



State of Oregon
Department of
Environmental
Quality

Passenger Vessels Impact on Water Quality

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By:

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Executive Summary

RISK FOR ENVIRONMENTAL HARM IS LOW

House Bill 3123 was enacted by the Legislature in May 2009. The bill recognizes the authority of the state to protect water quality by controlling the discharge of gray water, hazardous material and to the extent allowed by 33 U.S.C. 1322(f), prohibiting the discharge of sewage from passenger vessels. The bill requires DEQ to study the impact of vessel discharges of sewage, gray water and hazardous materials on water quality and the reasonable availability of adequate facilities for safe and sanitary removal of sewage from passenger vessels. A “passenger vessel” means a ship of 300 or more gross tons carrying passengers for compensation. (ORS 468B.300) House Bill 3123 is attached in Appendix A. Because of existing regulations, which are summarized in this report, DEQ believes the risk for environmental harm to water quality is low.

SUMMARY OF REGULATIONS

A large amount of data collection and regulation began in early 2000, which is around the time a new federal law was passed on cruise ships in Alaska. The Title XIV- Certain Alaskan Cruise Ship Operations federal legislation was passed in December 2000 to ensure cruise ships with 500 or more passengers comply with all the federal regulations and allow for further study of current operating practices and newer technologies to treat sewage and graywater. The U.S. Environmental Protection Agency and Alaska continue to collect data and have permitting authority over passenger vessels that are considered cruise ships. Most cruise ships in Oregon water are associated with coastal voyages that reach Alaska.

This report looks at federal and neighboring states’ regulations on vessels, but does not include the myriad international agreements and regulations to which vessels conform. This report contains recent study results and regulations on discharges that are established for cruise ships in Alaska and part of the EPA vessel general permit. The EPA vessel general permit and the 2010 Alaska general permit were issued after completion of the studies.

In Oregon, non-recreational vessels equal to or greater than 79 feet are required to comply with the EPA vessel general permit that was issued in December 2008. EPA administers this general permit and the Coast Guard implements it. The EPA vessel general permit regulates the discharge of hazardous material by prohibiting the discharge under the permit and regulating operating practices and conditions of discharge. There are water quality based effluent limits for graywater and sewage mixed with graywater from large cruise ships and medium cruise ships. Alaska’s 2010 general permit has effluent limits for continuous discharge while in port and while underway. The effluent limits are based on water quality standards and based on the capability of current treatment technologies with consideration for dilution for certain pollutants.

If passenger vessels in Oregon waters have a separate discharge for sewage, then the regulation for sewage discharge comes under the EPA’s 1976 performance standards under Clean Water Act (CWA) Section 312 for marine sanitation devices (MSDs), although the ships that enter the Alaskan water must meet higher standards than those established back in 1976.

Chapter 1- Introduction

This report fills the directive in House Bill 3123 for DEQ to study the impacts of water quality from passenger vessels of 300 or more gross tons. The report centers on readily available data like the national statistics gathered on the cruise ship industry, the actions of nearby states and water quality based permits to present the impacts on water quality. The DEQ was required to determine the reasonable availability of facilities to remove sewage from passenger vessels. This report provides information on the availability of pumpout stations in the state and focuses on their availability in Astoria, the leading cruise ship port in Oregon.

Chapter 2- Passenger Vessel Activity in Oregon Water

The Maritime Administration keeps statistics on cruise ships that focus on seventeen major cruise lines that offer North American cruises with a U.S. port of call. The prevalent destination in the Pacific Northwest is Alaska. Table 1 is a statistical snapshot that shows there were 512 cruise ships with a destination to Alaska in 2009. Cruise travel to Alaska is concentrated in the second and third quarters of the year. Pacific Coast destinations are also scheduled in the second and third quarters of the year.

Table 1. North American Cruise Snapshot of the seventeen major cruise lines in North America (U.S. DOT 2009)

Destination	2004	2005	2006	2007	2008	2009
Alaska	473	487	493	510	513	512
Bahamas	597	591	654	609	599	710
Bermuda	143	137	136	116	102	109
Canada/New England	112	99	79	86	107	97
Eastern Caribbean	541	556	554	558	542	489
Hawaii	127	161	200	240	122	90
Mexico (Pacific)	430	491	457	518	540	428
Nowhere (Note: a trip to Nowhere starts and ends at the same port.)	13	5	6	14	11	7
Pacific Coast	28	32	30	29	31	32
South America	10	7	15	8	11	28
South Pacific/Far East	10	11	10	12	20	23
Southern Caribbean	454	377	357	344	359	323
Transatlantic	71	91	82	92	90	86
Trans-Panama Canal	82	83	69	82	73	97
Western Caribbean	1,374	1,335	1,293	1,246	1092	1,071

In the Maritime Administration statistics, the Pacific Northwest includes all U.S. ports from Barrow, Alaska to Coos Bay, Oregon. The Pacific Southwest includes all ports from Crockett, CA to San Diego, CA and all Hawaiian ports. Their statistics detail the number of cruises, cruises by departure port, destination, the number of passengers, lengths of the cruise and nights occupied by passengers. The level of occupancy is important for the cruise ship industry. The amount of passengers a cruise ship carries on each cruise is measure of its success. Fares can be lowered to encourage passenger occupancy and, unlike land operations, cruise ships destinations can move to markets with higher demands. The Maritime Administration reported that in 2008, ships spent more time overseas than in North America; however, there was an increase in passengers departing from Pacific Northwest and Pacific Southwest ports from 2003-2008. The Maritime Administration report concluded that over the last 5 years Seattle (WA), San Diego (CA), Long Beach (CA), Cape Liberty (NJ), Mobile (AL) and Whittier (AK) have emerged as significant cruise ports. (U.S. DOT 2009)

Details on the cruise destinations for 2004 through the second quarter of 2010 indicate that Alaska is the primary destination for the Seattle (WA) and Whittier (AK) ports. Approximately 90% of the cruise ships from Seattle were destined to Alaska. The cruise ships from Port Whittier travel within Alaska, with the exception of one trip per year at the end of the season to the South Pacific/Far East. (U.S. DOT 2009)

Oregon ports primarily service exports of the State’s agricultural, timber, seafood and manufacturing industries and imports of goods from throughout the world. Oregon has five deep water ports, which include Newport, Coos Bay and the three ports of the lower Columbia River in Astoria, St. Helens and Portland, as well as, smaller coastal ports.

Port of Astoria is the main port of call for cruise ships in Oregon. The Port of Astoria web site (www.portofastoria.com) notes that the Port of Astoria has been receiving cruise ships since 1982 and that the Port of Astoria has invested \$10 million in pier improvements to accommodate cruise vessels. (Port of Astoria, 2010) Most of the large cruise ships arrivals to Oregon water are associated with coastal voyage itineraries in transit to or from Alaska during the shoulder seasons.

The Port of Astoria posts their projected cruise ship schedules on their internet web site. The schedules from the Port of Astoria web page are shown below in Table 2. Each year the number of cruise ships scheduled to arrive are in the same range, with the exception of 2010. In 2010 the cruise lines pulled two vessels from the Alaska destination, in part due to concerns of increases in fees in Alaska. This had a rippling downturn effect on the Port of Astoria. (Conner 2010)

Table 2. Number of Cruise Ships calling on Astoria

Year	MAR	APR	MAY	JUN	AUG	SEP T	OCT	NOV	Total each Year
2007	0	2	9			5	1	1	18
2008	1	4	8			4	2		19
2009		1	7	4		4	2		18
2010		2	2	1		3	1		9
2011		2	10		1	3			16
Total each Month	1	11	36	5	1	19	6	1	

Coos Bay is a deep water port, but no cruise ships have called on Coos Bay. Whether Coos Bay ever becomes a port of call for cruise ships is under consideration for the future. An investment in infrastructure would be needed to allow for passage into the bay, as well as, facilities to accommodate the cruise ships. The Port of Coos Bay is pursuing a Section 203 permit with the U.S. Army Corps of Engineers to widen and deepen the channel, in response to a developer’s interest in building a container terminal in the lower bay. As part of that Section 203 process, the Port of Coos Bay is doing an economic analysis. The cruise industry scored well in a preliminary analysis and will be included in the final economic study. There may be an opportunity to accept 1-3 ports of call for repositioning ships. (Hammer 2010)

Newport does not have the facilities to accommodate cruise ships.

Small Cruises tour the Columbia River. Two small cruise ships the National Geographic Sea Bird and National Geographic Sea Lion are 152 feet in length and have the capacity for 70 passengers. These leave from Portland for a 7 day cruise along the Columbia River. These ships are considered to be less than 300 gross tons.

North West & Canada Cruise Association (NWCCA) is a trade organization for cruise ships that has 10 member lines representing 25 ships in 2010. The Port of Astoria is on their itinerary in mid-spring and mid-fall. This is when the cruise ships are repositioning from in or out of the Pacific Northwest. For example, the vessels that sail from the Central American and Southern California market to the Puget Sound; Vancouver, B.C.; Inland Passage; and Alaska market. Because the NWCCA member ships also travel to Alaska, they are all retrofitted with advanced wastewater treatment systems. (Hammer 2010) More cruise ships are using the advanced wastewater treatment technology. “One recent estimate by the cruise ship industry is that roughly 40% of the International Council of Cruise Lines (ICCL) member ships have installed advanced wastewater treatment and 10 to 15 more systems are added each year. The ICCL members make up two-thirds of the worlds fleet. In 2006, 23 of 28 large cruise ships that operated in Alaskan waters had advanced wastewater treatment in order to meet the more stringent discharge requirements in effect in Alaska.” (U.S. EPA Report 2008)

Cruise Ships have been compared to floating hotels or small cities, because of their on board services and the maximum passenger capacities of up to 4,000 passengers. The 2008 Congressional Research Report to Congress indicated that the discharge from cruise ships may be of more concern than other vessels because of the large volume of wastes generated from the passengers on board and the repeated pattern of their voyage in a local area.

The cruise ships that call on the Port of Astoria have maximum passenger capacities that range from 542 to 3840 passengers. One exception is “The World” which is a ship that serves as a residential community that is owned by its residents. The number of residents and their guests aboard the ship ranges between 100 and 300. “The World” did make a call to Astoria and Portland in 2009.

Passenger vessels generate sewage and graywater, as well as hazardous waste. The accommodations and services on a cruise ship include sanitary facilities, showers, pools, spa tubs, laundry, dry-cleaning, and photo processing. Tetrachloroethylene, also called TCE, perchloroethylene, or PERC are a hazardous materials used in dry-cleaning. Photo processing wastes include ammonia, sulfuric acid, and silver. The use of toxic and hazardous materials may be necessary for the operation and maintenance of passenger vessels.

Chapter 3-Environmental Regulations

OREGON

The Department of Environmental Quality (DEQ) prohibits the discharge of any wastes into the waters of the state that will reduce water quality. (Oregon Revised Statutes (ORS) 468B.025)¹ The definition of waste under ORS 456B.005(9) and Oregon Administrative Rules (OAR) 340-041-0002(69) means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state. Waters of the State includes rivers and the Pacific Ocean within territorial limits, which is within 3 miles, of the State of Oregon. (ORS 468B.005(10))²

DEQ is authorized by the Environmental Protection Agency (EPA) to issue National Pollutant Discharge Elimination System (NPDES) permits and conduct the compliance verification, monitoring and enforcement for these permits. NPDES permits are issued in accordance with the Section 402 of the Clean Water Act (CWA) requirements and any additional state requirements to protect water quality. The NPDES permit program regulates pollution from point sources and while a vessel is defined as a point source under Section 402 of the CWA, sewage from cruise ships and other vessels is exempt from the definition of pollutant. The discharge of sewage is regulated under Section 312 of the CWA unless sewage is mixed with graywater.

Sewage that is mixed with grey water and discharges incidental to the normal operation of vessels are regulated under an NPDES permit. These discharges from non-recreational vessels equal to or greater than 79 feet are regulated under EPA's vessel general permit by the EPA in the state of Oregon. While DEQ water quality has the authority to regulate the treatment and discharge of sewage (468B.080)³, the authority is pre-empted by

¹ **468B.025 Prohibited activities.**

(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.

² **468B.005(10) Waters of the State** means lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals and includes the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

³ **468B.080 Prohibitions relating to garbage or sewage dumping into waters of state.** (1) No garbage or sewage shall be discharged into or in any other manner be allowed to enter the waters of the state from any building or structure unless such garbage or sewage has been treated or otherwise disposed of in a manner approved by the Department of Environmental Quality. All plumbing fixtures in buildings or structures, including prior existing plumbing fixtures from which waste water or sewage is or may be discharged, shall be connected to and all waste water or sewage from such fixtures in buildings or structures shall be discharged into a sewerage system, septic tank system or other disposal system approved by the department pursuant to ORS 448.305, 454.010 to 454.040, 454.205 to 454.255, (1973 Replacement Part), 454.505 to 454.535, 454.605 to 454.755 and ORS chapters 468, 468A and 468B.

Section 312 of the CWA on the design, manufacture or use of any marine sanitation device (MSD), on any vessel. States can request EPA to establish ‘no discharge zones’ for sewage after making certain findings. The section below on Federal Regulation explains this in more detail.

The DEQ Land Quality Division regulates hazardous materials, requiring proper management, spill reporting and clean up. Under the OAR 340-142, there are regulations in place that are specific to passenger vessels operating in the territorial sea. A passenger vessel is defined as a ship of 300 or more gross tons carrying passengers for compensation.

Under OAR 340-142-0005 a reportable quantity is an amount of oil or hazardous materials, which if spilled or released, or threatens to spill or release in quantities that are equal to or greater than those listed in OAR 340-142-0050 and OAR 340-142-0040. The definition of hazardous materials includes those designated by EPA under Section 311 of the Federal Water Pollution Control Act and EPA’s Code of Federal Regulations Part 302 ‘List of Hazardous Substances and Reportable Quantities. These definitions include hazardous materials generated on board a passenger vessel.

The release or even the threat of release of these hazardous materials is required to be reported to Oregon Emergency Management Division's Oregon Emergency Response System.

All vessels including passenger vessels must prepare a contingency plan for the prevention, containment and cleanup of oil spills from a vessel into the navigable waters of the state, and for the protection of fisheries and wildlife, other natural resources and public or private property from such spills. OAR 340-141-0100(1).

FEDERAL REQUIREMENTS

EPA Vessel General Permit

In February 2009, EPA issued the vessel general permit which establishes effluent limits and best management practices for the discharges associated with incidental operations of vessels to protect water quality in inland waters and the territorial seas. The permit became effective for most states on December 19, 2008. The permit became effective for Alaska and Hawaii on February 6, 2009. The permit expires December 19, 2013. Non-recreational vessels equal to or greater than 79 feet in length are subject to the permit. All vessels under the permit must manage their incidental discharges as necessary to meet applicable water quality standards. Passenger vessels of a certain length regardless of gross

468B.075 Definitions for ORS 468B.080. As used in ORS 468B.080:

- (1) “Buildings or structures” includes but is not limited to floating buildings and structures, houseboats, moorages, marinas, or any boat used as such.
- (2) “Garbage” means putrescible animal and vegetable wastes resulting from the handling, preparation, cooking and serving of food.
- (3) “Sewage” means human excreta as well as kitchen, bath and laundry wastes. [Formerly 449.140 and then 468.765; 2005 c.22 §341]

tons must register with EPA under the permit. Each cruise ship in the NWCCA is registered under the EPA vessel general permit.

The vessel general permit is comprehensive: 26 discharges incidental to the normal operation of vessels are regulated. The vessel general permit contains effluent limits to control pollutant discharges. The major categories regulated under the permit include:

- Aquatic Nuisance Species,
- Nutrients,
- Pathogens (including E. Coli & fecal coliform),
- Oil and grease,
- Metals,
- Conventional pollutants (Biochemical Oxygen Demand, pH, Total Suspended Solids), and
- Other toxic and non-conventional pollutants with toxic effects.

Pathogens are found in sewage and graywater. Although sewage is not regulated under the vessel general permit, the discharge of graywater and graywater that is mixed with sewage is regulated by the permit. Graywater is water from showers, baths, sinks, and laundry facilities. Graywater can contain high levels of pathogens, nutrients, soaps, detergents, trace metals and organics. Untreated graywater is much more likely to cause environmental impact when it is generated in large volumes (i.e., from cruise ships). (U.S. EPA Permit Fact Sheet 2008) Sewage that is not combined with graywater is regulated under Section 312 of the CWA.

The vessel general permit regulates graywater from cruise ships through discharge minimization requirements, prohibitions, standards, and other requirements applicable to graywater. It is expected that compliance with the conditions in the permit will ensure that water quality standards are met. When sewage is mixed with graywater, the commingled discharges are required to meet the permit requirements in Part 2 and Part 5 of the permit for graywater. The effluent limits with monitoring are established for the treatment of graywater and discharge of graywater on large and medium cruise ships. Under the vessel general permit a large cruise ship has overnight accommodations and is authorized to carry 500 or more passengers. The vessel general permit definition of large cruise ship is the same as the definition used in the state of Alaska “Title XIV—Certain Alaskan Cruise Ship Operations” of the Miscellaneous Appropriations Bill (H.R. 5666) in the Consolidated Appropriations Act of 2001 (P.L. 106-554) which was passed on December 12, 2000. A medium cruise ship has overnight accommodations and is authorized to carry between 100 and 449 passengers. EPA based the effluent limits in this permit on the advanced wastewater treatment technology, which is a technology that is already used on many cruise ships. (U.S. EPA Permit Fact Sheet 2008)

All Vessels

- All vessels must minimize the production of graywater if there is no storage capacity and minimize the discharge of graywater while ‘in port.’
- A vessel over 400 gross tons, that regularly (at least once per month) goes beyond 1 nautical mile (nm) from shore and has storage capacity, may not discharge untreated graywater within 1 nm.

- A vessel with storage capacity and that does not go beyond 1 nautical mile from shore, must treat or dispose of graywater onshore if facilities are available and disposal is economically practicable and achievable.

Large Cruise Ships

The effluent limits for graywater

- While in port include:
 - Use the pierside port authority facilities or municipality to discharge if available, or treat to secondary treatment standards shown in Table 3 below or hold until underway
- While underway,
 - Discharge within 1 nm from shore must meet treatment standards as shown in Table 3 below.
 - Discharge between 1 and 3 nm from shore must either meet treatment standards in Table 3 below or the vessel must be underway with a speed of at least 6 knots
- Note: The treatment standards for Biochemical Oxygen Demand (BOD), carbonaceous oxygen demand (CBOD), Total Suspended Solids (TSS) and pH shown in Table 3 below are the same as the secondary treatment standards established for sewage treatment plants under 40 CFR Part 133.102.

Table 3: Effluent Limits in Part 5.1.1.1.2 and 5.2.1.1.2 of the EPA Vessel General Permit					
	BOD/CBOD	pH	Fecal Coliform	TSS	Chlorine
30 day average	30 /25 (mg/L)			30 (mg/L)	
7 day average	45/40 (mg/L)			45 (mg/L)	
30 day average Percent Removal	85 (%)			85 (%)	
Range		6-9 (S.U.)			
30 day geometric mean bacteria count			20/100 ml not more than 10% of the samples to exceed 40/100 ml		
Maximum (µg/L)					10

Medium Cruise Ships

Medium Cruise ships that voyage more than 1 nm from shore have these same requirements as the large cruise ships. After December 19, 2008, the permit requires medium cruise ships unable to voyage more than 1 nm from shore be constructed to meet the medium cruise ship requirements.

Appendix B contains a visual representation of the effluent limit requirements for cruise ships.

There are additional discharge limitations for nutrient impaired water. Operational conditions in the permit always require the use of phosphate free and non toxic soaps and detergents. Pool and spa discharges are required to be de-chlorinated and/or de-brominated prior to discharge. The presence or use of toxic and hazardous materials may be necessary for the operation of vessels. The permit prohibits the discharge of any toxic or hazardous materials to systems, such as floor drains and sinks that would eventually be discharged to water.

Toxic and hazardous materials are required to be appropriately located in protected areas of the vessel. Exposure of containers to ocean spray or precipitation must be minimized. Toxic and hazardous materials are required to be in appropriate containers, constructed of a suitable material, labeled and secured. Containers must be managed so they are not overfilled or the contents mixed with incompatible wastes. These management practices are similar to hazardous waste generator requirements that industry must follow. Jettisoning of containers holding toxic or hazardous material is not allowed under the permit.

The Clean Water Act prohibits the discharge of any pollutant within territorial waters of the United States and of oil and hazardous substances within 12 nautical miles. The permit requires compliance with all federal environmental laws that establish controls on oily or hazardous discharges, including among others:

- Discharges of small amounts of oil incidental to the normal operation of a vessel are permissible provided appropriate effluent limits are met; however the discharge of used or waste oil is not allowed under the permit.
- All discharges of oil, including oily mixtures, from MARPOL vessels⁴ must have concentrations of oil less than 15 parts per million.
- All MARPOL vessels must have a current International Oil Pollution Prevention Certificate (IOPP) issued in accordance with 33 CFR 151.19 or 151.21.
- All other discharges of oil including oily mixtures must not contain oil in quantities that may be harmful. The term harmful includes 'violates water quality', under 40 CFR Part 110.
- CWA section 311 (33 U.S.C. 1321), of the Federal Water Pollution Control Act (the Clean Water Act)
- The National Marine Sanctuaries Act, (16 U.S.C. 1431 *et seq.*) and implementing regulations found at 15 CFR Part 922 and 50 CFR Part 404
- The Act to Prevent Pollution from Ships (33 U.S.C. 190-1915). The Act to Prevent Pollution from Ships incorporates the provisions of MARPOL into U.S. law.

⁴ MARPOL vessels are subject to Annex I of the International Convention for the Prevention of Pollution from Ships as implemented by the Act to Prevent Pollution from Ships and U.S. Coast Guard regulations found in 33 CFR 151.09 Part 151: Vessels carrying oil, noxious liquid substances, garbage, municipal or commercial waste, and ballast water.

- The Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 *et seq.*), and
- The Oil Pollution Control Act, 33 U.S.C. 2701-2761.

The permit identifies discharges that are not included; therefore either cannot be discharged because the waste can be stored or an alternative material can be substituted, or would have to receive a more comprehensive individual permit under the NPDES program in order to discharge in inland water and territorial seas. The types of hazardous materials not eligible for coverage under the vessel general permit includes

- Photo-processing waste, which may include such compounds as ammonia, sulfuric acid and silver.
- The discharge of medical waste as defined in 33 U.S.C. 1362(20), spent or unused pharmaceuticals, formaldehyde or other biohazards no longer being used for their intended purposes.
- Tetrachloroethylene and perchloroethylene from degreasing or dry cleaning operations;
- Noxious Liquid Substance (NLS) Residues. (The term is consistent with the Coast Guard definition under 46 CFR 153.2) discharges of NLS residues are either prohibited or, if allowed, may only take place at sea at least 12 nautical miles from the nearest shore.

The vessel general permit was required to meet the NPDES permit discharge requirements for Ocean Discharge Criteria (40 CFR 125, Subpart M regulations for the issuance of NPDES permits for discharges into territorial sea, the contiguous zone and the ocean). EPA made findings and determined that the incidental discharges regulated under the permit will be well-mixed upon discharge and will mix further as it moves away from the vessel. Considering the effluent limits, the best management practices, additional controls for vessels that may operate in sensitive areas and compliance with all federal environmental laws that establish controls on oily or hazardous discharges, EPA made the determination that compliance with the permit will ensure that the applicable water quality standards will also be met.

The vessel general permit expires in December 2013. EPA is in the process of developing the next general permit and is inviting comments on suggested revisions to the 2008 vessel general permit. The notice for public comment appeared in the October 29, 2010 Federal Register. The comment period ended on December 31, 2010.

Clean Water Act Section 312

Sewage from vessels is regulated under the CWA section 312. This section requires vessels with installed toilet facilities to have operable MSDs. Section 312 is implemented jointly by the EPA and the Coast Guard. EPA developed the performance standards in 40 CFR Part 140 and the Coast Guard is responsible for developing regulations for the implementation and enforcement (33 CFR 159). The Coast Guard is responsible for overseeing compliance in Oregon. Under the CWA, states can be authorized to implement and enforce the regulations (33 U.S.C. 1322(k)), however all states are pre-empted by federal law with respect to the design, manufacture, installation, or use of any MSDs.

The EPA performance standards are set for MSDs in different water bodies. Under 40 CFR Part 140, the discharge of sewage (treated or untreated) is not allowed in freshwater lakes, freshwater reservoirs, or other freshwater impoundments whose entrance point(s) and exit point(s) are too shallow to allow these vessels to enter or leave. Untreated sewage cannot be discharged unless the vessel is more than 3 miles from shore in coastal water. (U.S. EPA, Oceans and Coastal Protection 2010) To meet this requirement, the vessel needs a holding tank for treated and untreated sewage (Type III MSD) or a procedure to close discharge valves in a secure manner.

In all other water bodies, there is a requirement for the discharge from MSDs to meet certain standards as shown in Table 4. below.

EPA (40 CFR Part 140)	Fecal Coliform	Total Suspended Solids	Coast Guard MSDs (33 Part 159)
All other waters on or before January 30, 1980	1000/100 ml	None. Instead there is a requirement for no visible floating solids	Type I – flow through devices that commonly use maceration and disinfection. Type I may be installed on vessels less than or equal to 65 feet in length.
All other waters after January 30, 1980	200/100 ml	150 mg/L	Type II- flow through treatment devices which may have biological treatment followed by disinfection although some use maceration and disinfection. Type II may be installed on vessels of any length.

EPA recently received a petition from Friends of the Earth to have EPA revise the regulations establishing performance standards for vessel sewage treatment under the CWA Section 312(b). The notice of the petition appeared in the Federal Register on July 12, 2010. EPA was seeking public input on this request, specifically, the universe of vessels operating on navigable waters that use sewage treatment devices, technical information on the performance, effectiveness and costs of vessel sewage treatment devices, including test data; suggestions on what, if any, changes to the performance standards that might be appropriate, as well as approaches for monitoring, recordkeeping and reporting for vessel sewage discharges. The comment period ended on November 9, 2010.

In addition to setting the performance standards for MSDs, 40 CFR Part 140 allows states to request EPA to establish ‘no discharge zones,’ where sewage from vessels may not be discharged in waters of the state. Under 40 CFR Part 140.4 (a), (b) & (c), a state has to make a written application and receive approval from the administrator of EPA to completely prohibit the discharge of sewage and/or treated sewage in any particular waters of the state. After states make the written application with the proper findings, EPA reviews the application and if approved, EPA initiates rulemaking. A state can have

all or portions of their waters designated as a ‘no discharge zone’ for vessel sewage to achieve protection. The three different types of designations that states can apply for are listed below.

- **Particular Environmental Importance when Adequate Pumpout Facilities are Available (40 CFR Part 140.4(a), CWA Section 312 (f)(3))**
A state may completely prohibit the discharge of sewage, whether treated or not, into some or all of its waters from all vessels if: (1) the state determines that the protection and enhancement of the quality of the waters require greater environmental protection than current federal regulations; and (2) EPA determines that adequate facilities for the safe and sanitary removal, and treatment of sewage from all vessels are reasonably available.
- **Particular Environmental Importance (40 CFR Part 140.4(b), CWA Section 312 (f)(4)(A))**
If EPA determines, upon application by a state, that the protection and enhancement of specified waters require a prohibition, EPA will by regulation completely prohibit the discharge of sewage, whether treated or not, into those waters from a vessel. A strict interpretation of this regulation is that ‘a vessel’ means all vessels and not just a certain class of vessels. The interpretation is under consideration by EPA as part of their review of California’s application for a ‘no discharge zone’ under this designation.

The purpose of this type of designation is to protect human health (through water-contact activities), sensitive habitats, and aquatic organisms, birds, and other animals utilizing the water from adverse impacts of vessel sewage.

Environmental importance can include waters located in established sanctuaries, national parks, national wilderness areas, national recreation areas, and areas used by endangered or threatened species.

- **Drinking Water Intake Zone (40 CFR Part 140.4(c), CWA Section 312 (f)(4)(B))**
EPA, upon application by a state, will by regulation prohibit the discharge of sewage from vessels within a drinking water intake zone. The purpose of this no-discharge zone is to safeguard human health through the protection of intake waters used for drinking.

Currently seven states have all (or nearly all) of their surface waters designated as ‘no discharge zones.’ Those states are: Michigan, Missouri, New Hampshire, New Mexico, Rhode Island, and Wisconsin. In addition, 14 other states have some of their surface waters designated as ‘no discharge zones.’ Those States are: Arizona, California, Connecticut, Florida, Georgia, Maryland, Massachusetts, Minnesota, New Jersey, Nevada, New York, North Carolina, South Carolina, Texas, and Utah. Approximately 50% of the ‘no discharge zones’ are in fresh water and the other 50% are in salt or estuarine waters. (U.S. EPA, Oceans and Coastal Protection 2010) Oregon has not established ‘no discharge zones’ in waters of the state.

Adequate Facilities

Section 312 of the CWA contains provisions for states to apply for ‘no discharge zones’ where the discharge of all vessel sewage (both treated and untreated) is illegal. Information on the application requirements are given in 40 CFR Part 140.4. Upon review of the application, EPA is responsible for determining if there are adequate facilities. DEQ would work with EPA, the Oregon Marine Board and other state and local agencies to gather information and conduct outreach in order to propose areas for ‘no discharge zones.’

Applications to protect an particular area of environmental importance (CWA Section 312(f)(3)) with adequate pumpout facilities need to include:

1. A certification that the protection and enhancement of the proposed ‘no discharge waters’ require greater environmental protection than the applicable Federal standard;
2. A map showing the location of commercial and recreational pumpout facilities;
3. A description of the location of pumpout facilities within waters designated for no discharge;
4. The general schedule of operating hours of the pumpout facilities;
5. The draught requirements on vessels that may be excluded because of insufficient water depth adjacent to the facility;
6. Information indicating that treatment of wastes from such pumpout facilities is in conformance with Federal law; and
7. Information on vessel population and vessel usage of the subject waters.

The pump out stations in Oregon can be found on the Oregon Marine Board web page (www.boatoregon.com/OSMB/Clean/CVA.shtml). The Port of Astoria has a pumpout at the West Mooring Basin (Columbia River Mile 13.5) for small vessels 90-100 feet. The East Mooring basin has a portable pumpout for boats at the pier. Nearby, there is a pumpout facility at the Warrenton Marina (Skipanon River Mile 1.7) and a private pumpout on Pier 39 (Columbia River Mile 16.1). These pumpouts ultimately go to a municipal wastewater treatment system. Waste Away Marine Services is a pumpout boat with a 350 gallon holding tank that operates on the Columbia and Willamette Rivers and can travel to Astoria to provide their service. EPA makes the final determination as to whether or not adequate facilities are available. There is no requirement under Section 312 of the EPA standards or the Coast Guard regulations to require ports or marinas to install pump out stations. The Port of Astoria provides the dock but does not provide pump out services for foreign-flagged cruise ships. As with other services for off-loading wastes, if ships require that service, they contract out for those services.

EPA has authority under CWA §312(f)(4)(A) to designate a ‘no discharge zone’ for the protection and enhancement of waters with environmental importance within the state. The application must identify areas of protection, such as, water recreational areas, aquatic sanctuaries, fish-spawning and nursery areas, and areas of intensive boating activities. The application does not need to show that there are adequate and reasonably available pumpout stations.

The application to establishing a drinking water intake ‘no discharge zone’ (CWA section 312(f)(4)(B)) needs to include exact and detailed information on the intakes. The state

does not need to show that there are reasonably available pumpout stations. Information required in the application needs to:

1. Identify and describe exactly and in detail the location of the drinking water supply intake(s) and the community served by the intake(s), including average and maximum expected amounts of inflow;
2. Specify and describe exactly and in detail, the waters, or portions thereof, for which a complete prohibition is desired, and where appropriate, average, maximum and low flows;
3. Include a map that clearly marks by latitude and longitude the waters or portions thereof to be designated a drinking water intake zone; and
4. Include a statement of basis justifying the size of the requested drinking water intake zone, for example, identifying areas of intensive boating activities.

‘No discharge zones’ are established for water bodies and usually includes all vessels.

Title XIV – Certain Alaskan Cruise Ship Operations, Division B, Title XIV of the Miscellaneous Appropriations Bill, H.R. 5666, in the Consolidated Appropriations Act, 2001 (P.L. 106-554); (33 U.S.C. 1901 Note)

In response to concerns about the increase in cruise ships and acts of non-compliance in Alaska waters, federal legislation was passed in December 2000 to ensure that cruise vessels complied with all applicable environmental laws including but not limited to the CWA (33 U.S.C. 1251 et seq.), the Act to Prevent Pollution from Ships (33 U.S.C. 1901 et seq.) and the new requirements under Title XIV.

The law sets standards for vessels with 500 or more overnight passengers for hire and protects Alaskan water by prohibiting the discharge of untreated sewage more than 3 nm from shore in areas within Alaska’s Inside Passage. Specifically, the discharge of untreated sewage is prohibited in the waters of the Alexander Archipelago, the navigable waters of the United States in the State of Alaska, or within the Kachemak Bay National Estuarine Research Reserve. Appendix C shows the discharge areas closed by federal legislation.

The law establishes operating standards and limitations on the discharge of treated sewage and graywater in Alaska water, requires monitoring and recordkeeping, provides for inspections and sets penalties for noncompliance. The law authorizes EPA to use the best available scientific information to evaluate the environmental effects of the regulated discharges and promulgate standards for sewage and graywater in Alaska water.

Until new standards are promulgated by EPA, the effluent standards for treated sewage under Title XIV are the MSD Type II performance standards (fecal coliform bacterial count of no greater than 200 /100 ml and suspended solids no greater than 150 mg/L). This type of treated sewage is only allowed to be discharged when the cruise ship is underway and proceeding at a speed of not less than 6 knots one nautical mile from the nearest shore. If sample results, for graywater and sewage meet the secondary treatment standards for BOD/CBOD, TSS and pH in 40 CFR 133.102, fecal coliform and chlorine as shown in the Table 5 below, then continuous discharge is allowed.

Table 5: Title XIV Continuous Discharge Standards

	BOD/ CBOD	pH	Fecal Coliform	TSS	Chlorine
30 day average	30 /25 (mg/L)			30 (mg/L)	
7 day average	45/40 (mg/L)			45 (mg/L)	
30 day average percent removal	85 (%)			85 (%)	
Range		6-9 S.U.			
30 day geometric mean bacteria count			20/100 ml not more than 10% of the samples to exceed 40/100 ml		
Maximum					10 (µg/L)

The regulations to implement the law (33 CFR Part 159 Subpart E) became effective in July 2001. The Coast Guard enforces the regulations for the EPA. EPA continues to assess the large cruise ship sewage and graywater discharge standards in Alaska. EPA is evaluating technologies that would improve the quality of the treated effluent in terms of nutrients, metals, and temperature. (U.S. EPA Report 2008)

STATE REGULATION

Alaska

The state of Alaska is actively engaged in tracking, studying and regulating cruise ships. From Alaska Cruise Ship Initiative, which was the movement behind the initial federal Title XIV legislation and implementation rules in 2001 to the state of Alaska Department of Environmental Conservation (ADEC) 2010 permitting program in place now, there is a decade of experience.

- July 2001 -The ADEC Commercial Passenger Vessel Environmental Compliance (CPVEC) Program was established by Alaska Statute (AS) 46.03.460 - AS 46.03.490. Effluent limits were established at 200 fecal coliform per 100 mL and 150 mg/L of total suspended solids (TSS). Monitoring, sampling and reporting are part of the program.
- August 2006-Through a ballot measure, new requirements became a part of CPVEC Program. Specifically, a wastewater discharge permit was required for treated sewage, treated graywater, or other treated wastewater. The discharge was required to meet Alaska Water Quality Standards at the point of discharge.

- In March/May 2008 - ADEC issued the Large Commercial Passenger Vessel Wastewater Discharge General Permit No. 2007DB0002. The permit allowed a period of time to achieve compliance with the permit limit for ammonia, copper, nickel and zinc at the point of discharge. However results of the 2008 and 2009 sample data showed that the large cruise ships could not consistently meet the limits. The data is representative of the current practices and treatment technology.
- 2009 the Alaska legislature enacted HB 134-The bill establishes the premise for the current 2010 general permit. Under the bill, ADEC is allowed to issue a three year permit with effluent limits less stringent then meeting water quality standards at the point of discharge if the most economical, current and effective technology is being used. To this end, a science advisory panel has been established to evaluate wastewater treatment technology.

The current general permit regulates “large” cruise ships which are defined as a commercial passenger vessel that provides overnight accommodations for 250 or more passengers for hire. The general permit contains effluent limits for all vessels, as well as, effluent limits for advanced wastewater treatment systems. Additional sampling and reporting is required for nutrients, base-neutral acid extractable compounds, volatile organic compounds, metals in the dissolved and total recoverable form. Sampling is required twice per month. The effluent limits for all vessels are shown in Tables 6 and 7 below.

Table 6: Alaska General Permit 2009DB0026 – Effluent Limits for All Vessels

	Fecal Coliform (bacteria count per 100 ml)	BOD (mg/L)	Total Residual Chlorine (µg/L)	pH (S.U.)	TSS (mg/L)
Monthly Geometric Mean	14				
Monthly Average		30			
Daily Maximum	43	60	10		150
Minimum-Maximum				6.5-8.5	

Table 7: Alaska General Permit 2009DB0026–
Daily Maximum Effluent Limits for Treatment Systems*

System	Ammonia (mg/L)		Copper (µg/L)		Nickel (µg/L)		Zinc (µg/L)	
	Continuous	Underway	Continuous	Underway	Continuous	Underway	Continuous	Underway
Hamworthy	28	143	87	133	63	63	395	395
Marisan	20	20	87	157	24	24	112	112
Rochem	12	12	10	10	10	10	118	118
Scanship	28	68	26	26	28	28	267	267
Zenon	28	51	50	50	40	40	188	188
All Other	28	130	87	130	43	43	360	360

*Notes: The continuous effluent limit applies to wastewater discharged while docked, anchored, or moving at less than 6 knots. The underway effluent limit applies to wastewater discharged while underway traveling at a speed of 6 knots or greater. For the 2010 season, this is a monitoring and reporting requirement only. For any samples collected in 2010 that exceed the limit, the permittee must, with the DMR, provide a written explanation of the known or likely cause(s) of the exceedance and the corrective measures the permittee will take to address the cause(s) before the 2011 season.

The ADEC established an Ocean Ranger Program to conduct compliance monitoring for state and federal environmental laws. Ocean Ranger inspections are conducted during voyages with a small number of inspections conducted while the ship is in port. The ADEC uses contractor assistance in implementing the Ocean Ranger Program.

Washington

The state of Washington has a Cruise Ship Operations Memorandum of Understanding (MOU) with the Port of Seattle and the Northwest Cruise Ship Association. The MOU was originally signed in 2004 and most recently amended in May 19, 2008 (Amendment No. 4). The MOU acknowledges that the U.S. Coast Guard has federal jurisdiction over environmental matters in navigable waters of the U.S. NWCA agrees to adopt the practices in the MOU. The MOU is in effect in state water when a vessel owned or operated by a member of the NWCA calls at a port in the state of Washington.

The Department of Ecology (DOE) monitors the ships discharges using a number of approaches, such as inspections, documentation, reporting, required sampling, and whole effluent toxicity testing for some vessels. The MOU requires annual meetings to review the effectiveness of the MOU.

The MOU prohibits certain discharges and regulates the discharge from advanced wastewater treatment systems. Advanced wastewater treatment systems are the systems that meet federal law, Title XIV, Certain Alaska Cruise Ship Operations. The MOU agreement for wastewater includes:

- No discharge of untreated sewage or untreated graywater
- Discharge of treated sewage and graywater from advanced wastewater treatment systems is allowed when the vessel is at least one nm away from its berth at a port and the speed is at least 6 knots. Documentation that the system meets specific requirements must be submitted at least 60 days prior to discharge.
- Continuous discharge is allowed when documentation shows that the system meets specific requirements, the discharge is treated with a final UV light disinfection, and the system has the capability for emergency shutdown for treatment upsets.
- No discharge is allowed within 0.5 miles of designated bivalve shellfish beds

The prohibition for discharge within 0.5 miles of the shellfish beds comes from the recommendations in the Washington State Health Department study on cruise ship impacts on shellfish to protect shellfish beds from malfunctioning treatment systems that may contain viruses that would reach the shellfish beds and cause illness. (WDOH 2007)

The MOU acknowledges and accepts that the cruise ship industry will practice Cruise Lines International Association (CLIA) Industry Standard E-01-01, titled 'Cruise Industry Waste Management Practices and Procedures' for the management of solid waste, hazardous waste and wastewater.

California

California regulations prohibit the discharge of hazardous waste, graywater, photography lab chemicals, dry cleaning chemicals and medical waste from large passenger vessels and oceangoing ships in the state marine water (within three nm of shore, including offshore California islands). A large passenger vessel is generally defined as a vessel of 300 gross registered tons or greater that carries passengers for hire. An oceangoing ship is a private, commercial, government, or military vessel of 300 gross registered tons. The discharge prohibition for large passenger vessels was in effect and oceangoing ships were added in January 2006 under Senate Bill 771-The California Clean Coast Act of 2005. Discharge of prohibited waste streams are required to be reported and the regulated

vessels were required to complete a one time survey on their wastewater management capabilities. The law directed the Californian State Water Resources Board (State Board) to submit an application to EPA, which upon approval from EPA, would establish a 'no discharge zone' for sewage for these vessels. This section of law had a sunset date of January 1, 2010 the sunset date was extended to January 1, 2014.

The State Board submitted an application to establish a 'no discharge zone' for treated sewage under CWA 312 (f)(4)(A) to EPA for a certain class of vessels in April 2006. Unlike the prohibition in a waterbody for all vessels, the State Water Board requested EPA to approve a 'no discharge zone' for only oceangoing ships with enough holding capacity and large passenger vessels within state marine water along the California coast within 3 nm. The 'no discharge zone' would apply to more than 2,000 vessels that weigh more than 300 tons that make nearly 11,000 port calls a year in the state. (Greenwire 2010) The rule allows discharges in water beyond the 3 mile limit where ships are moving at higher speeds. The higher speeds increase sewage mixing and dilution. The public comment on the proposed rule began in August 2010 and ended in November 2010. EPA approval is still pending.

Chapter 4- Current Studies

EPA and ALASKA STUDIES

Title XIV for “Certain Alaskan Cruise Ship Operations” set discharge standards for certain areas of Alaskan waters and prohibited discharges of untreated sewage from cruise vessels. Title XIV also required EPA consider updating the treatment performance standards for cruise ships, after evaluating environmental impacts to Alaskan waters. EPA’s initial evaluation for Title XIV is summarized “Cruise Ship Discharge Assessment Report,” EPA842-R-07-005, December 29, 2008. The water quality aspects on the advanced wastewater treatment and modeling from this report are provided below.

In 2004 and 2005, EPA sampled four advanced wastewater treatment technologies which treat a mixture of graywater and sewage to characterize graywater and sewage generated onboard cruise ships and to evaluate the performance of various advanced sewage and graywater treatment systems. Three of the advanced wastewater treatment technologies selected for study are on cruise ships that call on the port of Astoria. These cruise ships are the Veendam, Oosterdam and the Norwegian Cruise Line Vessel the Star. The characterization of their discharge will be the same for Oregon if these systems are operated and maintained to meet the standards in Alaska.

The effluent sample results in the EPA, Cruise Ship Discharge Assessment Report, December 29, 2008 (EPA842-R-07-005) are summarized below. The sample data was from EPA’s sampling efforts, the Alaska Department of Environmental Conservation (ADEC), the Coast Guard and the self monitoring data from the cruise ships. The data that was evaluated is considered to be representative of the waste stream. The data in the report are representative of end of the pipe discharges, with no consideration given for dilution that may occur while docked or underway.

Pathogen indicators: fecal coliform, E. coli and enterococci.

Sampling data based on data collected by EPA in 2004 showed that advanced wastewater treatment remove the pathogen indicators to levels below detection at an overall system efficiency of greater than 99%. The data is presented below in Table 8. Out of all the data evaluated, when pathogen indicators were detected, they were at levels that were close to the detection level. (U.S. EPA Report 2008)

Pathogen Indicator	Unit	Average Concentration ²	Percent Removal ¹
Fecal Coliform	CFU/100 ml	14.5* (26 detects out of 285 samples)	>99
	MPN/100 ml	10.1* (47 detects out of 320 samples)	
<i>E. coli</i>	MPN/100ml	1.98* (6 detects out of 59 samples)	>99
Enterococci	MPN/100ml	1.28 * (9 detects our of 58 samples)	>99

¹ Based on data collected by EPA in 2004.

² Based on data collected by the ADEC/ Coast Guard from 2003 to 2005; data collected by EPA in 2004 and data collected through EPA's 2004 cruise ship survey.

*Average includes at least one nondetect value; this calculation uses detection limits for nondetected results.

The results of EPA's nutrient data collected in 2004 and 2005 indicate that advanced wastewater treatment reduces ammonia (as nitrogen) by 58 to 74%, total kjeldahl nitrogen by 70 to 76% and total phosphorus by 41 to 98%.

Metals: antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium and zinc.

Total and dissolved metals were evaluated. Copper, nickel and zinc showed the highest concentrations. EPA noted that copper, nickel and zinc are common components of ship piping. Metals in the effluent are in the dissolved form, which indicates that the advanced wastewater treatment systems are very efficient in removing particulate metals. Sampling results indicate that the advanced wastewater treatment removes 37 to 50% of the dissolved metals on average. (U.S. EPA Report 2008)

Volatile and Semivolatile Organics: 2,4-Dichlorophenol, Bis(2-ethylhexyl) phthalate, Chloroform, Diethyl phthalate, Di-n-butyl phthalate, Phenol, Tetrachloroethylene, Toluene and Trichloroethene

EPA concluded that the advanced wastewater treatment generally removes the volatile and semivolatile organics to below detection limits. (U.S. EPA Report 2008)

Pesticides

EPA analyzed for 121 organohalide and organophosphorus pesticides in the wastewater going into the advanced wastewater treatment. The treated wastewater coming out of the system was not analyzed. Simazine was the only pesticide detected at concentration of 0.96 µg/l in one sample. The report states that simazine is a general use pesticide that has been used to control broad-leaved weeds and annual grasses in fields, berry fruit, and vegetables. Simazine is classified by EPA to be slightly toxic to practically non-toxic. In the past, simazine has been used to control algae in swimming pools, hot tubs, and whirlpools. (Exttoxnet,1996). (U.S. EPA Report 2008) The ADEC 2003 analysis results were non detectable for organophosphorus pesticides samples taken from the discharge leaving advanced wastewater treatment.

The EPA report evaluates the effluent data and compares it to the National Recommended Water Quality Criteria with and without dilution. Dilution occurs in ambient water at rest and while the ships are underway. The water quality criteria are different in each state and the dilutions studies conducted in Miami, Florida (2001) and Skagway Harbor in Alaska (2003) are site specific and ship specific. The comparison with water quality standards would be different for each port of call including Oregon.

EPA found that the saltwater pathogen indicators of enterococci and fecal coliform meet the national recommended water quality criteria without dilution. Since the EPA standards for enterococci and fecal coliform are the same for Oregon, the discharge at the

end of pipe from the advanced treatment systems would meet Oregon's water quality standards. The advanced wastewater treatment, that EPA tested, use Ultra Violet light (UV) disinfection to reduce pathogens; however there is chlorine in the discharge. EPA found that some dissolved metals, tetrachloroethylene, chlorine and ammonia would likely meet the national recommended water quality criteria after the initial mixing when the ship is at rest. The initial mixing dilution is based on a study conducted by the ADEC during a neap tide in Skagway Harbor, the initial mixing dilution ranges from 5 to 60, when the plume is between 1 and 7 meters from the ship.

EPA conducted a dilution study off the coast in Miami, Florida while ships were moving at between 9.1 and 17.4 knots. The study found that the dilution ratio for the ships moving at these speeds was between 200,000:1 and 640,000:1. EPA concluded that the advanced wastewater treatment and the Type II MSDs would meet national water quality standards while underway. (U.S. EPA Report 2008) Again the dilution studies were site and ship specific; however the EPA vessel general permit contains discharge limits for large and medium cruise ships while underway. EPA administers the vessel general permit in Oregon.

EPA along with ADEC conducted another cruise ship dilution study in Skagway Alaska in 2008 and presented the results in a report entitled 'Sampling Episode Report Cruise Ship Dilution Study, Skagway, Alaska,' USEPA May 18, 2009. The study included ships that call on the Port of Astoria: Ryndam, Millennium, Norwegian Star and Voldam. Generally for all the ships the initial dilutions were found to be within 2.5 meters from the point of discharge. The plumes tended to remain intact to distances of about 15 meters. Dilution at 15 meters from the discharge port ranged from approximately 40 to 90. (EPA Skagway Dilution Study 2009) The data collected in this study will be used by ADEC to validate previous modeling studies.

EPA is continuing to evaluate on board treatment technology and land-based wastewater treatment technology that could be adapted for shipboard treatment of graywater and sewage. EPA recognizes that the technologies under consideration have to undergo further engineering studies that take into account the design, material of construction, operating parameters and knowledgeable operators in order to transfer that technology to vessels. (U.S. EPA Report 2008)

ADEC conducted its own review of cruise ship wastewater technologies, conducting a technology conference on February 18, 2009 and a follow-up report. ADEC's primary conclusion from this effort was that advanced wastewater treatment systems are very effective wastewater treatment systems. While other new and emerging technologies, as well as some existing technologies used in shore-based facilities could result in improvements to cruise ship effluent quality, none are currently readily available for installation and use on the entire cruise ship fleet that discharges in marine waters of the state. ADEC finds that cruise ships are currently using the most technologically effective treatment systems that are economically feasible. (ADEC General Permit Information Sheet 2010)

Chapter 5- Conclusion

NPDES permits are protective of water quality. Monitoring and record keeping is required to show compliance. An active enforcement program is required to verify compliance. The EPA vessel general permit was issued in December 2008 and took into consideration the studies on technologies used to treat graywater and graywater mixed with sewage as well as the studies on dilution. The water quality based effluent limits in the EPA vessel general permit are based on the advanced wastewater treatment technology and takes into account the dilution while the vessel is at rest and underway. Discharge is not allowed at a pier unless the technology on board the ship can treat the discharge to a level that is equivalent to the secondary treatment standards for sewage treatment plants. The EPA vessel general permit also contains management practices and prevents the discharge of hazardous and toxic material in order to protect water quality. These are not outright prohibitions like those in place in California, because an application can be made to receive approval for discharge under a different type of individual NPDES permit.

The EPA vessel general permit is in effect in Oregon. The expiration date is 2013 and EPA is seeking input prior to renewal. But Oregon can always develop their own general permit, specific regulations or prohibitions for the discharge of graywater, graywater mixed with sewage and hazardous material from certain vessels in order to be more protective of water quality. The complete prohibition of a discharge is more protective than an allowable treatment standard. Depending upon the direction taken, future effort would involve more resources to develop detailed studies on the number and types of vessels in Oregon water, the holding and treatment capabilities, involve other state and local agencies and if necessary conduct representative dilution studies.

The system to treat sewage can be separate from the graywater treatment system. Federal legislation improved the performance standards for discharge of treated sewage in Alaska water, but the federal law does not apply in other states. Sewage that is not mixed with graywater is not regulated under the vessel general permit. EPA's 2008 cruise ship assessment report states that many ships that travel to Alaska have installed advanced wastewater treatment systems to treat sewage. EPA's 2008 study concluded the less advanced treatment system, Type II MSDs, can meet national water quality standards while at a certain speed underway; however that operating parameter is not in place for the discharge of treated sewage in Oregon.

The discharge of untreated sewage is prohibited within states territorial water and treated sewage regulation is based on outdated 1970's technology and does not require a permit or reporting. EPA received a petition to update the standards and revise the regulation based on newer technology but until then states have the option to request EPA to approve 'no discharge zones' to prohibit the discharge of untreated and treated sewage. Oregon would be required to gather the information that is required in 40 CFR Part 140.4 for the application.

Passenger vessels on coastal voyages typically only enter Oregon territorial waters when destined for a port, otherwise ship travel in the ship lanes is outside the 3 mile boundary.

Passenger vessels stop only in Astoria at this time. Smaller Columbia River and inland water passenger vessels that are smaller than 300 tons are not considered passenger vessels under state statute; however these vessels are regulated under the EPA vessel general permit because of their length. DEQ believes that because of the environmental regulations in place, the risk for environmental harm in Oregon is low.

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Appendix A-House Bill 3123

75th OREGON LEGISLATIVE ASSEMBLY--2009 Regular Session

A-Engrossed House Bill 3123

Ordered by the House April 29
Including House Amendments dated April 29

Sponsored by Representative BAILEY; Representatives BOONE, WITT

SUMMARY

The following summary is not prepared by the sponsors of the measure and is not a part of the body thereof subject to consideration by the Legislative Assembly. It is an editor's brief statement of the essential features of the measure.

[Prohibits owner or operator of passenger vessel from releasing or directing another person to release hazardous material or sewage into Pacific Ocean within territorial limits of State of Oregon.]

Directs Department of Environmental Quality to study impact of sewage, gray water and hazardous material discharged by vessels on water quality and availability of facilities for removal and treatment of sewage from passenger vessels.

A BILL FOR AN ACT

- 1
2 Relating to the release of substances by passenger vessels.
3 **Be It Enacted by the People of the State of Oregon:**
4 **SECTION 1. The Legislative Assembly declares that it is the policy of this state to pro-**
5 **tect the quality of the waters of the state by:**
6 **(1) Controlling the discharge of sewage, gray water and hazardous material as defined in**
7 **ORS 466.605 from passenger vessels as defined in ORS 468B.300; and**
8 **(2) To the extent allowed by 33 U.S.C. 1322(f), prohibiting the discharge of sewage from**
9 **passenger vessels.**
10 **SECTION 2. (1) The Department of Environmental Quality shall study:**
11 **(a) The impact of sewage, gray water and hazardous material discharged by vessels, in-**
12 **cluding passenger vessels, on water quality; and**
13 **(b) The reasonable availability of adequate facilities for the safe and sanitary removal and**
14 **treatment of sewage from passenger vessels.**
15 **(2) The department shall report the results of the study conducted pursuant to sub-**
16 **section (1) of this section to the Legislative Assembly on or before January 14, 2011.**
17 **SECTION 3. Sections 1 and 2 of this 2009 Act are repealed on January 2, 2012.**
18

NOTE: Matter in **boldfaced** type in an amended section is new; matter *[italic and bracketed]* is existing law to be omitted.
New sections are in **boldfaced** type.

Appendix B- EPA Vessel General Permit Cruise Ship Requirements

Cruise Ship Requirements

* Based on conditions in Title XIV for Alaska
* Applies Nationwide (not just Alaska)

Treated gray water if:

- meets 2^o treatment standards (BOD, TSS, pH)
- < 20 fecal coliform/100 mL
- ≤ 10 µg/L total residual chlorine

Discharge prohibitions in nutrient impaired estuary (if vessel has holding capacity)

≥ 6 knots

- Gray water without limits (unless in nutrient impaired estuary).

OR

< 6 knots

Same as < 1 nm from shore.

AND

- **Nutrient Impaired Estuaries**
 - Must hold if vessel has capacity;
 - if discharging must meet secondary standards (*large cruise ships only*)

1 nm

3 nm



Appendix C-Areas Closed by Title XIV Federal Cruise Ship Legislation

