Lobster Quality
Preseason Sampling Program
Southwest Nova Scotia LFA33 & LFA34

Preason Summary Report

November 2020

Submitted by:

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HIGHLIGHTS FOR 2020

Preseason sampling period: early August to mid-November with brief pre-emption in October due to the fishery access disputes.

4 sampling areas with inside-outside sampling locations (8 in total) in LFAs 33 & 34 (see map below). 52 sampling dates and nearly 7000 samples taken.

150 samples per date/area collected for lobster sex, size, blood protein (BRIX), hardness, moult stage, egg-bearing status.

Summary focus on BRIX trend over time and by location.

In 2020, November BRIX trends in all sampled areas show evidence of high quality for the start of season in LFAs 33 and 34.

2020 LMQ Sampling Area- 4 areas ; 8 sampling locations 4- INSIDE and 4- OUTSIDE August-November

2020 LFA 33 & 34 LOBSTER QUALITY

This report summarizes results of preseason at-sea sampling conducted by Coldwater Lobster Association in 8 locations within LFA 33 and LFA 34 from August 4 to November 17, 2020. This sampling represents a continuation of the longstanding Atlantic Lobster Moult and Quality Project (ALMQ) longitudinal database that has continued since 2006.

Preseason sampling was conducted by Coldwater Lobster Association in 8 different locations – the designated 'inside' and 'outside' areas of Lobster Bay, St. Mary's Bay, Yarmouth in LFA34, and Port La Tour in LFA33. Data analyses were carried out with the cooperation of the Centre de recherche marine/Marine Research Centre of the Université Sainte-Anne, Petit de Grat Campus. The 2020 preseason survey is funded by a scientific partnership grant from the Atlantic Fisheries Fund to the Université Sainte-Anne in collaboration with the Coldwater Lobster Assocation and members of the southwest Nova Scotia lobster industry. We acknowledge this opportunity to maintain the ALMQ longitudinal database and to develop it for the future.

As in previous years, individual lobster data on blood protein level (measured via refractometer as the BRIX Index), manual shell hardness (soft, medium or hard), moult stage (from selected lobster pleopod examination under a microscope), carapace length, and sex data were collected manually for individual lobster samples for each location-date.

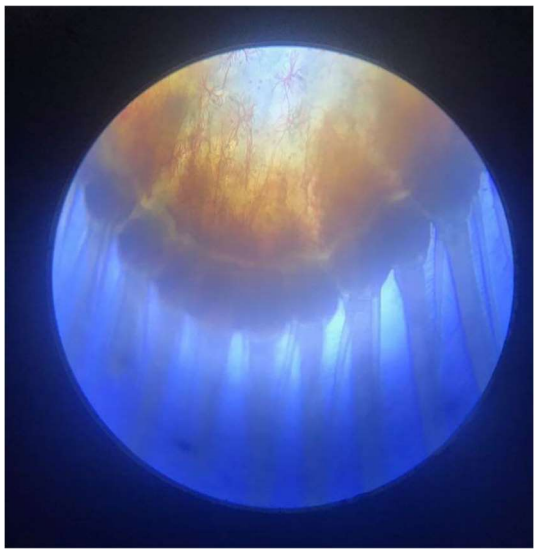
Figure 1. Sampling tools.

These data are designed to approximate lobster quality, i.e., meat content and suitability for storage and shipping, and are provided as an indicator to the industry about the early season status of the post-moult lobster harvest in the designated sampling areas of LFAs 33 & 34.

The results presented here focus on the distribution of the recorded BRIX levels for 2020 compared to past years' samples from the same preseason time and sampling locations over the period 2012-2020. This information enables the industry to compare the 2020 sample results to known past years of observed preseason and subsequent in-season lobster quality and status.

In 2020, as has been the protocol in the past, BRIX index values below 6.0 units/ml in the samples provide a probable indication of poor quality and less than fully-meated lobster that are less suitable for storage and shipping. These lobsters often appear weak, potentially soft shell, and would not be ideal for holding or shipping. BRIX index values between 6.0–7.99 indicate that lobsters may still be recovering from their prior moult and may still be of concern with respect to quality. BRIX levels at 8 or above are indicative of good quality and are relatively more fully-meated lobsters that are more suitable for storage and shipping.

The manual assessment of shell hardness is a subjective indicator of lobster quality. Guidelines are in place for manual estimates of shell hardness on a non-numeric scale of 2 ("soft"), 4 ("medium"), and 5 ("hard"). In 2020, shell hardness measures are poorly correlated with BRIX levels and correlations are mostly not significantly different from zero for all sample location-dates. Shell hardness measures cannot be the lone determining factor in lobster quality prediction.



Moult stage analyses are carried out by analysing selected lobsters (30 lobsters from the sample of 150 lobsters per sampling location-date). Each lobster's moult status is determined by microscopic analysis of the lobster pleopod (swimmeret). Moult stage levels of zero indicate no moult activity is pending; advanced moult stages (3+) indicate the moult is approaching. Pleopod analysis in female lobsters may also indicate the onset of the egg bearing cycle.

Figure 2. View of lobster pleopod under microscope.

Overview of the 2020 Preseason Survey Results

In 2020, a total of 6,940 samples were taken over the 4-month period from August 4 to November 17, a period of approximately 16 weeks. A summary of the sample results by BRIX category are shown in the following pages by each sampling location. Graphic results present the time trend of the 2020 samples, and comparable preseason sampling for the years 2012 to 2020. The graphic trends are described and predictions and recommendations for the 2020 start-of-season are presented.

Weather conditions over the 52 trips completed were generally quite favourable with light winds and calm seas. Approximately six times during the survey - weather conditions presented challenges when the traps were initially deployed resulting in fewer lobsters for the overall count on the first haul. However, in only 9 of the 52 trips were fewer than 150 samples achieved (see also Table 1 below). Survey vessel captains spoke of how the weather was much more conducive for data collection this year as opposed to the 2019 sampling period including, warmer sea temperature and air temperature.

Due to the ongoing fisheries dispute in Southwestern, Nova Scotia this year, lobster sampling activities were temporarily disrupted between September 21 to November 1 in several areas. Coldwater Lobster Association took cautionary steps to ensure the safety for all participants in the survey and temporarily suspened sampling activities in Lobster Bay, Yarmouth Bar and St. Mary's Bay during this period. A total of six trips were postponed and ultimately, two final inside areas samples in Yarmouth Bar and St.Mary's Bay were not completed as planned.

Over the survey, minimal bi-catch appeared in the traps, especially as the lobster counts increased (in most locations) toward the latter part of the survey. It is noted that BRIX levels observed at the beginning of the survey deemed to be average, soon dropped off as more berried females, soft shell and “weak” lobsters started appearing more often in the traps. However, as the weeks went by in the survey, a noticeable shift from higher to lower lobster counts for inside areas was occurring, while lower to higher counts of lobster began appearing in corresponding outside locations along with increased BRIX levels and reductions in soft and weak lobsters. These data are summarized in Table 1 below.

Figure 3. Blood sample taken using clean syringe; sample used in refractometer to determine lobster blood protein BRIX level.

Berried (egg-bearing) females were examined in considerable detail again this year. Each of the 52 location-date combinations captured an average of over 5 berried females or approximately 2.5% (270) of all female lobsters captured (10,851) during the survey. Berried female analyses recorded carapace size, clutch fullness, egg stage and condition. Analyses of these and other data will be provided in further detail in the full report of the 2020 Preseason Lobster Quality Sampling Program to be released early in 2021.

Table 1. Summay of 2020 Preseason Sampling Survey

Sampling Location	Area	2020 Sampling Date	Total Harvested Count (#)	Numbers of Samples (#)	%Soft/ %Weak	Average BRIX levels (units/mL)
Yarmouth	Inside	August 27	374	105	1%/0.95%	9.12
		September 12	539	150	0%/3.3%	7.69
		October 07	428	150	0.7%/18.7%	6.71
		October 21	435	150	0%/10%	6.88
		November 05	370	150	0.7%/0%	10.89
		November 17	367	150	0%/1.3%	10.30
	Outside	August 26	325	113	0.9%/0%	7.90
		September 11	237	112	0%/2.7%	7.66
		October 06	380	150	0.7%/13.3%	6.14
		October 20	758	150	0%/12%	6.24
		November 04	892	150	1.3%/21.3%	6.20
		November 15	1151	150	1.3%/0.7%	9.57
Lobster Bay	Inside	August 21	854	202	2%/0.5%	9.07
		September 03	905	150	0.7%/6.7%	8.94
		September 15	927	150	0.7%/17.3%	7.43
		October 14	851	150	2.7%/20%	7.97
		October 28	507	150	5.3%/22.7%	8.64
		November 10	497	150	0.7%/0%	12.71
		November 11	631	150	2%/1.3%	12.16
	Outside	August 22	447	150	1.3%/2%	10.35
		September 04	443	150	0%/6.7%	9.35
		September 14	489	150	0%/12.7%	7.97
		October 13	805	150	3.3%/13.3%	6.50
		October 27	620	150	1.3%/19.3%	6.41
		November 09	590	150	3.3%/1.3%	9.66
Port La Tour	Inside	August 19	292	106	3.8%/2.83%	7.47
		September 02	371	150	0.7%/0.7%	6.94
		September 17	419	150	0.7%/8%	6.02
		September 29	526	150	1.3%/8%	6.48
		October 15	399	150	0%/9.33%	6.90
		October 29	449	150	0.7%/15.3%	6.91
		November 11	259	150	0%/1.33%	10.47
		November 12	433	150	0%/0%	10.70
	Outside	August 18	7	3	0%/0%	13.7
		September 01	5	4	50%/0%	11.2
		September 16	2	1	0%/0%	6.0
		September 28	146	140	0%/14.3%	6.11
		October 14	91	66	0%/13.6%	5.83
		October 28	404	150	2%/10%	6.11
		November 10	276	150	2%/0%	9.65
St. Mary's Bay	Inside	August 25	290	150	0%/2.67%	7.91
		September 10	262	150	2%/2.67%	7.79
		October 06	550	150	0%/6.67%	6.44
		October 20	440	150	0%/6.67%	7.30
		November 04	329	150	0%/1.33%	9.69
		November 17	362	150	0%/2.67%	11.29
	Outside	August 24	30	27	0%/0%	9.97
		September 09	68	61	0%/0%	8.40
		October 05	544	150	1.3%/6.67%	6.38
		October 19	607	150	0%/12%	6.52
		November 05	796	150	0%/2%	10.17
		November 15	691	150	0%/1.33%	10.44
TOTALS		**52 dates**	**23,870**	**6,940**	**Weighted Ave 1.4%/10.4%**	**8.37 units/ml**

Review of the 2019 Preseason Survey Results

In the 2019 survey, a total of 1,500 samples were taken over a condensed period of 6 weeks in the 8 sampling locations. Locations were sampled only 1 or 2 times over the 2019 preseason period. The 2019 preseason sampling results indicated that lobsters landed at the start of the 2019-2020 season were of mixed quality comparable to what was seen at the beginning of the pervious 2018-2019 commercial season. Lobster blood protein levels measured using the BRIX Index suggested that lobsters were slightly weaker or comparable in quality with what was observed in the 2018 preseason survey. The 2019 preseason samples found that the Yarmouth Inside site showed improvements in both shell hardness and BRIX levels compared to 2018 sampling. The shortened and condensed sampling period of 2019 made it difficult to determine changes in lobster quality from the early through to the later sampling periods of that year.

The following pages present the survey breakdown of the 2020 BRIX results for each of the 8 lobster sampling locations. Graphic results are provided for the BRIX categories and BRIX means for each of the location's 2020 sampling dates. As noted previously, the 3 BRIX categories are as follows:

BRIX Category (1)	Poor – BRIX index values les than 6, (denoted in Red in the graphs);
BRIX Category (2)	Medium – BRIX index values between 6 and 7.99 (denoted in Orange); and
BRIX Category (3)	Good – BRIX index values that exceed 8 (denoted in Green).

Results are also provided for each location compared to previous years' samples (from 2012 onward) for the approximate same preseason periods:

(i) 5-6 weeks prior to the start of the commercial season in LFAs33 and 34; and
(ii) 3-4 weeks prior to the start of the commercial season.

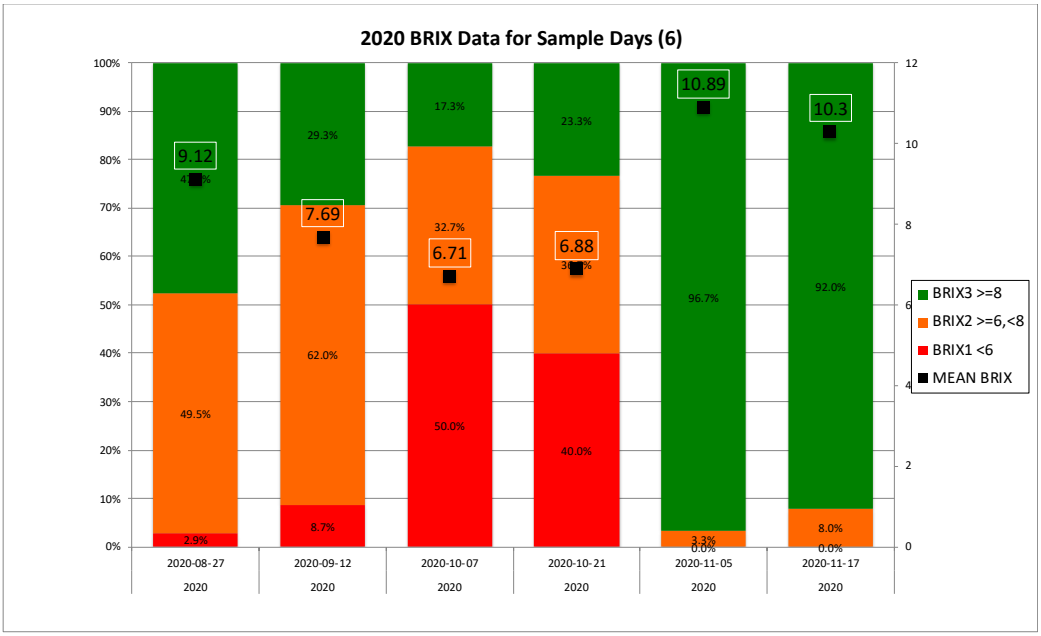
These annual comparative graphics allow the reader to compare recent years of BRIX levels leading up to the start of the current 2020-2021 season. The sections below for each of the 8 sampling locations enable predictions on start of season lobster quality based on these comparsions.

YARMOUTH INSIDE

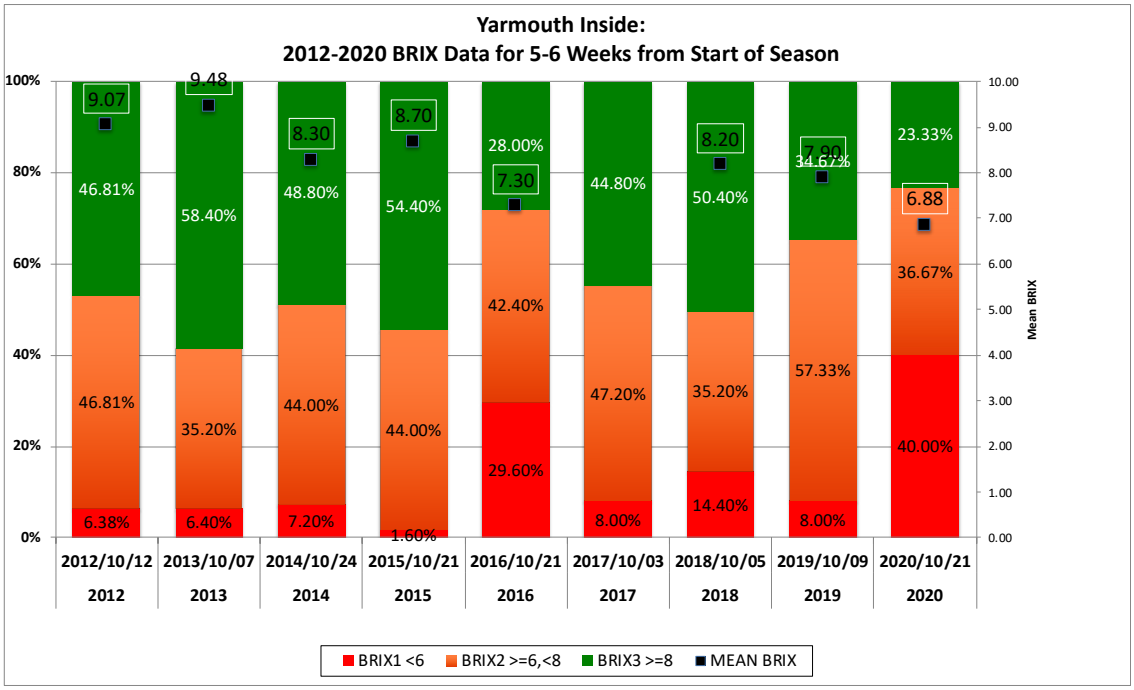
2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

The 2020 preseason survey results for Yarmouth Inside show the percent of "Good" category lobsters (BRIX>=8) declined until mid-October and then rebounded to very high proportions in November attaining levels of over 90% by the last survey dates in mid-November (the 5th and the 17th).

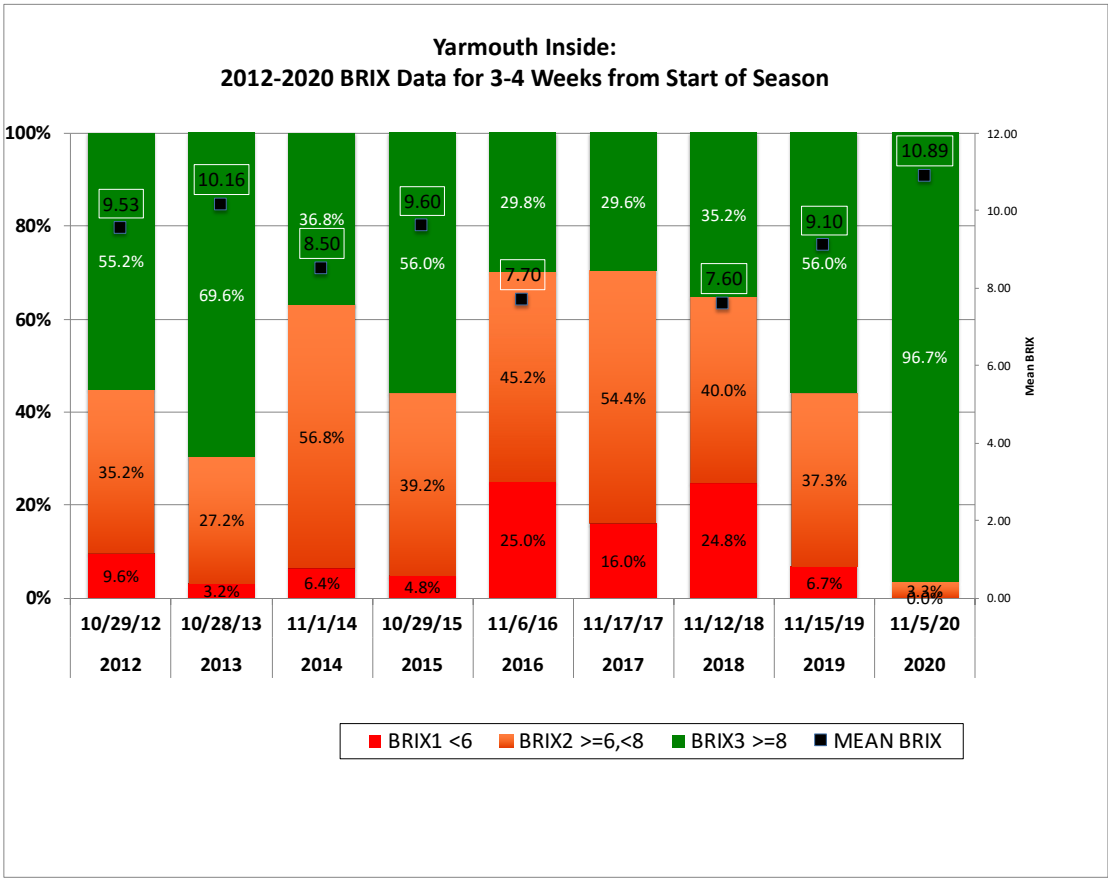


In comparison with past survey years data for 5-6 weeks from the start of the commercial harvest season opening, 2020 sample results were mixed (see graph below) and the low BRIX category (<6) reached levels of 40%, with low numbers (less than 25%) in the high BRIX category (>=8).



The 2020 5-6 week results are comparable to similar results for 2016-2017 – a season of low quality with good abundance. However, closer to the current season start, the survey results show that the BRIX levels rebound.

The 2020 3-4 weeks from the start of the commercial harvest season opening results are not easily comparable to past years. The 2020 observations show remarkably high quality results with all BRIX values for sampled lobster greater than 6, the low BRIX category.



The November 5 sample records the highest average BRIX level in the 2020 series (with a slight drop off in the subsequent November 17 observations) and the largest percentage of high BRIX category lobsters (97%) in the entire series to date.

The rapid turnaround of the BRIX observations this area are grounds for caution. In the absence of a trend, and based on a single data observation at the end of the time series, the evidence of a sustained high quality for Yarmouth Inside remains promising but uncertain.

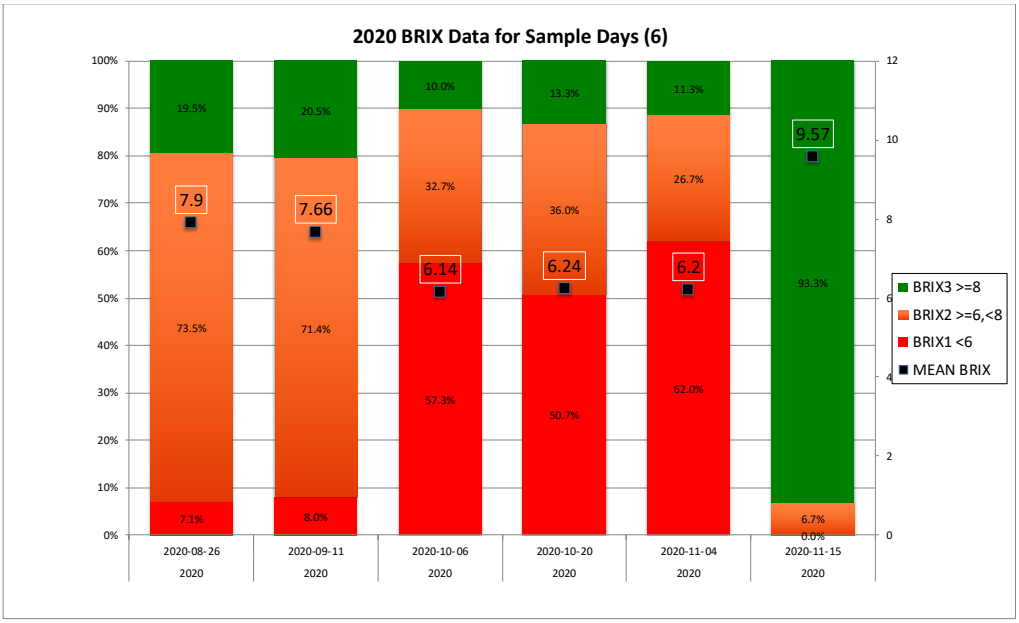
Summary : Preseason sampling results for YARMOUTH INSIDE closest to the start of the season suggest that quality at the start of the 2020 season will be of VERY HIGH quality comparable to and out-performing the 2013-2014 season – the previous best preseason BRIX result for this area.

YARMOUTH OUTSIDE

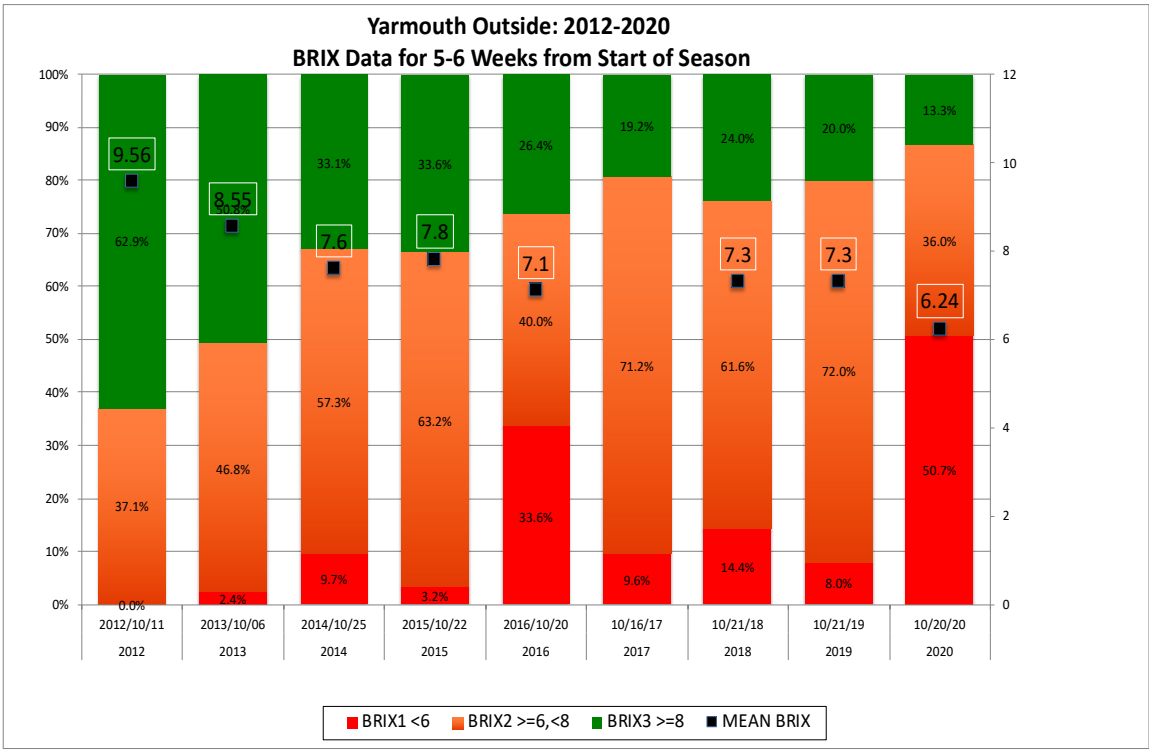
2020 SUMMARY OF RESULTS

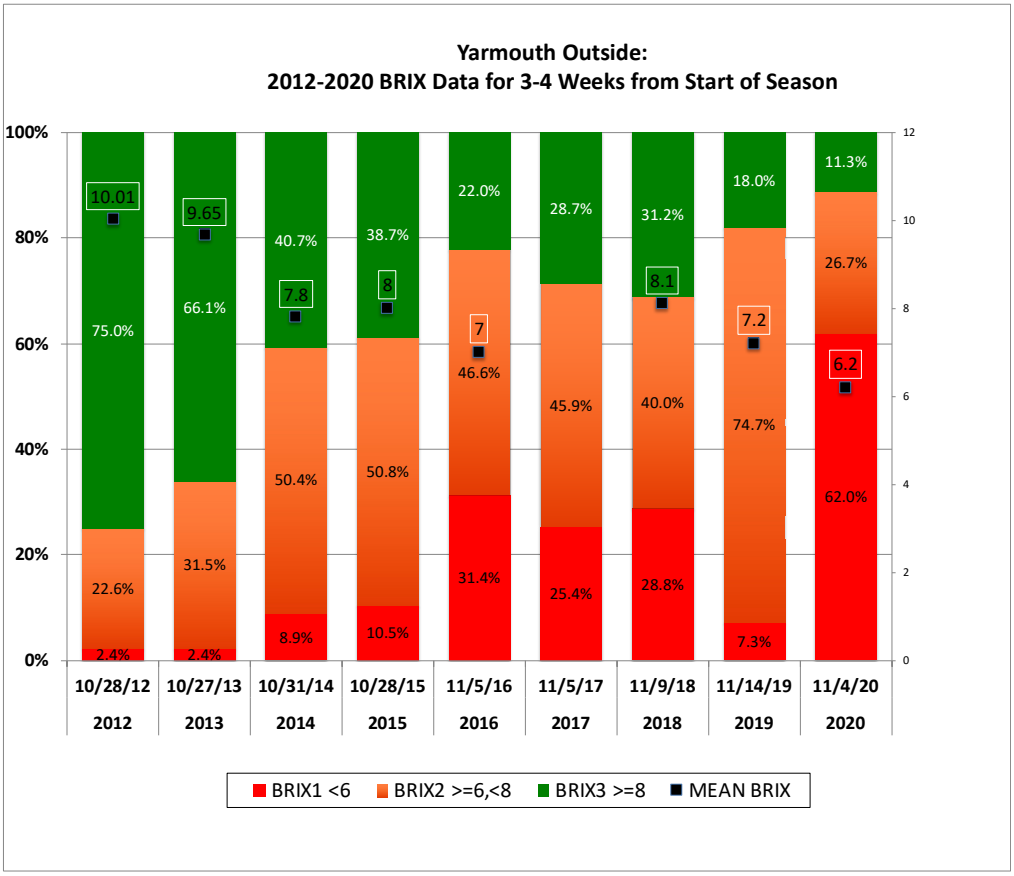
Blood Protein (BRIX) Distribution by Category

As for Yarmouth Inside, the 2020 preseason survey results for Yarmouth Outside show the percent of "Good" category lobsters (BRIX>=8) declined throughout October and until mid-November then rebounded to very high proportions attaining levels of over 90% by the last survey dates in mid-November.



The graphic below shows the results for Yarmouth Outside for the years 2012 to 2020 for 5-6 weeks from the start of the commercial harvest season opening. This graphic shows a trending deterioration in high category BRIX values over the years from 2012 to 2020. The 2020 survey for October 20 records the largest proportion of low quality BRIX (50%) and the lowest level high quality BRIX (6%) in the entire series.





The 2020 Yarmouth Outside results in the graphic for 3-4 weeks from the start of the commercial harvest season opening show a similar trend over time of declining high BRIX and increasing low category BRIX values from 2012 to 2020 as was the case for the 5-6 week graphic above. In the 2020 sample, the percent of "Good" BRIX category lobsters (>=8) was only 11% in the November 4 sample. This percent represents the lowest "Good" category for 3-4 weeks before the season in the 2012-2020 time series. As well, the November 4 sample records the highest percent of "Poor" BRIX category lobsters (<6) at 62% in the entire series from 2012-2020.

Taking into account these relatively poor observations for the November 4 sample for this area, the subsequent reporting of the last 2020 survey point of November 15 is surprising. The 2020 Yarmouth Outside results for November 15 show a rebound toward high quality whereby the percent of "Poor" category lobsters (<6) was 0%, i.e., no low BRIX lobsters were found in the November 15 sample. As a consequence, the percentage of high BRIX (>=8) for November 15 was a remarkable 93%, i.e., of the 150 samples in this area on this date, 140 attained BRIX values of 8 or more. The rapid turnaround of this area are grounds for caution. It may be conjectured that the inside to outside movement of lobster over this time period (November 4 to November 15) may contribute to a BRIX gain. However, it is acknowledged that, in the absence of a trend, and based on a single data observation at the end of the time series, the evidence of a sustained high quality for Yarmouth Outside remains uncertain.

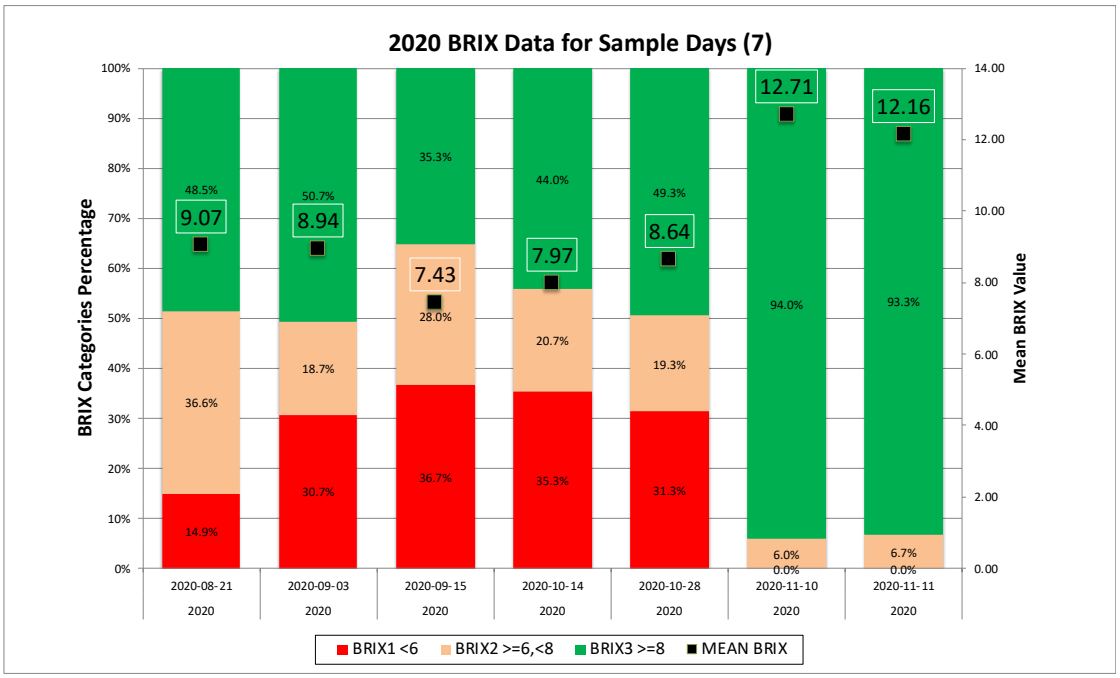
Summary : Late preseason sampling results for YARMOUTH OUTSIDE show that quality at the start of the 2020-2021 season is expected to be HIGH. Caution is noted that major improvements in quality were observed only in the final preseason sample and that it is unlikely that this level may be sustainable beyond the start of the 2020-2021 season.

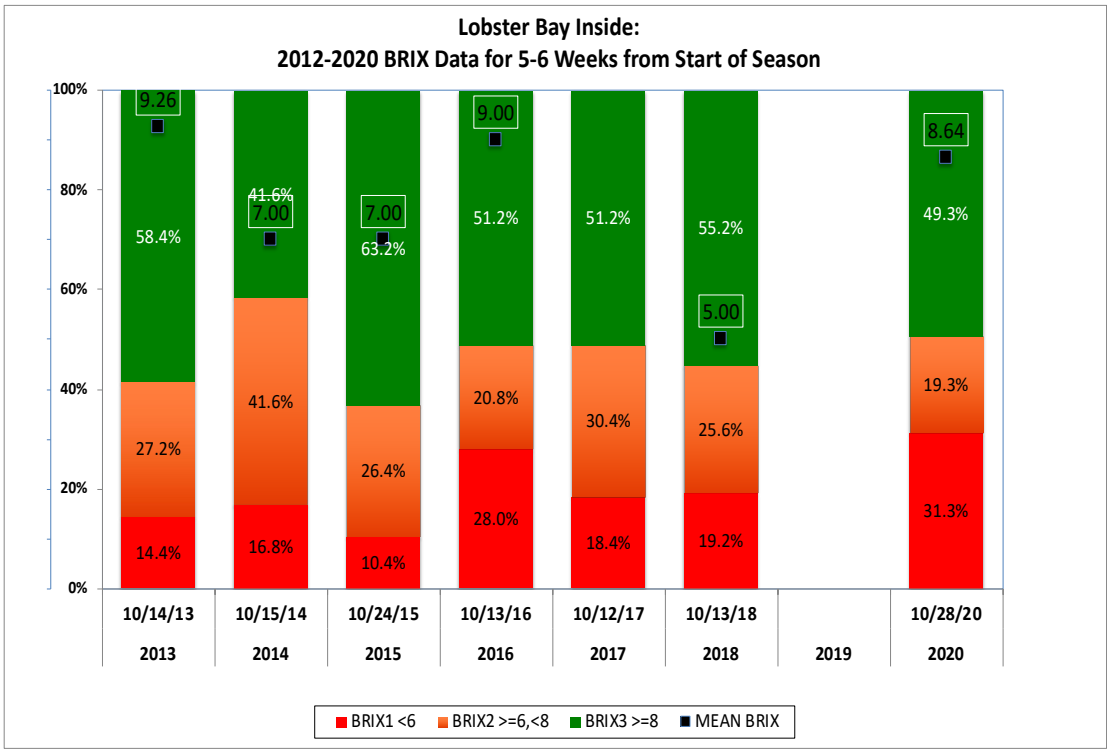
LOBSTER BAY INSIDE

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

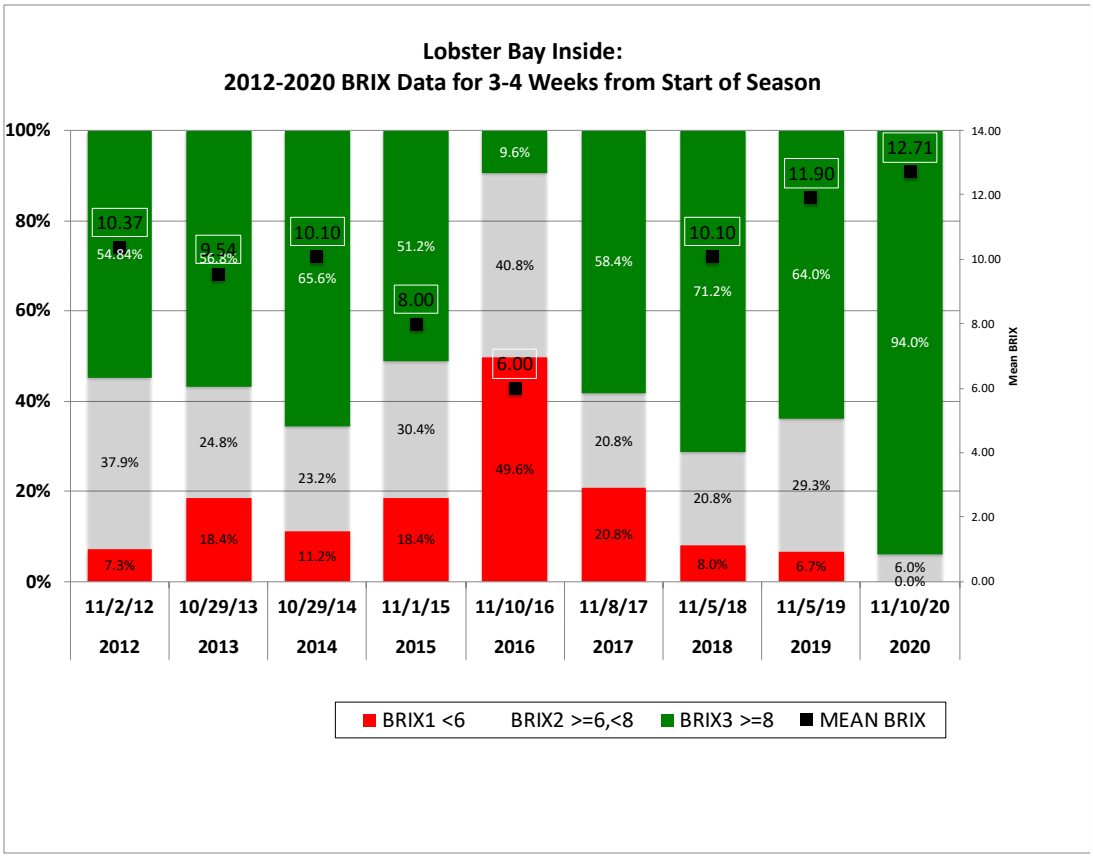
The 2020 preseason survey results for Lobster Bay Inside show the percent of "Good" category lobsters (BRIX>=8) remained relatively stable from August through October. However, the proportion of low category BRIX doubled during that same period (from 14% in August to 31% by end October). However, in November the observed high BRIX values for this area exceeded all previous observations with zero incidences of any low BRIX lobster in the samples.





The results for Lobster Bay Inside for 5-6 weeks from the start of the commercial harvest season opening are essentially stable over the time period 2013 to 2020. However, the low BRIX levels of the 2020 samples at 31% are the highest low BRIX measures in the series.

The 2020 Lobster Bay Inside results for 3-4 weeks from the start of the commercial harvest season opening show the strong difference of the 2016 observations. They also show that the 2020 sample year is remarkably positive with the highest BRIX "Good" category (at 94%) and the lowest "Poor" category BRIX (at 0%) in the entire series. As such, the 2020 observations continue the positive high BRIX trend since the very weak 2016 observations culminating in the very high BRIX results of 2020.



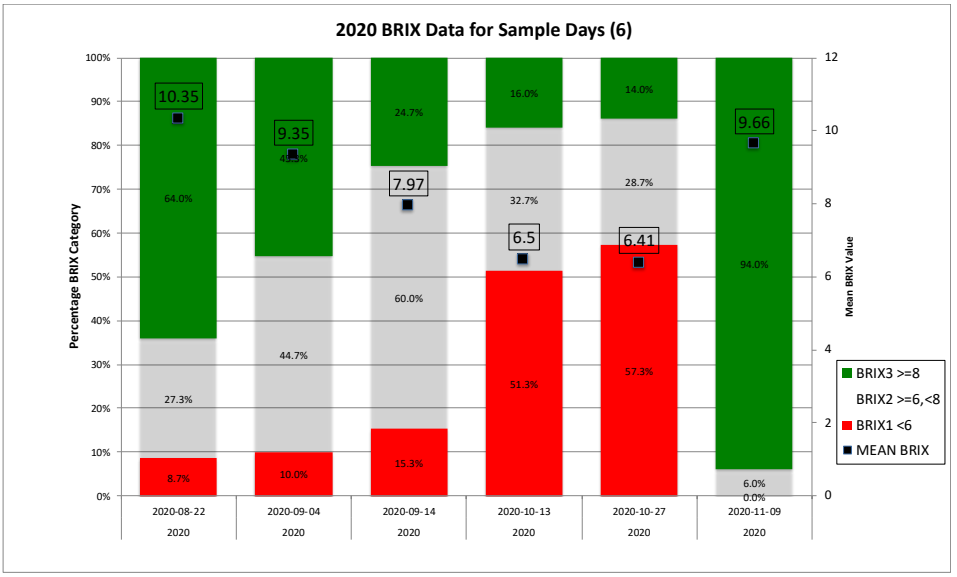
The 2020 BRIX distribution is indicative of positive lobster quality for Lobster Bay Inside for the start of the 2020-2021 season.

Summary : Preseason sampling results for LOBSTER BAY INSIDE suggest that quality at the start of the 2020 season will be of VERY HIGH quality comparable to the recent results of the 2018-2019 and 2019-2020 seasons.

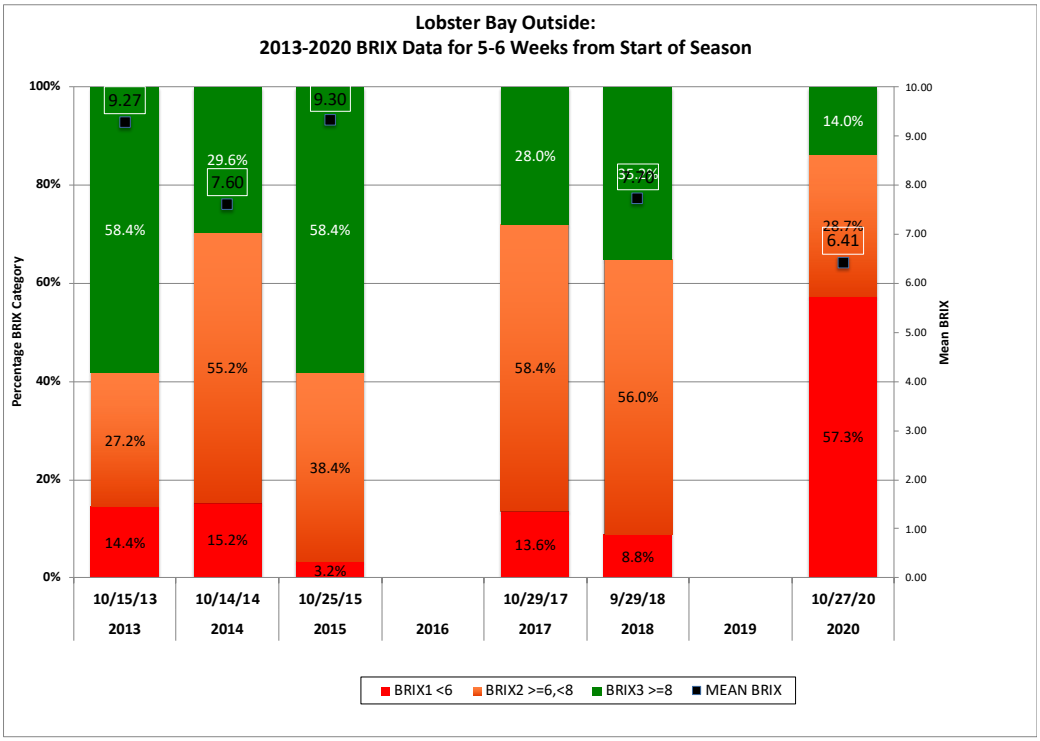
LOBSTER BAY OUTSIDE

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

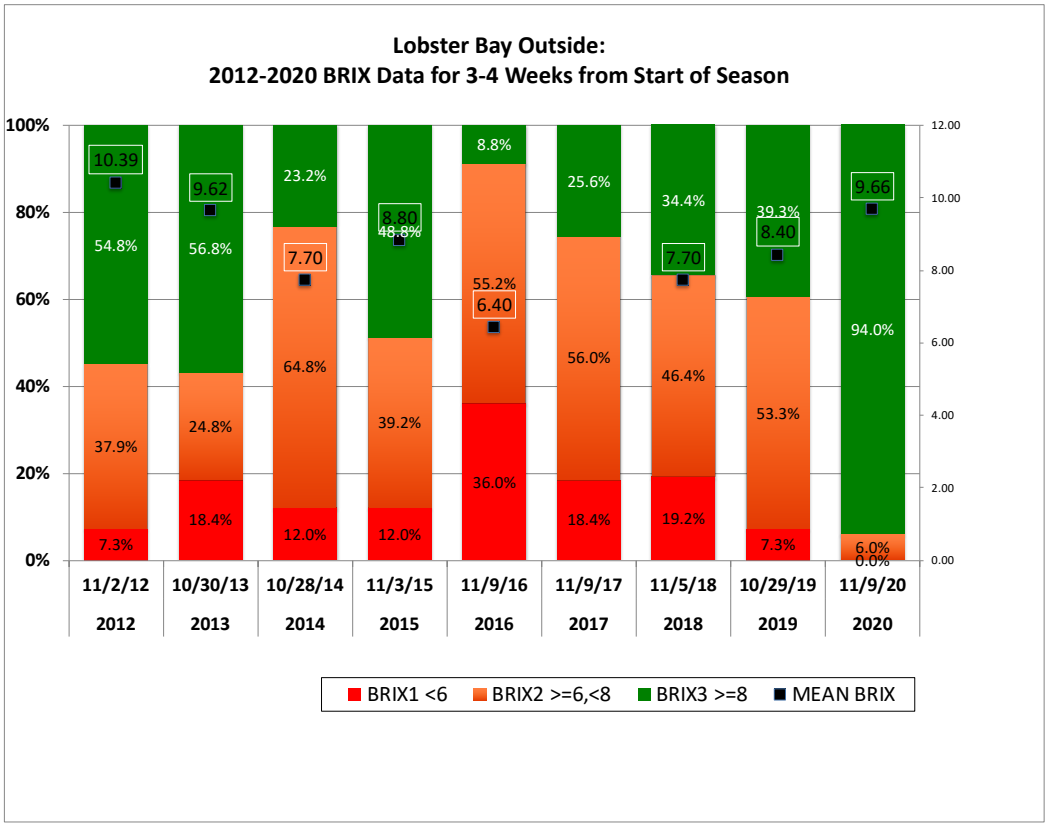


The 2020 preseason survey results for Lobster Bay Outside up to the end of October showed an evident trend toward declining "Good" BRIX values and increasing "Poor" BRIX values. However, sampling in this area in November revealed a remarkable rebound of lobster BRIX values. The sample of November 9, three weeks before the start of the commercial season, shows that the percent of "Good" category lobsters (BRIX>=8) exceeded 90% on that date and found zero samples of BRIX below 6.0. Given the evident trend in the area sample to November, this dramatic shift was not anticipated.



The graphic for Lobster Bay Outside for 5-6 weeks from the start of the commercial harvest season opening does not exhibit evident trends (even without the 2016 and 2019 missing BRIX values). The 2018 preseason samples show an improvement over the previous season of 2017 BRIX and the 2015 preseason BRIX distribution is the best in the series with highest Good percent value (58%) and lowest Poor percent value (3%). The 2020 samples are disappointing with lowest "Good" (14%) and highest "Poor" (57%) category values in the series.

The 2020 Lobster Bay Outside results in the graphic for 3-4 weeks from the start of the commercial harvest season opening show the percent of "Good" category lobsters greater than 8 was over 90% with a "Poor" (<6) category of 0% in the November 9 sample.



This shift continues the trend of improved BRIX levels since 2016 at 3-4 weeks prior to season opening. The 2020 values for this site is the best BRIX performance in the entire series from 2012 to 2020.

These results are consistent with the rebound in November for the Lobster Bay Inside results and the BRIX gain may, in part, be attributed to inside to outside movement of lobster over the early November time period. However, it is also acknowledged that, in the absence of a trend, and based on a single data observation at the end of the time series, the evidence of a sustained high quality for Lobster Bay Outside remains uncertain.

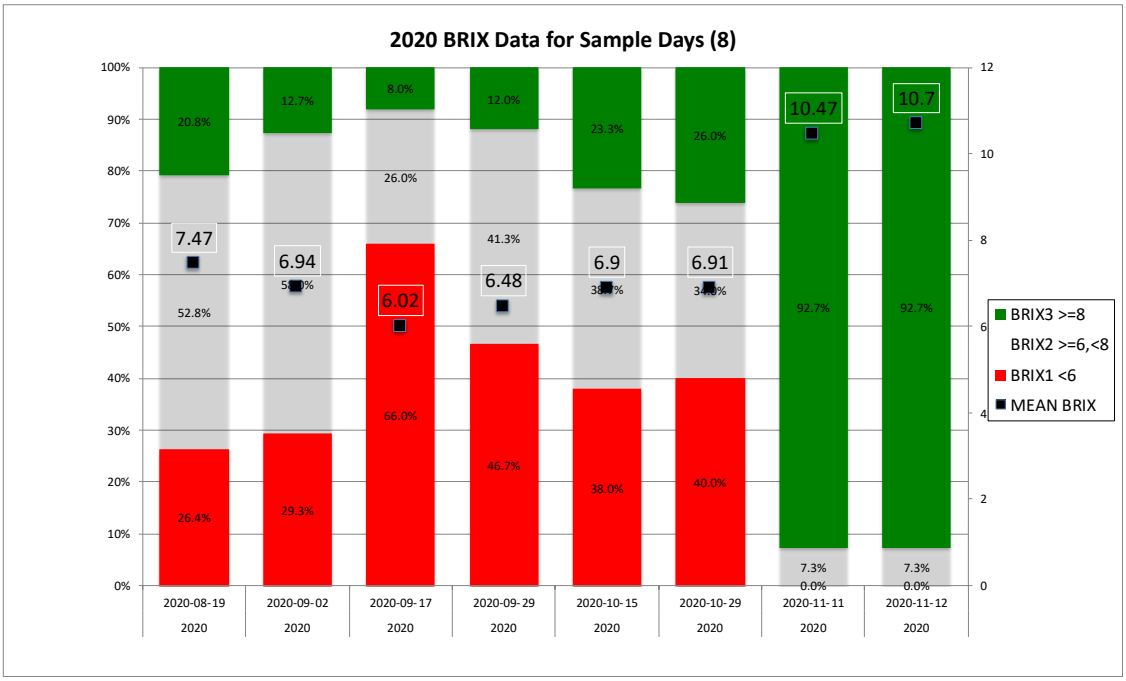
Summary : Late preseason sampling results for LOBSTER BAY OUTSIDE show that quality at the start of the 2020-2021 season is expected to be HIGH. Caution is noted that major improvements in quality were observed only in the final preseason sampling observations and that it is unclear whether or not this level may be sustainable beyond the start of the 2020-2021 season.

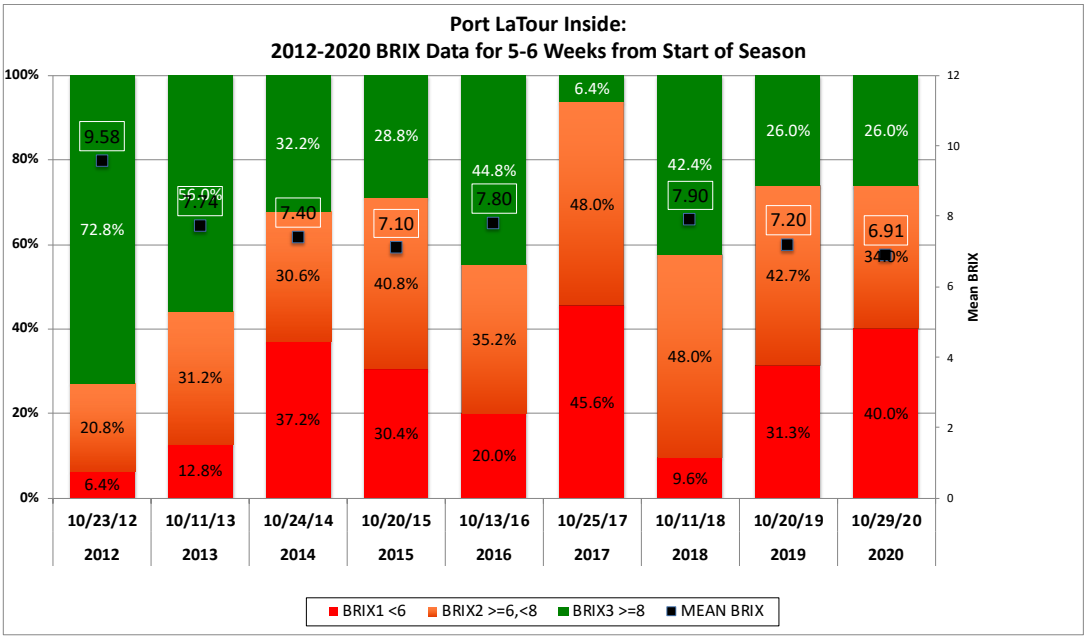
Port La Tour INside

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

The 2020 preseason survey results for Port La Tour Inside show improvement in BRIX category levels and mean values from mid-September into November 2020. The final 2 sample points for this area are one day apart (November 11 and 12) and they confirm the very high BRIX observations for both these samples. As such, the November samples are the best in the 2020 series with "Good" category lobsters (BRIX>=8) over 90% each day and zero "Poor" category observations (BRIX<6).

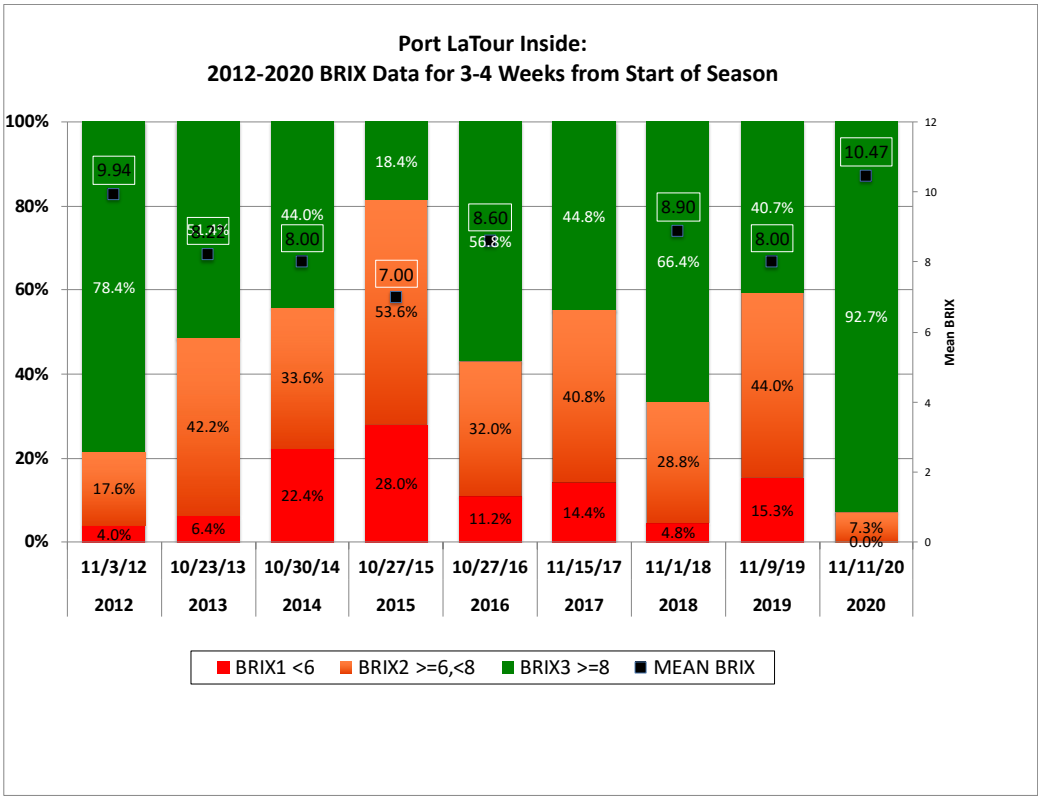




The 2020 results for Port La Tour Inside show the percent of "Good" category lobsters greater than 8 was 26% and equal to the 2019 sample for the similar priod before the season opening. However, the "Poor" BRIX category lobster moved from 31% (2019) to 40% (2020).

The 40% “Poor” category for 5-6 weeks before the season in 2020 is the second highest in the 2012-2020 time series.

The graphic for 3-4 weeks before the opening of the season does not show any evident trend year-over-year in the 2012-2020 time series. However, the 2020 sample is clearly the best of the series with high BRIX category percentage of over 90% and zero low BRIX values observed. The 2020 results are thus comparable to the 2012 samples – a year of high quality and relatively lower abundance in this area.



The anticipation is that the 2020-2021 start of year harvest will be of very good quality.

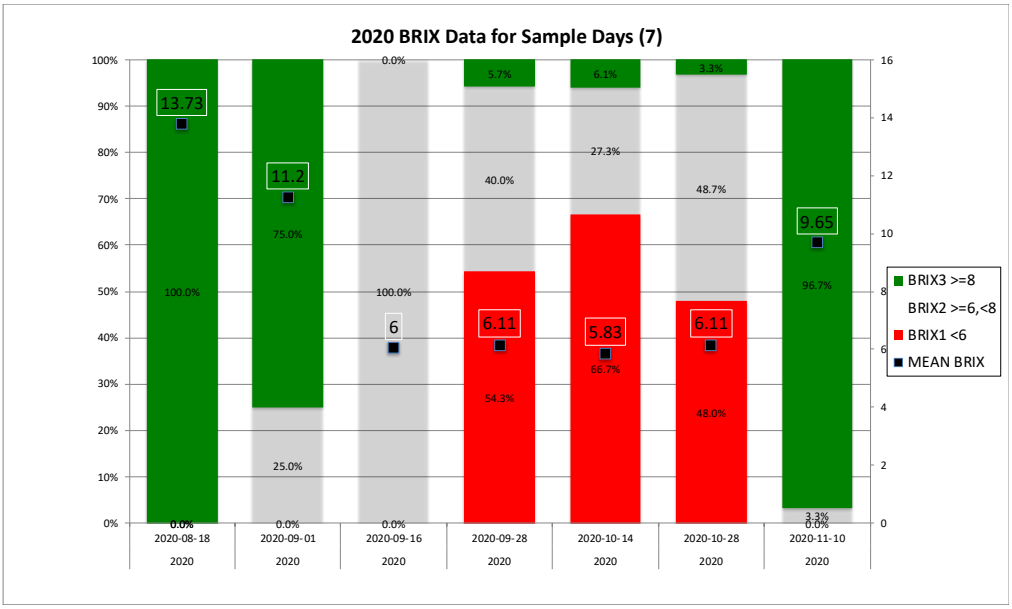
Summary : Preseason sampling results for PORT LA TOUR INSIDE suggest that quality at the start of the 2020 season will be of VERY HIGH quality comparable to the results of the 2012-2013 season.

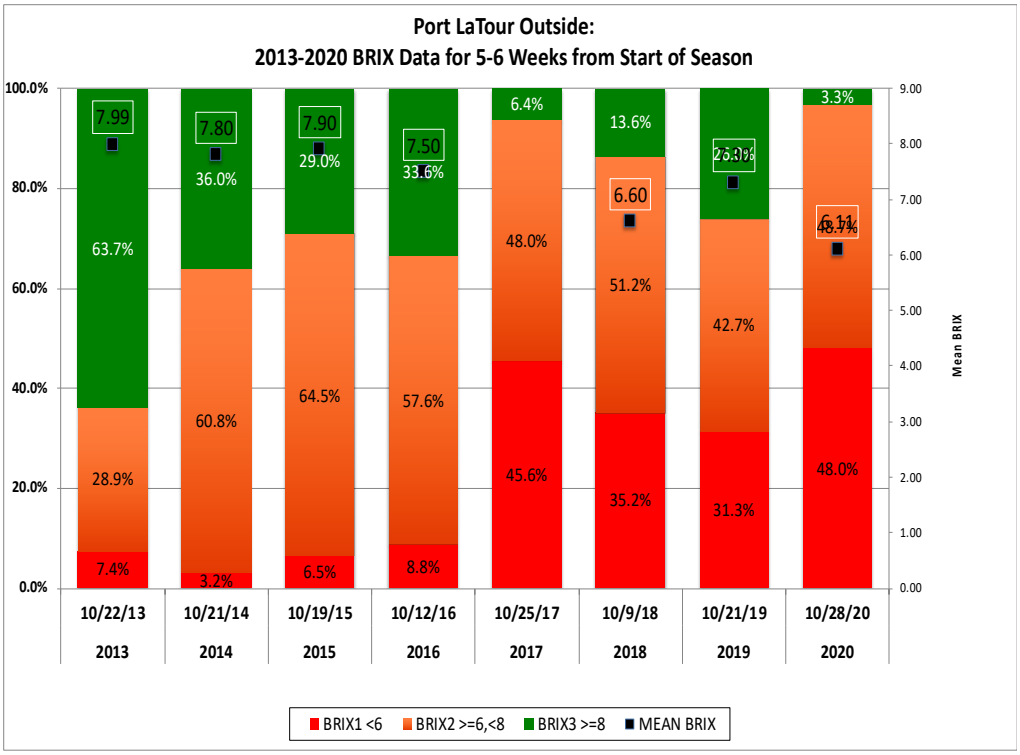
PORT LA TOUR OUTSIDE

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

The 2020 preseason survey results for Port La Tour Outside show an initial worrying decline trend from August through October with a remarkable rebound of BRIX values in the final sample observation in early November. "Poor" BRIX values climbed to over 66% in mid-October sampling and "Good" BRIX effectively evaporated after a very strong initial showing in August and early September.

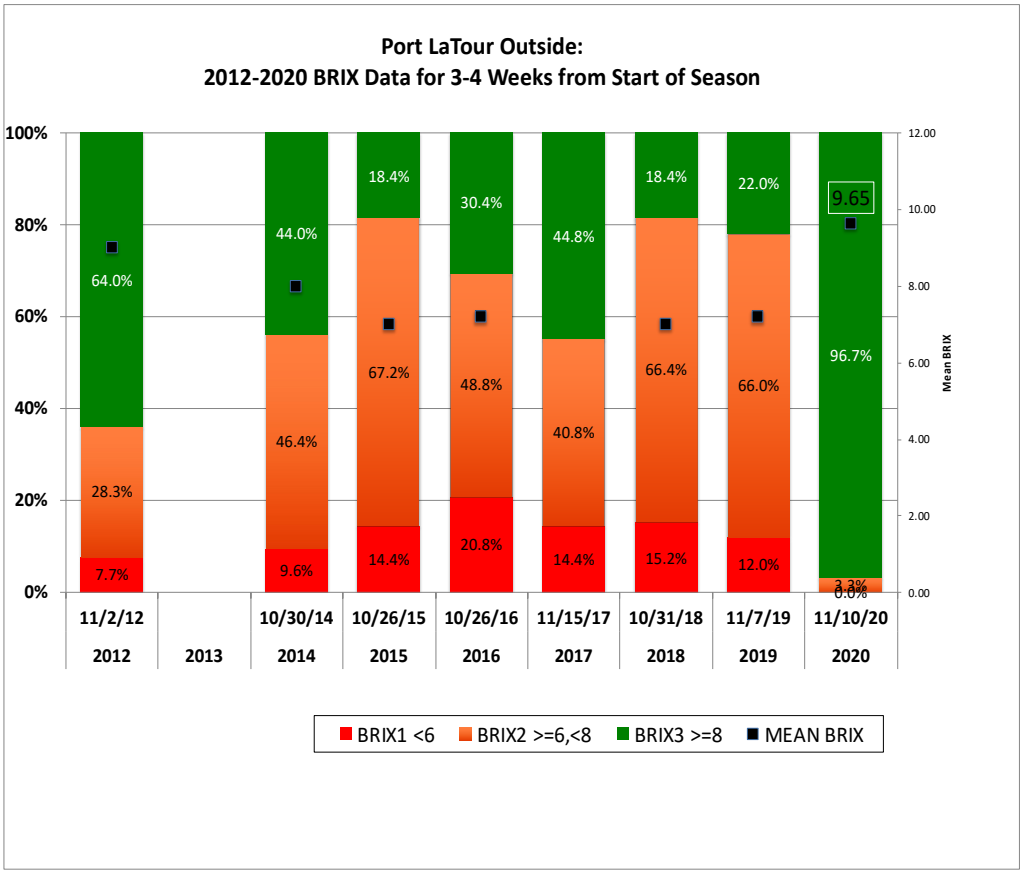




The 2020 results for Port La Tour Outside show the percent of "Good" category lobsters greater than 8 was the smallest in the 2020 time series with values for 5-6 weeks from the start of the commercial harvest season opening of only 3%. As well, low category BRIX values for 2020 were the largest in the time series at 48% of the 150 lobsters sampled on October 28.

These 2020 results confound the apparent improving year-over-year trend since 2017 for 5-6 weeks before the season opening and, to this point, the extent of a potential decline in BRIX for Port La Tour Outside is concerning. Further analysis of the samples closer to the season opening are required and are presented below.

The results for Port La Tour Outside sampling exhibit a similar behaviour to the Port La Tour Inside results. For the case of 3-4 weeks before the start of the season, the 2020 sample data (for November 10) show a marked rebound in BRIX values. The 2020 sample point attains the highest "Good" category percentage of almost 97% with zero "Poor" category lobsters in the sample. As for Port La Tour Inside, the 2020 observations are clearly the best in the 2012-2020 series. These results are comparable only to the very good BRIX values observed in the 2012 series – as was the case for Port La Tour Inside.



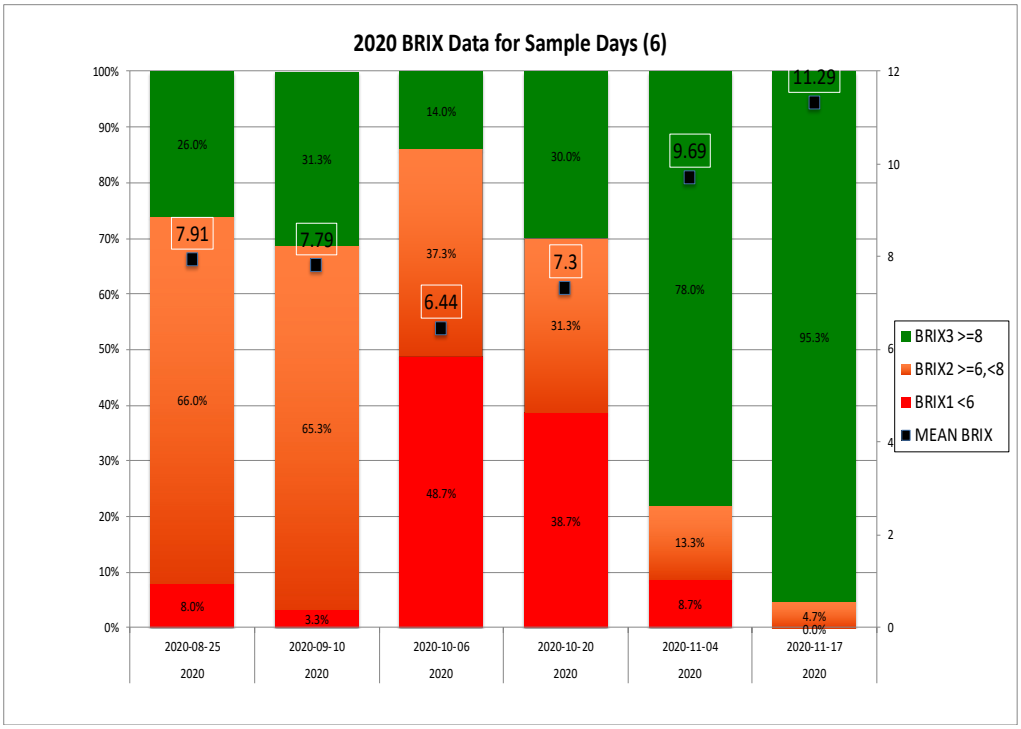
Summary : Late preseason sampling results for PORT LA TOUR OUTSIDE show that quality at the start of the 2020-2021 season is expected to be HIGH. Caution is noted that poor quality observations throughout the 2020 sample periods shifted only in the final preseason sampling observation and that it is unclear whether or not this level may be sustainable beyond the start of the 2020-2021 season.

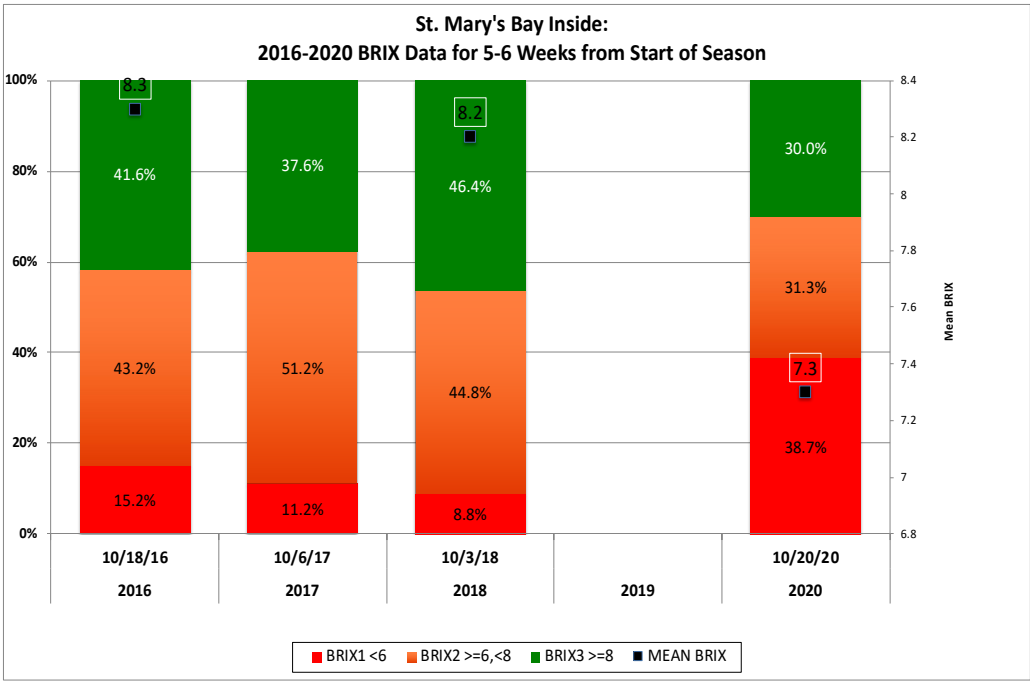
ST. MARY'S BAY INSIDE

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

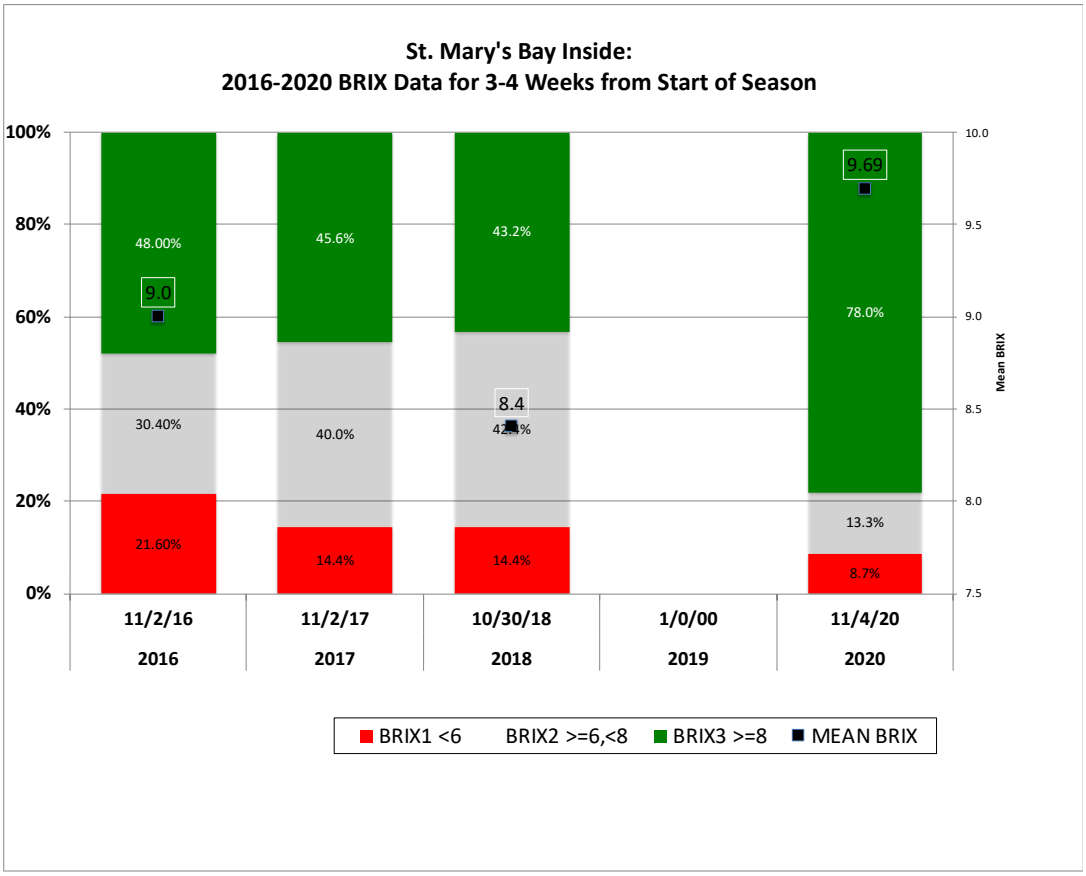
The 2020 preseason survey results for St. Mary's Bay Inside show an initial decline in BRIX from the initial end-August into early October followed by a marked improvement (rising "Good" BRIX values, and declining "Poor" BRIX values) from October into mid-November. The final two samples in November (4th and 17th) are the most positive with respect to rising BRIX in the 2020 series. As noted, the average BRIX values continue to climb from 6.4 units/ml in Ocotber to over 11 by November 17.





The annual comparison of BRIX categories from samples taken 5-6 weeks before the start of the season shows a stable trend from 2016 to 2020 (with the exception of the 2019 missing data). However, it is noted that the "poor" category reaches its largest value in the series for the 2020 sample (October 20).

Similarly, the annual trend in the graphic for 3-4 weeks prior to the start of the season appears to be shifting toward higher BRIX values as evidenced by the 2020 sample of November 4. The average BRIX of 9.69 exceeds all annual values in this series and lends to a positive prediction for good quality in St. Mary's Bay Inside for the 2020-2021 season.



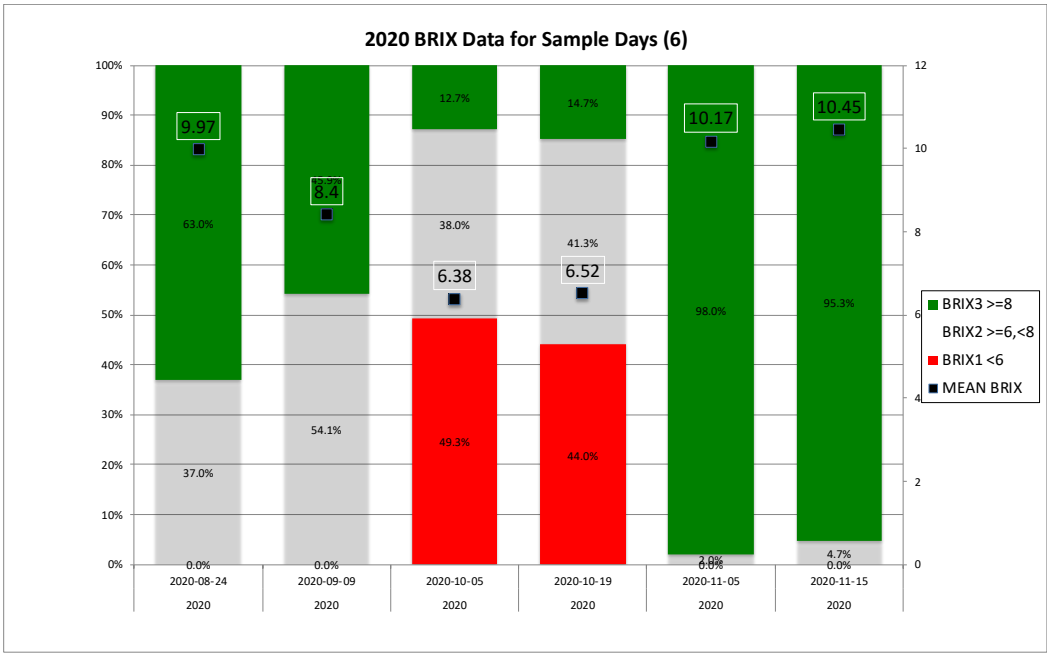
Summary : Preseason sampling results for St. MARY'S BAY INSIDE suggest that quality at the start of the 2020 season will be of VERY HIGH quality comparable to or exceeding the results of the 2018-2019 season in this area.

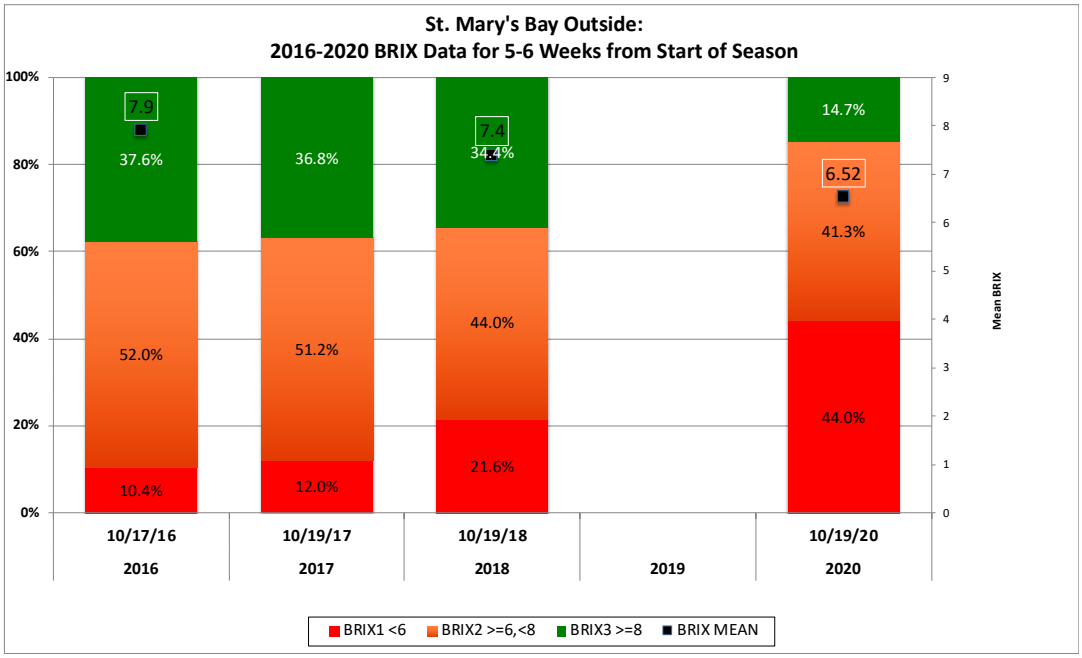
ST. MARY'S BAY OUTSIDE

2020 SUMMARY OF RESULTS

Blood Protein (BRIX) Distribution by Category

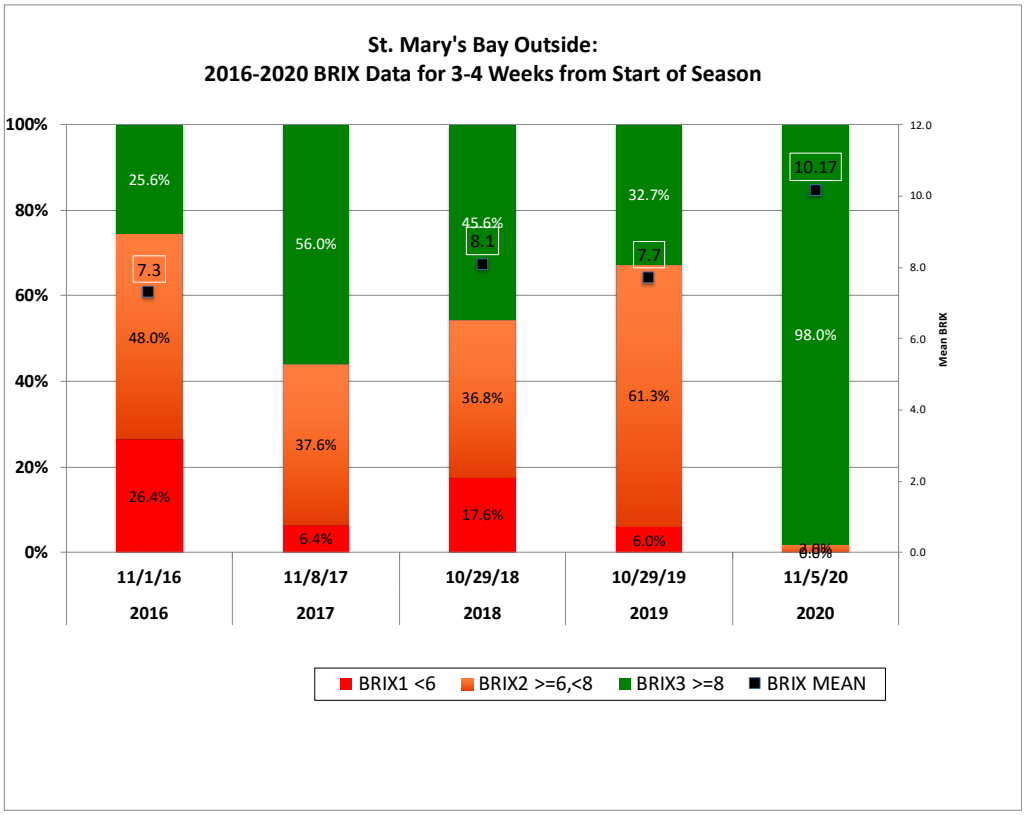
The 2020 preseason survey results for St. Mary's Bay Outside show an apparent decline in BRIX valuations from the start of the survey at end-August through to mid-October. However, this trend was reversed with the sample results of November whereby observations of the "Good" BRIX category exceeded 95% in both the November 5 and November 15 sample dates. These sequential results can be said to confirm the positive BRIX rebond for this area and provide the basis for a robust quality outlook for St. Mary's Bay Outside.





Annual sample results for 5-6 weeks before the start of the season reveal that the October 19 sample in 2020 had not yet rebounded toward the positive BRIX category. As such, the 2020 sample is the poorest of the 2016-2020 time series (2019 excepted) to this point.

The annual sample results for 3-4 weeks before the start of the season include the November 2020 positive sample.



It can be stated that St. Mary's Bay Outside has been trending negatively since 2017 based on samples 3-4 weeks before the season with lower "Good" BRIX and higher "Poor" BRIX percentages by category. However, the remarkable positive observations (including 0% low BRIX observations and mean BRIX of over 10) for the two November 2020 samples turn this trend around completely. These results provide a positive quality outlook for St. Mary's Outside for the 2020-2021 start of the season.

These results are also consistent with the rebound in November for the St.Mary's Bay Inside results. As such, the BRIX gain may be attributed to inside to outside movement of lobster over the early to mid November time period. However, it is also acknowledged that, in the absence of a trend, and based on the November observations at the end of the time series, the evidence of a sustained high quality for St. Mary's Bay Outside remains uncertain.

Summary : Late preseason sampling results for ST. MARY'S BAY OUTSIDE show that quality at the start of the 2020-2021 season is expected to be HIGH. Caution is noted that major improvements in quality were observed in the final preseason sampling observations erase an apparent declining trend. It is therefore acknowledged that this positive trend may not be sustainable beyond the start of the 2020-2021 season.

2020 Outlook

The 2020 preseason sampling results in LFAs 33 and 34 indicate that lobsters landed at the start of the 2020-2021 season in South West Nova Scotia, are of overall *very good quality*. When compared to past years of the preseason surveys, the last survey points in 2020 are superior to all years of the survey's history since 2006.

In all 8 survey locations, inside and outside areas for the final (early to mid-November dates) survey observations, are reporting zero incidence of lower category BRIX values, i.e., all lobsters surveyed in mid-November have BRIX values exceeding 6. Moreover, over 90% of all lobsters surveyed by mid-November have "Good" BRIX values in the high range of 8 units/ml or greater. These results are not thought to be spurious or a function of biased equipment or readings that have been regularly tested and verified. Nevertheless, the consistent overall rebound in all areas is remarkable and, to this point, does not permit a clear explanation as to why this event is occurring. This explains the reasoning for caution in interpreting these results by area.

It is instructive to note the anecdotal evidence from the Bay of Fundy lobster opening in LFA35, whereby high quality lobsters at the beginning of the season (October 15) have been followed by deteriorating lobster quality as the season progresses. It is similarly unlikely that the high BRIX observations of the mid-November observation of this survey in the LFA33 and 34 sampling areas will be maintained throughout the 2020-2021 season.

Finally, it is acknowledged that years when preseason quality has been observed to be high, e.g., 2012 and 2013, catch per trap has been relatively lower. Conversely, seasons of relatively lower preseason quality lobster (2016, 2017) have resulted in relatively higher catches. Analyses of these hypotheses – and others – will be explored and presented in the full report of the 2020 Preseason Lobster Quality Sampling Program to be released early in 2021.

The sector is advised to watch these results carefully as the season progresses. In the interim, it appears that the 2020 season will herald a high quality opening on November 30, 2020.

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Acknowledgements

Coldwater Lobster Association and the Universite Sainte-Anne wishes to thank all participants in and contributors to the 2020 Preseason Lobster Moult & Quality Survey. Your commitment to this scientific task during this difficult period is commendable and it is only worthwhile to the sector thanks to your valuable contribution. We appreciate and thank all of you for your continued support for this important scientific study for the benefit of the lobster sector in southwest Nova Scotia. To those about to embark on another lobster season in LFAs 33 and 34, here's to calm waters, a prosperous season, and stable international and domestic markets. Stay safe and watch out for one another.

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