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PHASE 2 COMMERCIAL VESSEL SEWAGE MANAGEMENT AND PUMPOUT

PUGET SOUND NO DISCHARGE ZONE FOR VESSEL SEWAGE

Prepared for
Washington State Department of Ecology

Prepared by
Herrera Environmental Consultants, Inc.
and
Veda Environmental

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PUGET SOUND NO DISCHARGE ZONE FOR VESSEL SEWAGE

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Introduction

The Washington Department of Ecology (Ecology), in coordination with other agencies and interested stakeholders has been exploring whether to petition the United States Environmental Protection Agency (US EPA) to establish a No Discharge Zone (NDZ) for vessel sewage in all or parts of Puget Sound. Under a NDZ designation, no sewage discharges from any vessels, even if treated by a marine sanitation device (MSD), would be allowed in any portion of the area designated as a NDZ.

During 2012, the first phase of the process of gathering existing data to fulfill the petition requirements began. During that process, three reports were prepared to help clarify the NDZ petition process, and fulfill specific elements of a NDZ petition. The first report summarized NDZ petition requirements and petition development strategies used by other states (Herrera 2012a). The second report summarized the environmental condition of Puget Sound, and outlined the regulatory context for vessel sewage discharges (Herrera 2012b). The third report provided an initial characterization of Puget Sound's recreational and commercial vessel population and of existing vessel sewage pumpout facilities (Herrera 2012c).

Information gathered in the first phase provided a framework for evaluating the potential costs and benefits of establishing a NDZ for Puget Sound. However, Ecology needed more information before making an informed determination of whether it should move forward in pursuing a NDZ designation. One of the more critical aspects needed to weigh the costs and benefits of a NDZ is an understanding of how NDZ regulations would impact the various stakeholders who use Puget Sound, particularly those dependent on it for their livelihood.

This memorandum summarizes the results of an information gathering effort jointly conducted by Ecology, Herrera Environmental Consultants (Herrera), and Veda Environmental (Veda) aimed at learning about the wastewater management practices of commercial vessels operating in Puget Sound. The results will help determine how stakeholders may have to modify their vessels, sewage management practices, and routines to comply with NDZ regulations. It will also help inform decisions on how the availability of pumpout facilities and services may be improved to better facilitate compliance with the NDZ.

Approach

Information gathering in the form of a questionnaire (Appendix A) and informal phone conversations with commercial vessel operators, associations, and stakeholder groups on the potential benefits and impacts of a NDZ designation in Puget Sound were conducted between January 1 and April 1, 2013. The list of stakeholders was developed during the first phase of the project, and was informed by the experiences of other states that have successfully implemented NDZs in their waters.

The information collected was intended to estimate commercial vessel types operating in Puget Sound, number of people generally on each vessel, and practices of sewage management including type of Marine Sanitation Device (MSD), presence of holding tanks, existing sewage pumpout capabilities, and potential impediments to compliance. The information obtained for each of the commercial vessel groups is described in the following section and summarized in Table 1.

Table 1. Commercial Vessel Types and Sewage Disposal Practices in Puget Sound.								
Vessel Type	**Area of Operation**	**Time in Puget Sound**	**Approximate number of People on Board**	**Typical Marine Sanitation Device**	**Holding Capacity**	**Sewage Disposal**	**Pumpout Options**	**Ease of NDZ Compliance**
Tugboats/Barges	Puget Sound	24/7 operation	4-6	Nearly all Type II	Newer tugs: yes Older tugs: none	Discharge of treated waste	Large pumpout boats w/proper fittings	Challenging
Cargo Ships/Tankers	Pacific Ocean	Few hours to days.	20	Type II / III	Typically 1-3 days	Hold until open ocean, pumpout when in port.	Large pumpout boats w/proper fittings	Most are currently compliant
Commercial Fishing Vessels	Puget Sound	Day trips/seasonal	2-5	Type III	30-250 gallons	Shoreside facilities and pumpout boats	Dockside facilities, pumpout boats	Most can comply with existing infrastructure
	Pacific Ocean	Seasonal operation	10	Type II / III	65-1,500 gallons	Hold until open ocean, pumpout when in port.	Dockside facilities, pumpout boats	Dependent on Vessel
Charter Fishing Vessels	Puget Sound	4-12 hrs.	6-12	Type III, Porta Potty	25-60 gallons (one outing)	Shoreside facilities, pumpout boats	Dockside facilities, pumpout boats	Currently compliant or can easily comply
Tribal Vessels	Puget Sound, Pacific Ocean	Day trips, sometimes longer	2-6	Type III, Porta Potty	5-35 gallons (1 week)	Pumpouts, dump stations	Dockside facilities, pumpout boats	Most can comply with existing infrastructure
Large Cruise Ships	Pacific Ocean	10-14 hours	800-5000	Type II or AWTS	2-3 days	Hold until open ocean	Seattle City Sewer	Currently compliant
Small Cruise Ships and Whale Watching Vessels	Puget Sound	4-10 hrs.	15-600	Type III	1-3 days	Shoreside facilities, pumpout boats	Large pumpout boats, shoreside facilities	Most are currently compliant
Military Vessels		Not disclosed	Not disclosed	Type III	not disclosed	Privately maintained pumpout	Privately maintained pumpout	Currently compliant
Ferries	Puget Sound	Continuous daytime operation	100-500	Type III	Variable	Privately maintained pumpout	Privately maintained pumpout	Currently compliant
NOAA Research Vessels	Puget Sound	Days to months	30-55	Type II	8 hours to 3 days	Discharge of treated waste	Dockside facilities, pumpout boats	Challenging

Commercial Vessel Groups

Tugs/Barges

Results from this category are based on 10 completed surveys with 9 different tug operators, and from information obtained during a tour of one of the tug services, and from other communications with the industry. (Barges typically do not have restroom facilities on-board and therefore are not discussed further in this report.) There are about 138 tugs operating in Puget Sound or in and out of Puget Sound. According to the survey results, most tugs operate 24 hours a day, and remain solely in Puget Sound. Generally, there are about 4 to 6 people on these boats, although there may be as many as 10. A few tugs have Type III MSDs (i.e., holding tanks) but most tugs use Type II MSDs, and therefore would need retrofitting in order to comply with a NDZ. In addition, most of these vessels are too large to access public pumpout facilities. Like other commercial vessels, they currently cannot efficiently use most mobile pumpout services because of limitations on the volume of sewage pumpout boats can handle. Meeting the needs of tugs and barges would require new mobile services that can pump quickly, hold larger quantities of waste (i.e., 1,000 gal), and have the appropriate valving to handle these vessel types and/or stationary pumpouts in key locations where the tugs most frequently stop. The tugs would also need time to design, construct and go through the approval process for the retrofits. The American Waterways Operators, which is a national trade association for the tugboat, towboat, and barge industry, expressed serious concerns about the tug operators ability to comply with a NDZ due to the fact that tugs are typically underway 24/7 and are too large for most marinas where pumpout facilities are located. In addition tug operators typically do not have the flexibility to travel off-course or out of their way to use those facilities that would accommodate these vessels.

Cargo Ships and Tankers

There are approximately 2,600 vessel entries in to the Puget Sound from various types of cargo and tanker vessels (based on 2005 Automated Identification System-AIS data). The Pacific Merchant Shipping Association (PMSA) represents commercial vessels such as cargo ships, container ships, tankers, fishing vessels, and tugs and barges. This group was contacted to obtain information about the vessels. In terms of operating conditions, cargo and container ships typically have a quick turnaround at the dock, while tankers may anchor for many hours or days. Port Angeles, Anacortes, and Cherry Point are the main terminals for tankers. The number of people on board cargos and tanker vessels varies widely, but a crew of approximately 20 represents a reasonable average. Most container/cargo and tanker vessels have a combination of Type II and Type III MSDs with holding times of about 1 to 3 days, which means they have the ability to treat and discharge or hold for multiple days.

In addition to providing the general information summarized above, the PMSA distributed the commercial vessel questionnaire (Appendix A) to members and discussed the requested information during one of its membership meetings. Meeting attendees confirmed that under standard operating conditions they treat and hold sewage until it can be discharged offshore beyond 3 miles. However, there are exceptions to this, such as during emergencies or during extended stays, which are rare. The PMSA expressed interest in including exemption language

in the NDZ to address these infrequent situations, such as was included in the NDZ for the State of California coastline.

Large Cruise Ships

In 2012, there were 202 port calls by large cruise ships to the Puget Sound, with an average of 209 port calls over the last 5 years and a passenger volume of approximately 890,000 per year. The Cruise Lines International Association – North West & Canada or CLIA-NWC (previously known as North West & Canada Cruise Association) – represents about 99 percent of large cruise ship port calls frequenting the Puget Sound. This association has been operating under a voluntary Memorandum of Understanding with Ecology and the Port of Seattle related to their sewage discharge. Under that agreement, vessels can currently request direct discharge to Puget Sound if they have an advanced wastewater treatment system and meet stringent sampling and effluent limit requirements. All of the large cruise ships have the capacity to hold their discharges the entire time they are in the Puget Sound or, if needed can use pumpout trucks at the Ports. In the last two cruise seasons, no vessels have requested discharge to Puget Sound. The large cruise ships typically carry between 500 and 4,000 passengers and crew, and call in Seattle at Pier 66 or 91 or occasionally in Port Angeles. The vessels have either a traditional Type II MSD or what is referred to as an Advanced Wastewater Treatment System (AWTS), which typically includes biological treatment with ultrafiltration and ultraviolet light disinfection. Typical holding capacity is 2 to 3 days and the vessels are usually in Washington waters for about 10 to 14 hours.

Small Cruise Ships and Whale Watching Vessels

Several small cruise ship companies and whale watching vessels were contacted to obtain information about the practices and capabilities of small cruise ships and whale watching vessels. Depending upon the vessel and the group, these vessels carry from about 15 to 600 passengers, although the majority are at the lower end of this range and carry 60 or fewer passengers. All of the companies contacted reported that they have Type III MSDs (i.e., holding tanks) and use pumpout facilities or pumpout trucks at docks. The small cruise ships can typically hold their sewage for 1 to 2 days and whale watching vessels for about 3 days. The small cruise ship and whale watch companies contacted were not concerned about their ability to comply with a NDZ in the Puget Sound.

Commercial Fishing Boats

Washington Department of Fish and Wildlife (WDFW) staff was contacted to obtain information on commercial salmon and groundfish fishing in Puget Sound. The salmon fishery can be divided into two sectors; purse seiners, and gillnetters. There are approximately 70 purse seiners that operate in Puget Sound, not including tribal fishers. The purse seiners operate primarily in the fall of the year. The vast majority of the boats operate out of Fisherman's Terminal in Seattle, but Bellingham, Gig Harbor, and Anacortes also have purse seiners. Most of the purse seiners that are docked in these areas actually do their fishing in Alaska, and therefore only pass through the Sound at the beginning and end of their season. On average, the purse seiners have about five people on board.

Based on permits, there are approximately 250 gillnetters in Puget Sound; again, this does not include tribal fishers. This fishery is also seasonal and includes a late summer sockeye fishery that is concentrated in the Frazier River area and a late fall chum season that is concentrated in the Frazier River but also in Hood Canal. Gillnetters typically have two people on board.

There is almost no commercial groundfishery in Puget Sound any longer. Tribal fishers conduct the remaining commercial ground fishing.

In terms of operations, both gillnetters and purse seiners in Puget Sound typically do not stay out multiple days, although they may leave their docks the day before an opening to survey the area, and pick their fishing location. In terms of sewage management, no one could speak to the type of MSD the commercial fishing boats would likely have, as it is widely variable.

The North Pacific Fishing Vessel Owners Association (NPFVOA) distributed a questionnaire about sewage management to its members. The owners of 16 vessels responded to the questionnaire. The types of fishing vessels owned included trawlers, seiners, long liners, crab boats, a tender boat, and one tugboat. None of these vessels fish in Puget Sound, though most are moored seasonally in Puget Sound. When the vessels are moored, waste generation rates are low as there are very few, if any, crew on board. Vessels had either a Type II or Type III MSD, and a holding capacity of 30 to 1,400 gallons. Some of the vessel owners/operators already forgo sewage discharges while in Puget Sound, and indicated that there is convenient access to pumpout facilities and services. Other owners/operators indicated that there is not convenient access to pumpout facilities, and that vessel modifications would be required for them to be able to comply with NDZ regulations.

Charter Fishing

Charter fishing for salmon, halibut, and bottom fish is a popular activity in Puget Sound, and there are a large number of charter boats. There are 'certified' and 'non-certified' charter boats. Certified charter boats are generally large, are captained by individuals licensed to carry a large number of people, and must undergo coast guard inspection and certification. Non-certified boats, or uninspected passenger vessels are typically small to medium sized recreational type vessels, and can only carry up to six people for hire. These boats must meet federal safety and pollution standards, but are not inspected.

The certified charter boat captains that were contacted indicated that holding waste and using pumpout stations/services is compulsory to maintaining status as a certified charter boat. Therefore, certified charter vessels are already in compliance with a NDZ. The charter boat captains of non-certified boats that were interviewed also indicated that NDZ compliance should not be difficult. The captains interviewed indicated that their vessels either have Type III MSDs or porta-potties and that they already use pumpout or dump stations.

Agencies and Tribes

State and Federal Government

Interviews were conducted with representatives from the US Navy, US Coast Guard, and Washington (WSDOT) and Alaska Marine Highway System (AKMHS) ferries. The US Navy, USCG,

AKMHS, and Washington State Ferries use Type III MSDs and have their own pumpout facilities at their ports or docks. There were no expressed challenges, and several expressed that their organizations would already be in compliance with a potential NDZ in Puget Sound. In 2012, there were 22 Washington State ferries operating in Puget Sound; the largest has capacity for 2,500 passengers. The AKMHS ferries, which make approximately 122 port calls in Bellingham each year, typically carry 300 to 799 persons. These ferries have either a Type III MSD or a combination of Type II and Type III MSDs, and can hold waste for about 2 to 3 days. All of their vessels hold their wastewater the entire time that they are in Washington State waters and use a pumpout that was installed for their vessels in Bellingham. The National Oceanic and Atmospheric Administration (NOAA) Marine Operations Center – Pacific, reported concerns that some of their research and survey ships would be affected by a NDZ designation, and could have challenges with their ability to complete missions in Puget Sound. They specifically commented that two of their hydrographic survey ships (which carry approximately 50 to 55 persons) could only operate 8 to 10 hours before their sewage tanks fill up. Each of these vessels is typically in Seattle for a few days to a week prior to going up to Alaska, although at times they may be in Puget Sound for longer periods (weeks or months) doing research. NOAA's two research ships (which carry approximately 30 to 40 persons) have about 3 days of sewage holding time. Each of these vessels is typically in Seattle for a couple of weeks twice a year prior to going up to Alaska, or they may be in Puget Sound for longer periods of time doing research. All of the NOAA ships have Type II MSDs and shift to pumping to shore while at port. Mobile pumpout stations or retrofits may be possible, but cost is a concern.

Tribes

Interviews were carried out with representatives of two Puget Sound tribes. Many of the tribal fishing boats are smaller boats owned by individual tribal members. These boats typically remain in Puget Sound, have two to six people onboard, and are primarily day use. Although sewage management practices can be expected to vary, most of these fishers likely use porta-potties or buckets that are dumped at shoreside facilities. There are larger tribal fishing vessels but these operate outside of Puget Sound. Most of those vessels have holding tanks or porta-potty units. In general, the tribes contacted felt a NDZ would not significantly affect vessel operations, could improve water quality and help protect shellfish growing areas, and that a NDZ designation would have little impact on most tribal-owned vessels.

Vessel Sewage Management Strategies

There are a range of sewage management systems and practices in place on the vessels that use Puget Sound. In general, vessels of similar type (e.g., tugboats) have similar sewage management systems, and will face similar challenges, if any, with complying with NDZ regulations. Table 1 provides a generalized summary of findings for each of the commercial vessel categories. As indicated in the table, many commercial, public, and recreational vessels operating in Puget Sound are already capable of complying with NDZ regulations. In fact, many vessels already manage sewage waste in a manner consistent with NDZ regulations. For example, military vessels, and Washington State Ferries use holding tanks and have their own pumpout facilities at their ports or docks, and cruise ships are already holding and discharging more than 3 miles off the west coast.

However, for the remaining categories, (e.g., tugboats and commercial fishing boats) sewage management strategies likely vary widely. Those vessels with Type III systems could comply with a NDZ with existing infrastructure but would incur additional expense through lost time and pumpout costs. Those vessels with Type II systems, which appear to be prevalent among tugs and possibly fishing boats, would need retrofitting to increase holding capacity or to use pumpout available pumpout facilities.

Impediments to Compliance

As indicated in Table 1, many vessels already comply with NDZ regulations, and for many more, only minor modifications to the vessels or routines would be required. However, for many mid-sized work vessels (such as tugs and some commercial fishing vessels), compliance may be difficult due to space constraints. Such vessels will require the expense of retrofits. For example, most of the tugs that operate in Puget Sound do not have holding tanks, and would require retrofitting. Because they operate on a 24-hour, 7-day schedule, and have a moderate size crew, they would require a fairly large holding tank. Yet the engine rooms on these vessels are already cramped, and in many cases might require extensive reconfiguration to make room for an appropriately sized holding tank.

There may be creative ways to find space where it is not obviously available on vessels that need to add a holding tank in addition or in lieu of a Type II MSD. Type II MSDs, while generally smaller than holding tanks, are still relatively space intensive. By removing the Type II MSD, some of the space needed for a holding tank would become available. Some tugs that operate in other NDZs (such as the Great Lakes) have modified their ballast tanks to serve as sewage holding tanks in addition to providing ballast for the vessel.

Some vessel owners have recently invested in Type I and II MSDs. Many of these vessel owners feel that in doing so, they have already invested in cleaner water by investing in better treatment technologies. Type I and II MSDs would not be approved for use in Puget Sound if the NDZ is established, so the well intentioned upgrades by vessel owners would be obsolete. Furthermore, many vessels would need to be modified again to be able to comply with the NDZ.

For commercial vessels to use pumpouts, the pumpouts ideally would be located where they dock and resupply. Issues such as draft capacity, access, and appropriate valving are critical. Pumpout boats seem to be one of the more practical options for larger commercial vessels, as they would alleviate docking and draught limitations. In addition, because they travel to the vessel needing pumpout rather than vice versa, less time would be lost. However, the pumpout boats currently used in Puget Sound have a relatively small holding capacity (less than 500 gallons), so they are not well suited for handling the potentially large waste volumes generated by commercial vessels. A number of the commercial vessel groups identified this as a problem.

Perceived Benefits to a NDZ

Many of the stakeholder groups, even those that might not outwardly support the NDZ, do perceive benefits in establishing Puget Sound as a NDZ. Many vessel operators suggested that

they thought a NDZ could be beneficial to organisms sensitive to poor water quality, such as shellfish. Some thought that cleaner water could benefit fish and other marine life too. Some also acknowledged that the existing regulations are confusing or at least interpreted differently, and in that sense, having one clear regulation would be beneficial.

While designating Puget Sound a NDZ could prove burdensome to some vessel operators, it also opens potential business opportunities to create additional pumpout capacity especially for mobile pumpout services.

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APPENDIX A

Commercial Vessel Questionnaire

PHONE SURVEY FOR COMMERCIAL VESSEL OPERATORS

Name of Organization: _____

Contact Name: _____

Contact Phone Number: _____

Date of Survey: _____

Surveyor's Name: _____

Introduction

1. Are you familiar with a No Discharge Zone policy? (If YES, continue; if NO, spend a few moments explaining very briefly what it is. See definitions below.)

Vessel Characteristics

1. What type(s) of vessel do you operate? (e.g., tugs, barges, cruise ships)
2. How many people are typically on board the vessel when in Puget Sound? (Fill in the blank with a range of persons) _____
3. Please describe the typical scenario for handling your waste water on board. (Getting at the question: what's a typical day on your vessel with regard to waste water?)
4. What kind of MSD does your vessel have? (Type II / Type III / Advanced wastewater treatment system) _____
5. What is the sewage holding capacity on your vessel? (Fill in the blank with volume) _____
6. How long can you go between pumping out?
   (Circle one: 0 day / 0-1 day / 1-3 days / >3 days)
7. Does your vessel have capacity to hold waste the entire time it is operating in Puget Sound?
   (Yes / No)
8. Would you need to retrofit your vessel to meet the requirements of a NDZ?
   (Yes / No / Unsure)

Sewage Management Practices

1. Do you have convenient access to a pumpout facility (this could include pumpout station, pumpout barge, pumper truck, etc.)?
   (Yes / No)

2. Is your vessel equipped to pumpout – for example, does it have proper valving?
   (Yes / No)

3. Which pumpout facility/facilities are you currently using? (Provide name(s) and location(s)) _____

4. As part of normal operations, do you discharge treated or untreated sewage while operating in Puget Sound? Is this primarily south of Admiralty Inlet? North or west of Admiralty Inlet?

Views on NDZ

1. How would NDZ requirements change your wastewater management operations?

2. What challenges would NDZ requirements pose for you?

3. What benefits, if any, would NDZ designation in Puget Sound offer you?

4. Do you have any additional feedback for the Department of Ecology you would like to provide?

Definitions

Marine Sanitation Devise (MSD):

- Type I MSD: Typically installed on smaller recreational vessels (>26 to <69 feet) and use maceration and chlorination to liquefy and disinfect waste. Most popular brands include Electro Scan EST 12 and Thermopure-2 systems.

- Type II MSD: Typically installed on larger vessels (>69 feet) and include a three-stage process consisting of aerobic bacteria digestion, clarification and filtration, and ultimately chlorine disinfection.

- Type II Advanced MSD: typically a tertiary system (like membrane bioreactor or reverse osmosis) with ultrafiltration and UV disinfection.

- Type III MSD: Holding Tank

No Discharge Zone: A No Discharge Zone is an area of a water body or an entire water body into which the discharge of sewage (whether treated or untreated) from boats and vessels is completely prohibited.

AWTS: Advanced wastewater treatment system.