



Vard Marine Inc.

ANALYSIS OF SHIP BREAKING AND RECYCLING CAPACITY IN CANADA

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DISCLAIMER

Transport Canada commissioned Vard Marine Inc. in 2015 to undertake an analysis of ship breaking and recycling in Canada. The purpose of the study was to gain a better understanding of the current recycling capacity in Canada, for both large and small vessels. Please note that the opinions expressed in the report do not necessarily reflect those of Transport Canada, and the list of facilities identified in the report is not intended to be complete, but rather an illustration of the variety and type of capacity that exists.

EXECUTIVE SUMMARY

This study has been undertaken to explore:

1. the existing and potential capacity for ship breaking/recycling in Canada for small and large vessels; and
2. the factors influencing domestic shipowner decisions on when and how to dispose of vessels

The work was undertaken using literature surveys, targeted questionnaires, and discussions with selected stakeholders.

For the purposes of the study, the threshold between “large” and “small” vessels was set at 100 gross tons. Above this size, almost all vessels are commercial (or government) ships, with steel hulls. There are approximately 2700 vessels over 100 gross tons in the Canadian Large Vessel Registry. In contrast, there are estimated to be over 4 million small vessels. Some of these are commercial, including fishing vessels, tugs, small ferries, etc. Most however are recreational. The great majority have fibreglass (GRP) hulls, with some of the larger vessels being steel, wooden, and (occasionally) aluminum.

A small number of large vessels are disposed of in Canada in any year. There is sufficient capacity in most regions of the country to handle these disposals by shipbreaking and associated recycling of some of the materials; however, the economics are unattractive for most owners. The labour and other costs for domestic disposal are high compared with international shipbreaking, and the prices paid for recyclables such as scrap steel are low. As a result, domestic shipbreakers can only compete where the costs and inconvenience of an overseas disposal outweigh these other cost factors. Also, in many cases Canadian owners prefer to sell ships approaching their end of life to other operators, disposing of their own disposal problem in the process.

A large number of small vessels are disposed of in any year, estimated as somewhat over 40,000. There is little infrastructure tailored to their disposal. To date fibreglass cannot be recycled in a cost-effective manner. As a result, hulls will generally end up in landfills, though some equipment and components are more recyclable.

A significant number of small vessels become derelict every year after abandonment by owners who are either unaware of or unprepared to pay for more responsible disposal options. Abandonment is perceived as being a major issue by many on the West Coast; less so in other areas of Canada, though some stakeholders in all areas of Canada do see this as a concern. Winter haul-out in many Canadian waterways greatly reduces the number of small craft which are abandoned while afloat, these being vessels that are most likely to be seen as eyesores or obstacles.

Shipbreaking and small vessel disposal are regulated by Canadian and provincial environmental and health and safety legislation, which imposes strict controls on the disposal of hazardous waste and on working conditions for those involved. For large vessels, efforts are ongoing internationally to develop appropriate norms but shipbreaking in some leading countries continues to be seen as dirty and dangerous.

Currently, Canada has limited federal and no real provincial legislation which targets the responsible disposal of large or small vessels at end-of-life. For example, owners have the obligation to undertake wreck removal, or to pay for costs incurred. However, the government's powers are limited, and are rarely invoked or enforced. This was a concern expressed by many stakeholders contacted during the project.

The problem of vessel disposal is not unique to Canada, and does not appear to have been completely solved in any country. A number of US states have instituted measures aimed at both the prevention and remediation of vessel abandonment, with varying levels of success.

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ACRONYMS

ACRONYMS	DEFINITIONS
CARI	Canadian Association of Recycling Industries
CCG	Canadian Coast Guard
CFOA	Canadian Ferry Operators Association
CMVA	Canadian Vehicle Manufacturers' Association
CSA	Canadian Shipowners Association
DFO	Department of Fisheries and Oceans
EC	Environment Canada
EEMAC	Electrical Equipment Manufacturers Association of Canada
GRP	Glass Reinforced Plastic
HC	Health Canada
ILO	International Labour Organization
IMO	International Maritime Organization
MODEP	Ministry of Sustainable Development, Environment and Parks
MEPC	Marine Environment Protection Committee
MRC	Marine Recycling Corporation
NMMA	National Marine Manufacturers Association
NSPS	National Shipbuilding Procurement Strategy
NPA	Navigation Protection Act
NPP	Navigation Protection Program
NRCAN	Natural Resources Canada
OARA	Ontario Automotive Recyclers Association
PIC	Prior Informed Consent
RFP	Request For Proposal
TC	Transport Canada
ULS	Upper Lakes Shipping
VOC	Vessel of Concern
WRAP	Waste Reduction and Prevention
WHSCC	Workplace Health and Safety Compensation Commission

1 INTRODUCTION

The Canadian marine sector comprises a relatively small number of large commercial vessels, a substantial number of smaller commercial vessels (fishing vessels, tugs, and workboats), and a very large number of private recreational craft. Typically, these have life expectancies of 20+ years, following which they are usually disposed of by their owners.

Almost any craft is composed of a variety of materials. Many of these materials are potentially hazardous to the environment. Others may have value if recycled, which will also help to reduce overall volumes of waste. Unfortunately, there are some owners, particularly of smaller craft, who choose to abandon their vessels rather than incurring disposal or recycling costs.

This study has been undertaken by Vard Marine Inc. (VARD) to assess Canada's existing and potential future ship breaking/recycling capacity for large and small vessels. A variety of factors have been considered, including regional variability, the different types of barriers, costs versus benefits, and demand for and viability of services. The study also identifies factors affecting vessel owner decisions.

1.1 SCOPE OF WORK

Transport Canada's (TC's) scope of work for the project is provided at Annex A to the report. This divided the study into eight tasks, summarized as:

1. Inventory of potential ship breaking/recycling organizations
2. Capacities and regulations affecting ship disposal
3. Regional factors affecting ship disposal
4. Capacity building for large ships
5. Shipowner perceptions for large ships
6. Capacity building for small vessels
7. Owner perceptions for small vessels
8. Best practices

VARD's approach and our report follow this breakdown; except that the capacity of organizations for breaking and recycling has been rolled into Task 1, leaving Task 2 focused on the international, national and provincial regulatory framework. For clarity, we have also moved the sections on owner perceptions before those on capacity building for both large and small vessels, and have provided the general discussion of regional factors towards the start of the report. Each section of the report covers a single task, providing additional detail on its scope and outcomes.

As no formal definition of large ships was set for this project, VARD assumed that a large vessel will have a steel hull, and a volume in excess of 100 gross tons (gt). Such vessels could be disposed of outside Canada, while smaller vessels are unlikely to be disposed of outside Canada or possibly the United States (US). The smaller vessels may still be steel, but are more likely to have hulls constructed of other materials. Equipment and outfit for large and small vessels will be fabricated from a wide range of materials including pollutants, hazardous and noxious substances.

1.2 METHODOLOGY

VARD has used three main sources of information to assemble this report, including:

- a) An extensive literature survey, starting with materials provided by TC and extended throughout the course of the project. Reference documents are cited using footnotes throughout our report.
- b) Industry surveys, using questionnaires and follow-up where appropriate. The questionnaires used are provided at Appendix A to the report.
- c) Presentations to stakeholders and follow-up discussions with interested parties.

In general, VARD has provided factual information on certain organizations by name where relevant. However, we have generally kept the opinions of stakeholders anonymous. The only exceptions to this come where groups or individuals have already expressed these opinions in the public domain.

The terminology used in the report generally follows common usage, except that “wreck” has specific legal meaning in federal legislation and is used only in this limited sense. Otherwise, references to abandoned or derelict vessels use the terms more or less interchangeably; a derelict, non-functional vessel is also likely to be abandoned.

2 REGIONAL FACTORS

For the purposes of the project, the Canadian marine environment has been divided into 4 main regions: the Atlantic Provinces, Central Canada (Ontario and Quebec), the Prairies and the West Coast (British Columbia). There are considerable regional differences across the Canadian marine sector in almost all aspects, a number of which have significant influences on the availability of and future potential for ship breaking and recycling. Many of these are discussed in more depth in subsequent sections, and so this section of the report provides a basic overview of commercial and recreational shipping and boating across Canada.

2.1 EAST COAST

The East Coast supports a large fishing industry, ranging from small near-shore vessels to large factory ships. In addition, the commercial domestic fleet includes a number of ferries, tankers, cargo ships, and tugs. Although ports such as Halifax and St. John's support a significant amount of traffic, only a limited amount is domestically operated. The information available to the project also indicates that there are far fewer recreational vessels on the East Coast compared to elsewhere in the country.

Discussions with industry contacts have also suggested that the more rugged nature of the Atlantic seaboard means that abandoned vessels may disappear into the ocean instead of remaining within view of shore or harbours. This may influence the decision to abandon rather than recycle, given that allowing an abandoned vessel to sink at sea represents no cost to the owner, and relatively little risk to their home port or harbour.

Little information was available detailing typical inland boat usage for this region, however the project considers it reasonable that fresh water, inland recreational usage on lakes and rivers in the Maritimes is similar to most other parts of Canada, as outlined below.,

2.2 CENTRAL CANADA

A significant portion of the Canadian small vessel fleet is located in Central Canada, particularly in Eastern and Southern Ontario. Hundreds of lakes, rivers, and the Great Lakes coastlines are well used by recreational and small commercial craft of all types. While the region is by no means free of derelict vessels, the issue is somewhat different for these areas. Foremost, the entire fleet operates in fresh water, and older and well-used vessels generally last significantly longer than their salt water counterparts elsewhere in Canada. Here and elsewhere, winter freeze-up of lakes and rivers means that most small vessels are laid-up ashore for part of the year. Boaters in the region often try to sell unwanted boats, and due to the comparatively small bodies of water on which they operate a boat which cannot be sold in many cases will be laid up on land or in a driveway.

The St. Lawrence Seaway carries a significant amount of large vessel traffic throughout the navigable season. The Seaway and Great Lakes are travelled by large commercial lakers, tankers, and other ships, as well as by recreational vessels of all types and sizes. There is a long history of ship and boat building on the Great Lakes, and while the industry has slowed in recent decades, the vessel traffic and recreational usage remain. Many of the very large vessels in the Canadian fleet are lakers, which spend most, if not all of their sailing time on the Seaway and Great Lakes.

2.3 PRAIRIES AND THE NORTH

The prairie provinces have very little commercial traffic, other than international trade into the Port of Churchill and some river ferries. Recreational craft on lakes and rivers are similar to those in Central Canada, but fewer in number.

The Mackenzie River system is an important transportation route for northern communities in the Northwest Territories and Nunavut, but their small populations mean that the total traffic volume is itself small. Other Arctic commercial shipping comes from ports in the South, and is almost entirely confined to the summer season. Some Arctic communities have small craft for seasonal fishing and transportation, but numbers are again small in comparison to Canada as a whole.

2.4 WEST COAST

On Canada's West Coast, domestic commercial marine activity is concentrated on ferries and tug-barge operations. The West Coast does support a significant fishing industry, however most of this is limited to inshore or near-shore fisheries and aquaculture and does not require the same size and scale of fishing fleet as the East Coast.

The sheer amount of sheltered coastline and islands in the region, combined with the favourable climate has led to recreational boating being a very popular activity. This also means that the issue of small vessels being abandoned is most prevalent on the West Coast. Municipalities and marinas frequently encounter derelict vessels left at anchor, blown on shore, or sunk in regions where they pose a hazard.

A significant amount of information detailing industry trends, concerns of marina operators and municipalities, as well as recycling and boat breaking industries throughout Canada is provided throughout the subsequent sections of the report.

2.5 SUMMARY

Canada's diverse marine geography lends itself of a wide variety of commercial and recreational traffic, and each region manages vessels which have reached their end-of-life in different ways. The issue of vessel abandonment (and in fact, the perceived need for recycling of vessels) varies across the country.

3 INVENTORY OF BREAKAGE/RECYCLING ORGANIZATIONS

The starting point for this study was to develop an inventory of potential ship breaking/recycling organizations in Canada. To extend the coverage of the inventory developed to date by TC, shipowners associations, recyclers/scrap merchants, municipalities, marinas and boat storage organizations in the private and public sectors, were contacted with the objective of identifying organizations that deal with marine products.

To survey the levels of service now available, a brief Vessel Disposal Questionnaire was developed and distributed when contacting organizations and requesting their engagement in the study. The Vessel Disposal Questionnaire is provided in Appendix A.

The response to the Questionnaire was rather limited despite the substantial number of organizations contacted. Thus, a substantial portion of the material presented in this study is based on information gathered from research and other sources.

Results from the Questionnaire pertaining to capacities, regulations, regional factors, owner perceptions or best practices are presented in the subsequent sections of this report.

As anticipated, the majority of the dedicated organizations in Canada had been formerly identified by TC. However, through contacting multiple organizations and subsequently performing additional research, various other organizations and facilities equipped and ready/planning to handle material and components from vessels of various types and sizes, were added to the inventory. The results, forming Task 1 of the study, are presented in this section of the report and have been subdivided in terms of their relevance to the small and large vessel sectors. Results are presented geographically by region of Canada.

3.1 SMALL VESSELS – INVENTORY AND CAPACITY OF BREAKING/RECYCLING ORGANIZATIONS

3.1.1 ATLANTIC CANADA

The Atlantic Canada region is home to an extensive fleet of small fibreglass and fibreglass encased wood vessels. Since the launch of the fibreglass boat industry in the 1960's, these vessels have proven to have long life spans, due to the durability of the material.

Notwithstanding the longevity of these vessels, they do eventually reach the end of their useful life and are decommissioned, abandoned or scrapped. However, a proper process for recycling these materials has yet to be established. In most provinces within the region, ship breaking of these types of boats has been limited to the recovery of engines and other operational equipment, before being scrapped with disposal in a local solid waste or landfill facility.

In a 2014 review of ship breaking and recycling in Eastern and Central Canada¹, forty six facilities within the regions were identified and interviewed to assess the current status of activities and

¹ T8080-14003 Transport Canada Contract: Review of Ship-Breaking (Ship Recycling) in Eastern and Central Canada, December 2014

services offered. Additional organizations have been identified in this study which accept various scrap boat materials in Newfoundland and Labrador and are presented in Table 1.

Table 1: Newfoundland and Labrador Small Vessel Disposal/Recycling Facilities

Organization	Reference	Notes
Newco Metal & Auto Recycling Ltd.	http://www.newcometal.com/about/index.php	Pay competitive market prices for unwanted scrap metal.
Maritime Recycling Ltd.	http://www.yellowpages.ca/business/Newfoundland-and-Labrador/St-John-s/Maritime-Recycling-Ltd/2663949.html	Purchase a variety of scrap metal, including; aluminum, brass, copper, lead, stainless steel and more.

Nova Scotia is currently leading the way with their vessel disposal initiatives in Atlantic Canada by establishing a process for disposing of unwanted or derelict boats. This process as outlined by the Nova Scotia Boatbuilders Association (NSBA) is as follows:

1. First, the boatyard will remove any parts or fittings from the boat that have value for re-use. Any hazardous fluids (such as oils and fuels) are drained into containers to be delivered to a hazardous waste recycling depot.
2. The boatyard then engages a demolition company.
3. The demolition company removes all steel, stainless steel and aluminum materials to be taken to a recycling depot.
4. All fibreglass, wood, trim and other construction materials are then removed, broken down and delivered to an official landfill site.

The NSBA also noted that for a derelict 60ft fibreglass fishing boat, the demolition process could be performed in one day, as an example of the process duration. In addition, the association indicated that the process involves a cost to the boatyard which is partially offset by the value of the recycled materials, and that the remaining cost is eventually recovered from income garnered from this newly available storage space and paying boat owners.

Table 2 provides a list of businesses in Nova Scotia which offer vessel disposal services for a range of vessels types, including those composed of fibreglass.

Table 2: Nova Scotia Small Vessel Disposal/Recycling Facilities

Organization	Reference	Notes
Halifax C&D Recycling Ltd.	http://halifaxcdrecycling.ca/	Handles and disposes fibreglass vessels.

		Boat owner is required to remove all fuel, engines and other liquids.
McDonald C&D	http://www.yellowpages.ca/search/si/1/Paul-McDonald-Trucking-Backhoe-Ltd/Port+Morien+NS	Recently disposed of three fibre glass vessels.

3.1.2 CENTRAL CANADA

A pair of facilities were identified in Ontario operating under a business model where vessels would be delivered to a large yard and stripped for parts and components, which would in turn be sold to the public. Both facilities storage yards are often full, and they do not always accept new vessels. These facilities along with others identified in Central Canada to offer vessel disposal/recycling services are presented in Table 3.

Table 3: Ontario Small Vessel Disposal/Recycling Facilities

Organization	Reference	Notes
Ontario Boat Wreckers	http://www.ontarioboatwreckers.com	Do not offer pickup.
Kawartha Marine	http://kawarthaboatwrecking.com	Will pick up intact boats at no cost. Will pick up wrecks for cost.
Sandy Cove Marine	http://www.sandycovemarine.com	Operate a scrap yard near Innisfil, ON. Will only take delivery of boats when their yard has space available.
LA Boat Works	http://www.laboatworks.com/	Offer recycling of boats, including grinding waste into reclaimable FRP (for cost).

For Quebec, Section 3.2.2 identifies large scale marine facilities in the province. However, no dedicated or specialized marine facilities likely to have an interest in recycling small craft were identified in Quebec.

3.1.3 PRAIRIES AND THE NORTH

As expected, in the Canadian Prairies region and in the North no organizations were identified as providers of small vessel disposal or recycling services, nor were any planning to offer these services. This can be attributed to factors such as geography, regional differences and other influences discussed in detail in the subsequent sections of this report.

3.1.4 WEST COAST

In British Columbia, multiple organizations and potential providers of removal, salvage and disposal services for abandoned or derelict vessels were identified. Table 4 provides a full list of organizations identified in British Columbia which offer boat disposal and recycling facilities. A report summarizing the Vessels of Concern (VOC) inventory in British Columbia prepared for TC provided the basis of the following inventory, from which additional organizations were included following the work completed in this study.

Table 4: British Columbia Small Vessel Disposal/Recycling Facilities

Organization	Reference	Facility Services and Limitations
Shelter Island Marina & Boatyard Inc.	http://www.shelterislandmarina.com/boatrecycling.html	Offers recycling and disposal services. Capable of recycling boats up to 150 feet and 220 tons.
Jack Campbell Marine Ltd.	http://www.recyclemyboat.com/	Offers recycling services. Also offers pick-up service for intact vessels and provides a vessel Recycling Plan.
Recycle It - Earth Friendly Junk Removal	http://www.recycleitcanada.ca/large-item-pickup/	Offers disposal and recycling services. Also offers pick-up service for intact vessels.
Ecowaste	http://ecowaste.com/content/ecowaste-ourservices/ecowaste-permitted-materials/	Offers disposal services.
Wastech	http://www.wastech.ca/us/	Offers disposal services for boats under 17 feet in length. \$50 surcharge for all waste over 2.5 meters (8 feet) in length).
Old School Marine	http://oldschoolmarine.com/	Offers removal, salvage and disposal services.
Davis Trading & Supply Ltd.	http://davistrading.com/	Offers salvage and disposal services.
Jenkins Marine Ltd.	http://jenkinsmarine.com/	Offers removal, salvage and disposal services.
Saltair Marine Services Ltd.	http://www.ladysmithcofc.com/portfolio/saltair-marine-services-ltd/	Offers removal, salvage and disposal services.

Sea Roamer Marine Services	http://www.searoamermarine.com/	Offers removal, salvage and disposal services.
Wainwright Marine Services	http://www.wainwrightmarine.com/	Offers removal, salvage and disposal services.
Dolphin Marine Services	http://www.dolphinmarine.ca/	Offers removal, salvage and disposal services.
Diversified Marine Ltd.	http://www.secheltchamber.bc.ca/#!clothing--accessories/c19lk	Offers removal, salvage and disposal services.
Rupert Disposal Ltd.	http://www.rupertdisposal.com/	Offers removal, salvage and disposal services.
Allen's Scrap & Salvage Terrace	http://www.allensscrap.com/	Offers removal, salvage and disposal services.
Shuswap Marine Freight	http://www.ic.gc.ca/eic/site/icgc.nsf/eng/home	Offers removal, salvage and disposal services.
Marine Wreckers	http://listings.ftb-companies-ca.com/l/112297618/Marine-Wreckers-in-Winfield-BC	Offers removal, salvage and disposal services.
Columbia Recycling	http://columbiarecycle.ca/	Offers salvage and disposal services.

3.2 LARGE VESSELS – INVENTORY AND CAPACITY OF BREAKING/RECYCLING ORGANIZATIONS

A valuable resource for this element of the work was an earlier TC report, which identified a number of shipbuilding and repair yards with the skills and facilities with the potential capability to provide shipbreaking and recycling services. Additional information has been gathered from another independent report on the capacity of ship recycling in North America²³. The inventory from these reports have been updated and extended by the current project, using contact with industry associations, literature searches, and direct contact with a number of facilities. This work has served to identify both potential capacities and also to identify the barriers to their actually offering shipbreaking services, as reported in Section 6.

The two large shipyards involved in Canada's National Shipbuilding Procurement Strategy, Irving (Halifax) and Seaspan (Vancouver) have been excluded from the inventory, as both will be fully occupied with new construction for the foreseeable future.

² Basel Action Network: A Report on 'Green' Ship Recycling Capacity in the United States, Canada and Mexico, November 2012

³ T8080-14003 Transport Canada Contract: Review of Ship-Breaking (Ship Recycling) in Eastern and Central Canada, December 2014

3.2.1 ATLANTIC CANADA

Three facilities located in Newfoundland and Labrador, the Kiewit Offshore Services – Marystown Yard, NEWDOCK and Glovertown Shipyards currently have the facilities, expertise and experience, to conduct ship breaking of large steel ships. However, no facilities are currently conducting large shipbreaking in the province or are planning to offer the service.

In Nova Scotia, the AECON/Fabco Pictou Shipyard recently conducted the shipbreaking and recycling of two Department of National Defense (DND) vessels, the HMCS Terra Nova and the HMCS Gatineau. The Canadian Maritime Engineering North Sydney Shipyard is also seeking opportunities to perform shipbreaking of steel ships. In addition, the Lunenburg Foundry Shipyard has conducted shipbreaking of former steel fishing vessels but the number of projects have been limited.

The Atlantic Canada facilities and details regarding the services they can or do provide are presented in Table 5.

Table 5: Atlantic Canada Potential Large Vessel Disposal/Recycling Facilities

Organization	Reference	Operations and Capacity
Marystown Kiewit Offshore Services	http://www.kiewit.com/districts/kiewit-offshore-services	Facility now focuses exclusively on offshore oil and gas projects
Newdock St. John’s	http://www.newdock.nf.ca	Mainly repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 4,000 t (marine elevator)
Glovertown Shipyard	http://glovertownshipyard.com	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 150 t
AECON Atlantic Pictou Shipyard	http://pictoushipyard.com	Has handled ship-breaking of steel vessels. Maximum size approx. 2,500 t
Lunenburg Marine Railway Co. Dry-dock	http://www.lunenburgfoundry.com	Has handled ship-breaking of steel vessels.
Canadian Maritime Engineering North Sydney	http://www.cmelimited.com/Marine-Services	Planning to provide ship breaking for steel vessels; maximum size approx. 2,500 t

3.2.2 CENTRAL CANADA

The 2014 review of shipbreaking in Central and Eastern Canada⁴ also recognized that there are currently no facilities offering shipbreaking of steel ships in the province of Quebec, despite the apparent capability to provide this service. The review noted that there are currently seven organizations in Quebec that are equipped with the facilities and/or expertise to perform shipbreaking activities. Some of these have conducted extensive ship repair projects which could have involved asbestos and hazardous materials management. These organizations include; Chantier Naval Forillon Inc., Chantier Naval Matane, Chantier Davie Canada Inc., Mount Royal/Walsh Inc., Navamar Ship Repairs Ltd., Ocean Group Inc. and Groupe Verrault Maritime Inc. Several of these are “alongside” repair organizations, and some others are quite limited in terms of potential capacity. Table 6 provides details for the larger organizations with suitable facilities.

Table 6: Quebec Large Vessel Potential Disposal/Recycling Facilities

Organization	Reference	Operations and Capacity
Chantier Davie Canada	http://chantierdaviecanada.com	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Could take Panamax size.
Verrault Navigation	http://www.verreaultnavigation.com	Repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Could take Panamax size.
Groupe Ocean	http://www.groupeocean.com	Group companies offer salvage, shipbuilding and repair. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 1,000 t

Marine Recycling Corporation (MRC) in Port Colborne, ON, has been offering marine vessel recycling services for decades, and is the sole dedicated facility in Canada for large shipbreaking and recycling. Larger contracts included recycling of two Oberon Class submarines, navy destroyers, and a variety of Great Lakes vessels including the recent award of the recycling contract for the Algoma Progress, a 220m bulk carrier⁵. Additional details about the facility are provided in Table 7.

⁴ T8080-14003 Transport Canada Contract: Review of Ship-Breaking (Ship Recycling) in Eastern and Central Canada, December 2014

⁵ <http://www.marinerecycling.ca/>



Figure 1: An Oberon Class submarine being scrapped at the MRC facility

Table 7: Ontario Large Vessel Actual and Potential Disposal/Recycling Facilities

Organization	Reference	Operations and Capacity
Marine Recycling Corporation (MRC)	http://www.marinerecycling.ca/	The world's first ISO 14001 Certified ship recycling company. Provides marine services and wreck removal for a variety of marine vessels; Great Lakes Freighters, barges, tugs, ferries, etc.
Purvis Marine	http://www.purvismarine.com/services	Mainly repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 2,000 t

Purvis Marine Limited in Sault Ste. Marie, ON has been providing services and equipment to the marine industry in Canada since 1967. The company was recognized the 2012 report on the capacity of ship recycling in North America⁶ as having a potentially significant annual throughput capacity for vessel recycling operations, however they were currently not undertaking these activities. The company today has yet to offer ship recycling services.

3.2.3 PRAIRIES AND THE NORTH

In the Canadian Prairies, the Port of Churchill in Churchill, Manitoba offers minor repair services but does not currently undertake ship building or breaking activities. There are no facilities on the Arctic coast.

3.2.4 WEST COAST

Four organizations provided in the 2014 Vessels of Concern (VOC) inventory report for British Columbia⁷ were characterized as potential large vessel disposal and recycling facilities. All four organizations provide salvage and disposal services and two of the facilities additionally offer removal assistance. These operations which are located in British Columbia, are displayed in Table 8. All have limited ability to dispose of larger vessels

In addition, there are a number of shipyards in B.C. which are similar to those in other parts of Canada in that they do possess facilities which could be used for shipbreaking and recycling but do not currently offer these services. The larger companies are shown in Table 9.

Table 8: British Columbia Large Vessel Actual Recycling Facilities

Organization	Reference	Operations and Capacity
Amix Marine Services Ltd. New Westminster	http://amixgroup.ca/	Offer removal, salvage and disposal services.
Recycle My Boat – Geco Marine North Vancouver	http://www.gecomarine.com/	Offer removal, salvage and disposal services.
Schnitzer Steel (various locations)	http://www.schnitzersteel.com/company_locations.aspx?View=Detail&ID=142	Offer salvage and disposal services.
ABC Recycling (various locations)	http://www.abcrecycling.com/	Offer salvage and disposal services.

⁶ Basel Action Network: A Report on ‘Green’ Ship Recycling Capacity in the United States, Canada and Mexico, November 2012

⁷ TyPlan Planning and Management for the Navigable Waters Protection Program (NWPP) of Transport Canada (TC): Vessels of Concern Inventory, March 2014

Table 9: British Columbia Large Vessel Potential Recycling Facilities

Organization	Reference	Operations and Capacity
Victoria Shipyard	http://www.seaspan.com/victoria-shipyards	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size limited by lack of dedicated dock.
Allied Shipbuilders	http://alliedship.com/	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 10,000t
Canadian Marine Engineering Port Alberni	http://cmelimited.com/Marine-Services	Repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 500t

3.3 SUMMARY

A limited number of facilities exist across Canada with the notional capability to break and recycle a large vessel. However, as explained in Section 6 there is little appetite amongst these facilities for recycling work due to its relative non-profitability compared to other work streams.

Small vessels can be disposed of in all regions of Canada. There is a limited capacity for recycling in Nova Scotia and at a variety of locations on the West Coast and in Ontario. As explained in subsequent sections of the report, there is a considerable potential market for recycling small vessels. However, this is unlikely to become active until the value of recycling becomes more appealing to operators.

A collated list of the key facilities identified throughout this report is available in Appendix B.

The complete inventory developed of ship owners associations, recycling/scrap merchants, municipalities, marinas and boat storage organizations is included in Appendix C.

4 LEGISLATION, REGULATIONS AND GUIDELINES

Task 2 of the study involved identifying key regulations (e.g. environmental, safety) that govern the vessel disposal/recycling industry.

The identification of applicable regulations again began with TC's own prior work and inventory. The work presented under this task was sub-divided in terms of legislation, regulations and guidelines administered at international, federal and provincial levels, the last of which has been divided by region into Atlantic Canada, Central Canada, Canadian Prairies and the West Coast of Canada.

Federal legislation and regulations principally include those of TC, the Department of Fisheries and Oceans (DFO), the Canadian Coast Guard (CCG), Environment Canada (EC), Health Canada (HC) and Natural Resources Canada (NRCan). At the provincial level, the ministries of the environment (with different names and supplementary responsibilities) served as the main source for environmental regulations, while majority of the safety regulations were provided by the ministers of labour.

4.1 INTERNATIONAL

The first set of international agreements relevant to shipbreaking and recycling are those under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.⁸ Canada ratified the Basel Convention on August 28, 1992.

The Basel Convention's key objectives are to:

- Minimize the generation of hazardous waste and hazardous recyclable materials;
- Ensure they are disposed in an environmentally sound manner and as close to the source of generation as possible;
- Minimize the international movement of hazardous waste and hazardous recyclable materials.

The Basel Convention controls the transboundary movement of hazardous and other wastes through its provisions for "Prior Informed Consent" (PIC). These must be met before any shipment of wastes is permitted, and shipments without proper documentation are considered illegal under the terms and conditions of the Convention. Each Party to the Convention is required to take appropriate measures to regulate the transboundary movement of wastes.

Canada applies the Basel Convention through the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* (EIHWRMR) under Environment Canada.

In 2003, the first set of marine industry guidelines developed by the International Maritime Organization (IMO) on ship recycling⁹ were adopted by the IMO General Assembly. The Guidelines, Resolution A.962(23), aimed to provide guidance to flag, port and recycling countries and more specifically shipowners, shipbuilders, marine equipment suppliers and recycling facilities on best practices, by taking into account the full life cycle of the ship.

⁸ <http://www.basel.int/>

⁹ <http://www.imo.org/en/OurWork/Environment/ShipRecycling/Pages/Default.aspx>

The Guidelines in Resolution A.962(23) also introduced the concept of a Green Passport for vessels. A Green Passport, produced by the shipyard during the construction stage, is intended to accompany the vessel throughout its operating life and contain an inventory of all potentially hazardous materials onboard the vessel. The documentation should also enable subsequent changes to be recorded such that successive owners can maintain the documents accuracy. Documentation such as the Green Passport can greatly assist the ship recycling industry as it allows effective measures to be taken to reduce the risks posed to the health and safety of workers and their surrounding environment during the ship recycling process.

These Guidelines were subsequently amended by the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships 2009 (the Hong Kong Convention) which was adopted at a diplomatic conference held in Hong Kong, China in 2009. The Convention aims to ensure that once vessels reach the end of their operational lives, they are recycled without posing any risks to human health, safety and the environment.

At the conference Resolution A.980(24) was adopted, mandating the Marine Environment Protection Committee (MEPC) of the IMO to develop the following set of guidelines to support the implementation and enforcement of the Convention's technical standards:

- Guidelines for the Development of the Inventory of Hazardous Materials – Adopted in July 2011
- Guidelines for the Development of the Ship recycling Plan – Adopted in July 2011
- Guidelines for Safe and Environmentally Sound Ship Recycling – Adopted in March 2012
- Guidelines for the Authorization of Ship Recycling Facilities – Adopted in March 2012
- Guidelines for the Inspection of Ships under the Hong Kong Convention – Adopted in October 2012
- Guidelines for the Survey and Certification of Ships under the Hong Kong Convention – Adopted in October 2012

Only three countries have ratified the Hong Kong Convention, and Canada is not one of these. A number of countries and other stakeholders and commentators have expressed concerns as to whether the requirements are actually weaker than those of the more general Basel Convention. Work is continuing at IMO to try to achieve greater consensus for a way ahead.

The International Labour Organization (ILO) likewise produced the Safety and Health in Shipbreaking: Guidelines for Asian Countries and Turkey, at the Interregional Tripartite Meeting of Experts on Safety and Health in Shipbreaking for Selected Asian Countries and Turkey¹⁰, in 2003. The Guidelines were developed to assist shipbreakers and capable authorities in implementing the pertinent provisions of ILO standards, codes of practice and guidelines on occupational health, safety and working conditions as well as the provisions issued by other international organizations, aiming for progressive improvement. Some of the material is included in Section 9 of this report, which addresses best practices in vessel disposal.

The International Labour Organization (ILO) has additionally issued numerous codes of practice with provisions applicable to shipbreaking activities, some of which include:

¹⁰ MESH/2003/1 International Labour Organization: Safety and Health in Shipbreaking: Guidelines for Asian Countries and Turkey

- Safety and Health in Shipbuilding and Ship Recycling, 1974
- Protection of Workers Against Noise and Vibration in the Working Environment, 1977
- Occupational Safety and Health in the Iron and Steel Industry, 1983
- Safety in the use of Asbestos, 1984
- Prevention of Major Industrial Accidents, 1991
- Safety and Health in Dock Work, 1997

These codes are referenced by some international shipbreakers as evidence that they follow “best practices”.

4.2 CANADA

4.2.1 FEDERAL REGULATIONS

At present, there are only two pieces of federal legislation which are directly relevant to vessel disposal and recycling, and these are applicable only to cases where vessels are abandoned, wrecked or obstruct navigation¹¹. These can be summarized as follows:

1. *Navigation Protection Act (NPA)*

Section 16 of the NPA presented above, allows the Minister of Transport to require removal of any wreck, or to undertake the work directly and to recover the costs either from the owner or from the sale of the vessel. Similar provisions can also be applied to a vessel which is still afloat but which may be obstructing navigation. The Act provides these powers but does not mandate their use – in all cases it is at the discretion of the Minister as to whether to take action. It can also be noted that the waters covered under the Act do not cover most inland lakes and rivers, so generally do not apply to “cottage country”.

2. *Canadian Shipping Act 2001 (CSA 2001)*

The CSA 2001 provides a full definition of a wreck, which also applies to the NPA. The Act authorizes the Minister to designate persons as “receivers of wrecks”, who can arrange for their disposal. Persons who claim wrecks are entitled in some circumstances to recover salvage fees and other expenses from the proceeds of disposal.

As with the NPA, the application of the provisions of the CSA 2001 to wrecks is discretionary. In cases where the value of the wreck exceeds the cost of disposal, there will be some economic incentive for individuals or organizations to undertake salvage or disposal. In other cases this is less attractive.

In addition to these acts, administered through TC, the other significant player at the federal level is EC. As noted earlier, the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (EIHWRMR)* apply to movements of many materials from (and to) Canada; they also form part of the basis for interprovincial movements inside Canada which are covered

¹¹ <http://avicc.ca/transport-canadas-study-of-abandoned-and-derelict-vessels-released/>

under the Interprovincial Movement of Hazardous Wastes Regulations. These could be considered applicable to the movement of a vessel between provinces for breaking or scrapping, though it is unclear whether they have been interpreted in this sense until now.

The removal of a derelict or abandoned vessel may also be subject to other legislation at the provincial level, as outlined at Section 4.3 below.

4.2.2 PRIVATE MEMBERS BILLS (C-638 AND C-695)

In recent years there has been increasing public concern over problems associated with abandoned and derelict vessels, which has led to the introduction of several private members bills aimed at strengthening federal government powers and responsibilities.

Bill C-638 was introduced to amend the Canada Shipping Act, 2001, by strengthening the requirements relating to wrecks by ensuring that regulations are made to establish measures to be taken for their removal, disposition or destruction. It designated the Canadian Coast Guard (CCG) as the receiver of wrecks and required receivers of wreck to take reasonable steps to determine and locate the owner of the wreck.

Numerous facilities operators and municipalities expressed support for this bill, as did Liberal and New Democratic Party members. However, the bill was opposed by the government citing various concerns, including the potential costs of mandatory disposal and the need to focus on prevention rather than remediation. It was defeated at second reading in May 2015.

Following this, Bill C-695 was introduced in June 2015. This aimed to prohibit the abandonment of vessels, also as an amendment to the CSA. The provisions would have made it a criminal offence to abandon a vessel, with both jail time and large fines as sanctions. The end of the parliamentary session meant that this bill died before full debate.

In the 2015 election, candidates in several ridings in B.C. have made the issue of abandoned and derelict vessels a campaign issue. It can therefore be anticipated that there will be pressure on the next government to take some action on this file.

4.3 PROVINCIAL REGULATIONS

In general, there are no provincial regulations that explicitly apply only to vessel disposal and recycling. Vessels are governed by general environmental and associated legislation. The common objectives of most of this legislation and of associated local programs are:

1. To avoid hazardous wastes in general disposal sites, and
2. To increase the flow of materials into recycling programs.

In general terms, as vessels become larger they are more likely to incorporate some of the types of hazardous materials specifically designated by provincial programs; such as electronic components, batteries, various types of light fixtures, oily wastes, etc.

Larger quantities of metals (steel and aluminum) are not generally covered by disposal requirements, as their economic value tends to ensure a high level of recycling. Materials used in smaller vessels such as fibreglass and wood, which have little or no residual value, have not to date been subject to explicit requirements at the provincial level.

Some specific non-regulatory initiatives at the provincial level which are or could be models for vessel disposal and recycling are discussed in Section 9 of this report.

4.4 SUMMARY

Legislation and regulations which directly or indirectly govern the disposal and recycling of large and small vessels do exist at the federal and provincial levels in Canada. These, combined with international conventions and guidelines, address a number of issues associated with the disposal and/or recycling of vessels. There is however, especially where small vessels are concerned, a lack of cohesion between different strata of regulations and legislation, which currently leaves a number of grey areas, particularly where responsibility and authority for vessel end of life and derelict vessels are concerned.

5 LARGE SHIPS – SHIPOWNER PERCEPTIONS

5.1 SCOPE

This task has involved compiling and assessing the key factors that affect shipowner decisions to use either domestic ship breaking/recycling facilities or overseas shipbreaking/recycling facilities – including comparison with foreign services and labour.

VARD has discussed this issue with a number of Canadian shipowners, including several who have recently disposed of vessels and others who are now considering their options for doing so.

5.2 FINDINGS

An initial finding on this task is that many Canadian shipowners prefer to sell their older vessels onwards to other operators rather than arranging for their final breaking, whether this be in Canada or elsewhere. Any sale will realize some amount of revenue, and will also avoid the potential problems, publicity and costs associated with final disposal.

This applies not only to commercial vessels; a number of Coast Guard ships have been sold over the years to other governments and to private sector interests.

Onward sales for continued operation are preferred, but are not always possible. Ships such as lakers often have no markets outside their specialized areas of operation. In some cases, the general condition – or an incident such as a fire – may render the ship unfit for further operation. In these cases the owner will make disposal decisions based on factors including:

- Economics
- Convenience
- Social license

A domestic option will need to be cost-competitive with other alternatives. However, lowest cost is not always the deciding factor. Most operators have a limited level of resources to manage ship disposal (and other decisions) and will favour options which simplify the process. Local facilities may have advantages, including ease of delivery.

Social license is somewhat more complex. Many ship owners do not want to be involved with operations that generate poor publicity, but this could arise with either domestic or overseas disposal if, for example, a Canadian facility is accused of using unsafe working practices. This has happened in the past and continues to reverberate – shipbreaking in Newfoundland in the 1970s is still being blamed for health and environmental damage some 40 years onwards.¹² In the 1970's the Marystown Shipyard, owned by the Newfoundland and Labrador government, conducted the dismantling of the SS Baccalieu passenger ferry and its sister ship the SS Burgeo. Since then, numerous concerns and complaints regarding health and safety issues have been raised, which in 2007 resulted in the provinces Workplace Health and Safety Compensation Commission (WHSCC) compensating 15 former workers following a disease claim from exposure to asbestos. The yard

¹² <http://globalnews.ca/news/837009/ship-breaking-newfoundlands-legacy-with-one-of-the-most-hazardous-jobs/>

has not conducted any shipbreaking since it was privatized in 2010 and the quest for compensation from various activist groups for their work related illnesses continues.

Some owners are also increasingly cautious over potential adverse publicity following end-of-life sales. The MV Canadian Miner was sold by Upper Lakes Shipping (ULS) to foreign interests with the intention of scrapping the ship in Turkey. When the final voyage turned into a very public wreck off the coast of Nova Scotia, ULS still suffered from the fallout, although the sale had removed its formal liability. When Marine Atlantic sold the MV Smallwood and MV Caribou, the sales terms included a condition that if the buyers decided to recycle the vessels, it would be done in a yard with full green recycling facilities in compliance with International Maritime Organization (IMO) guidelines. In fact the ships ended up on the beach in Alang, one of the most notorious breaking sites worldwide. There was considerable public criticism of this, though no direct consequences for any of those involved.



Figure 2: MV (Canadian) Miner Wreck, circa 2013

It is probable that in future more Canadian owners will be more cautious about “sale for breaking” transactions and may require more commitments to responsible disposal methods. This may also promote somewhat earlier fleet renewal decisions, so that the ships being replaced still have residual operational value and are not scrapped immediately after leaving Canada.

5.3 SUMMARY

Large vessel owners in Canada typically prefer to sell their unwanted ships to new owners, as this generates some revenue, and in some cases can avoid the problems associated with disposal and recycling.

Owners are however becoming more conscious of the potential public relations problems associated with foreign disposal and sale for scrap of their vessels. There have been a number of very visible incidents in recent years, and in some cases owners have now agreed to spend more to have their ships recycled in Canada.

6 LARGE SHIP CAPACITY BUILDING

6.1 SCOPE AND APPROACH

The scope of this task included three main issues:

1. Barriers and constraints to expanding domestic shipbreaking capacity;
2. Opportunities and benefits of expanding this capacity domestically;
3. The capacity for the Canadian shipbuilding yards to expand their business scope to include breaking/recycling ships.

VARD has explored these issues through data collection and discussion with a number of Canadian shipowners, shipbuilders and other stakeholders.

6.2 MARKET SIZE

Most ships that have the potential to be scrapped in Canada are owned and operated in Canada. There will be some exceptions; for example foreign ships that have major accidents in Canadian waters or some which are abandoned here due to the owner’s financial or legal problems. A well-known case of the latter scenario was the “Lyuba Orlova”, which spent years tied up in St. John’s before being lost while under tow to the Caribbean for scrapping. However, such incidences are relatively rare.

There are approximately 48,700 vessels registered in the Canadian Large Vessel Registry¹³. However, for registry purposes a “large” vessel is required to be registered if it is over 15gt and smaller vessels may be also be registered on a voluntary basis. Roughly 20,000 of the vessels in the registry are pleasure vessels, and a further 20,000 are fishing vessels, few of which are “large” in the context of this project (>100 gt).

The actual Canadian flag fleet of larger commercial and government vessels which are covered under this task is a few thousand. An extract from the vessel registry is provided at Table 10.

Table 10: Vessels over 100 gt

Vessel Type	Number
Barge	1304
Cargo	128
Ferry	113
Fishing	379
Floating Structure	1
Non-Commercial	25
Passenger	211

¹³ Study of the extent of abandoned and derelict vessels in Canada, Transport Canada, November 2012

Pleasure Craft	107
Sailing	1
Tanker	38
Tug	254
Workboat	157
Total	2718

As examples of the makeup of this list, the fleet represented by the Canadian Ferry Operators Association (CFOA) includes 162 vessels, not all of which meet the 100gt threshold. The Canadian Shipowners Association (CSA) represents 96 vessels operating mainly in the Great Lakes and St. Lawrence, a small number of which are small tugs operating with larger barges. There are a number of tug/barge operations on the West Coast, and offshore supply vessels on the East Coast. The Canadian Navy has roughly 30 large units (which are not covered by the list), and the Canadian Coast Guard a somewhat greater number of large icebreakers, buoy tenders, research and patrol vessels.

In recent years, a number of commercial and ferry fleets have been undertaking fleet renewal programs. This includes BC Ferries and Seaspam on the West Coast, and the Newfoundland and Quebec (STQ) provincial fleets. Algoma and Canada Steamship Lines have built new Lakers, and Groupe Desgagnes has two new tankers under construction. These and other examples are in most cases benefitting from changes to the import duty regime which allows the ships to be built economically offshore.

The federal fleets are intended to be rebuilt under the National Shipbuilding Procurement Strategy (NSPS). This is a long term initiative, which has not yet delivered any new ships. However, a number of vessels have reached the end of their service lives and been withdrawn from service, awaiting disposal. By policy, the Navy is currently committed to breaking all of its vessels in Canada, despite the considerable costs that this can incur. The Coast Guard has sold (or made available for sale) a number of its older units.

Almost half the vessels in Table 10 are barges, which are different in nature from other vessels and as a result have differing breaking and recycling challenges. Barges have few systems and little equipment on board, and so tend to have few hazardous materials to dispose of (though cargo residues such as oil may need to be cleaned). The steel and other metals used in their construction generally have significant scrap value. Self-propelled vessels, meanwhile, are much more complex, and will normally incorporate a wide range of materials that are hazardous and/or have no residual value.

Typically, Canadian flag ships have had service lives of 40-50 years, so a fleet of 2700 vessels would turn over around 25-300 larger ships and a similar number of barges per year. This is not a particularly large market, even assuming that all or most of the vessels would be disposed of in

Canada. A recent report¹⁴ suggest that Canada as a whole has more than enough capacity to handle potential needs in coming years, though without considering regional distribution. In principle, a facility capable of handling large vessels would also have the ability to deal with smaller craft but in practice the overhead costs are likely to make this uneconomic.

6.3 BARRIERS TO ADDING CAPACITY OR TO USING MORE OF THE EXISTING CAPACITY

A number of different barriers to adding shipbreaking and recycling capacity in Canada, nationally or regionally have been considered and explored. These include:

- The cost of labour in Canada, compared to other potential breaking locations
- Lower prices for certain recycled materials, compared to other breaking locations
- Stringent environmental and safety regulations for handling and disposing of hazardous materials
- Limited availability of suitable sites for shipbreaking

6.3.1 COMPARATIVE COST

Globally, most shipbreaking has gravitated to low wage countries and/or to locations where some form of government support has been provided for the operation. Figure 3 provides recent statistics for global shipbreaking projects¹⁵.

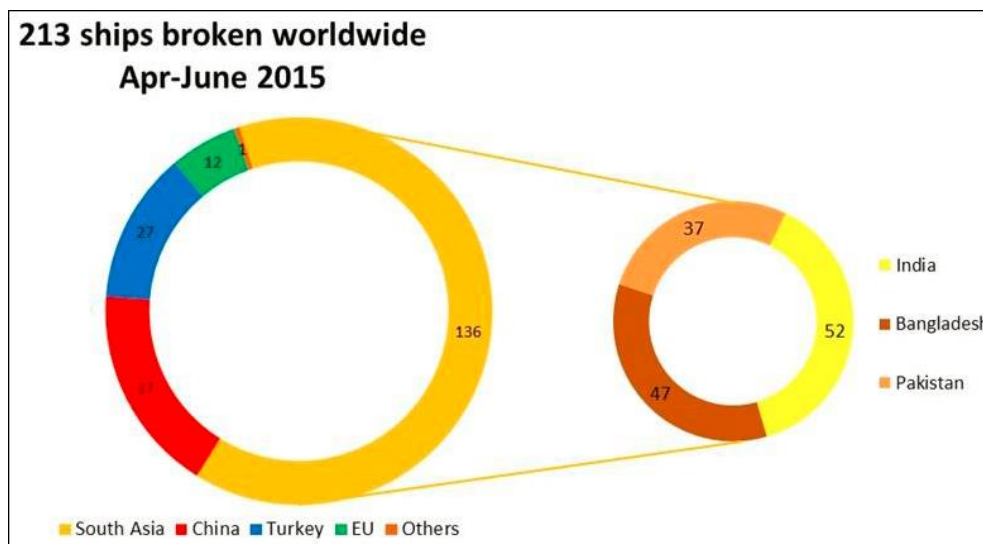


Figure 3: Worldwide Shipbreaking, Jan-Apr 2015

¹⁴ Industrial capabilities of North America -A report on “Green” ship recycling capacity in the United States, Canada and Mexico; Basel Action Network, Seattle, November 2012

¹⁵ NGO Shipbreaking Platform, April, 2015

Currently, the most popular location for many owners has become China, where facilities have been set up that can come close to matching other East Asian costs while meeting rather higher standards of environmental and safety protection than the well-known “ship on the beach” breakers in Alang, India and elsewhere. At its peak, Alang employed up to 60,000 workers, whose wages are as low as 250 rupees per day (about \$5 Canadian). As noted earlier, Alang was the final resting place for the two Marine Atlantic ferries, Smallwood and Caribou, shown in Figure 4.



Figure 4: M.V. Caribou at Alang Shipbreakers

The Chinese government adopted a substantial ship recycling subsidy in 2013 that was recently extended to 2017. Chinese shipowners receive \$120 a ton for a recycled ship and an extra \$120 a ton applied to the purchase of a new one. There was no longer any economic incentive to send old Chinese ships anywhere but China, and other South Asian destinations began to lose out. The consequence for the industry has been substantial. From January to April 2015, China recycled 65 ships, 24.8 percent of the 262 scrapped worldwide during the period, behind India's 69 and Bangladesh's 66. It is expected to become the No. 1 destination in the next quarter.¹⁶

Some European owners – and governments - are using Turkish shipbreaking yards as their preferred option, as these combine reasonable labour and environmental standards with relatively low wages and locational convenience. At this time, several Canadian owners are having new vessels built in Turkey (e.g. Seaspam, Desgagnes) and this may encourage them and others to consider Turkey for disposals as well. The “Canadian Miner” was intended to be scrapped in Turkey when it broke a towline and ended as a wreck.

¹⁶ <http://www.bloombergview.com/articles/2015-07-31/steel-glut-and-china-subsidy-clean-up-graveyards-of-ships>

Turkish shipyard labour rates are around 20% of those in Canada, and a similar ratio is likely to apply to shipbreaking. Shipyard workers in Canada are typically unionized and paid in the range of \$25-50/hour, depending on location and skill set. This is somewhat above the general Canadian salary range for labourers, which is likely to be more typical for shipbreaking operations. There the median Canadian salary is around \$18/hour, which is still above skilled labour rates in the major shipbuilding countries.

The current prices paid by shipbreakers for ships of different types are shown in Table 11¹⁷. These are indicative, and size and other characteristics have a strong influence. The price a breaker is prepared to pay reflects the cost of dismantling and the relative resale value of the materials that can be recovered, principally steel.

Table 11: Shipbreaking Values, \$US per Tonne

Country	Bulker	Tanker	Container	Price Trend
Turkey	220-225	230-235	220-225	Values are falling
Pakistan	335-345	360-370	n/a	Values are falling
India	335-350	360-370	360-370	Values are falling
Bangladesh	330-340	360-370	360-370	Values are falling
China	170-180	180-190	180-190	Values are falling

6.3.2 VALUE OF RECYCLABLES

For many shipbreaking facilities, the main value of a project is the sale of scrap steel to nearby steel mills. This is the case in India, China and Turkey; and also in Canada, though the volumes involved here are much smaller. This makes establishing relative values difficult, as most scrap prices in North America are quoted for small quantities. Recent numbers are in the order of \$US 100/tonne for scrap steel in North America, which would obviously make it uneconomic to break ships at anything like the sale prices shown in Table 11 above, where the values are reflective of local scrap prices.

The value of scrap metal in a ship may be offset in full or in part by the costs of disposal of any hazardous materials. There are many such materials in most ships, ranging from asbestos insulation in older vessels to mercury in lighting systems, lead in batteries, etc. Some of these may also be recyclable, but for an individual ship the quantities are too small to be economically interesting to the breaker itself, who may have to pay for their disposal. Generally, the ratio of steel to other materials becomes less attractive as ships become smaller or more complex; so that (for example) a ferry is less desirable to a shipbreaker than a bulk carrier or a barge. Therefore, while a shipbreaker may be ready to pay a significant amount of money for a large bulk carrier, it may actually require payment for the disposal of some ship types. This is more likely in countries where environmental and safety standards are high than in those where they are more casual.

¹⁷ Information from Lion Shipbrokers, July 2015

6.3.3 ENVIRONMENTAL AND SAFETY REQUIREMENTS

The shipbreaking yards in the Indian subcontinent have very poor records and reputations from both an environmental and a safety standpoint, to the point that many shipowners have become reluctant to use them from a reputational and social license standpoint (see also Section 5). Towards the other end of the spectrum, several of the Turkish yards are considered to meet equivalent standards to those of the EU, and comply with all IMO, ILO and ISO standards and guidelines. As noted at 6.3.1, several EU governments have sent warships and other vessels to Turkey for disposal without significant public fallout. Meanwhile, the first dedicated ship breaker in China was set up in a joint venture by the major (and socially responsible) shipowner Maersk to meet their own exacting standards, and although they no longer have an ownership interest the yard continues to operate in accordance with these standards.

In Canada, Marine Recycling in Port Colbourne advertises itself as a world-leading shipbreaker in terms of its environmental performance. To quote from the company's website:

"Hazardous wastes and dangerous goods designated under the Ontario Occupational Health & Safety Act such as Lead, Mercury and Asbestos are handled in house by MRC trained hazardous waste technicians. All employees are tested monthly through rigorous company medical surveillance programs that ensure the workers are protected to the best of MRC ability in the working environment. Mercury control programs, lead control programs and asbestos abatement control programs are all part of MRC's diligent health, safety and environmental programs. In addition, MRC has numerous trained HazMat Technicians, Confined Space Technicians, Asbestos Certified Technicians as well as many other certified company representatives to properly handle and abate the most dangerous wastes in the most rigorous circumstances.

All waste materials removed from MRC vessel conversions, total vessel demolition or various dismantling contracts are properly identified, packaged and removed from site through authorized contractors approved through MRC's ISO 14001 Environmental Management System Program. End destination facilities are audited by MRC's environmental compliance department."¹⁸

Requirements in Canada are without doubt more onerous than those in most of the major shipbreaking countries, but the differences in comparison with some are relatively minor in comparison with direct cost issues.

6.3.4 SITE AVAILABILITY

Shipbreaking is not a very attractive industrial activity from a visual, auditory or other standpoint. However, there are a reasonable number of sites in most of Canada where shipbreaking could be undertaken alongside or as a replacement for other similar activities. A number of Canadian shipyards have gone out of business or downsized in recent years, and while some of their locations have been repurposed (e.g. Collingwood, Ontario) there are others which would remain as possible options (e.g. Port Weller, Ontario; Vito, Vancouver, British Columbia, Marine

¹⁸ <http://www.marinerecycling.ca/page/company/environment/>

Industries, Sorel, Quebec, etc.). It is not considered that lack of suitable sites is a major impediment to adding capacity in most of Canada. This is more of a problem for the largest ships on the West Coast (in the Canadian context, this being anything over 100m in length) – these are also few in number.

6.4 OPPORTUNITIES AND BENEFITS

As noted earlier, it is not clear that Canada as a whole has a need for additional shipbreaking and recycling capacity; though the West Coast is relatively poorly served and the East Coast has no dedicated facilities.

Providing more capacity in these areas would potentially provide some benefits, including:

1. reducing overall (through-life) costs to vessel owners
2. reducing the incentive to abandon vessels at their end of life
3. reducing the risk of exporting Canadian vessels to countries with lower environmental and safety standards

In order to realize the first two benefits, the owner will have to receive financial benefit from the ship disposal; i.e. the breaker/recycler will need to pay more for the ship than the cost of transporting it to the breaking facility. In order to realize the third, the net value from breaking in Canada would have to be greater than the value of sending the ship to an overseas facility for breaking. Currently, this most favourable situation may only exist for a few owners of larger ships in Central Canada. There, the existence of Marine Recycling Corporation as a dedicated, high quality facility simplifies local disposal, and many of the ships (especially lakers) are more difficult to send overseas due to their lack of ocean-going certification. It is not clear that market forces alone would be able to create a similar situation on either coast, or for owners of smaller and more complex vessels.

6.5 SHIPYARDS AND SHIPBREAKING

VARD has discussed shipbreaking with a number of individual Canadian shipbuilding and ship repair yards, with the Canadian Shipbuilding Association, and with the West Coast Shipbuilding and Ship Repair forum.

Around the world, shipbuilding, ship repair and shipbreaking are typically handled by separate organizations due to the differences in the business models. Canadian yards have tended to mix build and repair due to the lack of business opportunities, but have never targeted shipbreaking as an ongoing business area. Several yards have broken individual vessels, but in most cases have been paid to do so, generally by provincial or federal governments. The current vessel disposal program of the Canadian Navy will involve significant payments to one or more selected facilities.

While a shipbuilding facility is very capable of handling ship breaking, there are several significant disadvantages. Firstly, the work does not require the types of skills which are involved in building or repair. Labour costs are therefore higher than necessary. Secondly, breaking will occupy valuable space in the yard's drydock and other facilities, which can prevent the yard from pursuing other and higher value-added work. Breaking projects will therefore only be taken on as a temporary expedient when other work is not available; or in cases where payment terms are attractive, such as those for the Department of National Defence.

6.6 SHIP SINKING – ARTIFICIAL REEFS

An alternative means of ship disposal is to remove hazardous materials from the vessel and then to deliberately sink it to form an artificial reef. In BC, the Artificial Reef Society of BC has disposed of seven ships (and one aircraft) in this way. Most have been ex-naval vessels, the most recent being the ex-HMCS Annapolis. Currently, the Department of National Defence has no plans to dispose of any other vessels in this way due to the increasing challenge of compliance with environmental regulations (see below)



Figure 5: Sinking of the Annapolis

However, discussion with the Society suggest that there is no shortage of suitable sites for this type of project, and there are opportunities on both coasts, although nothing has been done on the East Coast or in the Great Lakes for over 20 years. The Society itself is a charity, but aims to conduct its projects as partially self-financing ventures using a combination of commercial organizations and volunteer efforts to undertake equipment and material removals and to undertake site preparation work. Costs are recovered mainly through the scrap value of recovered items such as engines and other large components. With the Navy projects, the Navy itself has also undertaken much strip-out both of militarily sensitive equipment and of some hazardous materials. A typical project has taken 1-2 years to plan and execute.

According to the Society and to 3rd party research, ship-based reefs can provide valuable habitat for marine species. A supplementary benefit is to promote tourism by adventure divers, for whom these reefs become interesting destinations.

Ideal candidates for reefs are vessels in the order of 30 – 70m in length, which is a category that is otherwise relatively unattractive for breaking. It is therefore possible that this approach could

make a more significant contribution to ship disposal in Canada in the coming years, though this will still be highly dependent on material scrap values.

Ship sinking is controversial in many jurisdictions and is banned altogether in the US. The increasing stringency of environmental legislation can make even trace amounts of certain pollutants difficult and expensive to handle; on the other hand more modern vessels can have fewer of these and better documentation of those which are present.

6.7 SUMMARY

Most large ships disposed of by Canadian owners are not broken or recycled in Canada. Ships are typically sold to new owners, or are broken at foreign shipbreaking centres where the relatively low cost of labour has historically made resale of their recycled materials profitable enough to maintain the business.

While a limited number of Canadian facilities exist with the capability, the task of recycling a large vessel is generally unprofitable (or less desirable than ship building, refit, or repair) and is not likely to be undertaken by most Canadian shipyards. While a dedicated ship recycling facility does exist on the Great Lakes, the distance from the West Coast and the cost associated with transporting a vessel to the facility for recycling limits the former's market.

Ship sinking has been used to dispose of a number of large Canadian vessels but is becoming more difficult due to the increased stringency of environmental legislation.

7 SMALL VESSEL STAKEHOLDER PERCEPTIONS

Development of an understanding of the perceptions of small vessel owners (and other stakeholders associated with small vessels) was undertaken through surveys and discussions with a range of stakeholders through meetings and telephone follow-up of some survey responses.

The project received few responses from individual small vessel owners. There was however a significant number of responses as well as informal conversations with other stakeholders such as marina operators and boating groups (including local membership of the Canadian Power Squadron). These stakeholders were willing to share their own views, and to a degree were able to act as a proxy for the views of some small vessel owners.

Discussions and survey responses yielded a variety of opinions on small vessel disposal and issues surrounding the end-of-life of these vessels. The most common types of feedback and opinions offered by these stakeholders included feedback on the extent of the problem currently posed by abandoned vessels, the perceived availability of recycling or safe disposal options for small vessels, impressions of reasons an owner or operator would choose to dispose of a small vessel, as well as impressions of the underlying reasons that small vessels may be abandoned rather than disposed of in an appropriate fashion.

This section will describe the feedback gathered by the project across four categories:

1. Stakeholder Concerns and Perceptions of Small Vessel Disposal Throughout Canada
2. Drivers Towards Small Vessel End-of-Life
3. Stakeholder Perceptions of Small Vessel Recycling, Disposal, and Abandonment
4. Availability of Recycling and Safe Disposal Options and Considerations for Change

7.1 STAKEHOLDER CONCERNS AND SMALL VESSEL DISPOSAL

7.1.1 OVERVIEW OF PERCEPTIONS OF THE ISSUE OF VESSEL ABANDONMENT

Vessel abandonment is an obvious problem in a number of regions on the West Coast, where ease of access to sheltered areas near, or even within private marinas and public waterfront makes inconspicuous abandonment possible.

The problem is less obvious throughout Ontario, much of Quebec and the Prairies where inland waterways and lakes are the bodies of water used for recreational purposes. Vessels in this region are more likely to be laid up on land, or re-sold. In some cases ownership may be taken over by marina owners after a period of non-payment of marina fee, and the craft may be sold off or disposed of by the latter. This is fairly common in marinas where vessels have been left unattended over long periods of time, though it needs to be handled very carefully to avoid legal pitfalls¹⁹.

The perceived problem is much less of a concern on the East Coast. Immediate access to the Atlantic Ocean and its winds and currents typically means that some small vessels which have been abandoned can easily disappear into the ocean. There is also more of a tradition and perception that derelict vessels are more acceptable than is the case in other regions.

¹⁹ <http://www.cmla.org/papers/Marina%20Operator-Chapelski.pdf>

7.1.2 SPECIFIC STAKEHOLDER CONCERNS, IMPRESSIONS, AND COMMENTS

The project team fielded a significant number of survey responses from marina operators in BC. Vessel abandonment is clearly perceived to be a significant issue in the region, with numerous respondents reporting problems ranging from illegal mooring adjacent to their facilities, to abandoned or sunken vessels inside their facilities which cannot be dealt with easily due to regulatory and risk uncertainty, and even incidents of vessels leaking fuel, sewage, or even being set ablaze in their harbour as a means to scuttle them quickly.

Responses were received from a number of marina operators from both within and outside the greater Vancouver region, as well as from several municipalities. All the stakeholders acknowledged that proper disposal of vessels is an issue.

One marina reports an estimated 16 vessels sunk deliberately or after being abandoned on the sea floor within the bounds of their marina. Another marina provided images of derelict vessels inside their bay which are being monitored by TC, but have not yet been removed.



Figure 6: Abandoned vessels sunk in the harbour at Oak Bay, BC

This stakeholder also noted that this type of situation is typical of most small marinas in the region from year to year. Other facilities operators have stated that they provide safe disposal for a fee, but have observed dozens of abandoned hulls along the shoreline within a short sail from their facilities. Stakeholders noted that abandoned vessels frequently blow onto private shorelines, where responsibility for cleanup is difficult to discern as no party willingly incurs the cost.

A remote municipality with limited resources noted that derelict vessels must be towed away to a facility for demolition, which can cost thousands of dollars of municipal funds. They have been able to obtain a limited amount of federal assistance to date, however it has not yet been sufficient to cover their costs. Coupled to the impact of incurring costs is the need to mitigate potential environmental issues. Both municipalities and facilities operators often have to incur the cost of disposal regardless of any lack of clear responsibility to avoid or mitigate environmental issues stemming from contaminants leaking out of wrecked vessels.

Outside of BC, there was acknowledgement that the issue of proper vessel disposal is important, but the perceived problem of abandoned vessels is of less general concern. Marinas do have many anecdotal examples of owner abandonment and have to arrange for vessel disposal. In much of Canada, all small craft do have to be hauled out every winter which leads to far fewer cases of vessels sinking at their moorings; one of the most visible manifestations of abandonment on the West Coast.

7.2 SMALL VESSEL END-OF-LIFE FACTORS

There are a variety of reasons that a small vessel owner could choose to dispose, recycle or abandon of their boat. Feedback from stakeholders suggested a number of common reasons that their clients or members choose to no longer own their vessels. These can be grouped into 2 main categories:

- Financial issues: The continued ownership of the boat imposes a financial burden on the owner; for example storage fees, insurance costs, necessary maintenance, and operating costs. These can be particularly burdensome for long-time owners with changing priorities, as well as new owners lacking in experience with the full cost of owning and operating a small vessel.
- Personal Issues: Includes owners who are moving and not able or willing to bring the boat, no longer have the available time to enjoy their small vessel, or are no longer be sufficiently healthy or mobile to operate the boat.

Other less common reasons also cited include changes to regulations or access to waterways. Marinas closing or having limited slip space available, or social pressure at the owner's property or waterfront access may introduce too much inconvenience to using the boat regularly to make it worth maintaining.

7.3 DRIVERS TOWARDS VESSEL ABANDONMENT

7.3.1 OVERVIEW

There are a variety of reasons that vessels may be abandoned rather than disposed of responsibly. Discussions with stakeholders suggest that, particularly on the West Coast, the main factors in

play are a lack of enforcement coupled with a lack of convenient and inexpensive (or free) options. Operating a small vessel is not an inexpensive undertaking, and in the opinion of many marina operators the issue is that some boat owners will choose the path of least resistance and cost to rid themselves of an unwanted financial burden by abandoning the boat.

A variety of other drivers were also suggested through survey responses and discussions, including financial, logistical, and social reasons:

- A lack of incentive for the proper disposal of old vessels in addition to a lack of penalties for abandoning vessels.
- Unwillingness to incur the cost of proper disposal. Some stakeholders noted that boat owners already financially burdened by their unwanted vessel will certainly not incur additional cost to dispose of it.
- Difficulty in establishing information on vessel licensing and ownership.
- Accessibility and location of disposal or recycling facilities is limited in certain regions where abandonment is an issue.
- Lack of enforcement for proper disposal or recycling.

Another interesting anecdote is that certain marina operators on the west coast have a reputation amongst their fellow facilities operators for encouraging the scuttling of vessels. Essentially, each time an owner abandons a vessel within a marina facility its operators become obligated to have it removed and scrapped at their own expense. It is believed within industry circles that avoiding this problem by encouraging owners to deliberately sink their vessels outside marina boundaries is a fairly common practice.

7.3.2 POTENTIAL LEGISLATIVE DRIVERS

Another likely cause of vessel abandonment throughout all regions of Canada is a legislative disconnect between licensing of small vessels and disposing of them at end-of-life.

Under the Small Vessel Regulations, a sub-section of the *Canada Shipping Act* that was established in 2001, all pleasure craft powered by a propulsion system of more than 7.5kW must be licensed. The license is free of cost and is valid for ten (10) years. Licensing of craft with propulsion systems rated below 7.5kW is optional. The fine for the unlicensed operation of a vessel that requires a license is currently \$250.

There is however no mechanism currently in place in Canada that governs end-of-life for these vessels. With vessel registration taking place under a federal mandate, and disposal generally being a provincial or municipal issue, there is no unifying mechanism for reporting that a licensed vessel is derelict or about to be destroyed; or that a license has lapsed, which may also indicate a high risk that a boat will be abandoned. As a result, there is little legal incentive for an owner to take any action if they no longer intend to use the boat – it can simply be lost in the system or forgotten. While this is not a barrier to the expansion of Canada’s small vessel recycling capability per se, it does represent a legislative shortcoming which manifests as a social issue that will hinder a new facility or program’s market expansion.

Discussions with industry stakeholders suggest that an eventual solution may be a system which would require both record keeping of vessel licensing, ownership, and physical location or home port, as well as a requirement to officially “un-license” a vessel when it is to be destroyed. The

latter would require a significant amount of effort to implement, though amendments to the regulations, public education, and possibly the introduction of fines, fees, or financial incentives to encourage compliance.

7.4 AVAILABILITY OF SAFE DISPOSAL/RECYCLING FACILITIES AND PUBLIC PERCEPTION

Generally, recycling appears to be most common (or at least most widely understood to be an option at all) in Southern Ontario. Some options exist on the West Coast, however most are generally thought to be limited to specific marinas with the capability to demolish and dispose of vessels. There were no responses or discussions which suggested any sort of publicly known options on the East Coast for small vessels, despite the initiative of the NSBA discussed in Section 3.

Discussions with stakeholders and numerous responses from facilities operators suggest that while a variety of options are in fact available for the safe disposal of small vessels, they tend to be only practical within a narrow geographic radius, and they are generally focused on demolition and disposal of unwanted vessels, as opposed to complete or even partial recycling.

Operators of a number of marinas and boat yards in BC noted that they offer disposal services for unwanted small vessels for a fee. This typically involves removal of hazardous substances, and subsequent demolition of the hull using construction equipment (typically a rented excavator and dump truck) followed by finally taking the broken down materials to a local landfill.



Figure 7: Boats being scrapped and recycled at Shelter Island Marina in BC

Some operators noted that they are physically located near areas where abandoned vessels are a problem, and that the general public should be able to discern that the service is available via an internet search. They also noted that they do in fact dispose of a limited number of boats each

season. There is however a cost of anywhere from \$300 to over \$1000 associated with demolition of a vessel, and in their experience an irresponsible owner will be more likely to simply abandon the vessel rather than incur the cost of proper disposal.

In central Canada, and particularly Southern Ontario near large bodies of water such as Lake Simcoe, there are a number of marine salvage yards suitable for sailboats and motor yachts. These facilities will store, rather than demolish, unwanted vessels and allow the public to purchase salvaged parts, hulls, or even complete vessels. At least one such facility has launched a pilot program whereby they completely dismantle the vessels, and recycle all materials including fibreglass.²⁰



Figure 8: Boats awaiting recycling in the yard at Kawartha Boat Wreckers in Bobcaygeon, ON

Discussions with Ontario based members of the Canadian Power Squadron suggest that most of their membership is aware of this option for disposal of unwanted vessels, though the service is only available in a limited region. They also noted that typically these vessels will have an extremely long useful life due to freshwater operations, and will generally be sold (often on commission through a marina) at an attractively low price rather than be scrapped.

²⁰ <http://kawarthaboatwrecking.com/fibreglass-recycling/our-environmental-initiatives/>



Figure 9: Boats in storage, some for sale, at Ontario Boat Wreckers in Sunderland, ON

Additionally, when new regulations affecting the status of a vessel become enforceable, historically it has remained economically viable to make the necessary modifications. Many vessels undergo reconfigurations to meet contemporary needs.

Other discussions with stakeholders in Southern and Eastern Ontario such as local municipalities also suggested that small recreational vessels are rarely abandoned in waterways. Coastlines in the region tend to be much less remote than in Northern BC, and are well-travelled by cottage and land owners, making it more difficult to discretely abandon a vessel. As a result, many small recreational vessels no longer in service will often be pulled to land and abandoned there. The facilities inventory development portion of this project found little readily available information on recycling facilities for this type of small vessel, and stakeholder discussions echoed this, as a number of responsible boat owners and associated stakeholders could not offer any suggestions as to where one could recycle a small vessel other than taking it to a salvage yard.

7.5 SUMMARY

The responses received by the project suggest that vessel abandonment is widely acknowledged as a problem throughout western Canada and Ontario. Discussions with stakeholders suggest that, particularly on the West Coast, the main factors in play are a lack of enforcement coupled

with a lack of convenient and inexpensive (or free) options. More specifically, an irresponsible boat owner will be likely to abandon their unwanted vessel in the absence of enforced consequences. Inexpensive or free disposal or recycling options would be beneficial, however the operators of marinas and municipal marine infrastructure would benefit the most from this, as it would reduce their costs when removing abandoned vessels from their facilities.

Recycling of small vessels is available in a number of regions, and is used by a limited number of responsible boat owners. However, accessibility of disposal or recycling facilities is limited in certain regions where abandonment is an issue. In most cases, laying an unwanted vessel up on land or mooring it near shore is a path of lower resistance compared to trailering it to a disposal site, or paying for pickup or removal.

On the East Coast of Canada there appears to be more of a tradition and perception that derelict vessels are more acceptable than is the case in other regions.

In general, the issues surrounding the proper disposal or recycling of vessels are widely acknowledged by industry stakeholders, and the latter typically believe that while options are available to owners, they will be under-used until one or both of lower costs and strict enforcement become reality in Canada.

8 SMALL VESSELS CAPACITY BUILDING

This task focusses on:

- barriers and constraints to the expansion of Canada’s domestic shipbreaking capacity for small vessels,
- potential opportunities for and benefits of expanding this capacity, and
- the related potential for other recycling businesses to expand into breaking/recycling small vessels.

The project team engaged in dialogue with existing recyclers to help clarify the current economic and logistical state of recycling in Canada, including the current market for the materials commonly found in small vessels, whether large scale facilities could be interested in dealing with both small and large vessels, and whether the differences in skills and in material types reduce the feasibility of this approach.

8.1 BARRIERS AND CONSTRAINTS TO EXPANDING DOMESTIC SHIPBREAKING CAPACITY FOR SMALL VESSELS

As noted in the Statement of Work, a variety of barriers to expanding Canada’s domestic small vessel breaking and recycling capacity have been considered, including:

- The cost of labour in Canada, compared to other potential breaking locations.
- Lower prices for certain recycled materials.
- Stringent environmental and safety regulations for handling and disposing of hazardous materials.
- Limited availability of suitable sites for shipbreaking.

While these have been discussed for large vessels under Section 6.3.4, there are some significant differences for small vessels; particularly with respect to economics and site availability.

8.1.1 ECONOMICS – LABOUR COSTS AND MATERIAL VALUE

Large ship breaking is paid for by recovery of recyclables for which a market exists. However, unlike larger steel vessels there is not a market for the materials from these small vessels. These vessels typically have relatively small amounts of scrap steel or aluminum, wood from these vessels is often oil-soaked and of no value, and as described elsewhere in this report it is widely recognized that fibreglass can be challenging to breakdown and recycle.

Unlike large steel vessels, small recreational and commercial vessels do not get transported to foreign markets to be recycled and thus the cost of labor in other potential breaking and recycling locations in comparison to Canada was not considered to be an influencing factor.

Currently the economic reality in Canada is that it is more costly to purchase recycled material than virgin material. Likewise it generally costs more to recycle old material than it does to dispose of it by dumping. While the cost of dumping depends largely on the number of available landfill sites in a given region (and to a lesser degree, regulations) it is generally the lesser of the

two alternatives. This means that generally, across Canada, it is cheaper to send small vessels to landfill than to attempt to completely recycle them.

The project team met with representatives from the Canadian Association of Recycling Industries (CARI) in an effort to better understand the domestic industry, as well as to reach out to operators through their industry representatives. The meeting helped to clarify the economics of the recycling industry, and also supported the project's finding that recycling of small vessels is not appealing to the industry's operators.

- CARI explained that in Canada the recycling industry is typically concerned with the commodity price of desirable metals, and does not see any other factors as influences or drivers affecting their business model. The commodity price of steel has fallen recently, resulting in increasingly tight margins.
- In general, CARI expect that intake of unwanted vessels whose hulls or structure is primarily steel or aluminum would be desirable.
- Intake of vessels constructed primarily from fibreglass or GRP which do however have salvageable wiring or components is much less likely due to tight margins, and the labour associated with stripping the vessel.
- Intake of the typical case for abandoned recreational vessels such as sailboats with little remaining metal material onboard is highly unlikely as the industry earns no benefit at all from doing so.
- Current intake rates for entire vessels is estimated to be on the order of one or two per year, and at a very limited number of facilities.

CARI also agreed to publish a brief description of the vessel disposal study in their industry circular, inviting operators of recycling facilities to participate. To date, no responses have been received.

There is not currently a market in Canada for recycled materials from small craft because the cost of using the most common recycled material, specifically Glass Reinforced Plastic (GRP) – commonly known as fibreglass, is not competitive with using new materials. A market is unlikely to develop until either a legislative requirement or incentive system is in place, or the difference in cost between new and recycled materials becomes insignificant.

8.1.2 CHALLENGES RECYCLING OF GRP/FRP

The majority of small craft are constructed primarily out of GRP, commonly referred to as fibreglass or Fibre Reinforced Plastic (FRP) and are outfitted using numerous forms of synthetic materials. Typical small boats have cores of either balsa wood, synthetic foam or plastic honey comb and their laminates are comprised of woven or knitted glass fibre fabrics. This material is particularly difficult to render down for re-use. Advanced composites utilizing carbon fibre in lieu of glass fibre are creeping into the market but are currently reserved mainly for high cost exotic or extreme competition boat designs. At what juncture alternatives to glass fibre reinforcement will take any significant market share is difficult to predict.

To date, GRP has very limited secondary applications largely due to economics and the challenges associated with decomposing the material into its constituent components. As a result, GRP has traditionally been directed to landfill sites as opposed to recycling facilities.

The glass fibre content in GRP, if separated, can be used in secondary applications as a low grade reinforcement in mediums such as concrete, asphalt and Sheet Molding Compound (SMC). Currently, there are three processing methods used for recycling fibreglass and extracting its glass fibre content known as grinding, incineration and pyrolysis.

In the grinding process, the material is reduced to small pieces to be reused in other materials and products. Incineration involves the combustion of organic substances contained in waste materials to create heat for other purposes and is thus described as a thermal treatment system. Incineration carries with it the risk of atmospheric toxic pollution and is the leading source of dioxin into the global environment. Thus, stringent environmental and safety regulations are applied to this process. An alternative approach to incineration is pyrolysis. Pyrolysis is the process of chemically decomposing or transforming a material into one or more recoverable substances by heating it to very high temperatures in an oxygen-depleted environment. This process is different from incineration, which takes place in an open atmosphere environment. It is significantly cleaner than traditional incineration.

A company named Clean Harbor Canada, Inc. operates a treatment and disposal incineration facility in Corunna, Ontario for waste generators from across the Great Lakes region. The company provides an extensive range of environmental services some of which include hazardous and non-hazardous waste transportation and disposal, as well as field and industrial services.

Other companies which provide recycling services for fibreglass boats include LA Boat Works, T&C Scrappers and Happy Harry's Used Building Materials, all of which are located throughout Ontario. The Cape Breton Regional Municipality (CBRM) and the Halifax Regional Municipality (HRM) in Nova Scotia also operate incinerator facilities.

Although the technology to recycle fibreglass is available, the industry has failed to develop due to low profitability from byproducts and the abundance of cheap virgin materials. Considerable research and development is ongoing to develop better recyclable composites and technologies to recycle composite materials. Unfortunately, the economic viability of any of these remains unproven in Canada or elsewhere (see also Section 9).

8.1.3 SITE AVAILABILITY

Disposal of small vessels generally happens close to their area of operation. Final, often lengthy voyages to a breaking yard which are the norm for large vessels are almost unknown for small craft. Vessels are generally stripped and cut up where they are found and their elements transported to nearby landfills and facilities for further processing or disposal. This adds to the disposal cost and lack of convenience.

Discussions with stakeholders suggested that large scale facilities are unlikely to be interested in dealing with small vessels due to low or non-existent profit associated with the work.

Developing dedicated sites for small vessel disposal across Canada could conceivably be feasible in a few locations in or adjacent to major metropolitan areas with large populations of small craft.

However, these are also areas in which there is considerable resistance to industrial/waste disposal activities of this type, due to perceptions of environmental hazards.

8.2 OPPORTUNITIES AND BENEFITS OF EXPANDING DOMESTIC CAPACITY

The potential volume of shipbreaking and recycling on an annual basis as compared with current volumes was assessed in order to quantify the potential benefits to expanding this capacity domestically. The Canadian small vessel fleet is extremely large, and is several orders of magnitude greater than the large vessel fleet. As noted in Section 6.2, discounting fishing vessels, pleasure craft, and vessels smaller than the project’s 100gt threshold for a “large” vessel there are only a few thousand “large” vessels in the Canadian fleet.

In 2012, the National Marine Manufacturers Association (NMMA) Canada conducted a study into The Economic Impact of Recreational Boating in Canada²¹. This study estimated the approximate number of vessels by region, as shown in Table 12 below.

Table 12: Number of Boats by Region

Number of Boats by Region	
Region	Lower Bound on the Number of Boats
Atlantic	350,000
Quebec	860,000
Ontario	1,830,000
Prairies	650,000
BC	610,000
Canada	4,300,000

The study also investigated the number of boat sales in Canada over a four (4) year period. It was found that from 2009 to 2012, the number of new recreational boats entering the Canadian market each year was approximately 45,000. This is about 42% of total boats sold each year, as shown in Table 13.

²¹ The Economic Impact of Recreational Boating in Canada: 2012, National Marine Manufacturers Association

Table 13: Boat Sales by Year

Boat Sales By Year				
	2009	2010	2011	2012
New Boats	46,366	57,215	44,400	47,032
Pre-owned Boats	68,526	80,733	54,257	63,302
% New	40%	41%	45%	43%

The number of new vessels coming into service each year is therefore approximately 1% of the total number of boats.

The project team also examined the age distribution and condition of a small set of recreational craft whose owners have requested inspections or valuations over the past three years.

The age of the craft ranged from 1929 to 2012, with an average length of 9.7m. The age distribution of craft inspected is shown in Figure 10, with the exception of two boats predating 1960. As depicted in the Figure 9, there was a significant decrease in the number of vessels from before 1970.

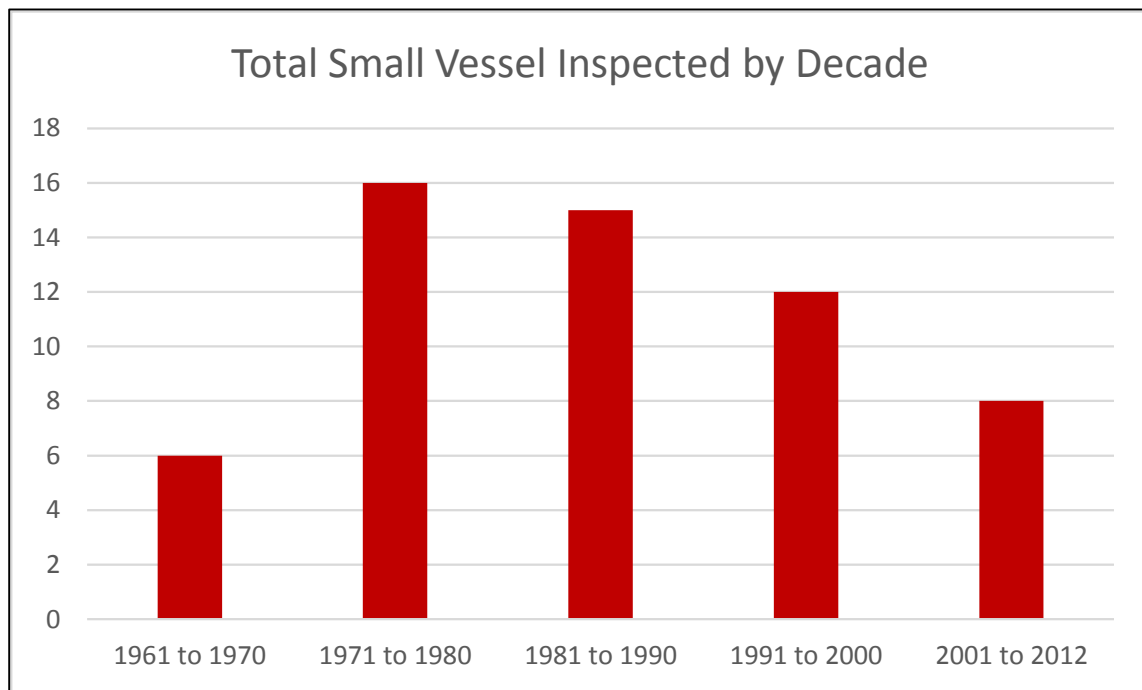


Figure 10: Age Distribution of Craft Inspected (SWL Consultants, 2015)

The review rated the participating vessels in terms of their operating conditions, as either Good, Fair or Poor. The results and comments from the review are presented in Table 14.

Table 14: Inspection Results (SWL Consultants, 2015)

Inspection Results		
Number of Boats	Outcome	Additional Notes
38	Good	<ul style="list-style-type: none"> Fully operational and no major deficiencies.
17	Fair	<ul style="list-style-type: none"> All operational but in need of some upgrading. Sixteen (16) of these were built between 1962 and 1989.
4	Poor	<ul style="list-style-type: none"> Two were of Glass Reinforced Plastic (GRP), one of aluminum and one of wood with overlaid GRP. More financial investment is required than the vessel's market value warrants. Age ranged from 1970 to 1984.

Although the number of inspected craft identified in this study is not statistically significant, the results imply that the life expectancy of a recreational craft may be in the order of forty five to fifty five (45-55) years for a large proportion of vessels. The results can be used to formulate an estimate for the potential number of derelict vessels and candidates for recycling, per annum.

For example, assume that over 3-5 years the 4 boats in poor condition are disposed of. This represents 7% of the surveyed vessels. Using conservative assumptions of 5% of vessels every 5 years, or 1% per year gives a similar number to that for new vessels entering service, which seems quite reasonable – the active fleet size is remaining relatively constant. Therefore, given the estimated total stock of 4,300,000 vessels in the fleet, this would suggest that 43,000 vessels need to be disposed of each year. More information would need to be collected on the size and type distribution of the fleet, but again conservatively the average weight of GRP in these vessels can be taken as around 100kg, giving a need – or opportunity – to handle around 4,300 tonnes of GRP nationwide.

8.3 THE POTENTIAL FOR OTHER RECYCLING BUSINESSES TO EXPAND INTO BREAKING/RECYCLING SHIPS

Contacts in the non-marine field were used to explore possibilities for other recycling businesses to expand into breaking/recycling of ships. Breakers of cars and recycling organizations for building materials are the logical candidates for leveraging capability and material streams across industries.

Building materials created from recycled products or containing a certain quantity of recycled content are available, however the building industry tends to focus on larger-scale recycling of fabricated items, such as site provided materials, scrap or salvaged wood, shipping containers, and the like. Some base materials containing a certain amount of post-consumer waste are also becoming popular alternatives to new materials, including plastic “wood-like” forms used for park benches, boardwalks, decks, and other applications where softwood has previously been favored. These products are generally created from other sources of plastics such as municipal recycling programs, and certainly do not represent a viable waste stream recipient for a massive number of small vessels.

The auto recycling industry is well organized to handle automobiles; stripping, re-stocking used parts, reduction of metal parts and disposal of the non-value materials. Since the 1990’s there has been a noticeable increase in the molded plastic content of automobiles in particular Sheet Molding Compound (SMC), glass fibre reinforced composite. As previously mentioned, the glass fibre content in vessels composed of Glass Reinforced Plastic (GRP), if extracted, can be used to create SMC.

To determine whether there is a business case to be made between the marine and automobile recycling sectors, the economic benefits and modifications required in organizing and managing the disposal of GRP boats within or alongside a business devoted to automobiles can only be assessed by the operator of a given facility. The business case will be driven primarily by the ‘predictable’ number of craft received on a regular basis and areas of sizable boating populations will clearly be the most viable.

8.4 SUMMARY

While large vessels face a variety of barriers to being recycled in Canada, small vessels are primarily constrained by the lack of market appetite for the component materials. There is a reasonable market in regions with plentiful marine recreational activity for salvaging the most desirable components of a small vessel (engines and propulsion equipment, electronics, etc.) There is not however any appreciable market for recycling the wood, fibreglass, and plastics which account for most of the materials of which a small vessel is typically constructed.

Effectively, across Canada, it is almost always cheaper to demolish small vessels and direct them to landfill rather than to completely recycle them. New materials are less expensive than recycled materials, and there are currently no incentive programs in place which can offset this cost.

Opportunities do exist to expand capacity, however new facilities (or expansion of current facilities) will require good strategic locations as well as a means of achieving financial viability given the relatively cheaper cost of new materials compared to the recycled materials they will

produce. Development of recycling sites for small vessels will likely be most feasible in locations in or near major metropolitan areas with large populations of small craft, or at facilities easily access from waterways with significant volumes of recreational marine traffic.

There is potential for significant number of small vessels, likely in the thousands or more, to come out of service each year across Canada. Given the volume of material this represents, recycling even a fraction of these vessels would represent diverting tens of thousands of tonnes of waste from landfill each year.

9 BEST PRACTICES

This section of the report presents a number of examples of current best practices on vessel disposal and recycling worldwide, which may help provide a basis for future policy formulation in Canada at either a federal or provincial level. The report is largely based on literature survey, combined with discussions with some organizations in Canada and the US.

Best practices in this context are taken to include a range of measures that can contribute to environmentally-friendly means of vessel disposal, and also to the prevention or remediation of the problems caused by abandoned and derelict vessels. As such, the report identifies initiatives ranging from legislation to new technologies for recycling.

9.1 CANADA

9.1.1 SHIPBREAKING

It is worth noting that the Ontario Marine Recycling Corporation is acknowledged as a leader in environmentally friendly and safe shipbreaking, waste disposal and recycling, and therefore a good example of best practices. It does undertake a reasonably steady stream of projects, without operating to its full potential capacity. It is essentially a large vessel breaking facility and would not be a cost-effective option for smaller craft.

9.1.2 OPPORTUNITY FOR DONATION

As an alternative end-of-life solution for boat owners, multiple charitable organizations are now in place to accept old or scrap vehicles. This may include boats as well as cars, trucks, motorcycles, etc.

These organizations often provide a quick, hassle free pick-up and removal process for vehicle owners as well as a tax deductible receipt for their donation. Depending on the condition, the organization may choose to dispose, recycle, sell or re-commission the donated vehicle. This provides boat owners with relatively easy, manageable option for disposing of their old boat, with the benefit of supporting a good cause. Table 15 provides examples of large charitable organizations in Canada which run these types of programs. Unfortunately, unserviceable fibreglass or wooden boats will often not have any residual value allowing use of this approach.

Table 15: Donation Option – Charitable Organizations

CHARITABLE ORGANIZATIONS			
LOCATION	NAME	REFERENCE	NOTES
BRITISH COLUMBIA	Disabled Sailing Association	http://www.dsaboatdonation.org/contact-us.html	<ul style="list-style-type: none"> - Receive tax deductible and a quick removal process. - The association facilitates the delivery of the boat to an appropriate marina.

CANADA-WIDE	Donate a Car Canada	http://donatecar.ca/	<ul style="list-style-type: none"> - Accept marine vehicle donations in every province. - The vehicle owner chooses which charity they would like to give the donation. - Receive tax deductible receipt.
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9.2 UNITED STATES

In the US, the ship recycling industry dates back to the 1950's, when an abundant supply of end of life vessels emerged following World War II when a substantial number of U.S. military vessels formed the National Defence Reserve Fleet (NDRF). This yield a strong ship recycling industry in the U.S. and coincidentally developed a successful public private recycling partnership which was maintained until the 1970's.

Due to military build-up as a result of the Cold War throughout the 1980's, the ship disposal industry rapidly declined as reserve fleets were kept at maximum capacity, which subsequently encouraged recycling operations to move overseas. This continued until 1998 when vessel disposal overseas was prohibited under a moratorium put in place by the Clinton Administration. It was further secured in 2009 when the U.S. Congress provided funding that ensured government vessels were recycled and disposed of in the U.S. However, the costs of US vessel disposal are too high to be attractive to Canadian owners.

9.2.1 STATE PROGRAMS

For small vessels several States have successfully implemented various vessel recycling programs and policies. Twenty-four (24) states have Abandoned Vessel Programs, of which 14 receive funding from various sources. They vary considerably in approach by state and in some cases by county. A number of the more comprehensive approaches are on the West Coast of the USA.

As examples, the state of **California** proposed legislation in the "Report and Recommendations Related to Abandoned Vessels" report published in 2005, which allows boat owners to turn in their boats rather than abandon them. The first ten (10) recommendations in the report provide strategies to prevent recreational vessels from being abandoned. The remaining recommendations were related to revising regulations to make vessel disposal easier and more accessible for local agencies, increasing the penalties of abandoning vessels and consequently provide a stronger deterrent for boat owners, and encouraging vessel registration and tracking to simplify the ownership discovery process.

In addition, the California State Parks, Division of Boating and Waterways (DBW) introduced a Vessel Turn in Program (VTIP) in 2010 to provide an alternative for recreational craft owners to dispose of unwanted vessels to public local agencies. The program operates by providing funding from the Abandoned Watercraft Abatement Fund (AWAF) to public local agencies wishing to participate in the program, allowing them to administer a turn-in program in their jurisdictions.

The DBW also offers grants under the Surrendered and Abandoned Vessels Exchange (SAVE), which also provides funding to local agencies for the proper disposal of vessel whether abandoned or turned into their respective jurisdictions.

The state of **Oregon** also has laws pertaining to the abandoned and derelict vessels.

In Oregon, abandoning a vessel is a violation and other criminal or civil charges related to environmental degradation may also apply.

In addition, the owner of an abandoned or derelict vessel remains responsible for the cost of clean-up, removal, storage and disposal of the vessel. The owner of an abandoned or derelict vessel has the option to reclaim their vessel if they pay all of the costs incurred for salvaging, towing and storing the vessel.

It is also notable that, it makes no difference whether the abandoned or derelict vessel is left on public or private property, by law both are considered illegal.

Washington State has a derelict vessel removal program administered by the Department of Natural Resources²², which has disposed of roughly 600 vessels since 2002 and which has been cited as a model by others. This program includes funding which allow the Department itself or 3rd parties to remove derelicts, and also a more recent component which helps owners to turn-in vessels if they are financially incapable of doing this themselves. Current funding levels for these programs are roughly US\$2.5 million/year.

The state has also strengthened the legislation aimed at preventing vessels from being abandoned, and clarifying the legal responsibilities of owners.

In the state of **Florida**, which is home to a vast array of small craft, has policies at both state, county and municipal levels. The legal regime and obligations on boat owners are generally similar to those in Oregon, and owners of abandoned or derelict vessels are obligated to pay all costs associated with disposal at risk of fines and jail time. Despite this, abandoned and derelict craft are a continuing problem. Tampa Bay in 2009 benefitted from \$1.5 million in state funding to pay for removal of some of the hundreds of derelict vessels littering the inlets of Tampa Bay.

The state of **South Carolina** has established a state law that permits the salvage of abandoned vessels, in aims of encouraging their removal by other boat owners and enthusiasts.

9.3 EUROPE

9.3.1 LARGE VESSELS

A feasibility study commissioned by the European Union (EU) in 2002, concluded that shipbreaking was unlikely to be carried out in Europe due to its hazardous nature, its relatively high cost and the lack of demand for scrap steel. A focus for the EU has therefore been on reducing the environmental and safety impacts of vessel disposals by EU owners in other countries

²² <http://www.dnr.wa.gov/programs-and-services/aquatics/recovering-derelict-vessels>

A new EU Ship Recycling Regulation entered into force on 30 December 2013²³ that brings into force the early implementation of the requirements of the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships, 2009, and is intended to contribute to its global entry into force.

The new Ship Recycling Regulation applies to large commercial seagoing vessels flying the flag of the EU Member State, and to ships flying the flag of the third country calling at EU ports or anchorages.

The Regulation sets out a number of requirements for European ships, European ship owners, ship recycling facilities willing to recycle European ships, and the relevant competent authorities or administrations.

European ship owners will have to ensure that ships are only recycled in ship recycling facilities included in the European List. They will have to ensure that each end-of-life ship is prepared for recycling.

Prior to any recycling of a European ship, a ship recycling plan will have to be developed by the operator of the ship recycling facility based on the information provided by the ship owner.

In order to be included in the European List, any ship recycling facility irrespective of its location will have to comply with a number of requirements. The Commission will assess the applications received from the ship recycling facilities located in third countries.

The European List will be published in the Official Journal of the European Union and on the website of the Commission at the latest thirty six months after the date of entry into force of the Regulations (i.e. at the latest by the end 2016). It will include the following information about the ship recycling facility:

- a) the method of recycling;
- b) the type and size of ships that can be recycled;
- c) any limitation and conditions under which the ship recycling facility operates, including as regards hazardous waste management;
- d) details on the procedure (explicit or tacit) through which the ship recycling plan will be approved; and,
- e) the maximum annual ship recycling output.

Meanwhile, the EU has funded a number of large research and development projects examining various aspects of ship disposal and recycling, including:

- RECYSHIP, a pilot project for the decontamination and recycling of end of life vessels.
- SHIPDISMANTL – Cost effective and environmentally sound dismantling of obsolete vessels. The project was funded with 1.5m EURO under the 6th European Research Framework Programme (FP6)
- SHIPMATES – Ship repair to maintain transport which is environmentally sustainable. The project was funded with 2.15m EURO under the 6th European Research Framework Program (FP6).

²³ <http://ec.europa.eu/environment/waste/ships/list.htm>

- DIVEST – Dismantling of vessels with enhanced safety and technology. Project foreseen under the 7th European Research Framework Program (FP7).

All of these projects have websites offering additional information on the participants and findings.

9.3.2 SMALL VESSELS

Disposal of small vessels in the EU is subject to general EU-wide environmental regulations and policies, but with more national variability than is the case for large vessels. In general, EU policy aims to make landfill options very expensive. This higher expense makes recycling the lesser of two economic evils. Typically, landfill costs are several times higher in EU countries than in North America. Some countries go further; for example the Netherlands banned all FRP scrap in landfills as of September 1997. Options there are to recycle, incinerate, pyrolyze or ship it outside the country.

Policies such as this means there has been considerable research in EU countries into recycling options for small vessel materials. One example was the BOATCYCLE project in Spain, which developed several technologies and applications for processed FRP and other materials.²⁴ However, to date there is not considered to be a solution to vessel disposal within the EU which is environmentally sustainable or economically attractive.

9.4 INTERNATIONAL

As noted in Section 4, the IMO and ILO have developed numerous guidelines, principally targeted at larger vessel breaking and disposal. While in most cases some element of Canadian federal or provincial legislation does cover the same issues as these materials, they can still be useful in consolidating key considerations for safe and environmentally responsible end of life management. As an example, Figure 11 shows the Model Safe Shipbreaking Plan included in the IMO Guidelines. Successful programs should ensure that all parties in vessel disposal understand their own responsibilities and how these interact with others.

²⁴http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3455&docType=pdf

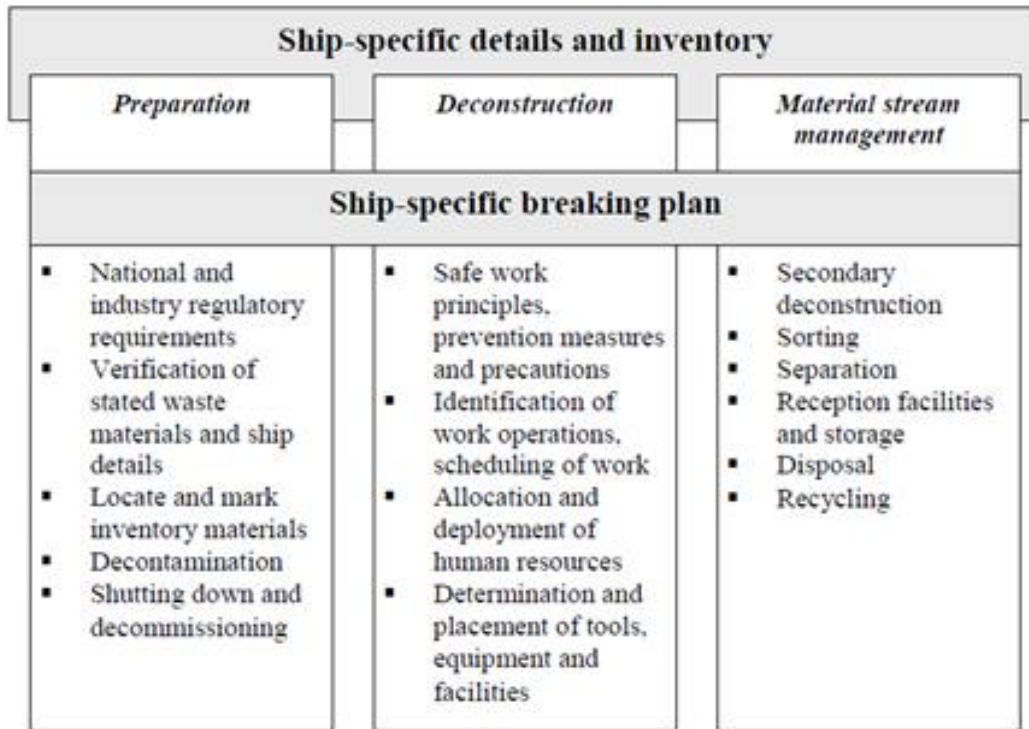


Figure 11: Model Safe Shipbreaking Plan

9.5 SUMMARY

Internationally, and in the US, there are a variety of incentive-based and legislative approaches to managing vessel recycling and/or safe disposal. In Canada, there are not currently any such mechanisms in place, however there are opportunities such as vessel donation, artificial reef creation, as well as simply paying for safe recycling and disposal available to a ship owner willing to seek them out.

10 SUMMARY & CONCLUSIONS

The issues surrounding the proper disposal or recycling of both large and small vessels are generally acknowledged by industry stakeholders. Recycling of large vessels in Canada is seen as costly compared to foreign disposal, and is only recently becoming a frequently considered option.

Small vessel stakeholders generally believe that while options for recycling and/or disposal are available to owners, they will be under-used until one or both of lower costs and strict enforcement become reality in Canada.

10.1 LARGE VESSELS

There is a relatively small number of large vessels (>100 gt) in the Canadian domestic fleet, and a smaller number which are disposed of in any year. There is capacity in most regions of Canada to handle these disposals by shipbreaking and associated recycling of some of the materials; however, the economics are unattractive for most owners. The labour and other costs for domestic disposal are high compared with international shipbreaking, and the prices paid for recyclables such as scrap steel are low. As a result, domestic shipbreakers can only compete where the costs and inconvenience of an overseas disposal outweigh these other cost factors.

Also, in many cases Canadian owners will prefer to sell ships approaching their end-of-life to other operators, disposing of their own disposal problem in the process.

The following summary points have been drawn from sections throughout the report, and provide an overview of several key findings for issues concerning recycling and/or disposal of large vessels:

- A limited number of facilities exist across Canada with the notional capability to break and recycle a large vessel. There is however little appetite amongst these facilities for recycling work due to its relative non-profitability compared to other work streams.
- There is a dedicated ship recycling facility on the Great Lakes, but the distance from the West Coast and the cost associated with transporting a vessel to the facility for recycling limits the market for the facility's services.
- Most large ships disposed of by Canadian owners are not broken or recycled in Canada. Owners typically prefer to sell their unwanted ships to new owners, as this generates some revenue, and in some cases can avoid the problems associated with disposal and recycling.
- Ships being scrapped have historically been broken at foreign shipbreaking centres where the relatively low cost of labour has made resale of their recycled materials profitable.
- Owners are however becoming more conscious of the potential public relations problems associated with foreign disposal and/or sale for scrap of their vessels, and some owners have now agreed to pay the additional cost to have their ships recycled in Canada in order to avoid future incidents.
- Ship sinking has been used to dispose of a number of large Canadian vessels but is becoming more difficult due to the increased stringency of environmental legislation.

10.2 SMALL VESSELS

There are several million small vessels in Canada, and little infrastructure tailored to the disposal of the estimated 40,000 plus of these which reach their end-of-life each year. Most small vessels are now built using fibreglass, which cannot currently be recycled in a cost-effective manner. As a result, hulls will generally end up in landfills, though some equipment and components are more recyclable.

Currently, a significant number of small vessels become derelict every year after abandonment by owners who are either unaware of or unprepared to pay for more responsible disposal options. Abandonment is perceived as being a major issue by many on the West Coast; less so in other areas of Canada, though some stakeholders in all areas of Canada do see this as a concern. Winter haul-out in many Canadian waterways greatly reduces the number of small craft which are abandoned while afloat, these being vessels that are most likely to be seen as eyesores or obstacles.

Effectively, across Canada, it is almost always cheaper to demolish small vessels and direct them to landfill rather than to completely recycle them. New materials are less expensive than recycled materials, and there are currently no incentive programs in place which can offset this cost.

The following summary points have been drawn from sections throughout the report, and provide an overview of several key findings for issues concerning recycling and/or disposal of small vessels:

- Small vessels can be disposed of in all regions of Canada, with most of the capacity being concentrated in the West Coast and in Ontario. The capacity is currently used by a limited number of boat owners.
- Stakeholder feedback suggests that vessel abandonment is widely acknowledged as a problem throughout western Canada and Ontario. The main factors in play are a lack of enforcement coupled with a lack of convenient and inexpensive options. General opinion is that an irresponsible boat owner will be likely to abandon their unwanted vessel in the absence of enforced consequences.
- Facilities are limited in certain regions where abandonment is an issue. In most cases, laying an unwanted vessel up on land or mooring it near shore is easier for an irresponsible owner than trailering it to a disposal site, or paying for pickup or removal.
- On the East Coast of Canada there appears to be more of a tradition and perception that derelict vessels are more acceptable than is the case in other regions.
- Inexpensive or free disposal or recycling options would be beneficial, however the operators of marinas and municipal marine infrastructure would benefit the most from this, as it would reduce their costs when removing abandoned vessels from their facilities.
- There is potential for significant number of small vessels, likely in the thousands or more, to come out of service each year across Canada. Given the volume of material this represents, recycling even a fraction of these vessels would represent diverting tens of thousands of tonnes of waste from landfill each year. Although this represents a significant potential market for recycling small vessels this is unlikely to become active until the value of recycling becomes more appealing to operators.

- Recycling of small vessels is primarily constrained by the lack of market appetite for the component materials. There is a market for salvaging the most desirable components of a small vessels, but there is no appreciable market for recycling the wood, fibreglass, and plastics which account for most of the vessel's materials.

10.3 REGULATORY ISSUES

Shipbreaking and small vessel disposal are regulated by Canadian and provincial environmental and health and safety legislation, which imposes strict controls on the disposal of hazardous waste and on working conditions for those involved. For large vessels, efforts are ongoing internationally to develop appropriate norms but shipbreaking in some leading countries continues to be seen as dirty and dangerous.

Currently, Canada has limited federal and no real provincial legislation which targets the responsible disposal of large or small vessels at end-of-life. For example, owners have the obligation to undertake wreck removal, or to pay for costs incurred. However, the government's powers are limited, and are rarely invoked or enforced. This was a concern expressed by many stakeholders contacted during the project.

The problem of vessel disposal is not unique to Canada, and does not appear to have been completely solved in any country. A number of US states have instituted measures aimed at both the prevention and remediation of vessel abandonment, with varying levels of success.

Internationally, and in the US, there are a variety of incentive-based and legislative approaches to managing vessel recycling and/or safe disposal. In Canada, there are not currently any such mechanisms in place, however there are opportunities such as vessel donation, artificial reef creation, as well as simply paying for safe recycling and disposal available to a ship owner willing to seek them out.

ANNEX A – PROJECT STATEMENT OF WORK

Original statement of work (SOW) from TC RFP document T8080-14-0426:

The focus of this work is two-fold:

1. Current and future capacity for ship breaking/recycling in Canada for small and large vessels
2. Factors driving domestic shipowner decisions to dispose of vessels

The Contractor must complete the following tasks:

Phase I:

Task 1:

Develop a comprehensive inventory of the current domestic ship breakers/recyclers, salvage operators, waste disposal operators and others involved in the breakage/recycling business for large and small vessels (as noted above, the Contractor will be provided with the results from the earlier work undertaken by the Marine Safety and Security Group).

Task 2:

Determine:

- Current capacities of domestic ship breakers/recyclers, salvage operators, waste disposal operators and others involved in the breakage/recycling business, taking into consideration size, location, and operating/economic conditions.
- Key regulations (e.g. environmental, safety) that govern this type of industry (federal and provincial).

Task 3:

Determine whether and what regional differences exist that may affect ship breaking and recycling in Canada – i.e., east coast vs. west coast vs. Great Lakes/St. Lawrence Seaway – and identify the major factors driving these differences, as relevant.

Phase II:

Task 4:

Assess:

- Barriers and constraints to expanding domestic shipbreaking capacity such as legislative/regulatory constraints and economic/market forces (e.g. overseas facilities may continue to pay for large end-of-life vessels, rendering this option more attractive for vessel owners, smaller steel vessels or those unfit for transoceanic voyage may not be of interest to overseas facilities but will still have value) – this should also include assessing current/future demand and price of recovered materials (e.g. the value of steel would act as an incentive) as well as labour, operating, compliance and other costs as relevant.
- Opportunities and benefits of expanding this capacity domestically, including economic (e.g. job creation) and environmental (e.g., improved water, land and air quality) – including potential to improve end-of-life management to reduce or avoid vessels of concern.

- The capacity for the Canadian shipbuilding yards to expand their business scope to include breaking/recycling ships, including an assessment of constraints (e.g. economic, regulatory).

Task 5:

Compile and assess the key factors that affect shipowner decisions to use either domestic ship breaking/recycling facilities or overseas shipbreaking/recycling facilities – including comparison with foreign services and labour.

Task 6:

Assess:

- Business constraints for the small vessel recycling industry (e.g. legislative/regulatory, market forces, current and future demand, prices of recovered materials, labour, operating and maintenance costs, etc.).
- Opportunities and benefits of expanding this capacity domestically, including economic (e.g. job creation) and environmental (e.g. improved water, land and air quality) – including potential to improve end-of-life management to reduce or avoid abandoned and derelict vessels.
- Assess the current and future ability other types of dismantling and recycling industries to assume this type of breakage and recycling (e.g. could dismantling facilities for motor vehicles be used to dismantle small vessels?). Are there successful current “turn-in” programs for vessels (e.g. <http://www.kidney.ca/kidneycar>). What kind of practices do they use to breakdown and recycle the vessel?


Task 7:

Assessment of key factors that affect small vessel owner behavior and disposal decisions (e.g. economic cost, legal responsibilities, awareness of services and responsibilities, etc.).

Task 8:

Compile compendium of “best practices” in ship breaking/recycling for both small and large vessels in Canada and internationally as well as criteria for assessing these “best practices”.

APPENDIX A – VESSEL DISPOSAL QUESTIONNAIRE



VESSEL DISPOSAL QUESTIONNAIRE

1. Contact Information

Facility Name:

Address:

Contact Person: Phone: Email:

2. Nature of Operation

Waste Disposal: Yes No

Recycling: Yes No *If Yes, materials typically recycled:*

Steel: <input type="checkbox"/> Yes <input type="checkbox"/> No	Wood: <input type="checkbox"/> Yes <input type="checkbox"/> No
Aluminum: <input type="checkbox"/> Yes <input type="checkbox"/> No	GRP (Fiberglass): <input type="checkbox"/> Yes <input type="checkbox"/> No
Other metals: <input type="checkbox"/> Yes <input type="checkbox"/> No	Other Plastics: <input type="checkbox"/> Yes <input type="checkbox"/> No

Overall annual throughput estimate: tonnes/m³ per year

Workforce: persons (full time equivalent)

3. Involvement with Marine Sector

Handle marine craft or components: never

occasionally, estimate tonnes/m³ per year

regularly, estimate tonnes/m³ per year

4. Other Clientele

Please check all that apply:

Road vehicles Domestic waste Industrial waste Commercial waste

5. Pre-Processing and Delivery Requirements

Will arrange for pick-up of bulky items off-site: Yes No

Will accept items only up to tonnes, or maximum dimension

6. Additional comments

Vard Marine Inc
 Suite 1502, 85 Albert St., Ottawa, Ontario, Canada, K1P 6A4
 Tel: (613) 238-7979 | Fax: (613) 238-7979 | www.vardmarine.com
 Business ID: 869668707

Figure A.1: Vessel Disposal Questionnaire

APPENDIX B – PRIMARY FACILITIES INVENTORY

The following tables provide a compilation of the key facilities identified in Section 3 of the report for the recycling and/or disposal of small and large vessels.

Table 16: Small Vessel Disposal/Recycling Facilities

PROVINCE	ORGANIZATION	REFERENCE	NOTES
NL	Newco Metal & Auto Recycling Ltd.	http://www.newcometal.com	Pay competitive market prices for unwanted scrap metal.
NL	Maritime Recycling Ltd.	http://www.yellowpages.ca/bus/Newfoundland-and-Labrador/St-John-s/Maritime-Recycling-Ltd/2663949.html	Purchase a variety of scrap metal, including; aluminum, brass, copper, lead, stainless steel and more.
NS	Halifax C&D Recycling Ltd.	http://halifaxcdrecycling.ca	Handles and disposes fibreglass vessels. Boat owner is required to remove all fuel, engines and other liquids.
NS	McDonald C&D	http://www.yellowpages.ca/search/si/1/Paul-McDonald-Trucking-Backhoe-Ltd/Port+Morien+NS	Recently disposed of three fibre glass vessels.
ON	Ontario Boat Wreckers	http://www.ontarioboatwreckers.com	
ON	Kawartha Marine	http://kawarthaboatwrecking.com	Will pick up intact boats at no cost. Will pick up wrecks for cost.
ON	Sandy Cove Marine	http://www.sandycovemarine.com	Operate a scrap yard near Innisfil, ON. Will only take delivery of boats when their yard has space available.
ON	LA Boat Works	http://www.laboatworks.com/	Offer recycling of boats, including grinding waste into reclaimable FRP (for cost).

■ ANALYSIS OF SHIP RECYCLING CAPACITY IN CANADA

BC	Shelter Island Marina & Boatyard Inc.	http://www.shelterislandmarina.com/boatrecycling.html	Offers recycling and disposal services. Capable of recycling boats up to 150 feet and 220 tons.
BC	Jack Campbell Marine Ltd.	http://www.recyclemyboat.com/	Offers recycling services. Also offers pick-up service for intact vessels and provides a vessel Recycling Plan.
BC	Recycle It - Earth Friendly Junk Removal	http://www.recycleitcanada.ca/large-item-pickup/	Offers disposal and recycling services. Also offers pick-up service for intact vessels.
BC	Ecowaste	http://ecowaste.com/content/ecowaste-ourservices/ecowaste-permitted-materials/	Offers disposal services.
BC	Wastech	http://www.wastech.ca/us/	Offers disposal services for boats under 17 feet in length. \$50 surcharge for all waste over 2.5 meters (8 feet) in length).
BC	Old School Marine	http://oldschoolmarine.com/	Offers removal, salvage and disposal services.
BC	Davis Trading & Supply Ltd.	http://davistrading.com/	Offers salvage and disposal services.
BC	Jenkins Marine Ltd.	http://jenkinsmarine.com/	Offers removal, salvage and disposal services.
BC	Saltair Marine Services Ltd.	http://www.ladysmithcofc.com/portfolio/saltair-marine-services-ltd/	Offers removal, salvage and disposal services.
BC	Sea Roamer Marine Services	http://www.searoamermarine.com/	Offers removal, salvage and disposal services.
BC	Wainwright Marine Services	http://www.wainwrightmarine.com/	Offers removal, salvage and disposal services.

■ ANALYSIS OF SHIP RECYCLING CAPACITY IN CANADA

BC	Dolphin Marine Services	http://www.dolphinmarine.ca/	Offers removal, salvage and disposal services.
BC	Diversified Marine Ltd.	http://www.secheltchamber.bc.ca/#!clothing--accessories/c19lk	Offers removal, salvage and disposal services.
BC	Rupert Disposal Ltd.	http://www.rupertdisposal.com/	Offers removal, salvage and disposal services.
BC	Allen's Scrap & Salvage Terrace	http://www.allenscrap.com/	Offers removal, salvage and disposal services.
BC	Shuswap Marine Freight	http://www.ic.gc.ca/eic/site/icgc.nsf/eng/home	Offers removal, salvage and disposal services.
BC	Marine Wreckers	http://listings.ftb-companies-ca.com/l/112297618/Marine-Wreckers-in-Winfield-BC	Offers removal, salvage and disposal services.
BC	Columbia Recycling	http://columbiarecycle.ca/	Offers salvage and disposal services.

Table 17: Large Vessel Disposal/Recycling Facilities

REGION	ORGANIZATION	REFERENCE	NOTES
Atlantic	Marystown Kiewit Offshore Services	http://www.kiewit.com/districts/kiewit-offshore-services	Facility now focuses exclusively on offshore oil and gas projects
Atlantic	Newdock St. John's	http://www.newdock.nf.ca	Mainly repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 4,000 t (marine elevator)
Atlantic	Glovertown Shipyard	http://glovertownshipyard.com	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 150 t
Atlantic	AECON Atlantic Pictou Shipyard	http://pictoushipyard.com	Has handled ship-breaking of steel vessels. Maximum size approx. 2,500 t
Atlantic	Lunenburg Marine Railway Co. Dry-dock	http://www.lunenburgfoundry.com	Has handled ship-breaking of steel vessels.
Atlantic	Canadian Maritime Engineering North Sydney	http://www.cmelimited.com/Marine-Services	Planning to provide ship breaking for steel vessels; maximum size approx. 2,500 t
Quebec	Chantier Davie Canada	http://chantierdaviecanada.com	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Could take Panamax size.
Quebec	Verrault Navigation	http://www.verreaultnavigation.com	Repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Could take Panamax size.
Quebec	Groupe Ocean	http://www.groupeocean.com	Group companies offer salvage, shipbuilding and repair. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 1,000 t
Ontario	Marine Recycling Corporation (MRC)	http://www.marinerecycling.ca/	The world's first ISO 14001 Certified ship recycling company.

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			Provides marine services and wreck removal for a variety of marine vessels; Great Lakes Freighters, barges, tugs, ferries, etc.
Ontario	Purvis Marine	http://www.purvismarine.com/services	Mainly repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Maximum size approx. 2,000 t
BC	Amix Marine Services Ltd. New Westminster	http://amixgroup.ca/	Offer removal, salvage and disposal services.
BC	Recycle My Boat – Geco Marine North Vancouver	http://www.gecomarine.com/	Offer removal, salvage and disposal services.
BC	Schnitzer Steel (various locations)	http://www.schnitzersteel.com/company_locations.aspx?View=Detail&ID=142	Offer salvage and disposal services.
BC	ABC Recycling (various locations)	http://www.abcrecycling.com/	Offer salvage and disposal services.
BC	Victoria Shipyard	http://www.seaspan.com/victoria-shipyards	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size limited by lack of dedicated dock.
BC	Allied Shipbuilders	http://alliedship.com/	Build and repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 10,000t
BC	Canadian Marine Engineering Port Alberni	http://cmelimited.com/Marine-Services	Repair yard. Has not undertaken shipbreaking, but facilities could be used for this. Max size approx. 500t

APPENDIX C – COMPLETE FACILITIES INVENTORY

The following tables list all the facilities, organizations, or other sites or stakeholders with ties to the recycling industry in Canada and potential for participation in marine recycling. Note that while these tables provide a list of all organizations identified as part of the project, these organizations were not necessarily contacted or verified, and this list should be treated as a starting point for further research or industry engagement only.

Table 18: Organizations and Associations representing recyclers/scrap merchants

PROVINCE	CITY	ORGANIZATION	TYPE	REFERENCE
NL	St. John's	Ever Green Recycling	Recycling Facilities	http://www.greencan.ca/
NL	St. John's, Mount Pearl, St. Joseph's, Gander, Corner Brook	Scotia Recycling	Recycling Facilities	http://scotiarecyclinggroup.com/
NL	St. John's, St. Joseph's	Dominion Recycling Ltd.	Recycling Facilities	http://www.dominionrecycling.ca/en/
NL	Mount Pearl	E-Waste NL	Recycling Facilities	http://ewastenl.com/
NL	St. Joseph's	Atlantic Blue Recycling	Recycling Facilities	http://www.atlanticbluerecycling.com/
NL	Corner Brook	B C Trucking and Recycling	Recycling Facilities	http://www.manta.com/ic/mxh76pl/ca/b-c-trucking-and-recycling
NL	Bonavista	Bonavista Recycling Depot	Recycling Facilities	Bonavista Recycling Depot
NL	Botwood	Botwood Recycling	Recycling Facilities	http://town.botwood.nl.ca/listings/single/115/
NL	Marystown	Dal Enterprises Ltd.	Recycling Facilities	http://burinpeninsulachamber.com/m/listing/view/dalent
NL	St. Joseph's	Ecowise Products Inc.	Recycling Facilities	http://www.craftsofcharacter.com/producer.php?prodID=150

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NL	Port Au Choix	Mvp Recycling Ltd.	Recycling Facilities	http://www.manta.com/ic/mt6hlg9/ca/mvp-recycling-ltd
NL	St. Joseph's	O'leary Avenue Recycling Depot Corporation	Recycling Facilities	http://www.manta.com/ic/mt68n6b/ca/o-leary-avenue-recycling-depot-incorporated
NL	Conception Harbour	Pardy's Waste Management	Recycling Facilities	http://www.pardyswaste.com/
NL	St. Mary's	Riverhead Green Depot	Recycling Facilities	http://www.mmsb.nl.ca/recyclingprograms/beverage-containers/green-depots/
NL	Stephenville	Scotia Recycling 1990 Ltd.	Recycling Facilities	http://www.manta.com/ic/mtqqdtn/ca/scotia-recycling-1990-ltd
NL	Deer Lake	Sedler Green Depot	Recycling Facilities	http://www.manta.com/ic/mtqnnfg/ca/sedler-green-depot
NS	Halifax	1082990 Nova Scotia Limited	Recycling, Waste Materials	http://www.manta.com/ic/mt618yr/ca/1082990-nova-scotia-limited
NS	Halifax	Advanced Recycling Ltd.	Recycling, Waste Materials	http://www.profilecanada.com/companydetail.cfm?company=2324968_Advanced_Recycling_Ltd_Halifax_NS
NS	Truro	Atlantic Canada Electronics Stewardship	Recycling, Waste Materials	http://www.manta.com/ic/mxvbgby/ca/atlantic-canada-electronics-stewardship
NS	Halifax	Beavor Enviro Depot	Recycling, Waste Materials	http://putwasteinitsplace.ca/envirodepot-HRM.asp
NS	Bedford	Bedford Enviro Depot	Recycling, Waste Materials	http://putwasteinitsplace.ca/envirodepot-HRM.asp#.VclU03D-Uk
NS	Dartmouth	Burnside Enviro Depot	Recycling, Waste Materials	http://www.manta.com/ic/mt689xv/ca/burnside-enviro-depot
NS	Blandford	Coveys Auto Recyclers Ltd.	Recycling, Waste Materials	http://www.coveys.com/
NS	Springhill	Cumberland Joint Services Management Authority	Recycling, Waste Materials	http://www.cjsma.ns.ca/
NS	Lower Sackville	Fader's Bottle Exchange Limited	Recycling, Waste Materials	http://www.manta.com/ic/mt621b9/ca/fader-s-bottle-exchange-limited

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NS	Dartmouth	Great Northern Recycling Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mtq86fj/ca/great-northern-recycling-inc
NS	Edwardsville	Green Island Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt62h67/ca/green-island-recycling-ltd
NS	Goodwood	Halifax C & D Recycling Ltd.	Recycling, Waste Materials	http://halifaxcdrecycling.ca/
NS	Halifax	Hannarch Limited	Recycling, Waste Materials	http://www.manta.com/ic/mt61lhp/ca/hannarch-limited
NS	Dartmouth	Harbour Metal Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mxb5vtz/ca/harbour-metal-recycling-ltd
NS	Halifax	H R D A Enterprises Limited	Recycling, Waste Materials	http://socialeconomyhub.ca/content/hrda-enterprises-ltd-%E2%80%93-halifax-nova-scotia
NS	Inverness	Inverness Municipality	Recycling, Waste Materials	http://www.inverness-ns.ca/
NS	Inverness	Inverness Recycling Depot	Recycling, Waste Materials	http://www.inverness-ns.ca/blue-bag-recycling.html
NS	Dartmouth	Karen's Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6dk7z/ca/karen-s-recycling-ltd
NS	Black Point	Lady Beth Enterprises Limited	Recycling, Waste Materials	http://www.manta.com/ic/mtqp7ly/ca/lady-beth-enterprises-limited
NS	Springhill	L & F Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtqp50d/ca/l-f-recycling-ltd
NS	Kingston	Mat Jen recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6dkz9/ca/mat-jen-recycling-ltd
NS	Wolfville	Mcconnell Sod Supply	Recycling, Waste Materials	http://www.mcconnellssod.com/
NS	Halifax	Miller Paving Limited	Recycling, Waste Materials	http://www.manta.com/ic/mtqdpfq/ca/miller-paving-limited
NS	Oxford	Moore Nickles & Dimes For You	Recycling, Waste Materials	http://www.manta.com/ic/mxcn13/ca/moore-nickles-dimes-for-you

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NS	Bridgewater	Municipality Of The District Of Lunenburg	Recycling, Waste Materials	http://www.modl.ca
NS	Truro	Northeastern Resource Recovery Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtqgb4v/ca/northeastern-resource-recovery-ltd
NS	Amherst	Novapet Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt60tbw/ca/novapet-inc
NS	Windsor	O'leary, W Auto Body Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt63n66/ca/o-leary-w-auto-body-ltd
NS	Amherst	Pbs Waste Services Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtq0r0w/ca/pbs-waste-services-ltd
NS	Dartmouth	Preston C & D Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6y7g6/ca/preston-c-d-recycling-ltd
NS	Halifax	Renovators Resources Incorporated, The	Recycling, Waste Materials	http://www.renovators-resource.com/
NS	Truro	Resources Recovery Fund Board, Incorporated	Recycling, Waste Materials	http://putwasteinitsplace.ca/
NS	Dartmouth	Ribbons Recycled Incorporated	Recycling, Waste Materials	http://www.ribbonsrecycled.com/stores.html
NS	Bedford	Rosco Crushing & Recycling	Recycling, Waste Materials	http://www.manta.com/ic/mt6hzs3/ca/rosco-crushing-recycling-inc
NS	Hantsport	Scotia Recycling Ltd.	Recycling, Waste Materials	http://scotiarecyclinggroup.com/
NS	Dartmouth	Srt Soil Remediation Technologies Limited	Recycling, Waste Materials	http://www.manta.com/ic/mt6l1lw/ca/srt-soil-remediation-technologies-limited
NS	Truro	Subway Bottle Exchange Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtq06lg/ca/subway-bottle-exchange-ltd
NS	Guysborough	Sunnyville Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6stnn/ca/sunnyville-recycling-ltd
NS	Tatamagouche	Tatamagouche Recycling Depot	Recycling, Waste Materials	http://www.manta.com/ic/mtq8426/ca/tatamagouche-recycling-depot

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NS	Yarmouth	Western Region Solid Waste Resource Management Authority	Recycling, Waste Materials	http://www.manta.com/ic/mtq4d9b/ca/western-region-solid-waste-resource-management-authority
NS	Waverley	White Star Ici Polymer Management & Plastic Recycling Services	Recycling, Waste Materials	http://www.manta.com/ic/mtq5h4b/ca/white-star-ici-polymer-management-plastic-recycling-services
NS	Halifax	Youth Live Recycling & Enviro Depot	Recycling, Waste Materials	https://www.halifax.ca/youthlive/
NS	Chester	Zinck's Recycling	Recycling, Waste Materials	Zinck's Recycling
NS	Cape Breton	Baddeck Enviro Depot and Municipal Recycling Facility	Recycling Facilities	http://putwasteinitsplace.ca/envirodepot-capeBreton.asp#.VcIIk3D-Uk
NS	Cape Breton	Green Island Recycling Facility	Recycling Facilities	https://www.novascotia.ca/nse/waste.facilities/facilities.recycling.php
NS	Cape Breton	Inverness Material Recycling Facility	Recycling Facilities	https://www.novascotia.ca/nse/waste.facilities/facilities.recycling.php
NS	Cumberland/Colchester/East Hants	Cumberland Central Recycling Facility	Recycling Facilities	http://www.cjsma.ns.ca/cumberlandlandfill.html
NS	Cumberland/Colchester/East Hants	Municipality of the County of Colchester	Recycling Facilities	http://www.colchester.ca/
NS	Halifax Regional Municipality	Miller Waste Systems, operators of the Halifax Regional MRF	Recycling Facilities	https://www.google.ca/?gws_rd=ssl#q=Miller+Waste+Systems%2C+operators+of+the+Halifax+Regional+MRF
NS	South Shore	E & F Recycling	Recycling Facilities	https://www.novascotia.ca/nse/waste.facilities/facilities.recycling.php
NS	South Shore	GTI Refuse	Recycling Facilities	http://www.manta.com/ic/mt67pvn/ca/gti-refuse-limited

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NS	South Shore	Lunenburg Regoinal Recycling and Composting Facility	Recycling Facilities	http://www.communityrecycling.ca/
NS	South Shore	O'Leary's Recycling Ltd.	Recycling Facilities	https://www.novascotia.ca/nse/waste.facilities/facilities.recycling.php
NS	South Shore	Queens Solid Waste Facility	Recycling Facilities	http://www.novascotia.ca/nse/waste/solidwastedisposal.asp
NS	Yarmouth/Digby	Clare Recycling Facility	Recycling Facilities	https://www.novascotia.ca/nse/waste.facilities/facilities.recycling.php
NS	Yarmouth/Digby	Scotia Recycling Ltd.	Recycling Facilities	http://scotiarecyclinggroup.com/
PEI	Cardigan	Gdc Recycling Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt6yr78/ca/gdc-recycling-inc
PEI	Charlottetown	Green Isle Environmental Inc.	Recycling, Waste Materials	http://www.greenisleenvironmental.com/
PEI	Montague	Myers Industries	Recycling, Waste Materials	http://www.myersindustries.com/Home.aspx
PEI	Montague	Obrien Auto Recycling and Towing	Recycling, Waste Materials	http://www.manta.com/ic/mxblgty/ca/o-brien-auto-recycling-towing
NB	Moncton	506930 N B Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtq5hmy/ca/506930-n-b-ltd
NB	Grand Bay	Bayview Redemption Centre Inc.	Recycling, Waste Materials	http://www.nbinfo.ca/record/HDC0870
NB	Baie-Ste-Anne	Bsa Recycling 2003	Recycling, Waste Materials	http://www.manta.com/ic/mtqnn4/ca/bsa-recycling-2003
NB	St. Stephen	Charlotte County Can & Bottle	Recycling, Waste Materials	http://www.nbinfo.ca/record/HDC0877
NB	Shippagan	Chaisson, Simon Pierre	Recycling, Waste Materials	http://www.manta.com/ic/mtqnn5/ca/chiasson-simon-pierre
NB	Tracadie-Sheila	Cogedes Centre, De	Recycling, Waste Materials	http://www.recyclagepa.ca/node/13

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NB	Moncton	D R Recycling Ltd.	Recycling, Waste Materials	http://www.drrecycling.com/home.php
NB	Richibucto	Fero Waste & Recycling Inc.	Recycling, Waste Materials	http://www.fero.ca/
NB	Noonan	John Flowers Salvage	Recycling, Waste Materials	http://www.manta.com/ic/mtq4gp7/ca/flowers-john
NB	Fredericton	Fredericton Region Solid Waste Commission	Recycling, Waste Materials	http://frswc.ca/
NB	Saint John	Golden Mile Redemption Centre	Recycling, Waste Materials	https://saintjohn.cioc.ca/record/HDC0873
NB	Miramichi	Hebert's Recycling Inc.	Recycling, Waste Materials	http://www.heberts.ca/
NB	Hillsborough	Hillsborough Recycling Depot	Recycling, Waste Materials	http://www.manta.com/ic/mtqsnb2/ca/hillsborough-recycling-depot
NB	Tracadie	Investissement N & N Mcgraw Ltee	Recycling, Waste Materials	http://www.manta.com/ic/mt62fhc/ca/investissement-n-n-mcgraw-ltee
NB	Quispamsis	K V Redemption Centre	Recycling, Waste Materials	http://www.saintjohninfo.ca/record/HDC0876
NB	Berry Mills	Miller Waste Systems Inc.	Recycling, Waste Materials	http://www.millergroup.ca/waste_management/
NB	Sussex	Norrad's Express and Redemption Centre Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6ghpw/ca/norrad-s-express-and-redemption-centre-ltd
NB	Big River	Northeast Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mxhkp0w/ca/northeast-recycling-ltd
NB	Fredericton	Northside Redemption Centre Ltd.	Recycling, Waste Materials	http://www.southsideredemption.com/green_power_003.htm
NB	Pennfield	Peters, Andrew J & Sons Salvage	Recycling, Waste Materials	http://www.manta.com/ic/mt6hdhj/ca/peters-andrew-j-sons-salvage
NB	Moncton	Rayan Investments Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt675z0/ca/rayan-investments-ltd

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NB	Portage St. Louis	Recyclage Kent Recycling Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mtqp3c/ca/recyclage-kent-recycling-inc
NB	Bertrand	Recyclage Peninsule Lt E	Recycling, Waste Materials	http://www.manta.com/ic/mt6s06f/ca/recyclage-peninsule-lt-e
NB	Saint John	Regoinal Petroleum Products Recycling Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtqgc5d/ca/fredericton-region-solid-waste-commission
NB	Grand Falls/Grand-Sault	Roach Enterprises Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mt6lv0g/ca/roach-enterprises-ltd
NB	Tracadie	Serge, Brideau H Garage & Scraps Metal Ltd.	Recycling, Waste Materials	http://www.manta.com/ic/mtqq1q3/ca/serge-brideau-h-garage-scraps-metal-ltd
NB	Saint John	S N F Inc.	Recycling, Waste Materials	http://snf.us/
NB	Fredericton	Soilbac Recycling Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt6724f/ca/soilbac-recycling-inc
NB	St. George	St. George Redemption Centre	Recycling, Waste Materials	http://www.manta.com/ic/mt69nt9/ca/st-george-redemption-centre
NB	Minto	TireRecycling Atlantic Canada Corporation	Recycling, Waste Materials	http://www.tracc.ca/
NB	Oromocto	Tri-R Recycling	Recycling, Waste Materials	http://www.manta.com/ic/mtqd12v/ca/tri-r-recycling
NB	Somerville	Valley Solid Waste Commission	Recycling, Waste Materials	http://rsc12.ca/solidwaste.html
NB	Berry Mills	Westmorland-Albert Solid Waste Corporation	Recycling, Waste Materials	http://www.nbse.ca/solidwaste/welcome
QC	Lachine	Sims Recycling Solutions	Recycling Facilities	http://www.simsrecycling.com/
QC	Saint-Laurent	InteRecycle	Recycling Facilities	http://interecycle.com/
QC	Montreal	Groupe Melimax	Recycling Facilities	http://www.melimax.com

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QC	Anjou	EBI Montreal Inc.	Recycling Facilities	http://www.groupe-ebi.com/
QC	Montreal	Saine-Terre Recyclage	Recycling Facilities	http://saine-terre.ca/
QC	Laval	Met-Recy Ltee	Recycling Facilities	http://www.met-recy.com
QC	Montreal	Services Monde Vert	Recycling Facilities	http://greenworld-service.com/
QC	Lachine	Acier Century Inc.	Recycling Facilities	http://aciercentury.com/en/
QC	Gatineau	Ecocentres	Recycling Facilities	http://www.gatineau.ca/portail/default.aspx?p=compostage_recyclage_ordures/ecocentre
QC	Montreal	Eco-Quartiers	Recycling Facilities	http://www.eco-quartiers.org/
ON	Vaughan	Progressive Waste Solutions	Recycling, Waste Materials	http://www.progressivewaste.com/
ON	North York	Solid Waste & Recycling	Recycling, Waste Materials	http://www.solidwastemag.com/
ON	Ottawa	Just Junk	Recycling, Waste Materials	http://www.justjunk.com/
ON	Peterborough	1013389 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt6lz5t/ca/1013389-ontario-inc
ON	Tillbury	1067602 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mtqnby7/ca/1067602-ontario-inc
ON	Welland	1071017 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt68y9q/ca/1071017-ontario-inc
ON	Sturgeon Falls	1081107 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt63cp5/ca/1081107-ontario-inc
ON	Woodbridge	1133306 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/ic/mt63jrm/ca/1133306-ontario-inc

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ON	Blind River	1188163 Ontario Inc.	Recycling, Waste Materials	http://www.manta.com/world/North+America/Canada/recycling_waste_materials--E33B97N5/
MB	Winnipeg	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
AB	Edmonton	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
AB	Calgary	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
BC	Surrey	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
BC	Vancouver	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
BC	Kelowna	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
BC	Victoria	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
BC	Prince George	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/
	Nanaimo	Cascades Recovery Inc.	Recycler	http://www.recoverycascades.com/

Table 19: Marinas and Facilities with Boat Storage

PROVINCE	CITY	ORGANIZATION	TYPE	REFERENCE
NS	Louisburg	A & L Seafood Wharf	Marina	http://marinas.com/view/marina/9932_A_%26_L_Seafood_Wharf_Louisburg_NS_Canada
NS	Meteghan River	A. F. Theriault & Son Ltd.	Marina	http://www.aftheriault.com/en/
NS	North Yorkshire	Abbotts Harbour Marina	Marina	http://marinas.com/view/marina/9045_Abbotts_Harbour_Marina_North_Yorkshire_NS_Canada
NS	Tangier	Abriel Fisheries Wharf Marina	Marina	http://marinas.com/view/marina/9051_Abriel_Fisheries_Wharf_Marina_Tangier_NS_Canada
NS	Alder Point	Alder Point Harbour	Marina	http://ports.com/canada/alder-point-harbour/
NS	Dartmouth	Alderney Marina	Marina	http://marinas.com/view/marina/9111_Alderney_Marina_Dartmouth_NS_Canada
NS	St. George St	Annapolis Royal Wharf	Marina	http://annapolisroyal.com/business-information/wharf-association/
NS	Arisaig Harbour	Arisaig Harbour	Marina	http://marinas.com/view/marina/9112_Arisaig_Harbour_NS_Canada
NS	Halifax	Armdale Yacht Club Marina	Marina	http://www.armdaleyachtclub.ns.ca/
NS	Tatamagouche	Atlantic Canada House Blockhouse Point	Marina	http://marinas.com/view/marina/12048_Atlantic_Canada_House_Blockhouse_Point_Tatamagouche_NS_Canada
NS	Western Shore	Atlantica Hotel and Marine Oak Island	Marina	http://www.atlanticaoakisland.com/
NS	Aulds Cove	Aulds Cove Harbour Marina	Marina	http://marinas.com/view/marina/9056_Aulds_Cove_Harbour_Marina_NS_Canada
NS	Baddeck	Baddeck Government Wharf	Marina	http://marinas.com/view/marina/9934_Baddeck_Government_Wharf_NS_Canada
NS	Baddeck	Baddeck Marine	Marina	http://www.baddeckmarine.com/
NS	East Jeddore	Baker's Point Fisheries Wharf Marina	Marina	http://marinas.com/view/marina/9062_Baker%27s_Point_Fisheries_Wharf_Marina_East_Jeddore_NS_Canada

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NS	Antigonish	Ballantyne's Cove Marina	Marina	http://www.novascotia.com/see-do/outdoor-activities/ballantynes-cove-marina/1858
NS	North Sydney	Ballast Ground Fisheries	Marina	http://marinas.com/view/marina/9936_Ballast_Ground_Fisheries_North_Sydney_NS_Canada
NS	Grand Narrows	Barra Strait Marina	Marina	http://www.grandnarrowswaterfront.com/barrastrait/bshome.htm
NS	Barrios Beach	Barrios Beach Harbour Marina	Marina	http://marinas.com/view/marina/9057_Barrios_Beach_Harbour_Marina_NS_Canada
NS	Battery Point	Battery Point Harbour	Marina	http://marinas.com/view/marina/9058_Battery_Point_Harbour_NS_Canada
NS	Judique	Baxters Cove	Marina	http://marinas.com/view/marina/9938_Baxters_Cove_Judique_NS_Canada
NS	St. Margaret	Bay St. Lawrence	Marina	http://baystlawrence.ca/
NS	Lunenburg	Bayport Harbour Marina	Marina	http://www.parkbridge.com/en-ca/marinas/bay-port-yachting-centre
NS	Bear Point	Bear Point Harbour Marina	Marina	http://marinas.com/view/marina/9063_Bear_Point_Harbour_Marina_NS_Canada
NS	Bedford	Bedford Basin Yacht Club Marina	Marina	http://www.bbyc.ca/page-573026
NS	Sydney	Ben Eoin Beach RV Resort & Campground	Marina	http://beneoinbeach.ca/
NS	East Bay	Ben Eoin Yacht Club & Marina	Marina	http://www.beneoinmarina.com/
NS	Big Bras D'Or	Big Bras D'Or Harbour	Marina	http://www.close-to-the-coast.ca/wharfinfo.aspx?mapId=10&authorityID=214
NS	Lunenburg	Blue Rocks Harbour	Marina	http://marinas.com/view/marina/9070_Blue_Rocks_Harbour_Lunenburg_NS_Canada
NS	Baddeck	Bras D'Or Yacht Club	Marina	http://www.brasdoryachtclub.ca/
NS	Broad Cove Harbour	Broad Cove Harbour	Marina	http://marinas.com/view/marina/9113_Broad_Cove_Harbour_NS_Canada

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NS	Brooklyn	Brooklyn Marina	Marina	http://marinas.com/search/?search=1&category=marina&country=CA&region=NS&city=Brooklyn
NS	Bush Island	Bush Island Harbour	Marina	http://marinas.com/view/marina/9068_Bush_Island_Harbour_NS_Canada
PEI	Abrams Village	Abrams Village Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64964&lang=EDate
PEI	Alberton	Alberton Harbour	Marina	http://marinas.com/view/marina/8175_Alberton_Harbour_PE_Canada
PEI	Murray Harbour	Beach Point Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64971&lang=E
PEI	Abrams Village	Cape Egmont Fishing Cove Harbour	Marina	http://marinas.com/view/marina/8541_Cape_Egmont_Fishing_Cove_Harbour_Abrams_Village_PE_Canada
PEI	Cardigan	Cardigan Village Marina	Marina	http://www.villageofcardigan.ca/
PEI	Charlottetown	Charlottetown Marina	Marina	http://www.charlottetownmarina.ca/
PEI	Charlottetown	Charlottetown Yacht Club	Marina	http://www.cyc.pe.ca/
PEI	New Glasgow	Covehead Harbour	Marina	http://marinas.com/view/marina/8543_Covehead_Harbour_New_Glasgow_PE_Canada
PEI	Georgetown	East Isle Shipyard	Marina	http://www.irvingshipbuilding.com/irving-shipbuilding-facilities-east-isle-shipyard.aspx
PEI	Georgetown	Georgetown Fishermens Wharf Harbor	Marina	http://marinas.com/view/marina/8544_Georgetown_Fishermens_Wharf_Harbor_PE_Canada
PEI	Georgetown	Georgetown Government Wharf	Marina	http://marinas.com/view/marina/8099_Georgetown_Government_Wharf_PE_Canada
PEI	Oleary	Howards Cove Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64984&lang=E
PEI	Lennox Island Harbour	Lennox Island Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64967
PEI	Murray River	Machons Point Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64935&lang=ywwzryrbeicj

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PEI	Ellerslie	Milligan Wharf	Marina	http://marinas.com/view/marina/8549_Milligan_Wharf_Ellerslie_PE_Canada
PEI	Miminegash	Miminegash Harbour	Marina	http://marinas.com/view/marina/8550_Miminegash_Harbour_PE_Canada
PEI	Montague	Montague Harbour Marina	Marina	http://montagueharbour.com/
PEI	Meadowbank	Nine Mile Creek Wharf Harbor	Marina	http://marinas.com/view/marina/8652_Nine_Mile_Creek_Wharf_Harbor_Meadowbank_PE_Canada
PEI	North Rustico	North Rustico Harbour	Marina	http://northrustico.net/
PEI	Charlottetown	Point Deroche Harbour	Marina	http://www.travelinpei.com/Point-Deroche.cfm
PEI	Port Borden	Port Borden Harbor	Marina	http://marinas.com/view/marina/8655_Port_Borden_Harbor_PE_Canada
PEI	Charlottetown	Quartermaster Marina	Marina	http://www.quartermastermarine.com/
PEI	Morell	Red Head Harbour	Marina	http://marinas.com/view/marina/8657_Red_Head_Harbour_Morell_PE_Canada
PEI	North Rustico	Rustico Bay Harbour	Marina	http://marinas.com/view/marina/8658_Rustico_Bay_Harbour_North_Rustico_PE_Canada
PEI	Seacow Pond	Seacow Pond Harbour	Marina	http://www.gov.pe.ca/infopei/index.php3?number=64986&lang=E
PEI	Skidders Pond	Skidders Pond Harbour	Marina	http://marinas.com/view/marina/8660_Skidders_Pond_Harbour_PE_Canada
PEI	Higgins Shore	Slipway - Higgins Shore	Marina	http://marinas.com/view/marina/9109_Slipway_-_Higgins_Shore_PE_Canada
PEI	Souris	Souris Harbour Marina	Marina	http://www.sourisharbourauthority.com/harbour-authority/marina/
PEI	Murray Harbour	South River Murray Harbour Port Marina	Marina	http://marinas.com/view/marina/12978_South_River_Murray_Harbour_Port_Marina_PE_Canada
PEI	Summerside	Summerside Harbour	Marina	http://www.portofsummerside.com/
PEI	Summerside	Summerside Yacht Club	Marina	http://www.silverfox-pei.com/
PEI	Tignish	Tignish Fisheries Co-op Association	Marina	http://www.profilecanada.com/companydetail.cfm?company=128156_Tignish_Fisheries_Co-Op_Association_Tignish_PE

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PEI	Charlottetown	Tracadie Harbour	Marina	http://marinas.com/view/marina/10374_Tracadie_Harbour_Charlottetown_PE_Canada
PEI	Victoria	Victoria Harbour	Marina	http://marinas.com/view/marina/10375_Victoria_Harbour_PE_Canada
PEI	Oleary	West Point Harbour	Marina	http://marinas.com/view/marina/10376_West_Point_Harbour_Oleary_PE_Canada
NB	Wellington	Barre De Cocagne Marina	Marina	http://marinas.com/view/marina/11082_Barre_De_Cocagne_Marina_Wellington_NB_Canada
NB	Bathurst	Bathurst Marina	Marina	http://www.bathurstmarina.com/
NB	Bay Du Vin	Bay Du Vin Harbour	Marina	http://marinas.com/view/marina/11084_Bay_Du_Vin_Harbour_NB_Canada
NB	Kingston	Belleisle Bay Marina	Marina	http://marinas.com/view/marina/8151_Belleisle_Bay_Marina_Kingston_NB_Canada
NB	Anse Bleue	Blue Cove Harbour	Marina	http://marinas.com/view/marina/11085_Blue_Cove_Harbour_Anse_Bleue_NB_Canada
NB	Murray Corner	Botsford Harbor Marina	Marina	http://marinas.com/view/marina/8761_Botsford_Harbor_Marina_Murray_Corner_NB_Canada
NB	Dalhousie	Bowater Maritimes Cargo Wharf	Marina	http://marinas.com/view/marina/12957_Bowater_Maritimes_Cargo_Wharf_Dalhousie_NB_Canada
NB	Dalhousie	Bowater Maritimes West Wharf	Marina	http://marinas.com/view/marina/12958_Bowater_Maritimes_West_Wharf_Dalhousie_NB_Canada
NB	Burnt Church	Burnt Church Harbour	Marina	http://marinas.com/view/marina/11089_Burnt_Church_Harbour_NB_Canada
NB	Flatlands	Campbellton Harbour	Marina	http://marinas.com/view/marina/12959_Campbellton_Harbour_Flatlands_NB_Canada
NB	Cocagne	Cap De Cocagne Marina	Marina	http://cocagnecapemarina.com/
NB	Richibucto-Village	Cap Lumiere Marina	Marina	http://marinas.com/view/marina/11093_Cap_Lumiere_Marina_Richibucto-Village_NB_Canada
NB	Cap Pele	Cap Pele Marina	Marina	http://marinas.com/view/marina/11095_Cap_Pele_Marina_NB_Canada

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NB	Shediac Bridge	Cape Des Caissie Marina	Marina	http://marinas.com/view/marina/11091_Cape_Des_Caissie_Marina_Shediac_Bridge_NB_Canada
NB	Cape Tormentine	Cape Tormentine Marina	Marina	http://marinas.com/view/marina/11092_Cape_Tormentine_Marina_NB_Canada
NB	Caraquet	Caraquet Harbour	Marina	http://marinas.com/view/marina/11096_Caraquet_Harbour_NB_Canada
NB	Caraquet	Caraquet Marine Center	Marina	http://marinas.com/view/marina/11097_Caraquet_Marine_Center_NB_Canada
NB	Mactaquac	Centennial Park Sailboat Marina	Marina	http://www.tourismnewbrunswick.ca/Products/Y/York-Centennial-Park-Sailboat-Marina.aspx
NB	Chipman	Chipman Marina	Marina	http://marinas.com/view/marina/8152_Chipman_Marina_NB_Canada
NB	Galloway	Chockpish Harbour Marina	Marina	http://marinas.com/view/marina/10461_Chockpish_Harbour_Marina_Galloway_NB_Canada?from=mobile
NB	Deer Island	Chocolate Cove Wharf	Marina	http://marinas.com/view/marina/5822_Chocolate_Cove_Wharf_Deer_Island_NB_Canada
NB	Cocagne	Cocagne Marina	Marina	http://www.cocagnemarina.com/
NB	Gagetown	Colpitts General Store And Marina	Marina	http://marinas.com/view/marina/8153_Colpitts_General_Store_And_Marina_Gagetown_NB_Canada
NB	Dalhousie	Dalhousie Marina	Marina	http://www.portdalhousiemarina.com/
NB	Dalhousie	Dalhousie Regional Marina	Marina	http://www.dalhousie.ca/attractions/all/dalhousie-regional-marina
NB	Deer Island	Deer Island Public Wharf	Marina	http://marinas.com/view/marina/5823_Deer_Island_Public_Wharf_NB_Canada
NB	Escuminac	Escuminac Harbour	Marina	http://marinas.com/view/marina/11099_Escuminac_Harbour_NB_Canada
NB	South Trescott	Ferry Wharf Harbour	Marina	http://marinas.com/view/marina/7337_Ferry_Wharf_Harbour_South_Trescott_NB_Canada
NB	Carleton	Fisherman's Refuge	Marina	http://marinas.com/view/marina/11101_Fisherman%27s_Refuge_Carleton_NB_Canada

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NB	Fredericton	Fredericton Yacht Club	Marina	http://www.fyc.ca/
NB	Grand Manan	Fundy Marine Service Resource Centre	Marina	http://www.marineresourcecentre.ca/
NB	Grand Manan	General Marine Service Marina	Marina	http://marinas.com/view/marina/7339_General_Marine_Service_Marina_Grand_Manana_NB_Canada
NB	Grande Anse	Grande Bay Harbour	Marina	http://marinas.com/view/marina/11102_Grande_Bay_Harbour_Grande_Anse_NB_Canada
NB	Hardwicke	Hardwicke Harbour	Marina	http://marinas.com/view/marina/11112_Hardwicke_Harbour_NB_Canada
NB	Campobello Island	Head Harbour Public Wharf	Marina	http://marinas.com/view/marina/5824_Head_Harbour_Public_Wharf_Campobello_Island_NB_Canada
NB	St. Martins	Amis De La Marina	Marina	http://www.manta.com/ic/mw6xj9w/ca/marina-de-bonaventure-inc
NB	Erbs Cove	Belleisle Bay Marina	Marina	http://marinas.com/view/marina/8151_Belleisle_Bay_Marina_Kingston_NB_Canada
NB	Rexton	Coastal Millyard Services Ltd.	Marina	http://www.manta.com/ic/mtqgzl3/ca/coastal-millyard-services-ltd
NB	Grand Falls	Cocagne Cape Port Authority	Marina	http://www.cocagnecapemarina.com/
NB	Gagetown	Gagetown Marina Inc.	Marina	http://gagetownmarina.ca/
NB	Tracadie	Marina De Tracadie	Marina	Marina De Tracadie
NB	Miramichi	Miramichi Boating & Yacht Club Inc.	Marina	http://www.nstya.com/clubs/mirmichi.htm
NB	Pointe-Du-Chene	Point Du Chene Harbour Authority	Marina	http://www.knowmoncton.com/businesses/marinas/pointe-du-chene-wharf-pointe-du-chene-harbour-authority/64-pointe-du-chene-wharf-road-pointe-du-chene.html
NB	Pointe-Du-Chene	Point Du Chene Yacht Club Ltd.	Marina	http://www.pcy-cb.ca/
NB	Shediac	Port De Plaisance De Shediac	Marina	http://sbyc.ca/
NB	Dalhousie	Port of Dalhousie Inc.	Marina	http://www.portofdalhousie.com/

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NB	Fredericton	Regent Street Wharf Mooring	Marina	http://marinas.com/view/marina/8154_Regent_St_Wharf_Mooring_Facility_Fredericton_NB_Canada
NB	Richibucto	Richibuctou Marina Inc.	Marina	http://www.richibucto.org/richibucto-marina-wharf
NB	Saint John	Saint John Marina Ltd.	Marina	http://www.saintjohnmarina.ca/index.asp
NB	Boucoucher	Saw Mill Point Boat Basin Inc.	Marina	http://www.manta.com/ic/mtqph9m/ca/saw-mill-point-boat-basin-inc
NB	Miramichi	Station Wharf Marina Inc.	Marina	http://stationwharfmarina.com/
QC	Akwesasne	Adams Marina	Marina	http://marinas.com/view/marina/7147_Adams_Marina_Akwesasne_QC_Canada
QC	Newport	Anse A Fullum Harbour	Marina	http://marinas.com/view/marina/12515_Anse_A_Fullum_Harbour_Newport_QC_Canada
QC	Saint-Bernard	Association Chasse & Peche St. Bernard	Marina	http://marinas.com/view/marina/7274_Association_Chasse_%26_Peche_St_Bernard_Saint-Bernard_QC_Canada
QC	Dorval	Avenue Sevigny Marina	Marina	http://marinas.com/view/marina/7188_Avenue_Sevigny_Marina_Dorval_QC_Canada?pfv=1
QC	Beaconsfield	Beaconsfield Yacht Club	Marina	http://www.byc.qc.ca/
QC	Saint-jean-sur-richelieu	Bellerive Marine Inc	Marina	http://marinas.com/view/marina/301_Bellerive_Marine_Inc_Saint-jean-sur-richelieu_QC_Canada
QC	Beloeil	Beloeil Public Dock	Marina	http://marinas.com/view/marina/7162_Beloeil_Public_Dock_QC_Canada
QC	St. Joseph De Sorel	Berthier Marine Plus	Marina	http://marinas.com/view/marina/8415_Berthier_Marine_Plus_St._Joseph_De_Sorel_QC_Canada
QC	Berthierville	Berthierville Harbour	Marina	http://marinas.com/view/marina/7163_Berthierville_Harbour_QC_Canada
QC	Berthierville	Berthierville Marina	Marina	http://www.marinaquebec.qc.ca/marinas/port-de-plaisance-de-berthierville/
QC	Berthierville	Berthierville Town Docks	Marina	http://marinas.com/view/marina/7164_Berthierville_Town_Docks_QC_Canada?pfv=1
QC	Gaspé	Big Beach Harbour	Marina	http://marinas.com/view/marina/12516_Big_Beach_Harbour_Gaspé_QC_Canada

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QC	Grande Riviere	Big River Harbour	Marina	http://marinas.com/view/marina/12517_Big_River_Harbour_Grande_Riviere_QC_Canada
QC	Big Valley	Big Valley River	Marina	http://marinas.com/mobile/view_city?category=marina&country=CA&prov=QC&city=Big%20Valley
QC	Big Valley	Big Valley River Cove Wharf	Marina	http://marinas.com/view/marina/12519_Big_Valley_River_Cove_Wharf_QC_Canada
QC	St. George De Malbaie	Bright Cove Marina	Marina	http://marinas.com/view/marina/12520_Bright_Cove_Marina_St_George_De_Malbaie_QC_Canada
QC	Rigaud	Camping Trans-Canadian	Marina	http://www.camping-trans-canadien.com/
QC	Cape Chat	Cape Chat Harbour	Marina	http://marinas.com/view/marina/12521_Cape_Chat_Harbour_QC_Canada
QC	Black Cape	Caplan Harbour	Marina	http://marinas.com/view/marina/12558_Caplan_Harbour_Black_Cape_QC_Canada
QC	Capucins	Capucins Harbour	Marina	http://marinas.com/view/marina/12559_Capucins_Harbour_QC_Canada
QC	Chambly	Chambly Marine	Marina	http://www.asbmarine.com/fr/
QC	Chandler	Chandler Marina	Marina	http://www.marinachandler.com/fr/accueil.php
QC	Chandler	Chandler Marine Terminal Harbour	Marina	http://marinas.com/view/marina/12560_Chandler_Marine_Terminal_Harbour_QC_Canada
QC	Chantier	Chantier Naval Matane Inc. Boatyard	Marina	http://marinas.com/view/marina/12561_Chantier_Naval_Matane_Inc_Boatyard_QC_Canada
QC	Chateauguay	Chateauguay Marine	Marina	http://www.chateauguaymarine.com/
QC	St. Placide	Chemin Des Outardes Marina	Marina	http://marinas.com/view/marina/7198_Chemin_Des_Outardes_Marina_St_Placide_QC_Canada
QC	Chateauguay	Chemin Du Bord L'Eau Marina	Marina	http://marinas.com/view/marina/7276_Chemin_Du_Bord_L%27Eau_Marina_Chateauguay_QC_Canada
QC	Pointe-Des-Cascades	Chemin Du Canal Marina	Marina	http://marinas.com/view/marina/7277_Chemin_Du_Canal_Marina_Pointe-Des-Cascades_QC_Canada
QC	Cloridorme	Cloridorme Harbour	Marina	http://marinas.com/view/marina/12562_Cloridorme_Harbour_QC_Canada

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QC	Gatineau	Club De Voile Grande Riviere	Marina	http://www.cvgr.qc.ca/
QC	Senneville Road	Club De Voile Senneville Yacht Club	Marina	http://www.cvsyc.com/index.php?langue=en
QC	Matane	Club De Yacht De Matane	Marina	http://marinamatane.com/
QC	St. Joseph De Sorel	Club Nautique Berthier	Marina	http://clubnbi.org/
QC	St. Joseph De Sorel	Club Nautique D'Eschaillons	Marina	http://www.marinaquebec.qc.ca/marinas/club-nautique-deschaillons/
QC	Boucherville	Club Nautique de Boucherville	Marina	http://www.marinaquebec.qc.ca/marinas/club-nautique-de-boucherville/
ON	Kingston	Rideau Marina	Marina	http://www.rideaumarina.on.ca/
ON	Lansdowne	River Rat Marine	Marina	http://www.boatingontario.ca/Find/Marinas/tabid/59/Region/View/MemberID/219/River-Rat-Marine.aspx
ON	Summerstown	Roger's Marina	Marina	http://rogersmarina.ca/site/
ON	Prescott	Sandra S. Lawn Harbour	Marina	http://www.prescott.ca/tourism/area-attractions-directory/harbour-and-marina.aspx
ON	Prescott	St. Lawrence Marina Ltd.	Marina	http://www.stlawrencemarina.com/
ON	Kingston	The Boat Warehouse	Marina	http://theboatwarehouse.com/
ON	Kingston	Treasure Island Marina	Marina	http://www.treasureislandmarina.com/
ON	Lansdowne	Williams Marine Inc.	Marina	http://www.williamsmarine.ca/
ON	Arnprior	Urban Sport	Marina	http://www.urban-sport.ca/
ON	Orleans	Orleans Boat World & Sports	Marina	http://www.orleansboatworld.com/
ON	Ottawa	George's Marine & Sports	Marina	http://www.gmas.ca/
ON	Portland	Bayview Yacht Harbour Ltd.	Marina	http://www.bayviewyachtharbour.com/
ON	Elgin	Brown's Marina Ltd.	Marina	http://www.brownsmarina.com/
ON	Ottawa	Dows Lake Pavillion	Marina	http://www.dowlake.com/
ON	Eganville	George's Marine & Sports	Marina	http://www.gmas.ca/
ON	Hawkesbury	Golden Anchor Marina	Marina	http://www.goldenanchormarina.on.ca/index.php?lang=fr

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ON	Trenton	Trent Port Marina	Marina	http://trentportmarina.ca/
ON	Toronto	Executive Yacht	Marina	http://www.executiveyachtcanada.com/
ON	Belleville	Crate's Belleville	Marina	http://cratesbelleville.com/
ON	Hamilton	DeWildt Honda Powerhouse	Marina	http://www.dewildthonda.com/
ON	St. Catharines	Port Weller Marina Ltd.	Marina	http://www.stcatharinesmarina.com/index.shtml
ON	Toronto	Toronto Yacht Services Inc.	Marina	http://www.torontoyachtservices.com/
ON	Pickering	Frenchman's Bay Marina	Marina	http://www.frenchmansbaymarina.com/html/index.php
ON	Trenton	Bay Marine	Marina	http://www.bay-marine.com/
ON	North Kawartha	Reach Harbour Marina	Marina	http://www.reachharbour.com/
ON	Bobcaygeon	Centre Point Marina	Marina	http://centrepoinmarina.ca/
ON	Apsley	Forest Glen Marina 2012	Marina	http://www.boatingontario.ca/Find/Marinas/tabid/59/Region/View/MemberID/833/Forest-Glen-Marina-2012.aspx
ON	Coboconk	Thompson's Yacht Harbour	Marina	http://www.boatingontario.ca/Find/Marinas/tabid/59/Region/View/MemberID/628/Thompsons-Yacht-Harbour.aspx
ON	Bobcaygeon	Kawartha Lakes Marina & Cottag	Marina	http://www.kawarthalakesmarina.com/
ON	Selwyn	Paris Marine Ltd.	Marina	http://www.parismarine.com/
ON	Gores Landing	Harris Boat Works Ltd.	Marina	http://harrisboatworks.ca/
ON	Buckhorn	Buckhorn Yacht Harbour Ltd.	Marina	http://www.buckhornyachtharbour.com/
ON	Keswick	Krates Keswick Inc.	Marina	http://www.kratesmarina.com/
ON	Orillia	Eleven North Marine Services Ine.	Marina	http://elevennorthmarine.com/
ON	Innisfil	Pride Marine Group	Marina	http://www.pridemarinegroup.com/
ON	Innisfil	Sandy Cove Marine Services	Marina	http://www.sandycovemarine.ca/
ON	Holland Landing	Riversports Recreation Inc.	Marina	http://www.riversportsrecreation.com/
ON	Orillia	Crate's Lake Country Boats Inc.	Marina	http://www.crateslakecountryboats.com/

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ON	Oro Station	Golden - Medonte Powerboat Club	Marina	http://www.boatingontario.ca/Find/Marinas/tabid/59/Region/View/MemberID/16/Golden-Medonte-Powerboat-Club.aspx
ON	Lefroy	Monto Reno Marina Ltd.	Marina	http://www.montoreno.com/home.html
ON	Orillia	Port of Orillia	Marina	http://www.orillia.com/index.php?id=17
ON	Haliburton	Kennisis Marina Ltd.	Marina	http://www.manta.com/ic/mtqg8p7/ca/kennisis-marina-ltd
ON	Seguin	Otter Lake Marina	Marina	http://www.otterlakemarina.info/
ON	Port Carling	Muskoka Boat Gallery	Marina	http://www.muskokaboatgallery.com/
ON	Haliburton	Haliburton Marine & Storage	Marina	http://www.haliburtonmarine.com/
ON	Minett	SWS Marine	Marina	http://summerwatersports.com/marina/
ON	Port Carling	Ed Skinner Boat Brokerage	Marina	http://edskinnerboatbrokerage.com/
ON	Algonquin Highlands	Big Hawk Lake Marina	Marina	http://www.bighawk.ca/
ON	Bracebridge	Allport Marina	Marina	http://www.allportmarina.com/
ON	Midland	Georgian Bay Yamaha Leisure & Marine	Marina	http://www.gbayyamaha.com/
ON	Tiny	Minty's Marine Service Inc.	Marina	http://www.mintysmarineservice.com/Home
ON	Clarksburg	Shore Power Services	Marina	http://www.shorepowerservices.com/
ON	Midland	Pride of Georgian Bay	Marina	http://www.pridemarinegroup.com/Page.aspx/locationId/24700/pageId/155393/view/Detail/Pride-of-Georgian-Bay-ON.aspx
ON	Owen Sound	Georgian Shores Marina	Marina	http://www.georgianshoresmarina.com/
ON	Coldwater	The Boat Warehouse Georgian Bay	Marina	http://www.theboatwarehousegeorgianbay.com/
ON	Township of Seguin	Holiday Cove Marina	Marina	http://www.thearchipelago.on.ca/holidaycove/
ON	Honey Harbour	Georgian Bay Landing	Marina	http://www.manta.com/ic/mtqpsw9/ca/georgian-bay-landing-inc
ON	Sauble Beach	Sauble River Marina & Lodge Resort	Marina	http://www.saublerivermarina.com/
ON	Bayfield	Bayfield River Cottage Colony	Marina	http://www.bayfieldrivercottages.ca/

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ON	Kincardine	Municipality of Kincardine	Marina	http://www.kincardine.net/
ON	Bayfield	Village of Bayfield Marina	Marina	http://grandbendtourism.com/bayfield-village-marina
ON	Grand Bend	Grand Bend Harbour	Marina	http://www.grandbend.com/marine.htm
ON	Bayfield	Harbour Lights Marina	Marina	http://harbourlightsmarina.on.ca/
ON	Port Franks	Seven Winds Marina	Marina	http://sevenwinds.lambtonshores.com/
ON	Goderich	Maitland Inlet Marina	Marina	http://maitlandmarina.on.ca/
ON	La Salle	Acali Place	Marina	http://www.cbsa-asfc.gc.ca/do-rb/offices-bureaux/920-eng.html
ON	Belle River	Deerbrook Marina Inc.	Marina	http://www.gomuskie.com
ON	Amherstburg	Ranta Marina	Marina	http://www.rantamarina.com/ranta/
ON	La Salle	Holiday Harbour Marina Inc.	Marina	http://www.holidayharbourmarina.com/
ON	Amherstburg	Boblo Island Marina	Marina	http://boblo.ca/marina-info/
ON	La Salle	St. Clair Marine	Marina	http://stclairmarine.ca/
ON	Stoney Point	Action Marina Service Inc.	Marina	http://www.actionmarineservice.com/
ON	Belle River	Belle River Marina	Marina	http://www.belleriverbia.com/node/99
ON	Waterloo	Waterloo Marine	Marina	http://www.waterloomarine.ca/contact_us.html
ON	Rodney	Rodney Repair Centre	Marina	http://www.rodneysmechanicalrepaircentre.com.au/
ON	Rodney	Rodney Repair Centre	Marina	http://www.rodneysmechanicalrepaircentre.com.au/
ON	Erieau	Erieau Marina Ltd.	Marina	http://erieaumarina.com/
ON	Port Rowan	Bayview Harbour Marina	Marina	http://www.bayviewharbour.com/
ON	Ridgeway	Bertie Boating Club	Marina	http://www.bertieboating.com/
ON	St. Williams	Biddle's Marine Services	Marina	http://www.biddlemarine.ca/
ON	S. Williams	Booth's Harbour Development Ltd.	Marina	http://www.boothsharbour.com/
ON	North Bay	North Bay Marina	Marina	http://www.cityofnorthbay.ca/living/RecLeisure/marina
ON	Burks Falls	Port Carmen Marina	Marina	http://www.portcarmenmarina.com/
ON	Callander	Hunters Bay Marine Ltd.	Marina	http://huntersbaymarine.ca/
ON	Temagami	Temagami Marine Ltd.	Marina	http://www.temagamimarine.com/

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ON	Temagami	Boatline Bay Marine	Marina	http://www.temagami.ca/rolodex/id/67
ON	Powassan	Giesler Marine Limited	Marina	http://www.gieslermarine.com/
ON	Haileybury	Haileybury Marina	Marina	http://www.temiskamingshores.ca/en/resident/marinas.asp
ON	Pembroke	R.G. "Dick" Plummer Ltd.	Marina	http://www.dickplummer.ca/
ON	Whitefish	Legend Boats	Marina	http://legendboats.com/
ON	Spanish	Spanish Municipal Marina	Marina	http://www.townofspanish.com
ON	Thessalon	Thessalon Municipal Marina	Marina	http://thenorthchannel.ca/thessalon-municipal.html
ON	Manitowaning	Bay Street Marina	Marina	http://baystreetmarina.com/
ON	Kagawong	Berry Boats	Marina	http://ontariomarinas.notjustfishing.com/berryboats.shtml
ON	Little Current	Boyle Marine	Marina	http://www.boylemarine.com/
ON	Gore Bay	Gore Bay Marina	Marina	http://www.gorebay.ca/index.php?option=com_content&view=article&id=44&Itemid=64
ON	Little Current	Harbour Vue Marina Limited	Marina	http://www.harborvue.ca/
ON	Kenora	Tall Pines Marina	Marina	http://www.tallpinesmarina.com/
ON	Wawa	Buck's Marina	Marina	http://www.bucksmarina.com/
ON	Thunder Bay	McKeller Marine Centre	Marina	http://mmarinecentre.com/
ON	Kenora	Northern Harbour	Marina	http://northernharbour.com/
ON	Thunder Bay	Prince Arthur's Landing	Marina	http://www.thunderbay.ca/Living/recreation_and_parks/Prince_Arthur_s_Landing_at_Marina_Park.htm
MB	Onanole	Marina on Clear Lake	Marina	http://www.theclearlakemarina.com/
MB	Whiteshell	West Hawk Marine Ltd.	Marina	http://westhawkmarine.com/
MB	Winnipeg	Boundary Creek Marina	Marina	http://www.lakeagassizmarine.com/boundary-creek-marina.html
MB	Falcon	Faloma Beach Marina	Marina	http://www.falomabeachmarina.ca/
MB	Arnes	Silver Harbour Marine Resort	Marina	http://silverharbourmarineresort.com/
MB	Falcon	Falcon Lake Marina	Marina	http://www.falconlakemarina.net/
AB	Strathcona Country	Aquatica Inc.	Marina	http://www.strathcona.ca/

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AB	Cold Lake	Cold Lake Marina	Marina	http://www.coldlake.com/content/cold-lake-marina
AB	Sylvan Lake	Marina Bay Yacht Club	Marina	http://www.mbyh.com/
AB	Edmonton	Marina Spak	Marina	http://www.manta.com/ic/mx1ls1g/ca/marina-spak
AB	Okotoks	Outpost RV Storage	Storage	http://www.outpost-rv.com/
AB	Rimbey	R V Heaven & Marina - Gull Lake	Marina	http://www.rvheaven.ca/
AB	Kinuso	Spruce Point Park Marina	Marina	http://www.sprucepointpark.ca/
BC	Mayne Island	Active Pass Auto & Marine	Marina	http://activepassautoandmarine.com/
BC	Egmont	Agamemnon Bay Marina	Marina	http://marinas.com/view/marina/12778_Agamemnon_Bay_Marina_Egmont_BC_Canada
BC	Ahousat	Ahousat General Store	Marina	http://marinas.com/view/marina/12988_Ahousat_General_Store_BC_Canada
BC	Richmond	Airport Yacht Club	Marina	http://airportyachtclub.com/
BC	Alert Bay	Alert Bay Boat Harbour	Marina	http://www.vancouverislandnorth.ca/stakeholder/list/alert-bay-boat-harbour/
BC	Nanaimo	Anchorage Marina	Marina	http://www.anchoragemarina.ca/
BC	Brentwood Bay	Angler's Anchorage Marina	Marina	http://www.anglersanchagemarina.com/
BC	Quathiaski Cove	April Point Marina	Marina	http://www.aprilpoint.com/
BC	Quathiaski Cove	April Point Resort & Spa	Marina	http://www.aprilpoint.com/
BC	Bamfield	Bamfield General Store	Marina	http://www.bamfieldgeneralstore.com/
BC	Bamfield	Bamfield Government Wharf	Marina	http://marinas.com/view/marina/12994_Bamfield_Government_Wharf_BC_Canada
BC	Bamfield	Bamfield Lodge & Cottages	Marina	http://bamfieldlodge.com/home.html
BC	Port Alberni	Barkley Sound Resort Alberni Top Marina	Marina	http://marinas.com/view/marina/13089_Barkley_Sound_Resort_Alberni_Top_Marina_Port_Aberni_BC_Canada
BC	Egmont	Bathgate General Store, Resort & Marina	Marina	http://bathgate.com/
BC	Vancouver	Bayshore West Marina	Marina	http://www.thunderbirdmarine.com

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BC	Powell River	Beach Gardens Resort and Marina	Marina	http://www.beachgardens.com/
BC	NanOOSE Bay	Beachcomber Marina	Marina	http://marinas.com/view/marina/12640_Beachcomber_Marina_NanOOSE_Bay_BC_Canada
BC	Sooke	Becher Bay Marina & Campground	Marina	http://marinas.com/view/marina/12996_Becher_Bay_Marina_%26_Campground_Becher_Bay_Indian_Reserve_1_BC_Canada
BC	Duncan	Birds Eye Cove Marina	Marina	http://marinas.com/view/marina/12997_Birds_Eye_Cove_Marina_Duncan_BC_Canada
BC	Blind Channel	Blind Channel Resort	Marina	http://www.blindchannel.com/
BC	Vancouver	Blue Pacific Yacht Charters	Marina	http://www.bluepacificcharters.com/
BC	Cowichan Bay	Bluenose Marina	Marina	http://www.thebluenosemarina.com/marina.htm
BC	Bowen Island	Bowen Island Marina Ltd	Marina	http://www.bowen-island.com/
BC	Nanaimo	Brechin Point Marina Ltd	Marina	http://marinas.com/view/marina/12644_Brechin_Point_Marina_Ltd_Nanaimo_BC_Canada
BC	Victoria	Brentwood Inn Resort & Marina	Marina	http://www.brentwoodbayresort.com/marina/brentwood-bay-marina.htm
BC	Victoria	Broughton Street Wharf	Marina	http://gvha.ca/f_streetmarinas.php
BC	Browns Bay	Browns Bay Marina	Marina	http://www.brownsbayresort.com/marina.php
BC	Halfmoon Bay	Buccaneer Marina & Resort LTD	Marina	http://www.buccaneermarina.com/
BC	Vancouver	Burrard Bridge Civic Marina	Marina	http://vancouver.ca/streets-transportation/burrard-civic-marina.aspx
BC	North Vancouver	Burrard Yacht Club	Marina	http://burrardyachtclub.com/
BC	Victoria	Canoe Brewpub Marina & Restaurant	Marina	http://www.canoebrewpub.com/
BC	North Saanich	Canoe Cove Marina	Marina	http://www.canoecovemarina.com/
BC	North Sannich	Capital City Yacht Club	Marina	http://www.ccy.ca/
BC	Delta	Captain's Cove Marina	Marina	http://captainscovemarina.ca/

Table 20: Boat Builders and Repair Facilities

PROVINCE	CITY	ORGANIZATION	TYPE	REFERENCE
QC	Matane	3326403 Canada Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6k2t2/ca/3326403-canada-inc
QC	Gaspe	9002-7296 Quebec Inc.	Boat Builder and Yards	http://listings.fta-companies-ca.com/l/110583706/9002-7296-Quebec-Inc-in-Gaspe-QC
QC	Portneuf	9151-4216 Quebec Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6htkk/ca/9151-4216-quebec-inc
QC	Princeville	Bateaux Princecraft Inc.	Boat Builder and Yards	http://www.princecraft.com/ca/en/index.aspx
QC	Saint-Jean-Des-Piles	Bateaux St-Jean-Des-Piles Inc.	Boat Builder and Yards	http://embarcationstrudeletfils.com/
QC	Dorval	Byte Boats Inc.	Boat Builder and Yards	http://www.zimsailing.com
QC	St-Etienne-Des-Gres	Canoe Frappier Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6nzm1/ca/canoe-frappier-inc
QC	Saint-Eustache	Chantier Maritimes De L'archipelle Enr	Boat Builder and Yards	http://www.manta.com/ic/mt6bq4l/ca/chantier-maritimes-de-l-archipelle-enr
QC	Gaspe	Chantier Naval Forillon Inc.	Boat Builder and Yards	http://www.chantier-naval.com/en/
QC	Saint-Eustache	Dumarin Inc.	Boat Builder and Yards	http://www.manta.com/ic/mw61b8r/ca/dumarin-inc
QC	Cap-Aux-Meules	Entreprises Leo Leblanc & Fils Inc., Les	Boat Builder and Yards	http://entreprisesleoleblanc.com/fr/
QC	Richelieu	Hicat Corporation Inc.	Boat Builder and Yards	http://www.ic.gc.ca
QC	Princeville	Lecours Soudure Inc.	Boat Builder and Yards	http://www.jysmarine.com/
QC	Ile-Aux-Noix	Menui-Fibre Enr	Boat Builder and Yards	http://menui-fibre.com/
QC	Neuville	Passion Marine Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6y2gm/ca/passion-marine-inc
QC	St-Camille	Pronaubec Inc.	Boat Builder and Yards	http://www.profilecanada.com/companydetail.cfm?company=2597905_Pronaubec_Inc_Saint-Joseph-De-Beauce_QC

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QC	Lachine	P S 2000 Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6nd64/ca/p-s-2000-inc
QC	Laval	Raw Tide Inc.	Boat Builder and Yards	http://www.manta.com/ic/mt6k8k7/ca/raw-tide-inc
QC	Havre-Aux-Maisons	R D Lamineur Inc.	Boat Builder and Yards	http://www.manta.com/ic/mtqnh7z/ca/r-d-lamineur-inc
QC	Sainte-Marthe-Sur-Le-Lac	Service Dkm Installations	Boat Builder and Yards	http://www.manta.com/ic/mv57rdv/ca/service-dkm-installations
QC	Kuujuuaq	Umiak Boats Builders	Boat Builder and Yards	http://www.manta.com/ic/mxtfzw1/ca/umiak-boats-builders
QC	Les Mechins	Verreault Navigation Inc.	Boat Builder and Yards	http://www.verreaultnavigation.com/#!/home/c1ct6
QC	Sainte-Emelie-De-L'Energie	3871690 Canada Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt68nr8/ca/3871690-canada-inc
QC	Gaspe	9002-7296 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6b36b/ca/9002-7296-quebec-inc
QC	Saint-Jean-Des-Piles	9054-7977 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6b4hb/ca/9054-7977-quebec-inc
QC	Shawinigan	9114-7959 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6lk9q/ca/9114-7959-quebec-inc
QC	Saint-Louis-De-Blandford	9136-5270 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6w5f4/ca/9136-5270-quebec-inc
QC	Portneuf	9151-4216 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6htkk/ca/9151-4216-quebec-inc
QC	Lemieux	9187-2184 Quebec Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt67zkt/ca/9187-2184-quebec-inc
QC	Montreal	Atlantix Innovations Marines Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt683z6/ca/atlantix-innovations-marines-inc
QC	Cap-Aux-Meules	Bateaux Madeleine Enr, Les	Boat Building and Repairing	http://www.manta.com/ic/mt6wq5v/ca/bateaux-madeleine-enr-les
QC	Princeville	Bateaux Princecraft Inc.	Boat Building and Repairing	http://www.princecraft.com/ca/en/index.aspx

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QC	Saint-Jean-Des-Piles	Bateaux St-Jean-Des-Piles Inc.	Boat Building and Repairing	http://www.ic.gc.ca/app/ccc/srch/nvgt.do?sbPrtl=&prtl=1&estblmntNo=123456155576&profile=cmpltPrfl&profileId=501&app=sold&lang=fra
QC	Gaspe	Chantier Naval Forillon Inc.	Boat Building and Repairing	http://www.chantier-naval.com/en/
QC	Saint-Omer	Croisiere Cortereal Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt67z32/ca/croisiere-cortereal-inc
QC	Saint-Eustache	Dumarin Inc.	Boat Building and Repairing	http://www.manta.com/ic/mw61b8r/ca/dumarin-inc
QC	Grandes-Piles	Ebenisterie Alain Rheaume Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6rh08/ca/ebenisterie-alain-rheaume-inc
QC	Trois-Rivieres	Embarcations Pierre Tessier	Boat Building and Repairing	http://www.manta.com/ic/mt6ms6k/ca/embarcations-pierre-tessier
QC	Saint-Jean-Des-Piles	Embarcations Trudel & Fils Inc.	Boat Building and Repairing	http://embarcationstrudeletfils.com/
QC	Frampton	Canots Esquif Inc.	Boat Building and Repairing	http://www.esquif.com/
QC	Prevost	Canots Nor-West Canoe Inc.	Boat Building and Repairing	http://nor-west.ca/
QC	Trois-Rivieres	Canots Pasquinel Enr, Les	Boat Building and Repairing	http://www.manta.com/ic/mt67ryj/ca/canots-pasquinel-enr-les
QC	Vercheres	Chaloupes Vercheres Inc.	Boat Building and Repairing	http://www.manta.com/ic/mtqzkh/ca/chaloupes-vercheres-inc
QC	Saint-Eustache	Chantier Maritimes De L'archipelle Enr	Boat Building and Repairing	http://www.manta.com/ic/mt6bq4l/ca/chantier-maritimes-de-l-archipelle-enr
QC	Cap-Aux-Meules	Entreprises Leo Leblanc & Fils Inc., Les	Boat Building and Repairing	http://entreprisesleoleblanc.com/fr/
QC	Trois-Pistoles	Equipements Sm 2000 Inc., Les	Boat Building and Repairing	http://equipementssm2000.ca/
QC	Saint-Lambert-De-Lauzon	Equipements V L R Inc.	Boat Building and Repairing	http://equipementsvlr.com/

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QC	Rawdon	Fibre De Verre Rawdon Inc.	Boat Building and Repairing	http://www.canotrawdon.com/
QC	Rouyn-Noranda	Fibres De Verre Abitibi Inc.	Boat Building and Repairing	http://www.fibresdeverreabitibi.ca/
QC	Chicoutimi	Fibres De Verre Devco Inc., Les	Boat Building and Repairing	http://www.ic.gc.ca/app/ccc/srch/nvgt.do?lang=fra&prtI=1&sbPrtI=&estblmntNo=234567003208&profile=cmpltPrfl&profileId=181&app=sold
QC	St-Roch-De-Richelieu	9154-7877 Quebec Inc.	Ship Building and Repairing	http://www.manta.com/ic/mxbbhc5/ca/9154-7877-quebec-inc
QC	Saint-Hyacinthe	9191-9258 Quebec Inc.	Ship Building and Repairing	http://www.manta.com/ic/mt6m1sl/ca/9191-9258-quebec-inc
QC	Quebec	Bernier Electro-Services Marine Inc.	Ship Building and Repairing	http://www.manta.com/ic/mvqbc0q/ca/bernier-electro-services-marine-inc
QC	Les Mechins	Cales Seches Verreault Inc., Les	Ship Building and Repairing	http://www.manta.com/ic/mtqdggq/ca/cales-seches-verreault-inc-les
QC	Matane	Chantier Naval Matane Inc.	Ship Building and Repairing	http://www.chantier-naval.com/
QC	Levis	Chantiers Davie Inc.	Ship Building and Repairing	http://www.davie.ca/
QC	Le Bic	Daniel St.-Pierre Atelier	Ship Building and Repairing	http://www.science-techmarine.ca/fr/enterprises.aspx/Details/65
QC	Saint-Bernard-Sur-Mer	Industries Ocean Inc.	Ship Building and Repairing	http://www.manta.com/ic/mt6w58y/ca/industries-ocean-inc
QC	Gatineau	Martec Limited	Ship Building and Repairing	http://www.martec.com/
QC	Grand-Mere	Metaux Produits D T Inc.	Ship Building and Repairing	http://www.metauxdt.com/
QC	Montreal	Mount Royal/Walsh Inc.	Ship Building and Repairing	http://www.mrw-group.com/
QC	Sainte-Anne-Des-Monts	Pratt and Bulik Inc.	Ship Building and Repairing	http://www.manta.com/ic/mxtcsrI/ca/pratt-and-bulik-inc

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QC	Alma	Rio Tinto Alcan Inc.	Ship Building and Repairing	http://www.riotintoalcan.com/
QC	Montreal	Rpf Marine	Ship Building and Repairing	http://www.manta.com/ic/mxvq231/ca/rpf-marine
QC	Val-David	Savery, Walter	Ship Building and Repairing	http://www.manta.com/ic/mtqlsmz/ca/savery-walter
QC	Longueuil	Solution Highpoint Inc.	Ship Building and Repairing	http://www.highpoint.com/
QC	La Prairie	Techno Citer-Net Inc.	Ship Building and Repairing	http://www.technociternet.com/en/
QC	Jonquiere	Tfi Transport 5 Lp	Ship Building and Repairing	http://www.manta.com/ic/mtqdl12/ca/tfi-transport-5-lp
MB	Winnipeg	Alumarine Boats (1996) Ltd.	Boat Building and Repairing	http://www.alumarineboats.net/
MB	Rosenort	Dueck Laminated Rafters	Boat Building and Repairing	http://www.duecksrafters.com/
MB	Gimli	Lake Winnipeg Boat Works (1993) Inc.	Boat Building and Repairing	http://www.lakewinnipegboatworks.com/
MB	Lorette	Red River Canoe & Paddle	Boat Building and Repairing	http://www.redrivercanoe.ca/
MB	Kleefeld	Misty River Marine (1999) Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt682h4/ca/misty-river-marine-1999-inc
MB	Winnipeg	Prince, E H Limited	Boat Building and Repairing	http://www.priceindustries.com/
MB	Riverton	Riverton Welding and Fabricating Inc.	Boat Building and Repairing	http://www.manta.com/ic/mt6cf6l/ca/riverton-welding-and-fabricating-inc