ESFPA Conservation Strategy
V-notching Report
LFA 32 and 31B: 2023 Update

Quantifying V-notched Lobsters Returned to the Ocean

Fishermen and Scientists Research Society

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ABSTRACT

The Fishermen and Scientists Research Society (FSRS) began working with the fishermen and lobster plant owners of LFAs 31B and 32 of the Eastern Shore of Nova Scotia on May 31 2023 to undertake the annual Eastern Shore Fisherman's Protective Association's (ESFPA) V-Notch Conservation Program. The technicians carried out several tasks including: ensuring the correct weight was presented, counting the female lobsters, measuring to verify carapace length over 110mm, recording the number of female lobsters with carapace size below 110mm; and V-notching the female lobsters for release.

There were 45 appointments covering 160 fishers. FSRS technicians released 17883 lbs of v-notched lobster. Additional lobsters were released by the GCIFA in LFA 31B. The GCIFA released 5 497.8 lbs of v-notched lobster for 50 fishers. In total, 210 fishers participated in the v-notching program, releasing 23 554.8.8 lbs of v-notched female lobster in Spring 2023.

The FSRS technicians collect unbiased data, which is representative of the size and number of the female lobsters returned to the water in LFAs 31B and 32. This report documents not only the total number of female lobsters returned, but also provides insight on the size range of lobsters released in the current year of the program and some comparison to past years.

2023 Report is modified from the 2012-2022, 2003 & 2002 reports.

Contents

INTRODUCTION

Lobster fishing areas (LFAs) 32 and 31B have successfully implemented the V-notching conservation program established by the Eastern Shore Fisherman's Protective Association (ESFPA) for the past 20 years. Over more than 20 seasons, an excess of 565 827.3 pounds of female lobsters were released throughout the two LFAs through the V-notch conservation program. Unfortunately, we are unable to confirm the number of v-notched lobster released in 2020 due to the covid-19 pandemic which required fishers to release lobster voluntarily without FSRS verification.

The motivation behind the V-notching program stems from a report written by the Fisheries Resource Conservation Council (FRCC) in 1995. The report, "A Conservation Framework for Atlantic Lobster", describes the state of the lobster fishery for the Atlantic Provinces. The report states that the lobster fishery was at risk due to high exploitation rates and low levels of egg production (FRCC, 1995). With the collapse of the cod fishery in the early 1990s, it was recognized that a more precautionary approach had to be taken in the management of fisheries resources. In December 1997, the Minister of Fisheries, Herb Dhaliwal, accepted the recommendations in the 1995 FRCC report. He set in place a mandate to double the number of eggs per lobster recruit over the next 2-3 years (later increased to a four-year time span). It is important for the biologists and fishermen involved in this conservation program to understand the exponential benefits the V-notching program has on increasing egg production.

For the V-notching program on the Eastern Shore of Nova Scotia, FSRS technicians must verify specific information about the female lobsters before they are released. While conducting v-notch appointments, FSRS technicians record the weight and number of large female lobsters released. The technicians also ensure the lobsters returned are in good health to maximize the benefits of the program. The positive results of the V-notching program can only be achieved through the cooperation between science and industry personnel, and the direct involvement of fishermen in the science. Thus far, the program has been successful through the collaboration of technicians, scientists, and fishermen. This 2023 report is an update on the Fishermen and Scientists Research Society's (FSRS) role in the V-notch conservation program, as contracted through the ESFPA.

LFA 32/31B V-Notching Definition

V-notching is a procedure in which an individual uses a specialized tool to create a notch in the shape of a V in a female lobster's tail, in the uropod to the right of the center uropod (Figure 1). The position of the v-notch on the right uropod is determined when the lobster is lying underside down and its tail is toward the person making the determination (DFO, 2008). All the female lobsters released thus far for the LFA 32 and 31B conservation program have been V-notched in this manner. This lobster conservation tool works by providing protection for the female lobster when it is not carrying eggs, as it cannot be legally retained by fishermen. A v-notched lobster is protected until the v-notch grows out completely and the uropod returns to its natural state (DFO, 2008). A small notch is still visible in the edge of a lobster's uropod even after two molts. Therefore, V-notching a lobster and returning it to the water provides protection for the female lobster, allowing it to produce several additional clutches of eggs prior to being harvested.

For the first 15 years of the program, V-notching was solely enforced by the ESFPA and Nova Scotia Department of Fisheries and Aquaculture. Due to the importance of the program and desire from most fishermen in the area to continue with the program, it was proposed that the conservation measure become a condition of licence through the Department of Fisheries and Oceans (DFO). In 2015, LFA 31B's lobster condition of licence was modified to include the following specifications for V-notching, with LFA 32 receiving the same changes in 2017:

> THE LICENCE HOLDER/OPERATOR IS REQUIRED TO V-NOTCH AND RETURN TO THE WATER FEMALE LOBSTERS CAUGHT DURING THE SEASON ACCORDING TO THE AMOUNTS AND IN THE MANNER SPECIFIED IN SCHEDULE 5. THE LOBSTERS MUST HAVE A CARAPACE LENGTH OF 110 MM OR GREATER, MUST HAVE TWO FULL-SIZED CLAWS, AND MUST APPEAR, WHEN RELEASED, TO BE ALIVE AND HEALTHY. THE V-NOTCHING, CONDITION AND RELEASE OF THE LOBSTERS MUST BE RECORDED AND VERIFIED BY AN INDIVIDUAL LISTED IN ITEM 3 OF SCHEDULE 5. THE LICENCE HOLDER/OPERATOR MUST MAKE THEIR COPY OF THE CONFIRMATION NOTICE DESCRIBED IN ITEM 5 OF SCHEDULE 5 AVAILABLE TO A FISHERY OFFICER UPON DEMAND. THE LICENCE HOLDER/OPERATOR MUST FOLLOW THE ADDITIONAL INSTRUCTIONS FOR V-NOTCHING IN SCHEDULE 5.

Furthermore, the licence conditions were also altered to make it legal for V-notched lobsters under the 110mm size requirement to be retained. This was a change from previous years of the program when no V-notched lobster of any size could be retained. This new regulation was outlined in licence conditions as follows:

Figure 1. Location of V-notch on the female lobster's tail; on the uropod to the right of the center uropod when the lobster is underside down and the tail is facing toward the person making the determination.

NO PERSON SHALL CATCH AND RETAIN OR POSSESS, IN LOBSTER FISHING AREA 31B (or 32), ANY FEMALE LOBSTER OF 110 MM CARAPACE LENGTH OR GREATER WITH AN IMPRESSION (WITH OR WITHOUT SETAL HAIRS) ON THE BOTTOM OUTSIDE EDGE OF THE RIGHT FLIPPER (UROPOD) NEXT TO THE MIDDLE FLIPPER (TELSON) THAT AFFECTS THE NATURAL SHAPE OF THAT FLIPPER. THE NATURAL SHAPE OF THE FLIPPER WOULD ALSO BE ALTERED WITH THE REMOVAL OF ALL OR A PORTION OF THE BOTTOM OUTSIDE EDGE OF THE RIGHT FLIPPER. THE RIGHT FLIPPER SHALL BE DETERMINED WHEN THE UNDERSIDE OF THE LOBSTER IS DOWN AND ITS TAIL IS TOWARD THE PERSON MAKING THE DETERMINATION.

The V-notch definition is not uniform across LFAs. For example, in LFAs 33 and 34 the V-notch lobster definition explains that any female lobster with the setal hairs along the edge of the uropod is a legal lobster. Under most conditions, the setal hairs grow back in a V-notched uropod after one molt. In consequence, this definition only provides the lobster protection for one batch of eggs.

METHODS

FSRS technicians were responsible for verifying the compliance of fishermen to the V-notch conservation program initiated by the ESFPA. The technicians completed pre-release measurements, and V-notching of large female lobsters provided by fishers as a part of the V-notch program. All FSRS technicians involved in the V-notch program were provided training, both in the office and in the field, prior to program implementation.

At the training sessions, technicians were shown the proper procedure to notch the specific uropod of female lobsters (Figure 1) and given the V-notch tools: a set of calipers, a pre-set measuring gauge (set to 110mm), a v-notch tool, and data sheets to complete their work. Technicians were instructed to record the source of female lobsters being released by each fisherman (i.e., were the lobsters from a plant or did they hold their own lobsters) as well as count all lobsters and ensure that each lobster exceeds 110mm. It is important that technicians

measure any lobsters less than 110mm in carapace length and record the measurements, these lobsters do not count towards a fishermen's total pounds released.

Following the alteration of licence conditions in 2015 and 2017 (for LFAs 31B and 32, respectively), lobsters with a carapace length equal to or greater than 110mm meet the mandatory size requirement to be released as a part of the V-notch conservation program. This size requirement was established through consultation with DFO Science. Lobsters less than 110mm were exchanged for larger lobsters whenever possible. If lobster that met the requirements of the V-notch program were unavailable, lobsters less than 110mm were documented when they were released. Since the change in licence conditions, there has been a greater focus placed on releasing lobsters only 110mm or greater. In addition to verifying size, lobsters with any physical defects were also exchanged by technicians for lobsters without imperfections if there were replacement lobsters available. The FSRS's technicians returned the healthiest possible lobsters to the ocean. Fishers have participated in V-notching for many years, and it is rare that replacement lobsters would be unavailable. Fishers strive to provide the largest, healthiest lobster possible for release.

As in past years, groups of fishermen appoint a group leader who is responsible for contacting the ESFPA to arrange a V-notching appointment on behalf of their group at a specific wharf. Most appointments host between three to nine fishers. The ESFPA contacts FSRS by email at least 24 hours in advance to book an appointment with one of the FSRS technicians. The appointment is confirmed by FSRS staff and the technician who is responsible for calling the group leader fisherman and/or the fish plant manager to verify the time, location of the lobsters and port of release.

The technicians arrived at the fish plant or wharf early to weigh, count and inspect all female lobsters being returned to the water. Any lobster seen with problems such as a broken shell, missing claw(s), or loss of vigor were exchanged by the technician for another lobster without imperfections, if other lobsters were available. A measuring gauge was used to determine if a lobster's carapace was greater or less than 110mm in length.

The technicians were instructed to verify the weight of the female lobsters collected by the participating fishermen before they were returned to the water. The return weight varied depending on the individual fisherman's Class of Licence and LFA (Table 1). In most cases, scales at the fish buyers, or on buyers' trucks were used to ensure that the weight of the returned lobsters was accurate. In some cases, weight slips verified by buyers were accepted in place of weighing the lobsters at the wharf. While this is sometimes easier for the fishermen, it is not

encouraged and should be avoided if possible. In the future, providing electronic scales to FSRS technicians would improve accommodations for fishers who do not have a scale at their wharf.

Table 1. Pounds required for female lobster release

LFA 32	**LFA 31B**
Class A: 110 lbs.	Class A: 110 lbs.
Class B: 33 lbs.	Class B: 33 lbs.
Partnership: 165 lbs.	Partnership: 165 lbs.

Once the sampling and weighing were completed, the technician(s) and fisher(s) boarded the designated vessel and began the V-notching procedure. The female lobsters were returned to shallow water locations after they were V-notched, at the fishermen's discretion. It is noted that releasing lobster from the wharf is discouraged as it is not necessarily a clean environment. Freshwater mixing from streams and chemical spill at wharfs can harm the released lobster. Technicians and fishermen should be aboard the vessel before releasing. It is noted that if weather is rough, exceptions can be made to release lobsters from the vessel still tied to the wharf. This should be confirmed with the director of FSRS or senior research assistant at FSRS.

The participating fishers had to complete a confirmation notice form to state that they returned their required amount of V-notched lobsters to the water (Appendix A). The technician signed and dated the form and the fisher and technician each retained a section for their official records. The technician's signed form was passed into the FSRS office to be processed, with a copy being forwarded to the ESFPA.

RESULTS

The 2023 v-notching program appointments began on May 31th, 2023, and concluded on June 20th, 2023. The delayed start of v-notching appointments was attributed to a high shore price of lobster early in the fishing season, and difficulty retaining enough large female lobster later in the fishing season. As a result, FSRS technicians were on the water daily from June 6th to June 20th, completing 42 of the 45 scheduled v-notching appointments in a two-week period. We express gratitude to the technicians for their hard work and dedication to the v-notching program. The FSRS technicians completed V-notch appointments along the Eastern Shore including ports from Three Fathom Harbour to Sonora, Nova Scotia. The Guysborough County Inshore Fishermen's Association (GCIFA) technicians were responsible for the rest of LFA 31B and some of their results are included in this report to give a broader picture of LFA 31B.

Five FSRS technicians were involved in V-notching lobsters for ESFPA licence holders in 2023. The technicians verified the release of 17 883 lbs of lobster in June 2023. When considering the lobster released by the GCIFA, the total weight of lobster released was 23 554.8 lbs. The total weight of large female lobsters released in 23 105 lbs in 2021 and 23 433.5 lbs in 2022. In 2023, 45 V-notching appointments were attended by 160 fishers, releasing 7592 large female lobster. An additional 50 fishers were covered by GCIFA technicians, for a total of 210 fisher participants in the v-notching program in LFA 31B and 32.

Table 2 shows the pounds released, the number of lobsters, and the average weight of the V-notched lobsters released by harbour by FSRS technicians.

Table 2: 2023 total weight of lobster released, number of lobsters released, and average weight of V-notched lobsters released by FSRS technicians at each harbor in LFA 32 and LFA 31B.

LFA	Harbour	Lobster Released (lbs)	Lobster Released (num)	Average weight per lobster (lbs/lobster)
32	East Chezzetcook	440.9	134	3.3
32	Ecum Secum	1985.2	666	3
32	Harrigan Cove	550	183	3
32	Jeddore	2675	845	3.2
32	Little Harbour	651.2	198	3.3
32	Marie Joseph	774.2	261	3
32	Murphy's Cove	440	149	3
32	Mushaboom	1218.6	323	3.8
32	Musquodoboit	440	98	4.5
32	Owl's Head	1102.5	339	3.3
32	Petpeswick	726	217	3.3
32	Port Dufferin	773	274	2.8
32	Quoddy	440	143	3
32	Sheet Harbour	330	132	2.5
32	Sober Island	440	147	3
32	Spry Bay	660	221	3
32	Pleasant Harbour	110	25	4.4
32	Pope's Harbour	110	41	2.7
32	Tangier	991.8	315	3.1
32	Three Fathom	994.3	318	3.1
Total LFA 32		15 852.7*	5029*	3.2*
31B	Ecum Secum (31B)	663.4	214	3.1
31B	Liscomb	770.9	238	3.2
31B	Marie Joseph	550	185	3
31B	Sonora	220	78	2.8
31 B	GCIFA	5497.8	1848	3
Total LFA 31B		7702.1	2563	3
Total 2023		23554.8*	7592*	3.1*

*Total counts of lobster for LFA 32 and eastern shore region exclude 117 lobster weighing 220 lbs released in a challenging appointment in LFA 32. Including this unusual appointment would reduce the average size of lobster for that harbour, and would not be representative of the effort otherwise shown by that area, or by the program as a whole.

The average weight of the lobsters released varied between harbours. The average weight of lobster released in LFA 32 in 2023 was 3.2 lbs, which is greater than the average weight of lobster released in LFA 32 in 2022 (3.1 lbs). The average weight of lobster released in 2023 in LFA 31B was 3 lbs, which is greater than the average weight of lobster released in LFA 31B in 2022 (2.9 lbs). The average weight of each large female lobster across LFAs returned in 2023 was 3.1 lbs. A 3.1 lb lobster has an average carapace length of 121 mm (MacDonald and Scott, 2000; Appendix C).

The fishermen and plants keep large female lobsters for their V-notch conservation program whenever possible. In some past years, large females have been more difficult to accumulate for the release. For this reason, lobsters measuring slightly less than 110mm (108-109mm) were permitted to be released, as these lobsters were the largest lobsters available at the time. However, it is now mandatory that all lobsters released for the program have a carapace length of 110mm or above as per license conditions in LFA 32 and 31B. This condition has not yet caused many issues for the fishermen or technicians. We had one appointment this year where the plant had sent the fishers 2lb lobster instead of 3 lb lobster, resulting in 117 undersize lobster weighing 220 lbs were released. These undersize lobster were not used in the calculated weights. Two other incidents of noncompliance occurred in 2023. On one of these incidents a fisher had no replacements for 5 lb injured female lobster and a 4 lb male lobster. The second incident was more complex, and included an altercation at the wharf and an unfinished appointment for one fisher who had only 93 lbs of lobster that met the license conditions. FSRS technicians gave the fishers in non-compliance additional opportunities to replace the remaining lobster required to meet their license conditions.

In 2023, a total of 7592 lobster were released by FSRS and GCIFA technicians. Fishers and plants were very cooperative in the replacement of undersize females. This demonstrates the success of the V-notching program in promoting the release of large, quality females.

Table 3 shows a summary of the number of pounds of lobsters released through the V-Notch Conservation Program since 2000. The total weight of lobster released in 2023 (23 554.8lbs) is greater than the total weight of lobster released in 2022 (23 433.5 lbs).

Table 3. Summary of the total number of pounds of lobsters released per year. The weights provided in this table include data collected by FSRS technicians and data collected by GCIFA[1].

Year	LFA 32 (Lbs released by year)	LFA 31B (Lbs released by year)	V-notched lobster released (lbs released by year)
2000	32,166	16,027	48193
2001	16,170	7,491	23661
2002	15,461	8,151	23612
2003	15,562	8,151	23713
2004	15,565	8,151	23716
2005	15,565	8,151	23716
2006	16,048	8,151	24199
2007	15,977	8,151	24128
2008	15,994	7,623	23617
2009	16,284	7,358	23642
2010	16,071	7,795	23866
2011	15,895	7,527	23422
2012	15,554	8,077	23631
2013	15,917	7,967	23884
2014	15,719	6,429	22148
2015	15,587	7,314	22901
2016	15,609	7,770	23379
2017	15,807	7,714	23521
2018	15,642	7,601	23243
2019	16204	7,338	23542
2021	15570	7,535	23105
2022	15887.5	7,546	23433.5
2023	14861.7	8693.1	23554.8

[1] Lobsters for 2002-2007 in LFA 31B were verified jointly by the GCIFA and the FSRS. The numbers shown are approximate values due to incomplete information about the number of pounds released. The FSRS released approximately 50% of the LFA 31B lobsters. 2015 saw a decrease in the number of lobsters released by the FSRS technicians out of the LFA 31B area. 2021 also saw a decrease in the number of lobsters released by the FSRS in LFA 31B, as several requested that their v-notching appointments be overseen by technicians from the GCIFA to promote covid-19 safety through reduction of travel.

* The total weight of large female lobster released in 2020 was not verified by FSRS technicians due to travel and sampling restrictions in place due to covid-19

DISCUSSION

The Fishermen and Scientists Research Society successfully worked with members of the ESFPA, plant owners, and buyers in LFAs 32 and 31B to implement the lobster V-notch conservation strategy for 2023. As in previous years, the program encountered some obstacles; however, the reception and implementation of the program was overall outstanding. Comments regarding the V-notch conservation strategy are incorporated in Appendix C, with past technician reports outlined in Appendix D. More than 565 827 lbs of lobster have been released over the lifetime of the v-notching program (unable to verify weights during Covid-19 pandemic).

Damaged or undersized female lobster were almost always exchanged for those without any apparent issues. Lobsters that were missing a claw, had a regenerating claw, or any other significant injury or obvious loss of vigor were not accepted for release as part of the program. The FSRS's technicians made every effort to return the highest quality lobsters to the ocean as possible. Overall, the female lobsters validated by the FSRS were in great condition to reproduce.

Any female lobster that measured below 110mm in carapace length was brought to the attention of the captain or plant staff, and a replacement lobster was provided. All lobsters have not been measured since the initiation of the program. It may be beneficial to add the portion of the project which included measurements of all lobster released to have additional data to use for future considerations regarding the conservation strategy. This, however, would add time to each appointment for both technicians and fishermen, which would need to be considered.

This year, when time allowed, 278 v-notched lobsters were also tagged with streamer tags provided by Ben Zisserson at the DFO. FSRS technicians asked captains if they would mind if we tagged several lobsters on their appointments. The reception of the tagging effort was overwhelmingly positive, with older captains reminiscing about past tagging programs, and younger captains asking how to report found tags. Some captains recorded all the tag numbers of tags inserted on their appointment so that they could look for the lobster they released throughout the season. Tagging v-notched lobster is an opportunity for tags to be retained in the population for a longer period, as the v-notched females cannot be retained.

This spring, 23554.8 lbs of female lobsters were returned in LFA 32 and 31B by FSRS and GCIFA technicians. The average weight of a female lobster released in 2023 was 3 lbs or approximately 120 mm carapace length. A total of 7592 lobsters were released in LFA 32 and LFA 31B in 2023. It is known that the number of eggs produced by female lobsters increases exponentially with female size. For example, one 3-pound female lobster that is 120mm in carapace length (33, 260 eggs) will produce as many eggs as four 1-pound female lobsters.

To determine the amount of eggs a female lobster produces, the following equation can be used to calculate the relationship between fecundity and size: Fecundity = (.000605 * CL ^ 3.7227), where CL is carapace length (Estrella and Cadrin, 1995). Releasing 110 pounds of large female lobsters will result in the production of a greater number of eggs compared with releasing 110 pounds of small female lobsters.

The average carapace lengths were taken from calculated weights for female lobsters. The numbers shown are estimates since they do not consider natural mortality and other extenuating circumstances; however, they still illustrate how the size of the female being released affects the potential for greater egg production and future stock growth. Possible eggs released = total female lobsters released * possible egg production per female.

Table 4: Fecundity chart showing possible eggs released from the ESFPA V-Notch conservation program. Also note that the possible # of eggs released for LFA 31B excludes lobster released by the GCIFA.

Year	LFA	Weight (lbs)	Carapace Length (mm)	Possible # of Eggs Produced/Female	Possible # of Eggs Released
2010	32	2.58	112	25,726	159,838,230
2011	32	2.58	112	25,726	158,629,106
2012	32	2.67	114	27,423	159,575,808
2013	32	2.6	113	26,592	162,609,896
2014	32	2.62	113	26,592	159,365,616
2015	32	2.73	115	28,329	161,531,169
2016	32	2.85	117	30,269	165,992,447
2017	32	3.07	120	33,260	171,156,423
2018	32	3.1	121	34,304	173,164,875
2019	32	3.13	121	34,304	177,521,441
2021	32	3.16	122	35,370	174,272,828
2022	32	3.1	121	34,304	173,543,936
2023	32	3.2	123	36,462	183 367 398
2010	31B	2.33	108	22,468	40,532,272
2011	31B	2.21	106	20,959	37,914,035
2012	31B	2.52	112	25,726	46,307,551
2013	31B	2.32	108	22,469	41,814,642
2014	31B	2.69	115	28,387	26,683,517
2015	31B	2.85	117	30,207	25,675,593
2016	31B	2.92	118	31,243	25,869,072
2017	31B	2.94	118.5	31,739	26,120,802
2018	31B	3.07	120	33,260	27,373,054
2019	31B	3.06	120	33,260	15,499,202
2021	31B	3.21	123	36,462	24,940,275
2022	31B	2.9	118	31,243	22463717
2023	31B	3	120	33,260	85245380

In 2023, the average weight of lobster released was 3.1 lbs, denoting an average carapace length of 121 mm. A lobster with a carapace length of 121 mm would be predicted to produce 34,304 eggs. If we consider the average size of females released in 2023, the potential eggs produced by the 7 592 lobster quantified by FSRS and GCIFA technicians could produce as much as 260 435 968 eggs if each of the lobster has the opportunity to produce eggs once.

Broken down by LFA, LFA 31 B had an average weight of lobster released at 3 lbs, or 120 mm in carapace length while LFA 32 released lobster of an average weight of 3.2 lbs, or 123 mm in carapace length. When considering the number of females released by FSRS technicians in these areas, the potential eggs produced in LFA 31 B is approximately 85 245 380 eggs and in LFA 32 the potential eggs produced is approximately 183 367 398. This represents record highs for potential egg production from the v-notching project in both LFA 32 and LFA 31 B.

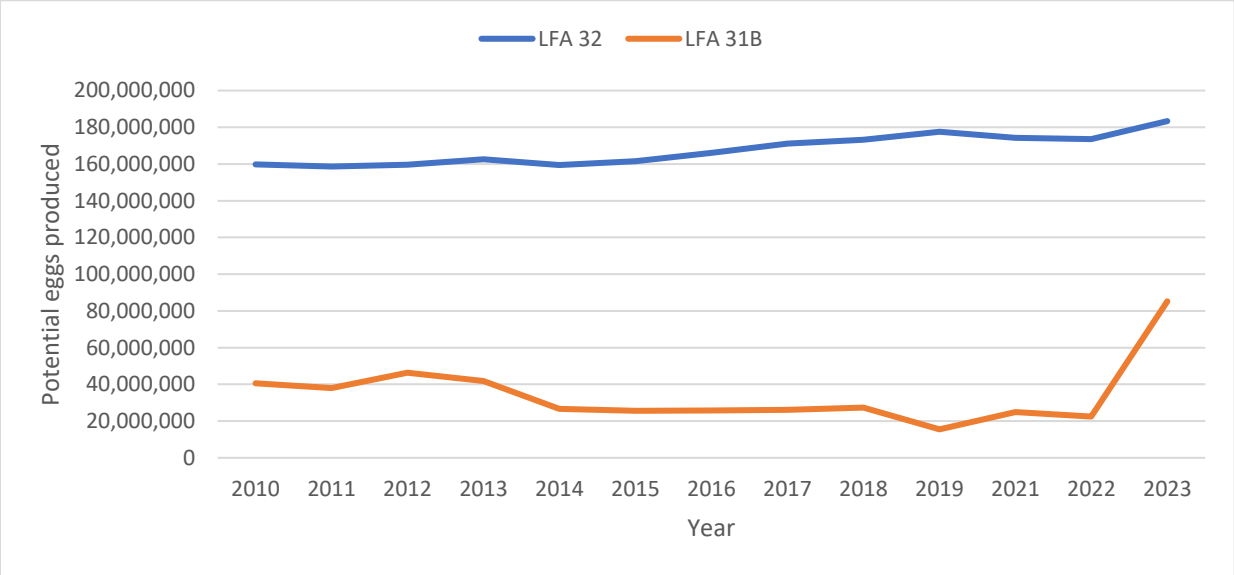

Figure 3. Possible egg production per female released for LFAs 32 and 31B from 2010-2023.

With the current V-notch definition for LFA 31B and 32, the lobsters get extra chances to mate and produce eggs as they grow larger. Studies done by DeAngelis et al. (2010) found that once lobsters molted once after being V-notched, there were setal hairs present and could be legally landed in other LFAs. Large female lobsters are more likely to have already bred and produce many more eggs than smaller lobsters. A 2.3 lb lobster produces close to 2.6 times more eggs in each clutch (batch or brood of eggs) than a 1 lb lobster (82.5mm CL), and a 3.8 lb lobster, close to 4.6 times. Very large female lobsters at sizes of 153mm CL produce close to 8 times as many eggs per clutch (DFO, 2009). The benefit of releasing larger female lobsters for the V-notch

program is that they can carry and release more eggs than smaller lobsters. As larger lobsters have been provided over the past several years of the program, the number of estimated eggs being released has also risen (Figure 3).

CONCLUSION

The V-notch conservation program continues to be a positive step towards increasing the egg production for the Eastern Shore areas, as more females are released and have more chances to reproduce. The information collected was unbiased and completed in a professional manner. There have been several studies completed by other organizations such as the Department of Marine Resources in Maine (2013) to validate the importance of V-notching as a conservation measure. To better understand the effect of the V-notching program, landings data and/or sea sampling data could be examined to compare the changes in discard rates.

It is of great importance that the lobsters being returned to the ocean are held for the shortest period and in the best conditions possible to minimize stress on the female lobsters. The V-notched lobsters that are returned to the water are an investment and need to be treated with care. Good handling practices can only strengthen good conservation measures.

The program continues to improve as all parties involved are working together in a conservation management plan. The Fishermen and Scientists Research Society is very grateful to be involved in this study and would like to thank all the fishermen, plant owners and staff for their continued assistance, cooperation, and interest in maintaining a sustainable fishery.

ACKNOWLEDGEMENTS

The FSRS would like to express its appreciation to the Eastern Shore Fisherman's Protective Association for involving the FSRS in this conservation program. The fishermen and the plant staff also deserve thanks for welcoming our technicians on their vessels and in their facilities.

The FSRS would like to recognize the commitment of ESFPA members to the v-notching program, and their role in the success of another v-notching season. Buyers and Fishermen alike monitored catch closely for the presence of v-notched lobster throughout LFA's 32 and 31B. In the rare event that a previously v-notched female was present in the lobster provided in the v-notching appointments, the fishermen or buyers replaced the v-notched females with unmarked females. The previously v-notched females were not counted towards the weight of lobster provided by

each fisherman; however, the fishermen were happy to release these females, and asked that FSRS staff would cut a fresh v-notch to replace partially grown out v-notches.

At each appointment, the fishers helped FSRS technicians ensure that the females released were in the best condition to survive and reproduce. Fishers and their buyers had replacements available in cases where lobster was damaged or undersize. Altogether, FSRS technicians affirm that the females supplied by fishers were in excellent condition.

Captains, their crew and their family members made v-notching appointments run efficiently. Fishers arrived early for appointments and were well prepared with lobster sorted and weighed. When buyers were present with their scales, they helped technicians and fishers to verify the weight of the lobster. Having scales present is always preferred over weigh slips, which have been accepted on occasion. Fishers were quick to lend a hand in releasing the lobster during the appointments, and often shared stories about the number of previously v-notched females they had seen with eggs throughout the fishing season. In addition, captains regularly had several locations chosen for strategic release of the v-notched females. This local ecological knowledge can only serve to strengthen the program.

We would like to acknowledge the hard work of the plant staff at several lobster holding facilities for their care in grading and storing large female lobster for the v-notching program. FSRS technicians regularly work with lobster buyers who store v-notch lobster for their fishers. We would like to recognize the extra time spent to sort, space to store, cost to transport and risk of loss expended to maintain the lobster in good condition until the scheduled v-notching appointments. We thank the buyers who allow us to use their scales at the wharf, and those who accommodate us at their facilities when we verify the weight and condition of the lobster they select for the program.

The FSRS would like to thank our technicians, Julian Greer, Jordan Eaton, Bailey MacDonald, Drew Jardine and Jade Petritchenko for the professional manner in which they conducted this program, as well as all their hard work. We received positive feedback from fishers and lobster buyers on how efficient, adaptable and easy to work with our staff was this year.

Finally we would like to thank Lori Baker and the ESFPA for hiring FSRS technicians to complete the v-notching program each year. Lori and her team devote a lot of time to making sure their members meet their license conditions on a tight schedule. This partnership is valuable to us, as it is an excellent example of fisheries-led science.

For more information on the v-notching program in Atlantic Canada, please contact: info@fsrs.ns.ca

APPENDICES

APPENDIX A: 2023 Confirmation Notice for Return of V-Notched Lobsters

2023 Confirmation Notice for Return of V-Notched Lobsters

I _____, fishing out of_____

Fisherman's Name (Please Print) Port or Harbour

in LFA ____, hereby confirm that I returned to the water _____ pounds of v-notched, female lobsters on the ____ day of _____, 2023.

Fisherman's Signature: _____

I hereby confirm that I instructed the above fisherman how to properly v-notch the lobsters, and I witnessed and participated in the above fisherman returning to the water _____ pounds of v-notched, female lobsters. Dated this _____ day of _____, 2023.

FSRS Technician Name: _____

FSRS Technician Signature: _____

2023 Confirmation Notice for Return of V-Notched Lobsters

I _____, fishing out of_____

Fisherman's Name (Please Print) Port or Harbour

in LFA ____, hereby confirm that I returned to the water _____ pounds of v-notched, female lobsters on the ____ day of _____, 2023.

Fisherman's Signature: _____

I hereby confirm that I instructed the above fisherman how to properly v-notch the lobsters, and I witnessed and participated in the above fisherman returning to the water _____ pounds Of v-notched, female lobsters. Dated this _____ day of _____, 2023.

FSRS Technician Name: _____

FSRS Technician Signature: _____

APPENDIX B: Carapace Lengths

Carapace lengths and the calculated weights for female lobsters generated from the regression analysis for the V-notch conservation program (MacDonald and Scott, 2000)

For all Sizes (mm)	(mm) Size to inches	Calculated Weight (g)	Calculated Weight (lbs)
94	3 22/32	733	1.62
95	3 24/32	753	1.66
96	3 25/32	774	1.71
97	3 26/32	795	1.75
98	3 27/32	817	1.80
99	3 29/32	838	1.85
100	3 30/32	861	1.90
101	3 31/32	883	1.95
102	4 1/32	906	2.00
103	4 2/32	929	2.05
104	4 3/32	953	2.10
105	4 4/32	977	2.15
106	4 6/32	1001	2.21
107	4 7/32	1026	2.26
108	4 8/32	1051	2.32
109	4 9/32	1076	2.37
110	4 11/32	1102	2.43
111	4 12/32	1128	2.49
112	4 13/32	1155	2.55
113	4 14/32	1182	2.61
114	4 16/32	1209	2.67
115	4 17/32	1237	2.73
116	4 18/32	1265	2.79
117	4 19/32	1294	2.85
118	4 21/32	1323	2.92
119	4 22/32	1352	2.98
120	4 23/32	1382	3.05
121	4 24/32	1412	3.11
122	4 26/32	1442	3.18
123	4 27/32	1473	3.25
124	4 28/32	1505	3.32

For all Sizes (mm)	(mm) Size to inches	Calculated Weight (g)	Calculated Weight (lbs)
125	4 29/32	1536	3.39
126	4 31/32	1568	3.46
127	5	1601	3.53
128	5 1/32	1634	3.60
129	5 3/32	1667	3.68
130	5 4/32	1701	3.75
131	5 5/32	1735	3.83
132	5 6/32	1770	3.90
133	5 8/32	1805	3.98
134	5 9/32	1840	4.06
135	5 10/32	1876	4.14
136	5 11/32	1912	4.22
137	5 13/32	1949	4.30
138	5 14/32	1986	4.38
139	5 15/32	2024	4.46
140	5 16/32	2062	4.55
141	5 18/32	2100	4.63
142	5 19/32	2139	4.72
143	5 20/32	2179	4.80
144	5 21/32	2219	4.89
145	5 23/32	2259	4.98
146	5 24/32	2299	5.07
147	5 25/32	2341	5.16
148	5 26/32	2382	5.25
149	5 28/32	2424	5.34
150	5 29/32	2467	5.44
151	5 30/32	2510	5.53
152	5 31/32	2553	5.63
153	6 1/32	2597	5.72
154	6 2/32	2641	5.82

APPENDIX C: Covid 19 Accomodations in 2020-2022

Further accommodations were made in 2021 and 2022 to address concerns about the Covid-19 pandemic. In 2020, FSRS staff did not participate in v-notching activity at the advisement of the federal government and health authorities who discouraged travel and prohibited fisheries techs from boarding commercial vessels. The FSRS had prepared procedures to conduct v-notching appointments safely under covid-19 conditions, however these standards of practice were not approved by DFO in time for the FSRS to assist the ESFPA with the v-notching contract. As such, fishers voluntarily released lobster without verification by FSRS staff to fulfill their license conditions. This raised concern among fishers who feared that the release of v-notched lobsters across fishers would be inconsistent without outside confirmation. This concern was acknowledged and addressed through the operation of FSRS technicians under covid-19 conditions in 2021 and 2022.

In 2021, the FSRS advised that the number of fishers present on each appointment be reduced if outdoor gathering limits were still in effect. FSRS staff wore masks during appointments, sanitized equipment between appointments and practiced social distancing. FSRS technicians agreed to not schedule appointments if they have experienced symptoms of the Covid-19 virus, including a cough, elevated temperature, or shortness of breath. FSRS technicians scheduled covid-19 tests once per week to verify that they had not contracted the virus asymptomatically. In addition, FSRS technicians verified by phone 24 hours before the appointment, that the fisher attending the scheduled appointment had not experienced symptoms of Covid-19. Similarly, if a v-notching appointment is scheduled at a processing plant, FSRS technicians verified by phone 24 hours before the appointment that the processing plant staff had not experienced symptoms of Covid-19. In 2021, fishers had the option for lobster to be v-notching on shore by FSRS technicians, and to take the lobster to release by themselves without technicians present.

In 2022, FSRS technicians wore masks when indoors or on smaller vessels while practicing social distancing. FSRS technicians did not schedule appointments if they were experiencing covid symptoms. FSRS technicians rescheduled appointments for fishers experiencing covid-19 symptoms.

APPENDIX D: Field Technician Reports

2023 Technician Reports

Technician 1:

The word to hold over the entire project this year is: communication. I don't mean this as a point for improvement. I found this year's contract ran incredibly smooth and it was all due to how we kept in contact with all parties involved. Communication was the driving force behind making this year one for the books.

Our days at Lobster World, Baker's, and other plants set us up for success by us planning with the folks onsite. We were able to get nearly 3x the amount of tagging done this year and have our appointments run in a much timelier manner because of how efficient those early starts were. I have a lot of respect for the plant workers and have no doubts in that the successes of this season were partly owed to their hard work/cooperation with us. Lorrie is also an absolute rockstar and we couldn't have done it without her helping hands. It would be criminal to not also point the spotlight on Jade as her incredible management of this project is what really kept this whole ship sailing. Both Jade and Lorrie are why this season was a success and, in my own opinion, why any wavering doubts on this practice are quickly abolished. They kept everything streamlined to make this a quick excursion for the harvesters as opposed to a burden at the end of the season that they dreaded. It made it into something fun and I saw that reflected in the overall mood at each appointment.

On the whole, this season was fantastic. We were tasked with the largest appointments, but it really didn't feel like there were proportional obstacles to overcome. Instead, it was quite the opposite. All the harvesters knew the drill and we got through them in an incredibly efficient manner. I would say 98% of them were painless. There are always a few bad eggs in any demographic, but even the more troubling appointments for us went by without major issues. The ones that did were easy enough to get through as we have refined our systems to prevent situations getting out of hand. At no point did I feel as though our safety was compromised nor did I ever truly feel unwelcome.

For the 98%/folks we had no issues with, everyone was an absolute delight. It's incredible to see what they make of this task. Some will bring their families out, others will have a grand celebration when we dock, and then there's folks who treat it like any other day because it's part of the job. There's a passion for preserving their domain that is unlike anything I have ever seen. They know the ramifications of overfishing and what happens in conservation efforts are not utilized. I love being part of this because the collective opinion is the same, but everyone has their own perspective to it and it's fascinating to see how they approach it. There's more

than a handful of groups who make a competition out of to see who can meet the 110 lbs with the fewest lobster. We've also seen harvesters and plant workers make a point to put lobsters of extraordinary sizes or shell colours aside for us because of the respect they have for the program (and because they're cool).

If I were to modify anything for next season, it would be to take the 2023 workplan and change the year to 2024. I'm sure there's a few little things to iron out, but I don't see any need to "fix what ain't broke". I genuinely did not see anything that required improvements from a fisheries technician perspective. While this wasn't my first season aiding the program and while I don't have many others to compare to, I can honestly say it was the best and that it was an honour to have been part of. It's a task that is rough on the body and can be mentally draining towards the end of the month, but there's no doubt in my mind that I would do it again next year because of how great of an experience the 2023 season was for me.

Technician 2:

This is my third season working with the FSRS and my second season of vnotching. Although I didn't participate in as much vnotching as I wanted to this season, it was still great to release over a thousand pounds of lobsters back to the sea. Putting back and marking these girls is the most rewarding part of the job and I'm always grateful to be a part of it.

It seems there were many interestingly coloured lobsters in this year's batch so that will be exciting to see if they are recaught in future. I also noticed a high number of seabirds in the area during this year's trips, quite a bit more than previous years in my opinion at least.

All the fishers I worked with were excellent and the lobsters provided were in general of very high quality. Many hands make light work when handling and notching lobsters and this year was no exception as the fishers usually wanted to help. Here's to many more years of the fishing industry and the lobsters!

Technician 3:

This year I had the opportunity to work with the Fisherman and Scientist Research Society (FSRS) as a Fisheries Technician. During the spring lobster season on the Eastern Shore, the FSRS was contracted by the Eastern Shore Fisherman's Protective Association to assist with general fishing data collection and with the V-notching program. This year was my first ever introduction to the V-notching program, and it was such a gratifying, and educational experience.

As a fisheries technician, I had to work closely with the local fishers and lobster plants for V-notching and can confidently say that it was such a welcoming and kind environment. Nearly everyone that I had the opportunity to meet with did their best to both make the appointment run smoothly and quickly. Some fishers kept the appointments running smoothly

by ensuring the lobsters were all organized and ready for me when I arrived, and by helping notch the tails, and un-band the lobsters once it was time to release them. The care that I witnessed the fishers take with these female lobsters was heartwarming. Despite it being a licensing condition to release 110lbs of healthy female lobsters, there was a general feeling of pride and contentment sense amongst the fishers during their appointments. There was such a sense of community between fishers during this time of the year, as they helped each other each finish their lobster season strong, and on a good note. Either by having extra lobster for other fishers on their appointment, or by providing help and guidance to some fishers who might be newer to the area and the program.

Generally speaking, this v-notching season was, for me anyways, a great experience. As with any large program, there was some stress associate with v-notching this season, but other members of the FSRS did everything in their power to take as much of it off of myself and the other technicians. However, there were some unavoidable situations I was faced with, either with some confusion on "what is an acceptable condition and size for a lobster to be released in", or just general unpleasantness. Some fishers, and plant workers were unaware of the fact that even a broken rostrum or missing leg could mean the difference in that lobster being releasable. Typically, there was replacements available however, some lobsters in a less than ideal condition had to be released. Additionally, as a woman in a science field, I am used to having to work in a historically male dominated industry, and unfortunately some of that followed me to the v-notching appointments. Largely in the form of inappropriate, and uncomfortable comments, made either directly to my face or loudly behind my back. Just as I was surprised by the kindness and pride on the wharf, I was also surprised by the opposite attitude held by others. Despite all the handful of negative experiences, they are outweighed by the pleasant ones.

Looking at the whole of the lobster season on the Eastern Shore, and the v-notching program overall I found it to be successful and a generally great experience. One that I am sure to look back on, for all the great people I had the chance to meet, interesting sights and places I got to see, and of course all the wonderfully unique lobsters I had the chance to see, and all those I got to release. I am truly grateful that I could be a part of this wonderful sustainability practice, and the time dedicated to its success by the fishers, and everyone behind the scenes.

Technician 4:

My first year working in the v-notching program with the FSRS has quickly come to an end. I was excited to have this work opportunity as I am doing a bachelor of science in marine biology at Dalhousie university, with a certificate in aquaculture. My experience in this field includes growing up around wharfs/the fishing scene, and working as a bander on a lobster fishing boat in Mira Bay, Cape Breton.

I found this program to be extremely valuable, as seeing the amount of female lobsters being returned to the ocean first hand was incredible. Witnessing this in person shows what a huge difference is being made. Returning large females, preferably with large claws and a feisty

attitude, is what is going to keep this fishery thriving. Nova Scotia has a long tradition of fishing, especially lobster fishing, and it is something I want to see continuing forever. Without conservation and regulation efforts such as this one, this traditional fishing program may no longer exist. From talking to multiple fishers, they have commented on how they notice the catch has been improving each year at a steady rate. Although some years may be better than others, it has been noticed that there is a gradual and consistent improvement.

One of my favorite parts of this job was meeting local fishers and hearing their stories. Some would tell me about wild fishing days, or overall how their catch has recently been. Meeting fishers that were passionate about this program was the best. It was inspiring to see fishers care so much about not only the conservation of lobsters, but also caring for them and teaching me ways we can treat them more carefully and decrease their stress as much as possible. The less stressed a lobster is, the higher quality the meat will be. Or in relation to this program, the less stressed a female lobster that is being returned to the ocean is, the better chance of survival it has once being returned to the water. Keeping lobsters in moving water, away from the sun and wind will keep them from experiencing stress and will also ensure they are feisty and ready to defend themselves when going back into the water.

Overall I had a great experience throughout the season and I met quite a few fishers who were passionate about this program. Fishers who were not enthusiastic about this program were still cooperative. I found the most difficult part of this job being finding the location of some of the remote wharfs. Up until my very last appointment at the end of the season I really had no problems with fishers. We had one fisher show signs of aggression, so the other technician and I decided to leave the appointment. It is unfortunate that the lobsters did not get released, but we make our safety top priority.

I am looking forward to going into next year's season with a lot more knowledge, experience and confidence. I look forward to continuing to build relationships with the FSRS team and local fishers!

2021 Technician Reports

Technician 1:

The Spring 2021 season was my second season implementing the ESFPA Research Strategy. After no field work in 2020, myself and the rest of the team were very excited to get back on the water and connect with those members of the community. I was saddened to hear that the Board had opted to not conduct the At-Sea Sample portion of the Research Strategy, however, it was very understandable. Fortunately, they opted to continue with the V-Notching portion.

This year, all appointments were conducted in the month of June, as opposed to having them spread out throughout the entire season. This caused some stress during the scheduling and assignment of appointments to each technician as there were often multiple appointments with many people in one day. There were also a few last-minute appointments which caused

some stress to try to coordinate. Ultimately, all appointments were completed, with some adjustments made to the time of the last-minute appointments.

Many licence holders expressed the difficulty in acquiring the correct size and quantity of female lobsters this season. This created stress for them, as well as for buyers and fish plants. The inability to collect all required lobsters caused delays in many appointments.

As always, mostly all fishers were excited to participate in the Research Strategy Program and contribute to the conservation of lobster in their area. Appointments always ran smoothly with lots of help loading the lobsters onto the boat and unbanding them after they were notched. It's always a pleasure working with these fishers and hearing about how their season went. I'm looking forward to next year!

Technician 2:

I had the great opportunity to work for the Fishermen and Research Society (FSRS) as a fisheries technician, contracted through the Eastern Shore Fisherman's Protective Associations (ESFPA) for the v-notching program. One of the major highlights of this job was the drive along the Eastern shore to the different v-notching appointments and being able to see and experience more of Nova Scotia and the lobster fishing communities.

My role as a fisheries technician was to first call and confirm appointments scheduled for v-notching and travel to various appointments along the Eastern Shore during the 9-week lobster season. Once I arrived at the appointment I would meet with fishermen and look over their lobsters to confirm that they were female, of good quality/health and have a carapace length greater than 110cm. I would also make sure that each fisherman would have the appropriate weight of lobsters corresponding with their license, commonly this would be 110lbs. Then the lobsters would be transported to the boat, where we would steam out of harbor to v-notch the lobsters and release them in the ocean.

I found most of the Fishermen to be very friendly and helpful at my appointments. Fishermen would help in different ways such as assisting with v-notching, helping remove bands, ensuring the vessel was easy to board, and carrying crates. I found that the easier and more enjoyable appointments I had were the ones with numerous people, because it provided more help. I was also surprised at the support many had for the v-notching program. Some fishermen would include extra lobsters to v-notch even if it went over their 110lbs, and some would insist on going far from the harbor as to provide the lobsters with a better chance of survival. Many even

brought children or family members v-notching and promoted v-notching as a method of conservation for future generations.

This year all the appointments were booked within the first three weeks of June. This caused for a very busy few weeks, a lot of driving and very long days. Most of the difficulties that arose during my job was mainly due to lack of communication and bookings. Some appointments were made a day before or even the last minute the day of. Many Fishermen this year struggled to get the required 110lbs of females to v-notch and had to reschedule their appointments last minute. As well, three different appointments stated they were not aware they needed a weigh slip and had no access to a scale to weigh their lobsters. These appointments happened to be all just one person appointments.

Overall, I really enjoyed the v-notching program and found this job it to be a great experience. I was interested to hear different opinions on the program and was surprised to hear a lot of positivity towards v-notching. I also loved working with the FSRS team appreciated all the commitment they put into the program this year.

Technician 3:

This was my first year working for the Eastern Shore Fisherman's Protective Association v-notching program and although the scheduling was complicated by covid, it was overall a positive season. Having moved to Nova Scotia recently, I could not imagine a better introduction to the communities of the Eastern Shore, the associated lobster fishery, or the people of the area than to have worked as a fisheries technician this summer. Returning the v-notched lobsters to the sea was one of the more rewarding experiences I've had in my several years as a field technician and I will surely look back fondly on my time spent on the water this summer.

The plants that we worked with this year were mostly Lobster World and Bakers Point although Ryers, Kaisers, Capital, LMF and others delivered lobsters to the wharfs for the fishermen on occasion. We only entered the first two plants due to covid restrictions but in general the quality of the lobster was good this year with only a few undersized or injured/dead lobsters being rejected. We consistently heard that it was difficult to get the large females required for the program, but it seems everyone was able to get them in the end and several very large unique lobsters (one green and peach coloured one was dubbed Lucile by the Baker's Point plant) were released as well.

In general, the fishermen I met were some of the friendliest and most helpful people around, although I certainly would not describe everyone in this manner. Despite most participants believing that the program has improved the fishery, some were quite vocal about their

opposition to releasing lobsters which can make for tense conversations. Furthermore, some fisherman could be rude and outright disrespectful at times although this was an uncommon experience. Some were also difficult to get a hold of with several people outright ignoring our calls although this could be explained by my out of province phone number.

I feel strongly that the continued work of the FSRS and other similar organizations plays a valuable role in not only lobster conservation, but in keeping the lifestyle of these communities alive amidst ever changing environmental conditions. Having a proper bridge between scientists, policy makers and fisherman will be key to meeting the needs of the coming decades for all groups involved and the FSRS's commitment to working with, not against, local communities is a strong testament to this ideology.

Technician 4:

After a year of work from home, we welcomed the opportunity to get back in the field and back on the water with many of our favourite fishers on the Eastern Shore. It was great to see so many familiar faces and hear how the pandemic affected their lives and the fishery.

This year, we heard from many of the fishers that it was difficult to obtain the required large female lobsters. The fishers and plant managers credited this to changing bottom temperatures, and the high price early in the season which encouraged them to sell as run (without sorting by size) early in the season. There was also confusion about how the program would be implemented due to the lack of technician presence in 2020 due to covid-19 travel restrictions. As a culmination of these factors, all of the v-notching appointments were booked in the last two weeks of the fishing season. I was amazed that we were able to fit all the fishers in, largely due to our technicians going above and beyond to accommodate long days and last minute changes in appointment bookings.

We were once again greeted with kindness and cooperation by the vast majority of fishers participating in the conservation program. One way to improve reception of the program would be to conduct a review of the program results in comparison with catch rates, or size distribution data. Several fishers also suggested studying the change in size of maturity, as they have observed many small lobsters spawning in recent years. Fishers expressing interest in conservation, asking questions and bringing their children aboard for the v-notching appointments to show them what they are doing for the future of their fishery, are reminders of why I love what I do. Fishers are stewards of the resource they share, and it is rewarding to help them implement their conservation strategy.

2019 Technician Reports

Technician 1:

This was my first year working with the Fishermen and Scientists Research Society (FSRS) to implement the Eastern Shore Fisherman's Protective Associations (ESFPA) v-notching program. As a whole, conducting the v-notch appointments with fishermen was a positive experience. The majority of appointments were made enjoyable and effortless by cooperative fishermen and plant workers.

I visited Lobster World to select female lobster for several appointments. The plant staff were exceptionally friendly and accommodating. They provided plenty of large females to fill crates for v-notch appointments. While I did not work directly with Bakers, Kaiser or Abriels Fisheries, lobster that had been held at these locations satisfied the requirements of the v-notch program. Sometimes, fishermen held their own lobster for appointments. I verified that all lobster provided were above 110mm in carapace length and in good condition. Almost all fishermen were present for their appointments, and when they were unable to attend, they sent someone to be present to weigh their lobster and sign their confirmation notice. For example: I was sorry to hear of the passing of one of the captains, whose daughter-in-law attended the v-notching appointment in his place.

With the exception of a few ports, all fishermen who participated in the v-notch appointments welcomed me and the other technicians onto their wharfs and vessels. Many of the fishers who participated were very invested in the sustainability of their fishery, and knowledgeable about the benefits of the v-notching program. On appointments with fishers who were relatively new to the fishery, the fishermen were interested in learning more about reproduction in lobster. When conducting appointments with older fishermen, they boasted that they always v-notch berried females and re-notch previously v-notched females at sea to enhance the effects of the program. Notably, on one appointment, fishermen competed to provide the largest females. Onboard the vessels, fishermen were always willing to help remove the bands from and release the lobster. Many fishers were eager to steam out to locations they believed the female lobster would thrive and reproduce. Others contributed additional lobster to the v-notch program, going above and beyond what is expected in the program.

Unfortunately, I experienced some challenges on several appointments this year. On one appointment, the participants insisted that the lobster are always released from the wharf. This group also assured me that there was extra lobster available should any need to be replaced; however, when asked there were no replacements available. As such, several damaged lobsters were released on this appointment and lobster were released off the wharf.

I also attended what was arguably the least pleasant appointment of the season. The fishermen on this appointment were not unkind or aggressive, and there were no issues with the quality of the females provided. Only two of the six fishers scheduled for the appointment were present, but this was not the issue as lobster were provided for them. Likewise, the fishermen on this appointment had chosen three locations where they wished to release the v-notched females and were supportive of the v-notch program. Although the participants technically complied with the conditions of the v-notch program, they were extremely unprofessional. Their behaviour has been relayed to the ESFPA and should be addressed prior to the next v-notching season. Regrettably, the fishermen on this particular appointment were extremely intoxicated. Several made inappropriate comments throughout the trip about me as a woman. Furthermore, the trip to release the lobster took 2.5 hours due to unnecessary detours. They hauled and reset traps and collected a friend who had run out of gas in his dinghy. This made it impossible to arrive on time for our next appointment, where we were greeted by understandably frustrated fishermen.

Luckily, the uncomfortable appointments were the minority. I cannot express how much I appreciate the cooperation of license holders, deck hands, truck drivers, and plant staff involved in the v-notching program. I extend additional gratitude and commendation to the fishers who go above and beyond in their support of the program. Finally, I would like to acknowledge the wives of the fishermen. Some of the captains' wives provided detailed directions to appointments over the phone. Others joined us on appointments to release the v-notched females. My admiration for these women grows each time we meet.

Technician 2:

I am so grateful I was able to spend the season working with FSRS, lobster fishermen and local fish plants (including Lobster World and Bakers Point) on the Eastern Shore. Overall, it was a great experience. I learned so much from the fishermen, and all of the staff at the plants were beyond friendly and helpful. For the most part, everyone was very excited about the v-notch program, some even carried their own v-notcher, which made the trips all the more enjoyable.

The lobsters were either at one of the plants or at the wharf prior to each appointment. Most fishermen and/or fish plants made sure to provide very healthy and large female lobsters to optimize reproduction potential, which only benefits the entire industry. There were occasionally a couple undersized, damaged, culls, and male lobsters present in the crates, but these lobsters were replaced before loading the crates onto the boat to release. When releasing, most fishermen were extremely helpful with assisting to v-notch, unbanding and releasing the lobsters, making the entire process quick and efficient.

I really praise Eastern Shore fishermen for taking the initiative to have such great conservation practices with the hope that more LFA's within Nova Scotia will eventually see the benefits of the program and adopt their own conservation measures to ensure the future of this industry. I am so thankful for the opportunity to work with the FSRS team, Eastern Shore Fishermen, and the plants. Prior to working with them I had experience working with lobsters in a plant and laboratory setting, so I am very happy to be able to now have the experience working through the entire chain of the lobster industry and have gained even more respect for the fishermen and how hard they work.

Technician 3:

I joined the Fishermen and Scientists Research Society in the spring of 2019, so this was my first v-notching season with the Eastern Shore Fisherman's Protective Association. I only attended v-notching appointments when the technicians and research assistants needed help, but the few appointments that I did attend were a positive experience.

The plants that I worked with included Lobster World Inc. and Baker's Point Fisheries. Overall, the plants provided large, healthy females and supplied replacements for the few males, damaged females, and dead lobsters that we found while measuring and weighing. The staff at both plants were helpful and friendly, but the staff at Baker's Point Fisheries were slightly less accessible than the ones at Lobster World Inc. As a general note for most of my appointments, several fishermen and myself had observed a noticeable number of soft females.

All fishermen and fishermen representatives, minus one individual, arrived early or on time for their v-notching appointments. The majority of the fishermen were helpful during the weighing and measuring process. Additionally, most participants were happy to release the lobsters from their vessels rather than at the wharf. We only released lobsters from the wharf at one appointment in order to avoid creating tension with the appointment holder, who had been in an altercation with a colleague the previous week. When on the vessels, the fishermen helped speed the releasing process up by helping de-band the lobsters. When asked about the program, all the participants that I spoke to were proud to be part of the v-notching conservation program, and some mentioned that they put fresh v-notches into previously v-notched females to encourage their growth.

All in all, I had a great experience v-notching with the Eastern Shore Fisherman's Protective Area. I felt welcomed by the fishermen when I told them that I'm new to the industry, and it was clear to me that the fishermen are proud of what they do and that they are proud to be

part of the v-notching program. I am appreciative for all the help the fishermen, wives, deck hands, truck drivers, and plant workers provided us prior to and during the appointments.

Technician 4:

I began working for the FSRS late last year, so this was my first year participating in the v-notching program. I am extremely grateful for the opportunity to work with fishermen, buyers, and plant workers through the ESFPA. Overall, it was a fantastic experience. I truly enjoyed meeting everyone and exploring the Eastern Shore.

During my appointments, one thing that helped the appointments run smoothly was the fishermen being organized and present at the wharf upon the arrival of the technicians. It was helpful when it was clear who's boat, we would be using for the release. Another point that may aid in the success of the appointments would be for the FSRS to have their own scale to bring to appointments in cases where the truck was unable to wait for technicians to arrive to ensure the correct weight for release.

I'm continuously impressed with the Eastern Shores' dedication to the conservation and preservation of their waters. While the release of lobsters is counterintuitive to many fishermen, it was obvious that they understand and respect the program and are willing to participate. It was a great experience to be able to speak with fishermen, their wives, buyers, plant workers, and ESFPA staff to gain a better understanding of the industry.

Technician 5:

This Lobster season (2019) was the first year that I have done any kind of fisheries work. From April until June, I worked closely with fishermen all along the Eastern Shore, Some I only met once and others I would see regularly, but one thing they all had in common is they welcomed me on their boat as if I've been fishing with them for years. Contacting fishermen was never an issue this year, I would always call early and then give some buffer time in case one was not able to pick up a call, but most called back or picked up the second time around and gave proper instructions and meeting times. There was one appointment I could not confirm or get directions to the wharf with the number given to me, in this case another fisherman on the appointment was contacted for the information and the problem was resolved.

My appointments went exceptionally well, in most cases the fishermen were at the wharf upon my arrival and ready to go. A lot of the lobsters released were put aside by

the fishermen themselves and weighed at the wharf with a personal scale to show the weight (which was then verified by me), other times the lobsters were weighed on a truck owned by a plant, or I was shown a weigh slip. The quality of the lobsters released were good and healthy, I came across two or three dead lobsters, but they were always replaced quickly with back-ups, the fishermen did not get upset or aggravated when being notified a lobster wasn't able to be v-notched and we quickly moved on with the appointment.

While out on the water, the captain usually had a few spots he wanted them to be dropped off which led to a larger area of dispersed female lobsters, this is something I enjoyed seeing because it shows that the fishermen are involved and thinking about the fishing seasons to come and what the program is doing for them. Once releasing began the deckhands normally took the bands off while I did the actual V-notching, on average an appointment would only last for about a half hour to forty minutes.

I encountered a mix of attitudes toward the V-Notching program, for the most part the Fishermen were all supportive and liked to see the effort being done to keep the fishery sustainable, only a few were disappointed with the process, but it was never more than a quick remark or small joke. The behaviour while on the boat itself was kept professional, there were a few cases where some of the people on the boat may have been intoxicated or high. This personally never bothered me, however, a future technician or colleague may not be comfortable with this behaviour.

There was one incident where a captain kept us out for far too long because he hauled and relocated the trap, and then went on to tow his friend in a pleasure craft who ran out of gas this led to me and my colleague to be late for the next appointment, where we got told off without being given a chance to explain ourselves. I think fishermen should be aware that we are doing a couple of these appointments a day and to expect some delays.

Overall, the 2019 V-notching season was a positive experience for me. It's always nice to meet in the middle with fishermen and talk about science and culture, the people I've met have taught me lots about the lobster fishery which will hopefully help both of us in the future. Seeing everyone work together and get the job done is always a reward, I always made sure to personally thank everyone involved and was also thanked in return. Hopefully the support for the V-notching Program continues to grow in order to keep the fishery thriving.

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