,425	14.52
McGhee Bank	0.50001 - 1.00000	3	39	0.70	275,169	10.73
McGhee Bank	1.00001 - 2.50000	0	39	0.00	0	0.00
McGhee Bank	2.50001 - 5.00000	0	39	0.00	0	0.00
Firing Range	0 - 0.01000	5	36.2	0.00	62	0.00
Firing Range	0.01001 - 0.05000	0	36.2	0.01	1,103	0.04
Firing Range	0.05001 - 0.10000	1	36.2	0.07	7,909	0.29
Firing Range	0.10001 - 0.50000	3	36.2	0.28	68,866	2.49
Firing Range	0.50001 - 1.00000	1	36.2	0.73	193,992	7.02
Firing Range	1.00001 - 2.50000	3	36.2	1.88	778,498	28.18
Firing Range	2.50001 - 5.00000	0	36.2	0.00	0	0.00
Glenburnie	0 - 0.01000	2	40	0.00	421	0.02
Glenburnie	0.01001 - 0.05000	1	40	0.05	4,723	0.19
Glenburnie	0.05001 - 0.10000	0	40	0.00	0	0.00
Glenburnie	0.10001 - 0.50000	0	40	0.00	0	0.00
Glenburnie	0.50001 - 1.00000	0	40	0.00	0	0.00
Glenburnie	1.00001 - 2.50000	0	40	0.00	0	0.00
Glenburnie	2.50001 - 5.00000	0	40	0.00	0	0.00

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