



# COVID PANDEMIC RESULTS IN A CLEANER COAST

*An Investigation into Unregulated Cruise Ship  
Pollution in Canada's West Coast Waters*

# CONTENT

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Executive Summary .....	<b>4</b>
Methodology .....	<b>5</b>
Recommendations .....	<b>6</b>
Introduction .....	<b>7</b>
Wasting B.C.'s Precious Coastal Waters .....	<b>9</b>
<i>Sewage</i> .....	<b>10</b>
<i>Greywater</i> .....	<b>11</b>
<i>Scrubber Washwater</i> .....	<b>12</b>
Environmental Impact of Cruise Ship Pollution .....	<b>13</b>
Impact of Covid-19 Pandemic Measures on Cruise Ship Pollution .....	<b>14</b>
Conclusion .....	<b>15</b>



“[Canadian] laws and policies have not yet been updated to reflect the growth of the [cruise] industry and its increasing pollution streams. In fact, it is difficult to determine who is polluting how much because inspection and monitoring is minimal. Where controls and regulations exist in the United States none exist in Canada: there are no standards for grey water discharge and no general prohibitions on untreated sewage discharge. American standards for hazardous and solid wastes are considerably stronger than Canadian standards.”

~ Linda Nowlan and Ines Kwan, *Cruise Control: Regulating Cruise Ship Pollution on the Pacific Coast of Canada*



“Before this law was passed, there was considerable concern about cruise ships discharging untreated sewage and graywater into areas within the Alexander Archipelago (a chain of islands in Southeast Alaska), but beyond three miles from any shore. In these areas, known as doughnut holes, the discharge of sewage was unregulated. Title XIV prohibited discharges of untreated sewage from cruise vessels and set requirements for discharges of treated sewage and graywater from cruise vessels into Alaskan waters, including the doughnut holes.”

~ 2008 EPA report



“BC is unique in failing to have in place safeguards to protect what tourists are inevitably drawn to: the natural beauty of water and land in BC en route to Alaska.”

~ Ross Klein. PhD, *Playing off the Ports: BC and the Cruise Tourism Industry*

# EXECUTIVE SUMMARY

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The cruise ship industry on Canada's West Coast has exploded over the last decade. In 2019, more than **one million passengers** and crew from 30 different cruise ships visited the Victoria cruise terminal during 256 ship calls on their way to and from Alaska.

Unfortunately, Canada's federal government does not adequately monitor or regulate marine pollution generated and discharged by cruise ships, resulting in more than **32 billion litres of potentially dangerous sewage, greywater and washwater dumped in BC coastal waters every year**. These waste streams contain a variety of pollutants, including fecal coliform, ammonia, heavy metals and polycyclic aromatic hydrocarbons, harmful to aquatic organisms and coastal ecosystems.

The vast majority of this pollution (31 billion liters) is washwater resulting from a massive legal loophole that allows cruise companies to comply with cleaner fuel standards by installing scrubbers that displace air pollution into coastal waters rather than changing to cleaner fuels.

Cruise ships also discharge an additional **1.5 billion litres** of sewage and greywater in BC waters every year.

When federal Minister of Transport Marc Garneau banned the operation of cruise ships, made in large part because of the cruise industry's unwillingness to make the decisions necessary to ensure the safety of its passengers and crew as the Covid-19 pandemic spiraled out of control on its ships, he essentially cancelled the 2020 cruise season along B.C.'s West Coast. The environmental benefits were astonishing.

**An estimated 220 million litres of sewage, 1.8 billion litres of greywater, and 31 billion liters of washwater**—enough to fill more than 13,000 Olympic swimming pools, or four times the volume of Whistler's Alta Lake—were prevented from being discharged into and polluting the Salish and Great Bear seas.

For one season, B.C.'s coastal waters—and the at-risk populations of killer whales and sea otters, and the salmon, herring, and clam food sources and habitats on which they depend—were given a reprieve from billions of litres of harmful pollution.

**Now it's time to make these changes permanent. If we are going to allow cruise ships to return to Canadian waters in the post-pandemic era, the Government of Canada must act now to update our regulations to protect our coasts.**

# METHODOLOGY

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**The estimated volumes of sewage and greywater discharged by cruise ships using B.C. coastal waters in 2017 were calculated using generation rates established by the United States Environmental Protection Agency in a 2008 study. This study estimated sewage generation to be 32 litres per person per day and greywater generation to be 253.6 litres per person per day.**

A 2019 VARD Marine Inc. study used Automatic Identification System (AIS) data from 2017 to estimate the number of cruise ships in B.C. coastal waters and the total volume of greywater generated. To estimate the amount of sewage generated in 2017, the amount of greywater generated was divided by the average generation rate to estimate the number of passenger days in the study area. The number of passenger days were then multiplied by the sewage generation rate to estimate the volume of sewage discharged by cruise ships in B.C. coastal waters in 2017.

Estimates of the volume of sewage and greywater that would have been discharged during the 2020 cruise season were calculated using per passenger volumes multiplied by the expected number of passengers in 2020. This assumed that increased passenger numbers in Victoria between 2017 to 2020 are representative of regional growth in cruise ships, and that the Alaska route was not overrepresented in those numbers. This also assumed that per passenger sewage and greywater generation rates have not changed during this period, and that the routes are not longer or shorter over the average of the season.

Estimates of washwater discharge from cruise ships was based on a 2019 analysis by the International Council on Clean Transportation.

# RECOMMENDATIONS

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In light of the inadequate response of the cruise ship industry to the COVID-19 pandemic, Canada's federal government placed a temporary ban on medium- and large-sized cruise ships in Canadian waters. In addition, passenger vessels carrying more than 12 people are prohibited from entering Canadian Arctic coastal waters.

The ban on cruise ships prevented tens of billions of litres of pollution from being dumped in B.C.'s coastal waters. If we are going to allow cruise ships to return to Canadian waters—particularly to fragile ecosystems such as the Arctic and the critical habitat for southern and northern resident killer whales along B.C.'s coast—in the post-pandemic era, the Government of Canada must act now to update our regulations to protect our coasts. This requires the federal Minister of Fisheries, Oceans and the Coast Guard Bernadette Jordan and Minister of Transport Marc Garneau to strengthen regulations governing the dumping of untreated and poorly-treated wastewater pollution, especially along the West Coast and in the Arctic.

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1

The Canadian government must remove loopholes in the *Canada Shipping Act* that allow the dumping of untreated sewage, greywater and washwater along Canada's world-renowned and ecologically significant West Coast.

2

Canadian laws must be updated to prohibit dumping of any untreated or poorly treated waste within 24 nm and no dumping in the Great Bear Sea.

3

The Canadian government must ban the use of heavy fuel oil by cruise ships in Canadian waters and mandate the switch to low-sulfur marine gas oil, which will eliminate the need for scrubbers and the washwater pollution these systems discharge into marine waters.

4

Cruise ship corporations must equip their ships with the latest advanced water treatment systems to treat greywater and sewage, rather than the aging marine sanitation devices, and stop all dumping of untreated and poorly treated sewage, greywater and washwater. Canada needs to require the maintenance of treatment systems and make those logs transparent and publicly accessible.

5

Cruise ship corporations must switch to low-sulfur marine fuels and invest in the transition to zero emissions propulsion systems, with cruise operators each required to have zero emissions vessels in operation by 2030, and achieve the complete decarbonization of the cruise ship fleet operating in Canadian waters by 2050.



# INTRODUCTION

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Although cruises in Canadian waters are often marketed as benign, nature-oriented experiences, the cruise industry is one of the most profitable and polluting travel-related industries in the world. Most cruise ships burn one of the dirtiest fossil fuels on earth, heavy fuel oil, which is very carbon intensive and highly polluting; standing on the deck of a cruise ship can be akin to walking the streets of the world's most polluted cities<sup>1</sup>. Cruise ships also discharge an extraordinary amount of pollution into our oceans: A cruise ship the size of the Royal Princess, for instance, owned by Carnival Corporation and one of 30 cruise ships that routinely sail Canadian waters between Vancouver and Alaska, on a one-week voyage dumps more than one million litres of human sewage and 8.7 million litres of highly polluting greywater (from sinks, baths, showers, laundry, galleys, spas, salons, workshops, print and photo shops, dry cleaners and medical facilities) into BC's coastal waters<sup>2</sup>, enough wastewater to fill four Olympic swimming pools. Add to this a potential estimated 200 million litres or so (80 more Olympic swimming pools)<sup>3</sup> of chemical-laden washwater that could be discharged from its fuel system, and they've dumped pollution from one weeklong cruise equivalent to **11 times the volume of all the tanks in the Vancouver Aquarium.**



Carnival Corporation is the largest cruise operator in the world. Every year, its fleet of 100+ cruise ships across nine cruise brands—Aida Cruise, Carnival Cruise Line, Costa Cruises, Cunard, Holland American Line, P&O Cruises, P&O Cruises Australia, Princess Cruises, and Seabourn—ferries 12.9 million customers through pristine coastal waters and sensitive marine ecosystems all over the world. Because Carnival's ships are flagged in countries where they are not required to pay U.S. corporate income tax, its \$3 billion in annual revenues means \$3 billion in net profit<sup>4</sup>.


Despite enormous revenues, Carnival can hardly be trusted to manage the prodigious amount of waste it produces. Its cruise brands have the poorest recorded environmental performance in the industry, and have been subjected to criminal prosecution for a variety of misdeeds, including multiple felony convictions for intentionally discharging oily wastes, the unlawful dumping of untreated waste in marine parks, and violating the terms of court-appointed probation<sup>5</sup>.

For instance, in 2017, the U.S. Department of Justice ordered Carnival’s Princess Cruise Lines to pay a \$40 million fine—the largest ever—when five Princess Cruise Line vessels were caught illegally dumping oil-contaminated waste for nearly a decade, tampering with pollution monitoring equipment, and falsifying logs to hide its actions<sup>6</sup>. In 2018, Holland America Line’s Westerdam cruise ship illegally dumped 26,000 gallons of untreated grey water in Glacier Bay National Park and failed to report the discharge to the Coast Guard, which was a felony violation committed while Carnival was on probation for its 2017 felony convictions. However, U.S. federal prosecutors chose not to pursue further criminal charges, and the State of Alaska fined the company \$17,000 for the incident<sup>7</sup>. In 2019, Carnival was fined an additional \$20 million for violating the terms of its environmental probation—including falsifying records and deliberately releasing illegal plastic and food waste pollution into Bahamian waters<sup>8</sup>.

Dozens of Carnival’s pollution-generating cruise ships, including the Westerdam, use Victoria’s cruise terminal as a stopover on their journeys between Seattle, Washington, and Ketchikan, Alaska. This includes Puget Sound, the Strait of Juan De Fuca, and the Strait of Georgia, a unique transboundary marine ecosystem known by Indigenous Peoples and the geographic boards of both Canada and the U.S. as the Salish Sea. It is home to the endangered southern resident killer whale population and the declining chinook salmon population on which they depend. Cruise ships also sail through the Johnstone Strait into the Great Bear Sea, another of B.C.’s unique marine ecosystems, where a threatened population of sea otters and the threatened northern resident killer whale population eke out an existence alongside dwindling salmon populations.

Unfortunately, the Canadian federal and B.C. governments do not adequately monitor or regulate marine pollution generated and dumped by cruise ships. In Canada, protection of the marine environment is under federal jurisdiction. Its *Vessel Pollution and Dangerous Chemicals Regulations (2012)*<sup>9</sup> is intended to reduce or otherwise mitigate pollution discharged from cruise ships and other maritime vessels, but it is weak, full of loopholes and inadequately enforced.

The *Pollution Prevention Guidelines for the Operation of Cruise Ships Under Canadian Jurisdiction (2013)*<sup>10</sup> is entirely voluntary and permits cruise ships with decades-old (as opposed to more modern advanced systems) marine sanitation devices to discharge dangerous amounts of raw and poorly treated sewage, greywater and washwater in Canada’s coastal waters and ports. In short, Carnival and the rest of the cruise ship industry are permitted to treat B.C.’s beautiful and sensitive marine ecosystems as the world’s largest tourist toilet bowl.

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<small>MARINE SAFETY RDIMS 531748v4</small>		
<b>POLLUTION PREVENTION GUIDELINES FOR THE OPERATION OF CRUISE SHIPS UNDER CANADIAN JURISDICTION</b>		
<b>Responsible Authority</b> The Director, Ships and Operations Standards, Marine Safety is responsible for this document, including any change, correction or update.		<b>Approval</b>  Gerard McDonald  Director General Marine Safety  Date: <u>March 31, 2005</u>
<b>Date Issued:</b> 2003-11-14 <b>Date Revised:</b> 2005-03-31 <b>Last Review:</b> November 2004 <b>Next Review:</b> November 2006		



# WASTING B.C.'S PRECIOUS COASTAL WATERS

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The cruise ship industry on Canada's West Coast has exploded over the last decade. Cruise ship arrivals to Greater Victoria Harbour Authority's (GVHA) Ogden Point cruise ship terminal, recently rebranded the Breakwater District, has increased 45 per cent since 2010, making it Canada's busiest single cruise ship port of call<sup>11</sup>. In 2019, more than one million passengers and crew from 30 different cruise ships visited the Victoria cruise terminal during 256 ship calls on their way to and from Alaska<sup>12</sup>. This broke the cruise tourism record set the year before, which had broken the record in 2017<sup>13</sup>.



In April 2020, the GVHA completed an expansion of its Victoria terminal to accommodate more and bigger cruise ships<sup>14</sup>. If cruise ships hadn't been banned by the federal government for 2020 because the industry put profits before human health during the Covid-19 pandemic, Victoria's cruise terminal would have had 300 ship calls and approximately 1.1 million cruisers and crew, breaking the record for the fourth time in as many years. The GVHA continues to increase cruise traffic and even hopes to establish Victoria as a home port for cruise ships<sup>15</sup>.

More calls by more and bigger cruise ships loaded with more passengers and crew members inevitably means more marine pollution in B.C.'s sensitive Salish and Great Bear seas and other coastal waterways. How much? More than 30 billion litres of potentially dangerous sewage, greywater and washwater are dumped in B.C. waters every year.

# SEWAGE

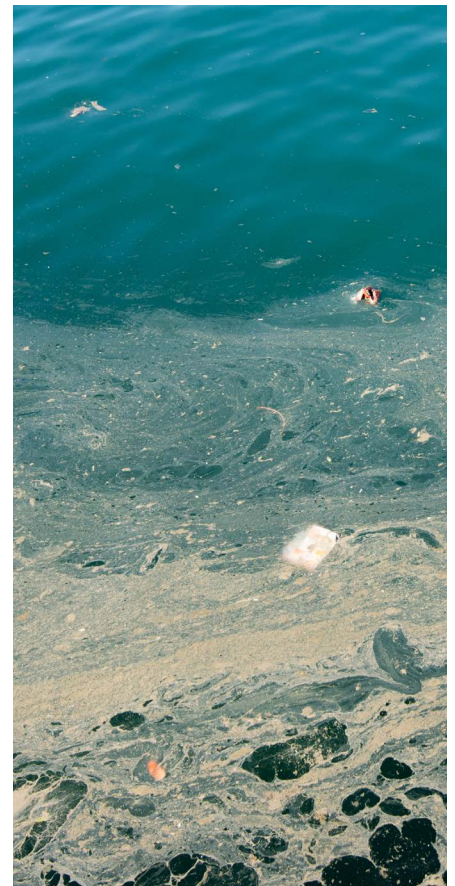
Sewage, or blackwater, is composed of human body wastes that flow from toilets into holding tanks before it is treated and discharged into the sea. Cruise ship sewage is more concentrated than domestic sewage because less water is used for sanitary purposes on cruises than on land, and contains fecal coliform, ammonia, chlorine and a variety of toxic pollutants, such as heavy metals, hydrocarbons and organochlorines<sup>16</sup>.

**Cruise ships produce a huge amount of sewage, estimated at 32 liters per person per day<sup>17</sup>. In 2017, 48 cruise ships spent 6,291 days in B.C. waters, creating and discharging 171 million litres of sewage, enough to fill 69 Olympic swimming pools. The average holding tank capacity for sewage is 62 hours, and treated sewage discharge rates are nearly equivalent to sewage generation rates<sup>18</sup>.**

Canada's *Vessel Pollution and Dangerous Chemicals Regulations (2012)* allows cruise ships to dump sewage in B.C.'s coastal waters as long as it is treated using a marine sanitation device before it is discharged into the sea, though better technology—advanced water treatment systems— has been available for more than a decade<sup>19</sup>.

Sadly, the use of outdated or poorly maintained marine sanitation devices on ships does not mean adequate sewage treatment. The U.S. EPA found that sewage treated with this antiquated technology often contains significant amounts of fecal bacteria, heavy metals, and nutrients in excess of federal water quality standards. A study conducted by the State of Alaska found treated blackwater (sewage) and greywater samples to have registered fecal coliform levels as high as 9 to 24 million colonies per 100 millilitre sample, which exceeds the United States limit by 10,000 to 100,000 times. Of the 22 ships involved in the study, none were in full compliance with blackwater standards and 75% exceeded the American coliform standard<sup>20</sup>. Canada's legislated limits for fecal coliform are weaker than the United States'.

Canada does not have the same testing, maintenance, or enforcement programs as Alaska. The lack of transparency required in Canadian waters makes it difficult to know if cruise ships are being operated in line with regulations and guidelines. Given the cruise ship industry's history of unlawful and irresponsible dumping in sensitive marine ecosystems, Canada must prohibit the dumping of wastewater in the Great Bear Sea, next to Alaska. Other waters under Canada's jurisdiction need protection and the government must require cruise companies to treat all wastewater.



# GREYWATER

Greywater is liquid waste from the galley (i.e. kitchen), showers and laundry facilities—basically anything else that isn't the toilet or an industrial part of the ship. The U.S. Environmental Protection Agency found higher counts of fecal coliform—bacteria that can cause gastroenteritis in humans—in greywater than in the inflow to municipal treatment facilities. Greywater may also contain detergents, cleaners, nutrients, solids, oil and grease, and hazardous carcinogens and other pollutants<sup>21</sup>.

Cruise ships produce an even greater amount of greywater than sewage, estimated at 253.6 litres per person per day<sup>22</sup>. Greywater can be collected for a maximum of 48 hours, but controlled discharge every 20-48 hours is common<sup>23</sup>. In 2017, 48 cruise ships spent 6,291 days in B.C. waters, creating and discharging 1.4 billion litres of greywater, enough to fill 560 Olympic swimming pools<sup>24</sup>.



Canada's *Vessel Pollution and Dangerous Chemicals Regulations (2012)* state that new passenger vessels carrying more than 500 passengers in waters south of 60 degrees latitude must ensure that any release of greywater is passed through a marine sanitation device, rather than the advanced wastewater treatment systems mandated by neighboring jurisdictions, or is made at a distance of at least three nautical miles from shore—which is to say, most of B.C.'s coastal waters. But this does not apply to ships built before 2007, and marine sanitation devices do not adequately treat greywater or sewage.



# SCRUBBER WASHWATER

Washwater is warm, acidic wastewater created by exhaust gas cleaning systems, known as “scrubbers”. With few exceptions, cruise ships are powered by burning heavy fuel oil, one of the dirtiest fossil fuels on earth. It is a waste product of the world’s oil refineries after other petroleum products are made from crude. It has concentrated levels of heavy metals, sulfur oxides and other harmful toxins.

The combustion of heavy fuel oil releases large amounts of health-harming particulate matter, heavy metals, polycyclic aromatic hydrocarbons, endocrine-disrupting chemicals, CO<sub>2</sub>, and nitrous and sulfur oxides<sup>25</sup>. On January 1, 2020, in an effort to require the industry to use cleaner fuels, the International Marine Organization began to enforce a fuel sulfur content limit of 0.5% (5,000 ppm), down from a maximum of 3.5% (35,000 ppm).

Unfortunately, a massive loophole in the international law allows companies to comply with the cleaner fuel standard without changing to cleaner fuels. Instead, most cruise ship companies have chosen to continue to burn heavy fuel oil and install scrubbers, which use water to remove sulfur oxides from the ships’ exhaust streams. Eighty per cent of these across all ship types are open-loop systems that discharge the contaminated waste, which contains carcinogenic and other toxic substances, such as polycyclic aromatic hydrocarbons and heavy metals, into the ocean<sup>26</sup>. According to available data, all scrubber systems installed on cruise ships operating in B.C. waters are either open-loop or hybrid systems, which allow for the continual discharge of the contaminated washwater directly into our coastal waters<sup>27</sup>.

**In 2017, cruise ships accounted for 23 of the 30 ships (77%) with scrubbers operating around Vancouver Island and Haida Gwaii. Of the 35 billion litres of washwater discharged in these waters, cruise ships were responsible for 31 billion liters (89%)—enough to fill 12,400 Olympic swimming pools. There are no regulations about the discharge of washwater in Canadian waters<sup>28</sup>.**

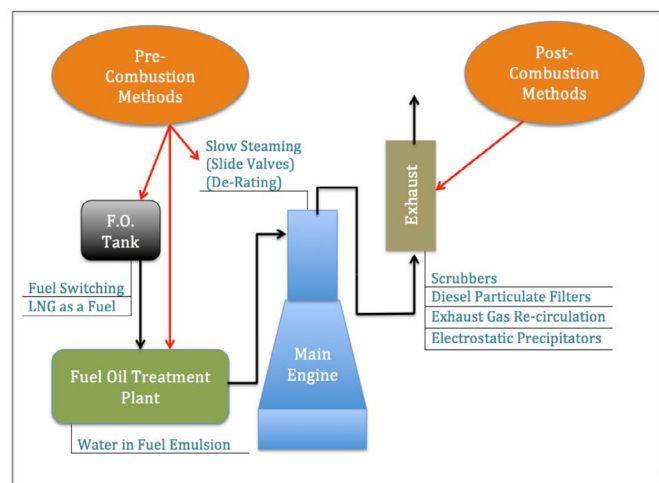


Figure 1: Schematic of potential pre-combustion and post-combustion marine black carbon control strategies. (Taken from ICCT & ECCC, 2016)

Approximately 10 per cent of of scrubber washwater discharges occurred in resident killer whale critical habitats. Heavy fuel oil use and scrubber washwater discharges are expected to grow by 35 per cent, and cruise ships will continue to account for most of heavy fuel oil use and washwater discharge<sup>29</sup>.

# ENVIRONMENTAL IMPACT OF CRUISE SHIP POLLUTION

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Untreated and poorly treated sewage contains large amounts of fecal coliform, nitrogen and phosphorus, and can also contain heavy metals, pharmaceuticals and plastic. Sewage can contribute to eutrophication and algal blooms and pollute filter-feeding shellfish. Sewage solids can cause increased turbidity that can alter the marine habitat on the bottom of the ocean. Sewage is also visually repulsive and can pose health-related hazards for water sports like swimming, scuba diving, and surfing<sup>30</sup>.

Greywater may pose greater threats than sewage discharges due to the greater volumes being dumped into coastal waters. Like sewage, it can contain a variety of toxic chemicals, nutrients, heavy metals, oils, and fecal coliforms and other pathogens. When released into the marine environment, greywater can create harmful algal blooms and dead zones, as well as suffocate fish, crabs, lobsters and sponges<sup>31</sup>. These impacts can have wide-ranging effects, decreasing biodiversity and disrupting food webs<sup>32</sup>.



The largest source by far of marine pollution comes from 31 billion litres of scrubber-created washwater, which contains carcinogenic and other toxic substances, such as polycyclic aromatic hydrocarbons (PAHs) and heavy metals. Like sewage and greywater, exposure to washwater can harm aquatic organisms and food webs. Heavy metals and PAHs are persistent in the marine environment and can accumulate in sediment, which negatively affects bottom-feeders. Even low PAH concentrations can cause liver damage and reduce fertility in fish. Nitrates can increase risk of eutrophication in the summer months when algal bloom and cruise ships schedules overlap<sup>33</sup>.

When released into the ocean, the wide array of toxic substances in these multiple cruise ship water pollution waste streams pose a significant, compounding threat to aquatic wildlife and the habitat and food webs on which they depend, including the recovering but threatened sea otter populations and threatened and critically endangered populations of resident killer whales that live off the coast of British Columbia<sup>34</sup>.

# IMPACT OF COVID-19 PANDEMIC MEASURES ON CRUISE SHIP POLLUTION

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On May 29, 2020, federal Minister of Transport Marc Garneau announced a ban on the operation of cruise ships with overnight accommodations for more than 100 passengers in Canadian waters until October 31, 2020. This decision, made in large part because of the cruise industry's unwillingness to make the decisions necessary to ensure the safety of its passengers, crew and port communities as the Covid-19 pandemic spiraled out of control on its ships, essentially cancelled the 2020 cruise season along B.C.'s West Coast.

For the first time in decades, behemoth cruise ships were not discharging billions of litres of potentially harmful pollution in Canadian waters.

**Specifically, an estimated 220 million litres of sewage (88 Olympic swimming pools' worth), 1.8 billion litres of greywater (720 Olympic swimming pools' worth), and 31 billion liters of washwater (enough to fill 12,400 Olympic swimming pools)—which together contain a variety of harmful pollutants, including fecal coliform, ammonia, heavy metals and polycyclic aromatic hydrocarbons—were prevented from being discharged into and polluting the Salish and Great Bear seas.**

For one season, B.C.'s coastal waters—and the at-risk populations of killer whales and sea otters, and the food sources and habitats on which they depend—were given a reprieve from billions of litres of harmful pollution. Now it's time to make these changes permanent.





# CONCLUSION

Despite being an extraordinarily profitable industry, the cruise sector chooses not to invest in best-in-class pollution prevention technology to limit its environmental footprint and protect the pristine coastal environments they market to their customers. Instead, cruise ships discharge an extraordinary amount of potentially dangerous pollution in B.C.'s coastal waters every year. Led by Carnival Corporation, the world's largest cruise company, cruise ships dump tens of billions of litres of contaminated sewage, greywater and washwater—enough to fill more than 13,000 Olympic swimming pools, or four times the volume of Whistler's Alta Lake—into the Salish and Great Bear seas along B.C.'s wild West Coast.

Legal loopholes and weak regulations in Canada actually incentivize cruise companies to dump their waste in Canadian waters rather than in Alaska or Washington State waters. And despite making billions of tax-free profits annually, cruise companies prefer to use dirt-cheap, dirty fuel and outdated waste treatment technology rather than cleaner and more responsible alternatives.

It's way past time that the Canadian federal government enacts statutory requirements that eliminate, reduce and/or treat with the best available technology the various waste streams created by cruise ships. The safest way to deal with cruise ship waste is to require that waste streams be treated with high-performance advanced wastewater treatment systems, and stored onboard and disposed of in appropriate onshore reception facilities. Given the cruise industry's poor track record at honoring their regulatory obligations, enhanced monitoring, including onboard observers, should also be mandatory. These systems need to be maintained well, and those maintenance logs must be publicly available.

As our American neighbors in Washington State and Alaska concluded almost two decades ago, strict regulatory oversight is the only way to prevent the Carnival Corporation and the rest of the cruise industry from polluting the B.C.'s coastal waters. Now is the time to make it happen.

To get engaged on this issue and more  
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## Endnotes

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Images

*Figure 1: Schematic of potential pre-combustion and post-combustion marine black carbon control strategies*  
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