

Green Crab Control Management Trapping and Population Prevalence, Abundance Survey in St Mary's Bay, Newfoundland and Labrador

(Riverhead, Mall Bay, St. Joseph's Beach, Mt. Carmel, and Mitchell's Brook, Holyrood Pond, Cootes Pond, and Colinet)

AQUATIC CONSERVATION INITIATIVE



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Section 2 – Performance Confirmation

Activity 1: Green Crab Removal from St. Mary's Bay area

Part A: Report: Summary of findings

European Green Crab Catch Summary

In the fiscal year of 2023-2024 Northeast Avalon ACAP worked in the St. Mary's Bay area to remove the invasive European Green Crab from coastal waters. The purpose of this work was to continue to remove Green Crab from the area in an effort to suppress the population and thereby assist in safeguarding eelgrass coastal habitat. In 2022, DFO preliminary AIS funding supported baseline studies to be conducted in the St. Mary's Bay area to monitor and remove green crab populations. The field team continued to remove green crab from field sites in the 2023-2024 fiscal year, and expanded our bait and capture efforts into new field sites in the St. Mary's Bay study area. Trapping efforts in both years are discussed to demonstrate trapping efforts and differentiate between previous and new trapping field sites. The field team collected data of European Green Crab removal counts, green crab sex distribution, and bycatch.

Based on the efforts of European Green Crab removal from St. Mary's Bay area in the fiscal year of 2023-2024, Northeast Avalon ACAP set 384 Fukui traps and removed 3,200 European Green Crab from coastal habitats in Mitchell's Brook, Riverhead, Mall Bay, Colinet, St. Joseph's, Cootes Pond, Mount Carmel, and Holyrood Pond. As shown in Table 2, the European Green Crab population in the St. Mary's Bay is male dominant based on field technician findings. Green Crab population counts as shown in Table 2 indicate that the Riverhead field site was the most successful in the greatest removal of European Green Crab. As shown in Table 2, the field sites with the highest catch per trap effort were Riverhead (12.55), Mitchell's Brook (12.58), and Mount Carmel (15.2). Based on these findings, efforts to trap Green Crab at the Riverhead, Mitchell's Brook, and Mount Carmel field sites should be prioritized at these locations in future years for Green Crab population management.

As shown in Table 1 and Table 2, in 2023 with increased trapping efforts and trapping site locations Northeast Avalon ACAP successfully removed more green crab from the St. Mary's Bay study area than the previous 2022 field season. Field crews included five new trapping sites in Mitchell's Brook, Colinet, St. Joseph's, Mount Carmel, and Holyrood Pond in the St. Mary's Bay study area. At all new trapping sites, field crews were successful in trapping green crab with highest catch rates in Mount Carmel, Mitchell's Brook and Riverhead. This excludes the Holyrood Pond site where green crab were absent. At the Riverhead field site field crews saw a reduction in catch rate from the 2022 field season indicating that trapping efforts could be reducing the population of green crab at the Riverhead trapping site. However, as shown in Table 2, the Riverhead field site had one of the higher rates of catch per unit of effort and should still be included in future trapping efforts to continue to reduce the population of green crab at this trapping site.

Bycatch Summary

During Northeast Avalon ACAP's efforts of European Green Crab removal from St. Mary's Bay area in 2023, bycatch found in Fukui Traps were documented. As shown in Table 3, five species of bycatch were found in the traps by field technicians including rock crab (*Cancer irroratus*), American eel (*Anguilla*

rostrata), sculpin (*Myoxocephalus* spp.), Cunner (*Tautoglabrus adspersus*), and Winter Flounder (*Pseudopleuronectes americanus*). At Mall Bay, St. Joseph's, Mitchell's Brook, and Cootes Pond (oceanside) field sites, Rock crab were found in high numbers as shown in Table 3 and it is possible that Mall Bay, St. Joseph's, Mitchell's Brook, and Cootes Pond are valuable habitats for rock crabs. Despite continued high trap efforts at the Riverhead fieldsite, rock crab bycatch reduced substantially from the previous year in 2022. The reduction of rock crab bycatch at the Riverhead fieldsite could indicate reduction in Rock crab population in coastal habitat at the Riverhead fieldsite. To ensure successful rock crab populations in both Mall Bay, St. Joseph's, Mitchell's Brook, and Riverhead, efforts to continue to remove the invasive green crab from these field sites could help minimize competition for habitat and prey for the native rock crab species. As shown in Table 3, an American eel was caught as bycatch at the Riverhead field site. American eel is known to be an indicator species, and given the presence of American eel in the Riverhead waters, the coastal habitat of Riverhead is likely ecologically significant habitat and should be continued to be monitored for invasive species to mitigate threats to ecosystem health. An increase of cunner bycatch was documented in 2023 green crab trapping efforts as shown in Table 4. Cunnners were caught as bycatch at the St. Joseph's fieldsite as the site is adjacent to a community wharf and breakwater which offer cunner habitat.

Table 1. Summary log of European green crab catch fiscal year 2022-2023 St. Mary's Bay, Newfoundland and Labrador

Location	Total Male	Total Female	Total Green Crab	Total Traps Set	Total Catch / Trap Effort
Riverhead	1922	250	2172	111	19.57
Mall Bay	192	39	231	20	11.55
Cootes Pond	24	11	35	4	8.75
All Locations	2138	300	2438	135	

Table 2. Summary log of European green crab catch fiscal year 2023-2024 St. Mary's Bay, Newfoundland and Labrador

Location	Total Male	Total Female	Total Green Crab	Total Traps Set	Total Catch / Trap Effort
Mitchell's Brook	581	287	868	69	12.58
Riverhead	773	231	1004	80	12.55
Mall Bay	129	6	135	24	5.63
Colinet	50	46	96	20	3.43
St. Joseph's	474	247	721	112	6.44
Cootes Pond	54	18	72	39	1.67
Mount Carmel	175	129	304	8	15.2
Holyrood Pond	0	0	0	8	0
All Locations	2236	964	3200	384	

Table 4. Summary log of European green crab by-catch fiscal year 2023-2024 St. Mary's Bay, Newfoundland and Labrador

Location	Rock Crab	Cunner	Sculpin	Flounder	American Eel
Mitchell's Brook	23	0	1	0	0
Riverhead	1	0	2	0	1
Mall Bay	174	0	0	0	0
Colinet	0	0	1	3	0
St. Joseph's	28	15	4	0	0
Cootes Pond	47	0	0	0	0
Mount Carmel	3	0	0	0	0
Holyrood Pond	0	0	0	0	0
All Locations	276	15	8	3	1

Activity 2: Outreach Focusing on Green crab work occurring in St. Mary's Bay

Part A: Outreach overview, social media, licence applications, and pictures

Outreach Overview

To further prevent the spread of invasive Green Crab in Newfoundland's coastal waters, and educate the public during this project, Northeast Avalon ACAP completed several community outreach events at field sites. Northeast Avalon ACAP engaged in small-scale public outreach which included chatting about the invasive Green Crab while approached by locals during fieldwork and delivering information pamphlets to the local post office in Mt. Carmel to be distributed in mailboxes. When discussing Green Crab with locals our team shared what an invasive species is, why the Green Crab are an invasive species, and how Green Crab negatively impacts the coastal ecosystems. Finally, we encouraged members of the public to apply for the green crab Control License program and shared application information to the public. Green Crab Control Licence applications were distributed to the public, however some members of the public declined licenses as there were no compensation for trapping green crab. To increase awareness and outreach on the invasive green crab, outreach efforts shifted to school field trip events.




During the Fiscal Year of 2023-2024, Northeast Avalon ACAP hosted and organized two main outreach events. Our first outreach event invited undergraduate biology and ocean sciences students from Memorial University to assist in the removal of Green Crab through green crab trapping at the St.

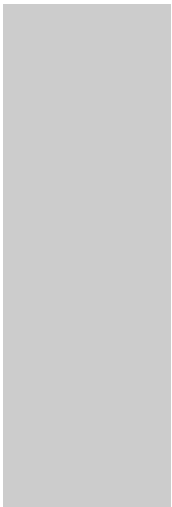
Joseph's field site in the St. Mary's Bay area. During this event, Northeast Avalon ACAP educated the students on how to identify the European Green Crab, how to sex Green Crab, why the Green Crab is an invasive species in Newfoundland, how Green Crab negatively impact Newfoundland coastal ecosystems, and what is currently being done in the province to mitigate the threats of aquatic invasive species. The undergraduate students were also shown how to set and bait Green Crab Fukui traps. Our team also discussed what bycatch is and how we appropriately manage bycatch in Fukui traps to ensure Green Crab Traps are not negatively impacting native species. In this discussion, our team showed how to distinguish native rock crab from green crab, and identified several other common bycatch species including native cunners and sculpin. In total 16 students were present at the event and we gave students information pamphlets on Green Crab provided by the Department of Fisheries and Oceans Canada as outreach materials.

The second outreach event invited grade 7-12 students from the local school, St. Catherine's Academy to assist in the removal of Green Crab through green crab trapping at the St. Joseph's field site in the St. Mary's Bay area. During this event Northeast Avalon ACAP educated the students on how to identify the European Green Crab, how to sex Green Crab, why the Green Crab is an invasive species in Newfoundland, how Green Crab negatively impact Newfoundland coastal ecosystems, and what is currently being done in the province to mitigate the threats of aquatic invasive species. The students were shown how to set and bait Green Crab Fukui traps. Our team also discussed what bycatch is and how we appropriately manage bycatch in Fukui traps to ensure Green Crab Traps are not negatively impacting native species. In this discussion, our team showed how to distinguish native rock crab from green crab, and identified several other common bycatch species including native cunners and sculpin. Following the trapping, our team did a round of Green Crab trivia based on the information shared during the event. As a prize, students were rewarded with Aquatic Invasive Species identification booklets and all students were given Green Crab Information pamphlets. All prizes were documents provided to Northeast Avalon ACAP through the Department of Fisheries and Oceans Canada as outreach materials. In total, fifteen students and four school staff members were present at the event.

Social Media

Table 5. Social Media posts on the invasive European Green Crab work carried out by Northeast Avalon ACAP staff members and volunteers

Date	Photos	Caption	Link
November 28, 2023		<p>"Last week we invited science students from St. Catherine's Academy from grades 7-12 out to one of our habitat restoration field sites in the St. Joseph's area. It was a chilly November day, but it didn't stop the eager students from hauling up 98 invasive European Green Crab, including 35 females and 63 males. This field trip tied in well with the student's current curriculum of invasive species and given that many of the students are already involved in the local fishery through their families!</p> <p>We had so much fun with the students and we are excited to come back for future field trips next season! Special thanks to St. Catherine's Academy and their teachers Scott, Chris, our bus driver Albert, and any support staff who made this outing for the kids possible! Thank you to the @fisheriesoceanscan for providing us with info pamphlets to hand out to the students."</p>	https://www.instagram.com/p/C0MrJd3uyO9/?utm_source=ig_web_copy_link
November 28, 2023		<p>November 28, 2023</p> <p>"We had the wonderful opportunity to take @memorialuniversity undergraduate students on a field trip to St. Joseph's back in October. They got to learn more about the impacts of the invasive European green crab and to do some hands-on fieldwork! We thank them for their enthusiasm and help during the wet weather!</p> <p>With their help we removed 95 green crab (12 female, 83 male)!"</p> <p>#dfo #invasivespecies #europeangreencrab #eelgrass #habitatrestoration #newfoundland #mun</p>	https://www.instagram.com/p/C0Mz-0Mz-OdxaOI/?utm_source=ig_web_copy_link
December 8, 2023		<p>December 8, 2023</p> <p>"Well, that's a wrap on green crab trapping for 2023! We completed our last trapping of green crabs back in late November with snow and ice present! ❄️🧊</p> <p>This year we set 352 traps and removed 2823 green crabs from the St. Mary's Bay area between July and November. Our biggest catch was 72 crabs from a</p>	https://www.instagram.com/p/C0mQt0NODd5/?utm_source=ig_web_copy_link



single trap we set in Riverhead in October for 24-hours.

Out of the 2823 crabs we removed 722 females and 2101 males. Female green crabs have the potential to spawn 185,000 eggs 1-2 times a year. If we do the math, we stopped between 13,357,000 - 26,714,000 future invasive green crabs - not so bad eh?"

[#greencrab](#) [#eelgrass](#) [#invasivespecies](#) [#newfoundland](#) [#dfo](#) [#marinebiology](#)

Note: Counts for social media posts were preliminary, and final counts were completed later which found a discrepancy to the final catch count.

License Applications

In all interactions with the public, we informed members of the public about the Department of Fisheries and Oceans Green Crab trapping licenses. In total 5 license applications were distributed to community members in the area. We did not follow up with members of the public if they completed the license application.

Information Distributed to the general public and frequently asked questions and responses

In all interactions with the public, Northeast Avalon field crews discussed the importance of monitoring aquatic invasive species with a focus on European Green Crab. In green crab conversations, field crew staff explained how and when green crab arrived to the island of Newfoundland, how they negatively

impact coastal ecosystems, and how they can negatively impact local food and traditional fisheries such as cod and lobster fisheries. If communications happened during trapping, the field crew showed members of the public identifying features of the green crab and discussed how green crab appear different from the native rock crab species.

In response, the public were keen to learn more or talk about their experience with green crab and the condition of coastal environments in their community. Some members of the public shared information of substrate change since their childhood, explaining there used to be more eelgrass in the bay and now there is much less eelgrass cover. Other members of the public shared they have observed alive green crab on grass lawns at night or in the early morning. In general, the public were eager to learn more about the removal of green crab from St. Mary's Bay and were glad that work was being completed to remove the invasive species.