

Evaluating the Sustainability of Dalhousie University's Seafood Purchasing Practices

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Abstract

Unsustainable fishing is a serious concern worldwide. One would expect universities, especially those with environmental programs, to set a good example by using sustainable seafood in residence cafeterias. In this project exploratory and descriptive research, face-to-face interviews, document analysis and direct measurements were all used in determining the environmental, social and economic implications of Dalhousie's seafood purchasing choices (Atchison & Palys, 2003; Creswell, 2003). With the seafood purchasing records obtained from Aramark, the SeaChoice seafood guide and advice from the Ecology Action Center, it was made possible to determine that Dalhousie's current seafood practices are not sustainable. Four seafood species provided at Dalhousie residences are classified as best choice species, listed as green, ten seafood species were determined to be species of concern, listed as yellow and three are classified as species to avoid, listed as red (SeaChoice, 2010). It is important to note that over 80% of the total mass of seafood purchased is Haddock and Atlantic salmon, both found in the species to avoid category. It has been recommended that Dalhousie should work in collaboration with SeaChoice and the Ecology Action Center and to publicly commit to eliminating one red and then yellow listed species per term, to eventually eliminating all red species and half of the yellow species (Ecology Action Center, 2010). As Dalhousie decreases its consumption of unsustainable seafood and increases its support for sustainably caught seafood it will show everyone affiliated with the university that change towards sustainability is possible.

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1.0 Introduction

1.1 Statement of Problem

Unsustainable fisheries have led to massive environmental devastation such as habitat destruction and extensive by catch kill. Supporting chronic industrial fishing will only lead to further devastation and extinction of ocean species locally and eventually globally.

1.2 Background Information

The seafood economy is essential to global trade, supporting businesses and livelihoods worldwide (Marine Stewardship Council, 2010). Regardless, the majority of fisheries today are unsustainable and poorly managed (Seachoice, 2010). Many fish stocks are in such serious decline as a result of overfishing that the cost of finding the fish exceeds the profit gained from the catch. More seriously, it can lead to extinction of the stock locally or even globally. (Myers and Worm, 2005) As the world's population increases and the uncertainties of climate change continue to grow around us, the need for sustainable fisheries is crucial (Marine Stewardship Council, 2010).

According to the Department of Fisheries and Oceans Canada, sustainable fisheries means “that harvesting and farming of fish stocks are done in a manner that meets the needs of the present without compromising the ability of future generations to meet their own needs. This includes taking steps to ensure the conservation of target fish species and the ecosystem in which they live. Sustainability also means that when decisions are taken to allow fishing and aquaculture activities, they will factor social and economic considerations as well as environmental effects” (Fisheries and Oceans Canada, 2009). In order to place our fisheries on a

path towards sustainability, examination of direct consequences of overfishing resulting in depletion and exploitation of aquatic species must be examined.

Developing and implementing sustainable fisheries will require collaboration from governments, industries, retailers, and individuals to take responsibility for changing our approaches towards seafood (Seachoice, 2010). At the grassroots level consumer power has the potential of strengthening the voice of conservation organizations when they advocate for changes to fisheries management to government and industry (Seachoice, 2010). However, it is often difficult for consumers to access and choose sustainable seafood products which include reliable and accurate seafood labels which include where or how a fish was caught (Ecology Action Centre, 2010). Labelling of sustainable seafood products must become more reliable, creditable, and accessible to the general public in order to promote change and make a conscious consumer decision. Some organizations have become leaders in this area, but the demand for sustainable fishery products needs to increase in order to fully promote sustainability.

The marine stewardship council (MSC) is one of the leaders today in labelling sustainable fisheries. The MSC has developed standards for sustainable fishing using a credible, independent, third-party assessment process (Marine Stewardship Council, 2010). These standards have three overarching principles that every fishery must prove it meets in order to be credited a sustainable fisheries. The three overarching principles are further supported by 23 detailed criteria. The three main principles are as follows; 1) proof of sustainable fish stocks, 2) minimizing environmental impact, and 3) effective management. There are currently 63 fisheries around the world that are certified sustainable fisheries according to the MSC standards (Marine Stewardship Council, 2010). Another mechanism that is used across Canada is the Seachoice guideline to sustainable seafood choices. Seachoice was created in the fall of 2006, with

collaboration from the David Suzuki Foundation (DSF), Canadian Parks and Wilderness (CPAWS), Sierra Club BC, and Halifax's own Ecology Action Center (Ecology Action Centre, 2010). Seachoice is Canada's sustainable seafood program, educating consumers and ensuring that Canada's sustainably caught seafood is identified and available to a range of markets (Ecology Action Centre, 2010). This guide indicates which choices are of best choice, some concern, and choices to avoid based upon what species it is, if its farmed or wild, the origin of the seafood, and the methods used for farming or catching that species (See Appendix B) (Seachoice, 2010).

The solutions and methodologies for labelling and certifying sustainable fisheries are within reach as seen by the MSC and Seachoice. However, they are not prominent enough within our society. In order to promote sustainability and prepare for the future we must begin at the grassroots level, by educating consumers about their choices and demanding for sustainable fisheries products that are reliable based on ecological, social, and economic components.

Dalhousie University received an A letter grade in 2010 within the food and recycling component of the College of Sustainability report card (Sustainable Endowments Institute, 2009). This component of the report card examines dining services policies for responsible food procurement, as well as schools' waste management practices (Sustainable Endowments Institute, 2009). Points are given based on the quantity and availability of organic and sustainably produced food, as well as locally grown food, taking into account geographic region (Sustainable Endowments Institute, 2009). Within this component only one question is based upon whether or not the seafood purchased for campus meets Monterey Bay Aquarium Seafood watch or Marine Stewardship Council standards. Aramark clearly states that they purchase

seafood by using Sea Choice guidelines. Aramark failed to provide the percentage of sustainable seafood provided to campus as well as Dalhousie's seafood policy.

In 2008, Aramark made a commitment to help preserve the world's oceans and fisheries through a partnership with Monterey Bay Aquarium's Seafood Watch program within the United States (Aramark, 2009). As part of the new partnership, Aramark has made a commitment to shift its seafood purchases in the U.S. toward sustainable sources over the next ten years (Aramark, 2009). This partnership empowers seafood consumers and businesses to make choices for healthy oceans (Aramark, 2009). In doing so, the program works to transform seafood markets in ways that create incentives for sustainable fishing and aquaculture practices (Aramark, 2009). This policy has not been implemented in Canada however.

1.3 Overview of the Research Problem

This research project addressed the issue of seafood purchasing practices in food services located at Dalhousie University residence on Studley Campus. Unsustainable fishing practices have led to extensive environmental, social, and economic problems on various levels (Worm et al. 2009). The majority of fisheries today are unsustainable and poorly managed, which have led to 80% of the world's fish stocks being fully exploited, over exploited or collapsed (Mora et al. 2009). A conundrum exists that more than 120 million people are entirely or partially dependent on fish for their source of income and/or protein (Seachoice, 2010); further depletion of seafood stocks world-wide would be devastating for a large portion of the human population. Unsustainable fishing practices such as blast fishing, cyanide fishing, clam dredging, bottom trawling, long-lining, and open-net cage aquaculture have also led to massive habitat destruction and extensive by catch kill (Seachoice, 2010). It is evident that without drastic

change towards a sustainable fisheries framework policy the environmental, social, and economic consequences of current fishing practices will continue to increase at an alarming rate.

1.4 A Coherent Argument

Universities can help encourage sustainable fishing practices by purchasing sustainable seafood products for their food service outlets and demanding that food suppliers for campus operate within sustainable seafood guidelines. This study identified some of the environmental impacts of the present seafood purchasing practices within food services at Dalhousie University residence on Studley Campus. Dalhousie's current seafood policy was also assessed based upon SeaChoice seafood guidelines. This information will allow for increased awareness, and possible suggestions as to what the cost and opportunities will be to adhere to a sustainable seafood policy.

It is the goal of this research project to provide the Dalhousie community with a greater understanding of Dalhousie's seafood purchasing choices and their environmental, social, and economic implications, whether or not these decisions are contributing to our goal of being a leader in sustainability, and what more sustainable alternatives are available and feasible for Dalhousie University to consider for implementation.

Sustainability and greening the campus is a common overlying goal found throughout Dalhousie University. This is evident as Dalhousie has signed three international sustainability declarations, has various student run groups addressing sustainability such as SustainDal, and has a sustainability office (Sustainable Endowments Institute, 2009). Dalhousie has already shown its' leadership in food services by having all dining facilities tray-less, running composting programs throughout the campus, and devoting 40% of its annual food budget towards

purchasing local foods (Sustainable Endowments Institute, 2009). However, the topic of sustainable seafood purchasing is not focused on within dining facilities. Further changes need to be made where there is evidence of unsustainable practices if Dalhousie is committed to becoming a leader in sustainability. In doing so Dalhousie would set a positive example for other universities and its surrounding community to follow

2.0 Methods

2.1 Project Design

The design of this study mainly used exploratory research. Exploratory research “aims to gain familiarity with or to achieve new insights into a phenomenon, often in order to formulate a more precise research question or to develop a hypothesis” (Atchison & Palys, 2003: 39). This method was used in order to become more familiar with Dalhousie’s current seafood purchasing policy and practices as well researching the various food suppliers whom supply Dalhousie with seafood. Descriptive research was also used within this research. Descriptive research “aims to accurately portray the characteristics of a particular individual, situation, group, sample, or population, and/or to describe processes that operate within a particular milieu” (Atchison & Palys, 2003: 40). This method of research was used in order to obtain weights purchased, types of seafood products purchased, origin of species, and method of harvest for the products supplied to the residence cafeteria’s

2.2 Research Tools Used

Throughout this research three different research tools were used which include; face to face interview, document analysis, and direct measurements. The information gathered can contribute to improving the current seafood purchasing policy at Dalhousie. A priori and a

posterior knowledge was used when analyzing all of the data, which will be collected using document analysis, face-to-face interviews, and direct measurement (Creswell, 2003). Research using qualitative and quantitative methods, lead to informative knowledge, which was used to evaluate the present seafood purchasing policy and its' environmental implications at Dalhousie University.

2.3 Procedure

Document analysis was a tool of great importance when researching the sustainability of seafood purchasing at Dalhousie to enable reliability and validity (Creswell, 2003). Various scholarly journals and articles assessing environmental impacts of seafood purchasing practices were researched as background information for assessing Dalhousie's seafood purchasing practices. The environmental effects which this research project focused on were gear use, origin, quantity, and type of species. As well as if species are wild or farmed. These environmental aspects of sustainable and unsustainable fishing practices are the focus of this research as these aspects are what Sea Choice bases their guidelines upon. Due to the exceptionally high levels of sustainability present in the University of British Columbia's and the University of Calgary's seafood purchasing practices, these universities were researched as to provide a comparison and example when evaluating Dalhousie's own purchasing practices. This information was accessed through online databases.

Food purchasing records from the past year was obtained from Aramark. These records helped form baseline data to be assessed. The records obtained contained weight and type of species being purchased and offered at Dalhousie residence cafeterias. Further research was then completed in order to gain familiarity as to the origin of the species and what methods were used for their harvest. This information was obtained from Premium Seafood, whom supplies

Aramark. Evaluation of the degree of sustainability of the seafood products being purchased was then assessed based upon SeaChoice guidelines. Seachoice guidelines can be found in Appendix A.

Face to face interviews was the final method of data collection that was used in this research project. Two students conducted a face to face interview with Rob Johnson from the Ecology Action Centre (EAC), who is the SeaChoice Atlantic Canada Coordinator. This interview provided an added depth to the research with the respondent sharing his wealth of knowledge and opinion on the subject. This interview was essential as the Ecology Action Centre focuses on environmental research and raising awareness for many sustainable issues, including sustainable seafood. The purpose of this interview was to receive recommendations for sustainable seafood purchasing options within Nova Scotia as well as to gain insight into the Sea Choice guidelines which was produced by the Ecology Action Centre in collaboration with other Canadian conservation groups. Gaining insight into SeaChoice was essential as to determine the significant environmental implications unsustainable fishing causes.

2.4 Reliability and Validity

Reliability is the consistency or stability of a measure or test from one use to the next. It is the extent to which the sampling was free of random error and the extent to which findings can be replicated by another researcher (Atchison & Palys. 2003). By using the method of a face to face interview within the research allowed for providing reliable data as a result of the dependable test questions that could be easily reproduced by a predecessor or anyone looking to imitate the interview (Atchison & Palys. 2003). Interview questions are

provided in Appendix B. Consent forms and thank you letters can also be found in Appendix C and Appendix D.

Validity is the ability to measure what a test or instrument is supposed to measure in the research. The validity of our results proved to be instrumental in the findings of our research. The research proved its validity by staying clear of systematic errors. This was due to analyzing our results based upon the SeaChoice guidelines as a comparison tool which is already an established document. Using various research methods also helped to ensure validity, reliability, and triangulation of our results (Creswell, 2003).

2.5 Limitations and Delimitations

Due to time constraints the scope of this project was limited to three of Dalhousie's Studley campus' residence buildings; Howe Hall, Sherriff Hall, and Risley. As these three residences are the larger residence building on campus, they have provided insight into the overall seafood practices on campus. The information obtained from these residences have therefore given a well rounded representation which can be used to compare to other residences at the University, since they are all supplied by Aramark. Another limitation posed upon the group was inaccessibility to specific data from Aramark, such as; weights of a specific seafood products being served at the residence cafeterias. The final limit encountered by the research group was that Premium Seafood was unable to give entire information regarding origin and method of harvest for all of the seafood species which they provide to Aramark.

A delimitation that the group placed upon itself was narrowing its focus to environmental implications of unsustainable fishing. This was due to time constraints. Social and economic implications of unsustainable fisheries could have been further assessed and incorporated into the

research if more time was permitted. However, only assessing environmental implications of unsustainable fishing was adequate since the methodology of the SeaChoice rankings are based on environmental implications such as; methods of harvest and percentage of by catch.

3.0 Results

3.1 Quantitative Results

Seafood purchased by Dalhousie from Aramark from February 2009 to February 2010 for Howe Hall, Sherriff Hall, and Risley are displayed in Table 1. SeaChoice seafood guide rankings per species are also found in Table 1 along with their approximate weight (lbs) and percentage of total seafood weight. This table indicates that the majority of seafood species bought by Dalhousie are listed as yellow species, which are species of concern. Four of the seafood species provided at these residences are classified as green species i.e. best choice species and three of the seafood products are classified as red listed species i.e. species to avoid. Haddock, a red listed species, is the most popular seafood choice at Dalhousie, comprising roughly 64% (by weight) of total Seafood purchased. The second and third most popular seafood choices are Atlantic salmon and cod making up roughly 9% and 6% of total seafood in Studley residences respectively. It should be noted that Atlantic salmon and cod have been listed as red and yellow species respectively by SeaChoice's seafood guide.

Table 1: Quantities of all seafood species purchased by Dalhousie University between February of 2009 and February of 2010, given in both pounds and percentage of total seafood weight. Each species is listed in a color corresponding to their rating in SeaChoices seafood guide. (Green=best choice, yellow=some concern, red=avoid)

Seafood Species	Approx. Weight (lbs)	% Totals
Mussels	96	0.171525
Coldwater Shrimp	1069	1.91
Tilapia	2450	4.377455
Mackerel	100	0.178672
White Shrimp	220	0.393078
Rock Crab	16.25	0.029034
Clam	12	0.021441
Lobster	27	0.048241
Squid	330	0.589616
Bluefish	150	0.268007
Pacific Salmon	100	0.178672
Cod	3634	6.492926
Scallops	1325	2.367399
Alaskan Pollock	3500	6.253506
Haddock	37735	67.42173
Atlantic Salmon	5144.35	9.191493
Black Tiger Shrimp	60	0.107203
Total	55968.6	100

Fishing methods used in harvesting each species as well as their location at which each species was caught is shown in Table 2. A large fraction of seafood purchased by Dalhousie originates from overseas and only a small fraction is caught locally (Table 2). Wide arrays of fishing methods are employed for harvesting of these species which include trawling, farming, long lining, trapping and a variety of wild caught/farmed systems (Table 2).

Table 2: Seafood species purchased by and offered through Dalhousie University Studley residences, along with the location at which they were caught and the methods of harvest for each particular species.

Seafood Species	Geographic Origin	Fishing Method
Mussels	Worldwide	Farmed/trawl/suspended culture
Coldwater Shrimp	India/Asia/Canada	Farmed/wild caught
Tilapia	Asia	Farmed
Mackerel	No information	No information
White Shrimp	India/Asia/Canada	Farmed/open systems
Rock Crab	No information	No information
Clam	Nova Scotia	Wild caught
Lobster	Atlantic Canada	Trap
Squid	No information	No information
Bluefish	Atlantic U.S.	Gill nets/drift gillnet/otter trawl
Pacific Salmon	Canadian Pacific	Wild Caught
Cod	Canadian Pacific	Wild caught
Scallops	Nova Scotia/China	Farmed/dredged
Alaskan Pollock	Alaska	Mid-water trawl
Haddock	Nova Scotia/China	Logline/trawl
Atlantic Salmon	Canadian Pacific	Wild caught
Black Tiger Shrimp	India/Asia/Canada	Farmed

Figure 1 illustrates the percent totals (by weight) of seafood species purchased by and offered through Dalhousie University Studley residences. This figure, along with figure 2, reiterates the relative proportions of the seafood species offered at Dalhousie along with their respective SeaChoice ratings. Together these figures show that the three most popular species offered at Dalhousie are haddock (a red listed species), Atlantic salmon (a red listed species) and cod (a yellow listed species). A large majority of the seafood offered at Dalhousie are listed as

red species, with only smaller fractions classified as yellow or green listed species.

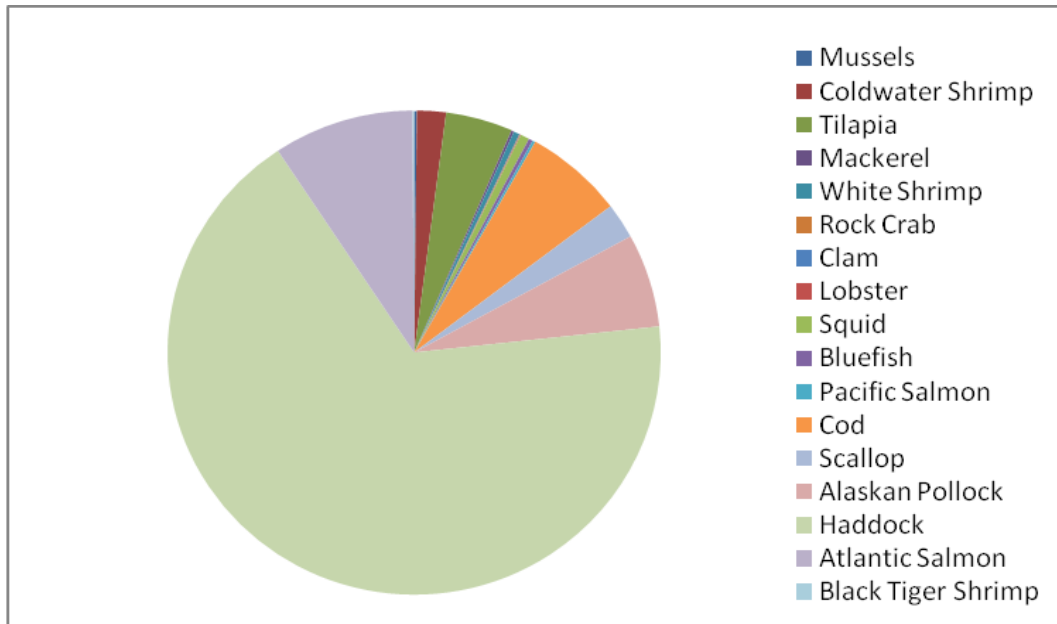


Figure 1: Percentage totals (by weight) of seafood species being purchased by and provided through Dalhousie University Study residences.

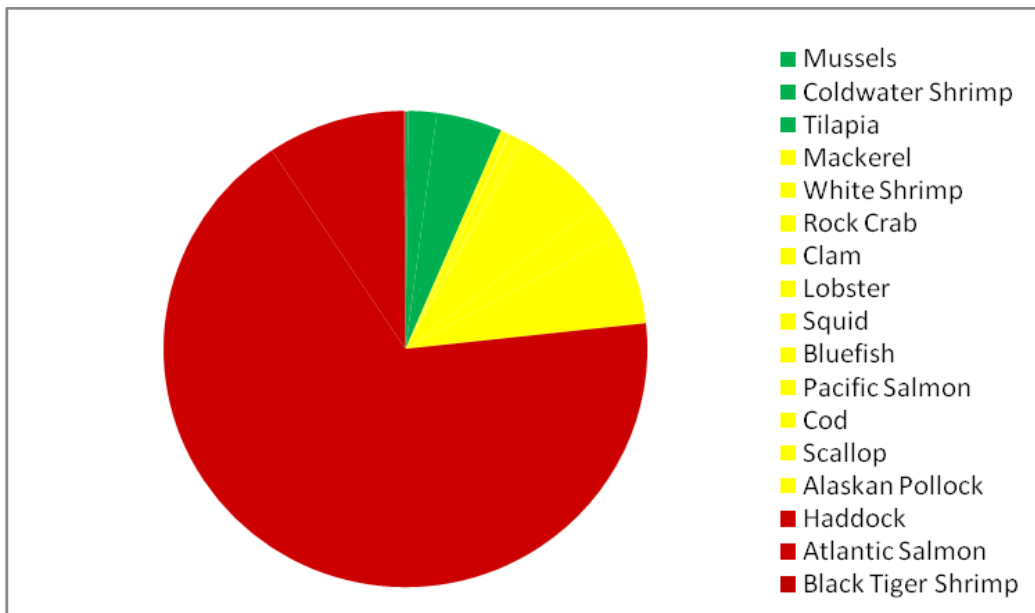


Figure 2: Seafood species being purchased by Dalhousie categorized as percentage totals according to their SeaChoice seafood guide rating

Figure 3 lists the species offered through Dalhousie University Studley residences and the quantities (in lbs) in which they were purchased between February 2009-2010. Once again, this table illustrates that the large majority of seafood offered at Dalhousie is haddock, along with significant amounts of cod, Alaskan Pollock and Atlantic salmon

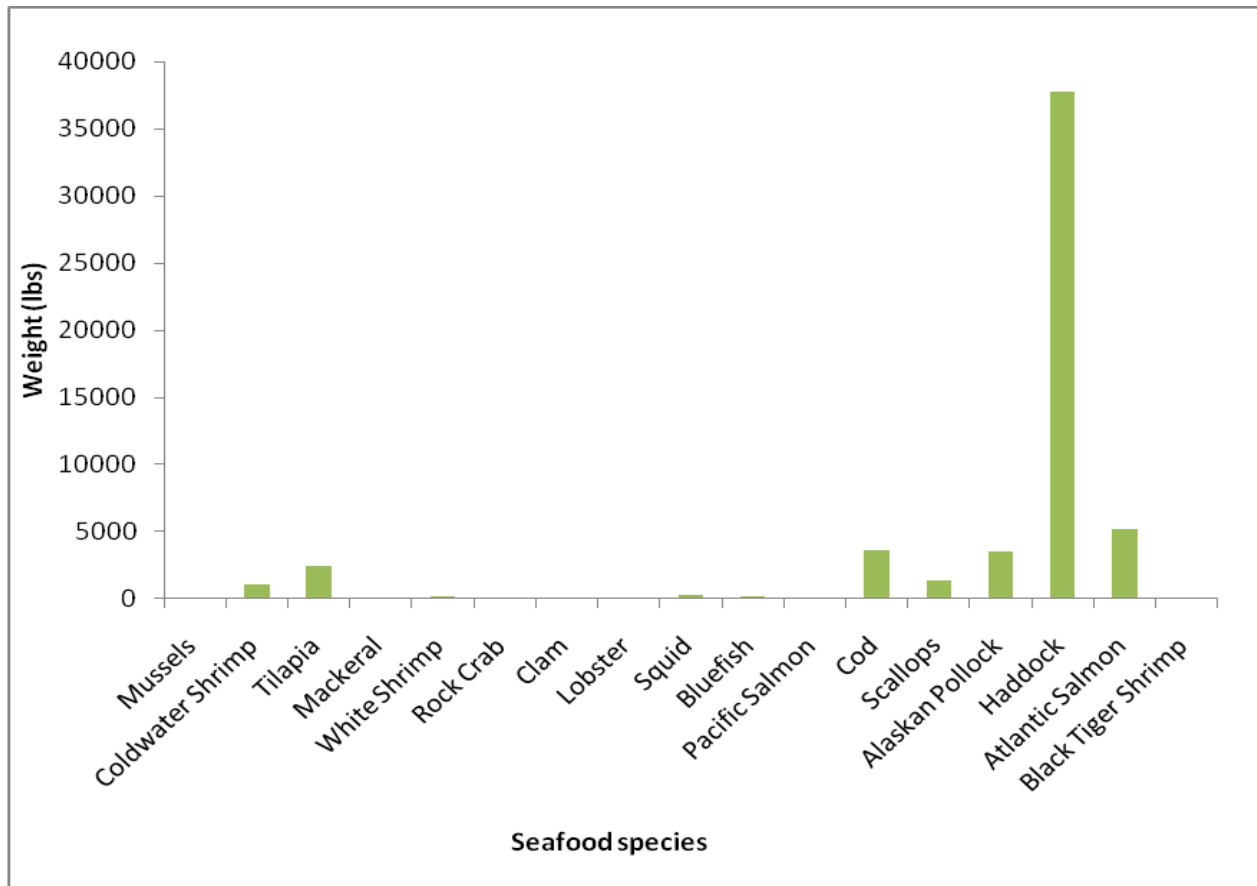


Figure 3: Seafood species being purchased by and offered through Dalhousie University Studley residences along with their corresponding weight (lbs)

3.2 Qualitative Results – Summary of Interview with Rob Johnson from the EAC

Face-to- face interview with Rob Johnson, Ecology Action Centre- Seachoice Atlantic Coordinator. Rob Johnson’s recommendations for implementing a sustainable seafood policy at Dalhousie:

- the best way to initiate a sustainable seafood purchasing policy at Dalhousie is to work with a program like Seachoice to draft a policy;
- first step is to commit publically to a policy because transparency is a key thing;
- necessary to get the sustainability office on board and develop clear goals, such as removing red listed species from the menus offered at Dalhousie residence cafeterias.

By eliminating one or two red and yellow species each year would have a significant impact;

- eliminating the red or yellow species will not cause a huge negative economic impact and;
- if Dalhousie commits to a sustainable seafood policy, it would be an opportunity for leadership. Dalhousie is one of the most prestigious marine biology and marine conservation institutions in the county and a sustainable seafood policy would be an extension of what's a significant aspect of Dalhousie already.

The interview with Rob Johnson also led to gaining insight into SeaChoice, as to determine the methodology which are used for rankings as well as the significant environmental implications unsustainable fishing causes. The following main points derived from the interview regarding this issue are as follows:

- Monterey Bay Aquarium Seafood Watch methodology;
- different criteria between wild-caught and farmed seafood;
- aquaculture, we look at the marine resources, feed ratio which is primarily a consideration for fin fish that are having a diet of fish meal and fish oil. Risk of escapes, disease and parasite transfer, risk of pollution and the effectiveness of management are the five sustainable criteria for aquaculture.
- For wild-caught, inherent vulnerability of the stock, the abundance, the by-catch, habitat impacts and again the effectiveness of management.
- Each of these sustainability considerations is what determines the ranking and the rating on the Seachoice cards.

4.0 Discussion

The ultimate goal of this project was to examine the environmental implications of Dalhousie's current seafood purchasing practices and provide Dalhousie's policy makers with the means to make Dalhousie's seafood purchasing practices more sustainable. Records obtained of seafood purchased (in the past year) for three of Dalhousie's residence cafeterias from the residence food provider, Aramark and from Aramark's seafood supplier, Premium Seafoods were analyzed using SeaChoice guidelines.

Canada's ocean conservation alliance, SeaChoice, aims to help Canadian businesses and consumers make the most ocean-friendly seafood choices that will support the long-term health of marine ecosystems and coastal communities. The SeaChoice report card aided in the evaluation of Dalhousie's seafood choices using knowledge of species vulnerability and of the methods used. SeaChoice uses a methodology obtained from the Monterey Bay Aquarium's Seafood Watch program. There are separate criteria from wild-caught and farmed seafood. In farmed seafood, the use of marine resources is considered, i.e. the amount of wild fish which must be caught to feed those being farmed. Also, the risk of escape is identified, as escaped fish can cause biopollution and become invasive species. The risk and magnitude of disease and parasite transfer is also evaluated, as farmed fish often suffer from such afflictions being kept in small confined spaces. Disease travels easily within fish farms, and if it is not contained can spread to wild fish stocks where disease and parasite infection cannot be controlled or remedied. The amount of pollution that the farm creates is also taken in to account, as well as how effectively the aquaculture is managed and controlled. Wild-caught seafood is evaluated differently. The inherent vulnerability of the stock must be evaluated; fish species with low abundance, and slow reproductive rates are typically the most vulnerable, as they cannot regenerate their population quickly.

Analyses by SeaChoice guidelines of Dalhousie's purchasing practices concluded that the majority of the seafood served in Dalhousie residences are of high or moderate concern. This is due to the fact that species such as cod and haddock are usually caught via bottom trawling and cod is an endangered species therefore these red-listed (SeaChoice) species should be removed from Dalhousie's menus immediately. Other species on the menu such as salmon, white and black tiger shrimp, Pollock, bluefish, lobster, rock crab, etc. were rated yellow or red by SeaChoice and found to be either farmed or processed in another country leaving a large carbon footprint, or captured by unsustainable means. Having these species on the menu does not help Dalhousie achieve its goal of becoming a leader in

sustainability nor of initiating positive change.

Looking further into the origins of and the methods used to farm or capture these species, it was found that most are wild-caught by long-lining, bottom trawling, bottom gillnetting, dredging, or farmed and processed in other countries such as China, Chile, or India (Angela Boudreau, Premium SeaFoods). Farming and/or processing seafood in other countries makes for a large carbon footprint due to transportation needs. This makes purchasing from these countries unsustainable; hindering local prosperity, and perpetuating global atmospheric pollution. It is important to note that two of the most popular species purchased (over 80%) are listed as high risk species, which is Atlantic salmon and haddock.

Bottom trawling which is used for haddock, cod, and shrimp, is one of the most environmentally devastating methods of fishing. This technique destroys large portions of ocean floor including essential corals, and has a by catch rate of up to 15% of the total catch (Fuller, S. et al. 2008). Bottom gillnets and dredging are also commonly used for scallops, cod, halibut, and clams. These techniques are also environmentally devastating as they produce a significant amount of by-catch and adversely affect the natural structure of the ocean bottom which forms critical breeding and nursery habitats (Fuller, S. et al. 2008).

By-catch, the percentage of a catch which is not the target species, is another negative affect that result from unsustainable fishing. By-catch is often the result of non-specific fishing methods such as trawls, long-lines and seines. Victims of by-catch include cetaceans (whales and dolphins), sharks, sea birds, turtles and a plethora of invertebrates (Hall et al. 2000). It is estimated that globally commercial fisheries generate approximately 44 billion pounds of by-catch each year (Ovetz, 2006). Some methods of fishing, specifically bottom trawling, have resulted in huge areas of habitat destruction (e.g. deep sea coral) (Jones, 1992). The expansion of

aquaculture has also led to the common misconception that it is a sustainable practice. In fact, fish farms can cause many serious environmental problems. Smaller feed fish must be caught in large amounts which depletes the food source for wild predators (Goldburg et al. 2001).

Aquaculture can also create bio-pollution, which occurs when selectively bred and genetically altered fish escape pens and mix/compete with wild populations. Aquaculture also releases a large amount of fecal matter into the coastal environments and results in large areas of land being clear-cut in order to make space for the farms (Paez-Osuna, 1998). Fisheries have seldom been sustainable and have led to induced depletion to improved technology, geographic expansion, and exploitation of species lower in the food web (Pauly et al. 2002). Many factors must be taken into account when deciding whether it is appropriate to harvest from a particular stock, including the distribution, life span, population size and reproductive rate of the species. (Musick, 1999)

The environmental implications of chronic industrial unsustainable fisheries are devastating. Therefore changes must be made in regards of a creating a more sustainable fisheries policy at Dalhousie in order to lessen the effects and demand for unsustainable fisheries. Rob Johnson was able to provide a great deal of information, including suggestions for changes that the university could make to implement a sustainable seafood policy. Transparency and education was said to be of great importance as awareness of the effects of unsustainable fishing and criterion required for seafood to be considered sustainable will increase demand among students for sustainable seafood options. Insight was provided into the six steps towards a sustainable seafood policy (See Section 5.0 Conclusion and Recommendations), and how SeaChoice's standards have been established. He was also able to provide a list of sustainable seafood suppliers that could be put forward to Aramark as alternatives to their current supplier. For example, one suggested supplier was Sambro Fisheries, which supply hook and line haddock, Pollock, hake and lobster, as well as harpooned swordfish, mackerel and herring. As shown in Figure 1, the majority of fish

purchased at Dalhousie is haddock. Using a supplier such as Sambro which can supply haddock sustainably would make a significant difference. Rob also made some excellent points regarding Dalhousie's educational affiliation with the Marine Sciences; since it is a school with such a well known marine program, it is only right that it should provide only sustainable seafood choices.

Other universities within Canada have excelled and set a high standard for sustainable seafood purchasing policies. The University of Calgary has set the standard in Canada for sustainable seafood by providing the campus with 100% sustainable seafood products (Sustainable Endowments Institute, 2009). This has been made possible through their partnership with Ocean Wise. Ocean Wise assessments are based on recommendations and research by leading marine conservation organizations such as, Sea Choice Canada and Monterey Bay Aquarium's Seafood Watch program (Vancouver Aquarium, 2010). This seafood purchasing policy supports the health of the oceans by using set guidelines and informing customers of their choices (Vancouver Aquarium, 2010). The University of British Columbia has also partnered with Ocean Wise and as a result now provides their campus with 32% of seafood being sustainable (Sustainable Endowments Institute, 2009). These universities have set the standard within Canada and have shown that it is possible to provide campuses with sustainable seafood choices.

As an institution of higher education, Dalhousie has the ability to greatly influence the general population and to promote change within the industry. This study has highlighted an opportunity for Dalhousie University to help influence and develop improved sustainable seafood purchasing policy with the aid of the Ecology Action Centre and by using the guidelines provided by SeaChoice. By doing so Dalhousie would not only be contributing to their tradition of sustainable responsibility but would also be benefiting the campus community by engaging

students in analyzing global issues, inter connectivity, and responsibility. As quoted by Rob Johnson, “[Dalhousie] is one of the most prestigious marine biology, marine conservation learning institutions in the country. Commitment to sustainable seafood would be an extension of what is a significant aspect of Dalhousie already. It is the right thing to do” (Rob Johnson, SeaChoice Atlantic Coordinator).

5.0 Conclusion and Recommendations

The results of this research project have shown that unsustainable fishing practices have lead to extensive environmental problems. After researching and assessing Dalhousie’s current seafood policy based upon SeaChoice seafood guidelines, it has been concluded that sustainability is not an aspect of their current policy. This is due to the vast amount of red listed products coming from overseas and caught using unsustainable methods. Encouraging chronic industrial overfishing only leads to further damage of habitat destruction and extensive by catch kill. It has become evident throughout this research that Dalhousie’s seafood policy must change. Doing so will help achieve the crucial goal of preserving the health of ocean and freshwater ecosystems and ensuring a long-term seafood supply.

Based on the results of this research project five recommendations were developed as a means to aid in developing a sustainable seafood purchasing policy for Dalhousie’s residence cafeterias. The first recommendation is that Dalhousie University should take the step of making a public commitment to providing more sustainable seafood choices to their consumers. Secondly, the university must develop transparency within the seafood menu, therefore, allowing students to be aware of where the seafood originates and how it was caught. This recommendation would allow consumers to make sustainable informed choices. Dalhousie also has to publicly commit to eliminating at least one red or yellow species from the menu every

term until all red and at least half the yellow species are removed from the menus offered at Dalhousie residence cafeterias. This will aid in decreasing the demand for high risk species and therefore the use of the most environmentally destructive fishing methods. Fourthly, the removal of red and yellow listed species, such as cod and Atlantic salmon could be replaced by providing a larger variety of green listed species such as, arctic char or land based farmed rainbow trout. These species are caught using more sustainable practices which have a lesser effect on habitat destruction and percentage of by catch. Finally, in order to accomplish these recommendations and become a leader in sustainability, Dalhousie University needs to create a partnership with SeaChoice and the Ecology Action Centre as soon as possible. Achieving this recommendation will lead Dalhousie on the path towards implementing a sustainable seafood policy.

There is a huge potential for future research regarding seafood at Dalhousie University. Examples of future research which could be conducted by students include; assessing the feasibility of promoting reduced seafood consumption at Dalhousie's residence cafeterias, implementing sustainable seafood education and awareness at Dalhousie, and the economic and social impacts of sustainable seafood in Nova Scotia could also be further researched.

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Appendix A: Canada's Seafood Guide

Best Choice

Catfish (US) **farmed**
 Caviar/ Sturgeon **farmed**
 Clams **farmed**
 Cod: Pacific (US) **bottom longline, jig, pot**
 Crab: Dungeness
 Fish sticks: Pollock (AK)
 Haddock (Canada) **bottom longline**
 Hake: Pacific (Canada)
 Herring: Atlantic (US), Pacific (Canada)
 Imitation crab: Pollock (AK)
 Lobster: American (Atl. Canada)
 Lobster: Rock, Spiny (Aus., US, Western Baja)
 Mussels **farmed**
 Oysters **farmed**
 Pollock (AK)
 Sablefish (AK, BC)
 Sardine: Brisling, Sprats (US)
 Shrimp/ Prawn: Sidestripe, Spot (BC) **trap-caught**
 Swordfish (Atl. Canada) **harpoon** ◇
 Tilapia (US) **farmed**
 Trout: Rainbow **land-based farmed**
 *Tuna **troll-caught** ◇

Some Concerns

Catfish/ Tra/ Basa (Int'l) **farmed**
 Clams: Atlantic soft shell (Atl.), Geoduck (US Pac.) **wild**
 Cod: Pacific (Canada, US) **trawl**
 Crab: King, Snow (Canada, US)
 Haddock (US) **bottom longline**
 Halibut: Atlantic, Pacific (Canada) **bottom longline** ◇
 Lingcod ◇
 Lobster: American (US Atl.)
 Mahi mahi/ Dolphin/ Dorado
 Mussels **wild**
 Octopus (US)
 Oysters **wild** ⊖
 Sablefish (CA, OR, WA)
 Salmon: Pacific **wild
 Scallops: Sea (NE Atl. US)
 Shark (US Pac.) ◇
 Shrimp (Atl., Gulf of Mexico) **trawled**
 Sole (Pac.) ⊖
 Squid: Jumbo, Humboldt, Shortfin, Summer (Int'l)
 Swordfish (US Atl.) **pelagic longline** ◇
 Trout: Rainbow (Canada) **open-cage farmed**
 *Tuna (US) **pelagic longline** ◇

Avoid

Caviar/ Sturgeon (Int'l) **wild** ◇ ⊖
 Chilean seabass/ Patagonian toothfish ◇
 Clams (Atl.) **dredged**
 Cod: Atlantic
 Crab: King (Russia)
 Flounder/ Sole: (US Atl.), Arrowtooth (Canada) ⊖
 Grenadier
 Haddock **trawl**
 Halibut: Atlantic (US) **trawl** ◇
 Lobster: Spiny (Int'l except Aus. + US)
 Monkfish ◇
 Orange roughy ◇
 Rockfish/ Snapper **trawl** ◇
 Salmon: Atlantic, Chinook **farmed** ⊖
 Scallops: Sea (Canada, Mid-Atl. US)
 Shark (Atl., Int'l) ◇
 Shrimp/ Prawn: Tiger, White (Int'l)
 Swordfish (Canada, Med., SE Atl.) **pelagic longline** ◇
 Tilapia (China, Taiwan) **farmed**
 *Tuna (Pac. Int'l) **pelagic longline** ◇
 Tuna: Bluefin ◇

Alert Codes

Green = Best Choice. This species is currently fished/ harvested sustainably and represents a best choice. Enjoy, while supporting responsible fishing and coastal livelihoods.

Yellow = Some Concerns. Seafood that should be consumed infrequently, or when a green choice is not available. There are conservation concerns with the current populations or practices in this fishery.

Red = Avoid. Do not purchase these fish for now. They come from sources that have a combination of problems—habitat damage, discard of unwanted species, poor management, low populations, can be easily harmed by fishing or may be listed by governments as Endangered.

Health advisory. Regular consumption of one or more species in this listing poses a health threat from: ◇ mercury or from ⊖ PCB, dioxins or pesticides. For further information visit: www.seachoice.org

*The category "Tuna" includes Albacore, Bigeye, Skipjack and Yellowfin tunas, but not Bluefin. ** Check seasonal recommendations for salmon at www.seachoice.org Version: 04/2008
 Abbreviations: AK=Alaska, Atl.=Atlantic, Aus.=Australia, BC=British Columbia, CA=California, Int'l=International, NE=Northeast, Med.=Mediterranean, OR=Oregon, Pac.=Pacific, SE=Southeast, US=United States, WA=Washington.

Healthy Choices for Healthy Oceans

Your consumer power can help the health of our oceans. Many Canadians are eating seafood for its health benefits. By buying green-listed seafood you are supporting sustainable fishing that can be maintained for years to come.

But don't stop here! Share your seafood smarts—download copies of Canada's Seafood Guide for your friends and get action updates at www.seachoice.org

How To Use This Card

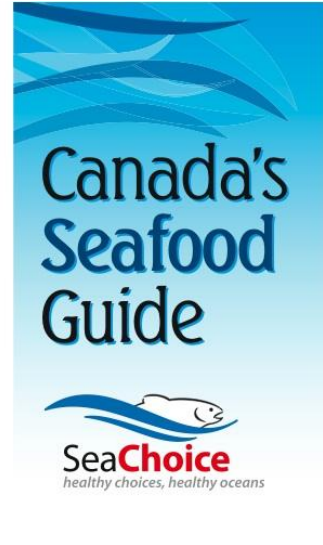
Keep this wallet card with you—it will help you make more sustainable seafood choices. Some seafoods are listed in more than one column: look for the bolded term that shows where it is from or how it was caught. When you shop and dine, always ask:

- What type of seafood is this?
- Where was it fished or farmed?
- How was it caught or farmed?

Then check the listings on the card and the explanation of our traffic-light colour codes. Seafood that could contain harmful levels of toxins is marked by the symbols: ◇ = mercury, and ⊖ = PCBs, dioxins and pesticides.

If the seafood doesn't appear here, look for it in our database at www.seachoice.org

SeaChoice is an initiative of Sustainable Seafood Canada:



Source: http://www.seachoice.org/files/pdf/SEACHOICE_alertcard09.pdf

Appendix B: Interview with Rob Johnson from the Ecology Action Centre.

1. How is the Ecology Action Center (EAC) involved in the movement towards sustainable seafood policies?

The EAC has seven different committees, and the Marine Issues committee is where I'm housed out of for the Seachoice program. It engages in a number of related aspects and sustainable fisheries work, policy, coastal community livelihoods and sustainable seafood primarily through the Seachoice program is really how the EAC is engaged in progressing sustainable seafood policies. With Seachoice it's a market based program, so it's about using the science based assessments for increased consumer demand and also what partnerships with businesses we should look at implementing a sustainable seafood policy. I guess it's a bit of an aside but the five groups within Seachoice are part *of a* larger umbrella group called the Conservation Alliance for Sustainable Seafood and so it's ten groups in the US that we partnered with as well. We've come together around a common vision for environmentally responsible seafood which is six steps that businesses can take. With a retailer or with a food service company like Aramark, these would be proposed as realistic steps for coming up with public sustainable seafood policy and then of course being transparent, educating (because you can't sell it if people don't know to buy it), promoting the good seafood options and removing the bad and then policy reform; using that to leverage more sustainable fisheries policy. It's really got to come from industry and from business as well from the conservation side of things.

2. What do you know about Dalhousie's seafood purchasing policy at this time?

Well, to the best of my knowledge, Dalhousie doesn't have a sustainable seafood policy. That's something that they could work together with a program like Seachoice to have a draft seafood policy that's totally customisable, that looks at what's important to them, what are solutions for them, and work together on that. I don't think they really have one currently, as far as I know.

3. How could Dalhousie's seafood purchasing policy be improved?

As far as their policy, I think coming out with a public policy, making a commitment publicly is the first important step and then you have to take some steps to back it up. I think a key thing there is transparency, where people can see and know what's available and how, then it allows tools like [Seachoice] to be more useful

4. What are the criteria used to determine what is sustainable and what is not?

The Seachoice program uses the Monterey Bay Aquarium Seafood Watch methodology. Its different criteria between wild-caught and farmed seafood. For aquaculture, we look at the marine

resources, so the feed ratio which is primarily a consideration for fin fish that are having a diet of fish meal and fish oil. Risk of escapes, disease and parasite transfer, risk of pollution and the effectiveness of management are the five sustainable criteria for aquaculture. For wild-caught, it's looking at the inherent vulnerability of the stock, the abundance, the by-catch, habitat impacts and again the effectiveness of management. Each of these sustainability considerations is what determines the ranking and the rating on the Seachoice cards.

Are there any considerations that Seachoice is not accounting for when determining what is sustainable and what is not?

Currently, anything outside of these five criteria wouldn't be factored in because it is a scientific process and so it's as rigorous and objective as possible from that aspect. Then we go through a peer review process and now a co-ranking session with other organisations as well just so we ensure alignment between our different programs. This way we're all on the latest and most substantiated science.

5. How can we effectively use Seachoice as a resource for developing a sustainable policy?

I think the values that Seachoice can bring are in the resources we provide. Educational materials; we've put together a resource guide that retailers of food service companies can use because it's about education as well. The people serving the food and buying it, anyone involved in the whole process need to be aware of why this choice is this way and what forms the basis of the rankings and what would be some of the concerns there so they can address them in their policy and also in their dealing with the students and staff. I think our connections with the other groups in the conservation alliance and the access to that document, the Common Vision, which outlines those six steps, means we have a lot of conservation expertise from the different groups but then experience beyond that in terms of retailer and food service engagement. It's really about leveraging that seeing where others have had success. We're partnered with Seacore seafood which is one of the biggest distributors in Canada which is based out of Toronto. They're profiling the green and yellow options that they already are providing but also starting now to look at some alternatives and how they can shift out and make some choices and they're actually seeing their business grow and benefit because of that.

6. Do you have any suggestions with regards to how we should approach our project?

Getting the sustainability office on board and having some clear goals like getting certain red listed items off. In many cases they're the low hanging food for some of these companies, they're the easy things, they're not big market dollars. They have a big impact if you pull red snapper and orange ruffly and shark, that's a good public face to it but without a huge economic loss or impact. Jeff Hutchins is currently advising Loblaws on their seafood policy and might be a good person to bring in. Since he's a professor at Dal, he can also help to sell it to senior administrators and leverage it that way.

7. **Are there any specific questions we should ask the suppliers (aside from the obvious; what species, fishing methods, quotas)?**

I don't think it's worth doing that yourself. We have established relationships with suppliers and it's really about finding out who supplies Aramark and in turn who they buy it from and that gives a leverage point to suggest and put forward sustainable options for changes.

8. **Do you have any suggestions of how we might convince Dalhousie policy makers to make a sustainable choice, even if it might come at a cost?**

I think, pointing to some of the market research about growing consumer consciousness and demand. McDonalds just came out with something today saying that sustainable seafood is going to become more on the radar of consumers and even their clients which aren't typically the demographic of sushi goers or sustainability. I think looking at examples like the COMPASS group, UBC sustainable seafood policy, McGill also has one. There's universities like Yale that have done a lot in terms of the local thing and community suppers and things to that take it a little bit outside of the food service component. It's the right thing to do and there are good examples of other food service providers, other universities and major retailers that are moving in this directions as well. It's an opportunity for leadership.

9. **Do you have any suggestions for suppliers that would be a good, sustainable submission to provide to Aramark?**

Provided in an additional email:

<http://www.thecoast.ca/halifax/how-to-get-sustainable-seafood/Content?oid=1102509#comments>

This article suggests the following suppliers:

- Fisherman's Market (607 Bedford Hwy, 443-3474):
(Farmed mussels, Chedabucto Bay Trap-caught Shrimp, Bottom hook and line haddock, Lobster, and *Seasonally*: Harpooned Swordfish, Mackerel, Herring, Rod-n-reel Tuna (not bluefin!))

- Mike's Fish Shop (Halifax Farmers' Market, 830-3474):
(Farmed mussels, Bottom hook and line haddock, Lobster, and *Seasonally*: Harpooned Swordfish, Mackerel, Herring, Rod-n-reel Tuna (not bluefin!))

- Home Grown Organics (6186 Allan, 492-1412):
(Hook and Line Haddock and Chedabucto Bay Trap-Caught Shrimp)

- Local Source Market (5783 Charles, 454-6014):
(Indian Point Mussels, and soon Chedabucto Bay Trap-Caught Shrimp)

- Pete's Frutique (1515 Dresden Row, 425-5700):
(Chedabucto Bay Trap-Caught Shrimp)

- Indian Point Mussels- low-density farmed mussels (available at the Halifax Farmer's Market & Local Source Market)
- Dave's Fresh Clams- delivers fresh clams weekly from Port Wade
- Shan Daph Oysters- low-density farmed oysters
- Sambro Fisheries: Bottom hook and line Haddock, Pollock, Hake, Lobster, and Seasonally: Harpooned Swordfish, Mackerel, Herring, Rod-n-reel Tuna (not bluefin!)
- Alyssa Foods: Bottom Hook and Line Haddock, Pollock, Hake (labeled as such, unlike others above)
- Sea Star Seafoods: Bottom Hook and Line Haddock, Pollock, Hake (soon to be labeled)

10. How would using a more sustainable supplier benefit the school and the community socially, economically and environmentally?

I think from the Dalhousie side of it, it's one of the most prestigious marine biology, marine conservation learning institutions in the country. I think it's an area of extending what the professors are already teaching and what's in core curriculum, what is leading science here. Kind of walking the talk a little bit in terms of practical aspects of the university. Commitment to sustainable seafood would be an extension of what's a significant aspect of Dalhousie already. It's a great pairing.

Appendix C: Consent Forms

To whom it may concern, of Aramark food distribution company,

We are conducting a research project in which we are trying to determine the level of sustainability of the seafood products offered on Dalhousie University campus. We will be using “Canada’s Seafood Guide” and the SeaChoice Database, provided on *SeaChoice.org* as guidelines when evaluating the sustainability of specific seafood choices offered here at Dalhousie. We will also be interviewing Halifax’s Ecology Action Center for their expertise in evaluating seafood sustainability. We would like to obtain records of all seafood products purchased by Dalhousie University from Aramark, made available in Dalhousie’s Studley campus residences. In obtaining these records we would like to gain insight into any efforts towards Seafood sustainability made by your selves. We would also like to use this information, possibly alongside information provided by Green Island Fisheries, to suggest possibly alternatives for more sustainable choices.

We would like to formally ask your permission for access to written records of all seafood sold to Dalhousie University by Aramark. We would greatly appreciate your help in our efforts to make Dalhousie a more sustainable University. By signing this form you agree to make your records available to our group and give us consent to use them for the purposes stated above.

Participant Signature: _____

Date: _____

Thank you so much in advance for your help.

Sincerely,

Christine Stortini (c.stortini@dal.ca)

Jeremy Corbin (jr430889@dal.ca)

Heather Grant (ht799295@dal.ca)

Gillian Fielding (gl648905@dal.ca)

Mary Chisholm (mr533565@dal.ca)

Vanessa Pook (vn467194@dal.ca)

Dear Robert Johnson,

We are conducting a research project in which we are trying to determine the level of sustainability of the seafood products offered on Dalhousie University campus. We will be using “Canada’s Seafood Guide” and the SeaChoice Database, provided on *SeaChoice.org* as guidelines when evaluating the sustainability of specific seafood choices offered here at Dalhousie. We will be obtaining records of all seafood products purchased by Dalhousie University from Aramark, made available in Dalhousie’s Studley campus residences. In obtaining these records we would like to gain insight into any efforts towards Seafood sustainability made by Aramark. We would also like to use this information, possibly alongside information (regarding techniques used to obtain the seafood) provided by Green Island Fisheries, to suggest possibly alternatives for more sustainable choices. We would greatly appreciate your help and expertise in evaluating the sustainability of Dalhousie’s seafood purchases, and developing ideas for more sustainable alternatives if needed.

By signing this form, you are giving your formal consent to participate in an interview/ discussion with one of our group members. We would greatly appreciate your guidance.

Participant Signature: _____

Date: _____

Thank you so much in advance for your help.

Sincerely,

Christine Stortini (c.stortini@dal.ca)

Jeremy Corbin (jr430889@dal.ca)

Heather Grant (ht799295@dal.ca)

Gillian Fielding (gl648905@dal.ca)

Mary Chisholm (mr533565@dal.ca)

Vanessa Pook (vn467194@dal.ca)

To whom it may concern, of Premium Seafoods,

We are conducting a research project in which we are trying to determine the level of sustainability of the seafood products offered on Dalhousie University campus. We will be using “Canada’s Seafood Guide” and the SeaChoice Database, provided on *SeaChoice.org* as guidelines when evaluating the sustainability of specific seafood choices offered here at Dalhousie. We will also be interviewing Halifax’s Ecology Action Center for their expertise in evaluating seafood sustainability. We would like to obtain records of all seafood products purchased by Dalhousie University from Aramark, made available in Dalhousie’s Studley campus residences. In obtaining these records we would like to gain insight into any efforts towards Seafood sustainability made by you and by Aramark. We would like to expand our knowledge on where these products are coming from and what methods are being used to obtain them/ fish them. We would also like to use this information to suggest possibly alternatives for more sustainable methods.

We would greatly appreciate your help in our efforts to gain a better understanding of Dalhousie's seafood purchasing practices. By signing this form, you are giving formal consent to participate in an interview with one of our group members.

Participant Signature: _____

Date: _____

Thank you so much in advance for your help.

Sincerely,

Christine Stortini (c.stortini@dal.ca)

Jeremy Corbin (jr430889@dal.ca)

Heather Grant (ht799295@dal.ca)

Gillian Fielding (gl648905@dal.ca)

Mary Chisholm (mr533565@dal.ca)

Vanessa Pook (vn467194@dal.ca)

Appendix D: Thank You Letter

To whom it may concern,

We would like to thank you sincerely for your time and energy, participating in an interview with us. Your knowledge has helped us gain a leap forward in our endeavours to make Dalhousie University a leader in sustainability. We appreciate you taking the time to share this knowledge with us and guide us toward a greater understanding of the economic, social and environmental aspects of Dalhousie's seafood purchasing practices. We will be using information and processes provided by you in combination with information and processes from other sources to develop a paper. In this paper, we will be suggesting possible alternatives or changes that could be made in order to make Dalhousie University's seafood purchasing practices more sustainable. Alternatives will be suggested where information suggests they should be.

If you would like to receive a copy of the final product, please do not hesitate to contact us. We would be more than happy to send a copy to you.

Once again, thank you so much for your help. Your knowledge and expertise are greatly appreciated and have made it possible for the project to be completed. Without your help we would not have been able to make these steps toward the betterment of our University community.

Sincerely,

Christine Stortini (c.stortini@dal.ca)

Jeremy Corbin (jr430889@dal.ca)

Heather Grant (ht799295@dal.ca)

Gillian Fielding (gl648905@dal.ca)

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