

March 10, 2017

Councillor Tony Mancini
Chair, Environment and Sustainability Standing Committee
Halifax Regional Municipality
Halifax, Nova Scotia

Dear Councillor Mancini:

The Master of Marine Management students in the Marine Affairs Program at Dalhousie University (<https://www.dal.ca/faculty/science/marine-affairs-program.html>) recently completed a project entitled "The Blue Urbanism Project: An Assessment of Macro Solid Pollution Around Halifax Harbour" as part of their field work requirements for one of their graduate level courses.

Macro solid marine pollution is a global problem that requires a localized approach in order to determine relevant and effective solutions. *The Blue Urbanism Project* was designed to bring awareness and help solve the problem of marine pollution within the Halifax Regional Municipality (HRM) by collecting evidence of the problem and presenting it in a publically accessible format that decision-makers and other stakeholders may find useful to inform decision making. The purpose of this project was to characterize the types and potential sources of marine macro solid pollution found around Halifax Harbour and analyze the external forces contributing to the problem. The outputs of the project are designed so as to provide data and recommendations on how this issue can be mitigated and to involve policy-makers and stakeholders in these solutions.

Given the nature of the project, which was undertaken in collaboration with Clean Nova Scotia, I am sure you would find the results of interest and as such, am writing to request the opportunity for our students present their findings to the Standing Committee on Environment and Sustainability.

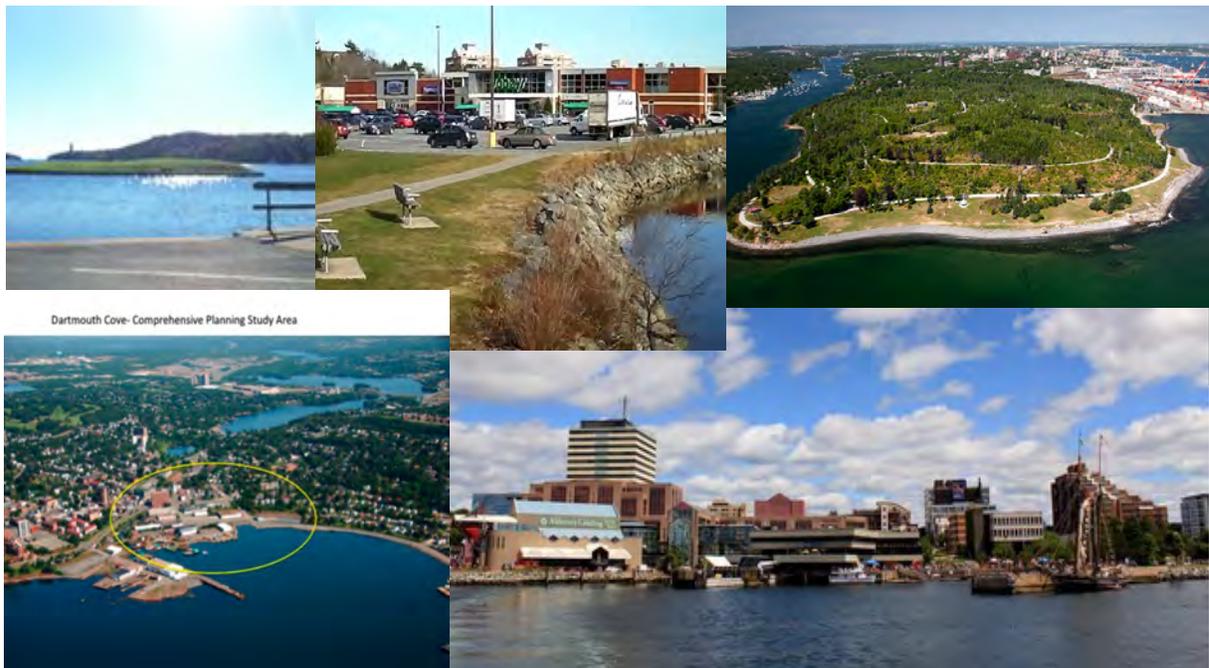
Please do not hesitate to contact me by email at lucia.fanning@dal.ca or by telephone at +1-902-494-8390 should you require any additional information regarding this request.

Sincerely,

ORIGINAL SIGNED

Lucia M. Fanning, PhD
Professor, Marine Affairs Program
<https://www.dal.ca/faculty/science/marine-affairs-program/faculty-staff/our-faculty/LuciaFanning.html>

The Blue Urbanism Project
An Assessment of Macro Solid Pollution Around
Halifax Harbour



**Report prepared by the Master of Marine Management class of 2016/17
(Marine Management MARA 5004, Fall 2016)**

For

Clean (Nova Scotia)

January 2017

Executive Summary

Introduction

Marine pollution has become a main topic of discussion within the environmental community. Of particular concern is that approximately 80% of it originates from sources on land and past studies past show that between 52% and 62% of the total litter in Halifax Harbour originates from recreation and land-based sources., which raises the question of whether current waste management systems are really doing their job. In light of this, the Marine Affairs Program at Dalhousie University has partnered with Clean Foundation to tackle the issue of macro solid marine pollution in Halifax Harbour through a graduate level project entitled *Blue Urbanism*.

Macro solid marine pollution is a global problem that requires a localized approach in order to determine relevant and effective solutions. *The Blue Urbanism Project* was designed to bring awareness and help solve the problem of marine pollution within the Halifax Regional Municipality (HRM) by collecting evidence of the problem and presenting it in a publically accessible format that Clean can present to decision-makers and other stakeholders. The purpose of this project is to characterize the types and potential sources of marine macro solid pollution found around Halifax Harbour and analyze the external forces contributing to the problem. The outputs of the project are designed so as to provide Clean Foundation with data and recommendations on how this issue can be mitigated and to involve policy-makers and stakeholders in these solutions.

Methodology

To gain an overall understanding of the situation of Halifax Harbour, five different coastal sites were assessed: Bedford Basin – Birch Cove Marine Area, Horseshoe Island Park on the Northwest Arm, Black Rock Beach in Point Pleasant Park, and Alderney Landing and Dartmouth Cove in Dartmouth. Each of these study sites was assigned to a group of four students who also focused on one of five sets of external forces that potentially could affect the issue of macro solid pollution around Halifax Harbour. These forces were categorized as: Political/legal, Economic, Socio-cultural, Technological, and Environmental factors. Linkages and synergies between these five external forces were taken into account by each of the groups in providing recommendations to address their findings.

This project was broken down into three parts: project management, applied geographic information system (GIS), and risk management. The initial project management phase was used to establish the project's structure, objective, and timeline to ensure that all relevant information is available and all stakeholders are considered at each step of the process. It also involved data collection and analysis of possible influences arising from each of the five aforementioned driving forces. The GIS module focused on communicating data effectively with the use of a publicly accessible story map. This component of the project was crucial in communicating the results yielded from our data collection and analysis. The risk section assessed the risks identified at each of the five study sites as well as the risks identified more broadly for Halifax Harbour, from the perspective of each group's set of assigned external driving forces.

Results

Each of the study site groups were required to complete two field visits to collect data concerning the types of material found at the sites. This collection of primary data complemented desk top research to provide a comprehensive report encompassing all factors that play a role in the issue of macro solid pollution around Halifax Harbour. Data analysis illustrated on the integrated map shows that the vast majority (~79%) of the pollution found in Halifax Harbour was land-based (Appendix 1). The story map also presented the project's purpose, the history of Halifax Harbour, the marine life that inhabits the Harbour, and the issue of marine pollution, calling for action from the public.

Group One's report (Appendix 2) focuses on the Bedford Basin – Birch Cove Marine Area, which is located on the property of China Town restaurant, and specifically on economic external forces.

Group Two's report (Appendix 3) focuses on Horseshoe Island Park on the Northwest Arm and specifically on environmental external forces.

Group Three's report (Appendix 4) focuses on Black Rock Beach in Point Pleasant Park and specifically on socio-cultural external forces.

Group Four's report (Appendix 5) focuses on Alderney Landing in Dartmouth and specifically on technological external forces.

Group Five's report (Appendix 6) focuses on Dartmouth Cove in Dartmouth and specifically on political/legal external forces.

Recommendations

Building on the knowledge acquired from implementing each of the three project modules (Project Management, Applied GIS and Risk Management), key recommendations were outlined and their feasibility discussed in each individual group's report (see Appendices 1 to 5). Proposed recommendations are divided into measures that can be more immediately addressed due to high feasibility, and more long-term measures that involve changing social attitudes around waste creation and waste management.

- *Use of Economic Instruments*

This recommendation involves the use of economic instruments, such as disincentivizing marine pollution originating from coastal development projects. This was founded on the basis that coastal development was identified as one of the sources of macro solid pollution in Halifax Harbour and was one of the risks addressed in the risk module. Another proposed economic instrument is the implementation of a tax on single-use plastics and styrofoam to reduce their demand.

- *Enhancing Public Awareness*

The results strongly suggest the need for public awareness campaigns to highlight the ecosystem services that the Halifax Harbour offers, and to shift public perception of the harbour towards one of health and beauty. A specific user group targeted for enhanced awareness by the Horseshoe Island Park Group is to expand the Clean Foundation's Ship-To-Shore program to recreational boaters who frequent the Northwest Arm. The Alderney Landing group highlighted the need to promoted increased sorted waste through new and more effective signage. This group also highlighted the opportunity

presented using information technology such as a geo-tagging app that could provide information to users on the nearest location of waste receptacles and the types of waste suitable for different forms of disposal. Increased sorted waste and cigarette disposal bins was marked as the top priority for this study site because it can be the most effective way in reducing marine pollution in Halifax Harbour and, has many synergies among the different external forces. Increasing sorted waste bins and cigarette disposals were also identified as improving public enjoyment, lessening pollution.

- *Engaging current and emerging key stakeholders, including private sector developers*
This recommendation was particularly relevant to those study sites where private sector developers and interests are key users of the areas, such as Bedford Basin – Birch Cove, Alderney Landing and Dartmouth Cove. In the case of Dartmouth Cove, given the recent residential and institutional developments taking place in the area, the need to encourage the current neighbouring stakeholders to engage with new and future stakeholders to mitigate future marine pollution was seen as a priority. Similarly, Horsehoe Island Park identified the need to actively engage the marina owners in the area.

- *Provision of additional waste receptacles and better infrastructure*
All of the groups noted the absence of an appropriate number of waste receptacles at the study sites and the need for receptacles to be more conveniently located. For the Black Rock Beach and Alderney Landing study sites, the need to address improper cigarette disposal through receptacles and signage that specifically target the current practices of cigarette users was the main recommendation identified. Additionally, the need to have more segregated receptacles in public spaces leading to both awareness raising and better waste management through sorting and reduction in garbage being taken to the land fill was evident from the results.

Conclusion

Moving forward, the project has provided the analysis of primary data that contributes to the issue of macro solid contamination around the Halifax Harbour at five key study sites. The results support earlier assumptions surrounding the issue as a problem and indicate that a number of recommendations can be implemented. These span the short to the long term and are diverse in both the breadth of stakeholders who can play a role in addressing this issue as well as the nature of the recommendations. By incorporating an analysis of risk and of the key external forces that negatively and/or positively influence the resolution of the problem, this project provides insights into the underlying causes and effects for macro solid contamination in Halifax Harbour, in addition to documenting the scale of the problem. Finally, by using GIS to create an integrated story map of the project's findings, the project provides the opportunity to provide a more comprehensive and visual understanding of macro solid marine pollution around Halifax Harbour. This will hopefully provide the Clean Foundation with the tools needed to continue to raise and enhance the awareness of this issue in the Halifax Regional Municipality (and beyond) and for key stakeholders to respond appropriately.

MARINE POLLUTION BACKGROUND

WHAT IS MARINE POLLUTION?

Marine pollution (also called marine debris) is, “[a]ny persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment...” The Atlantic region is highly dependent on the resources and ecosystem services provided by the ocean and has a vested interest in protecting and maintaining a healthy marine environment. Marine pollution poses a significant threat to our region’s social, economic, and natural capital by threatening water quality, habitat, commercial fish stocks, the safety of marine navigation, and the natural beauty and safety of our coastal communities.

SOURCES AND TYPES OF MARINE POLLUTION

While many people may initially think of marine pollution in terms of waste from marine industries like fishing or shipping, the most significant source of marine pollution in fact comes from mismanaged land-based waste that is washed into the oceans. Globally, 80% of the pollution spoiling our oceans comes from land-based waste, and 2016 research by students of the Marine Affairs Program at Dalhousie University confirmed that this is also the case in the Halifax Harbour.

Data collected by the Ocean Conservancy shows cigarette butts topping the top ten list of items recovered from shoreline clean-ups, with plastic goods making up 83% of the remainder of the list. This waste profile directly aligns with the composition of litter observed year after year in Clean’s province-wide litter clean-up program, the Great Nova Scotia Pick-Me-Up. In 2016-17, the most common litter items recovered were (in decreasing order of prevalence): coffee cups (which are plastic-lined); cigarette butts (which contain in the plastic filters) and cigarette packaging; food wrappers; fast food packaging; plastic bags; fishing-related waste; cans; paper; plastic bottles; and Styrofoam.

The common feature of all of these products is that they are consumer products designed for only a single use before disposal.

THE THREATS POSED BY MARINE POLLUTION

Marine pollution has many negative impacts, including:

- Damage to marine and shoreline habitats;
- Harm to wildlife (including commercially important fish stocks), who can be maimed, suffocated, poisoned and killed;
- Threats to marine navigation when waste becomes caught up in vessel propulsion systems or clogs intakes;
- Transportation of invasive organisms such microbes, algae, invertebrates and other animals that can hitch a ride on floating plastics;
- Potential risk to human food chains through ingestion of microplastic particles; and



- Diminishment of local use and tourism revenues at sites marred by litter.

Plastics, and in particular single-use, disposable consumer plastics, account for a great deal of the above harms. The Ocean Conservancy estimates that the ocean may already contain more than 150 million metric tonnes of plastic. And it's been projected that by 2050, without any significant changes to our use of plastics as a society, there will be as much plastic by weight in the oceans as fish.¹

OUR VISION

At Clean, we embrace the principle of the circular economy: a system where waste in all forms is reduced, and products are optimally reused and recycled. Such a vision is necessary to help mitigate and adapt to the challenges of declining resources, growing populations, and a changing climate. This vision requires transformative change in how we purchase, use, and ultimately dispose of the goods we use every day.

Over three decades of cleaning up litter, we have seen how the best efforts of Nova Scotian citizens and governments cannot keep pace with the deluge of disposable, single-use plastics. While there is an element of personal responsibility at play in the problem of litter, it is short-sighted to focus solely, or even mostly, on the role of individual choice because this focus ignores the barriers that prevent people from properly disposing of their waste. These barriers include:

- Lack of sufficient and/or conveniently located waste collection infrastructure;
- Insufficient care of the waste collection infrastructure we do have (i.e., garbage bins that are allowed to overflow with waste and become crusted with filth and flies); and
- Lack of education and awareness of the actual harms caused by litter; many people fail to realize that it's so much more than an eye-sore.

But beyond these barriers, there are larger systemic issues at play. We live in a culture that elevates materialism and convenience. These values tend (inadvertently) to support a 'culture of disposability'.

Clean believes that, through collaboration with partners from all sectors, we can begin to shift our behaviours from 'waste-full' to 'waste-less'. To begin to dismantle the culture of disposability, we need to move beyond cleaning up litter to identifying and addressing its root causes. Critical to achieving this vision is the need for deep public engagement and education, a willingness in all sectors to experiment with new tools and innovations, and an acceptance that the transformation requires time, persistence, and resources.

THE CLEAN FOUNDATION

We are a registered charity that seeks to encourage sustainability by informing, enabling and inspiring Nova Scotians to respect the environment in all aspects of daily life. To learn more about us, please visit clean.ns.ca.

¹ The Ellen MacArthur Foundation. (2016). The New Plastics Economy: Rethinking the future of plastics. https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_15-3-16.pdf

