

# Getting a Grip on Cruise Ship Pollution

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## Executive Summary

Protecting the nation's oceans from pollution discharged by ocean-going vessels is a serious challenge to policy makers and to industry. The cruise industry is of particular concern given the size of today's ships -- the newest (i.e., Royal Caribbean's *Oasis of the Seas*) accommodating as many passengers and crewmembers as live in a small American town like Corning, NY; Grinnell, Iowa; Astoria, Oregon; or Winslow, Arizona. A ship such as Royal Caribbean International's *Explorer of the Seas* produces every day more than 40,000 gallons of sewage, over 450,000 gallons of gray water, 4,000 gallons of oily bilge water, and as much as 19 tons of solid waste. Much of this waste is discharged into the environment directly, or indirectly as incinerator smoke and ash. In addition, a cruise ship, like all ocean going vessels, produces significant air emissions from burning large amounts of fuel and contaminates waters through ballast water that introduces non-native species into America's waters. Each of these waste effluents presents issues for the environment. Even when treated, the results are shameful. Treatment of wastewater -- sewage and gray water -- has been found by the U.S. Environmental Protection Agency to not adequately meet even water quality standards set for onshore sewage treatment plants. The problem is made more serious by loopholes in the Clean Water Act. The Act fails to classify sewage from cruise ships as a pollutant for permitting purposes, and fails to apply water quality standards to ships traversing U.S. coastal waters beyond three nautical miles. While the cruise industry has introduced initiatives to better deal with cruise ship waste streams, these measures often fall short.

Some states in the U.S. have taken bold steps to deal with pollution from cruise ships. Alaska sets explicit standards for wastewater discharged into state waters, regularly monitors air emissions when ships are in port, and employs onboard observers to ensure compliance with state regulations. Maine prohibits discharge of gray water and treated sewage into state waters; Casco Bay (Portland) is proclaimed a no discharge zone. Washington State, through a memorandum of understanding with the cruise industry, prohibits discharge of sewage sludge within twelve miles of the shore and within the whole Olympic Coast National Marine Sanctuary and, except from advanced wastewater treatment systems, outlaws the discharge of treated and untreated sewage and gray water into state waters. And California not only bans the discharge of all wastewater, sewage sludge, and oily bilge water into state waters, but also requires use of low sulfur fuels within 24 nautical miles of its coast, bans the use of onboard incinerators in state waters, and has progressive rules for ballast water. The result is a few patches on an otherwise outdated and overwhelmed system of pollution controls for U.S. waters.

There is urgent need for a minimum set of regulations across U.S. territorial waters. State initiatives provide some direction. The cruise industry--if its public commitments to be responsible stewards of the marine environment are to be believed--appears ready to comply with regulations that protect and preserve the marine environment. Though responsibility has economic costs, these are modest for an industry that earns billions of dollars in net income each year -- Carnival Corporation alone earned more than \$9 billion net profit over the past four years and, as a foreign registered corporation sailing foreign registered ships, pays virtually no corporate taxes to the U.S. other than that paid for its tour operations in the Pacific Northwest and Alaska.



## I. INTRODUCTION

The marine environment is by many accounts under siege. Increasingly common are news stories of dying coral reefs, of dead zones in coastal oceans – affecting more than 245,000 square kilometers<sup>1</sup> - and of forms of sea life becoming extinct or seriously threatened. At the same time, the cruise industry continues to grow with little sign of slowing. At the end of 2008, members of the Cruise Line International Association (CLIA), a trade organization and lobbyist representing 98 percent of cruise line capacity serving North America, collectively had 189 ships with accommodations for close to 300,000 passengers plus another 125,000 crewmembers.<sup>2</sup>

The cruise industry regularly claims to be a responsible steward of the nation's oceans. But its behavior has brought more than \$55 million in fines since 1998,<sup>3</sup> undermining such claims. While boasting profits of billions of dollars and paying virtually no corporate income taxes in the United States,<sup>4</sup> cruise lines in the past have appeared to place increased profit above environmental protection. Until recently, they have been adept at avoiding legislation and regulations that would force them to clean up their act through significant spending on lobbyists in Washington, DC (\$23.5 million since 2000; \$5.9 million in 2008 alone<sup>5</sup>) and on strategic contributions to federal and state election campaigns.<sup>6</sup>

The next chapter looks at the problem of pollution from cruise ships. It first identifies and discusses cruise ships waste streams, including sources of water pollution such as sewage (black water) and sewage sludge, gray water, solid waste, oily bilge water and ballast water, as well as sources of air pollution from cruise ship incinerators and engines. The potentially deleterious effects of each waste stream are considered, as are methods commonly used for treating pollutants from cruise ships. Many of these treatment methods are inadequate for ensuring effective protection of the environment.

Chapter III provides historical context to the cruise ship pollution problem. There is a brief primer on the history of the cruise industry (three corporations control ninety-five percent of the North American market) and an overview of the cruise industry's record of fines and citations for violations of environmental protection laws, some prosecuted by the federal government, many others pursued by states (i.e., Alaska, Washington, California, and Hawaii). A discussion of how the cruise industry has responded to its long series of violations of environmental laws and regulations conclude the chapter.

Chapter IV considers the range of regulatory regimes and protocols applying to cruise ships plying U.S. waters. The strengths and weaknesses of international conventions, federal regulations and laws, and state-initiated laws and regulations are considered with an eye toward identifying protocols that are effective for environmental protection.

The final chapter looks to solutions for dealing with cruise ship pollution. Recommendations are offered for effectively dealing with each waste stream. The goal is to have in place laws and regulations that ensure the cruise industry is environmentally responsible and behaves as a good steward of the marine environment.



## II. THE CRUISE SHIP POLLUTION PROBLEM

A cruise ship is not the most environmentally friendly form of transportation. On average, a cruise ship discharges three times more carbon emissions than aircraft, trains, and passenger ferries:

“Carnival, which comprises 11 cruise lines, said in its annual environmental report that its ships, on average, release 712 kg of CO<sub>2</sub> per kilometer ... This means that 401g of CO<sub>2</sub> is emitted per passenger per kilometer, even when the boat is entirely full. This is 36 times greater than the carbon footprint of a Eurostar passenger and more than three times that of someone traveling on a standard Boeing 747 or a passenger ferry.”<sup>7</sup>

But the problem is greater than just CO<sub>2</sub>. A moderate-sized cruise ship on a one week voyage with 2,200 passengers and 800 crewmembers is estimated to generate up to 210,000 gallons of human sewage (this would fill approximately ten backyard swimming pools), one million gallons (the equivalent of 40 more swimming pools) of gray water (water from sinks, baths, showers, laundry, and galleys), eight tons of garbage (the weight of a school bus), more than 130 gallons of hazardous waste, and 25,000 gallons of oily bilge water.<sup>8</sup>

The cruise industry frequently claims that its pollution is only a small part of the problem given the proportionately larger number of other ocean-going vessels and that these vessels, too, produce waste. While this may be true for waste streams such as oily bilge water and emissions from burning fuel, it is not the case with other pollution. With its large number of passengers and crew, wastes such as sewage, gray water, solid waste, and air emissions from incinerators are substantially greater on cruise ships than on other ships – a U.S. Congressional Research Service report estimates that 24 percent of the solid waste generated by vessels worldwide (by weight) comes from cruise ships.<sup>9</sup> In addition, because cruise ship operations tend to concentrate in the same geographic locations and along the same sea routes, their cumulative impact on local areas can be significant. Add to this the potential for, and reality of, accidental discharges and the environmental impacts of cruise ships are a serious concern.

### A. CRUISE SHIP WASTE STREAMS IDENTIFIED

1. Cruise Ship Water Pollution
  - a. BLACK WATER

Black water, otherwise known as human sewage, is the waste from cruise ship toilets and medical facilities. A cruise ship produces more than eight gallons of sewage per day per person.<sup>10</sup> The cumulative amount per day for a ship such as Royal Caribbean’s *Explorer of the Seas*<sup>11</sup> is more than 40,000 gallons; almost 300,000 gallons on a one week cruise. These wastes contain harmful bacteria, pathogens, disease, viruses, intestinal parasites and harmful nutrients. If not adequately treated they can cause bacterial and viral contamination of fisheries and shellfish beds.<sup>12</sup> In addition, nutrients in sewage, such as nitrogen and phosphorous, promote algal growth. Algae consume oxygen in the water that can be detrimental or lethal to fish and other aquatic life.<sup>13</sup>

Sewage from cruise ships is a critical problem, compounded by the fact that it is excluded from the Clean Water Act’s (CWA) National Pollutant Discharge Elimination System (NPDES) permitting requirements and ignored beyond three nautical miles from shore. The Clean Water Act’s provision for sewage discharges from vessels sets treatment standards



that are inadequate, and now outdated, and does not require permits or reporting. Further, the discharge of sewage from vessels in coastal waters beyond three miles is not regulated.

Sewage Treatment:

i. Marine Sanitation Devices. Sewage from a cruise ship traditionally has been treated by a Type II marine sanitation device (MSD). Under Section 312 of the U.S. Clean Water Act, commercial and recreational vessels (including cruise ships) with installed toilets are required to have an MSD. Type II MSDs are the most common type of wastewater treatment systems on cruise ships and consist of flow-through devices that break up and chemically or biologically disinfect waste before discharge. Within three nautical miles of shore vessels must treat sewage with an approved Type II MSD prior to discharge. Beyond three nautical miles, discharge of raw sewage is allowed. The U.S. Environmental Protection Agency's (EPA) regulations governing MSDs have not been updated since they were instituted in 1976.

Type II MSDs are supposed to produce effluent containing no more than 200 fecal coliform for 100 milliliters and no more than 150 milligrams per liter of suspended solids.<sup>14</sup> Whether MSDs achieve that standard was called into question in 2000 when the state of Alaska found that 79 of 80 samples from cruise ships were out of compliance with the standard. According to the Juneau port commander for the Coast Guard, the results were so extreme that it might be necessary to consider possible design flaws and capacity issues with the Coast Guard-approved treatment systems.<sup>15</sup> As seen in a 2008 report from the U.S. EPA, the problems identified in 2000 with MSDs continue today (see Appendix 1).<sup>16</sup>

ii. Advanced Wastewater Treatment Systems (AWTS). The cruise industry in recent years has adopted the use of AWTS (an advanced form of Type II Marine Sanitation Device) on many ships – most often ships visiting Alaska's Inside Passage where such systems are required for continuous discharge in state waters. A ship with an AWTS avoids the need to travel outside Alaska state waters to discharge treated sewage. Installation of AWTS for ships visiting other waters with less stringent or no regulations has been at a much slower pace. For example, Carnival Corporation (which includes Carnival Cruise Lines, Holland America Lines, and Princess Cruises) had AWTS installed on slightly less than one half of its fleet at the end of 2008. But Carnival Cruise Lines, which sends only one ship to Alaska per season, has installed an AWTS on only one of its twenty-three ships.<sup>17</sup> The corporation's spokesperson says they try to make sure AWTS are included on ships that go to Alaska and to other sensitive areas.

AWTS are a vast improvement over MSDs — yielding what the industry refers to as drinking-water quality effluent. However this terminology must be treated with skepticism. Such water cannot be recycled for onboard human consumption nor can it be used in the laundry because sheets and towels apparently turn gray.<sup>18</sup> Both the EPA and Alaska have found that even the best systems still had difficulty with a number of constituents (see Appendix 2 and Table 1 below). A key problem is the AWTS do not adequately address nutrient loading, which means they pose similar problems as MSDs with regard to nitrogen and phosphorous. In addition, tests in Alaska have shown levels of copper, nickel, zinc, and ammonia that are higher than the state's water quality standards.<sup>19</sup> As seen in Appendix 2, AWTS also exceed permitted concentrations of chlorine and tetrachlorethylene. As a result, 12 of 20 (60%) ships permitted to discharge in Alaska waters<sup>20</sup> violated discharge limits in 2008, logging 45 violations involving 7 pollutants (see Table 1).<sup>21</sup> These include ammonia, biological oxygen demand, chlorine, copper, fecal coliform, pH, and zinc.<sup>22</sup> 2009 was even worse, with 13 of 18 (72%) ships permitted to discharge in Alaskan waters violating Alaska discharge limits during the season, racking up 66 violations involving 9 pollutants (see Table 1). Each violation is liable for a fine of up to \$100,000. It is noteworthy that nearly 30 percent of ships discharging in Alaska were able to meet the water quality standards.



Royal Caribbean stated in 2003 that, “two of the three prototype systems on our ships today have proven unsatisfactory and we will replace them with even newer prototypes.”<sup>23</sup> Moreover, given that these systems are not regularly tested, except by Alaska, and that they are prone to breakdown and require constant maintenance and care, there is a need to be cautious with regard to where the effluent from an AWTS can be released. The need for caution is further supported by a 2007 study by the Washington State Division of Environmental Health that found, “AWTS can effectively remove bacteria but may not eliminate viruses that cause illnesses.”<sup>24</sup> The report recommends no discharges should occur within 0.5 nautical miles of bivariate shellfish beds that are recreationally harvested or commercially approved for harvest, and that cruise ships should withhold discharge when a system upset occurs.

Even with their limitations, AWTS are a marked improvement over Type II MSDs. In order to protect all U.S. waters from the harms associated with sewage, meaningful and reliable standards that support AWTS should be instituted within the entire U.S. Exclusive Economic Zone (EEZ). In addition, increased monitoring and reporting standards for treated sewage discharges are necessary to ensure reliability in operation of treatment systems.

**Table 1: Alaska 2008 and 2009 Wastewater Notice of Violation Summary\***

Pollutant	Number of Violations 2008	Number of Violations 2009
Ammonia	21	31
Copper	8	8
Zinc	7	11
Biological Oxygen Demand	4	4
Fecal Coliform	2	6
pH	2	3
Chlorine	1	1
Nickel	-	1
Total Suspended Solids	-	1
Total	45	66

\*Companies and ships cited in 2008 (number of violations in parentheses) include Princess Cruises: *Coral Princess* (3), *Dawn Princess* (1), *Diamond Princess* (7), *Golden Princess* (2), *Island Princess* (4), *Sapphire Princess* (6), *Star Princess* (7), *Sun Princess* (1); Holland America Line: *Westerdam* (10); Norwegian Cruise Line: *Norwegian Pearl* (1); Regent Seven Seas: *Seven Seas Mariner* (1); Silversea Cruises: *Silver Shadow* (2). Companies and ships cited in 2009 (number of violations in parentheses) include Princess Cruises: *Coral Princess* (1), *Diamond Princess* (6), *Golden Princess* (8), *Island Princess* (10), *Pacific Princess* (3), *Sapphire Princess* (21), *Sea Princess* (6); Holland America Line: *Ryndam* (2), *Statendam* (1), *Volendam* (3); Norwegian Cruise Line: *Norwegian Pearl* (2); Royal Caribbean Int'l: *Serenade of the Seas* (1); Silversea Cruises: *Silver Shadow* (2).

b. SEWAGE SLUDGE.

Most Type II MSDs and AWTS filter solids from sewage as part of treatment. This yields on average 4,000 gallons of sewage sludge per day;<sup>25</sup> cumulatively, it adds up quickly. It is estimated that 4.2 million gallons of sewage sludge are produced every year by ships as they pass through Washington State waters on their way to Alaska<sup>26</sup> – this is small compared to what cruise ships generate outside Washington state waters. In some cases (about one in sixteen ships with an AWTS), sewage sludge is dewatered and then incinerated. In other cases sludge is dumped at sea. Most jurisdictions permit sludge to be dumped within three miles of shore; in California a ship must be beyond three miles from shore and in Wash-



ington beyond twelve miles.<sup>27</sup> In either case, these sludges have a high oxygen demand and are detrimental to sea life. Sewage sludge poses the same problem as sewage, but in a more concentrated form.

A report issued in August 2003 by the California Environmental Protection Agency and the California state Water Resources Control Board said “it found ‘particularly troubling’ the discharging of sludge 12 miles out to sea.”<sup>28</sup> This concern is in stark contrast to regulations elsewhere that define sewage sludge as treated sewage and permit its discharge within three miles of the U.S. shoreline. The need for minimum regulations applicable to the entire U.S. coastline is obvious.

One option is to require sewage sludge to be dewatered and incinerated onboard, however incineration creates an air quality problem and the ash must be disposed of somewhere. Dumping the ash overboard raises new problems. Another option is to require sewage sludge to be held onboard and offloaded for treatment in port. Washington State has in recent years explored the commercial use and value of sewage sludge as a fertilizer, but no clear plans have yet been made.<sup>29</sup> Clearly, a workable solution to the huge volume of sludge being dumped into the waters of the U.S. – 28,000 gallons per week on an average-sized cruise ship – must be identified and implemented.

### c. GRAY WATER.

Gray water is wastewater from sinks, showers, galleys, laundry, and cleaning activities aboard a ship. It is the largest source of liquid waste from a cruise ship: as much as 90 gallons per day per person; nearly half a million gallons per day for a ship such as *Explorer of the Seas*.<sup>30</sup> Like sewage, gray water can contain a variety of pollutants. These include fecal coliform bacteria, detergents, oil and grease, metals, organics petroleum hydrocarbons, nutrients, food waste and medical and dental waste.<sup>31</sup> The greatest threat posed by gray water is from nutrients and other oxygen-demanding materials. The cruise industry characterizes gray water as innocuous, at worst. A 2008 report from the EPA disagrees (see Appendix 3). It states:

“Sampling done by EPA and the state of Alaska found that untreated graywater from cruise ships can contain pollutants at variable strengths and that it can contain levels of fecal coliform bacteria several times greater than is typically found in untreated domestic wastewater. Graywater has potential to cause adverse environmental effects because of concentrations of nutrients and other oxygen-demanding materials, in particular.”<sup>32</sup>

As recently as the 1980s ships were designed with pipes that directly discharged gray water overboard no matter where the ship was. Today gray water is more commonly collected in a holding tank and discharged, through a screen that filters out plastics, when a ship is one mile from shore. Some vessels with AWTs mix gray water with sewage and they are treated together. This is not always possible. Gray water lacks sufficient nutrients for a bioreactor system to properly function so ships using this design release their gray water with limited or no treatment.

Except for the Great Lakes, Maine, and Alaska, gray water was until recently largely unregulated. However, effective February 6, 2009, pursuant to a CWA National Pollutant Discharge Elimination System (NPDES) Vessels General Permit issued by U.S. EPA (VGP), cruise ships must meet treatment standards for gray water as well as 25 other types of incidental vessel discharges -- from ballast water to deck runoff. Operational limits in the permit prohibit the discharge of untreated gray water within one nautical mile (nm) of shore. Gray water discharges are only allowed within one nm if they meet specific effluent limits and can not be discharged in waters of marine sanctuaries, units of the National Park System, units of the National Wildlife Refuge System, National Wilderness areas, and national wild and scenic rivers system components. Discharges of untreated gray water are allowed between one nm and three nm of shore if the vessel is traveling at a speed of



six knots or more..<sup>33</sup> Beyond 3nm there are no restrictions.

The VGP is a positive step. However, there is room for improvement because the VGP only regulates gray water out to three nautical miles. As illustrated in Appendix 3, untreated gray water falls woefully short of National Recommended Water Quality Standards and the Title XIV Standard for Continuous Discharge in Alaska Waters, in particular for fecal coliform, chlorine, biological oxygen demand, suspended solids, ammonia, copper, nickel, zinc, and tetrachloroethylene. This suggests the need for upgrading and regular testing of systems treating gray water, and for extending the area in which gray water discharges are prohibited. As well, it is necessary to perform system inspection and monitoring more frequently than required in the NPDES VGP, which only requires annual inspection and evaluation by the U.S. Coast Guard or the ship's classification society.

#### d. SOLID WASTE.

A cruise ship produces a large volume of non-hazardous solid waste. This includes huge volumes of plastic, paper, wood, cardboard, food waste, cans, glass, and the variety of other wastes disposed of by passengers. It was estimated in the 1990s that each passenger accounted for 3.5 kilograms of solid waste per day.<sup>34</sup> With better attention to waste reduction this volume in recent years has been cut nearly in half. But the amount is still significant, more than eight tons in a week from a moderate sized cruise ship. Twenty-four percent of the solid waste produced by vessels worldwide comes from cruise ships.<sup>35</sup> Glass and aluminum are increasingly held onboard and landed ashore for recycling when the itinerary includes a port with reception facilities.

Food and other waste not easily incinerated is ground or macerated and discharged into the sea. These "... food waste can contribute to increases in biological oxygen demand, chemical oxygen demand, and total organic carbon, diminish water and sediment quality, adversely effect marine biota, increase turbidity, and elevate nutrient levels."<sup>36</sup> They may be detrimental to fish digestion and health and cause nutrient pollution.<sup>37</sup> An additional problem with discharging food waste at sea is the inadvertent discharge of plastics. Under MARPOL,<sup>38</sup> throwing plastic into the ocean is strictly prohibited everywhere.<sup>39</sup> Plastic poses an immediate risk to sea life that might ingest or get caught in it. It poses a longer term risk as it degrades over time, breaking down into smaller and smaller pieces, but retaining its original molecular composition. The result is a great amount of fine plastic sand that resembles food to many creatures. Unfortunately, the plastic cannot be digested, so sea birds or fish can eventually starve to death with a stomach full of plastic.<sup>40</sup>

Solid waste and some plastics are incinerated on board, with the incinerator ash being dumped into the ocean. Incinerator ash and the resulting air emissions can contain furans and dioxins, both found to be carcinogenic,<sup>41</sup> as well as heavy metal and other toxic residues. For this reason Annex V of MARPOL recommends, but does not require, that ash from incineration of certain plastics not be discharged into the sea.<sup>42</sup> At the very least, incinerator ash should be tested before each overboard discharge. This would include analysis and accounting of the contaminants typically found in cruise ship incinerator ash to determine whether it should be categorized as solid waste or hazardous waste.<sup>43</sup>

Under MARPOL<sup>44</sup> and U.S. law,<sup>45</sup> no garbage can be discharged within three miles of shore. Between three and twelve miles garbage can be discharged if ground-up and capable of passing through a one-inch screen. If not ground-up and capable of passing through a screen, most food waste and other garbage can be discharged at sea when a ship is more than twelve miles from shore.

Although cruise ships have reduced their volume of solid waste, the total amount is still significant. Royal Caribbean's



stated commitment in 2003 to not dump any trash overboard is admirable and should set a standard for all cruise ships operating from U.S. ports and in U.S. waters. If it is achievable by Royal Caribbean, then there is no reason why it is not practical for all cruise lines. This should be incorporated in legislation in order to ensure cruise ships can be held accountable for any unnecessary dumping of solid waste in the waters of the U.S.

e. HAZARDOUS WASTE.

A ship produces a wide range of hazardous waste. These include photo processing chemicals, dry cleaning waste, used paint, solvents, heavy metals, expired chemicals and pharmaceuticals, waste from the print shop, hydrocarbons and chlorinated hydrocarbons, used fluorescent and mercury vapor light bulbs, and batteries.<sup>46</sup> Although the volume produced by a ship may be relatively small (less than 1,000 liters in a typical week), the toxicity of these wastes makes them a serious concern. Hazardous wastes must be carefully managed in order to avoid contamination of other waste streams (e.g., gray water, solid waste, bilge water, etc).

Cruise industry compliance with hazardous waste laws in the U.S. must be seen in the context of confusion over what regulations apply. The Resource Conservation and Recovery Act (RCRA) is the primary federal law governing hazardous waste and its disposal, but it is not entirely clear what elements apply to cruise ships.<sup>47</sup> RCRA rules that cover small quantity generators (those that generate more than 100 kilograms but less than 1,000 kilograms of hazardous waste per month) are less stringent than those for large quantity generators (generating more than 1,000 kilograms per month) and it is unclear whether cruise ships are classified as large or small generators of hazardous waste. Further, it is unclear whether these limits are applied for each ship individually, or whether they apply to a company's full complement of ships and are taken together. At the same time, some cruise companies say they generate less than 100 kilograms per month and therefore should be classified in a third RCRA category, as conditionally exempt small generators, a category that allows for less rigorous requirements for notification and recordkeeping.<sup>48</sup> This confusion leads to inconsistencies in practice and, some would argue, to less stringent record keeping than should be required (especially of cruise ships with regular trans-boundary itineraries that allow disposal in other countries).

Rather than permit each individual cruise ship to be classified as an independent producer of hazardous waste, which means reporting and record-keeping requirements are relatively lax, each cruise corporation should be considered as a generator of hazardous waste, responsible for hazardous waste from its entire fleet. This would ensure that maximal control is maintained over the handling of wastes that would have potentially disastrous effects if released into the marine environment. Present loopholes that can be exploited by cruise lines must be closed.

f. OILY BILGE WATER.

A typical large cruise ship will generate an average of eight metric tons of oily bilge water for each twenty-four hours of operation;<sup>49</sup> according to Royal Caribbean's 1998 Environmental Report its ships produce an average 25,000 gallons of oily bilge water on a one week voyage. This water collects in the bottom of a vessel's hull from condensation, water lubricated shaft seals, propulsion system cooling and other engine room sources. It contains fuel, oil, wastewater from engines and other machinery, and may also include solid wastes such as rags, metal shavings, paint, glass, and cleaning agents.

The risks posed to fish and marine organisms by oil and other elements in bilge water are great. In even minute concentrations oil can kill fish or have numerous sub-lethal effects such as changes in heart and respiratory rates, enlarged livers,



reduced growth, fin erosion, and various biochemical and cellular changes.<sup>50</sup> Research also finds that by-products from the biological breakdown of petroleum products can harm fish and wildlife and pose threats to human health if these fish and wildlife are ingested.

Oily bilge water in U.S. waters is regulated by the Clean Water Act. The Act prohibits the discharge of oil or hazardous substances, in such quantities as may be harmful within 200 miles of the coast. In addition, Coast Guard regulations specifically prohibit discharges within 12 nautical miles of shore unless it has been passed through a fifteen parts per million (ppm) oily water separator and does not cause a visible sheen.<sup>51</sup> The NPDES VGP reinforces the 15 ppm standard and it requires large vessels (over 400 gross tons) to discharge oily bilge beyond 1 nautical mile from shore if the vessel is underway and the discharge is technologically feasible and safe. Beyond 12 nautical miles, oil or oily mixtures can be discharged while a vessel is proceeding en route so long as the undiluted oil content is less than 100 ppm.<sup>52</sup> The oil extracted by the separator can be reused, incinerated, and/or offloaded in port.<sup>53</sup> Vessels are required to document the disposal of oil, oily bilge water or oily residues in an Oil Record Book.<sup>54</sup>

To address the deleterious effect of oil to marine life, even in minute quantities, the discharge of oily bilge water should be prohibited in sensitive areas and in coastal zones out to 12 nautical miles. Additionally, consistent minimum water quality standards for oily bilge should be set across all waters under U.S. control either at the Coast Guard's current level of 15ppm or as low as 5 ppm. The reduction to 5 ppm is achievable.<sup>55</sup>

### g. BALLAST WATER.

Cruise ships like other ocean-going vessels use a tremendous amount of ballast water to stabilize the vessel during transport.<sup>56</sup> This water is often taken on in one location after a ship discharges wastewater or unloads cargo and then discharged at the next port of call.

"[Ballast water] ... typically contains a variety of biological materials, including plants, animals, viruses and bacteria. These materials often include non-native, nuisance, exotic species that can cause extensive ecological and economic damage [and] ... [pose] public health and environmental risks, as well as significant economic cost to industries such as water and power utilities, commercial and recreational fisheries, agriculture, and tourism."<sup>57</sup>

The problem is not limited to cruise ships – it is a problem posed by all ships traversing the world's oceans.

Although open ocean exchange requirements for ballast water exist under MARPOL, there are no regulations applying to ballast water quality. In the U.S., ballast water was erroneously exempted from permit requirements under a Clean Water Act regulation until that regulation was successfully challenged by a number of environmental groups. A 1999 petition to EPA ended with a successful court ruling in December 2008 vacating the regulation and the issuance of the NPDES VGP, which took effect February 6, 2009. The VGP, among other things, sets standards for ballast water discharges within 3 miles of the shoreline, but does not apply to invasive species. Ballast water remains unregulated beyond the three-mile limit.

In California, prior to the national lawsuit against EPA, four environmental groups (Bluewater Network,<sup>58</sup> Environmental Law Foundation, Surfrider Foundation, and San Diego Baykeeper) filed suit in a California state court to force cruise ships to follow a California ballast water law passed in 2000, a law which two-thirds of cruise ships were ignoring.<sup>59</sup> All cruise ships visiting California complied after the lawsuit was heard by a state court. In 2006, California passed SB 497, which



took a further step to protect state waters from invasive species in ballast water. The legislation requires ships to treat ballast water before dumping it in ports or coastal waters. The treatment standards are to be phased in, starting in 2009. By 2020, no discharge of organisms larger than 50 microns - about the size of a grain of sand - would be allowed.<sup>60</sup>

There is great value in having national legislation that regulates the quality of ballast water and ensures waters in the U.S. EEZ are protected from further encroachment by the invasive species often found in ballast water. Technology has advanced to the point where ballast water can be treated to a reasonable point that avoids deleterious environmental effects. This technology should be required on ships entering U.S. waters. California's SB 497 provides a useful template.

2. Cruise Ship Air Pollution
  - a. AIR EMISSIONS.

There are two sources of air emissions from cruise ships: incinerators and engines. Each presents its own set of issues.

### Incinerators.

Cruise ships incinerate and burn a variety of wastes, including hazardous wastes, oil, oily sludge, sewage sludge, medical and bio-hazardous waste, outdated pharmaceuticals, and other solid wastes such as plastics, paper, metal, glass, and food.<sup>61</sup> A cruise ship may burn 1 to 2.5 tons per day of oily sludge in these incinerators and boilers.<sup>62</sup> The emissions from onboard incineration and its ash can include furans and dioxins, both found to be carcinogenic, as well as nitrogen oxide, sulfur oxide, carbon monoxide, carbon dioxide, particulate matter, hydrogen chloride, toxic and heavy metals such as lead, cadmium and mercury, and hydrocarbons.<sup>63</sup>

In contrast to incinerator use on land, which is likely to be strictly monitored and regulated, incinerators at sea operate with few limits. MARPOL Annex VI bans incineration of certain particularly harmful substances, including contaminated packaging materials and polychlorinated biphenyls (PCBs).<sup>64</sup> There are no national standards limiting emissions from ship incineration.

The State of California has established that air emissions from incineration, generated between 27 and 102 miles off the coast, could negatively impact the air quality of the state.<sup>65</sup> The state initially introduced legislation in 2003 to prohibit ships from using onboard waste incinerators while within 20 miles of the coast, but subsequently passed legislation applicable only to waters over which the state had jurisdiction. The final California law prohibits incinerator use when a ship is within three miles of the coast.

Clear parameters are needed for operational requirements for onboard incinerators, much like on land. In addition, it is wise to do as California has done and ban the use of incinerators within a specific distance from the coast. Any such law must take into account the potential for onshore winds and ocean currents to move incinerator pollutants on-shore.

### Engine Emissions.

Air emissions from ship engines are an obvious source of pollution because many ships burn bottom-of-the-barrel bun-



ker fuel – typically what remains of the crude oil after gasoline and distillate fuel oils are extracted through refining.<sup>66</sup> An estimated 60,000 people die worldwide each year as a result of under-regulated shipping air emissions and that number is estimated to grow by 40 percent by 2012 due to increases in global shipping traffic.<sup>67</sup> According to the U.S. EPA, ocean-going ships that used Category 3 marine engines and operated in the U.S. Exclusive Economic Zone (EEZ) in 2007 emitted 870,000 tons of nitrogen oxide, a key contributor to smog.<sup>68</sup> Conventionally a cruise ship's daily emissions are likened to the impact of 12,000 automobiles.<sup>69</sup> A study published in 2007 raises an even greater alarm. It found that bunker fuel on average has almost 2,000 times the sulfur content of highway diesel fuel used by buses, trucks, and cars and that one ship can make as much smog-producing pollution as 350,000 cars.<sup>70</sup> This figure can vary widely depending on the fuel being burned. A number of ships began using gas turbine engines in the late 1990s and early 2000s, well before the spike in fuel costs in 2007. These gas turbines are considerably better than conventional cruise ship engines in terms of sulfur and nitrous oxide emissions.

Current international standards set maximum sulfur content for ocean going vessel fuel at 4.5 percent, making it easy for cruise lines to say they meet or exceed international regulations since bunker fuel averages 3 percent sulfur content.<sup>71</sup> Significantly, lower sulfur fuels such as on-road diesel currently have sulfur contents as low as 0.0015 percent. New international standards that will go into effect in 2020 will significantly reduce particulate matter, sulfur, and oxides of nitrogen pollution from vessels.<sup>72</sup>

Cruise lines have been resistant to adopting use of fuels below 3 percent because of their higher cost.<sup>73</sup> Governments struggling with air pollution problems, however, are beginning to take action to curtail air pollution from these ships. As one example, the United States and Canada have a proposal pending before the International Maritime Organization (IMO) that would create a protective Emission Control Area (ECA) along the majority of North American coasts, extending to the fuel use in all ships within 200 nautical miles of shore.<sup>74</sup> This ECA would require much cleaner bunker fuel use if approved by the IMO in March 2010 -- 1.0 percent by 2012 and 0.1 percent by 2015 -- saving thousands of lives in the process.<sup>75</sup>

Another way in which air emissions can be curtailed is by imposing reduced speed limits as cruise ships approach ports. In March 2009, the Port of San Diego moved forward with a vessel speed reduction program.<sup>76</sup> Cruise and cargo ships will be asked to voluntarily reduce their speed when entering and leaving San Diego Bay in an effort to reduce air pollution. The voluntary speed limit will be 15 knots for cruise ships when traveling in an area that extends 20 nautical miles out to sea from Point Loma; cargo ships are expected to reduce speed to 12 knots. According to port officials, studies have shown a significant reduction in air emissions from ship engines when speeds are reduced – particularly significant reductions in emissions of oxides of nitrogen, oxides of sulfur, diesel particulate matter and carbon dioxide.<sup>77</sup> Similar programs have been enacted by the ports of Los Angeles and Long Beach, which report the program saved more than 100 tons of nitrogen oxide from going into the air in the first three months of implementation.<sup>78</sup>

An additional way to grapple with the problem of air emissions from engines is cold ironing, the option for ships to turn off all engines while in port and to plug into shore-side power. Cold-ironing was first introduced in 2001 in a partnership between the port of Juneau and Princess Cruises and is slowly propagating to other locations, including the ports of Vancouver, Los Angeles, Long Beach, and Seattle. The west coast of the U.S. is setting an example for the rest of the country and the practice of cold ironing should be encouraged, if not required, along all coasts of the U.S.

While the industry argues that it meets or exceeds international limits, it must be recognized that these regulations are minimal and fall far short of those already in place in California where ships are required to use marine gas oil, or marine



diesel oil with a sulfur content of no more than 0.5 percent by weight in all diesel engines within 24 nautical miles of the coast beginning in July of this year (sulfur content of marine gas oil drops to 0.1 percent sulfur in 2012). According to the California Air Resources Board, the use of low sulfur fuel in auxiliary engines used in port could save 3,600 lives in coastal communities over the first six years through reduced respiratory illnesses and heart disease, including a potential 80% drop in cancer risk associated with ship pollutants.<sup>79</sup> The results are even more impressive if auxiliary engines are shut down and shore-side power is used instead.

### 3. Cruise Ship Observers

Alaska has demonstrated the feasibility and the value of onboard observers aboard cruise ships. Observers ensure onboard practices and systems conform to legal requirements. Observers ensure that effluent can be regularly tested, and they confirm that onboard systems are operational. Presently, as long as a ship has a sewage treatment system approved by the U.S. Coast Guard, it is assumed the system operates up to performance standards and effluent is discharged based on that assumption. As already mentioned, this is not the case with MSDs. As well, even if a cruise ship has an AWTS, there is no guarantee the system will be operational and used at all times while in U.S. waters. The existence of a system is one thing; confirming its use and that it is performing to required standards is another. Use of independent onboard observers is the most effective means for gaining confirmation.

Onboard observers are important also to ensure that oily water separators are properly maintained, that the system is not being tricked such that meters inaccurately measure oil content, and that proper records are kept. As was seen in the cruise industry's violations in the 1990s, there was economic advantage to violating requirements, and while these practices are presumed to have ceased, an onboard observer is the most effective method for ensuring they do not reappear. Onboard observers are perhaps more important now given that all cruise lines are off probation from their environmental violations in the 1990s and are thus under considerably less scrutiny than was the case two or three years ago.

One other lesson learned from Alaska is onboard observers must be given clear authority in legislation for their monitoring activities. Placing obstacles to observer access to onboard systems and log books, and to the ability to test effluent, must be clearly made illegal with stiff punishment. The value and efficacy of the observers depend on their ability to do their job without limits and without concern for their safety and security.



### III. History of the Cruise Industry's Environmental Record

#### A. A Brief History of the Industry<sup>80</sup>

The cruise industry has grown phenomenally since the emergence some 40 years ago of leisure cruising. Princess Cruises, established in 1965, was the first of today's modern cruise lines to focus on the leisure travel market. The cruise line began by chartering Canadian Pacific's 6,000 ton *Princess Patricia* from Vancouver to Alaska's Inside Passage. A year later Norwegian Caribbean Line, later renamed Norwegian Cruise Line (NCL), began sailing. Carnival Cruise Lines launched in March 1972. The other major player in the cruise industry today, Royal Caribbean, also had its start in the late 1960s.

As these companies grew the number of North Americans taking a cruise increased exponentially. Passenger numbers more than doubled between 1970 and 1980: from 600,000 to 1.4 million. They increased five-fold in the twenty-year period from 1980 to 2000: from 1.4 million to close to seven million. Between 2000 and 2008, passenger numbers grew another 79 percent to 13.2 million.<sup>81</sup>

This pattern of growth in the cruise industry is expected to continue. More than 26,000 berths were added by 10 new ships built in 2008 – on an annual basis this adds more than one million passengers. Nine new ships will be delivered in 2009, contributing more than 23,000 berths; 12 more ships with 33,000 berths will be delivered in 2010; and in 2011 at least 7 new ships with 16,000 berths are planned. Taken together, new construction over four years (2008 through 2011) will add 38 new ships with more than 100,000 berths (on an annual basis, approximately five million additional passengers).

The size of ships has also increased dramatically. In their early days, cruise ships could accommodate 750 to 1000 passengers, but new purpose-built cruise ships are increasingly taking on larger proportions. By the late 1990s, new cruise ships launched by Carnival, Royal Caribbean and Cunard were accommodating more than 3,300 passengers. These were soon eclipsed in 2006 by Royal Caribbean's 160,000 ton *Freedom of the Seas* with capacity for 4,370 passengers and over 5,700 people including crew. Competition is likely to end in the short term after Royal Caribbean introduces *Oasis of the Seas* in late 2009. *Oasis of the Seas* weighs 220,000 tons, has accommodations for close to 7,000 passengers (at capacity) and carries a complement of over 2,000 crew members. It is staggering to compare this to the ships Royal Caribbean and Carnival started with – *Song of Norway* at 18,000 tons and 724 passengers and *Mardi Gras* at 27,300 tons and 1,024 passengers.

As the cruise industry has grown it has increasingly consolidated. Today it is dominated by just three corporations which together control 95 percent of the North American market: Carnival Corporation, Royal Caribbean Cruises Limited and Star Cruises which owns Norwegian Cruise Line.<sup>82</sup> Carnival Corporation, which controls 53 percent of the market, is the largest and operates 11 brand names including Carnival Cruise Line, Princess Cruises and Holland America Line. It is followed by Royal Caribbean Cruises Limited, which controls 33.4 percent of the North American market, and Norwegian Cruise Line which controls nine percent of the North American market.



The remainder of the North American market, comprising less than 5 percent of the total, consists of small cruise lines operating two or three ships (e.g., Crystal Cruises, Disney Cruise Line), niche operators such as ultra-luxury Silversea Cruises and tall-shipped Windstar Cruises. Though there are a variety of brands and options, the vast majority of the cruise market is controlled and dominated by “the big three” corporations -- Carnival, Royal Caribbean and Norwegian. They in effect set the standards in the industry (for both the product and corporate behavior) and define the nature of relationships between the industry and ports, the industry and labor, and the industry’s orientation toward environmental issues and passenger safety. This is the context that sets the stage for the discussion that follows.

## B. Cruise Ship Environmental Violations (1990s to the present)

The cruise industry has had a very rocky record in terms of environmental pollution. The take-away message from this record is that voluntary improvements and trust-based verification measures are insufficient to protect our air and water quality from the ever-expanding cruise industry.

Environmental concern about cruise ships first emerged in the 1980s; by the early 1990s this concern led to surveillance by the U.S. Coast Guard. Initially the U.S. Government reported violations to the country where offending ships were registered, but it saw no change. In October 1992, the U.S. Government “...told the International Maritime Organization’s Marine Environmental Committee meeting that it had reported MARPOL violations to the appropriate flag states 111 times, but received responses in only about 10 percent of the cases.”<sup>83</sup> Consequently, the U.S. began stricter enforcement for pollution violations in 1993. Between 1993 and 1998 it charged 104 ships with violations involving illegal discharges of oil, garbage, and/or hazardous wastes.<sup>84</sup> The largest fine was levied against Royal Caribbean International in 1998. The chief engineer on the ship in that case, Michael Evangelos Psomadakis, is currently a fugitive on the EPA Criminal Investigation Division’s most wanted list. He is charged with tampering with a witness in order to conceal his involvement in altering an oil water sensor that resulted in the discharge of oily wastewater in violation of federal clean water laws.<sup>85</sup> He is one of four cruise ship engineers on the EPA’s list of 18 fugitives.

### 1. *Royal Caribbean Cruises Limited (RCCL)*

The issue of pollution from cruise ships became widely known when Royal Caribbean pleaded guilty in July 1999 to twenty-one counts of dumping oil<sup>86</sup> and hazardous chemicals and lying to the U.S. Coast Guard. With plea agreements in Miami, New York City, Los Angeles, Anchorage, Puerto Rico, and the U.S. Virgin Islands, the company agreed to pay \$18 million in fines;<sup>87</sup> it was also fined \$3.5 million by the State of Alaska.<sup>88</sup> Just one year earlier RCCL had paid \$9 million in fines to settle cases initiated four years before in San Juan, Puerto Rico and Miami, Florida. Attorney General Janet Reno commented in July 1999:

“Royal Caribbean used our nation’s waters as its dumping ground, even as it promoted itself as an environmentally ‘green’ company...[and] to make matters worse, the company routinely falsified the ships’ logs – so much so that its own employees referred to the logs with a Norwegian term meaning fairy tale book...[T]his case will sound like a foghorn throughout the maritime industry.”<sup>89</sup>

Despite the fines, there were subsequent violations. RCCL’s Celebrity Cruises was charged by the U.S. EPA for air pollution violations in the waters of Juneau, Seward and Glacier Bay in the summer of 1999<sup>90</sup> – it was fined \$55,000. Celebrity Cruises was again fined for violating Alaska’s state air opacity standards when docked in Juneau in 2000.<sup>91</sup>



In June 2001, Celebrity Cruises' *Mercury* illegally discharged treated wastewater at Juneau without required permits. In December 2003, two Royal Caribbean ships were cited for 12 violations of Hawaii's Memorandum of Understanding.<sup>92</sup> In 2006, Celebrity Cruises' *Mercury* was fined \$100,000 by Washington State for dumping 500,000 gallons of untreated wastewater into Puget Sound ten times over nine days in September and October 2005.

Royal Caribbean has received a number of air and water pollution violation notices from the State of Alaska from 2007 to 2009. On June 10, 2008 the company's *Rhapsody of the Seas* discharged about 20,000 gallons of wastewater into Chatham Strait in Southeast Alaska.<sup>93</sup> In 2009, Alaska issued a violation notice to the *Serenade of the Seas* for discharging wastewater contaminated with zinc. In 2007, the company was cited for two ships (*Vision of the Seas* and *Serenade of the Seas*) that violated visible air emissions standards on July 1 and August 9.<sup>94</sup> Both Royal Caribbean (*Rhapsody of the Seas* and *Serenade of the Seas*) and Celebrity Cruises (*Mercury* and *Millennium*) were cited for air quality violations in 2008.<sup>95</sup>

## 2. Carnival Corporation

Royal Caribbean is not the only cruise industry violator. Carnival Corporation's Holland America Line was fined \$2 million in 1998 for a 1994 incident in which it pumped oily bilge water overboard in Alaska's Inside Passage 13 times in 10 days.<sup>96</sup> The corporation's ships were also cited for violating Alaska's state air opacity standards: both Carnival Cruise Lines and Holland America Line were charged for violations in 1999,<sup>97</sup> receiving fines of \$55,000 each, and again in 2000 (receiving fines of \$27,500 and \$165,000, respectively), and 2001 (receiving fines of \$27,500 each). In 2002, Holland America Line was cited once again for air opacity violations and was fined \$27,500,<sup>98</sup> and in August 2004 two of its ships (*Volendam* and *Statendam*) were cited by the National Park Service for violating opacity standards while operating in Glacier Bay.<sup>99</sup> In July 2006, Holland America Line's *Zuiderdam* had a generator malfunction that caused the ship to spew black smoke and soot over three city blocks in Skagway, Alaska.<sup>100</sup> The cruise line said there was a technical malfunction of one of the ship's five diesel generators that resulted in an extraordinarily abnormal emission of heavy black smoke and some soot from its stacks.<sup>101</sup>

It was not only air pollution. Carnival Cruise Lines' *Holiday* discharged 768,000 gallons of gray water (nearly 40,000 gallons per week for 20 weeks) into the port of San Pedro, CA from January through May 2001.<sup>102</sup> Also in May 2001, Holland America Line's *Westerdam* discharged gray water while docked in Juneau.<sup>103</sup> In February 2002, Carnival Corporation's Cunard Line's *Carnonia* was detained and fined by Brazilian authorities after nearly 8,000 gallons of heavy fuel oil spilled into Guanabara Bay near Rio de Janeiro.<sup>104</sup> Its departure was delayed one day and the ship fined \$410,000; and in August 2002, Holland America Line's *Ryndam* discharged approximately 40,000 gallons of sewage sludge into Juneau Harbor. It was subsequently fined \$2 million.<sup>105</sup>

In April 2002, Carnival Corporation entered a plea agreement, pleading guilty to numerous pollution incidents from 1996 through 2001 of discharging oily waste into the sea from their bilges by improperly using pollution prevention equipment and of falsifying the Oil Record Book on six ships to conceal its practices. Part of the plea agreement, in addition to an \$18 million fine, was that the company was required to have environmental officers on all its ships; it was also required to file compliance reports with the court.<sup>106</sup>

Carnival was again under investigation in March 2004 for illegal discharges. Holland America Line notified the U.S. and Netherlands governmental authorities that one of its chief engineers had admitted to improperly processing oily bilge water on the *Noordam*. According to the company's filing with the U.S. Securities and Exchange Commission, a sub-



sequent internal investigation determined the improper operation may have begun in January 2004 and continued sporadically through March 4, 2004.<sup>107</sup>

There were still other violations during this time. In October 2003 the company paid a \$200,000 administrative fee to settle with the California State Lands Commission over the cruise line's noncompliance with the state ballast water law; three other cruise lines – Holland America Line, Princess Cruises, and Royal Caribbean – settled the lawsuit against them out of court, agreeing to follow state-mandated ballast water practices and to spend \$75,000 to research alternative ballast water management methods and technologies.<sup>108</sup> In December 2003, Carnival Corporation's Princess Cruises' *Dawn Princess* was charged with violating Hawaii's MOU three times by discharging 75 metric tons (19,813 gallons) of galley and gray water in marine areas and Holland America Line's *Statendam* was cited for errors in reporting discharges of wastewater.<sup>109</sup>

Carnival Corporation had further violations in 2005. In March 2005, Holland America Line's *Statendam* violated Hawaii's MOU when it discharged what appeared to be "brown water" into Kailua Bay for about 15 to 20 minutes before it moved further out to sea. Reports came from citizens who observed the discharge and who said it left a brown mark on the side of the vessel.<sup>110</sup> And in September 2005, Carnival Corporation's Cunard Line's *Queen Elizabeth 2* discharged 3,000 liters of what crew described as paper pulp in Canadian waters off Cape Breton.<sup>111</sup>

In November 2006, Carnival Corporation's P&O Australia's *Pacific Sky* was investigated by the Government of Vanuatu (an island nation in the South Pacific) for illegally dumping 500,000 liters of oil on the island. The *Sunshine Coast Daily* reported on November 13, that deep holes were dug, lined with thin plastic, and then filled with oil and raw sewage. The site is within 1 kilometer of a village and school, and is just above a river used for drinking, washing, and swimming. The motivation: it would cost U.S. \$30,000 to properly dispose of the waste at approved facilities in the region whereas dumping illegally cost less than \$200.<sup>112</sup> In 2008, Carnival Corporation's Princess Cruises received 30 Notices of Violation for violating its wastewater permit in Alaska and its Holland America Line received 8 Notices of Violation for violations of its wastewater permit.<sup>113</sup> In addition, both Holland America Line and Princess Cruises were cited for air quality violations in 2008.<sup>114</sup> Finally, in 2009, Holland America Line was cited for 6 violations of Alaska's wastewater permit from 3 cruise ships and Princess Cruises was cited for 55 violations of the same permit.<sup>115</sup>

### 3. Norwegian Cruise Line

Norwegian Cruise Line (NCL) has also had its share of environmental violations. In 2000 and 2001 it was cited for violating Alaska's smoke opacity standards – it was fined \$27,500 for each year, but the fine was suspended in 2001.<sup>116</sup> Also in 2001, NCL's *Norwegian Sky* discharged sewage for 20 to 30 minutes, leaving a waste stream of up to three-quarters of a mile, while the vessel was en route from Juneau to Ketchikan and within 3 miles of the Alexander Archipelago.<sup>117</sup>

In 2000, the Justice Department subpoenaed records from NCL, after its parent company, Star Cruises, reported it had uncovered questionable practices prior to its ownership of the company.<sup>118</sup> The U.S. EPA was already pursuing its own investigation because a former officer on NCL's Norway had gone to the EPA in 1999 with piping diagrams and videotaped evidence of oil dumping by the ship. Months after the EPA began investigating, senior Norwegian officials were faxed an anonymous letter warning that the former officer had tipped off the agency. EPA agents already had come across other disturbing information: the Norway had few of the legally required records for its wastes and had apparently routinely dumped sewage and hazardous waste into the ocean for years.<sup>119</sup>



In July 2002, Norwegian Cruise Line signed an agreement with the U.S. Department of Justice pleading guilty to having discharged oily bilge water for several years and to having falsified discharge logs.<sup>120</sup> The company was fined \$1 million and ordered to pay \$500,000 toward environmental service projects in South Florida.<sup>121</sup> Federal prosecutors considered the sentence lenient.<sup>122</sup> Three engineers that served aboard NCL's *Norway* are fugitives on the EPA Criminal Investigation Division's most wanted list. Chief Engineer Knut Sorboe, First Senior Engineer Aage Lokkebraten, and Chief Engineer Peter Solemdal allegedly conspired to illegally dump oil at sea, to falsify oil record books, and to conceal the pollution.<sup>123</sup>

Like Royal Caribbean, NCL did not appear to learn from its mistakes. In February 2003, passengers aboard the Norwegian Wind photographed crewmembers throwing garbage and plastic overboard while the ship was en route from the Fanning Islands to Maui.<sup>124</sup> The case, which received wide media attention, was investigated but not prosecuted. And then in May 2003, the Norwegian Sun was cited by the state of Washington for an illegal discharge of 16,000 gallons (40 tons) of raw sewage into the Strait of Juan de Fuca, a documented Orca whale habitat. NCL did not deny the discharges, but argued the state lacked jurisdiction over the discharge. The State dropped its case.<sup>125</sup>

NCL also had several violations of its MOU with Hawaii. In February 2005, the *Pride of Aloha* discharged about 70 tons of treated effluent into Honolulu Harbor.<sup>126</sup> The *Pride of America* recorded two discharges in 2007.<sup>127</sup> In August, residents of Kailua-Kona report that for 20 minutes the ship discharged water they believe to have been sewage – there were reports of odor, feces, and debris floating in the ocean.<sup>128</sup>

In 2008, Alaska cited NCL's *Norwegian Pearl* for violating its wastewater discharge permit. According to Alaska state regulators the wastewater samples from the ship had higher-than-permitted pH.<sup>129</sup> Also in 2008, the cruise line was cited for two violations of Alaska's air quality standards.<sup>130</sup> In 2009, the *Norwegian Pearl* was cited again for Alaska wastewater permit violations including fecal coliform and pH.<sup>131</sup>

### C. Believe What We Say, Not What We Do

Despite its environmental record, the cruise industry presents itself as environmentally concerned, responsible, and reformed after all the pollution incidents in the 1990s and early 2000s. They attempt to disarm critics with statements such as, "We visit some of the most pristine areas of the world and our income depends on them staying that way, so why would we pollute?" On the surface, it is a compelling argument, but as already seen is at variance with the cruise industry's behavior.

#### Exhibit A: *Crystal Cruises & Monterey Bay – 2002*

In April 2002, representatives from environmental organizations, the City of Monterey, the State of California and the Monterey Bay National Marine Sanctuary met with cruise lines planning to visit Monterey and told them that if they could not refrain from dumping pollution into the Bay, they were not welcome. Crystal Cruises was among the four cruise lines that travel into Monterey Bay and it sent a letter to the city promising not to discharge any sewage or trash from its ship *Crystal Harmony* while in the Bay.<sup>132</sup>

The May 2002 letter to the California Regional Water Quality Control Board, signed by Crystal's vice president, Joseph Valenti, stated that the "*Crystal Harmony* will observe a no-discharge policy in the Monterey Bay National Marine Sanctuary ... This policy will apply to all wastewater, ballast water, water discharged through the oily water separator, and all forms



of solid waste.”<sup>133</sup> Valenti reiterated the company’s commitment at a public lecture given by this author at the Monterey Institute for International Studies on January 14, 2003. He complained both publicly and privately <sup>134</sup> that he had been denied time to present the cruise line’s point of view at the lecture. However he made statements during the lecture asserting that Crystal Cruises was an exemplary company in the industry given its high environmental standards.

In late-February 2003 it was learned, through the California State Water Resources Control Board’s review of ship’s logs, that the *Crystal Harmony* had in fact discharged 34,078 gallons of gray water, 264 gallons of treated sewage, and 2,118 gallons of processed bilge water into Monterey Bay. When asked why they had not reported the discharge when it occurred, Valenti, defended the silence by saying the company had only broken its promise; it had not violated any laws. <sup>135</sup> International Council of Cruise Lines President, Michael Crye, also dismissed the violation telling a news reporter the ship’s discharge occurred 14 miles from the coast so it was not illegal. <sup>136</sup>

The people of Monterey expressed their extreme displeasure with these discharges and on March 18, 2003, the Monterey City Council voted to bar all Crystal Cruises ships from entering the port of Monterey for fifteen years and barred the *Crystal Harmony* forever. <sup>137</sup>

Exhibit B: *Carnival Corporation – 2003 & 2004*

Despite paying an \$18 million fine as part of its plea agreement in 2002, Carnival was back in federal court within a year. It had been summoned by the court in July 2003 after a probation officer reported the company failed to develop, implement and enforce the terms of an environmental compliance program stemming from the 2002 plea agreement. Holland America employees reportedly submitted twelve audits that contained false, misleading and inaccurate information. <sup>138</sup> Carnival Corporation replied to the court that three environmental compliance employees had been fired for the reports but it did not admit violating its probation. In a settlement signed August 25, 2003, Carnival agreed to hire four additional auditors and to provide additional training for staff. <sup>139</sup>

Carnival Corporation was back in court in July 2004. The former vice president for environmental compliance of its Holland America Line pled guilty to certifying environmental compliance audits that were never performed. <sup>140</sup>

Exhibit C: *Royal Caribbean – 2003-2008*

Royal Caribbean has also contradicted word and deed. The CEO of the corporation issued a form letter on September 24, 2003 responding to letters he received as part of an Oceana environmental action campaign. The letter clearly states that the company discharges its sewage and gray water “only when we are 12 or more miles from the shore and moving at least six knots.” <sup>141</sup> The letter proudly promotes Royal Caribbean’s policies and procedures for exceeding Coast Guard requirements and as stricter than U.S. law. Royal Caribbean’s claims seem impressive, but since coming off probation in 2004 from its 1999 federal prosecution, Royal Caribbean has reportedly returned to discharging untreated sewage and gray water outside three nautical miles, at variance with its public commitment to only discharge beyond 12 miles. The company reportedly has also changed the required qualifications of environmental officers and has reduced their on-board status. <sup>142</sup> More recent evidence of Royal Caribbean’s bad behavior came in 2006 when Celebrity Cruises’ *Mercury* discharged 500,000 gallons of wastewater in Puget Sound and in 2008 when the *Rhapsody of the Seas* discharged 20,000 gallons of wastewater into Chatham Strait in Southeast Alaska. <sup>143</sup>



Exhibit D: *Cruise Lines International Association, Inc. (CLIA)*

Several weeks after the July 1999 plea agreement between the Department of Justice and Royal Caribbean, the Cruise Lines International Association (CLIA), formerly known as the International Council of Cruise Lines, made a commitment on July 27 to standards for waste management. CLIA assured all concerned that "...member lines have strengthened their own environmental policies and procedures, and closely monitor onboard activities to ensure these standards are maintained. The internal procedures are designed to meet existing and comprehensive federal, state, and international standards designed to prevent discharges from all commercial vessels."<sup>144</sup>

CLIA restated its environmental commitment two years later in June 2001 with "New Mandatory Environmental Standards for Cruise Ships." The standards were announced while the Alaska State Senate was in special session considering legislation that would authorize monitoring of cruise ship emissions and enforce environmental standards. It also followed two new cruise ship violations in Alaska waters in May 2001 – NCL's *Norwegian Sky* discharged sewage for 20 to 30 minutes while in the Alexander Archipelago, leaving a waste stream of up to three-quarters of a mile long and Holland America's *Westerdam* discharged 100 gallons or more of gray water while docked in Juneau.

Just this year, CLIA CEO Terry Dale was quoted in the *New York Times* stating that "[a]ll our members have to have environmental policies and practices in place."<sup>145</sup> Yet, CLIA's member lines, including Royal Caribbean, Carnival and Norwegian, continue to violate environmental laws as evidenced by cruise ship violations in Alaska during the 2008 and 2009 cruise seasons.<sup>146</sup> While the CLIA commitments and supposed 'mandatory' standards set protocols for performance, there are no criteria for verification and enforcement, nor are there any regulatory targets or pollution levels. Furthermore, no member cruise line has ever been publicly sanctioned or had its membership in CLIA withdrawn for environmental violations.

As with every industry, especially when dealing with common resources such as our oceans or air, mandatory regulations are necessary to control behavior and, importantly, to move technology forward. This has been demonstrated by the effectiveness of Alaska's approach, which includes not only strict pollution reduction measures, but direct monitoring and enforcement. Alaska's stringent regulations have moved cruise ship water treatment technology forward dramatically. It is time that federal laws caught up with such innovations.



## IV. Cruise Ship Discharges Governed by a Mosaic of Sparse Regulations – Yet Pollution Continues

There is a wide range in cruise ship pollution regulations in the U.S. This is most visible on North America's west coast. While tempting to present a comparison from one jurisdiction to the next, it is more helpful to briefly summarize the regulations and protocols.

### A. International Regulations

The International Maritime Organization's Convention for the Prevention of Pollution from Ships (MARPOL) is the key international protocol setting marine pollution standards. MARPOL was initially drafted in 1973, and modified by the Protocol of 1978. Cruise ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail. The flag state is ultimately responsible for enforcing MARPOL's statutes as they apply to ships they have registered.

MARPOL is comprised of six Annexes,<sup>147</sup> each entering into force only after ratification by member countries whose accumulated gross tonnage represents at least 50 percent of the world's gross tonnage.

- Annex I: Regulations for the Prevention of Pollution by Oil, entered into force October 2, 1983 – Regulates the prevention of pollution by oil.
- Annex II: Regulations for the Control of Noxious Liquid Substances in Bulk, entered in force April 6, 1987 – Sets discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk.
- Annex III: Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form, entered into force July 1, 1992 – Sets general requirements for issuing standards on packing, marking, labeling, and notifications for preventing pollution by harmful substances.
- Annex IV: Prevention of Pollution by Sewage from Ships, entered into force September 27, 2003 – Sets requirements to control pollution of the sea by sewage.
- Annex V: Prevention of Pollution by Garbage from Ships, entered into force December 31, 1988 – Addresses different types of garbage, including plastics, and specifies the distances from land and the manner in which they may be disposed of. The requirements are much stricter in a number of "special areas" but perhaps the most important feature of the Annex is the complete ban imposed on dumping all forms of plastic into the sea.
- Annex VI: Prevention of Air Pollution from Ships, entered into force May 19, 2005 – Sets limits on sulfur oxide, nitrogen oxide, and other emissions from marine vessel operations and prohibits deliberate emissions of ozone-depleting substances.

The U.S. has ratified Annexes I, II, III, V, and VI. The terms of each Annex are implemented in the Act to Prevent Pollution from Ships (APPS, 33 U.S.C., §1905-1955). However MARPOL has limitations.

#### 1. Limitations of MARPOL

The cruise industry often attempts to demonstrate a commitment to the environment by stating it meets or exceeds all regulations and laws in the jurisdiction where it operates. This is an easy statement to make given regulations articulated



in MARPOL. For example, MARPOL requires ships to use fuel with maximum sulfur content of 4.5 percent when current bunker fuel averages 3 percent sulfur. While the industry may use lower sulfur fuel in some jurisdictions (e.g., fuel burned in the Alaskan Inside Passage is typically 1.8 percent sulfur content; these same ships use fuel of 3.0 percent in the Caribbean <sup>148</sup>), it has not adopted a policy whereby its fuel usage reflects a consistent commitment to environmental protection. MARPOL also poses concern because it does not regulate gray water. According to a study of discharges from vessels of the U.S. Armed Forces, gray water has the potential to cause adverse environmental effects because it contains significant concentrations and estimated loadings of nutrients and oxygen-demanding substances. <sup>149</sup> It can contain many of the same pollutants as sewage and also detergents, cleaners, oil and grease, metals, pesticides, and medical and dental waste.

MARPOL is at times more stringent than U.S. law, but in many cases the cruise industry follows regulations in local jurisdictions that are less stringent. Treatment and discharge of sewage is a good example. Annex IV of MARPOL (to which the U.S. is not a signatory) requires some minimal sewage treatment between 3 and 12 nautical miles which the U.S. does not. Cruise ships can opt for the lower threshold requirement when in U.S. coastal waters rather than operating under international regulations such as MARPOL.

Furthermore, MARPOL does not itself have an enforcement regime. The success of MARPOL’s regulations depends on active enforcement by coastal and flag states. This is a weakness given the inconsistent enforcement across different jurisdictions.

## B. U.S. Federal Laws and Regulations

Many of the U.S. laws and regulations applying to cruise ships have already been mentioned. The table below provides a summary with regard to each of the major waste streams discussed.

**Table 2: Federal Laws and Regulations Applying to Cruise Ship Waste Streams**

<u>Waste Stream</u>	<u>Relevant U.S. Law or Regulation</u>	<u>Nature of Regulation</u>	<u>Issues/Limitations</u>
Sewage	Clean Water Act (CWA), Section 402	Sewage discharges exempted from requirement to obtain an NPDES permit.	
Sewage	Clean Water Act (CWA), Section 312 - <i>Marine Sanitation Device (MSD)</i>	EPA sets performance standards for discharges within 3 miles of shore; Coast Guard responsible for design, operational regulations, and certifying compliance.	Performance standards have not been revised since 1976; regulations only cover bacterial contaminants; no sampling, monitoring, recordkeeping, or reporting requirements.



Sewage	Clean Water Act (CWA), Section 312 - <i>No Discharge Zones (NDZ)</i>	A state may apply for a NDZ under one of three categories: 1) the need for greater environmental protection and there are adequate pump-out facilities; 2) special waters found to have a particular environmental importance; 3) drinking water intake zones.	While used in several Marine Sanctuaries (Florida Keys National Marine Sanctuary (state waters only), Monterey Bay National Marine Sanctuary, Gulf of the Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary and Channel Islands National Marine Sanctuary) and in all state waters of Rhode Island, New Hampshire, and Michigan, <sup>150</sup> there is a lack of regular monitoring for enforcement of the NDZs.
Gray Water	Clean Water Act (CWA), Section 402	Controls pollutant discharge through NPDES permit (effective February 6, 2009).	Limited monitoring and enforcement (cruise ships are expected to self-report violations) and limited requirement to sample and test operational discharges. Untreated gray water discharge allowed beyond one nm.
Solid Waste	Title I of the Marine Protection, Research, and Sanctuaries Act (MPRSA, 33 U.S.C. 1402-1421) and Act to Prevent Pollution from Ships (APPS, 33 U.S.C. §1901-1915	MPRSA makes it illegal to transport garbage from the U.S. for the purposes of dumping it into ocean waters without a permit. APPS prohibits discharge of all garbage within 3 nautical miles of shore, certain types of garbage with 12 nautical miles offshore, and plastic anywhere.	Limited monitoring and enforcement. There is also concern that cruise ships may, as permitted in Canada, discharge macerated food waste in gray water. <sup>151</sup>
Hazardous Waste	Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §§6901-6991k) and Clean Water Act (CWA), Section 311	Imposes management requirements on generators, transporters, and persons who treat or dispose of hazardous waste; prohibits discharge of hazardous substances in harmful quantities into navigable waters of the U.S.	Law is unclear as to whether a cruise ship/cruise line/cruise corporation is a small quantity generator, large quantity generator, or a conditionally exempt small-quantity generator. No requirement for full accounting of hazardous waste disposal or mandatory incinerator ash testing. <sup>152</sup>
Oily Bilge Water	Clean Water Act (CWA), Section 311 as amended by the Oil Pollution Act of 1990 (33 U.S.C. §§2701-2720) and Coast Guard Regulations (33 CFR §151.10)	Prohibits discharge of oil within 12 miles from shore, unless passed through a 15-ppm oil water separator (and does not cause a visible sheen). Beyond 12 miles, discharge permitted if oil content is 100 ppm.	Inadequate monitoring and enforcement. Given the deleterious affects of even minute amounts of oil on sea life, permitted limits may not be adequate for environmental protection.
Ballast Water	Clean Water Act (CWA)	Controls pollutant discharge through NPDES permit. Cruise ships were exempt from requirement to obtain an NPDES permit until February 6, 2009.	Inadequate monitoring and enforcement. Permit does not restrict invasive species and only covers waters with 3 nautical miles of the coast.



Air Pollution	Clean Air Act (42 U.S.C. §7401 et seq.)	Requires EPA to set health-based standards for ambient air quality, sets standards for achieving those standards, and set national emission standards. In 2009, EPA promulgated emission standards for new marine diesel engines on large vessels.	EPA's proposed rule exempts foreign-flagged vessels. A major concern is the need to limit the sulfur content of fuel used by U.S. and foreign-flagged vessels when they enter or leave U.S. ports, and to require advanced pollution controls for other air emissions. EPA is combining its proposed rule with the protective lower sulfur fuel requirements of the North American ECA scheduled for approval by the IMO in 2010.
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Adapted from Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450) November 17. <sup>153</sup>

### C. State Laws and Regulations

#### ALASKA

Setting Standards. The state of Alaska is the only jurisdiction where discharges of wastewater and air emissions from cruise ships have explicit standards and are regularly monitored and reported. These standards are the result of an initiative begun in 1999. Alaskans had become seriously concerned about cruise ship pollution after plea agreements by Holland America Line and Royal Caribbean disclosed discharges into Alaska state waters of oily bilge and, in the case of Royal Caribbean, hazardous wastes.

Consequently, the Alaska State Department of Environmental Conservation (ADEC), along with the U.S. Coast Guard, launched a cruise ship initiative in December 1999. The initiative began with meetings between the State, U.S. Coast Guard, Environmental Protection Agency, the cruise industry, and environmental groups. The goal was to discuss the activities and operations of cruise ships with a view toward an assessment of possible environmental issues. When the workgroups realized there was little technical data, they developed a plan for sampling wastewater from cruise ships and for monitoring air emissions. Participation in monitoring was voluntary. Thirteen of 24 ships refused to participate. They chose to go beyond three miles from shore to dump raw sewage without monitoring and without limitations.

The results of monitoring during the summer of 2000 were, in the words of Alaska's governor, "disgusting and disgraceful."<sup>154</sup> Seventy-nine of 80 samples of ships' effluent had levels of fecal coliform or total suspended solids that violated even the weak Clean Water Act standards by, on average, over 10,000 times, with a high of over 140,000 times the federal standard.<sup>155</sup>

Air emission monitoring also gave reason for concern. The EPA had cited six cruise ship companies (involving thirteen ships) for air pollution violations in the 1999 season. The situation did not improve. In August 2000, state investigators charged seven companies for fifteen violations of state smoke-opacity standards in Juneau between mid-July and mid-August. One ship was cited both in 2002 and 2003, none in 2004 through 2006, and two in 2007 (both Royal Caribbean). In 2008, eight ships were cited for a total of ten violations. Companies cited included Celebrity Cruises, International Shipping Partners, Princess Cruises, Norwegian Cruise Line, Holland America Line, and Royal Caribbean.<sup>156</sup>

Monitoring results led Alaska's Senator Frank Murkowski to introduce legislation to regulate the dumping of raw sewage



in “donut holes” that had been previously treated as outside federal waters and where such disposal was common.<sup>157</sup> The legislation also set standards for treated sewage, banned discharges while ships were within one mile of shore, and empowered the State of Alaska to regulate black water (sewage) discharged into state waters.<sup>158</sup>

Monitoring results during the summer of 2000 also led to the Alaska Cruise Ship Initiative. Governor Tony Knowles introduced in March 2001 legislation designed to strengthen state monitoring of the cruise industry’s waste disposal practices, and enforce state clean air and water standards for cruise ships. Monitoring and enforcement would be funded by a \$1 per passenger fee charged to cruise ships. The Alaska Cruise Ship Initiative took effect on July 1, 2001.

The law was no more stringent than current U.S. law regarding the disposal of sewage or pollution from smokestack emissions, but it represented the first time a state held cruise ships accountable to environmental standards. Further, it instituted monitoring and sampling requirements for the discharge of cruise ship wastewater in Alaska state waters.<sup>159</sup> The monitoring and sampling demonstrated significant non-compliance with environmental standards. Four of 18 ships certified in 2003 were subsequently decertified and later recertified.<sup>160</sup>

In August 2006, a citizen-initiated Alaska Cruise Ship Ballot Initiative was approved. The initiative took a further step forward. It required a state permit for all discharges of treated wastewater in Alaska state waters and that effluent meet Alaska Water Quality Standards (AWQS). In effect, only wastewater treated by an AWTs could be discharged in Alaska state waters, and these systems would be regularly tested.<sup>161</sup> The initiative created an Ocean Ranger program of onboard observers that is funded by a \$4 per passenger fee. It also instituted a \$46 per passenger fee collected from cruise ships traversing state waters.<sup>162</sup>

Following from the ballot initiative, ADEC issued a general permit in March 2008 that specifies limits on the pollutants cruise ships are allowed to discharge in Alaska waters. Cruise lines responded that they could not meet the regulations for nickel, zinc, ammonia and copper. ADEC has allowed them less strict limits on those pollutants for now – on the condition that they submit plans detailing how they will eventually comply. The plans are called Source Reduction Evaluations (SREs). Cruise lines have until 2013 to comply.

By setting standards, Alaska seeks to ensure wastewater and air emissions released in state waters meet criteria similar to those for effluent produced on land. If a ship fails to meet state limits, it is liable to lose its permit for discharge in Alaska waters and be required to sail beyond state jurisdiction to release wastewater. The State’s initiatives have had a positive impact on the quality of effluent discharged within three miles of the shoreline.

Enforcement through Monitoring and Reporting. The monitoring of wastewater is achieved by regular testing of effluent from AWTs. Test results must be reported to ADEC. In 2008, the State issued a notice of violation to 12 of 20 ships permitted to discharge in Alaska waters, with a total of 45 violations involving 7 pollutants. In 2009, Alaska issued violation notices to 13 of 18 cruise ships allowed to discharge in state waters, logging 66 violations of 9 separate pollutants (see Table 1 above).

Air emissions are also monitored by observers. In this case, EPA-trained observers certified to reliably assess the opacity of a smokestack are used to determine when a ship’s air emissions exceed the permitted limit – when in port, a cruise ships’ plumes are not allowed to be more than 20 percent opaque for more than three minutes in any hour, except when ships are casting off or coming into port.



Ocean Rangers. Per the Alaska Cruise Ship Ballot Initiative, the state began using Ocean Rangers in 2007. The ballot measure created the Ocean Ranger program within ADEC, making Alaska the first and only state to require U.S. Coast Guard-licensed marine engineers on board vessels to act as independent observers monitoring state and federal environmental and marine discharge requirements. Rangers observe wastewater treatment practices, inspect pollution control equipment and sample all ship discharges.

While the Ocean Ranger program appears to be successful, a serious problem of access was identified after the first year of operation. According to a report issued June 23, 2008 by Crowley Marine Service (the company charged with administering the Ocean Ranger program), a number of Ocean Rangers had limited access on the cruise ships to which they were assigned – in some cases access was explicitly hindered or denied.<sup>163</sup> This was the case on nine ships, mainly ships operated by Holland America Line and Princess Cruises – both cruise lines are owned by Carnival Corporation.<sup>164</sup> According to the manager of the Ocean Rangers program, “[t]he general feeling is that both Holland America and Princess Cruises have issued guidelines to the onboard crews on how to restrict and control the observations of the rangers.”<sup>165</sup> After intervention by ADEC and meetings with the industry, a subsequent report on August 15, 2008 indicated all observers were getting adequate access.<sup>166</sup>

Many of the advances that have occurred in treatment of gray water and sewage have been motivated by Alaska’s requirement that all discharges in its waters meet or exceed state water quality standards with regard to fecal coliform and suspended solids. Alaska has demonstrated that legislation is effective in achieving environmental protection.

### CALIFORNIA

Three pieces of legislation directed at environmental regulation of the cruise industry were introduced in the California state legislature in 2003: one prohibited cruise ships from dumping sewage sludge or oily bilge water into state waters and sought federal support to extend the bans to marine sanctuaries along the California coast; one prohibited ships from using onboard waste incinerators while within 20 miles of the coast and would eventually require ships within 25 miles of the California coast to use low-sulfur diesel fuel; and the third prohibited the discharge of hazardous waste in state waters and sought federal support to extend the ban to marine sanctuaries along the California coast. The bills were supported by an August 2003 report prepared by the California Environmental Protection Agency and the California Water Resources Control Board. It concluded:

“Many vessels are not complying with international, state or federal standards in regards to handling hazardous materials, garbage, and discharges or treatment of grey water or sewage...[T]he report said it found ‘particularly troubling’ the discharging of sludge 12 miles out to sea, and the lack of monitoring of shipboard treatment plants and grey water, which had higher fecal coliform counts than treated sewage.”<sup>167</sup>

The cruise industry lobbied hard against the bills, successfully blocking the low sulfur fuel provisions bill and gutting the bill dealing with sewage sludge and oily bilge. The bill dealing with hazardous waste went through with minor changes.

In 2004, the California legislature again considered three pieces of legislation.<sup>168</sup> Each of these bills captured elements lost through amendments to the 2003 legislation, and in some cases they were more stringent than provisions a year earlier. All three bills passed despite the cruise industry’s strong opposition:

- AB 2093 – Prohibits cruise ships from discharging graywater from kitchens, laundries and showers into state waters.



Graywater was previously unregulated and could be discharged anywhere, including ports and harbors.

- AB 2672 – Prohibits cruise ships from dumping sewage (treated or untreated) into state waters, including effluent from AWTs. Cruise ships could previously dump treated sewage anywhere, including into ports and harbors. Untreated sewage could be dumped just outside state waters.
- AB 471 – Prohibits cruise ships from burning garbage, paper, sludge and any other materials in on-board incinerators while operating within three miles of the California coast.

Despite direct lobbying by the cruise industry, Governor Schwarzenegger signed the three bills in September 2004.<sup>169</sup> They are the strictest regulations legislated by a state in the U.S.

Senate Bill 771, the California Clean Coast Act of 2005, passed the California legislature in 2005. It directed the State Water Board to obtain permission from the U.S. EPA to impose sewage discharge prohibitions on cruise ships and other large ocean-going vessels in California waters. The application was submitted on April 5, 2006, but EPA approval is still pending.<sup>170</sup> In 2006 the state enacted Senate Bill 497 requiring the state to adopt ballast water performance standards by January 2008 and set specific deadlines for the removal of different types of species and bacteria from ballast water by the year 2020.

The California Air Resources Board has also issued regulations applying to cruise ship air emissions. In 2008, it approved regulations that required ships within 24 miles of its coast to use marine gas oil, or marine diesel oil, with a sulfur content of no more than 0.5 percent by weight, in all ship diesel engines beginning in July 2009. The sulfur content will be reduced even further, to 0.1 percent, in 2012. Part of the state's strategy is to encourage ships to shut down auxiliary engines while in port and to instead use shore-side power.<sup>171</sup>

### MAINE

The State of Maine has also been proactive in protecting its coastal waters from cruise ship discharges. In 2004, the Maine Legislature passed LD 1158 which bans discharge of gray water or any sewage from an MSD into state waters but allows discharges from AWTs meeting Alaskan standards. In addition, the state successfully petitioned the EPA to declare, in 2006, Casco Bay a No Discharge Zone.<sup>172</sup> Consequently, while discharge from an AWTs meeting Alaska standards is permitted in state waters, it is banned in Casco Bay.<sup>173</sup>

### HAWAII

In 2005, Hawaii passed a statute that prohibits the discharge of untreated wastewater within 3 nautical miles. Treated wastewater meeting Alaskan standards for fecal coliform and total suspended solids may be discharged within state waters.

## D. Memoranda of Understanding and Voluntary Reporting

1. Memoranda of Understanding. A Memorandum of Understanding (MOU)<sup>174</sup> has been used in Florida, Washington State, and Hawaii to address the issue of cruise ship discharges into state waters. In each case the cruise industry, either represented by the Northwest Cruise Ship Association (NWCA) in the case of Hawaii and Washington or the International Council of Cruise Lines (ICCL) and Florida-Caribbean Cruise Association in the case of Florida, has agreed to voluntarily abide by the parameters articulated in the ICCL's<sup>175</sup> "Cruise Industry Waste Management Practices and Procedures."



<sup>176</sup> The standards essentially restate key elements of MARPOL (see above for a description of each of the six Annexes under MARPOL). While the environmental standards are designed to increase compliance with regulatory regimes,

“...[they do] not describe the manner in which the voluntary standards are to be implemented into a company’s [Safety Management System] SMS, or impose consequences for failing to incorporate the standards into a member line vessel’s SMS, or comply with standards once incorporated. Further, the standards do not provide for a CLIA-sponsored inspection or verification mechanism. All cruise ships that were criminally convicted had incorporated environmental standards into their SMS.”<sup>177</sup>

Hawaii, Washington State, and Florida all have had different experiences with MOUs as described below. Florida’s MOU, signed in October 2002, goes no further than the ICCL guidelines, notwithstanding the fact that it hosts the largest number of cruise ships of any U.S. port in its waters every year. To date, Florida has yet to cite a cruise ship for noncompliance with the MOU.

### HAWAII

Similar to Florida, the cruise industry’s MOU with Hawaii, signed September 22, 2002, accepted the ICCL guidelines, however it went further and prohibited discharges of wastewater between the shoreline and any point four nautical miles beyond waters that are 600 feet deep (the 100 fathom contour line); ships with AWTs are allowed to discharge beyond one mile from the coastline. In the first year (2002/2003) there were sixteen violations of the MOU.<sup>178</sup> Twelve violations involved ships operated by Royal Caribbean International, three from Princess Cruises’ ships, and one from a ship operated by Holland America Line. There were two violations the second year (2003/2004), both involving ships operated by Norwegian Cruise Line.

In 2005, the cruise industry successfully lobbied for legislation that was much less stringent than the existing MOU. The legislation only governed discharges out to three miles from shore, leaving areas such as the Penguin Banks, which had been well protected by the MOU, unprotected. The legislation – Act 217 (the provisions of HB 422) – was enacted without the Governor’s signature, on July 12, 2005.<sup>179</sup> Two months later the NWCA quietly gave government officials notice it was transitioning out of the MOU because of ambiguity and operational confusion caused by having two sets of standards.

<sup>180</sup> Rather than continue to voluntarily abide by the more stringent terms contained in the MOU, the industry chose the less comprehensive legislation (which it had supported and lobbied for). The industry’s backsliding was made public only after KAHEA—the Native Hawaiian Environmental Alliance—discovered and exposed the action.<sup>181</sup>

### WASHINGTON STATE

The MOU between Washington State and Northwest Cruise Ship Association was signed April 20, 2004. There were three violations of the MOU in the first year (2004/2005). One violation occurred on May 13 in Port Angeles, when Holland America Line’s *Zaandam* discharged treated effluent through an advanced wastewater treatment system that was not approved by the Washington Department of Ecology (DEC). The other was Princess Cruises’ *Sapphire Princess*, which discharged treated effluent throughout the 2004 season through an advanced treatment system that had not received DEC’s approval. The ship also released untreated wastewater from its galleys and laundry during a voyage between Seattle and Victoria in June 2004.<sup>182</sup> Another violation occurred in 2005. Celebrity Cruises’ *Mercury* dumped a total of a half million gallons of sewage and untreated gray water into Puget Sound and the Strait of Juan de Fuca ten times over nine days in September and October.<sup>183</sup> The company initially denied the claim but it acquiesced when shipboard documents



indicated otherwise. It then appealed to state officials for \$100,000 in relief from the penalty because three of the violations occurred on the Canadian side of the international boundary and Washington did not have jurisdiction. As well, the cruise corporation argued the discharges, while a violation of its MOU with Washington, were not illegal in Canada.<sup>184</sup>

The state of Washington agreed to reduce the fine from \$100,000 to \$70,000, but the company paid the full \$100,000 after all. It said the money was never the issue; its concern was to ensure there was accurate information. It went on to say that paying the full amount was in order to demonstrate its commitment to protecting and preserving Washington State's marine environment.<sup>185</sup> It never apologized to Canada for the discharges and expressed no complementary commitment to the marine environment of British Columbia or Canada. It is as though the wastewater discharged in Canada was immaterial because it was legal.

The MOU between NWCA and Washington State has been renewed and refined on each of its anniversaries. The MOU now requires documentation demonstrating the proper performance of AWTS permitted to discharge in State waters. Amendments in 2008 prohibit discharge of wastewater (treated or untreated gray and black water) within a half mile of commercial shellfish beds; AWTS meeting Alaska standards are exempt from these limitations. They also prohibit discharge of biosolids (sewage sludge) within twelve nautical miles of the shoreline and within the entire boundary of the Olympic Coast Marine Sanctuary.

2. Voluntary Compliance. In most jurisdictions, monitoring is achieved by review of ship logs – logs required by MARPOL and U.S. law to show all discharges and where they occur.<sup>186</sup> Violations in California and Washington State have been identified as a result of review of logs. But violations occurring in the mid-to-late 1990s were often not recorded. There is no way to verify if logs are accurate or if all discharges are recorded.

A further problem, whether there is an MOU or legislation, is in most jurisdictions there is no system of regular monitoring. The importance of monitoring is seen in early prosecutions of cruise ship pollution in the 1990s. In some cases, violations became known as a result of aerial surveillance of cruise ships; in other cases a passenger or crewmember reported violations. While cruise ships increasingly self-report incidents where they violate a law or an MOU, there is no way to know for sure whether all violations are being reported. There is an element of trust that cruise ship staff will “do the right thing,” but no guarantee that they actually will.

Reliance on trust is risky. As California State Senator Joe Simitian stated when he introduced legislation in the California Assembly, “[t]rust us is no longer an effective environmental policy.”<sup>187</sup> A similar view is expressed in a 2003 report issued by the Paris-based Organization for Economic Co-operation and Development (OECD). The report questions the environmental effectiveness and economic efficiency of voluntary approaches. Focusing specifically on environmental policy, it notes that there are few cases where voluntary approaches have improved the environment beyond a business-as-usual baseline.<sup>188</sup> Just this year, the U.S. Inspector General issued a report citing U.S. EPA's failure to cut air emissions at U.S. ports stating that it should develop mandatory regulations for ocean-going vessels instead of relying on sparsely implemented voluntary emission reduction programs.<sup>189</sup>

Many reports of violation over the years have come from citizen observations. There have been a number of reports from swimmers and persons shoreside regarding illegal or questionable discharges in Hawaii.<sup>190</sup> As well, some discharges in Alaska ports were first observed and subsequently reported by a person on shore.<sup>191</sup> The obvious problem is that if no one sees a violation occur, then whether a report is made is left to the staff on a cruise ship and the company for which they work.



3. The Effects of a Patchwork Approach. With a patchwork of different regulations, cruise ships are permitted to legally discharge waste in one place but not another (see Appendix 4 for significant regulations directed at environmental protection). On the west coast for example, enforceable regulations have had a positive effect in Alaska, Washington, and California, but leave open for greater environmental harm neighboring jurisdictions such as Oregon and British Columbia. In fact, British Columbia is a good illustration of the problem with a patchwork approach. In some circles it is referred to as the toilet bowl of the Alaska cruise industry. This is because a ship may not discharge wastes in certain areas in Washington State (such as sewage sludge, untreated gray water, and sewage treated with a MSD) and it is restricted in the waste permitted for discharge in Alaska, but it can discharge those same wastes in Canada (see Appendix 5). The reason is weaker Canadian regulations and Canada's failure to enforce the regulations it has. The same scenario operates on the east coast where gray water cannot be discharged in the waters of Maine, but can be discharged in the waters of Canada and every other coastal state.

Inconsistent regulations permit the cruise industry to argue that it meets or exceeds all environmental regulations while at the same time showing relatively different regard for environmental protection from one place to the next. These differences are even seen in the fuel ships use. It was reported in 2007 that when Holland America Line's Zaandam operated on the west coast of North America (British Columbia and Alaska) it used fuel with a sulfur content of about 1.8 percent; while operating during the winter months in the Caribbean the sulfur content was as much as 3 percent.<sup>192</sup>

These variations raise to the forefront the need for comprehensive, minimum national regulations that maintain uniformly high standards for protection of the marine environment.



## V. U.S. CRUISE SHIP POLLUTION SOLUTIONS

There is critical need for increased protections from cruise ship pollution across U.S. waters. It makes no sense to have stringent regulations in one location, yet allow cruise ships to discharge untreated wastes and pollutants pursuant to inadequate regulations in a neighboring state. It also makes little sense to set regulations that aim for the lowest common denominator and that are significantly more lax than commitments the industry itself has made in the past. The following recommendations would set minimum standards for cruise ship operation in the U.S. providing vulnerable peoples and ecosystems with some initial protection from the air and water pollution associated with cruise ships. Any standards that are set based on these recommendations must also take into account the best available control technology, the best available scientific information on cruise ship air and water emissions, impacts and controls, and marine life, human health and unique marine ecosystems.

### Cruise Ship Pollution Recommendations

#### Sewage

Sewage from cruise ships is a critical problem, compounded by the fact that it is excluded from the CWA's NPDES permitting requirements and ignored beyond three nautical miles from shore. The CWA does not currently address the need to have meaningful and reliable standards for sewage discharged by cruise ships into all U.S. waters.

*Recommendation 1:* Discharge of untreated sewage shall not be permitted within the U.S. Exclusive Economic Zone (EEZ).

*Recommendation 2:* Discharge of sewage treated by a Type II MSD shall not be permitted within twelve nautical miles of the shoreline. Discharge from Type II MSDs shall be allowed beyond 12 nautical miles if the discharge meets the following minimum treatment standards at point of discharge and the cruise ship is travelling at not less than 6 knots:

- The discharge must satisfy the minimum level of effluent quality specified in 40 CFR 133.102, which sets parameters for biological oxygen demand, suspended solids and pH;
- The geometric mean of the samples from the discharge during any 30-day period may not exceed 20 fecal coliform/100 milliliters (ml) and not more than 10 percent of the samples exceed 40 fecal coliform/100 ml; and
- Concentrations of total residual chlorine may not exceed 10.0 micrograms per liter (µg/l).

*Recommendation 3:* Acceptable parameters for treated sewage shall be reviewed at least annually with a view toward setting limits matching, at a minimum, national federal water quality standards at point of discharge; achieving or exceeding Title XIV standards nationwide; and developing additional standards where necessary to protect ecosystem and human health.

#### Monitoring

*Recommendation 4:* Sufficient monitoring of discharges to U.S. waters shall be instituted on cruise ships to assure compliance with CWA standards. The monitoring frequency of effluent data shall occur at least monthly and more frequently as necessary to protect water quality and ecosystems. Monitoring data shall be reported to EPA on a monthly basis in an electronic, publicly accessible format.



Continuous monitoring effluent equipment is available for many pollutant parameters and EPA shall require such equipment be implemented on all cruise ships unless it is proven to be technically infeasible or not cost-effective. EPA shall periodically investigate the availability and efficacy of continuous effluent monitoring equipment for other pollutant parameters and shall require the use of such technology where it is technically feasible and cost-effective.

### Type II Marine Sanitation Devices (MSDs)

Traditional Type II MSDs have been found unreliable with regard to meeting qualitative standards for treatment of sewage – a point clearly demonstrated by testing done by Alaska in 2000 and further demonstrated by test results reported in the EPA's *Cruise Ship Discharge Assessment Report* (see Appendix 1). In addition, EPA's standards for MSD discharges have not been updated in over 30 years.

*Recommendation 5:* Given the inadequate EPA Type II MSD technology standards and documented problems with MSD compliance, MSD regulations shall be improved to incorporate the standards set out in Recommendation 2 in order to phase in the use of AWTS as a means for treating sewage on cruise ships.

*Recommendation 6:* Discharges from a Type II MSD shall be prohibited within twelve nautical miles of the shoreline.

*Recommendation 7:* Where traditional Type II MSDs are being utilized, they shall be required to undergo monthly testing and evaluation by the U.S. Coast Guard or U.S. EPA, or an independent engineer approved by the Coast Guard or EPA, to confirm the system is fully operational and can treat to current CWA standards: no more than 200 fecal coliform for 100 milliliters and no more 150 milligrams per liter of suspended solids.

*Recommendation 8:* A ship with a traditional Type II MSD that fails to meet the standards pursuant to Recommendation 7 shall be prohibited from discharging in U.S. waters until the equipment is compliant.

*Recommendation 9:* Require electronic transponders to signal land-based authorities when a discharge line is open or closed, and measure critical constituents of the effluent.<sup>193</sup>

### Advanced Wastewater Treatment Systems (AWTS)

The cruise industry in recent years has adopted the use of AWTS on many ships. While these systems are a vast improvement over traditional Type II MSDs, they are not without problems. These systems are prone to breakdown and require constant maintenance and care, so there is a need to be cautious with regard to where the effluent from an AWTS can be released. The systems also do not yet treat all types of pollution.

*Recommendation 10:* AWTS shall be required to undergo monthly testing and evaluation by the U.S. Coast Guard or U.S. EPA, or an independent engineer approved by the Coast Guard or EPA, to confirm the system is fully operational and can treat to the standards set out in Recommendation 2.

*Recommendation 11:* An AWTS meeting the standards in Recommendation 2 shall be permitted to discharge beyond 12 nautical miles from the shoreline; those found out of compliance shall be prohibited from discharging until the equipment is compliant.



*Recommendation 12:* Require electronic transponders to signal land-based authorities when a discharge line is open or closed, and measure critical constituents of the effluent. Such transponders are available and are already an optional component on some AWTS.<sup>194</sup>

### Sewage Sludge

Most Marine Sanitation Devices, including traditional Type II MSDs and AWTS, filter solids from sewage as part of the treatment process, resulting in an average of 4,000 gallons of sewage sludge per day per vessel.<sup>195</sup> Sewage sludge also has a high oxygen demand that is detrimental to sea life, posing the same problems as sewage, but in a more concentrated form. While each of the currently available disposal options for sewage sludge raise their own set of concerns, it is clear that discharging such waste should not occur within the U.S. EEZ.

*Recommendation 13:* Research shall be undertaken to determine the harm posed to marine life and to the marine environment from sewage sludge or incinerated sewage sludge discharged at sea.

*Recommendation 14:* Discharge of sewage sludge within the U.S. EEZ shall be strictly prohibited.

*Recommendation 15:* The federal government shall partner with state and local governments to develop capacity for the pump out of sewage sludge in port. This may include financial support for such projects.

### Gray Water

As illustrated in Appendix 3, untreated gray water falls woefully short of National Recommended Water Quality Standards and the Title XIV Standard for Continuous Discharge in Alaskan Waters, in particular for fecal coliform, chlorine, biological oxygen demand, suspended solids, ammonia, copper, nickel, zinc, and tetrachloroethylene. This suggests the need for upgrading and regular testing of systems treating gray water, and for extending the area in which gray water may not be discharged.

*Recommendation 16:* Systems used for treatment of gray water shall undergo monthly testing and evaluation by the U.S. Coast Guard or U.S. EPA, or an independent engineer approved by the Coast Guard or EPA, to confirm the system is fully operational and can treat to standards required by Recommendation 2.

*Recommendation 17:* Gray water shall not be discharged within twelve nautical miles of the shoreline.

*Recommendation 18:* Outside of twelve nautical miles, gray water treated by a traditional Type II MSD or AWTS to the standards set out in Recommendation 2 shall not be discharged unless the vessel is travelling at a speed of 6 knots or more.

*Recommendation 19:* Gray water discharges and constituents from cruise ships shall be monitored continuously and the results reported monthly to the U.S. EPA.

*Recommendation 20:* Require electronic transponders to signal land-based authorities when a discharge line is open or closed, and that measures critical constituents of the gray water effluent.



*Recommendation 21:* Acceptable parameters for treated gray water shall be reviewed at least annually with a view toward setting limits, at a minimum, matching national federal water quality standards at point of discharge; achieving or exceeding Title XIV standards nationwide; and developing additional standards where necessary to protect ecosystem and human health.<sup>196</sup>

### Solid Waste

Solid waste from cruise ships includes huge volumes of plastic, paper, wood, cardboard, food waste, cans, and a myriad of other miscellaneous wastes generated by the cruise line and cruise passengers. It is estimated that each passenger can generate 3.5 kilograms of solid waste per day.<sup>197</sup>

*Recommendation 22:* Require cruise ships to sort all wastes onboard and off-load recyclables only at ports with recycling facilities.<sup>198</sup>

*Recommendation 23:* Establish a mandatory, standardized incinerator ash testing program to determine appropriate management of ash (i.e. determine whether each batch of ash generated should be categorized as a solid waste or a hazardous waste).

*Recommendation 24:* Prohibit the discharge of any waste, food, or otherwise macerated waste within 12 nautical miles of the shoreline, except that the discharge of incinerator ash shall be prohibited within the U.S. EEZ.

*Recommendation 25:* In addition, prohibit the discharge of any waste, food, or otherwise macerated waste within 12 nautical miles of any marine sanctuary or any other sensitive area.

*Recommendation 26:* Conduct a study of the feasibility of requiring all solid waste be brought to shore for disposal and recycling.

### Hazardous Waste

While RCRA covers the handling of hazardous waste, the Act has loopholes that must be addressed.

*Recommendation 27:* Clarify the provisions of RCRA so cruise corporations are treated as large generators of hazardous waste, forbidding individual cruise ships from taking advantage of less stringent requirements accorded small generators of hazardous wastes.

*Recommendation 28:* Develop a means to track the path of all onboard generated hazardous wastes through all states and foreign ports.<sup>199</sup>

*Recommendation 29:* Establish a funding mechanism based on the polluter-pays model that will provide revenues to develop and implement a comprehensive hazardous waste regulatory scheme specific to cruise ships.

*Recommendation 30:* Establish a mandatory, standardized incinerator ash testing program to determine appropriate management of ash (i.e. determine whether each batch of ash generated should be categorized as a solid waste or a hazardous waste).



*Recommendation 31:* Prohibit the discharge of any hazardous materials or materials with hazardous characteristics into U.S. waters out to the U.S. EEZ.

### Oily Bilge

Oil, even in minute quantities, can have lethal or sub-lethal effects on marine life. By-products from the biological breakdown of petroleum products can harm fish and wildlife and pose threats to human health if contaminated fish and wildlife are ingested. Protective standards should be adopted and applied across the nation.

*Recommendation 32:* Prohibit the discharge of oily bilge water out to 12 nautical miles of the shoreline;<sup>200</sup>

*Recommendation 33:* Prohibit the discharge of oily bilge water beyond 12 nautical miles of the shoreline unless the discharge is between 5 and 15 ppm oil content and does not leave a visible sheen.

*Recommendation 34:* Require cruise ships navigating the U.S. EEZ to have a “White Box.” Before water is discharged, it passes through a flow meter with a pulse transmitter connected to a recorder which records and stores the following: time when the overboard pumping starts; oil content meter level over a discharge cycle; total quantity of water pumped overboard in a discharge cycle; and time when the overboard pumping stops.<sup>201</sup>

*Recommendation 35:* Establish penalties for failure to meet applicable standards in U.S. waters and regulations pertaining to oil content in bilge water discharges.

*Recommendation 36:* Require onboard observers to monitor sampling, monitoring, and other effluent-related requirements to oversee discharging practices, equipment operation and maintenance, and the completion and submittal of accurate Oil Record Books.

### Ballast Water

In the U.S., ballast water is included in the NPDES VGP, which sets standards for discharges within 3 miles of the shoreline, but the VGP does not provide adequate protections from invasive species and ballast water is unregulated beyond the three-mile limit. There is great value in having national legislation that regulates the quality of ballast water and ensures waters in the U.S. EEZ are protected from further encroachment by invasive species often found in ballast water. Technology has advanced to the point where ballast water can be treated to a reasonable point that avoids deleterious environmental effects. This technology should be required on ships entering U.S. waters. California’s SB 497 provides a useful template requiring ships to treat ballast water before dumping it in ports or coastal waters, with treatment standards phased in, starting in 2009. By 2020, no discharge of organisms larger than 50 microns - about the size of a grain of sand - would be allowed.

*Recommendation 37:* Adopt the standards contained in California’s SB 497 into the CWA as a minimum standard to apply to all waters in the U.S. EEZ.

### Air Emissions

Cruise ships generate significant amounts of air pollution from two sources: their engines, which burn dirty fuel generat-



ing large amounts of sulfur, nitrogen and particulate matter, and their incinerators which burn a variety of wastes, including hazardous wastes, oil, oily sludge, sewage sludge, medical and bio-hazardous waste, outdated pharmaceuticals, and other solid wastes such as plastics, paper, metal, glass, and food.

### Incinerator Waste

The emissions from onboard incineration include dioxins, nitrogen oxide, sulfur oxide, carbon monoxide, carbon dioxide, particulate matter, hydrogen chloride, toxic metals such as lead, cadmium and mercury, and hydrocarbons.<sup>202</sup> Clear parameters are needed for the operation of onboard incinerators.

*Recommendation 38:* Prohibit the use of onboard incinerators within 20 miles of the coast.

*Recommendation 39:* EPA should begin a rulemaking to ensure the operational standards and requirements for monitoring and reporting that apply to incinerators on land be extended to apply to cruise ships.

### Engine Emissions

A second, and equally serious, air quality concern is emissions from onboard engines which frequently burn bottom of the barrel bunker fuel.<sup>203</sup> An estimated 60,000 died worldwide in 2002 as a result of under-regulated shipping air emissions and that number is estimated to grow by 40 percent by 2012 due to increases in global shipping traffic. According to the California Air Resources Board, the use of low sulfur fuel in auxiliary engines used in port could save 3,600 lives in coastal communities over the first six years through reduced respiratory illnesses and heart disease, including a potential 80% drop in cancer risk associated with ship pollutants.<sup>204</sup> The results are even more impressive if auxiliary engines are shut down and shore side power used instead.

*Recommendation 40:* Require ships to use marine gas oil, or marine diesel oil with a sulfur content of no more than 0.5 percent by weight, in all diesel engines within 24 nautical miles of the coast immediately and 0.1 percent by 2012.

*Recommendation 41:* Require ships operating between 24 nm and the U.S. EEZ to use marine gas oil, or marine diesel oil with a sulfur content of no more than 1 percent by 2012 in all diesel engines, and 0.1 percent by 2015.

*Recommendation 42:* Establish federal government support for ports to develop capacity for cold ironing, and require all cruise ships operating in U.S. ports to have capability to use cold ironing in ports where it is available within two years of cold ironing being available.

*Recommendation 43:* Require cruise ships to reduce speed to between 10 and 12 knots (unless fuel efficiency dictates otherwise) within 40 nautical miles of the U.S. shoreline.

### Monitoring Through Onboard Observers

Alaska has demonstrated the feasibility and the value of onboard observers aboard cruise ships. Observers ensure onboard practices and systems conform to legal requirements. Their importance is that effluent can be regularly tested, and they confirm that onboard systems are operational. Presently, as long as a ship has a sewage treatment system approved by the U.S. Coast Guard, it is assumed the system operates up to performance standards and effluent is discharged based



on that assumption. As already mentioned, this is not the case with traditional Type II MSDs. As well, even if a cruise ship has an AWTs, there is no guarantee the system will be operational and used at all times while in U.S. waters. The existence of a system is one thing; confirming its use and that it is performing to required standards is another. Use of independent onboard observers is the most effective means for gaining confirmation.

Onboard observers are important also to ensure that: oily water separators are properly maintained, that the system is not being tricked such that meters inaccurately measure oil content, and that proper records are kept. One has merely to look at the cruise industry's violations in the 1990s to see that this is a problem, and while these practices are presumed to have ceased, an onboard observer is the most effective method for ensuring they do not reappear. Onboard observers are perhaps more important now given that all cruise lines are off probation from their environmental violations in the 1990s and are thus under considerably less scrutiny than was the case two or three years ago.

One other lesson learned from Alaska is onboard observers must be given clear authority in legislation for their monitoring activities. Placing obstacles to observer access to onboard systems and log books, and to the ability to test effluent, must be clearly made illegal with stiff punishment. The value and efficacy of the observers depend on their ability to do their job without limits and without concern for their safety and security.

*Recommendation 44:* Establish a national requirement that cruise ships operating to and/or from U.S. ports have an independent onboard observer that will monitor all waste streams and will ensure that all systems that discharge effluent into the air or water are operational and operate to specification. These observers will be U.S. Coast Guard certified employees and will report all infractions of U.S. regulations and laws to the Coast Guard and the FBI. They shall have complete and full access onboard a cruise ship, and there shall be heavy penalties for a cruise ship limiting that access.

*Recommendation 45:* Establish a funding mechanism on the polluter-pays model that will provide revenues to develop and implement a program of independent onboard observers.

*Recommendation 46:* Publicize the whistleblower provisions under 33 U.S.C. §1908(a) to passengers and crewmembers to encourage detection and reporting of illegal pollution.<sup>205</sup>

### The Need for a Level Playing Field

Cruise lines have long used their registration in foreign countries – Carnival Corporation in Panama, Royal Caribbean Cruises Limited in Liberia, Norwegian Cruise Line's parent Star Cruises in Bermuda – to avoid U.S. laws and regulations, including the avoidance of corporate income taxes. They are further protected from many U.S. regulations through offshore registration of their ships. All of this creates an unfair advantage when compared to segments of the hospitality sector that operate on land and that pay taxes, meet environmental regulations, are governed by labor regulations and minimum wage laws, and employ workers who also pay taxes in the country where they work.

When combined, these advantages to the cruise industry allow it to offer a vacation product that is deceptively inexpensive due to the fact that harm to the environment and human health is ignored. It is time the U.S. government takes action so cruise lines, at least with regard to environmental responsibility, are held to the same standards as those with which cruise tourism competes. Why should a hotel in San Juan, in Tampa, in Seattle, in Baltimore, or in Boston be held



to one set of standards while the cruise ships that operate from the port are permitted to escape regulation with less responsible stewardship of the environment? The playing field should be leveled in order to protect vulnerable ecosystems, U.S. residents and the environment as a whole.



## APPENDIX 1: Comparison of Traditional Type II MSD to Selected Wastewater Discharge Standards

### A. Title XIV Standard for Continuous Discharge in Alaska Waters

Analyte	Average Concentration in Traditional Type II MSD Effluent	Title XIV Standard for Continuous Discharge in Alaska Waters
Fecal coliform/100 ml	2,040,000	<20
Total residual chlorine (ug/L)	1,070	<10
Biochemical oxygen demand (5 day) (mg/L)	133	<45 <sup>1</sup>
Total suspended solids (mg/L)	627	<45 <sup>1</sup>

<sup>1</sup> The seven day average shall not exceed this value

### B. National Recommended Water Quality Criteria (NRWQC)

Analyte	Average Concentration in Traditional Type II MSD Effluent	NRWQC <sup>1</sup> Criteria Maximum Concentration	NRWQC <sup>1</sup> Criterion Continuous Concentration
Total Residual Chlorine (ug/L)	1,070	13	7.5
Ammonia (NH <sub>3</sub> -N ug/L)	145,000	2,140 – 15,600	321 – 2,960

<sup>1</sup> Values vary with average temperature, pH, and salinity

### C. National Recommended Water Quality Criteria (NRWQC) Human Health

Analyte	Average Concentration in Traditional Type II MSD Effluent	NRWQC Human Health (for the Consumption of Organisms)
Bis(2-ethylhexyl) phthalate (ug/L)	3.5	2.2
Carbon tetrachloride (ug/L)	2.0	1.6
Bromodichloromethane (ug/L)	34	17
Tetrachloroethylene (ug/L)	13	3.3

Source: United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005) <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)>.



## APPENDIX 2: Comparison of Advanced Wastewater Treatment (AWT) to Selected Wastewater Discharge Standards

### A. Title XIV Standard for Continuous Discharge in Alaska Waters

Analyte	Average Concentration in AWT Effluent	Title XIV Standard for Continuous Discharge in Alaska Waters
Fecal coliform/100 ml	14.5	<20
Total residual chlorine (ug/L)	338	<10
Biochemical oxygen demand (5 day) (mg/L)	7.99	<45 <sup>1</sup>
Total suspended solids (mg/L)	4.49	<45 <sup>1</sup>

<sup>1</sup> The seven day average shall not exceed this value

### B. National Recommended Water Quality Criteria (NRWQC)

Analyte	Average Concentration in Traditional Type II MSD Effluent	NRWQC Criteria Maximum Concentration	NRWQC Criterion Continuous Concentration
Total Residual Chlorine (ug/L)	338	13	7.5
Ammonia (NH <sub>3</sub> -N ug/L)	36,600	2,140 – 15,600 <sup>1</sup>	321 – 2,960 <sup>1</sup>
Copper (Dissolved) (ug/L)	13.7	4.8	3.1
Nickel (Dissolved) (ug/L)	13.3	74	8.2
Zinc (Dissolved) (ug/L)	185	90	81

<sup>1</sup> Values vary with average temperature, pH, and salinity

### C. National Recommended Water Quality Criteria (NRWQC) Human Health

Analyte	Average Concentration in Traditional Type II MSD Effluent	NRWQC Human Health (for the Consumption of Organisms)
Tetrachloroethylene (ug/L)	5.59	3.3

Source: United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005) <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)>.



## APPENDIX 3: Comparison of Untreated Cruise Ship Gray Water to Selected Wastewater Discharge Standards

### A. Title XIV Standard for Continuous Discharge in Alaska Waters

Analyte	Average Concentration in Untreated Gray Water (EPA Data)	Average Concentration in Untreated Gray Water (Alaska Data)	Title XIV Standard for Continuous Discharge in Alaska Waters
Fecal coliform/100 ml	36,000.000	2,950,000	<20
Total residual chlorine (ug/L)	Not Recorded	372	<10
Biochemical oxygen demand (5 day) (mg/L)	1,140	354	<45 <sup>1</sup>
Total suspended solids (mg/L)	704	318	<45 <sup>1</sup>

<sup>1</sup> The seven day average shall not exceed this value

### B. National Recommended Water Quality Criteria (NRWQC)

Analyte	Average Concentration in Untreated Gray Water	NRWQC Criteria Maximum Concentration	NRWQC Criterion Continuous Concentration
Total Residual Chlorine (ug/L)	372 <sup>2</sup>	13	7.5
Ammonia (NH <sub>3</sub> -N ug/L)	2,130 <sup>3</sup>	2,140 – 15,600 <sup>1</sup>	321 – 2,960 <sup>1</sup>
Copper (Dissolved) (ug/L)	195 <sup>3</sup>	4.8	3.1
Nickel (Dissolved) (ug/L)	18.2 <sup>3</sup>	74	8.2
Zinc (Dissolved) (ug/L)	1,610 <sup>3</sup>	90	81

<sup>1</sup> Values vary with average temperature, pH, and salinity, <sup>2</sup> Alaska Data, <sup>3</sup> EPA DATA

### C. National Recommended Water Quality Criteria (NRWQC) Human Health

Analyte	Average Concentration in Untreated Gray Water (EPA DATA)	NRWQC Human Health (for the Consumption of Organisms)
Bis(2-ethylhexyl) phthalate (ug/L)	71.9	2.2
Tetrachloroethylene (ug/L)	11.4	3.3

Source: United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005) <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)>.



## APPENDIX 4: Significant Parameters of State Laws, Regulations, and MOUs

### Alaska

*Alaska Cruise Ship Initiative – AS 46.030460 – AS 46.03.490 (2001)*: Sets standards for fecal coliform and total suspended solids and sampling requirements for the underway discharge of wastewater in Alaska state waters. In effect, only wastewater (sewage and gray water) treated by an AWTs can be discharged in Alaska state waters.

*Alaska Cruise Ship Ballot Initiative (2006)*: Requires ship discharges to meet Alaska Water Quality Standards. Also place on all ships observers (Ocean Rangers) who observe wastewater treatment practices, inspect pollution control equipment and sample all ship discharges.

### California

*AB 121 (2003)*: Bans discharge of sewage sludge and oily bilge water into state waters.

*AB 906 (2003)*: Prohibits discharge of hazardous wastes from photo-processing and dry cleaning operations into state waters.

*AB 2672 (2004)*: Bans discharge of treated wastewater into state waters (including from AWTs).

*AB 2093 (2004)*: Prohibits release of gray water into state waters.

*AB 471 (2004)*: Prevents use of incinerators in state waters.

*SB 771 (2005)*: Directed the State Water Board to obtain permission from the U.S. EPA to impose sewage discharge prohibitions on cruise ships in California waters. The application was submitted on April 5, 2006; approval is still pending.

*SB 497 (2006)*: Requires the state to adopt ballast water performance standards by January 2008 and sets specific deadline for removal of different types of species from ballast water, mandating that ship operators remove invasive species (including bacteria) by the year 2020.

*Rulemaking to Consider the Adoption of a Proposed Regulation for Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline* (Approved by the California Air Resources Board on July 24, 2008, <http://www.arb.ca.gov/regact/2008/fuelogv08/fuelogv08.htm>): Regulations require ships within 24 miles of its coast to use marine gas oil, or marine diesel oil, with a sulfur content of no more than 0.5 percent by weight, in all ship diesel engines beginning in July 2009. In 2012 the fuel sulfur content will be reduced to 0.1 percent.

### Florida

*Memorandum of Understanding (2001)*: The cruise industry agrees to not discharge wastewater (gray water and sewage, treated and untreated) into state waters. AWTs meeting Alaska standards are exempt from these limitations.

*Environmental Protection Agency – 67 FR 35735 (2003)*: Declares state waters within the Florida Keys National Marine Sanctuary a No Discharge Zone (NDZ).

### Hawaii

*HB 422 (2005)*: Allows treated sewage meeting Alaska standards for fecal coliform and total suspended solids to be discharged into state waters. Untreated sewage must be discharged outside state waters; incinerators shall not be used in port. No regulation of gray water.



Maine

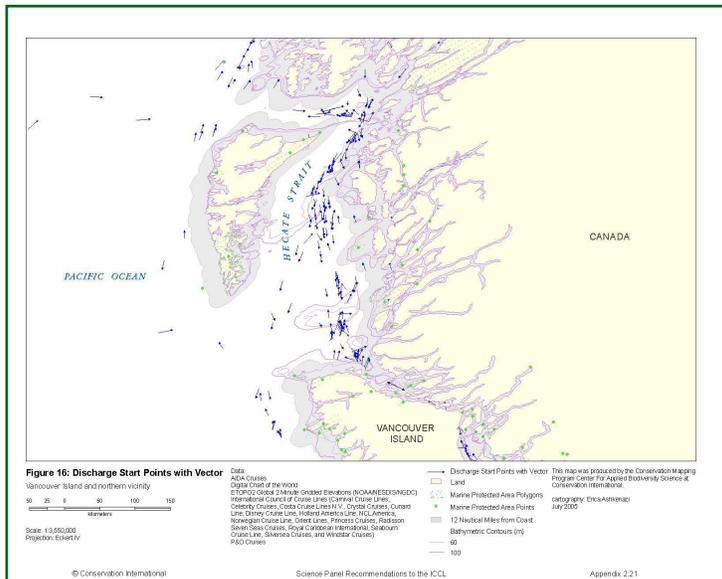
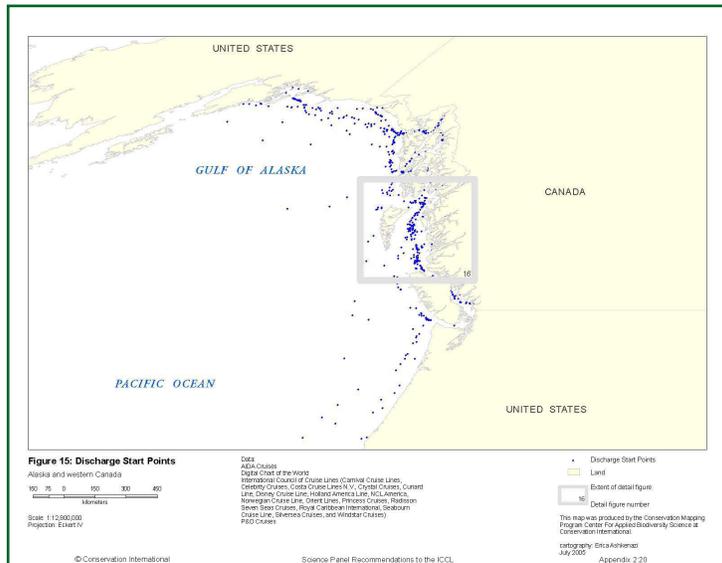
*LD 1158 (2004)*: Bans any discharge of gray water or treated/untreated sewage from a MSD into state waters. Discharge from an AWTs meeting Alaska standards permitted in state waters, except in Casco Bay, which is declared a No Discharge Zone (NDZ) by the EPA.

Washington

*Memorandum of Understanding (2004 with annual renewals)*: The cruise industry agrees to not discharge wastewater (gray water and sewage, treated and untreated) into state waters. AWTs meeting Alaska standards are exempt from these limitations. Discharge of biosolids (sewage sludge) prohibited within twelve nautical miles of the shoreline and within the entire boundaries of the Olympic Coast Marine Sanctuary.



### APPENDIX 5: Maps Showing Discharges in Waters Between Washington State and Alaska



NOTE: The data in the two preceding maps was collected from cruise ship logs by a volunteer, independent Science Panel convened by the Ocean Conservation and Tourism Alliance, a joint project of Conservation International and International Council of Cruise Lines. The basic unit of information is a “discharge event” beginning when pumps are activated at sea and having a variable duration from less than one day to periods of several days. Each vessel records such events separately for any of five types of waste: food waste, gray water, sewage, mixed gray water/sewage, and wastewater sludge. Vessels were therefore asked to list and characterize multiple discharge events over variable time periods corresponding to the actual duration of the event. In order to detect possible seasonal variation in discharge patterns, vessels were asked to provide data for the set of discharge events for any voyage that occurred on or nearest to each of four dates at different times of year (17 August 2003, 7 December 2003, 08 February 2004, and 23 May 2004). The maps were included in Appendix 2 of *Science Panel Recommendations to the International Council of Cruise Lines (ICCL)*, which was published in December 2003.



## End Notes

- <sup>1</sup> Diaz, Robert J. and Rutger Rosenberg. 2008. "Spreading Dead Zones and Consequences for Marine Ecosystems," *Science* 321, pp. 926 – 929 <[www.precaution.org/lib/marine\\_dead\\_zones\\_growing.080815.pdf](http://www.precaution.org/lib/marine_dead_zones_growing.080815.pdf)> (last accessed Nov. 6, 2009).
- <sup>2</sup> See 2008 CLIA Cruise Market Overview <[cruising.org/press/overview2008/#ExecSummary](http://cruising.org/press/overview2008/#ExecSummary)> (last accessed Nov. 6, 2009). CLIA reports more than 275,000 lower berths. With capacity utilization of 105.7 percent in 2007, this translates into close to 300,000 berths occupied per day.
- <sup>3</sup> See Pollution and Environmental Violations and Fines, 1992 – 2009 <[www.cruisejunkie.com/envirofines.html](http://www.cruisejunkie.com/envirofines.html)> (last accessed Nov. 6, 2009).
- <sup>4</sup> Carnival Corporation, which owns 11 brand names and commands 53 percent of the North American market, has reported corporate net profit each of the past three years in excess of \$2.25 billion. Royal Caribbean has 27 percent of the North American market and reports net profit of more than \$600 million in 2007. Both are foreign-registered corporations (Panama and Liberia respectively) and thereby avoid tax liability in the U.S.
- <sup>5</sup> See Reported Cruise Industry Spending on Lobbying the U.S. Congress, 1997 – 2008 [www.cruiseresearch.org/lobbying.pdf](http://www.cruiseresearch.org/lobbying.pdf) (last accessed Nov. 6, 2009).
- <sup>6</sup> See Klein, Ross A. 2005. *Cruise Ship Squeeze: The New Pirates of the Seven Seas*, Gabriola Island, BC: New Society, pp. 67-74.
- <sup>7</sup> Starmer-Smith, Charles. 2008. "Flying Three Times Greener than Cruising." *Daily Telegraph* January 19 <[www.telegraph.co.uk/travel/main.jhtml?xml=/travel/2008/01/19/et-cruise-green-119.xml](http://www.telegraph.co.uk/travel/main.jhtml?xml=/travel/2008/01/19/et-cruise-green-119.xml)> (last accessed Nov. 6, 2009).
- <sup>8</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*, Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-2 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 6, 2009).
- <sup>9</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*, Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-5 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 6, 2009).
- <sup>10</sup> United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 2-1 <[www.epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://www.epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 6, 2009).
- <sup>11</sup> The Explorer of the Seas accommodates 3,114 passengers, double occupancy <[www.royalcaribbean.com/findacruise/ships/class/ship/home.do?shipCode=EX](http://www.royalcaribbean.com/findacruise/ships/class/ship/home.do?shipCode=EX)> (last accessed Nov. 6, 2009). With occupancy often above 110 percent plus 1,180 crew, the ship typically has more than 4,500 passengers and crew onboard.
- <sup>12</sup> United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 3-21 <[www.epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://www.epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 6, 2009).
- <sup>13</sup> See United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 2-33 <[www.epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://www.epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 6, 2009).
- <sup>14</sup> 33 C.F.R. § 159.3 (2008); 40 C.F.R. § 140.3(d) (2008).
- <sup>15</sup> See McAllister, Bill. 2000. "A Big Violation on Wastewater: Some Ship Readings 100,000 Times Allowed Amount," *The Juneau Empire*, August 27 <[www.juneauempire.com/stories/082700/Loc\\_wastewater.html](http://www.juneauempire.com/stories/082700/Loc_wastewater.html)> (last accessed Nov. 6, 2009).
- <sup>16</sup> United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency. (Report #EPA842-R-07-005) [www.epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://www.epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf) (last accessed Nov. 6, 2009).
- <sup>17</sup> Brannigan, Martha. 2008. "Who Uses Advanced Waste-Removal Technology?" *Miami Herald* February 3 <[www.miamiherald.com/1060/story/404319.html](http://www.miamiherald.com/1060/story/404319.html)> (last accessed February 4, 2008). The article discusses AWTs on ships operated by each of the major three cruise corporations and their constituent cruise lines.



<sup>18</sup> This was told to the author by Giora Israel, a Vice President of Carnival Corporation, when they both appeared on a panel at the Caribbean Hotel Industry Conference, June 2003 in Punta Cana, Dominican Republic. Mr. Israel also discussed how some cruise executives would drink the effluent from AWTS, to prove it was “drinking water quality,” but said he would never do that because in his opinion it was still sewage.

<sup>19</sup> Alaska DEC. 2004. Assessment of Cruise Ship and Ferry Wastewater Impacts in Alaska. Juneau: Alaska Department of Environmental Conservation, p. 29 <[www.dec.state.ak.us/water/cruise\\_ships/pdfs/assessmentreport2004.pdf](http://www.dec.state.ak.us/water/cruise_ships/pdfs/assessmentreport2004.pdf)> (last accessed Nov. 6, 2009).

<sup>20</sup> Although 25 ships were authorized to discharge under Alaska’s Wastewater General permit (see list at [www.dec.state.ak.us/water/cruise\\_ships/gp/Auth\\_08.html](http://www.dec.state.ak.us/water/cruise_ships/gp/Auth_08.html) (last accessed Nov. 6, 2009)), according to correspondence from Denise Koch, Cruise Ship Program Manager, Alaska Department of Environmental Conservation, only 20 ships chose to discharge in Alaska waters.

<sup>21</sup> These numbers were reported in correspondence from Denise Koch, Cruise Ship Program Manager, Alaska Department of Environmental Conservation.

<sup>22</sup> Golden, Kate. 2008. “Twelve of 20 Ships Violated Wastewater Limits This Year,” Juneau Empire, Nov. 7 <[www.juneauempire.com/stories/110708/loc\\_353262397.shtml](http://www.juneauempire.com/stories/110708/loc_353262397.shtml)> (last accessed Nov. 6, 2009) and “More cruise ships cited for wastewater,” Juneau Empire, October 2, 2008 <[www.juneauempire.com/stories/100208/reg\\_339454665.shtml](http://www.juneauempire.com/stories/100208/reg_339454665.shtml)> (last accessed Nov. 6, 2009).

<sup>23</sup> Form letter dated September 24, 2003, addressed to “Dear Friend,” from Richard D. Fain, Chairman & Chief Executive Officer, Royal Caribbean Cruises Ltd.

<sup>24</sup> Washington State Department of Health. 2007. Report to the Legislature: Assessment of Potential Health Impacts of Virus Discharge from Cruise Ships to Shellfish Growing Areas in Puget Sound, Olympia: Washington Department of Health <[www.doh.wa.gov/ehp/sf/Pubs/cruise-ship-report.pdf](http://www.doh.wa.gov/ehp/sf/Pubs/cruise-ship-report.pdf)> (last accessed Nov. 12, 2009).

<sup>25</sup> National Marine Sanctuaries. 2008. Olympic Coast Marine Sanctuary: Condition Report 2008, Washington, DC: NOAA. p. 43 <[sanctuaries.noaa.gov/science/condition/pdfs/oc\\_conditionreport08.pdf](http://sanctuaries.noaa.gov/science/condition/pdfs/oc_conditionreport08.pdf)> (last accessed Nov. 12, 2009). The report indicates 28,000 gallons of sewage sludge is generated on each week-long voyage.

<sup>26</sup> King County Wastewater Treatment Division. 2007. Cruise Ship Wastewater Management Report. Seattle: Department of Natural Resources and Parks <[your.kingcounty.gov/dnrp/library/wastewater/csi/0708-CruiseShipWMreport.pdf](http://your.kingcounty.gov/dnrp/library/wastewater/csi/0708-CruiseShipWMreport.pdf)> (last accessed Nov. 12, 2009).

<sup>27</sup> The California prohibition for discharge of sewage sludge is contained in AB 121, passed by the state legislature and signed into law in 2003 <[www.leginfo.ca.gov/pub/03-04/bill/asm/ab\\_0101-0150/ab\\_121\\_bill\\_20030924\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/03-04/bill/asm/ab_0101-0150/ab_121_bill_20030924_chaptered.pdf)> (last accessed Nov. 12, 2009). The prohibition of discharge of sewage sludge within twelve miles of shore in Washington is contained in the Memorandum of Understanding between the Washington State Department of Ecology and Northwest Cruise Ship Association (NWCA), as amended May 19, 2008 <[www.ecy.wa.gov/Programs/wq/wastewater/cruise\\_mou/FINALamendment4MOU051908.pdf](http://www.ecy.wa.gov/Programs/wq/wastewater/cruise_mou/FINALamendment4MOU051908.pdf)> (last accessed Nov. 12, 2009).

<sup>28</sup> Weiss, Ken. 2003. “Cruise Line Pollution Prompts Legislation,” Los Angeles Times, August 18 <[www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm](http://www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm)> (last accessed Nov. 12, 2009). Also see: Report to the Legislature: Regulation of Large Passenger Vessels in California, Cruise Environmental Task Force, August 2003 <[www.swrcb.ca.gov/publications\\_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf](http://www.swrcb.ca.gov/publications_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf)> (last accessed Nov. 12, 2009).

<sup>29</sup> See Port of Seattle. 2008. Cruise Vessel Biomass Management Study, Phase 1A (Draft): Data Compilation and Initial Assessment, Port of Seattle, Nov. 18.

<sup>30</sup> The figure for discharge of gray water is based on 1360 crew and 4190 passengers. The ship’s number of passengers based on double occupancy is 3634, however it typically sails at 115 – 120% occupancy.

<sup>31</sup> Copeland, Claudia. 2008. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-4 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>32</sup> Copeland, Claudia. 2008. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues, Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-4 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).



- <sup>33</sup> See U.S. Environmental Protection Agency. 2008. Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP), Washington, DC: U.S. Environmental Protection Agency, p. 25, 43-44 <[www.epa.gov/npdes/pubs/vessel\\_vgp\\_permit.pdf](http://www.epa.gov/npdes/pubs/vessel_vgp_permit.pdf)> (last accessed Nov. 15, 2009). and U.S. Environmental Protection Agency. 2008. National Pollution Discharge Elimination System (NPDES) Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Vessels Fact Sheet, Washington, DC: U.S. Environmental Protection Agency, p. 109 <[www.epa.gov/npdes/pubs/vessel\\_vgp\\_factsheet.pdf](http://www.epa.gov/npdes/pubs/vessel_vgp_factsheet.pdf)> (last accessed Nov. 15, 2009).
- <sup>34</sup> Herz, Michael, and Joseph Davis. 2002. Cruise Control: A Report on How Cruise Ships Affect the Marine Environment. Washington, DC: The Ocean Conservancy., p. 11 <[www.oceanconservancy.org/site/DocServer/cruisecontrol.pdf?docID=141](http://www.oceanconservancy.org/site/DocServer/cruisecontrol.pdf?docID=141)> (last accessed Nov. 12, 2009).
- <sup>35</sup> Copeland, Claudia. 2008. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-5 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).
- <sup>36</sup> United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 5-11, <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).
- <sup>37</sup> See John Polglaze. 2003. "Can We Always Ignore Ship-Generated Food Waste," Marine Pollution Bulletin 46:1, pp. 33-38 <[www.researchgate.net/publication/10943513\\_Can\\_we\\_always\\_ignore\\_ship-generated\\_food\\_waste](http://www.researchgate.net/publication/10943513_Can_we_always_ignore_ship-generated_food_waste)> (last accessed Nov. 12, 2009).
- <sup>38</sup> "The International Maritime Organization (IMO), a body of the United Nations, sets international maritime vessel safety and marine pollution standards. It consists of representatives from 152 major maritime nations, including the United States. The IMO implements the 1973 International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978, known as MARPOL 73/78." Copeland, Claudia. 2008. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-7, <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).
- <sup>39</sup> See MARPOL, Annex V, Prevention of Pollution by Garbage from Ships, <[www.imo.org/Environment/mainframe.asp?topic\\_id=297](http://www.imo.org/Environment/mainframe.asp?topic_id=297)> (last accessed Nov. 12, 2009).
- <sup>40</sup> Reid, David. 2007. "Earth's Eighth Continent." The Tyee Nov. 21. <[thetyee.ca/News/2007/11/21/PacificGarbagePatch/](http://thetyee.ca/News/2007/11/21/PacificGarbagePatch/)> (accessed Nov. 12, 2009).
- <sup>41</sup> See Healthy Canada, Dioxins and Furans <[www.hc-sc.gc.ca/hl-vs/iyh-vsv/enviro/dioxin-eng.php](http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/enviro/dioxin-eng.php)> (last accessed Nov. 12, 2009).
- <sup>42</sup> See MARPOL Annex V, Appendix B, Section 5.4.6.2, referenced in United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 5-12 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).
- <sup>43</sup> United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 5-15 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).
- <sup>44</sup> See MARPOL 73/78. 1997. Consolidated Edition: Articles, Protocols, Annexes, Unified Interpretations of the International Convention for the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto (2<sup>nd</sup> ed.), London: International Maritime Organization.
- <sup>45</sup> See 33 C.F.R. parts 151.63, 151.65, 151.67, 151.69, 151.71, 151.73, and Appendix A for complete guidelines.
- <sup>46</sup> U.S. Bureau of Transportation Statistics. 2002. "Summary of Cruise Ship Waste Streams." Available at <[www.bts.gov/publications/maritime\\_trade\\_and\\_transportation/2002/html/environmental\\_issues\\_table\\_01.html](http://www.bts.gov/publications/maritime_trade_and_transportation/2002/html/environmental_issues_table_01.html)> (last accessed Nov. 12, 2009). See also United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 6-1 – 6-3 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).
- <sup>47</sup> Copeland, Claudia. 2008. Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues. Washington, DC: Congressional



Research Service (Report #RL32450), November 17, p. CRS-13 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>48</sup> Schmidt, Kira. 2000. *Cruising for Trouble: Stemming the Tide of Cruise Ship Pollution*. San Francisco: Bluewater Network. Available at <[www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf](http://www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf)> (last accessed Nov. 12, 2009). See also United States Environmental Protection Agency. 2008. *Cruise Ship Discharge Assessment Report*, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), p. 6-6 – 6-7 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>49</sup> National Research Council. 1995. *Clean Ships, Clean Ports, Clean Oceans: Controlling Garbage and Plastic Wastes at Sea*. Washington, DC: National Academy Press.

<sup>50</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-5 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009). See also Schmidt, Kira. March 2000. *Cruising for Trouble: Stemming the Tide of Cruise Ship Pollution*, Bluewater Network, p. 8 <[www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf](http://www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf)> (last accessed Nov. 16, 2009).

<sup>51</sup> See 33 C.F.R. §151.10. A Technical Advisory was issued September 16, 2008 by the U.S. Coast Guard's Assistant Commandant for Marine Safety, Security and Stewardship. It informs ship operators that Oil Content Monitors on Oily Water Separators are vulnerable to being tricked such that certain functionalities can be disabled. This means a ship may discharge oily water that exceeds that permitted by regulation and/or law. See <[www.hklaw.com/content/maritime/mardocs/Technical\\_Advisory\\_080916.pdf](http://www.hklaw.com/content/maritime/mardocs/Technical_Advisory_080916.pdf)> (last accessed Nov. 12, 2009).

<sup>52</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-14 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>53</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-5-6 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>54</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-14 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009). The requirement is contained in Coast Guard regulations (33 C.F.R. §151.25).

<sup>55</sup> An example of current technology that demonstrates the achievability of 5 ppm is a system manufactured by North Carolina-based EnSolve Biosystems. The company's PetroLinator oily water separator "is a green technology that consistently achieves effluent levels of less than 5 parts per million (PPM)." See "EnSolve Biosystems Launches Operating Cost Guarantee Program For Bilge Water Treatment Program," EnSolve Biosystems Inc. News, Volume 1, Issue 1, October 2008, <[www.ensolve.com/userfiles/file/News/EnSolve%20News-letter%2010-08.pdf](http://www.ensolve.com/userfiles/file/News/EnSolve%20News-letter%2010-08.pdf)> (last accessed Nov. 12, 2009).

<sup>56</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-6 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>57</sup> Copeland, Claudia. 2008. *Cruise Ship Pollution: Background, Laws and Regulations, and Key Issues*. Washington, DC: Congressional Research Service (Report #RL32450), November 17, p. CRS-6 <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed Nov. 12, 2009).

<sup>58</sup> Bluewater Network merged with Friends of the Earth in April 2005. See <[www.foe.org/bluewater-network](http://www.foe.org/bluewater-network)> (last accessed Nov. 12, 2009).

<sup>59</sup> "Cruise Lines Sued for Spreading Harmful Exotics: Lawsuit Aims to Halt Illegal Dumping of Ballast Water by Fun Ships in California Ports." 2002. Joint press release from Bluewater Network, Environmental Law Foundation, San Diego Baykeeper, and Surfrider Founda-



tion, April 24. <[www.envirolaw.org/cases/cruisepr.html](http://www.envirolaw.org/cases/cruisepr.html)> (last accessed Nov. 12, 2009).

<sup>60</sup> See <[www.leginfo.ca.gov/pub/05-06/bill/sen/sb\\_0451-0500/sb\\_497\\_bill\\_20060918\\_chaptered.html](http://www.leginfo.ca.gov/pub/05-06/bill/sen/sb_0451-0500/sb_497_bill_20060918_chaptered.html)> (last accessed Nov. 12, 2009) for a copy of the bill. See also Cuff, Dennis. 2006. "State seeking to restrict invasive ocean species," MercuryNews.com, September 8 <<http://www.sfei.org/inthenews/mercurynews%209-8-06.pdf>> (last accessed November 16, 2009).

<sup>61</sup> California Cruise Ship Environmental Task Force. 2003. Report to the Legislature: Regulation of Large Passenger Vessels in California, August, p. 54 <[www.swrcb.ca.gov/publications\\_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf](http://www.swrcb.ca.gov/publications_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf)> (last accessed Nov. 12, 2009).

<sup>62</sup> California Cruise Ship Environmental Task Force. 2003. Report to the Legislature: Regulation of Large Passenger Vessels in California, August, p. 56 <[www.swrcb.ca.gov/publications\\_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf](http://www.swrcb.ca.gov/publications_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf)> (last accessed Nov. 12, 2009).

<sup>63</sup> Bluewater Network's EPA petition on cruise ship incineration, April 2000.

<sup>64</sup> See MARPOL Annex VI, Prevention of Air Pollution from Ships, <[www.imo.org/Environment/mainframe.asp?topic\\_id=233](http://www.imo.org/Environment/mainframe.asp?topic_id=233)> (last accessed Nov. 12, 2009).

<sup>65</sup> California Cruise Ship Environmental Task Force. 2003. Report to the Legislature: Regulation of Large Passenger Vessels in California, August, p. 66 <[www.swrcb.ca.gov/publications\\_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf](http://www.swrcb.ca.gov/publications_forms/publications/legislative/docs/2003/cruiseshiplegrpt.pdf)> (last accessed Nov. 12, 2009).

<sup>66</sup> For more information, see Bunker Fuels, Liquid Minerals Group, <[www.liquidminerals.com/fuels.htm](http://www.liquidminerals.com/fuels.htm)> (last accessed Nov. 12, 2009).

<sup>67</sup> James J. Corbett, James J. Winebrake, Erin H. Green, Prasad Kasibhatla, Veronika Eyring, and Axel Lauer, Nov. 5, 2007 "Mortality from Ship Emissions: A Global Assessment," p. 8512, 8514 <[pubs.acs.org/cgi-bin/sample.cgi/esthag/asap/pdf/es071686z.pdf](http://pubs.acs.org/cgi-bin/sample.cgi/esthag/asap/pdf/es071686z.pdf)> (last accessed Nov. 12, 2009).

<sup>68</sup> United States Environmental Protection Agency, "Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder" <<http://www.epa.gov/EPA-AIR/2007/December/Day-07/a23556.htm>> (last accessed Nov. 12, 2009). Category 3 marine engines refer to compression-ignition marine engines with per cylinder displacement at or above 30 liters per cylinder.

<sup>69</sup> See Needless Cruise Pollution: Passengers Want Sewage Dumping Stopped, Washington, DC: Oceana, 2003, p. 1 <[na.oceana.org/sites/default/files/reports/polling\\_report1.pdf](http://na.oceana.org/sites/default/files/reports/polling_report1.pdf)> (last accessed Nov. 12, 2009).

<sup>70</sup> Waymer, Kim. 2007. "Ships' Soot Deadly, Study Shows." Florida Today, Nov. 17, <[pqasb.pqarchiver.com/floridatoday/access/1719620611.html?FMT=ABS&date=Nov+17,+2007](http://pqasb.pqarchiver.com/floridatoday/access/1719620611.html?FMT=ABS&date=Nov+17,+2007)> (accessed Nov. 12, 2009).

<sup>71</sup> New international standards will require a reduction of ship fuel sulfur content to 3.5 percent in 2012 followed by a reduction to 0.5 percent in 2020 subject to a feasibility review. Available at <[www.imo.org/Conventions/contents.asp?doc\\_id=678&topic\\_id=258#2008annexvi](http://www.imo.org/Conventions/contents.asp?doc_id=678&topic_id=258#2008annexvi)> (last accessed Nov. 12, 2009).

<sup>72</sup> See Ross A. Klein. 2003. Charting A Course: The Cruise Industry, The Government of Canada, and Purposeful Development, Halifax: Canadian Centre for Policy Alternatives, p. 25, 44 <[www.policyalternatives.ca/documents/Nova\\_Scotia\\_Pubs/charting\\_a\\_course.pdf](http://www.policyalternatives.ca/documents/Nova_Scotia_Pubs/charting_a_course.pdf)> (last accessed Nov. 16, 2009).

<sup>73</sup> Another initiative, which appeared at first blush to have potential, was introduced in June 2007 by Holland America Line. It announced a pilot project that used a saltwater air emission scrubber on its Zaandam. The scrubber was supposed to reduce emissions, chiefly sulfur. But at the end of the summer cruise season in the Pacific Northwest it was learned the scrubber system, which uses seawater pumped through the stacks to chemically scrub sulfur and other contaminants from ship emissions and then dumps the water back overboard, was contributing to increased greenhouse gases. Research out of Sweden and the U.K. indicated "... that when sulfuric acid is added to seawater by scrubbers, carbon dioxide is freed from the ocean surface. Each molecule of sulfuric acid results in release of two molecules of carbon dioxide as the ocean attempts to retain its alkaline balance" (Montgomery, Christina. 2007. "Cruise-ship Pollution Initiative Actually Contributes to Problem." The Province October 7, Available at <[www.canada.com/theprovince/news/story.html?id=438279ef-ec5e-42b0-a582-3ccea54df75](http://www.canada.com/theprovince/news/story.html?id=438279ef-ec5e-42b0-a582-3ccea54df75)> (last accessed Nov. 9, 2009).

<sup>74</sup> U.S. EPA's proposal for a North American ECA can be found at <[www.epa.gov/otaq/oceanvessels.htm#emissioncontrol](http://www.epa.gov/otaq/oceanvessels.htm#emissioncontrol)> (accessed Nov. 12, 2009).



- <sup>75</sup> U.S. Environmental Protection Agency. 2009. Regulatory Announcement: Proposal of Emission Control Area Designation for Geographic Control of Emissions from Ships, March, [www.epa.gov/otaq/regs/nonroad/marine/ci/420f09015.htm](http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f09015.htm) (last accessed Nov. 12, 2009).
- <sup>76</sup> Port of San Diego. 2009. "Port to Begin Voluntary Speed Reduction Program for Cruise and Cargo Ships," Port of San Diego, February 3, 2009, <[www.portofsandiego.org/environment/1459-port-to-begin-voluntary-vessel-speed-reduction-program-for-cruise-and-cargo-ships.html](http://www.portofsandiego.org/environment/1459-port-to-begin-voluntary-vessel-speed-reduction-program-for-cruise-and-cargo-ships.html)> (last accessed Nov. 12, 2009).
- <sup>77</sup> See California Environmental Protection Agency, Air Resources Board, "Vessel Speed Reduction for Ocean-Going Vessels," <[www.arb.ca.gov/ports/marinevess/vsr/vsr.htm](http://www.arb.ca.gov/ports/marinevess/vsr/vsr.htm)> (last accessed Nov. 12, 2009).
- <sup>78</sup> Port of Los Angeles. 2005. "Vessel Speed Reduction Program Eliminate 100 Tons of Emissions from Air in Three Months, Pollution Online, August 19, <[www.pollutiononline.com/article.mvc/Vessel-Speed-Reduction-Program-Eliminates-100-0001?VNETCOOKIE=NO](http://www.pollutiononline.com/article.mvc/Vessel-Speed-Reduction-Program-Eliminates-100-0001?VNETCOOKIE=NO)> (last accessed Nov. 12, 2009).
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- <sup>84</sup> See United States General Accounting Office. 2000. *Marine Pollution: Progress Made to Reduce Marine Pollution by Cruise Ships, but Important Issues Remain*, Washington, DC: GAO (Doc #GAO/RCED-00-48), p. 9 <<http://www.gao.gov/new.items/rc00048.pdf>> (last accessed Nov. 12, 2009).
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- <sup>86</sup> The obvious question is why a cruise ship would adopt such a practice. A key incentive was the monetary savings associated with not using the oily water separator. The membranes for the separator could cost as much as \$80,000 per year. In addition, it could cost another \$300,000 per year to dispose ashore the waste oil derived from the separator. Not only did the company save money, but a ship's officers could receive larger end of the year bonuses for staying under budget. See Frantz, Douglas. 1999. "Gaps in Sea Laws Shield Pollution by Cruise Lines." *New York Times* January 3, <[www.nytimes.com/library/national/010399cruise-industry.html](http://www.nytimes.com/library/national/010399cruise-industry.html)> (last accessed Nov. 12, 2009).
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<sup>99</sup> See [www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html) (last accessed Nov. 15, 2009).

<sup>100</sup> See [www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html) (last accessed Nov. 15, 2009).

<sup>101</sup> See [www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html) (last accessed Nov. 15, 2009).

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<sup>104</sup> See [www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html) (last accessed Nov. 15, 2009).

<sup>105</sup> See [www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html) (last accessed Nov. 15, 2009).

<sup>106</sup> See statement of Guy A. Lewis, U.S. Attorney for the Southern District of Florida, et al, April 19, 2002. <[www.oig.dot.gov/StreamFile?file=/data/pdfdocs/carnival.pdf](http://www.oig.dot.gov/StreamFile?file=/data/pdfdocs/carnival.pdf)> (last accessed Nov. 15, 2009).

<sup>107</sup> See Carnival Corporation 10Q filed with the U.S. Securities and Exchange Commission, April 8, 2004, p. 7 <[ccbn.10kwizard.com/cgi/image?ipage=2721742&doc=19&cik=815097&odef=8&rid=12&quest=1&xbrl=0&dn=2](http://ccbn.10kwizard.com/cgi/image?ipage=2721742&doc=19&cik=815097&odef=8&rid=12&quest=1&xbrl=0&dn=2)> (last accessed Nov. 15, 2009).

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<sup>109</sup> See <[www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html)> (last accessed Nov. 15, 2009).

<sup>110</sup> See <[www.cruisejunkie.com/enviro-CCL.html](http://www.cruisejunkie.com/enviro-CCL.html)> (last accessed Nov. 15, 2009).

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<sup>112</sup> See "P & O Cruise Line Pacific Star Dumps 500,000 Litres Of Oil On Vanuatu" CruiseBruise.com, Nov. 11, 2006 <[www.cruisebruise.com/P\\_O\\_Oil\\_Dump\\_Nov\\_11\\_2006.html](http://www.cruisebruise.com/P_O_Oil_Dump_Nov_11_2006.html)> (last accessed Nov. 15, 2009). See also <[www.sunshinecoastdaily.com.au/localnews/storydisplay.cfm?storyid=3709346&thesecion=localnews&thesubsection=&thesecondssubsection=>](http://www.sunshinecoastdaily.com.au/localnews/storydisplay.cfm?storyid=3709346&thesecion=localnews&thesubsection=&thesecondssubsection=>)> (last accessed Nov. 13, 2006).

<sup>113</sup> The source of this information is Alaska Dept. of Environmental Quality Notices of Violations, copies of which are on file with the author.

<sup>114</sup> Golden, Kate. 2009. "State Cites Smoky Cruise Ships for Air Quality Violations," Juneau Empire, February 15, <[www.juneauempire.com/stories/021509/loc\\_388168253.shtml](http://www.juneauempire.com/stories/021509/loc_388168253.shtml)> (last accessed Nov. 15, 2009).



<sup>115</sup> The source of this information is Alaska Dept. of Environmental Quality Notices of Violations, copies of which are on file with the author.

<sup>116</sup> See [www.cruisejunkie.com/enviro-Star.html](http://www.cruisejunkie.com/enviro-Star.html) (last accessed Nov. 15, 2009).

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<sup>118</sup> Doscher, Wendy. 2000. "Rough Seas for Cruise Line," *Miami Daily Business Review*, July 18, <[search.dailybusinessreview.com/sp?aff=1100&keywords=rough+seas+for+cruise+lines&submit=Go](http://search.dailybusinessreview.com/sp?aff=1100&keywords=rough+seas+for+cruise+lines&submit=Go)> (last accessed July 18, 2000).

<sup>119</sup> Adams, Marilyn. 2002. "US Keeps Wary Eye on Cruise Ships for More Pollution," *USA Today*, Nov. 8, <[www.usatoday.com/travel/news/2004-05-05-norway-pollution\\_x.htm?loc=interstitialskip](http://www.usatoday.com/travel/news/2004-05-05-norway-pollution_x.htm?loc=interstitialskip)> (last accessed Nov. 15, 2009).

<sup>120</sup> Department of Justice Press Release, "Norwegian Cruise Line Admits to Environmental Crime," July 31, 2002. <[www.usdoj.gov/opa/pr/2002/July/02\\_enrd\\_441.htm](http://www.usdoj.gov/opa/pr/2002/July/02_enrd_441.htm)> (last accessed Nov. 15, 2009).

<sup>121</sup> Department of Justice Press Release, "Norwegian Cruise Line Admits to Environmental Crime," July 31, 2002. <[www.usdoj.gov/opa/pr/2002/July/02\\_enrd\\_441.htm](http://www.usdoj.gov/opa/pr/2002/July/02_enrd_441.htm)> (last accessed Nov. 15, 2009).

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<sup>124</sup> Kubota, Gary T. 2003. "Maui-bound cruise ship investigated for dumping," *Honolulu Star-Bulletin*, March 8, <[starbulletin.com/2003/03/08/news/story6.html](http://starbulletin.com/2003/03/08/news/story6.html)> (last accessed Nov. 15, 2009).

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<sup>127</sup> See [www.cruisejunkie.com/enviro-Star.html](http://www.cruisejunkie.com/enviro-Star.html) (last accessed Nov. 15, 2009).

<sup>128</sup> See [www.cruisejunkie.com/enviro-Star.html](http://www.cruisejunkie.com/enviro-Star.html) (last accessed Nov. 15, 2009).

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<sup>131</sup> The source of this information is Alaska Dept. of Environmental Quality Notices of Violations, copies of which are on file with the author.

<sup>132</sup> "Tom Greene, director of safety, environment and training for Crystal Cruises, which plan[ned] to dispatch its 790-foot Crystal Harmony to Monterey on Oct. 9, said [in a letter to interested parties that] company officials had promised to withhold all liquid and solid waste water while in Monterey Bay. Even though a company policy forbids such dumping, Mr. Greene said the company wanted to reassure local officials in writing that it would abide by their demands." Madigan, Nick. 2002. "After Promise of Purity, a Cruise Ship Calls on Monterey," *New York Times*, September 19, <[www.nytimes.com/2002/09/19/national/19CRUI.html](http://www.nytimes.com/2002/09/19/national/19CRUI.html)> (last accessed Nov. 15, 2009).

<sup>133</sup> Madigan, Nick. 2003. "Monterey Bans a Cruise Ship Over Dumping," *New York Times*, March 6, <[www.nytimes.com/2003/03/06/](http://www.nytimes.com/2003/03/06/)



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<sup>134</sup> Letter from Dan Presser, owner of Fourwinds Travel to Gregg Michel, president of Crystal Cruises dated March 12, 2003.

<sup>135</sup> Laidman Dan. 2003. "Cruise Line Says Rookie Mistake Led to Ship's Waste Dumping," Monterey Herald, March 6, summarized at <[www.serconline.org/cruiseShipPollution.html](http://www.serconline.org/cruiseShipPollution.html)> (last accessed Nov. 15, 2009).

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<sup>141</sup> Form letter dated September 24, 2003, addressed to "Dear Friend," from Richard D. Fain, Chairman & Chief Executive Officer, Royal Caribbean Cruises Ltd. Klein, Ross A. 2007. "The Politics of Environmental Activism: A Case Study of the Cruise Industry and the Environmental Movement." Sociological Research Online 12, 2 (March) <[www.socresonline.org.uk/12/2/klein.html](http://www.socresonline.org.uk/12/2/klein.html)> (last accessed Nov. 15, 2009).

<sup>142</sup> This has been reported in private correspondence dated June 18, 2007 between an environmental officer and this author. The officer states: "We used to boast that we were the cruise line that never discharged anything less than 12 nm from shore. After probation, we lessened our own policies and now we can discharge black water and gray water at 4 nm." S/he also states the rank of environmental officer has been decreased and that with turnover of more than 50 percent (maybe as high as 75 percent), "the company has started (and still is) to take officers with no training, education, or background."

<sup>143</sup> See full discussion of Royal Caribbean's environmental violations above.

<sup>144</sup> Press Release, "Statement of the International Council of Cruise Lines (ICCL) Regarding Recent Environmental Settlement," July 27, 1999 <[www.iccl.org/pressroom/press13.htm](http://www.iccl.org/pressroom/press13.htm)> (last accessed May 17, 2003).

<sup>145</sup> See Conlin, Jennifer. 2009. "Cruise Lines Urged to Shrink Their Footprints," New York Times, February 15, <<http://travel.nytimes.com/2009/02/15/travel/15green.html>> (last accessed Nov. 15, 2009).

<sup>146</sup> See full discussion of Alaska cruise line environmental violations in this chapter and Chapter II.

<sup>147</sup> MARPOL 73/78. 1997. Consolidated Edition: Articles, Protocols, Annexes, Unified Interpretations of the International Convention for the Prevention of Pollution from Ships, 1973, as Modified by the Protocol of 1978 Relating Thereto (2<sup>nd</sup> ed.), London: International Maritime Organization.

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<sup>149</sup> Schmidt, Kira. Cruising for Trouble: Stemming the Tide of Cruise Ship Pollution, Bluewater Network, March 2000, <[www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf](http://www.cep.unep.org/publications-and-resources/databases/document-database/other/rep-ss-cruise-trouble-1.pdf)> (last accessed Nov. 15, 2009).



- <sup>150</sup> See U.S. EPA's No-Discharge Zones for Vessel Sewage web page at <[www.epa.gov/owow/oceans/regulatory/vessel\\_sewage/vsdno-zone.html](http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/vsdno-zone.html)> (last accessed Nov. 15, 2009).
- <sup>151</sup> See Canadian Marine Advisory Council. 2008. Canada Shipping Act 2001, Regulatory Reform Project, Public Consultation, Discussion Paper, Ottawa: Transport Canada (RDIMS 4335301).
- <sup>152</sup> United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency, pages 6-13 – 6-14. (Report #EPA842-R-07-005) <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassessment.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassessment.pdf)> (last accessed Nov. 12, 2009).
- <sup>153</sup> <[cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf](http://cep.unep.org/publications-and-resources/databases/document-database/other/cruise-ship-pollution-background-laws-and-regulations-and-key-issues.pdf)> (last accessed November 16, 2009).
- <sup>154</sup> See "Knowles Steps Up Pressure On Congress For Action On Cruise Ship Discharges," Press Release #00252, Office of the Governor, October 6, 2000 <[www.gov.state.ak.us/press/00252.html](http://www.gov.state.ak.us/press/00252.html)>.
- <sup>155</sup> See Cruise Ship Discharge Assessment Report, Washington, DC: U.S. Environmental Protection Agency, December 29, 2008, page 2-9 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassessment.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassessment.pdf)> (last accessed Nov. 12, 2009). See also McAllister, Bill. 2000. "A Big Violation on Wastewater: Some Ship Readings 100,000 Times Allowed Amount," The Juneau Empire, August 27 <[www.juneauempire.com/stories/082700/Loc\\_wastewater.html](http://www.juneauempire.com/stories/082700/Loc_wastewater.html)> (last accessed Nov. 12, 2009).
- <sup>156</sup> Golden, Kate. 2009. "State Cites Smoky Cruise Ships for Air Quality Violations," Juneau Empire, February 15, <[www.juneauempire.com/stories/021509/loc\\_388168253.shtml](http://www.juneauempire.com/stories/021509/loc_388168253.shtml)> (last accessed Nov. 15, 2009). See also <[www.dec.state.ak.us/water/cruise\\_ships/pdfs/2-09-09-2008\\_Air\\_Program\\_Summary\\_Final.pdf](http://www.dec.state.ak.us/water/cruise_ships/pdfs/2-09-09-2008_Air_Program_Summary_Final.pdf)> (last accessed Nov. 15, 2009).
- <sup>157</sup> See McAllister, Bill. 2001. "Cruise Initiative Brought About Federal, State Laws," Juneau Empire, Nov. 18, <[www.juneauempire.com/stories/111801/Loc\\_cruiselaws.shtml](http://www.juneauempire.com/stories/111801/Loc_cruiselaws.shtml)> (last accessed Nov. 15, 2009).
- <sup>158</sup> The regulations required that the geometric mean of the samples from discharge during any 30-day period does not exceed 20 fecal coliform/100 ml and not more than 10 percent of the samples exceed 40 fecal coliform/100ml. These are contained in H.R. 5666, Making Miscellaneous Appropriations For The Fiscal Year Ending September 30, 2001, and For Other Purposes, Section 1404 (C.3) <<http://thomas.loc.gov/cgi-bin/query/z?c106:H.R.5666>> (last accessed Nov. 15, 2009).
- <sup>159</sup> The standards are equivalent to those included in federal legislation in December 2000. See Certain Alaskan Cruise Ship Operations, Division B, Title XIV of the Miscellaneous Appropriations Bill, HR 5666, in the Consolidated Appropriations Act, 2001 (P.L. 106-554); 33 U.S.C. 1901 Note.
- <sup>160</sup> Bluewater Network Fact Sheet, March 2004.
- <sup>161</sup> See <[www.dec.state.ak.us/water/cruise\\_ships/pdfs/Largeship\\_Wastewater\\_Table\\_2009\\_rev2.pdf](http://www.dec.state.ak.us/water/cruise_ships/pdfs/Largeship_Wastewater_Table_2009_rev2.pdf)> (last accessed Nov. 16, 2009) and <[www.dec.state.ak.us/water/cruise\\_ships/pdfs/Small\\_ship\\_Wastewater\\_table\\_2009\\_rev0.pdf](http://www.dec.state.ak.us/water/cruise_ships/pdfs/Small_ship_Wastewater_table_2009_rev0.pdf)> (last accessed Nov. 16, 2009) for a list of large and small ships permitted to discharge in Alaska state waters.
- <sup>162</sup> Section 43.52.040 of the Alaska Cruise Ship Ballot Initiative stipulates that all proceeds be deposited in a special "Commercial Vessel Passenger Tax Account" in the general fund. These funds may be used for state-owned port and harbor facilities and other services to properly provide for vessel or water craft visits and to enhance the safety and efficiency of interstate and foreign commerce. In addition, funds are distributed to ports of call. See "Ballot Measure 2 - Initiative Petition: Cruise Ship Taxation, Regulation and Disclosure," 2006, p. 2 <[http://www.elections.alaska.gov/forms/06pri\\_ballot\\_two.pdf](http://www.elections.alaska.gov/forms/06pri_ballot_two.pdf)> (last accessed Nov. 16, 2009).
- <sup>163</sup> Crowley Marine Services. 2008. Ocean Ranger Access Status Report, June 23, p. 3-4 <[www.earthisland.org/csaw/AK\\_Cruise\\_web\\_docs/Ocean\\_Ranger\\_Program\\_Status\\_Report\\_6.08.pdf](http://www.earthisland.org/csaw/AK_Cruise_web_docs/Ocean_Ranger_Program_Status_Report_6.08.pdf)> (last accessed Nov. 16, 2009).
- <sup>164</sup> Crowley Marine Services. 2008. Ocean Ranger Access Status Report, June 23, p. 5 <[www.earthisland.org/csaw/AK\\_Cruise\\_web\\_docs/Ocean\\_Ranger\\_Program\\_Status\\_Report\\_6.08.pdf](http://www.earthisland.org/csaw/AK_Cruise_web_docs/Ocean_Ranger_Program_Status_Report_6.08.pdf)> (last accessed Nov. 16, 2009). See also Carnival Corporation & PLC Homepage at <<http://carnivalcorporation.com/>> (last accessed Nov. 16, 2009).
- <sup>165</sup> Golden, Kate. 2008. "Some Cruise Ships Restrict Ranger Access," Juneau Empire, July 2. <[www.juneauempire.com/stories/070208/loc\\_298852592.shtml](http://www.juneauempire.com/stories/070208/loc_298852592.shtml)> (last accessed Nov. 16, 2009). See also Crowley Marine Services. 2008. Ocean Ranger Access Status Report,



June 23, p. 4 <[www.earthisland.org/csaw/AK\\_Cruise\\_web\\_docs/Ocean\\_Ranger\\_Program\\_Status\\_Report\\_6.08.pdf](http://www.earthisland.org/csaw/AK_Cruise_web_docs/Ocean_Ranger_Program_Status_Report_6.08.pdf)> (last accessed Nov. 16, 2009).

<sup>166</sup> See Crowley Marine Services. 2008. Ocean Ranger Access Status Report, August 15, p. 2 <[www.dec.state.ak.us/water/cruise\\_ships/docs/Access\\_Survey\\_Report.pdf](http://www.dec.state.ak.us/water/cruise_ships/docs/Access_Survey_Report.pdf)> (last accessed Nov. 16, 2009). See also Bauman, Margaret. 2008. "DEC: Cruise Ships Offer Rangers Better Access," Alaska Journal of Commerce, August 24. <[www.alaskajournal.com/stories/082408/hom\\_20080824005.shtml](http://www.alaskajournal.com/stories/082408/hom_20080824005.shtml)> (last accessed Nov. 16, 2009).

<sup>167</sup> Weiss, Ken. 2003. "Cruise Line Pollution Prompts Legislation," Los Angeles Times, August 18, <[www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm](http://www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm)> (last accessed Nov. 16, 2009). Also see: Report to the Legislature: Regulation of Large Passenger Vessels in California, Cruise Environmental Task Force, August 2003, p. 90 <[montereybay.noaa.gov/resourcepro/resmanissues/pdf/CA\\_cruise%20ship\\_rept.pdf](http://montereybay.noaa.gov/resourcepro/resmanissues/pdf/CA_cruise%20ship_rept.pdf)> (last accessed Nov. 16, 2009).

<sup>168</sup> See Bluewater Network. "Cruise Ship Dumping and Trash Burning Banned Along California Coast." Press Release, September 23, 2004, <[www.kahea.org/cruiseships/pdf/20040924\\_california\\_cs\\_bill.pdf](http://www.kahea.org/cruiseships/pdf/20040924_california_cs_bill.pdf)> (last accessed Nov. 16, 2009). Also see Associated Press. 2004. "California Gets Tougher on Cruise Ship Pollution," Seattle Times, September 29 <[community.seattletimes.nwsourc.com/archive/?date=20040929&slug=cruise&slug=pollution](http://community.seattletimes.nwsourc.com/archive/?date=20040929&slug=cruise&slug=pollution)> (last accessed Nov. 16, 2009).

<sup>169</sup> According to Seatrade Insider (August 27, 2004, "Industry Sees Irony in California Sewage Bill"), the industry saw AB 2672 as problematic given its prohibition of discharges in state waters from AWTSSs and pointed its concerns out to the governor. Michael Crye, ICCL president, said the new law ignores the new technology the industry uses to treat sewage. Those wastewater purification systems "discharge water that is close to drinking-water quality." See Associated Press. 2004. "California Gets Tougher on Cruise Ship Pollution," Seattle Times, September 29 <[community.seattletimes.nwsourc.com/archive/?date=20040929&slug=cruise&slug=pollution](http://community.seattletimes.nwsourc.com/archive/?date=20040929&slug=cruise&slug=pollution)> (last accessed Nov. 16, 2009). It must be noted that "close" is not the same as drinking water quality.

<sup>170</sup> See "SB771 California Clean Coast Act Of 2005: Vessel Discharges" <[www.waterboards.ca.gov/water\\_issues/programs/npdes/sb771.shtml](http://www.waterboards.ca.gov/water_issues/programs/npdes/sb771.shtml)> (last accessed Nov. 16, 2009).

<sup>171</sup> See full text of Senate Bill No. 497 at <[www.boe.ca.gov/sptaxprog/pdf/sb497.pdf](http://www.boe.ca.gov/sptaxprog/pdf/sb497.pdf)> (last accessed Nov. 16, 2009). See also "California Enacts Law to Protect Coastline from Ship Discharges," National Sea Grant Law Center, October 2006. <[www.olemiss.edu/orgs/SGLC/National/CA%20Coastal%20Ecosystems.pdf](http://www.olemiss.edu/orgs/SGLC/National/CA%20Coastal%20Ecosystems.pdf)> (last accessed Nov. 16, 2009).

<sup>172</sup> See U.S. Environmental Protection Agency. 2006. Maine's First "No Discharge" Designation Made for Casco Bay, News Release from Region 1, July 20 <[yosemite.epa.gov/opa/admpress.nsf/1367c4195702d16a85257018004c771c/8160566c21021ba2852571b1007856ca!OpenDocument](http://yosemite.epa.gov/opa/admpress.nsf/1367c4195702d16a85257018004c771c/8160566c21021ba2852571b1007856ca!OpenDocument)> (last accessed Nov. 16, 2009).

<sup>173</sup> As already noted, state waters of Michigan, New Hampshire, and Rhode Island have also been declared No Discharge Zones by the EPA.

<sup>174</sup> For a discussion of the shortcomings of an MOU versus legislation see Klein, Ross A. 2003. The Cruise Industry and Environmental Practice: Is a Memorandum of Understanding Effective for Protecting the Environment, San Francisco: Bluewater Network, <[www.dieselduck.net/library/05%20environmental/2003%20Cruise%20industry%20track%20record%20on%20environmental%20issues.pdf](http://www.dieselduck.net/library/05%20environmental/2003%20Cruise%20industry%20track%20record%20on%20environmental%20issues.pdf)> (accessed Nov. 16, 2009).

<sup>175</sup> The International Council of Cruise Lines (ICCL) merged with the Cruise Lines International Association (CLIA) in 2006. ICCL was created in 1990, dedicated to participating in the regulatory and policy development process of the cruise industry. Prior to its 2006 merger with ICCL, CLIA was the principal external marketing organization for its member lines. CLIA today represents 25 cruise lines with 97 percent of the cruise capacity marketed in North America. See "About Clia," <[www.cruising.org/about.cfm](http://www.cruising.org/about.cfm)> (last accessed Nov. 16, 2009).

<sup>176</sup> The revised "Cruise Industry Waste Management Practices and Procedures" as of November 27, 2006 may be accessed at: <[cruising.org/industry/PDF/CLIAWasteManagement.pdf](http://cruising.org/industry/PDF/CLIAWasteManagement.pdf)> (last access Nov. 16, 2009).

<sup>177</sup> United States Environmental Protection Agency. 2008. Cruise Ship Discharge Assessment Report, Washington, DC: Environmental Protection Agency (Report #EPA842-R-07-005), page 1-8 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).



<sup>178</sup> See <[www.cruisejunkie.com/Hawaii\\_mou.html](http://www.cruisejunkie.com/Hawaii_mou.html)> (last accessed Nov. 16, 2009) for a summary, or see Yamanouchi, Kelly. 2003. "Cruise Lines Admit Pollution Violations," Honolulu Advertiser, December 12, <[the.honoluluadvertiser.com/article/2003/Dec/12/bz/bz02a.html](http://the.honoluluadvertiser.com/article/2003/Dec/12/bz/bz02a.html)> (last accessed Nov. 16, 2009).

<sup>179</sup> In her July 13, 2005, letter to the State Senate, Governor Lingle said she refused to sign the law, it did not regulate treated wastewater – the primary source of water pollution from passenger vessels, and it was less comprehensive than the existing MOU.

<sup>180</sup> Letter from Northwest Cruise Ship Association to Governor Linda Lingle dated September 12, 2005 <[www.cruiseresearch.org/NWCA-HI%20MOU.pdf](http://www.cruiseresearch.org/NWCA-HI%20MOU.pdf)> (last accessed Nov. 16, 2009).

<sup>181</sup> See Klein, Ross A. 2008. *Paradise Lost at Sea: Rethinking Cruise Vacations*, Halifax: Fernwood.

<sup>182</sup> See <[www.cruisejunkie.com/Wash\\_mou.html](http://www.cruisejunkie.com/Wash_mou.html)> (last accessed Nov. 16, 2009). See also Washington State Department of Ecology. 2005. "2004 Assessment of Cruise Ship Environmental Effects in Washington," January 24, p. 11, 13 <[www.ecy.wa.gov/pubs/0510026.pdf](http://www.ecy.wa.gov/pubs/0510026.pdf)> (last accessed Nov. 16, 2009)

<sup>183</sup> McClure, Robert. 2006. "Celebrity Cruises Asks for Leniency in Fine," Seattle Post-Intelligencer, December 20 <[seattlepi.nwsource.com/local/296572\\_cruise20.html](http://seattlepi.nwsource.com/local/296572_cruise20.html)> (last accessed Nov. 16, 2009). See also American Bar Association. Feb. 2007. "Environmental Enforcement and Crimes Newsletter," Vol. 8, No. 2, p. 26 <[www.abanet.org/environ/committees/enviocrimes/newsletter/feb07/EECCFeb07.pdf](http://www.abanet.org/environ/committees/enviocrimes/newsletter/feb07/EECCFeb07.pdf)> (last accessed Nov. 16, 2009).

<sup>184</sup> McClure, Robert. 2006. "Celebrity Cruises Asks for Leniency in Fine," Seattle Post-Intelligencer, December 20 <[seattlepi.nwsource.com/local/296572\\_cruise20.html](http://seattlepi.nwsource.com/local/296572_cruise20.html)> (last accessed Nov. 16, 2009).

<sup>185</sup> Robert McClure, Robert. 2007. "Cruise Line's Dumping Fine Inflated—But It Pays It Anyway," Seattle Post-Intelligencer, January 24 <[http://www.seattlepi.com/local/300871\\_cruise24.html](http://www.seattlepi.com/local/300871_cruise24.html)> (last accessed Nov. 16, 2009).

<sup>186</sup> MARPOL Annex 1, reg. 20(1) and 33 CFR §151.25(a) requires ships to have an Oil Record Book. For text of 33 CFR §151.25(a) as of July 1, 2008, see <[edocket.access.gpo.gov/cfr\\_2008/julqtr/pdf/33cfr151.25.pdf](http://edocket.access.gpo.gov/cfr_2008/julqtr/pdf/33cfr151.25.pdf)> (last accessed Nov. 16, 2009). Entries must be made whenever any of the following activities takes place: ballasting or cleaning of oil fuel tanks; discharge of dirty ballast or cleaning water from oil fuel tanks; disposal of oil residues (sludge); or discharge overboard or disposal otherwise of machinery space bilge water (MARPOL, Annex 1, reg. 20(2)(a)). Ships must also maintain a Garbage Record Book in accordance with the requirements of Appendix to Annex V, Reg. 9(3). Each discharge operation, or completed incineration, must be recorded and signed for on the date of discharge or incineration by the officer in charge. Each entry must include the date and time, position of the ship, description of the garbage, and estimated amount incinerated or discharged (Reg. 9(3)(b)). Similar logs are required by MARPOL and signatories to MARPOL Annex IV. The U.S. requires a Sewage Record Book for cruise ships traversing Alaska (see 33 CFR 149.315).

<sup>187</sup> Weiss, Ken. 2003. "Cruise Line Pollution Prompts Legislation," Los Angeles Times, August 18, <[www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm](http://www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm)> (last accessed Nov. 16, 2009)

<sup>188</sup> Organization for Economic Co-operation and Development. 2003. *Voluntary Approaches to Environmental Policy: Effectiveness, Efficiency, and Usage in Policy Mixes*, Paris: OECD, p. 11-15 <[www.foundationpartnership.org/pdf/oecd.PDF](http://www.foundationpartnership.org/pdf/oecd.PDF)> (last accessed Nov. 16, 2009).

<sup>189</sup> Bravender, Robin. 2009. "EPA port regs failing to protect public health," Greenwire, March 25. <[www.eenews.net/public/Greenwire/2009/03/25/2](http://www.eenews.net/public/Greenwire/2009/03/25/2)> (last accessed Nov. 16, 2009).

<sup>190</sup> This was borne out during this author's lecture tours of Hawaii in 2003 and 2005, and led KAHEA – The Native Hawaiian Environmental Alliance's campaign to have swimmers, surfers, and others report incidents they observe.

<sup>191</sup> This was most notably the case with Holland America Line's Ryndam discharging 40,000 gallons of sewage sludge into Juneau Harbour in August 2002.

<sup>192</sup> Montgomery, Christina. 2007. "Setting Out to Sea in an Eco-Friendly Ship," The Province, May 31. <[www.canada.com/theprovince/news/money/story.html?id=304a40a5-4fd8-4996-a0ee-a1d3bfdaa571](http://www.canada.com/theprovince/news/money/story.html?id=304a40a5-4fd8-4996-a0ee-a1d3bfdaa571)> (last accessed Nov. 16, 2009).

<sup>193</sup> The EPA's Cruise Ship Discharge Assessment Report, December 2008, also recommends transponders be installed on MSDs. See page 2-44 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

The AWTs produced by Hydroxyl can be outfitted with a transponder that measures the effluent for critical constituents and record



where discharges take place. This was described to the author by Juergen Puetter, President of Hydroxyl, in an interview March 2003.

<sup>195</sup> National Marine Sanctuaries. 2008. Olympic Coast Marine Sanctuary: Condition Report 2008, Washington, DC: NOAA. p. 43 <[sanctuaries.noaa.gov/science/condition/pdfs/oc\\_conditionreport08.pdf](http://sanctuaries.noaa.gov/science/condition/pdfs/oc_conditionreport08.pdf)> (last accessed Nov. 16, 2009). The report indicates 28,000 gallons of sewage sludge is generated on each week-long voyage.

<sup>196</sup> The EPA's Cruise Ship Discharge Assessment Report, December 2008, makes the same recommendation. See page 3-32 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>197</sup> Herz, Michael, and Joseph Davis. May 2002. Cruise Control: A Report on How Cruise Ships Affect the Marine Environment. Washington, DC: The Ocean Conservancy, p. 11 <[www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm](http://www.mindfully.org/Water/2003/Cruise-Line-Pollution18aug03.htm)> (last accessed Nov. 16, 2009).

<sup>198</sup> This recommendation, and those that follow (23 – 26) are consistent with recommendations contained in the EPA's Cruise Ship Discharge Assessment Report, December 2008, which makes the same recommendation. See pages 5-14 – 5-16 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>199</sup> This recommendation, and those that follow (28 – 31) are consistent with recommendations contained in the EPA's Cruise Ship Discharge Assessment Report, December 2008, which makes the same recommendation. See pages 6-12 - 6-14 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>200</sup> This recommendation, and those that follow (33, 35 – 36) are consistent with recommendations contained in the EPA's Cruise Ship Discharge Assessment Report, December 2008, which makes the same recommendation. See pages 4-16 - 4-18 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009). The use of a "White Box" is discussed on page 4-10 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>201</sup> See EPA's Cruise Ship Discharge Assessment Report, December 2008, page 4-10 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).

<sup>202</sup> See Friends of the Earth's letter to Administrator Vice Admiral Conrad C. Lautenbacher of the National Oceanic and Atmospheric Administration, 2003. "RE: Petition to Promulgate Regulations to Prohibit Cruise Ship Discharges in Marine Sanctuaries," September 15, p. 8 <[www.foe.org/pdf/NOAA\\_NMS\\_Petition\\_2003.pdf](http://www.foe.org/pdf/NOAA_NMS_Petition_2003.pdf)> (last accessed Nov. 16, 2009).

<sup>203</sup> The issue of air emissions from ocean-going vessels is a topic of concern in two recent studies: Axel Friedrich, Falk Heinen, Fatumata Kamakate, and Drew Kodjak. 2007. Air Pollution and Greenhouse Gas: Emission from Ocean-going Ships, Washington, DC: International Council on Clean Transportation <[www.theicct.org/documents/MarineES\\_Final\\_Web.pdf](http://www.theicct.org/documents/MarineES_Final_Web.pdf)> (last accessed Nov. 16, 2009); Janea Scott and Hilary Sinnamon. 2008. "Floating Smokestacks: A Call for Action to Clean Up Marine Shipping Pollution," New York: Environmental Defense Fund <[www.edf.org/documents/8619\\_FloatingSmokestacks\\_report.pdf](http://www.edf.org/documents/8619_FloatingSmokestacks_report.pdf)> (last accessed Nov. 16, 2009).

<sup>204</sup> Roosevelt, Margot. 2008. "California Adopts Stiff Pollution Rules for Ships," Los Angeles Times, July 25, p. B1. <[findarticles.com/p/news-articles/xinhua-news-agency-ceis/mi\\_8007/is\\_20080725/california-adopts-stiff-anti-pollution/ai\\_n41871944/](http://findarticles.com/p/news-articles/xinhua-news-agency-ceis/mi_8007/is_20080725/california-adopts-stiff-anti-pollution/ai_n41871944/)> (last accessed Nov. 16, 2009).

<sup>205</sup> This recommendation is also made in EPA's Cruise Ship Discharge Assessment Report, December 2008, pages 4-17, 5-16 <[epa.gov/owow/oceans/cruise\\_ships/pdf/0812cruiseshipdischargeassess.pdf](http://epa.gov/owow/oceans/cruise_ships/pdf/0812cruiseshipdischargeassess.pdf)> (last accessed Nov. 12, 2009).



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