Loughs Agency
Gníomhaireacht na Lochanna
Factrie fur Loughs

POST-FISHERY STOCK ASSESSMENT LOUGH FOYLE NATIVE OYSTER FISHERY

Spring 2020



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1. Executive Summary

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

There has been good survival of the 2018 spatfall on the oyster beds in Lough Foyle. This has helped to rebalance the length frequency that had been exhibiting askew towards the larger size classes following successive poor recruitment of juveniles. This cohort is now averaging between 30-60mm and represents a biomass of just over 147tonnes at this time, with a mean weight of 13.5g and an estimated 10.9 million individuals.

The biomass of oysters over 80mm on all oyster beds is estimated to be 27.7 tonnes with a total of 66.2 tonnes of the population over 70mm.

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.

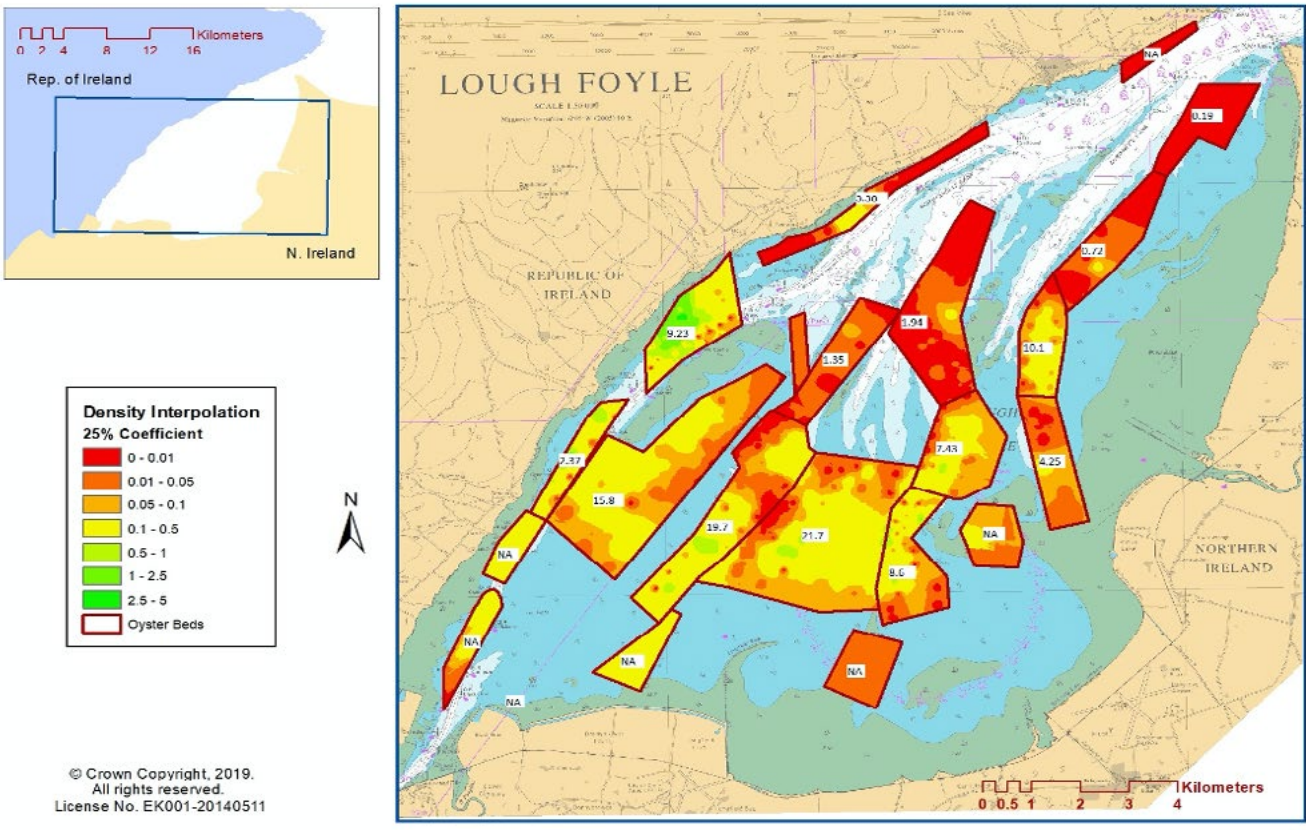

Figure 1 Estimated Biomass (tonnes) over 80mm on Foyle Oyster Beds Autumn 2019

2. Introduction

A post-fishery survey of the native oyster beds in Lough Foyle took place during the period April-May 2019. This survey was conducted by 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 which 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 0.09 oysters/m2. This figure is low relative to the results from previous years and is attributable to the low recruitment effort into the stock in recent years (Figure 4). The maximum density recorded was 1.52 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.

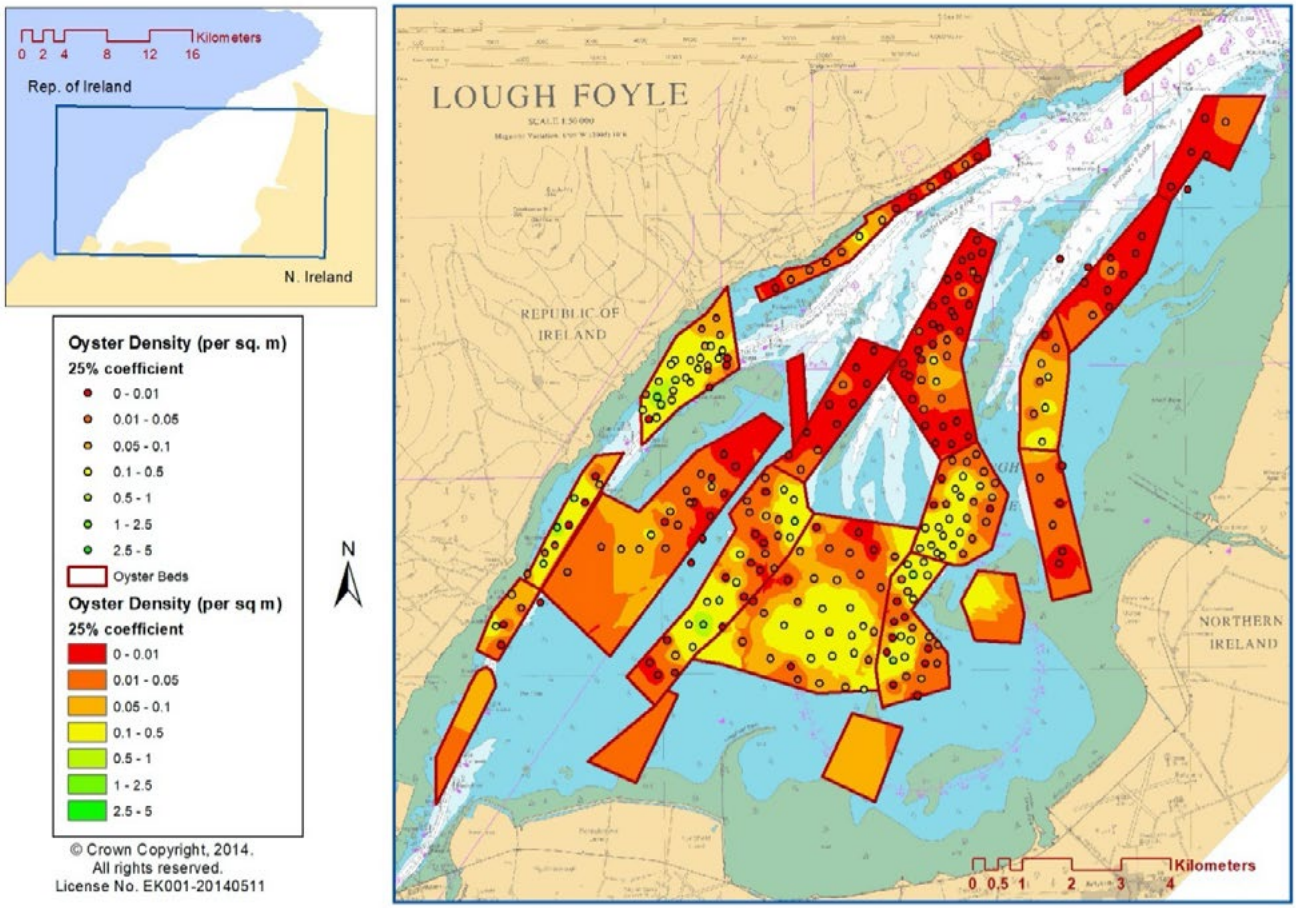

Figure 3 Interpolated Oyster Density Lough Foyle Spring 2020

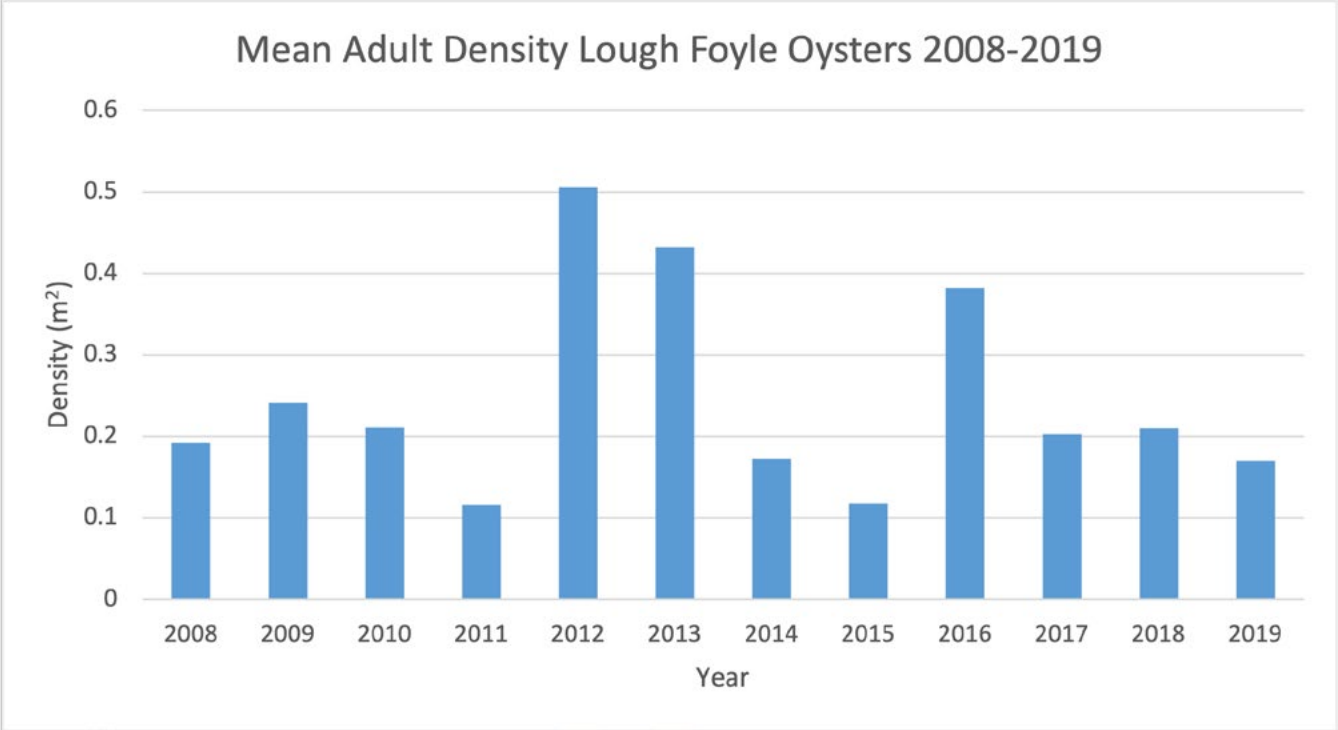

Figure 4 Mean Density Lough Foyle from Autumn Surveys 2008-2019

5. Biomass Estimate

The estimated total oyster population biomass is 378 tonnes (table 1). This is a decrease from the estimated biomass of 479 tonnes in autumn 2019. Total stock biomass over 80mm is currently estimated to be 27.7 tonnes and biomass over 70mm is estimated to be 66.2 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

			Dredge Efficiency 25%		
Bed name	**Area (ha)**	**Mean Weight (g)**	**Bed Total (t)**	**Total (t) >80mm**	**Total (t) >70mm**
Barney's Bank	200	85	0.28	0.19	0.21
Black Ghee	236	65	2.36	0.54	1.07
Drumskellan	91	58	11.87	0.15	0.86
Flat Ground	936	68	96.50	4.47	10.52
Great Bank	824	58	24.24	0.98	2.04
McGhee	167	65	8.90	0.00	6.23
Middle North	228	70	0.44	0.30	0.34
Middle South	531	68	62.06	5.47	9.84
Moville	250	63	0.64	0.15	0.30
Peak	208	94	10.74	2.39	4.79
Perch	276	33	43.17	1.54	6.84
Quigley's Pt	139	33	31.42	0.32	1.82
Redcastle	141	55	14.16	8.45	11.27
Sandy Ridge	474	99	1.93	0.46	0.92
Shooting Range	81	63	4.30		3.01
Southside North	312	65	30.97	1.14	3.07
Southside South	297	65	34.69	1.16	3.11
Total	**5391.22**	**65.12**	**378.67**	**27.72**	**66.24**

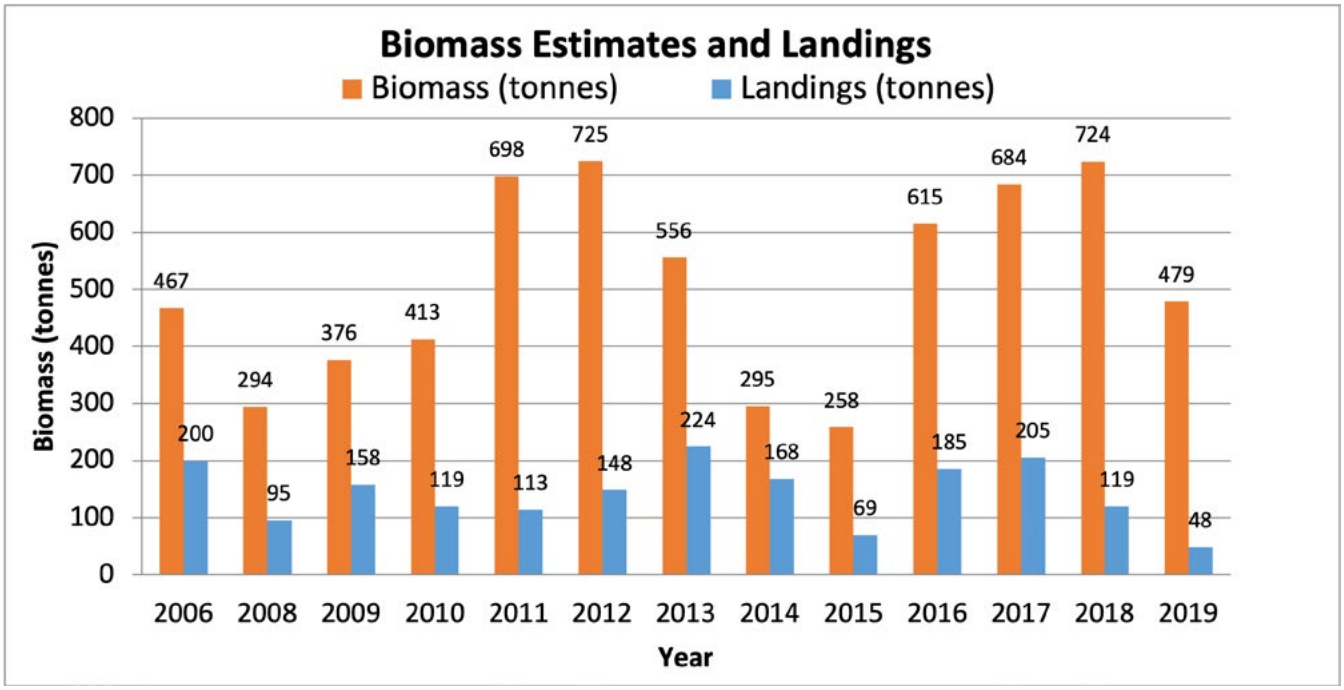

Figure 5 Historic Pre-Season Biomass Estimates and Landings Lough Foyle

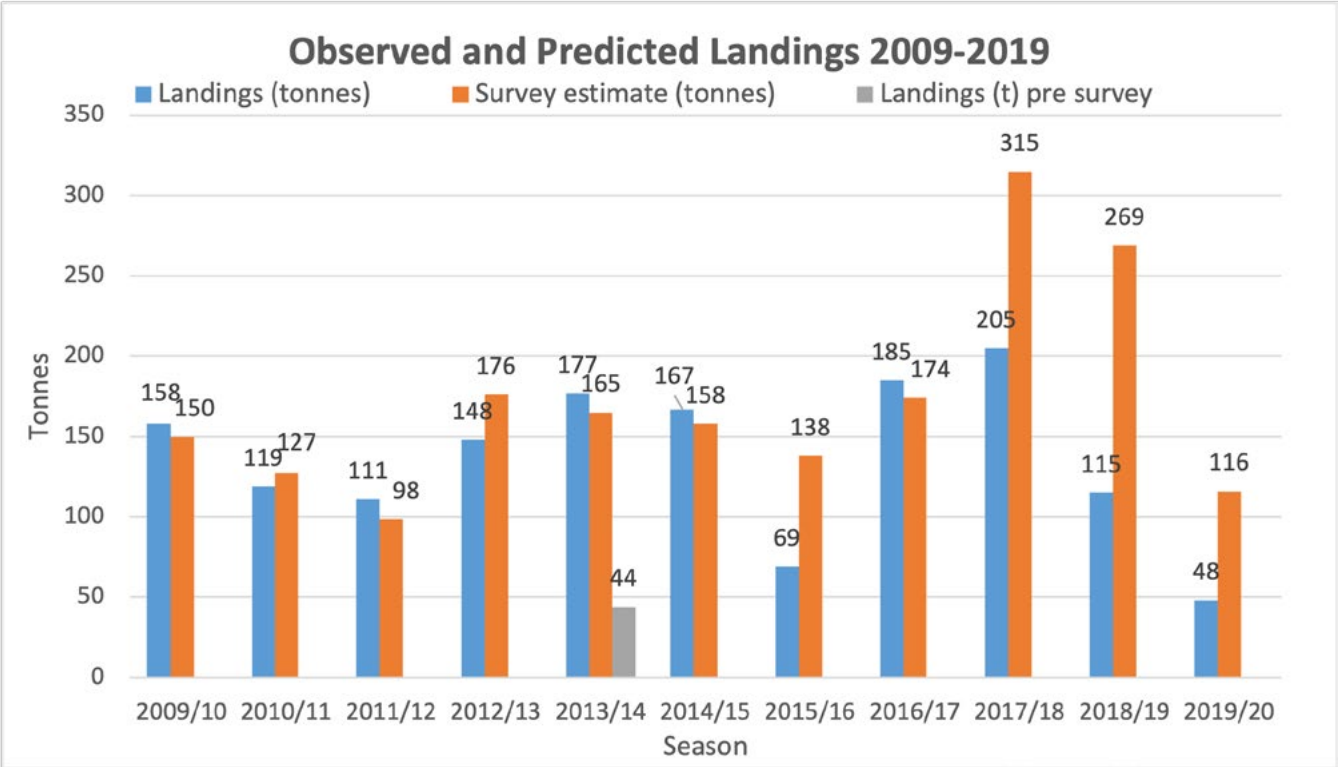

Figure 6 Observed and Estimated Landings from Lough Foyle

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 very limited spat settlement event appears to have occurred in 2019 on 2 beds with only 2.8% of the stations sampled having spat present (Figure 7 and 8). The majority of the spat recorded is less than 17.5mm in size, suggesting that it settled out late in the summer period.

Mean spat density observed is low at 0.007/m2. The historic trends reinforce the fact that successful spawning occurs once or twice every 5 years at best (Figure 9).

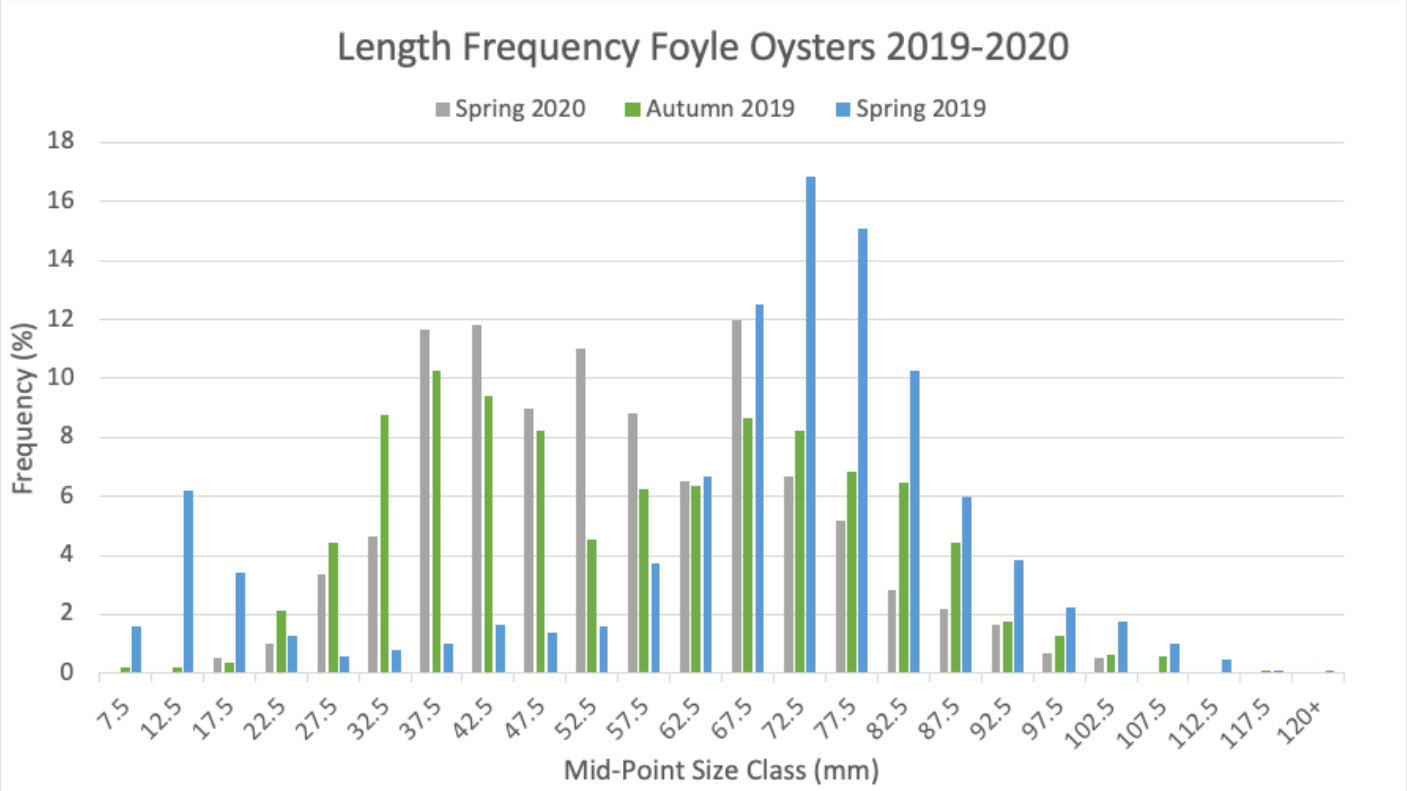

Figure 7 Length Frequency of Oysters in Lough Foyle 2019-2020

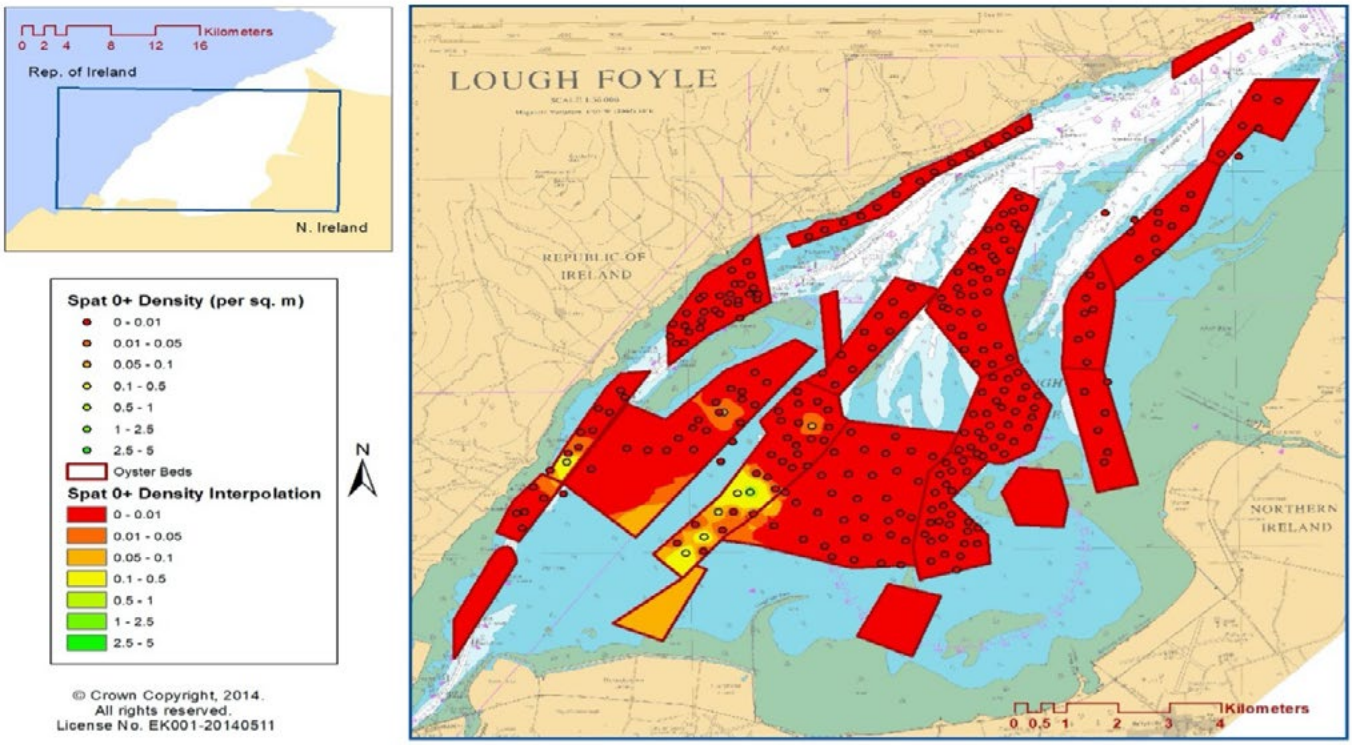

Figure 8 Oyster Spat Density in Lough Foyle Spring 2020

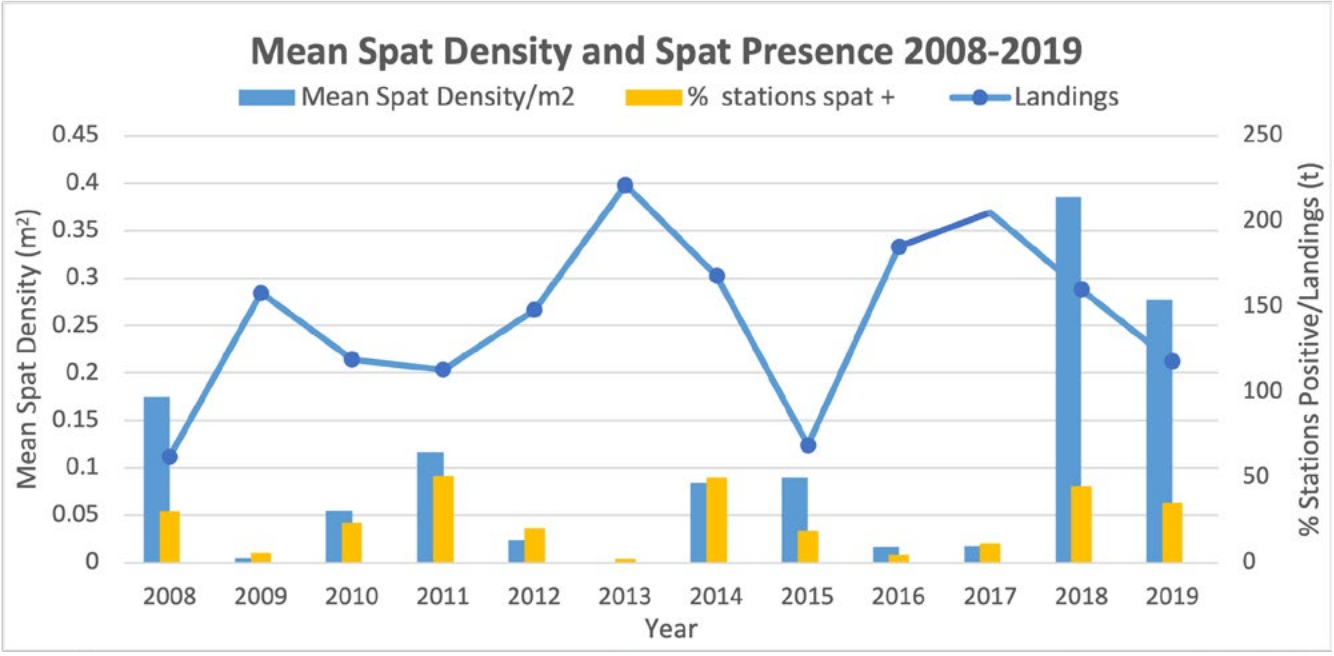

Figure 9 Historic Spat Density And Presence Lough Foyle (Autumn Survey Data Only)

7. Mortality Levels

There was very limited evidence of recent mortality on the oyster beds (Figure 10). Mortality was recorded in 6.3% of the samples taken and the majority of this appeared to be due to natural causes. The latest Bonamia test results show infection rates of 30%.

Total mortality throughout the stock has gradually begun to climb again since 2016 (Figure 11). This may be a result of increased fishing intensity or may be density dependent. Stock biomass has been relatively high in the past 2 seasons and these increased densities may be causing a slight increase in natural mortality.

There was some evidence of mortality linked to fishing gear, with some chipped and cracked oyster shells being observed. This needs further investigation to determine which types of gear are having the biggest impact. Heavy dredges with hydroplanes to help depress the dredge into the substratum may be having more of an impact than the traditional oyster dredge which does not have a hydroplane. The weight of the dredges should be investigated to determine the impact this has on survival of the catch and by-catch.

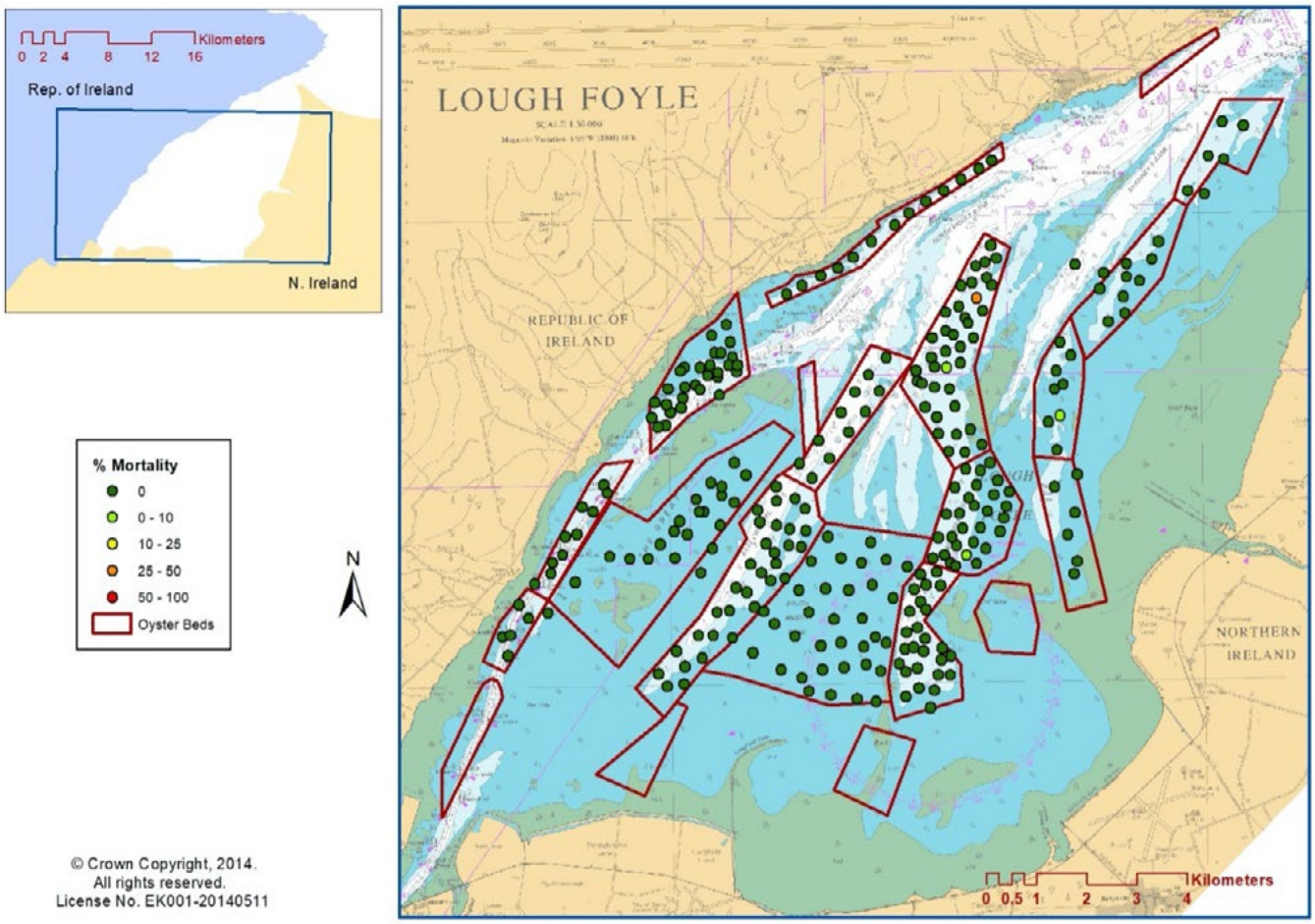

Figure 10 Oyster Mortality Observed in Lough Foyle Spring 2020

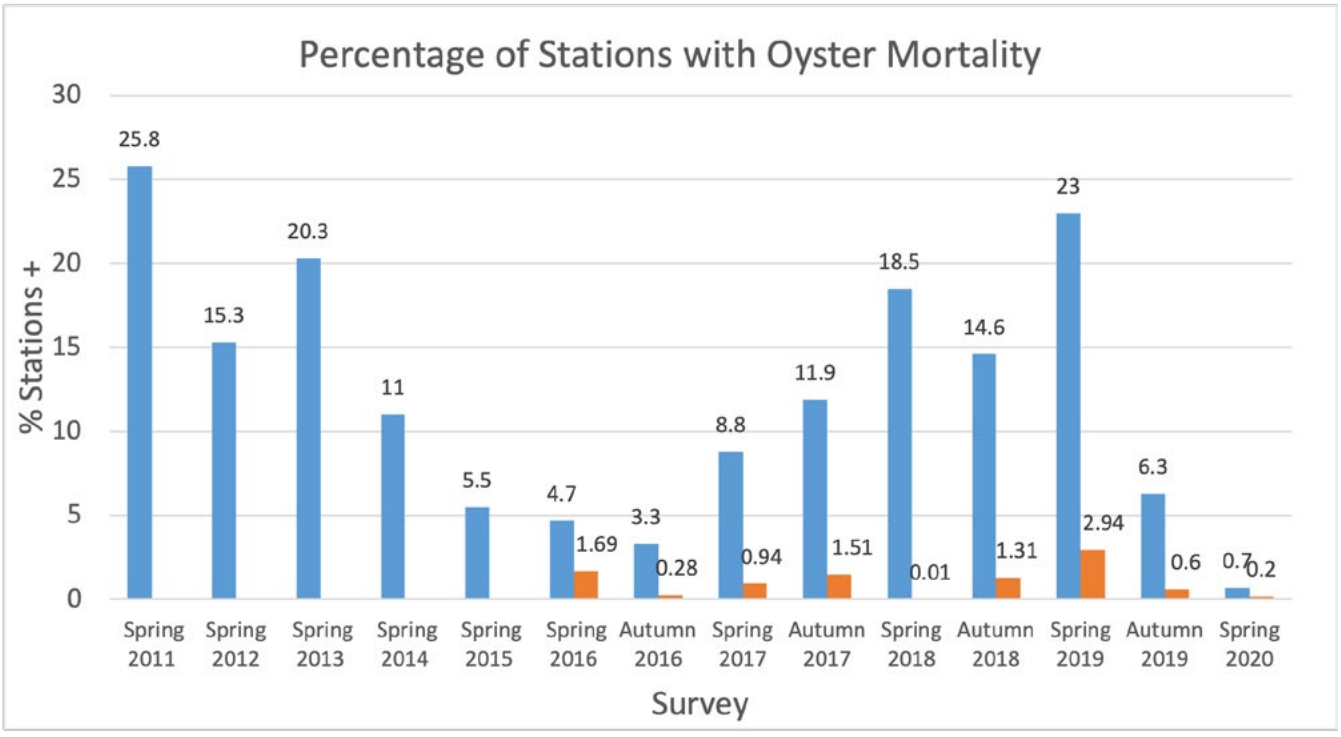

Figure 11 Oyster Mortality Levels Lough Foyle 2011-2020

8. Population Structure and Invasive Species

The length frequency of the oyster population shows that the proportion of larger size classes has increased since the 2007 stock survey. The 2007 results show that there was poor representation of oysters 75mm and above in the population. In the years since the regulation of the fishery in 2008 there has been greater evidence of larger oysters within the population (see Figure 12).

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 juvenile 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 estimated to have a biomass of just over 100 tonnes with a current individual mean weight of 9g.

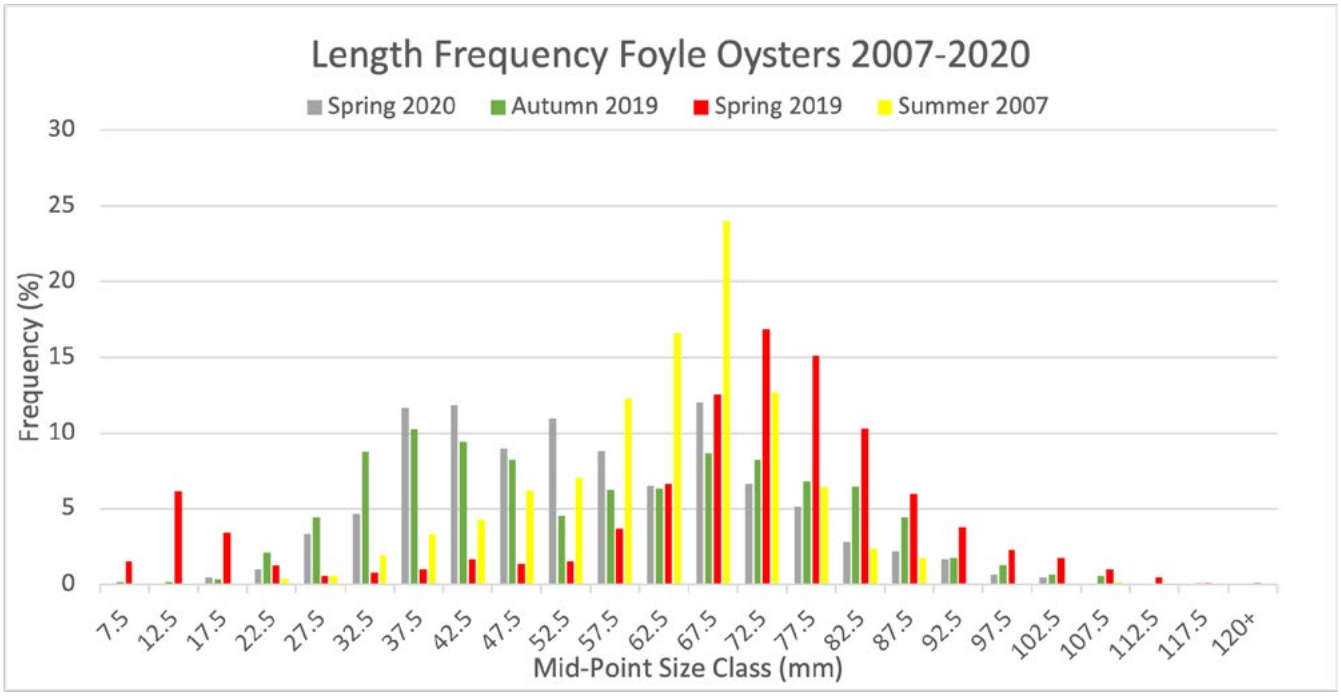

Figure 12 Length Frequency of Lough Foyle Oysters 2007- 2020

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.

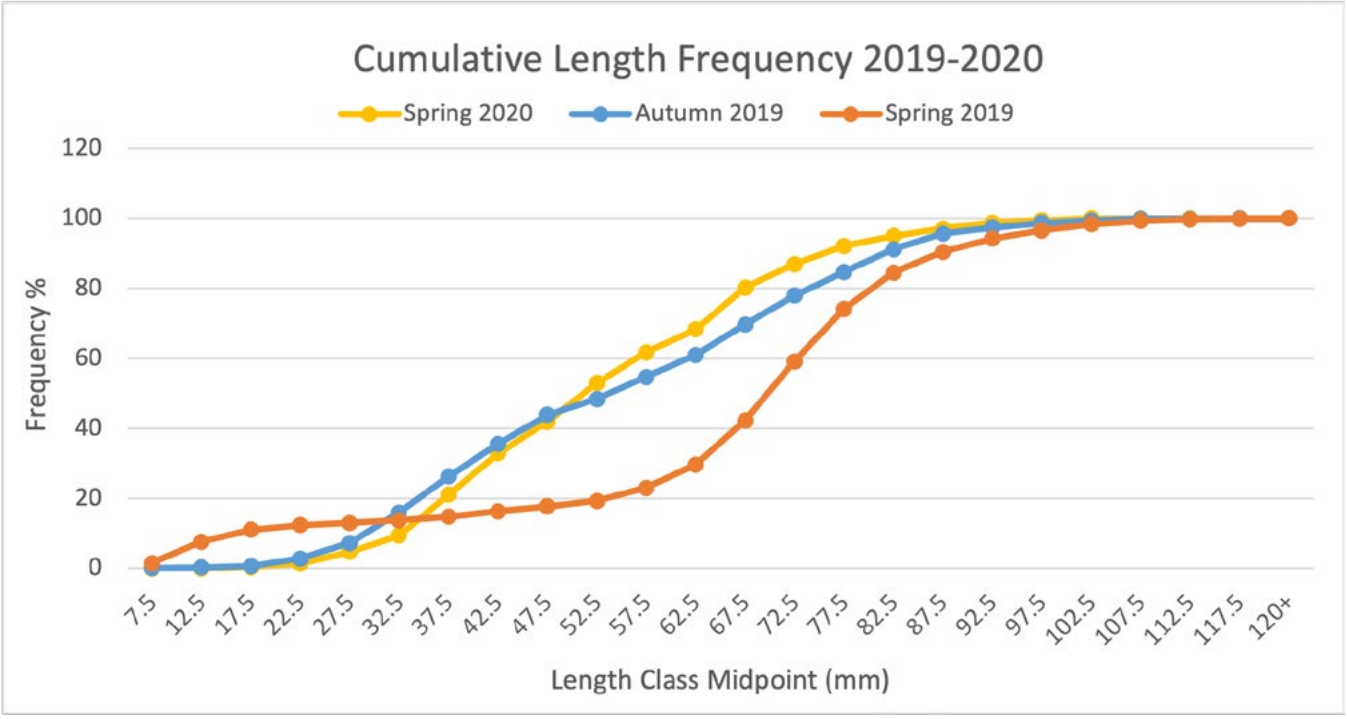

Figure 13 Cumulative Frequency Across All Oyster Beds In Lough Foyle 2019-2020

The pie chart in Figure 14 shows a better representation of smaller size classes than has 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.

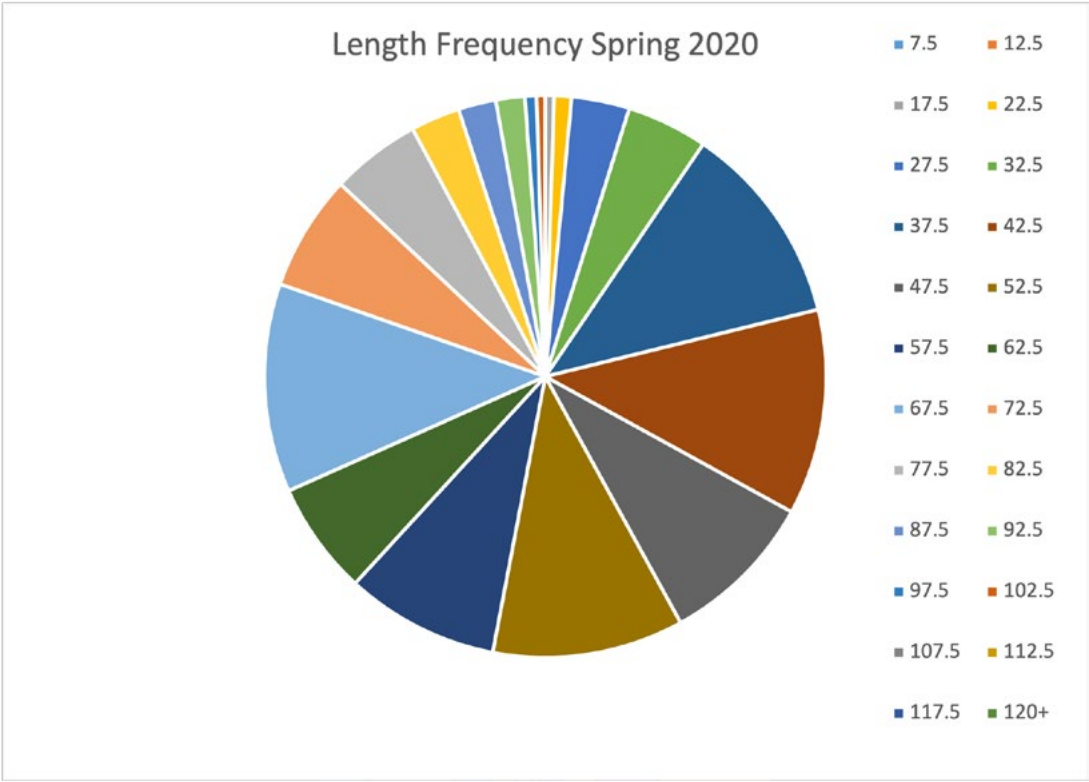

Figure 14 Length Classes on Oyster Beds Lough Foyle Spring 2020

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 61mm-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.

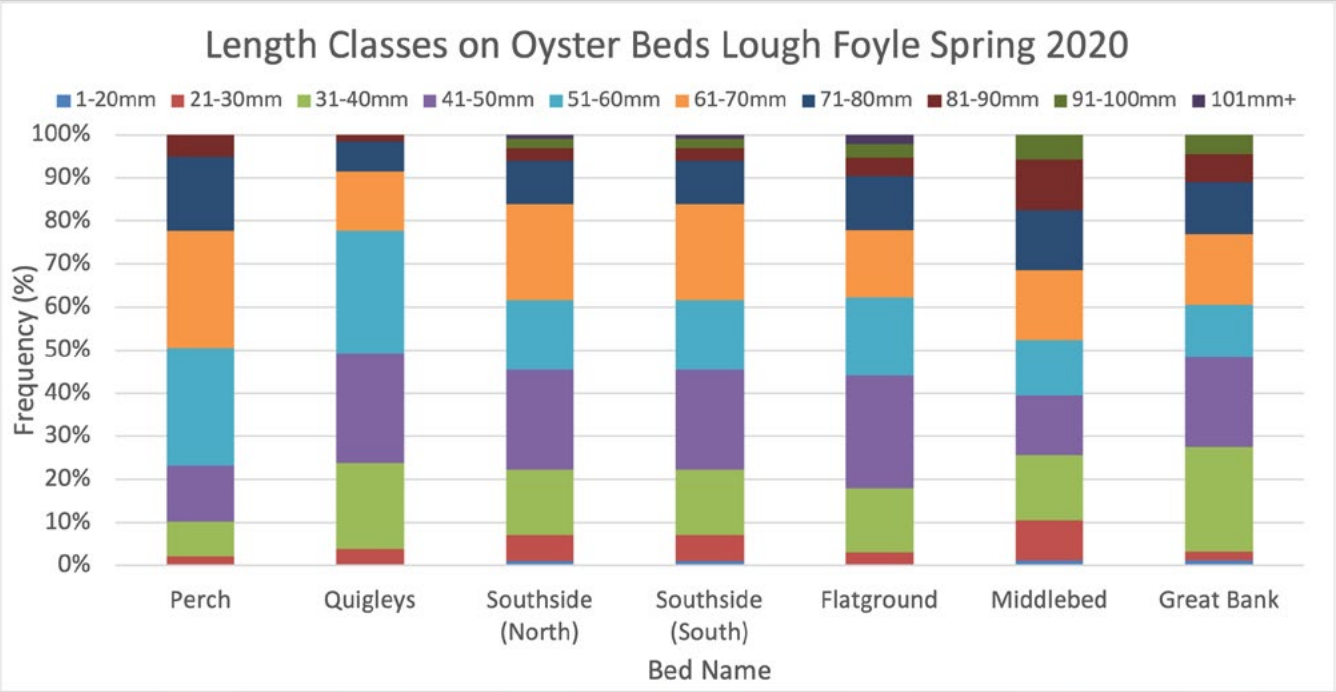

Figure 15 Size Class on Each Bed in Lough Foyle Spring 2020

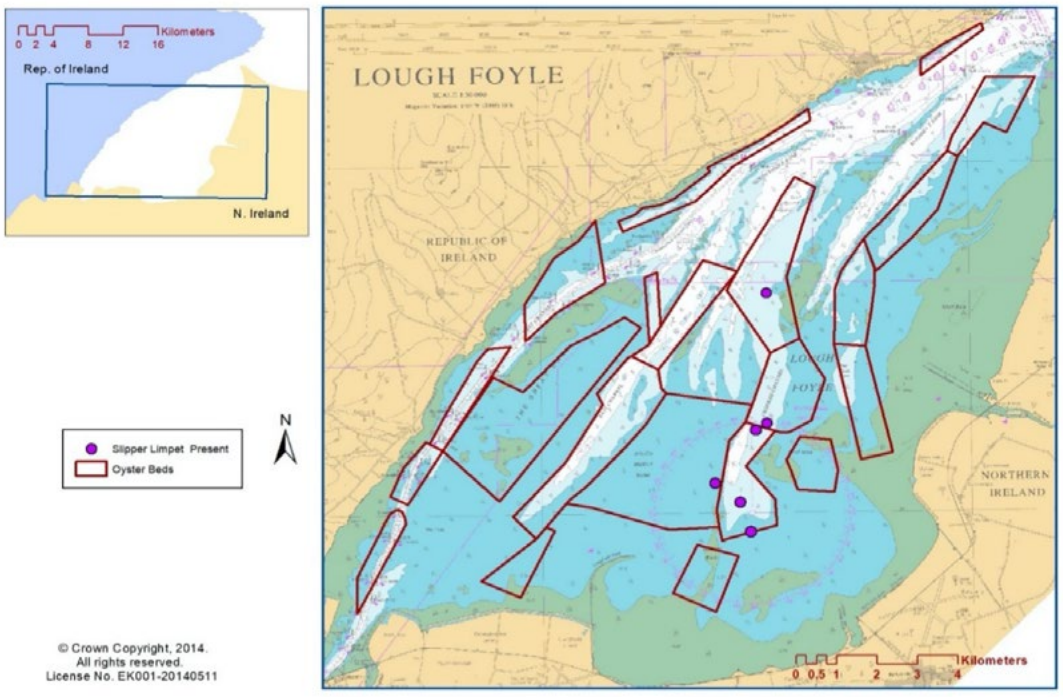

Figure 16. Location of Dredge Samples with Slipper Limpet Present

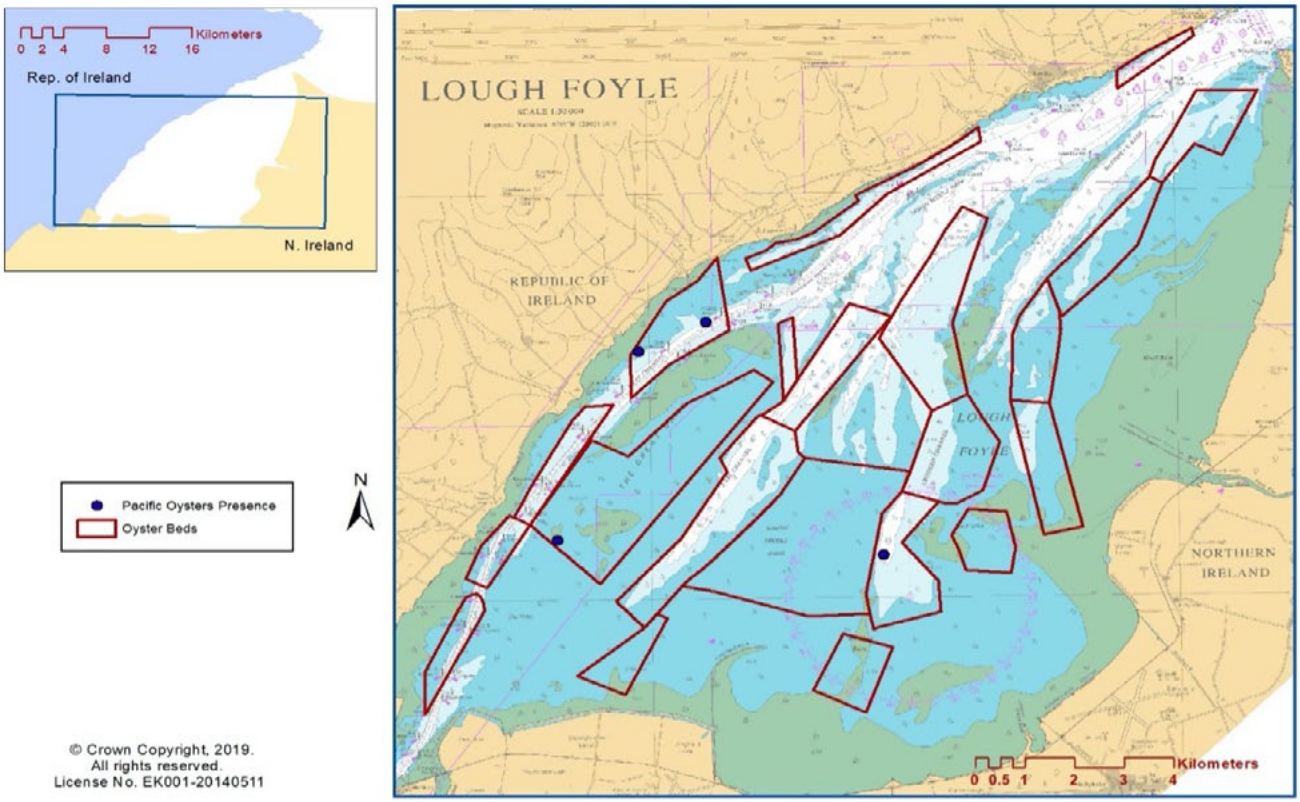

Figure 17. Location of Dredge Samples with Pacific Oyster Present

Slipper limpets were recorded on the Flat Ground Bed once again in the spring 2020 survey. There were 7 individuals in total observed with 2 individuals in a chain formation. Size ranges were from 22-38mm showing evidence of recruitment. Slipper limpets were first recorded in Lough Foyle during the autumn 2018 stock assessment and they have been observed in multiple locations since then, 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 were recorded ranging in size from 78-152mm.

9. Oyster Bed Review

9.1 The Perch

Table 2 Summary Information: The Perch

Bed Name	Perch
Area (h)	276
Total Biomass (t)	43.17
Biomass (t) >70mm	6.84

The Perch is one of the 5 main commercially fished oyster beds, with the highest density in Lough Foyle covering an area of 276 hectares. The overall biomass estimated for this bed is 43.17 tonnes. 6.84 tonnes of that figure is currently over 70mm and should be available to the fishery.

The length frequency for the Perch shows less evidence of the new spat settlement from summer 2019, with a small quantity of spat in the 25-35mm 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 35-55mm size classes.

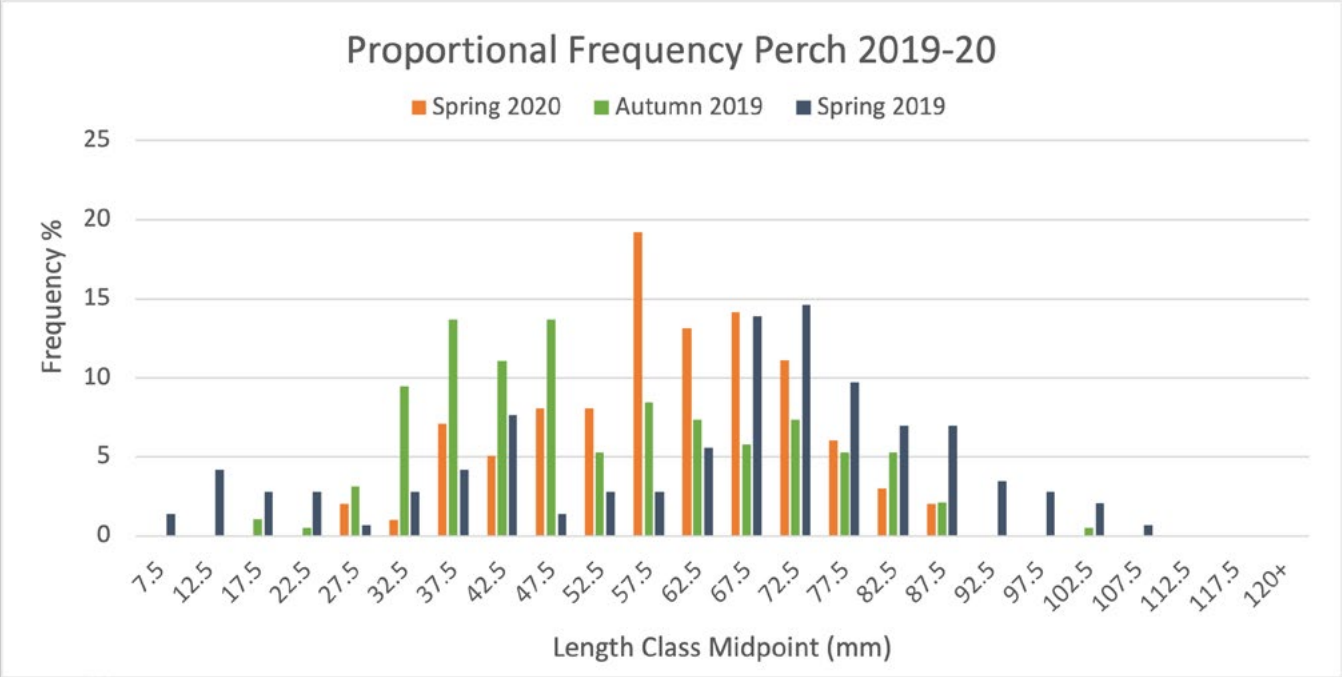

Figure 18 Proportional Length Frequency: The Perch 2019-20

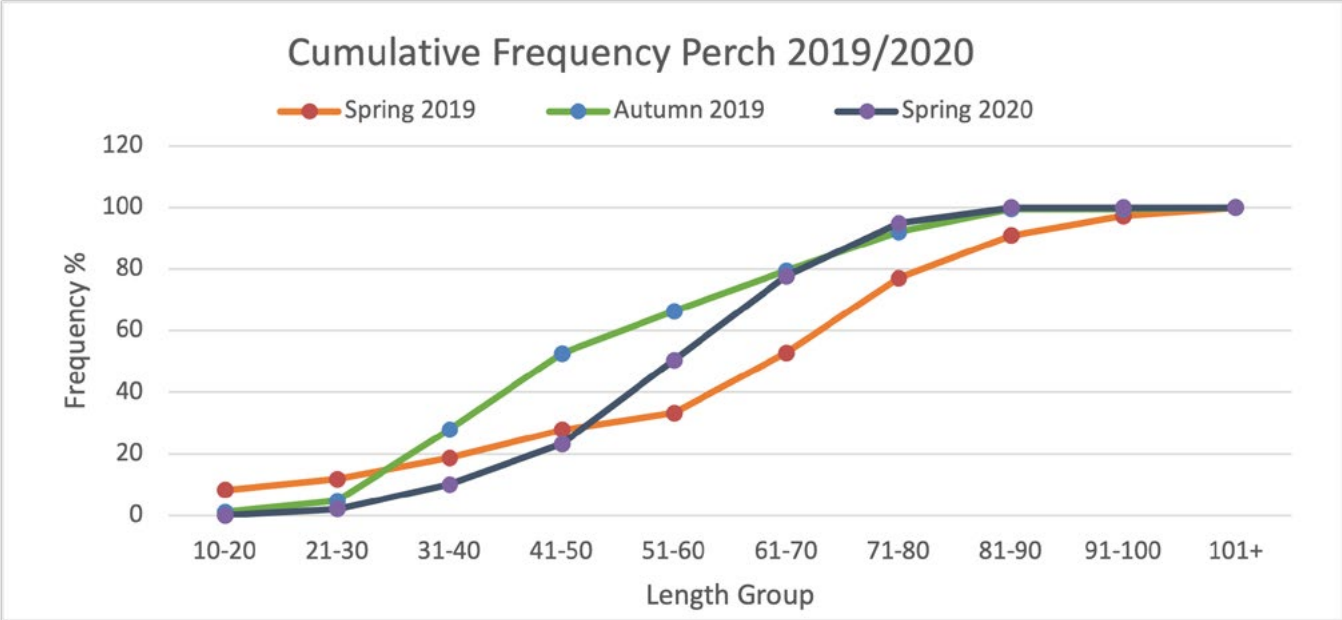

Figure 19 Cumulative Frequency: The Perch 2019-2020

The cumulative frequency of the stock on the Perch Bed shows evidence of the recruitment of juveniles onto this bed from the spatfall in 2018, and a slight decrease in oysters in the 70-90mm size classes most likely linked to fishing related mortality of oysters above the minimum size and by caught oysters less than the minimum landing size.

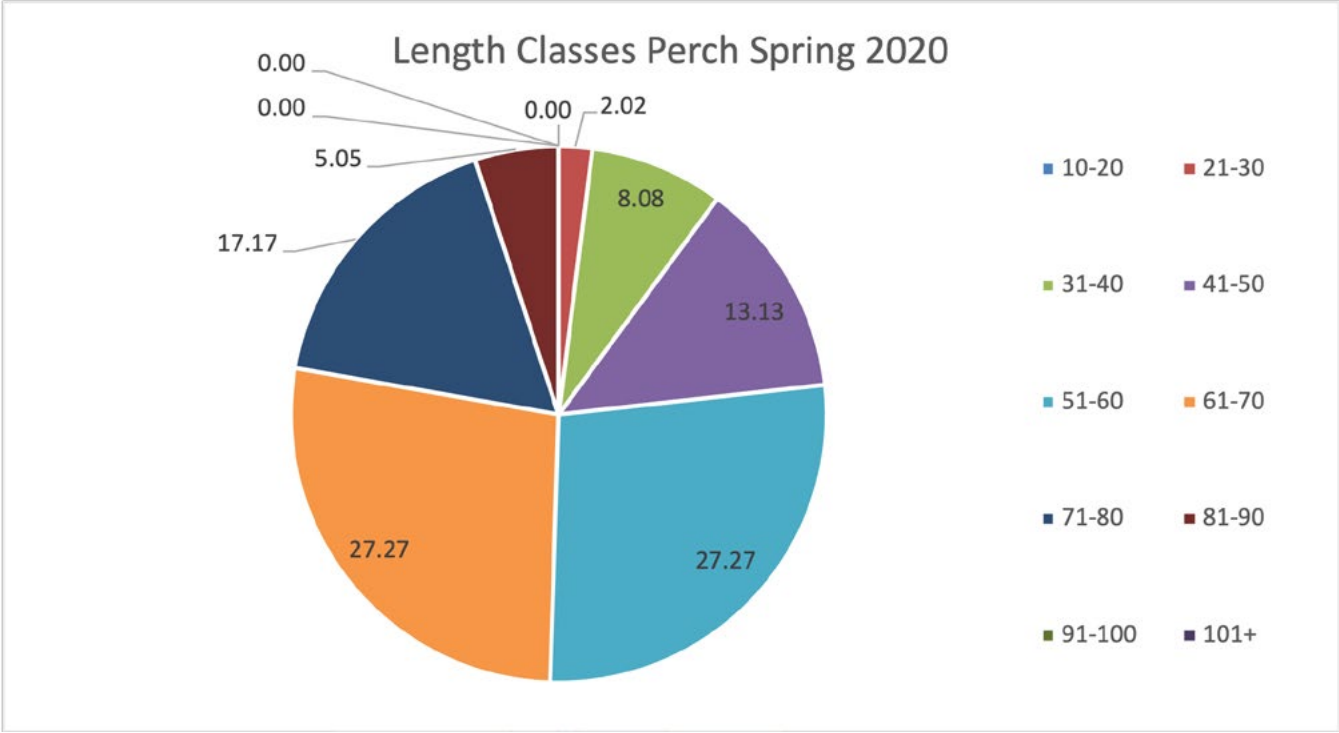

Figure 20 Length Classes: The Perch Spring 2020

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 20-50m size classes.

9.2 The Flat Ground

Table 3 Summary Information: The Flat Ground

Bed Name	Flat Ground
Area (h)	936
Total Biomass (t)	96.5
Biomass (t) >70mm	10.5

The Flat Ground covers an area of 936 hectares. Total stock biomass for this bed is estimated to be 96.5 tonnes. 10.5 tonnes of the stock on this bed is greater than 70mm in size and therefore should recruit into the fishery in 2020/21.

The length frequency (Figure 19) shows evidence of the 2018 spatfall (30-50mm) that was recorded during the survey on most oyster beds. These spat have survived well over the past year and show average growth of around 25mm since the spring 2019 observations when they averaged 15mm. The poor recruitment onto the bed in the 2016/2017 spawning seasons is evident from the poor representation of oysters in the 45-60mm size classes. In keeping with the overall length frequencies there is good representation of older age classes which would not have been recorded in the stock assessments during the period 2007-2010.

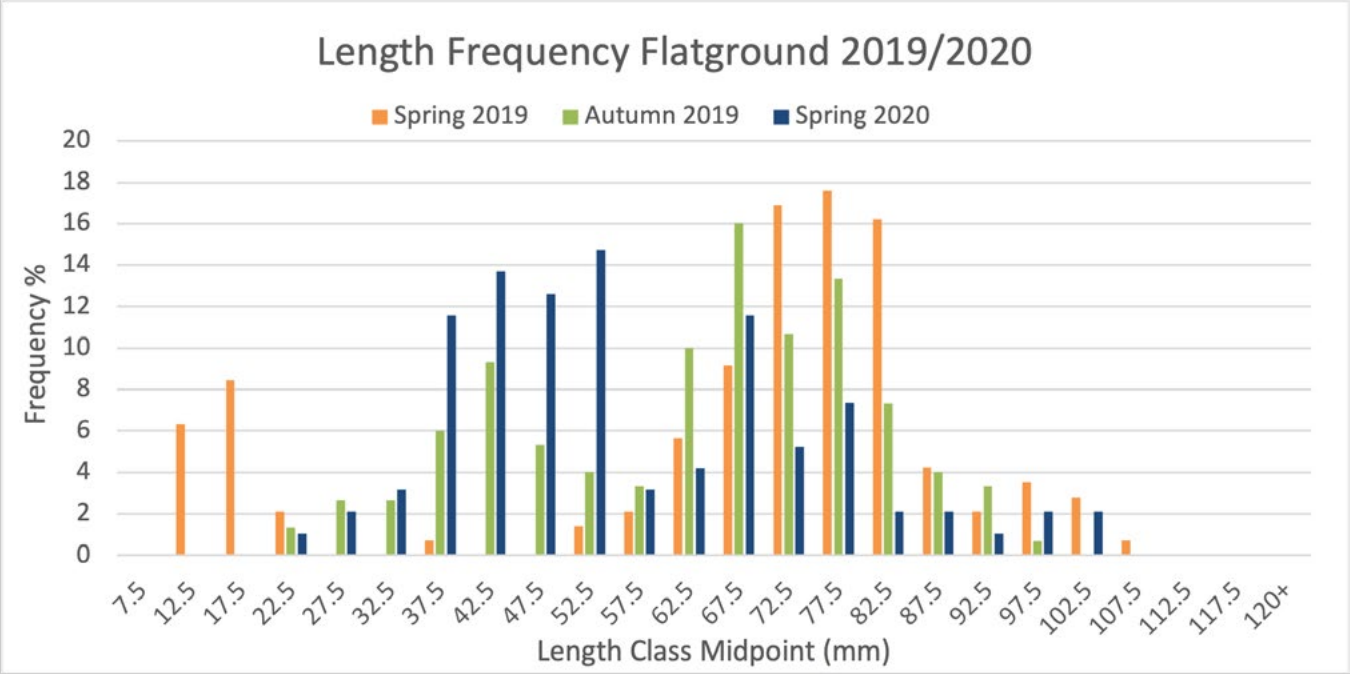

Figure 21 Proportional Length Frequency: Flat Ground 2019-20

The cumulative frequency (Figure 20) for the stock on the Flat Ground shows the impact of the spat settlement in the smallest size classes and the limited fishing removal in the larger size classes.

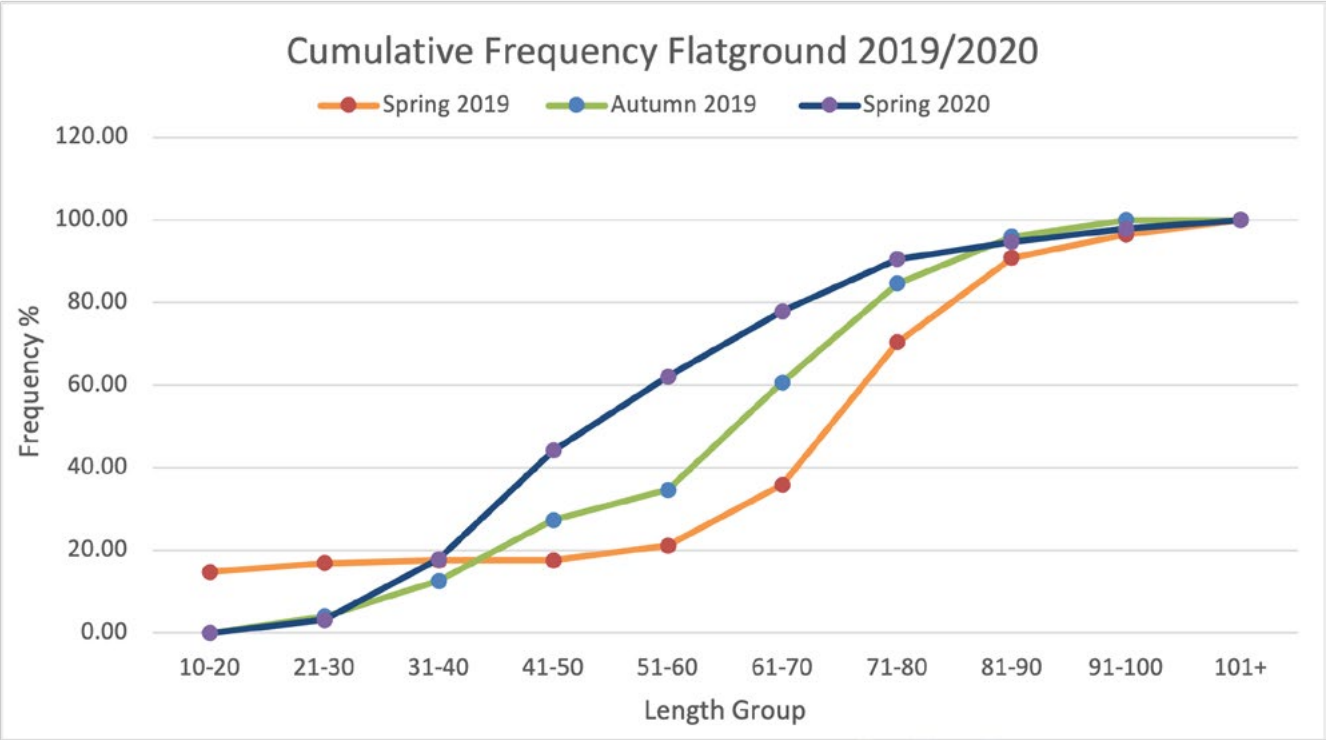

Figure 22 Cumulative Frequency: Flat Ground 2019-2020

The pie chart (Figure 21) also shows evidence of the large spat settlement in 2018 on this bed with almost 30% of the stock in the 20-50mm size classes.

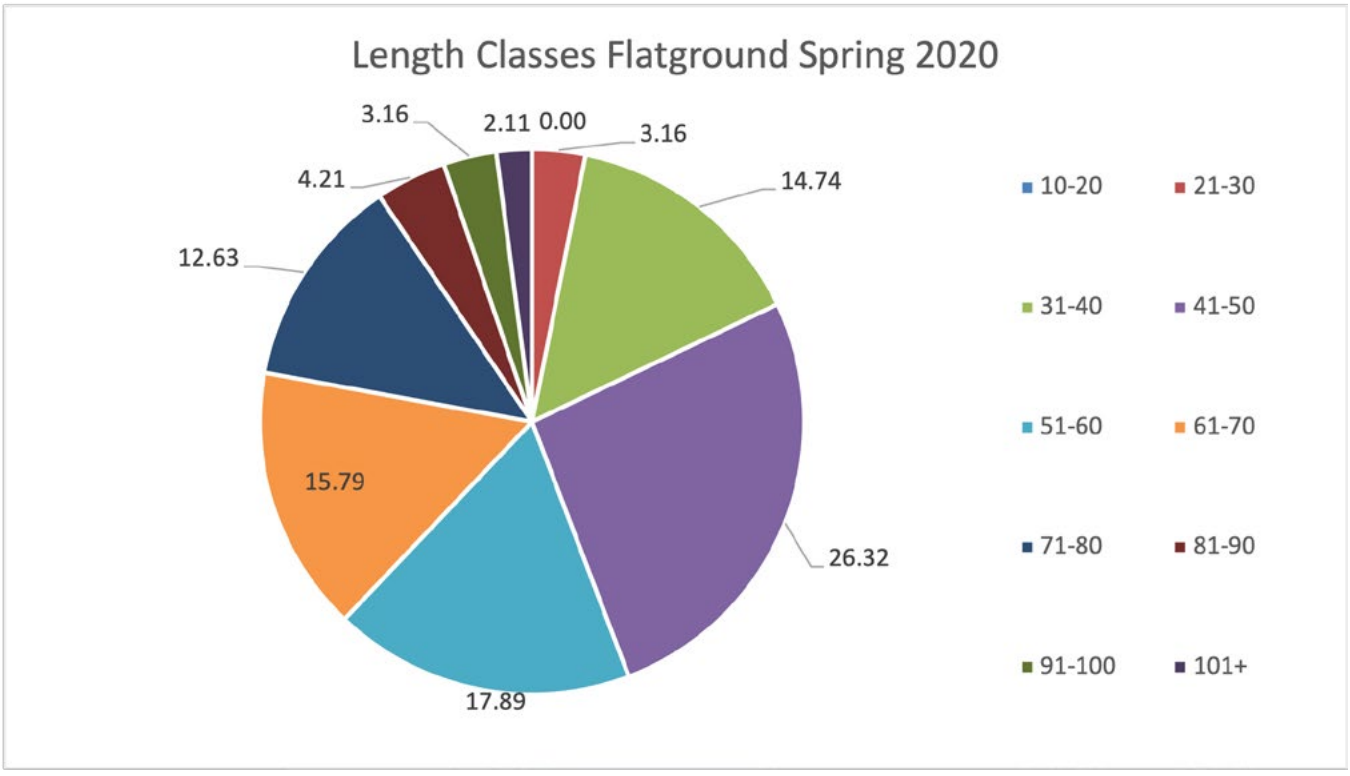

Figure 23 Percentage of Each Length Class: Flat Ground Spring 2020

9.3 Middle Bed South

Table 4 Summary Information: Middle Bed South

Bed Name	Middle Bed South
Area (h)	531
Total Biomass (t)	62.06
Biomass (t) >70mm	9.84

The south section of the Middle Bed covers an area of 531 hectares. There is an estimated total biomass of 62.06 tonnes on this bed and 9.84 tonnes of that figure is greater than 70mm, which should be available to the 2020/21 fishery.

The length frequency for the Middle Bed South (Figure 25) shows that the majority of oysters on this bed are now over 50mm, indicating poor juvenile recruitment in 2015 and 2016. There was some good evidence of a spatfall in 2018 with oysters in the 30-50mm size classes observed during the survey.

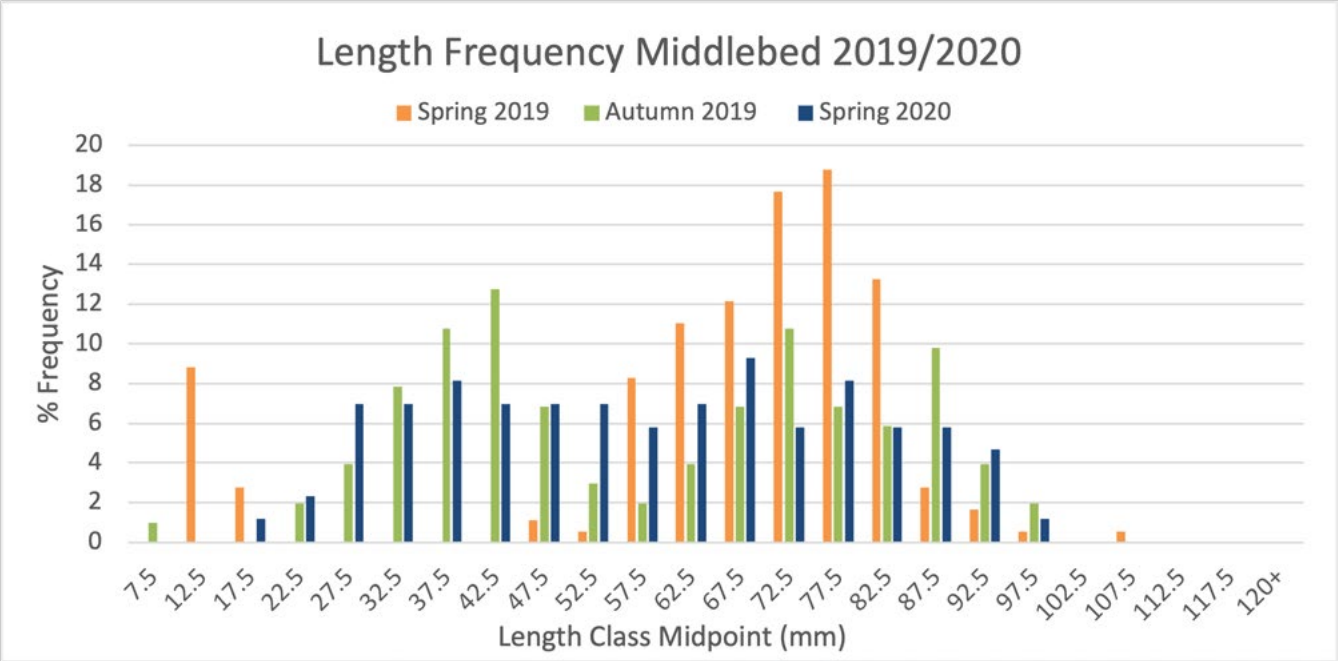

Figure 24 Proportional Length Frequency Middle Bed 2019-20

The south section of the Middle Bed covers an area of 531 hectares. There is an estimated total biomass of 62.06 tonnes on this bed and 9.84 tonnes of that figure is greater than 70mm, which should be available to the 2020/21 fishery.

The length frequency for the Middle Bed South (Figure 25) shows that the majority of oysters on this bed are now over 50mm, indicating poor juvenile recruitment in 2015 and 2016. There was some good evidence of a spatfall in 2018 with oysters in the 30-50mm size classes observed during the survey.

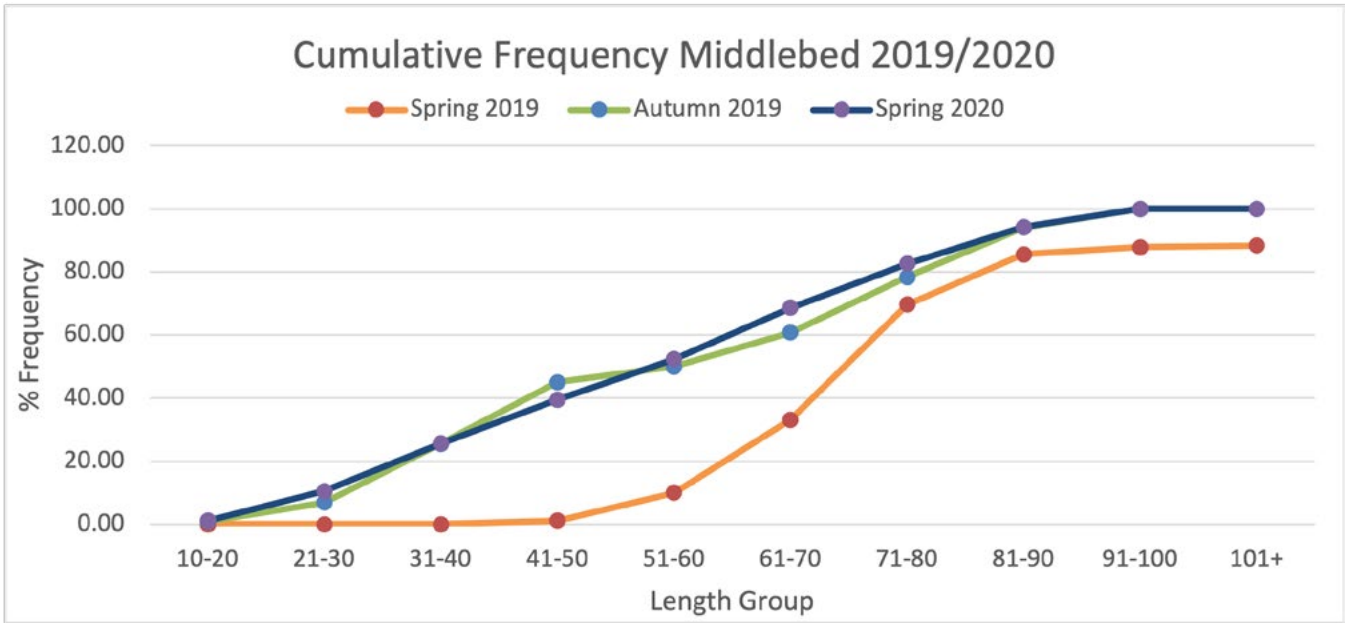

Figure 25 Cumulative Frequency Middle Bed 2019-2020

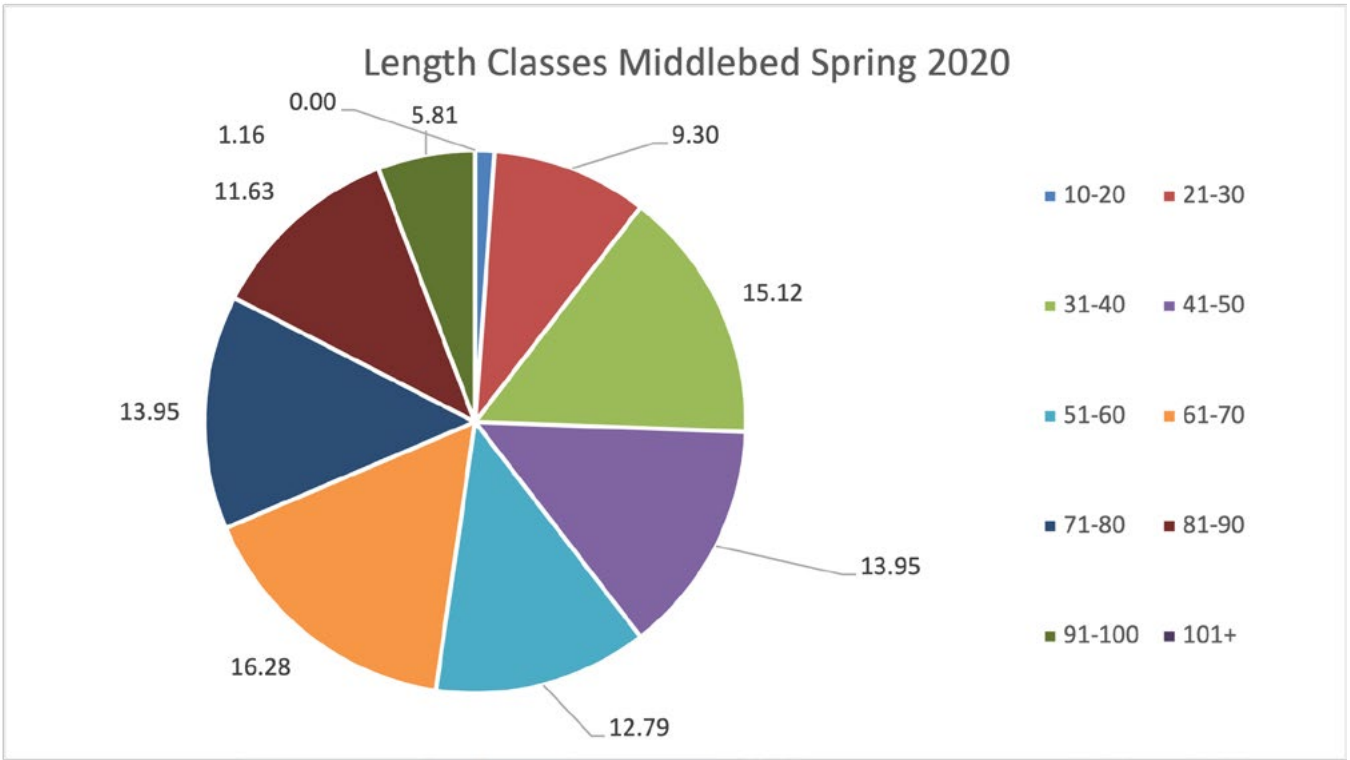

Figure 26 Percentage of Length Classes Middle Bed Spring 2020

9.4 Southside North

Table 5 Summary Information: Southside North

Bed Name	Southside North
Area (h)	312
Total Biomass (t)	30.97
Biomass (t) >70mm	3.07

The northern portion of the Southside Bed covers an area of 312 hectares. The overall biomass on this bed is estimated to be 30.97 tonnes, 3.07 tonnes of this figure represents oysters over 70mm in length.

The length frequency (Figure 28) continues to show strong evidence of a late settlement in 2018 with a very large proportion of the stock less than 50mm. This widespread settlement on the bed should help sustain the stock in the future provided that survival is good over the next few seasons. The poor settlement in 2016 and 2017 is evident in the poor representation of oysters in the 50-70mm size classes.

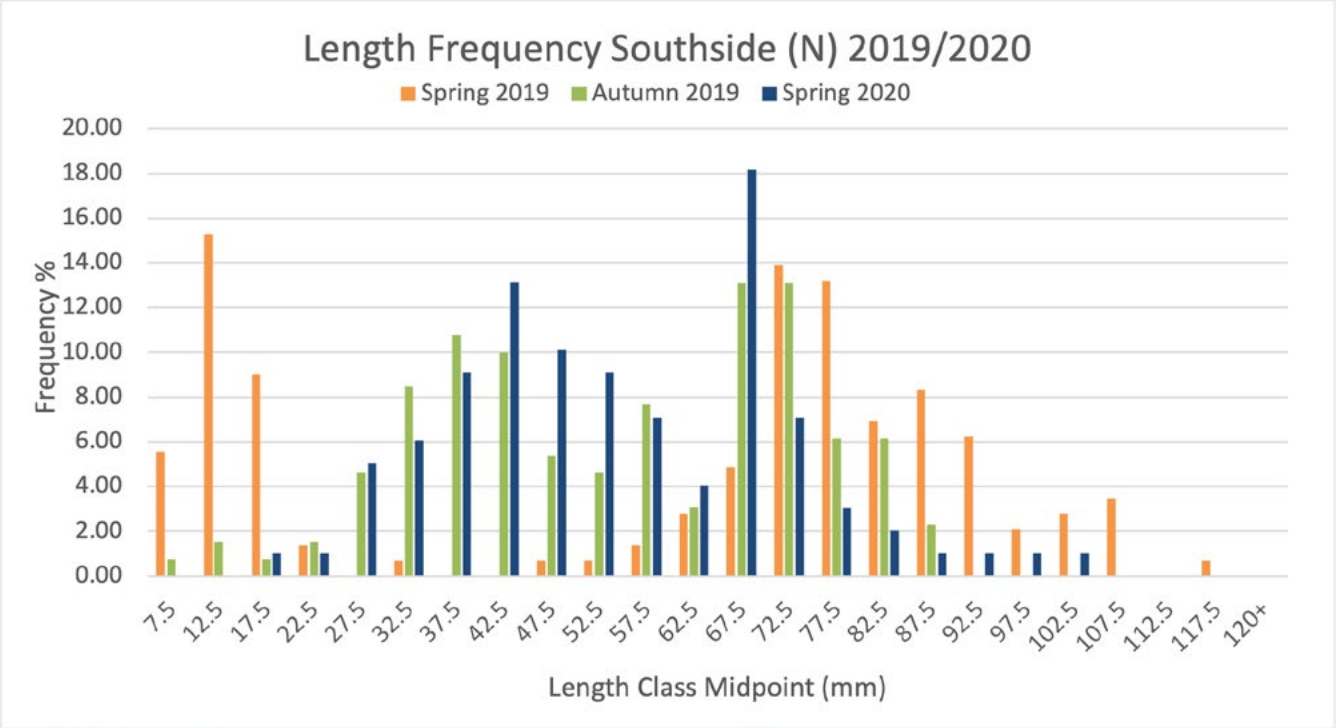

Figure 27 Proportional Length Frequency Southside (N) 2019-20

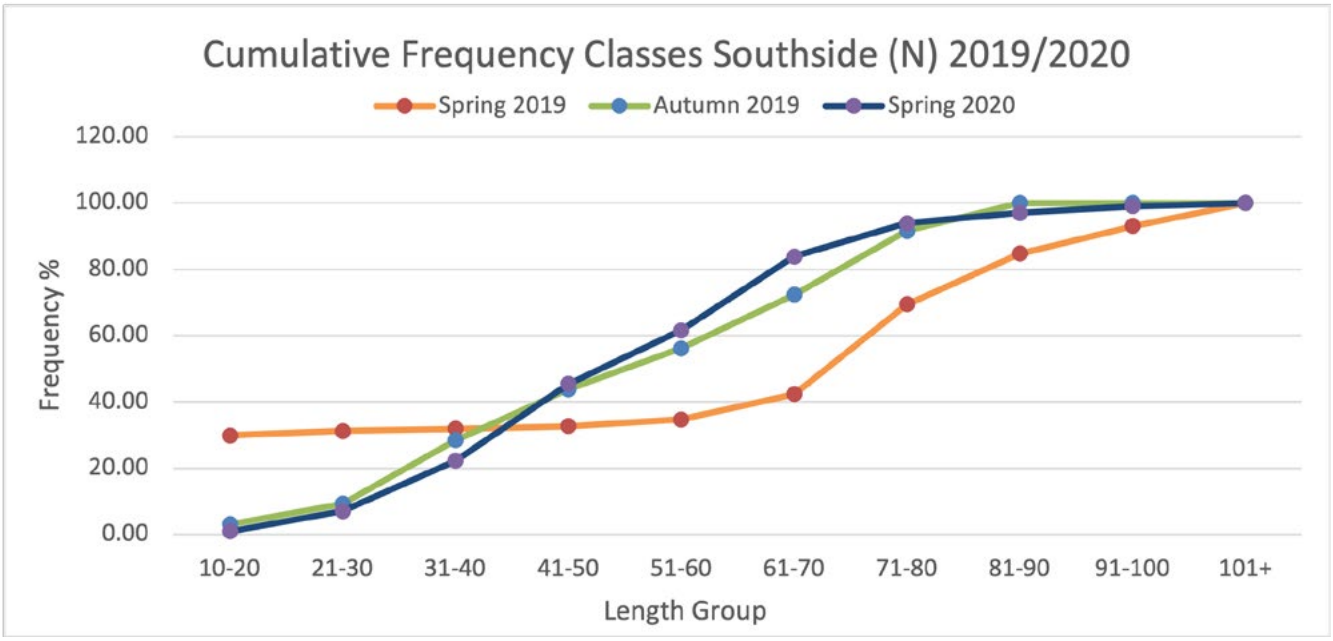

Figure 28 Cumulative Frequency Southside (N) 2019-2020

The cumulative length frequency is dominated by the large increase in spat from the 2018 season in the 30-50mm size classes.

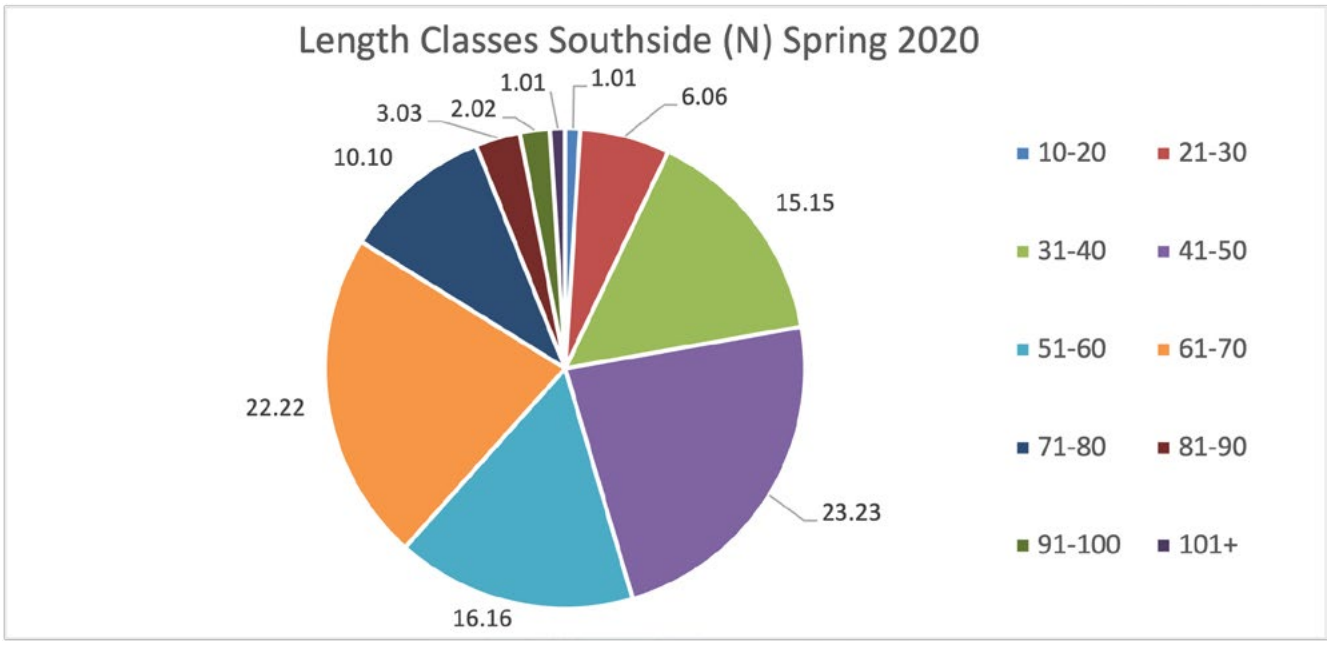

Figure 29 Percentage of Length Classes: Southside (N) Spring 2020

35% of the stock on this bed is in the 30-50mm size class 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)	34.69
Biomass (t) >70mm	3.11

The south section of the Southside Bed covers 319.0 hectares in total. The overall biomass of oysters calculated during the survey was 42.5 tonnes, 8.6 tonnes of this figure is currently above 80mm and therefore is available to the fishery for the 2019/20 season.

Again, like the length frequency for the northern section of the Southside there was widespread evidence of 1 year old oysters (30-50mm) recorded during this survey. There was a reduction in the proportion of oysters in the 90-120mm size classes which causes some concern and could indicate a mortality event in these larger size classes, however there was no unusual mortality observed on this bed during the survey.

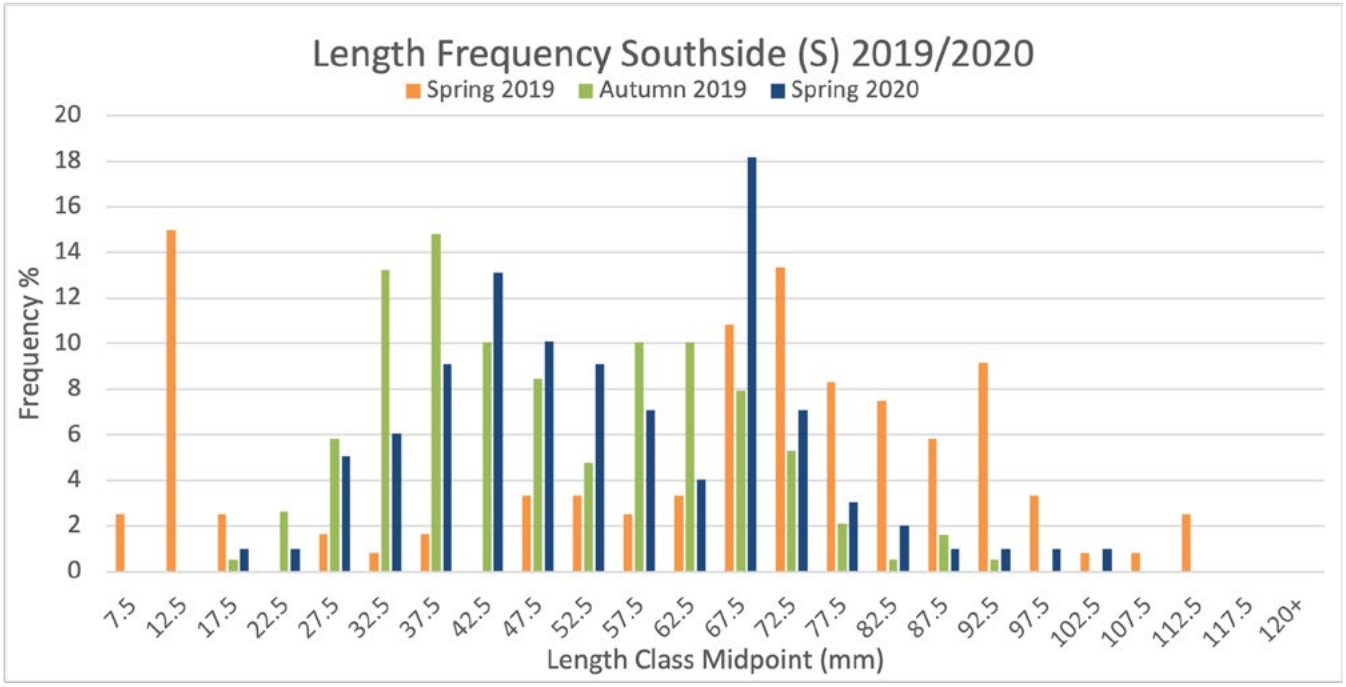

Figure 30 Length Frequency Southside (S) 2019-2020

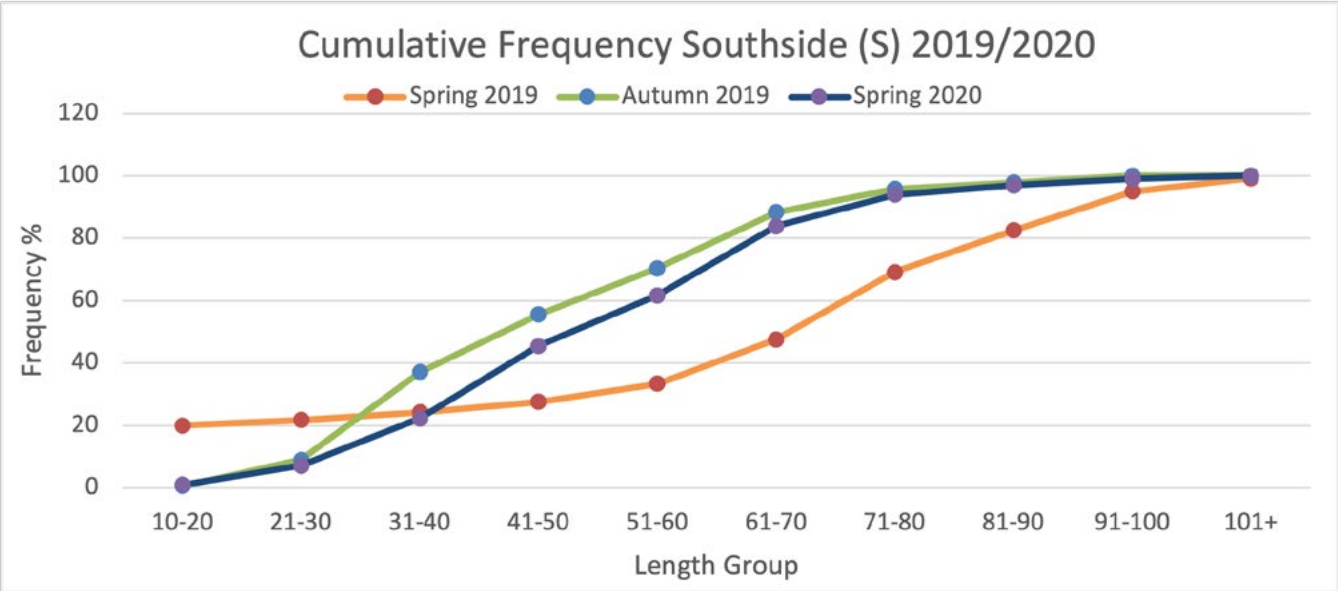

Figure 31 Cumulative Length Frequency Southside (S) 2019-2020

The cumulative length frequency shows a small increase in the proportion of the stock in the smaller size classes due to the 2018 spatfall on this bed.

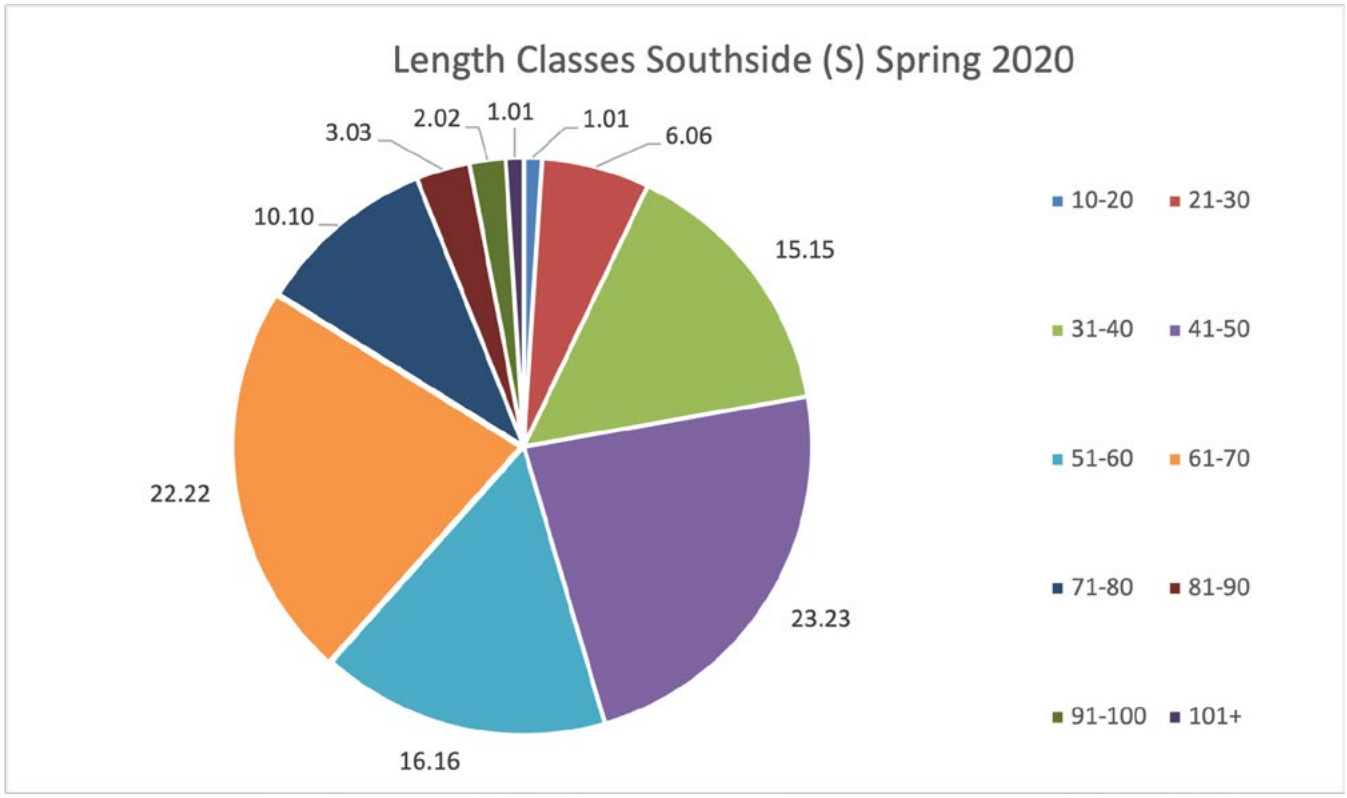

Figure 32 Percentage of Length Classes: Southside (S) Spring 2020

9.6 Great Bank

Table 7 Summary Information: Great Bank

Bed Name	Great Bank
Area (h)	824
Total Biomass (t)	24.24
Biomass (t) >70mm	2.04

The Great Bank Bed has an area of 824 hectares. The overall biomass of oysters calculated during the survey was 24.24 tonnes, 2.04 tonnes of this figure is currently above 70mm and therefore should be available to the fishery for the 2020/21 season.

There was a widespread spatfall on this bed in 2018 and the length frequency data shows that this cohort is now in the 30-50mm size range.

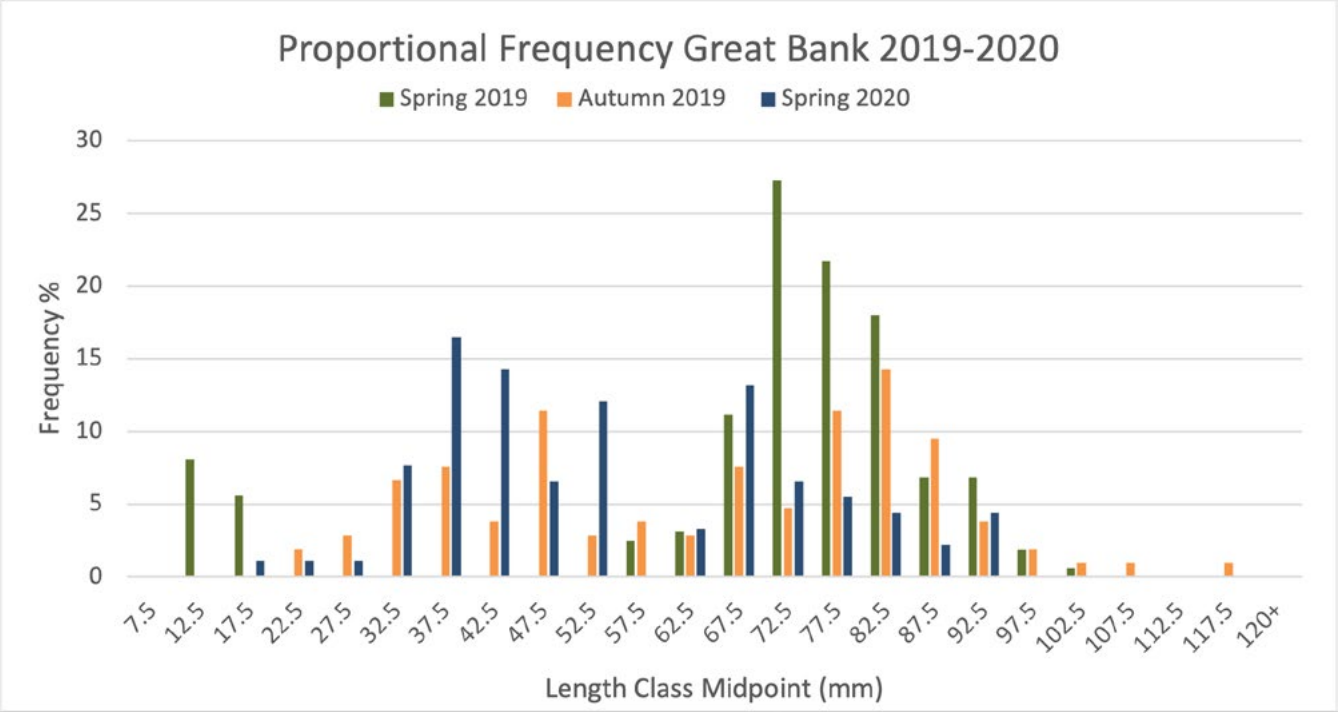

Figure 33 Length Frequency Great Bank 2019-20

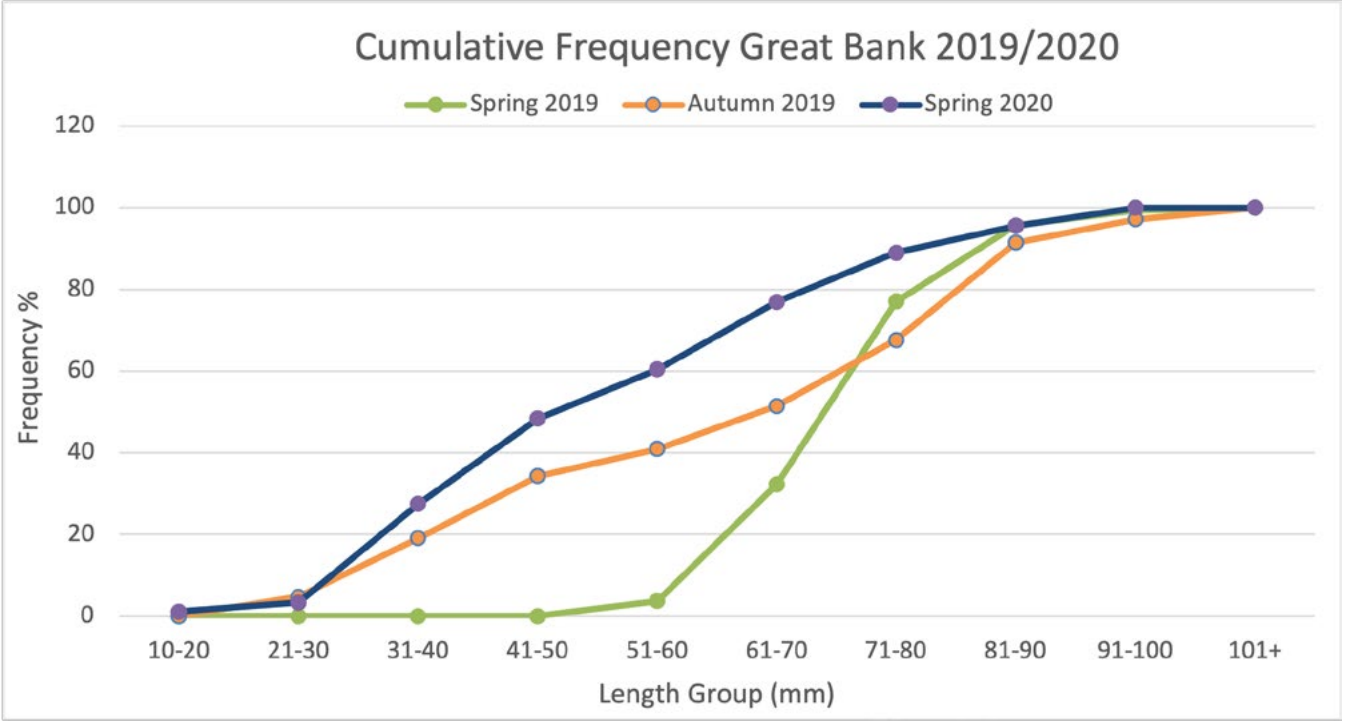

Figure 34 Cumulative Length Frequency Great Bank 2019-2020

Cumulative length frequency for the Great Bank shows evidence of the spatfall with a large increase in the 10-20mm size class.

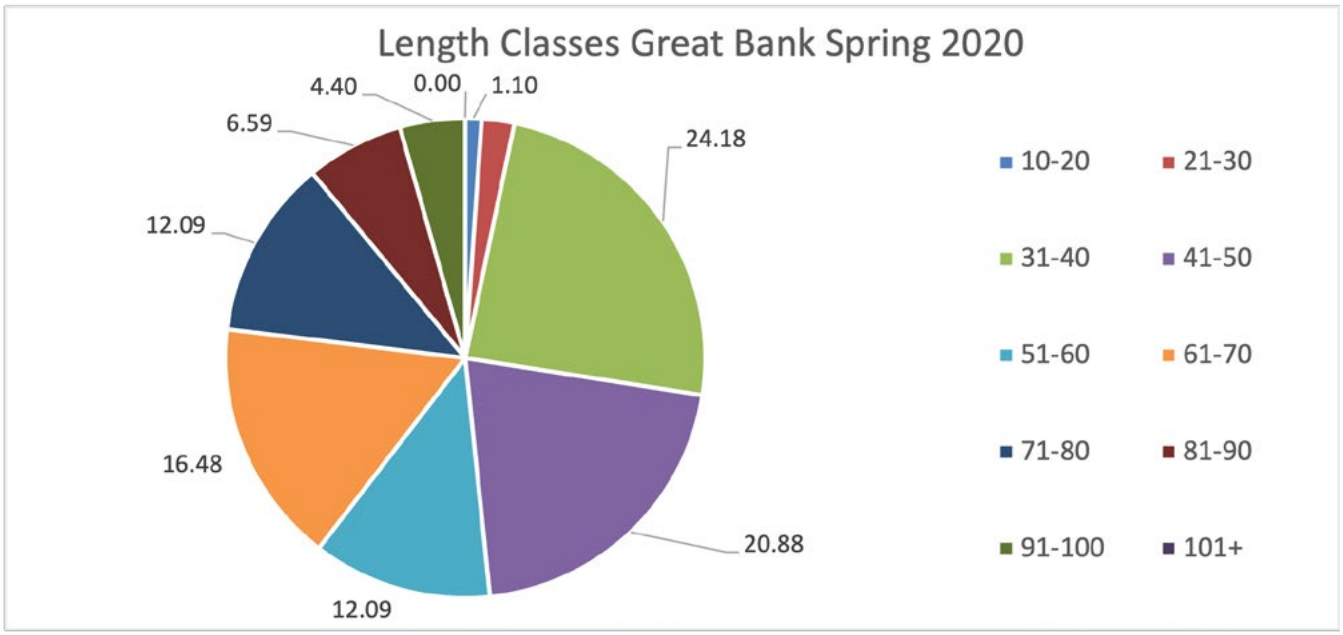

Figure 35 Percentage of Length Classes: Great Bank Spring 2020

10. Conclusions

The total biomass estimated for the stock is a decrease on the autumn 2019 figure, this is a direct result of fishing removal of 48 tonnes of oysters. 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 limited evidence of a spatfall in 2019 however not as widespread as the 2018 event. The biomass above the minimum landing size of 80mm is estimated to be 27.72 tonnes. There is an estimated 38.5 tonnes of stock between 70-80mm and this should recruit into the fishery in the 2020/21 season and the biomass should increase in line with annual growth rates. 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)	Mean Weight	No. of Oysters	Total Biomass (tonnes)
Barney's	0 - 0.01000	5	1,928,255	0.00	85	3,031	0.26
Barney's	0.01001 - 0.05000	1	74,094	0.02	85	1,765	0.15
Barney's	0.05001 - 0.10000	0	0	0.00	0	0	0.00
Barney's	0.10001 - 0.50000	0	0	0.00	0	0	0.00
Barney's	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Barney's	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Barney's	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Drumskellan	0 - 0.01000	1	73,321	0.00	58	73	0.00
Drumskellan	0.01001 - 0.05000	1	359,370	0.04	58	15,948	0.92
Drumskellan	0.05001 - 0.10000	1	383,626	0.07	58	26,788	1.55
Drumskellan	0.10001 - 0.50000	1	94,129	0.22	58	20,564	1.19
Drumskellan	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Drumskellan	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Drumskellan	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Flat Ground	0 - 0.01000	11	1,257,023	0.00	46	3,856	0.18
Flat Ground	0.01001 - 0.05000	11	2,247,758	0.03	46	63,158	2.92
Flat Ground	0.05001 - 0.10000	12	2,384,537	0.07	46	167,769	7.77
Flat Ground	0.10001 - 0.50000	25	3,478,828	0.23	46	792,918	36.71
Flat Ground	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Flat Ground	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Flat Ground	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Black Ghee	0 - 0.01000	3	1,562,048	0.01	65	9,351	0.61
Black Ghee	0.01001 - 0.05000	2	655,241	0.02	65	16,067	1.04
Black Ghee	0.05001 - 0.10000	2	119,815	0.05	65	5,991	0.39
Black Ghee	0.10001 - 0.50000	1	16,574	0.10	65	1,657	0.11
Black Ghee	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Black Ghee	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Black Ghee	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Great Bank	0 - 0.01000	5	2,544,627	0.00	48	2,525	0.12
Great Bank	0.01001 - 0.05000	9	4,589,552	0.02	48	94,330	4.55
Great Bank	0.05001 - 0.10000	11	1,094,584	0.08	48	83,170	4.01
Great Bank	0.10001 - 0.50000	19	36,674	0.12	48	4,401	0.21
Great Bank	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Great Bank	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Great Bank	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Middle (north)	0 - 0.01000	7	2,116,646	0.00	85	2,117	0.18
Middle (north)	0.01001 - 0.05000	6	170,403	0.02	85	2,559	0.22
Middle (north)	0.05001 - 0.10000	1	938	0.03	85	25	0.00
Middle (north)	0.10001 - 0.50000	0	0	0.00	0	0	0.00
Middle (north)	0.50001 - 1.00000	0	0	0.00	0	0	0.00

Bed name	Density Class Range	N	Mean Weight (g)	Mean Density (Ind/m2)	Mean Weight	No. of Oysters	Total Biomass (tonnes)
Middle (north)	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Middle (north)	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Middle (south)	0 - 0.01000	7	1,563,304	0.00	54	1,563	0.08
Middle (south)	0.01001 - 0.05000	7	654,299	0.02	54	10,220	0.55
Middle (south)	0.05001 - 0.10000	3	1,564,242	0.08	54	125,175	6.77
Middle (south)	0.10001 - 0.50000	12	1,726,655	0.19	54	333,889	18.06
Middle (south)	0.50001 - 1.00000	4	182,341	0.59	54	107,324	5.81
Middle (south)	1.00001 - 2.50000	1	2,900	1.03	54	2,989	0.16
Middle (south)	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Moville	0 - 0.01000	11	2,306,836	0.00	63	4,561	0.29
Moville	0.01001 - 0.05000	2	195,080	0.03	63	5,090	0.32
Moville	0.05001 - 0.10000	0	0	0.00	0	0	0.00
Moville	0.10001 - 0.50000	0	0	0.00	0	0	0.00
Moville	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Moville	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Moville	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Peak	0 - 0.01000	4	257,177	0.00	65	257	0.02
Peak	0.01001 - 0.05000	5	428,766	0.02	65	9,917	0.64
Peak	0.05001 - 0.10000	2	1,190,535	0.09	65	111,979	7.28
Peak	0.10001 - 0.50000	9	197,209	0.13	65	25,123	1.63
Peak	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Peak	1.00001 - 2.50000	0.00	0	0.00	0.00	0	0.00
Peak	2.50001 - 5.00000	0.00	0	0.00	0.00	0	0.00
Perch	0 - 0.01000	6	32,214	0.00	46	32	0.00
Perch	0.01001 - 0.05000	2	276,983	0.04	46	9,782	0.45
Perch	0.05001 - 0.10000	5	578,714	0.07	46	41,141	1.87
Perch	0.10001 - 0.50000	11	1,680,663	0.30	46	498,001	22.66
Perch	0.50001 - 1.00000	12	158,775	0.57	46	91,110	4.15
Perch	1.00001 - 2.50000	9	25,000	1.50	46	37,500	1.71
Perch	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Quigley's Point	0 - 0.01000	3	32,845	0.00	46	33	0.00
Quigley's Point	0.01001 - 0.05000	2	237,595	0.04	46	8,350	0.38
Quigley's Point	0.05001 - 0.10000	1	316,213	0.08	46	24,554	1.12
Quigley's Point	0.10001 - 0.50000	5	694,742	0.52	46	360,043	16.38
Quigley's Point	0.50001 - 1.00000	2	95,171	0.57	46	53,912	2.45
Quigley's Point	1.00001 - 2.50000	2	23,375	1.20	46	28,050	1.28
Quigley's Point	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Redcastle	0 - 0.01000	10	892,517	0.00	65	893	0.06
Redcastle	0.01001 - 0.05000	0	408,487	0.03	65	10,705	0.70
Redcastle	0.05001 - 0.10000	1	285,368	0.70	65	199,757	12.98
Redcastle	0.10001 - 0.50000	1	44,396	0.12	65	5,327	0.35
Redcastle	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Redcastle	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Redcastle	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Sandy Ridge	0 - 0.01000	20	3,789,717	0.00	65	3,790	0.25
Sandy Ridge	0.01001 - 0.05000	9	739,291	0.02	65	13,747	0.89

Bed name	Density Class Range	N	Mean Weight (g)	Mean Density (Ind/m2)	Mean Weight	No. of Oysters	Total Biomass (tonnes)
Sandy Ridge	0.05001 - 0.10000	1	213,037	0.05	65	10,652	0.69
Sandy Ridge	0.10001 - 0.50000	1	2,720	0.10	65	272	0.02
Sandy Ridge	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Sandy Ridge	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Sandy Ridge	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Southside North	0 - 0.01000	8	272,782	0.00	58	273	0.02
Southside North	0.01001 - 0.05000	8	1,051,475	0.02	58	23,703	1.36
Southside North	0.05001 - 0.10000	10	532,834	0.07	58	38,209	2.20
Southside North	0.10001 - 0.50000	14	1,265,736	0.21	58	269,598	15.50
Southside North	0.50001 - 1.00000	0	0	0.00	0	0	0.00
Southside North	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Southside North	2.50001 - 5.00000	0	0	0.00	0	0	0.00
Southside South	0 - 0.01000	7	311,064	0.00	58	311	0.02
Southside South	0.01001 - 0.05000	5	1,022,961	0.04	58	39,996	2.30
Southside South	0.05001 - 0.10000	10	532,834	0.06	58	32,556	1.87
Southside South	0.10001 - 0.50000	15	1,050,748	0.20	58	215,093	12.37
Southside South	0.50001 - 1.00000	3	62,400	0.77	58	47,878	2.75
Southside South	1.00001 - 2.50000	0	0	0.00	0	0	0.00
Southside South	2.50001 - 5.00000	0	0	0.00	0	0	0.00

Loughs Agency

Gníomhaireacht na Lochanna

Factrie fur Loughs

HEADQUARTERS

22 Victoria Road
Derry ~ Londonderry
BT47 2AB
Northern Ireland

Tel: +44 (0) 28 7134 2100

REGIONAL OFFICE

Dundalk Street
Carlingford
Co. Lough
Ireland

Tel: +353 (0) 42 936 3888