EPA CONSIDERATION OF ISSUES UPON REMAND IN *AMERICAN WATERWAYS OPERATORS v. WHEELER,* No. 18-cv-2933 (D.D.C.)

(February 26, 2021)

EPA prepared this document in response to a judicial remand of the administrative record in litigation challenging EPA's determination, in February 2017, that adequate facilities for the safe and sanitary removal and treatment of vessel sewage (pumpout facilities) are reasonably available in Puget Sound. *American Waterways Operators v. Wheeler,* No. 18-cv-2933 (D.D.C.) (Nov. 30, 2020). Such an EPA determination is necessary for the State of Washington's prohibition on the discharge of vessel sewage in Puget Sound – a "no-discharge zone" (NDZ) -- to apply.

Summary

The Court's Order directed EPA to further consider the following issues, including any additional fact-gathering the Agency deems necessary:

(1) the costs to vessels attributable to EPA's determination whether adequate pumpout facilities are reasonably available;

(2) the bases to determine whether adequate sewage treatment facilities are reasonably available for commercial vessels; and

(3) an explanation of the ratio of commercial vessels to pumpout facilities and why it helped EPA's determination that adequate treatment and removal facilities are reasonably available.

In response to the Court's Order, this document describes the Agency's consideration and conclusion of the aforementioned issues:

(1) EPA determines that the expected costs to affected vessels, both recreational and commercial, to access and use pumpout facilities do not materially alter EPA's determination that adequate facilities are reasonably available in the Puget Sound NDZ.

(2) EPA determines that Puget Sound sewage facilities are regulated at the federal, state, and local levels and in Indian Country and that there are adequate treatment facilities reasonably available in Puget Sound. Existing WWTPs can accommodate the extra sewage that is estimated to be generated under a Puget Sound NDZ.

(3) The 11:1 commercial vessel to pumpout ratio is a surrogate for pumpout capacity. Upon remand, EPA has again analyzed volume demand and capacity; the screening analysis detailed in this document now more quantitatively demonstrates that there is

widespread availability and sufficient capacity to treat the volume of sewage from the NDZ.

After consideration of the issues remanded by the Court – assessment of cost due to pump out of vessel sewage, assessment of whether adequate sewage treatment facilities are reasonably available, and addressing EPA's use of a ratio of commercial vessels to pumpout facilities to determine whether adequate treatment and removal facilities are reasonably available – EPA reaffirms its determination that adequate facilities for the safe and sanitary removal and treatment of vessel sewage (pumpout facilities) are reasonably available in Puget Sound.

Background

On July 21, 2016, the Washington State Department of Ecology (Ecology) petitioned EPA, pursuant to Clean Water Act (CWA) section 312(f)(3), 33 U.S.C. § 1322(f)(3), for a determination that adequate pumpout facilities are reasonably available for the waters subject to Washington's proposed NDZ. Ecology's application included a certification that the protection and enhancement of waters described in the petition require greater environmental protection. *See* 40 CFR 140.4. On October 14, 2016, Ecology supplemented its application with information concerning commercial vessel pumpout availability in Puget Sound.

On February 21, 2017, following public notice in the *Federal Register* and consideration of comments, EPA determined that adequate pumpout facilities are reasonably available in the waters subject to Washington's proposed NDZ. 82 FR 11218. EPA's determination assessed reasonable availability for all vessels but separately described the availability of sewage pumpout facilities for recreational vessels and for commercial vessels, respectively, in recognition of the different needs associated with each. EPA's administrative record, including the State's application materials, contained limited cost information applicable to vessel operations and to the treatment of sewage from vessels in Puget Sound. In its determination, EPA explained its then-current position that the CWA did not require EPA to consider costs in determining reasonable availability of facilities.

Following EPA's 2017 determination, Ecology proceeded with a State rulemaking to establish the vessel sewage discharge prohibition for the waters identified in its petition. WAC 173-228-030 (hereinafter "Puget Sound NDZ"). As part of this process, Ecology instituted a five-year delayed implementation schedule of the rule's effectiveness for certain commercial vessels. For vessels not identified for delayed implementation, such as recreational vessels, the NDZ took effect in May 2018. WAC 173-228-050.

In December 2018, American Waterways Operators (AWO) filed a lawsuit alleging that EPA's determination was arbitrary and capricious under the Administrative Procedure Act (APA), 5 U.S.C. § 706, and that EPA was not authorized to issue a determination on Ecology's purportedly defective petition. On November 30, 2020, the Court issued a Memorandum and Order holding that EPA was required to consider costs in determining whether adequate pumpout facilities were reasonably available. The Court reviewed Supreme Court and D.C. Circuit cases explaining that a statute's "textual hook" directs the scope of an agency's consideration of factors in regulatory determinations. The Court determined that the term

"reasonably available" in CWA section 312(f)(3) constitutes the type of language that "naturally and traditionally includes consideration of all the relevant factors" and that "[l]ogic likewise dictates that the agency was required to consider costs." As such, the Court held that EPA acted arbitrarily and capriciously in violation of the APA by not considering costs, and that the Agency must do so on remand. The Court further concluded that the record did not sufficiently document EPA's finding that adequate facilities for the *treatment* of vessel sewage were reasonably available in Puget Sound, or EPA's use of a ratio of commercial vessels to pumpout facilities in determining that facilities are available for these vessels. *American Waterways Operators v. Wheeler,* No. 18-cv-2933, at Dkt. 66.

On December 10, 2020, EPA invited the parties in the *American Waterways Operators v. Wheeler* litigation to provide updated data and information relevant to EPA's consideration of the issues on remand with a request that any such information be provided to EPA no later than Friday, January 8, 2021, in order for EPA to review and consider the information within the time provided by the Court. Each of the parties provided responsive information. In preparing its response to the remand, EPA also independently sought and compiled updated information from third parties, such as fees charged by pumpout facilities. *See* Memorandum to File Re: Documentation of Contacts with Pumpout Service Companies and NOAA (Memorandum to File).

This document explains EPA's consideration of the issues remanded by the Court and provides the basis for EPA's reaffirmation of its determination that pumpout facilities are reasonably available in the Puget Sound NDZ. First, the document discusses EPA's consideration of costs. Next, the document explains EPA's assessment of whether adequate treatment facilities for sewage from all vessels, including commercial vessels, are reasonably available in Puget Sound. Finally, the document addresses EPA's use of a ratio of commercial vessels to pumpout facilities to determine whether adequate treatment and removal facilities are reasonably available.

Cost Considerations

This section describes EPA's consideration of costs in the determination whether adequate facilities are reasonably available for the removal and treatment of sewage from all vessels in Puget Sound. Cost is one of many factors EPA now considers in making its determination. EPA also considers the variety of other factors addressed in the information submitted by a State in accordance with EPA's implementing regulations at 40 CFR140.4. Per the regulations, a State's application must include: "(1) A certification that the protection and enhancement of the waters described in the petition require greater environmental protection than the applicable Federal standard; (2) A map showing the location of commercial and recreational pump-out facilities; (3) A description of the location of pump-out facilities within waters designated for no discharge; (4) The general schedule of operating hours of the pump-out 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 pump-out facilities is in conformance with Federal law; and (7) Information on vessel population and vessel usage of the subject waters."

Overview of Cost Tool

Upon remand, EPA analyzed the costs associated with a Puget Sound NDZ by using a cost analysis tool (hereinafter, "the Tool") it had developed for estimating compliance costs for vessel sewage NDZs, that can be modified to reflect the unique characteristics of an individual water body (the Tool is available as an Excel file, see Appendix A). The Tool calculates the percent increase in baseline operating costs that affected vessels in Puget Sound may incur using pumpout facilities to comply with the Puget Sound NDZ. EPA selected this metric for the cost analysis because most costs incurred by affected vessels relate to operating costs, such as increased fuel or crew-related expenditures.

To derive final outputs, the Tool generated a series of calculations based on a variety of user inputs and default values described in detail below. A critical feature of the Tool is a screening analysis that calculates how frequently the demand for pumpout facilities (i.e., the volume of sewage produced by vessels that needs to be pumped out) is projected to exceed pumpout facility capacity (i.e., the volume of sewage that can be pumped out by available facilities). The frequency with which demand exceeds capacity influences the core of the cost analysis due to its relationship with factors such as wait time (and resulting lost revenue). The screening component primarily assesses the availability of facilities, though to some extent it also considers the adequacy of facilities because it assesses the capacity to manage the volume of vessel sewage generated.

EPA's cost analysis focuses on non-oceangoing commercial vessels operating in Puget Sound, including tugboats (and other similar vessels, i.e., workboats, escort vessels, barges, etc.), fishing vessels, excursion vessels, ferries, and research vessels. EPA assumed that oceangoing vessels would choose the least costly option of discharging sewage outside of Puget Sound.

EPA assessed the costs for both recreational and commercial vessels in its analysis. However, the Tool was designed to focus on the cost implications for commercial, not recreational, vessels for two primary reasons. First, federal grant funding is available to states through the Clean Vessel Act (CVA) for the construction and maintenance of pumpout facilities servicing recreational vessels. In contrast to fees charged by pumpout facilities servicing commercial vessels, fees to use these federally funded pumpout facilities are nominal (e.g., $5-25 per pumpout) or, as is increasingly common, free of charge.

Second, recreational vessels with toilets installed onboard tend to be more uniform in size, number of passengers, and volume of sewage produced than their commercial counterparts. As such, recreational vessel needs (e.g., draft and berth requirements, volume to be pumped) for access and use of pumpout facilities are generally consistent, which is not the case for commercial vessels, where size, number of crew/passengers, volume of sewage produced, and draft or height can vary widely (e.g., a four crew commercial fishing vessel versus a 100-passenger excursion vessel). This variation in commercial vessels directly affects the type of facility that commercial vessels can access. For this reason, the cost analysis sorted the commercial vessel population to determine whether adequate pumpout facilities are reasonably

available for the types of commercial vessels present in the proposed waterbody. An analogous sorting is not needed for most recreational vessels. Despite these two distinguishing factors, EPA did consider in this analysis whether the cost to recreational vessels is prohibitive, such that it would negate the ability to partake in recreational boating in Puget Sound, and discusses those considerations later in this document.

The statutory text of CWA section 312(f)(3) guided which costs were included and excluded from the cost analysis. Under CWA section 312(f)(3), EPA is directed, upon application by a State, to determine whether "adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels are reasonably available." The term "reasonably available" applies to the determination of "adequate pumpout facilities." As such, the costs identified for inclusion by EPA are those that vary based on the adequacy of existing facilities, as well as costs affecting the degree to which use of those facilities can be considered "reasonably available." These costs include facility use costs, pumpout time costs, travel costs, and wait time costs, all of which are described in more detail below.

EPA's cost analysis does not consider costs that are not influenced by the adequacy and availability of pumpout facilities. For example, EPA did not incorporate costs to retrofit a vessel to comply with the discharge prohibition (the NDZ itself), such as the costs associated with replacing a flow-through (Type I or Type II) marine sanitation device (MSD) to a Type III MSD (a holding tank designed to store vessel sewage until pumpout) or the costs for time lost out of service for installation of such devices. EPA did not include in its assessment the costs associated with replacing or supplementing an existing Type I or Type II MSD with a holding tank because any such need for retrofit would be attributable to the *per se* existence of the NDZ and would not be attributable to inadequacy or unavailability of pumpout facilities.

Under CWA section 312(f)(3), where the state takes primary responsibility for regulating, EPA's determination is limited to the reasonable availability of adequate pumpout facilities rather than the reasonableness of the State's establishment of the Puget Sound NDZ generally. EPA does not question a state's determination that waters identified in the NDZ application "require greater protection" when EPA determines whether adequate pumpout facilities are reasonably available in response to the state's proposal to prohibit vessel sewage discharges. For that reason, EPA constrains its consideration of costs to the costs that can be attributed to pumpout facility availability and adequacy. Because complying with a vessel sewage discharge prohibition (other than avoiding travel within the zone) would necessarily entail use of an existing or newly installed holding tank, any costs to vessel owners associated with retrofitting would be attributable to a state's prohibition on discharges itself and not to factors related to the "availability" or "adequacy" of the pumpout facilities that serve vessels equipped with such tanks.

This approach is based on a plain reading of CWA section 312(f)(3). A state NDZ does not "apply" unless and until EPA concludes that adequate facilities are reasonably available. Congress directs EPA to consider costs by using words (the adjective "reasonably available") that modify *only* the EPA pumpout facility determination. The statutory consequence of an

EPA's affirmative determination is that the vessel sewage prohibition "applies," but Congress did not include similar text directing EPA to consider (much less authorize EPA to consider) the reasonableness of application of the NDZ.

In addition, there is no indication that Congress meant the term "available" to have any meaning other than its commonplace meaning of ready or accessible or usable; whether pumpout facilities have any of these attributes is unrelated to whether use or installation of new or expanded holding tanks is required, let alone how much such retrofits may cost. In keeping with the CWA's policy emphasizing the primary role of states in water quality protection and the sensitivity to federal preemption demonstrated in the 1970 and 1972 legislative history of vessel sewage control provisions, the statutory text vests the state with the role of determining which waters require greater protection and ultimately whether the vessel sewage discharge prohibition should apply. EPA's task is limited to determining whether the pumpout facilities that become critical to avoiding disruptions to interstate commerce when a state establishes a NDZ are reasonably available. For EPA to determine that costs other than those attributable to the availability of adequate pumpout facilities preclude a sewage discharge prohibition would overstep EPA's statutory role and undermine the role that CWA section 312(f)(3) largely vests in states to take the actions they find necessary to protect their waters.

Moreover, retrofit costs are one-time "fixed costs" that are not influenced by and do not vary based on whether pumpout facilities are adequate and available. Such vessel costs are not relevant to any attribute (e.g., number, size, distribution, accessibility) of pumpout facilities.

Costs that EPA input into the Tool were determined annually by vessel class using a "uniform demand" scenario. The concept of uniform demand assumes that an equal number of vessels within a class will pump out every day. For example, if a particular vessel class is expected to pump out every four days, then under a uniform demand scenario one in four vessels within that class will pump out each day during the months that the class is expected to operate. This assumption is consistent with cost-minimizing behavior, as vessel operators will minimize costs by spreading out demand, reducing the wait time to access a pumpout facility. This assumption is also reasonable because vessel operators can schedule a pumpout ahead of time at a facility. In this way, EPA's Tool models daily demand on the available pumpout facilities across the year. Using the operating schedule of pumpout facilities, EPA estimated the volume of sewage each facility can receive daily and was therefore able to determine the percent of days per year that demand for pumpout service is expected to exceed capacity.

In addition to providing insight into the adequacy of pumpout facilities as compared to the needs of the vessel population, EPA used this value (percent of days per year when demand would exceed capacity) to estimate how often vessels may be expected to wait to access a pumpout facility, and subsequently the cost of such a wait. EPA assumed that individual pumpout facilities would be equally in demand for services. While EPA recognizes that some pumpout facilities may be in higher demand such that they experience wait times when others do not, EPA was not able to model unequal demand, however, and assumed that all facilities serve

pumpout needs for Puget Sound based on equal demand. For that reason, EPA approached the issue of wait times at the waterbody level rather than the facility level, such that when periods of demand exceeded capacity across Puget Sound, wait times could be expected. The cost associated with this wait time would be a function of lost revenue for the time spent waiting. These are conservative, worst-case scenario assumptions designed to estimate the high-end ranges of expected costs.

EPA's cost analysis used three categories of inputs for each vessel class – vessel inputs, pumpout facility inputs, and cost inputs – as described in the bullets below (definitions and source information are available in Appendix B).

- **Vessel inputs**: the number of vessels operating in the proposed NDZ, which months these vessels are operating, average number of crew/passengers onboard, sewage generation rate, number of days between pumping out, average distance traveled to access a facility, percent of vessels with holding tanks already installed, and a buffer time for pumping out.
- **Pumpout facility inputs**: pumpout facility name, type, operating schedule (hours, days, and months of operation), connectivity to sewer, holding tank capacity, total working flow of the pumpout facility, and the fee.
- **Cost inputs**: annual vessel baseline operating costs, vessel speed, fuel consumption, hourly revenue, and fuel price.

The analysis used these input values to generate the estimates of the different kinds of costs.

- **Pumpout facility use costs**: The estimated fees paid to use a pumpout facility. To generate an estimate, the Tool identifies which of the available pumpout facilities have capacity to service each vessel class and uses an average of those facility fees. For example, if the average tugboat is expected to pumpout 1,000 gallons of sewage per pumpout, only available facilities with capacities over 1,000 gallons will be used in determining the average cost to pumpout a tugboat.
- **Pumpout time costs**: The lost revenue to the vessel operator resulting from the time required to use the pumpout facility (i.e., to complete pumpout of onboard sewage). This value is a combination of the actual time to pumpout (based on the volume being pumped and the working flow of the facility), as well as a "buffer time" that accounts for additional time not actively pumping.
- **Travel costs**: The lost revenue and fuel cost to the vessel resulting from the time and distance to travel to a pumpout facility, should accessing a facility require substantial deviation from typical operations.
- **Wait time costs**: The lost revenue from waiting to access a pumpout facility. Wait time costs would be expected when the preliminary screening analysis in the Tool indicates that demand for pumpout facilities may exceed the collective facility capacity to receive sewage. On these days, EPA assumes that each vessel would have to wait for other vessels ahead of it to pump out, which includes the "buffer time" explained earlier. In the "Vessel Inputs" described above, one of the inputs is the percent of vessels of each class with holding tanks already installed. These vessels would not incur new costs associated with pumpout fees, pumpout time, or travel, since the vessels are already pumping out

prior to the NDZ designation. However, State establishment of an NDZ would create increased demand for pumpout facilities which may create new wait times associated with pumping out. As such, the additional wait times these vessels with holding tanks in the baseline may face are appropriately considered in EPA's determination. EPA notes, however, there is a sufficiently large pumpout capacity in Puget Sound such that EPA does not consider wait times to be a significant issue for commercial vessels (see screening analysis below).

To conduct the analysis with the formulae in the Tool, when EPA lacked values specific to Puget Sound, EPA relied on some "default values" for several inputs, which are explained below along with the sources of those default values. Many of the Puget Sound-specific values were taken from reports written directly by Ecology or by consultants working on behalf of Ecology, namely Herrera Environmental Consultants, Inc. (hereinafter, "Herrera").

Populating the cost analysis tool with the required values generated output results for EPA's review. The first section of the output pertains to the screening analysis and provides the minimum and maximum demand and capacity (in gallons per day) from the uniform demand scenario modeling. This section of the output also provides an estimate for the percent of days when minimum and maximum demand, respectively, exceeds capacity. The second section of the output is a table containing the full breakdown of the various costs by vessel class, including the total compliance cost per year in dollars, as well as the percent increase in baseline operating costs for vessels with and without holding tanks installed in the baseline.

Application of Cost Tool to Puget Sound

Vessel Population Profiles

This section explains the inputs that EPA used to characterize each Puget Sound vessel class in the analysis, including assumptions made and the sources for each input.

Tugboats

The sources reviewed by EPA indicate that approximately 174 tugboats, including ocean tugboats, harbor tugboats, workboats, and assist and escort boats operate within Puget Sound. Of these, Ecology (2016b) estimated that 150 tugboats would require pumpout facilities. EPA used 150 in its calculations and assumed year-round operation (and therefore sewage generation) by these vessels (i.e., non-oceangoing, sewage generating tugboats). This is a conservative approach to tugboat operating months because vessels would likely be taken out of service for a few weeks per year for maintenance. As reported by Herrera (2015), "[c]urrently about 25 percent of the tugboat fleet based out of Puget Sound utilizes holding tanks; the rest have Type II MSDs that treat and discharge waste (Charlie Costanzo, Vice President-Pacific Region, AWO, personal communication, November 2013)." As such, EPA assumed that 25% of the tugboat population used in the analysis have holding tanks installed in the baseline.

The default value used in the Tool for the average number of crew onboard a tugboat is six individuals. EPA reliance on this value was based on previous research conducted on EPA's behalf by Eastern Research Group, through conversation with AEP River, a barge company. Herrera and Veda Environmental (2013) estimated an average crew of four to six, with the

potential for as many as ten. In its most recent information submission, AWO reported that towing vessel operators typically carry five crew. Because the default value used in the Tool is in line with the estimates provided by both Ecology and AWO, EPA used an average crew of six.

In "Puget Sound NDZ Commercial Vessel Economic Evaluation," Herrera (2015) reported information conveyed by AWO regarding tugboat operations in Puget Sound, including information pertaining to sewage generation rates, trip duration, and the number of tugboats operating holding tanks in the baseline. For sewage generation, AWO provided an estimate of 16 gallons per person per day, noting that it was "based upon current vessel plumbing and configurations." The Herrera (2015) report explains that high efficiency heads are available on the market that would reduce the sewage generation rate to between two and six gallons per person per day. As such, EPA's use of 16 gallons as the generation rate may be overly conservative.

A Herrera (2015) report explains that AWO reported a typical trip length to be 14 to 21 days. In AWO's January 2021 submission, a footnote indicates that members reported pumpouts would need to occur between every 5-15 days. In the same document, as part of calculations for an appropriately sized holding tank, AWO used 30 days for the interval. In light of the varied information provided, EPA used 21 days as a midpoint of the values provided for the expected interval between uses of a pumpout facility by tugboats.

Because tugboats in Puget Sound are likely to rely on the use of mobile pumpout trucks instead of stationary facilities, EPA assumed a buffer time of one hour in addition to the calculated time for active pumping of the tank. This buffer time assumption accounts for the miscellaneous time, such as connecting the hoses to the vessel and travel time of the mobile facility, that the vessel operator must pay for in pumpout facilities fees. The Tool also calculates the estimated cost in lost revenue due to this time because the vessel cannot perform jobs during the time it is pumping out sewage. EPA selected an hour for the buffer time based on information available from several different pumpout truck companies, which suggests a rough approximation of one hour of billable time for every 1,250 or so gallons of sewage pumped.[1] EPA believes this is an appropriately conservative estimate given that the volume of sewage to be pumped by an average tugboat will vary based on days between accessing pumpout facilities, such that the volume pumped may be more or less than 1,250 gallons. For example, certain harbor tugs may access facilities more frequently, requiring a smaller volume to be pumped out and therefore experiencing shorter pumpout times. Additionally, vessel operators can choose to hire truck companies located nearest to preferred pumpout locations, limiting the buffer time needed to account for trucks traveling to the pumpout location.

[1] Arrow Marine Services provided information to AWO (reported in the January 2021 submission) that 6,000 gallons would take approximately 6-7 hours to pump out, suggesting a rough estimate of one hour of billed time per 1,000 gallons. Sound Marine & Industrial Services (*see* Memorandum to File) informed EPA that a recent pumpout of 5,000 gallons was billed for 2.5 hours, equating to about 2,000 gallons per hour. Lastly, Emerald (CleanHarbors) provided information to AWO (reported in the January 2021 submission) that a "standard" pumpout (assumed to be 3,000 gallons) would take a half day (assumed to be four hours), equating to approximately 750 gallons per hour. EPA recognizes that this is a rough approximation based on available information, as billable time will depend on where the vessel is located, where the pumpout truck is coming from, and other relevant factors.

For the average distance traveled to access a pumpout facility, EPA used in the Tool a value of five nautical miles. According to Ecology (2016b), "[t]he tug industry provided a list of preferred additional stationary pumpout locations and discussed their vessel logistics. Most tug vessels refuel at Harbor Island, and sometimes in other locations such as Anacortes or Tacoma. Other possible locations, although not refueling there now, are the east waterway in Everett, and Fisherman's Terminal." The locations identified here – where tug refueling operations typically occur – are well-distributed across the NDZ and are in areas where it is expected that vessels would require minimal travel to access a dock where pumpout operations could occur. In many cases, it is likely that a pumpout truck could access the vessel at the same location where refueling is to occur, such that additional travel would not be required at all. For context, in the northern portion of Puget Sound, the Port of Bellingham and Anacortes are approximately 15 nautical miles apart. In the southern portion of Puget Sound, on the other hand, Harbor Island and Elliott Bay Marina (south of Fisherman's Terminal) are just over four nautical miles apart. Assuming some vessels would not require travel, while some may require more, EPA identified five nautical miles as a reasonable estimate for the distance to travel to pumpout facilities.

Commercial Fishing Vessels

According to the reports generated by Herrera (e.g., Herrera, 2013), 350 commercial fishing vessels spend some portion of the year in Puget Sound. Per one such report (Herrera, 2015), "[a]bout 70 of these vessels are salmon seiners that fish in Puget Sound for part of the year. The remaining majority of the fleet berths in Puget Sound ports (e.g., Anacortes and Fisherman's Terminal in Seattle), and fishes outside of Puget Sound, typically in Alaska, for most of the year." According to Washington Department of Fish and Wildlife staff, the 70 purse seiners primarily operate during the fall, while approximately 250 gillnetters fish in late summer and late fall for sockeye and chum salmon, respectively (Herrera, 2013). The 2013 Herrera report further explained that most purse seiners fish in Alaska, such that they only pass through Puget Sound at the beginning and end of their season. Charter fishing vessels also operate in Puget Sound. However, as described by Herrera (2013),

> 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.

For purposes of the cost analysis, EPA used a value of 350 commercial fishing vessels in lieu of attempting to parse whether portions of the fleet may or may not place demand on pumpout services at any given time. Based on information gathered by Herrera (2015), approximately half of commercial fishing vessels in Puget Sound already had holding tanks installed within the time-period reported by Herrera at least six years ago.

In a conversation with Sound Marine & Industrial Services (*see* Memorandum to File), a sewage pumpout provider in Puget Sound, the company representative explained to EPA that the

commercial fishing fleet is typically serviced between October and mid-January, followed by a brief break, with services resuming between mid-February and May. The representative indicated that June through September sees little demand for pumpout services from the fleet. Because the information provided by Sound Marine covered a more expansive period than that described by the Washington Department of Fish and Wildlife, EPA used those time periods in the Tool.

EPA recognizes that the information provided by Sound Marine & Industrial Services may not be representative of the commercial fishing fleet's demand on pumpout facilities considering the myriad fisheries in the Puget Sound region. However, even if some of the fleet is pumping out in the four months between June and September, EPA estimates the volume of sewage produced to still be low because vessels in this class have small crews that produce an estimated 64 gallons of sewage per day. Herrera (2013; 2015) reports that commercial fishing vessel crews range from 2 individuals (gillnetters) to 5 individuals (purse seiners) and the vessels do not typically remain out of port for multiple days. As such, EPA assumed an average crew of four with a pumpout interval of one day. EPA used the sewage generation rate for tugboats of 16 gallons per person per day as a proxy for the rate on commercial fishing vessels because both vessel classes have small crews and may have marine heads of similar efficiency. This is a conservative assumption because it assumes that the gillnetters and purse seiners do not leave Puget Sound and discharge in the ocean during these months (or that the vessels return daily to pump out).

Because commercial fishing vessels typically return to port daily and produce small volumes of sewage, EPA assumed that these vessels can be serviced by pumpout facilities without the need to travel. Mobile pumpout facilities are not expected to have difficulty accessing fishing vessels where they are offloading their catch. Importantly, while this analysis only considers pumpout facilities identified as available for commercial vessels, some of the fishing fleet may access the facilities that typically service recreational vessels. The volume of sewage produced by the fishing vessels is low, and many fishing vessels likely do not have draft or berth restrictions that prevent access to these facilities. Indeed, marina operators would find it more profitable to service both recreational and commercial vessels, when able. EPA notes, however, that CVA-funded facilities are typically restricted to recreational vessel use. Because of this increased flexibility, EPA did not include a buffer time assumption for the average commercial fishing vessel.

Excursion Vessels

In Washington's Final Regulatory Analysis (Ecology, 2018), the State explains that the 60 excursion vessels identified as operating within Puget Sound were already compliant with the NDZ. Washington also identified three "small commercial passenger ships," defined as having 249 overnight passengers or fewer, that would need to retrofit and use pumpout facilities. These vessels include small cruise ships and whale watching vessels. EPA bundled these two sets of vessels together as "excursion vessels," using a total vessel population of 63 in the Tool calculations. Of these, all but three had holding tanks installed before establishing the NDZ and therefore are part of the baseline.

According to Herrera (2013), these small commercial passenger ships "carry from about 15 to 600 passengers, although the majority are at the lower end of this range and carry 60 or fewer passengers." As such, EPA conservatively entered into the Tool a default value of 187 passengers. This value was taken from work conducted by Eastern Research Group on EPA's behalf to estimate vessel sewage generation rates, and was an average based on information provided by 23 medium/small cruise ships.[2] This is likely an overestimate because Ecology indicates that most of the vessels are at the lower end of the provided range. EPA further assumed that these vessels would operate between April and September. This operating month range is based on the number of days per year this vessel type is expected to operate in U.S. waters – 174 – centralized to the middle of the year as EPA expects excursion vessels to typically operate during the spring and summer months (U.S. EPA, 2006).

For excursion vessels, EPA used a default sewage generation rate of 8.4 gallons of sewage generated per person per day, taken from EPA's (2008) "Cruise Ship Discharge Assessment Report." Herrera (2013) reported that small cruise ships typically hold their sewage for one to two days, while Ecology (2018) estimated the pumpout interval to be two to three days. As such, EPA selected the midpoint value of two days for the estimate of the excursion vessels' pumpout interval.

Lastly, EPA assumed that excursion vessels would likely not require additional travel to access pumpout facilities. Due to excursion vessels' typically large size, EPA expects that pumpout trucks can access the docks or other facilities where excursion vessels would typically frequent. Similarly, EPA did not calculate a buffer time for excursion vessels because pumping out may occur concurrently with other activities, such as boarding and offloading passengers.

Ferries

Of the 45 ferries operating in Puget Sound, Herrera (2013) reports that 22 of these ferries are Washington Department of Transportation ferries with dedicated pumpout facilities. Similarly, Ecology (2018) reports that the remaining 23 ferries are Alaska Marine Highway System vessels that also use dedicated pumpout facilities. Because these ferries already have holding tanks (installed prior to the establishment of the NDZ) and are serviced by dedicated pumpout facilities (meaning that they will not generate demand for the facilities used by other vessels), EPA concluded that none of the ferries will experience an increase in annual operating costs. As such, EPA does not provide any further profiling or analysis for ferries because the dedicated pumpout facilities mean that ferries do not compete with other vessels in the demand for pumpout capacity.

NOAA Research Ships ("Public Unclassified")

The National Oceanic and Atmospheric Administration (NOAA) Marine Operations Center – Pacific reported to Ecology that some of their research vessels may be impacted by the NDZ, specifically identifying four vessels (two hydrographic survey ships and two research ships) that would require pumpout facilities (Herrera, 2013). The frequency with which these

[2] A full accounting of the data used to generate these estimates is provided in the "Sewage Gen & Pumpout Int" tab of the Tool, as well as in the References section of this document.

vessels would operate in Puget Sound was not well-defined. Per Herrera (2013), the hydrographic survey vessels are "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." Similarly, the research vessels are "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." In conversation with EPA on January 29, 2021, NOAA staff indicated that the typical operating season ranges between April and October, with the majority of activity occurring in Puget Sound from April to mid-May and September to October, which is when vessels will be transiting to and from Alaska. As such, EPA used two operating seasons in the Tool for this type of vessel: April 1 through May 15 and September 1 through October 31. NOAA also confirmed that most trips last for a few days to approximately six weeks.

The two types of NOAA research vessels have as many as 55 and 40 persons onboard, respectively, so an average of 48 crew was used in EPA's analysis. In the absence of specific data regarding sewage generation rates, EPA used an estimate of sewage generation on board cargo/container/tanker ships as a proxy. This estimate – 11 gallons per person per day – was a median value derived from information provided to EPA by the Chamber of Shipping of America (2010).

EPA estimates that these vessels would pump out approximately every three days while operating in Puget Sound. The source of this value is "The NOAA Fleet Plan: Building NOAA's 21st Century Fleet" (NOAA, 2016). In discussing the effect of environmental regulations and policies on fleet operations, the report states that because of vessel discharge requirements under the Clean Water Act, "ships operating in coastal or protected areas must break operations every two to four days to transit from the working ground to perform these necessary services." This was confirmed in conversation with NOAA staff on January 29, 2021, who estimated that pumpouts would be needed every three to five days. EPA further assumed that these vessels would not need to travel additional distances to use pumpout facilities, as mobile facilities could be called to service the vessels where they are receiving other services.

As reported by Ecology, all four of the ships were equipped with holding tanks with capacity ranging from 8 to 10 hours for the hydrographic survey vessels, to three days for the research vessels. However, these NOAA vessels have since upgraded holding capacity to comply with the NDZ (*see* Memorandum to File). As such, the cost assessment assumes that 100% of "public unclassified" vessels have holding tanks (installed in anticipation of the establishment of the NDZ). While these vessels have sufficient holding capacity, they are still included in EPA's screening analysis because they do not have dedicated pumpout facilities and, therefore, require continued access to available public facilities.

Pumpout Facility Information

This section describes the available pumpout facilities identified by EPA for use in the analysis. Information regarding the facility characteristics was gleaned from the various reports produced for and by Ecology, as well as additional information provided by AWO. In some cases, information was obtained from the pumpout facilities themselves, either via company websites or from conversations with company representatives (*see* Memorandum to File). This

section also explains EPA's reliance on default values in the absence of Puget Sound-specific data or information.

Because the stationary facilities identified by Ecology in its application may not be suitable or accessible to certain larger commercial vessels, EPA limited its costs analysis for available and adequate pumpout facilities to include only mobile facilities identified by Ecology in the January 2021 submission and the stationary facilities at the Port of Bellingham. Fifteen mobile pumpout companies operate 69 individual facilities (i.e., a truck, boat, or barge). EPA gathered information about service hours per day, days per week, and months per year of operation for each facility primarily from company websites when available, and in some cases, conversations with certain operators.[3] If this information was not readily available, EPA assumed pumpout service to be available 16 hours per day, five days per week with year-round operation. While some recreational vessel pumpout facilities may close during the off-season, such closures are not expected to affect commercial vessel pumpout operations, particularly those able to service other sectors or pumpout needs (e.g., septic tanks). EPA supported this assumption by contacting some of the companies, each indicating that services are available 365 days per year (*see* Memorandum to File). To determine the maximum volume of sewage that each facility can pump per day while in operation, the Tool has fields for whether the facility is connected to a sewer and, if not, the size of the holding tank at the facility. EPA used information provided by Ecology and AWO in their January 2021 submissions and, in some cases, the companies themselves, regarding the size of holding tanks for the individual facilities.

An explanation of the fees used in the analysis is provided in the table below.

Company Name	**Fee Information**
Rose Head Service	According to Ecology's January 2021 submission, the fee is $18 and up. Rose Head Service website provides pricing between $15 for weekly service up to $25 for on-call service. However, for large tanks (>50 gal), the website indicates that a quote is required. As such, EPA did not populate the fee inputs.
SS Head	Per company website, "larger tanks" are serviced at a rate of $20 per pump plus $0.20/gallon.
Arrow Marine Services	Default value used. Per AWO's recent information submission, Arrow was unable to provide a rate sheet.
Port of Bellingham	Pumpout services are free of charge.
Pump Me Out	Per Ecology's January 2021 submission, the fee is $35-45.
Pelican Pump	Per Ecology's January 2021 submission, the fee is $20 and up.
Seattle Sanitation Services/SaniTug	Per Ecology's January 2021 submission, the fee is $20-25.
Elliott Bay Marina	Per Ecology's January 2021 submission, the fee is $25 and up.
Marine Vacuum Services	Default value used.
Washington Marine Cleaning	Per AWO's January 2021 submission, "Each time that a vessel undergoes service for pumpout from the company would cost

[3] *See* Memorandum to File.

	between $5,000 and $7,000." A company representative provided EPA with a rough estimate of approximately $175/hour plus $0.57 per gallon (including disposal fees). These are the values used by EPA in the analysis; however, the representative did note that additional variable fees may apply (e.g., tolls, PPE) (*see* Memorandum to File).
NRC	Per AWO's January 2021 submission, "Pumpout service from NRC costs $135/hour for the truck and an additional $0.50 - $0.85 per gallon of effluent removed." NRC also charges "additional disposal costs." As such, EPA used the high end of the range, $0.85/gallon.
Emerald/CleanHarbors	Per Ecology's January 2021 submission, "Pumping costs estimated at $1,700 for about 6 hours of work and 1,500 gallons of sewage ($0.25/gallon King County rate)." Using these values, EPA estimated a rate of $220/hour, in addition to the $0.25/gallon charge.
Sound Marine & Industrial Services	According to a company representative, a recent pumpout service had a rate of $154/hour and $0.25/gallon, plus a small fuel surcharge (*see* Memorandum to File).
Sanitation Offloading Solutions	Per Ecology's January 2021 submission, the fee is $35 and up.
Pumpout Seattle	Per Ecology's January 2021 submission, the fee is $25 and up.
NW Mobile Pump Out and Marine Environmental Services	Per Ecology's January 2021 submission, the fee is $20-30 and up.

Lastly, EPA assumed that commercial facilities would use a vacuum system with a working flow rate ranging between 75 and 100 gallons per minute (gpm), with an average of 88 gpm (Alaska Clean Harbors, no date; Keco Pump and Equipment, no date). EPA uses this default pump rate value throughout the analysis.

Cost Information

There are five cost inputs in the Tool, provided as default values, that are used to calculate a variety of the cost outputs. These include annual baseline operating costs for commercial vessels, vessel speed, fuel consumption, hourly revenue, and fuel price. For the Puget Sound cost analysis, EPA used the default values for all the inputs for tugboats, commercial fishing vessels, and excursion vessels, as explained below. Default values were not available for NOAA research ships.

Annual Baseline Operating Costs

For tugboats, EPA initially anticipated using a baseline operating cost estimate of $853,260 per year based on a U.S. Army Corps of Engineers Department of Civil Works memorandum (2004) that estimates the daily operating costs for the Mississippi River towboats. Because the estimates are in 2004 dollars, the Tool converted the amounts to 2018 dollars. Because the information available to EPA pertained to towboats in the Mississippi River and may not be perfectly representative of coastal tugboats in Puget Sound, EPA reviewed

information on annual operating costs for Puget Sound tugboats available in a report by Herrera (2015) to decide whether to adjust the initial estimate. The report provided a range of operating costs between $510,000 and $1.9 million. EPA also solicited information directly from AWO on operating costs for tugboats in Puget Sound, which AWO provided in its January 2021 submission, quoted below.

> Six AWO companies were surveyed for operating costs in December 2020. The low range of estimates for annual operating costs ran between $1 million - $1.5 million. The highest annual operating cost estimate ranged between $8 million - $10 million. Most harbor-assist towing vessels range between $3 million – $7 million in annual operating costs. Averaged out over the entire diverse fleet of AWO member vessels, the average approximate operating cost of crewing, vessel maintenance, insurance, regulatory compliance, and regulatorily required drydocking for a towing vessel operating in Puget Sound in 2020 is approximately $4 million…

AWO's estimates are substantially higher than EPA's initial default value and the information provided by the Herrera report. For this reason, EPA explains the different outcomes when applying baseline operating cost assumptions of both $853,260 and $4 million to account for this wide range.

For commercial fishing vessels, the default annual baseline operating cost of $377,893 was taken from the Valdez Harbor Expansion Feasibility Study (U.S. Army Corps of Engineers, 2010). The default values for excursion vessels in the Tool are the same as those used for ferries. The annual baseline operating cost of $1,884,944 is an average of the operating costs found across 11 different sources.[4] See the "Bsln Cost Assumptions" tab in the Tool for more details.

Vessel Speed

The default vessel speeds in nautical miles per hour used for each vessel class are 11.75 for tugboats (based on vessel speeds reported by Weeks Marine (2019)), 13 for commercial fishing vessels (based on the cruising speed of a tuna purse seiner from (Mauric Sea Novators, no date)), and 30.5 for excursion vessels (based on the average speed of two whale watching vessels from Boston Harbor Cruises). See the "Compliance Cost Assumptions" tab in the Tool for more details.

Fuel Consumption

Average fuel usage in gallons per hour for each vessel class was estimated by dividing horsepower by 10 (Lee, 2013). Average horsepower for each vessel class was based on a review of California commercial harbor craft (South Coast Air Quality Management District, 2015). Average fuel consumption (gallons per hour) was estimated as 98.2 for tugboats, 30.1 for commercial fishing vessels, and 82.7 for ferries and excursion vessels. In EPA's analysis, tugboats were the only class expected to travel to access pumpout facilities, therefore incurring

[4] (State of Washington Joint Transportation Committee, 2006); (U.S. Department of Transportation, 2011a; 2011b); (Skagit County, WA, 2019); (Whitman, Requardt, & Associates, 2015); (U.S. DOI, 2010); (Economic & Planning Systems, 2015; 2019), (Cambridge Systematics, 2011); (Whatcom County Public Works, 2018); (Nelson Nygaard Consulting Associates, 2006).

costs associated with these fuel consumption values. Another source of information consulted by EPA indicates that "modern tugs, with power ratings of 3,000 to 5,000 hp, burn large amounts of fuel when operating at full rpm — anywhere from 100 to 200 gallons per hour for a harbor tug pushing against a ship" (Walsh, 2008). Because tugboats would not actively be working while transiting to a pumpout location, EPA retained the lower default value of about 98 gallons per hour. See the "Compliance Cost Assumptions" tab in the Tool for more details.

Hourly Revenue

The tugboat hourly revenue default value of approximately $1,300 used in the Tool is based on the estimate provided by Herrera (2015) for Puget Sound. For commercial fishing vessels, EPA calculated a default value using commercial fishing revenue and catch volume data for the Pacific (Pacific Fisheries Information Network, 2019) and Atlantic (ACCSP, 2019) coasts. EPA determined an average dollar of revenue per megaton of catch and multiplied by the average capacity of a fishing vessel to generate an average hourly revenue estimate of $1,676. For excursion vessels, EPA used an hourly revenue estimate of $1,300, rounding up from the value developed for ferries based on the Washington State ferry fleet (San Juan County).

Fuel Price

Lastly, for all vessel classes, EPA used an average fuel price of $2.256 per gallon. This was the national 2018 average price per gallon for No. 2 diesel fuel from the Energy Information Administration (2019). EPA acknowledges that there is likely regional variability with state and local fuel taxes. However, EPA anticipates that, due to minimal expected travel, these changes would have an insignificant impact on the Tool calculations.

Values used for NOAA Research Ships

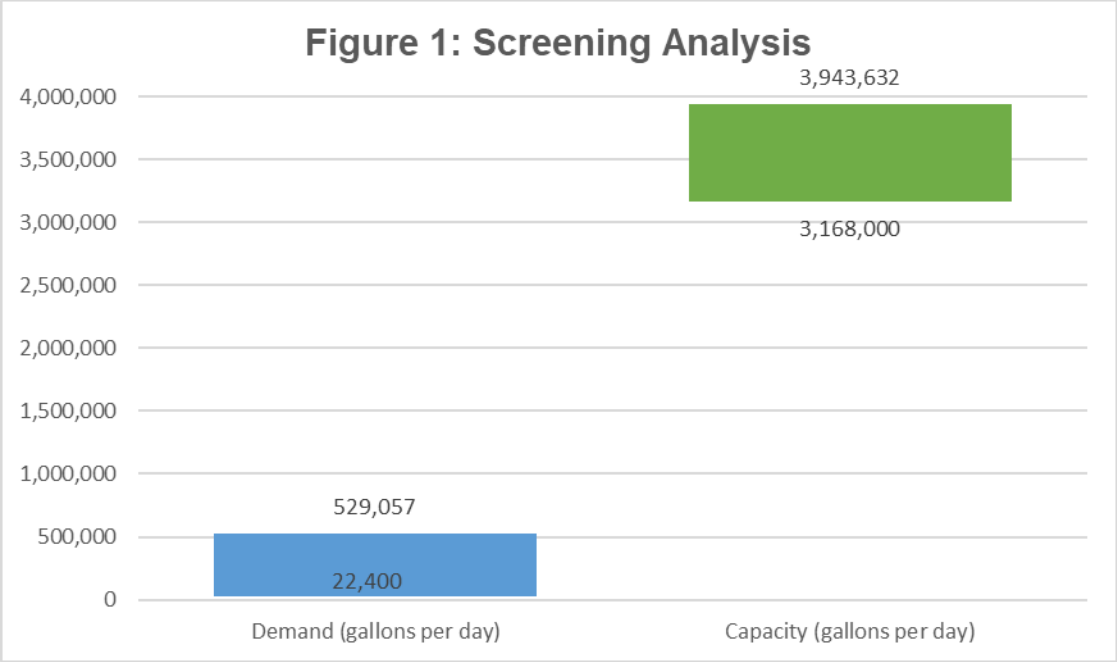
Default values were not available for the NOAA research ships. As such, EPA obtained a rough estimate of the annual baseline operating costs from NOAA's (March 2018) "NOAA Fleet Societal Benefit" final report, which provided total annual operating costs for 16 vessels in the fleet, totaling $108,568,526. EPA used the average value of $6,785,533 in the Tool. Average vessel speed for these ships was determined to be 12 nautical miles per hour using an average of the reported speeds of five ships based in NOAA's Pacific Marine Operations Center (Rainier, Bell M. Shimada, Fairweather, Oscar Dyson, and Reuben Lasker) from the Center's website. In the absence of more specific information, the fuel consumption value for ferries and excursion vessels was used. The default value for fuel price was also used. Because NOAA research ships are federally owned vessels, EPA did not attempt to establish a value for hourly revenue.

Output

After running the cost Tool – with the aforementioned inputs – it is projected that available pumpout capacity will *always* exceed the demand for pumpout services in Puget Sound. Before applying the uniform demand scenario, the Tool calculates ranges for demand and capacity. As shown in the Table and Figure below, minimum demand (which equates to the demand from vessels that pumpout every day) is approximately 22,400 gallons. In the case of Puget Sound, only commercial fishing vessels are expected to pump out every day. As such, minimum demand represents the total daily volume produced by the 350 fishing vessels that would need to be pumped out. Maximum demand (which reflects the total daily demand from all

vessel classes) is approximately 529,000 gallons. Capacity, on the other hand, reflects the day and month in which the smallest/fewest facilities are operating (total minimum capacity) and the day and month in which the largest/most facilities are operating (total maximum capacity).

	Total - minimum	Total - maximum
Demand (gallons/day)	22,400	529,057
Capacity (gallons/day)	3,168,000	3,943,632



Applying the uniform demand scenario, EPA can more precisely model the frequency with which demand may exceed capacity. The results are shown in the table below.

Minimum daily demand (gallons per day)	14,400
Maximum daily demand (gallons per day)	137,872
% of days where min. capacity meets demand	100%
% of days where max. capacity meets demand	100%

This means that on days in the year when the least volume of sewage is pumped out, demand for pumpout facilities is approximately 14,400 gallons. On days when the greatest volume of sewage is pumped out, demand is approximately 137,000 gallons. Based on these estimates, both minimum and maximum facility capacity meets demand every day of the model year. In other words, *pumpout capacity far exceeds projected demand from establishing an NDZ in Puget Sound.*

Because there are no days where maximum demand is expected to exceed minimum capacity, the analysis estimates that vessels will generally not incur wait times (nor the associated cost due to not being able to immediately access a facility) based on uniform demand. EPA recognizes that some of the companies operating pumpout trucks may be involved in other

services, such as pumping out septic tanks. However, over 80% of the available capacity could be otherwise engaged while still meeting maximum demand even before applying the uniform demand approach (see the Figure shown above). EPA also recognizes that some of the available facilities have tank capacities that are not suitable for some vessel classes. For example, Rose Head Service has a tank of 300 gallons, and so could not typically service vessel classes other than commercial fishing vessels. As described earlier, EPA accounted for this when determining the average cost for a pumpout for any given vessel class but cannot automatically do so for calculating minimum and maximum capacity and demand. As such, EPA ran a parallel screening analysis removing the facilities with more limited holding capacities. Facilities excluded from the screening analysis were Rose Head Service, SS Head, Pump Me Out, Pelican Pump, Seattle Sanitation Services/SaniTug, Elliott Bay Marina, Sanitation Offloading Solutions, Pumpout Seattle, and NW Mobile Pump Out and Marine Environmental Services. The facilities that remained in the parallel analysis have capacities of roughly 3,000 gallons or more. This results in available facility capacity between 3,104,640 (minimum) to 3,400,320 (maximum) gallons per day. *Even when removing the smaller capacity facilities altogether, minimum capacity still exceeds maximum demand throughout the year.*

A breakdown of cost by vessel class for tugboats, commercial fishing vessels, and excursion vessels is provided in the table below. Ferries and NOAA vessels were not included in the summary table below, since ferries have dedicated pumpout facilities and the NOAA vessels all have holding tanks in the baseline, such that no increased baseline costs are anticipated as there are no wait time costs.

Vessel Class	Tugboats	Commercial Fishing Vessels	Excursion
Total number of vessels	150	350	63
Number of vessels w/ holding tanks	38	175	60
Number of vessels w/o holding tanks	113	175	3
Annual baseline operating costs ($/year)	$853,260	$377,893	$1,884,944
Annual facility use costs ($/year)	$15,562	$5,171	$91,710
Annual travel costs - fuel ($/year)	$1,639	$0	$0
Annual travel costs - lost revenue ($/year)	$9,615	$0	$0
Annual pumpout time costs - lost revenue ($/year)	$31,223	$4,327	$67,681
Annual wait time costs - lost revenue ($/year)	$0	$0	$0
Total annualized compliance costs ($/year)	$58,038	$9,498	$159,391
Expenditure test - vessels w/ holding tank	0.0%	0.0%	0.0%
Expenditure test - vessels w/o holding tank	6.8%	2.5%	8.5%

EPA estimates that none of the vessel classes with holding tanks already installed prior to establishment of the NDZ will experience new/incremental costs. Most of the costs associated with using pumpout facilities were already part of these vessels' baseline operating costs. No wait time costs are expected for these commercial vessel classes in Puget Sound according to the uniform demand model.

For vessels without holding tanks in the baseline, the percent increase in baseline operating costs ranges from 2.5% to 8.5% across the vessel classes. The excursion vessels experience the greatest increase, at 8.5%. However, only three of the 63 excursion vessels included in the analysis do not have holding tanks; EPA expects only those three vessels to incur the increased costs. EPA used a conservatively high value of 187 passengers for excursion vessels, whereas Herrera (2013) reported that most of these vessels carry 60 passengers or fewer. If the analysis is conducted using the more realistic 60-passenger value, the percent increase in operating costs for these vessels drops to 2.9%. EPA also notes that, to the extent possible, some

or all of these costs may be passed on to customers, and that pumpouts may be able to occur concurrently with other necessary activities (such as boarding and offloading passengers), such that the lost revenue due to annual pumpout time costs may be overestimated. Lastly, it is important to note that the percent increase in baseline operating costs for excursion vessels would not substantially change if more pumpout capacity was available unless the price for pumpout services was driven down as a result. These vessels' high costs are the result of the large volumes of sewage produced onboard, due to the comparatively high number of passengers. For these reasons, EPA does not consider the 2.9% to 8.5% increase in operating costs for these three vessels to be unreasonable. Even if such an increase was untenable for these three of the 63 excursion vessels in Puget Sound, EPA's statutory role is to determine the reasonable availability of pumpout facilities for all vessels. If 60 of 63 vessels within the vessel class can operate viably based on current pumpout capacity, adequate facilities are reasonably available. Given that numerous excursion vessels operating in Puget Sound are already equipped with holding tanks, EPA did not find these added costs to be unreasonable.

Tugboats are expected to experience a 6.8% increase in baseline operating costs, resulting from facility use costs, travel costs, and pumpout time costs, based on the lower default value for baseline operating costs. According to AWO in the January 2021 submission, "…NDZ operating costs add approximately roughly 5% to 10% to the average vessel's annual operating costs. These costs do not include retrofits or modifications, or the cost to replace a vessel that cannot be physically altered to comply with NDZ requirements." EPA's estimate of 6.8% falls within AWO's predicted range; however, AWO provided to EPA a much higher baseline operating cost (average of $4 million). Using AWO's figure of $4 million, the resulting percent increase in baseline operating cost drops from 6.8% to 1.5%.

Because the default used by EPA results in a higher percent increase, EPA conservatively continued to use the original value of $853,260. Using an estimate of annual baseline operating cost of $853,260, a 6.8% increase equates to about $58,038 per vessel per year. As described by Herrera (2015),

> The size of tugboat companies that operate in Puget Sound range from small to very large. An example of a small company would be Campbell Maritime, which operates four tugboats, almost exclusively within Puget Sound. At the opposite end of the spectrum, Foss Maritime, operates more than 200 tugboats worldwide and has homeports on every continent (Saltchuk 2015). In the middle are companies such as Western Towboat, which operates 21 tugboats in Puget Sound and in Alaska. Foss' gross annual revenue was reported to be more than $430 million (Saltchuk 2015), which would equate to an annual revenue of about $2 million per boat. Calculated differently, assuming a tugboat does paid work for 12 hours a day, 365 days a year at a rate of $600 to $2,000 per hour, annual revenue would be $2.6 million to $8.7 million per boat.

Using Herrera's high-end and low-end estimates of annual revenue, $2.6 million and $8.7 million per vessel, an increase of $58,038 in operating cost equates to between 0.67% and 2.2% of annual revenue per vessel. Importantly, about $31,000 of that increase is attributable to lost revenue due to the time it takes to pump out. However, these costs would only be incurred when the vessel operator has turned down billable work to pump out. In other words, if the vessel can schedule pumpouts in between jobs, then revenue is not being lost. This is similarly acknowledged in Ecology's final cost-benefit analysis for the proposed NDZ (Ecology, 2018).

As such, the true cost is likely lower than the estimate because vessel operators may be able to pump out between scheduled work. Additionally, had EPA used the $4 million value for baseline operating cost for tugboats, the percent of annual revenue per vessel would also be lower.

Commercial fishing vessels are expected to experience a 2.5% increase in baseline operating costs, resulting from facility use costs and pumpout time costs. Based on a baseline operating cost of $377,893 (as explained in the Cost Information section above), this increase amounts to a dollar value of about $9,498 per vessel per year. As described by Herrera (2015),

> Washington statewide revenue for commercial finfish was approximately $160 million in 2013. Statewide revenue for shellfish, which includes crabs and clams, was about $44 million (WDOR 2015). Based on this revenue estimate and dividing by the 347 fishing vessels in Puget Sound (Herrera 2013), a gross estimate of the approximate revenue generated per vessel per year would be $575,000. A substantial number of Washington-based fishing vessels participate in fishing activities within and outside of Washington State and may therefore generate additional revenue that would not be included in this estimate… Since many vessels sell their fish outside of Washington State, the actual revenue per vessel may be substantially higher for at least some portion of the commercial fishing fleet based out of Puget Sound.

Using the $575,000 estimate for annual revenue, an increase of $9,498 in operating cost equates to 1.6% of annual revenue per vessel. Unlike local tugboats and excursion vessels, commercial fishing vessels have less flexibility in pricing their goods since they typically enter a global seafood market. However, as noted in the quote above, it is possible that certain vessels have higher annual revenues than used here, so 1.6% may be an overestimate of the increase.

Finally, as noted earlier, because NOAA's hydrographic survey ships and research ships already have been retrofitted and no wait time costs are expected, EPA does not anticipate that these ships will incur any increases to baseline operating costs.

Recreational Vessels

In addition to considering the cost implications of the NDZ on non-oceangoing commercial vessels, EPA considered costs to recreational vessels. Of the recreational vessels expected to have installed toilet facilities, Ecology (2018) reported that approximately 91% were already equipped with holding tanks, leaving about 2,013 vessels that would need to retrofit and therefore incur increased costs from using pumpout facilities. As explained by Ecology in the State's initial application, "on-going costs for recreational vessels to pumpout is minimal, with most pumpouts being free or $5 per pumpout" (Ecology, 2016a).

EPA has determined that this nominal fee is reasonable. Additionally, EPA does not expect substantial costs associated with traveling to access a pumpout facility because marinas with free or low cost pumpout facilities are distributed throughout Puget Sound (see Table 1 in Appendix C for an updated list of pumpouts available for recreational vessels). While commercial vessels have hourly revenue that can be impacted by lost time due to pumping out, as well as wait times, recreational vessel operators do not face monetary costs, although waiting for pumpout would take time away from other leisure pursuits. Although they do not face monetary losses from wait times, recreational vessel operators do still have an incentive (the value of their leisure time) to spread out their pumpout demands. As such, EPA did not calculate

a cost associated with the time waiting to access a pumpout facility or the time to pump out the holding tank of a recreational vessel. After considering cost of compliance to recreational boaters, as well as the other factors mentioned above and information in the administrative record, EPA has determined that there is reasonable availability of pumpout facilities for recreational boaters to comply with the NDZ.

Summary of Ecology's Cost Benefit Analysis

As part of the Washington State rulemaking process to designate the NDZ, Ecology (2018) developed a "Final Regulatory Analysis" report that included a final cost-benefit analysis. While EPA independently assessed the costs associated with its determination whether adequate pumpout facilities are reasonably available, as noted in the Court's order, EPA "is not starting from scratch." *American Waterways Operators v. Wheeler,* No. 18-cv-2933, at Dkt. 66, p. 42. Though EPA does not consider retrofit costs to be attributable to its pumpout facilities determination, Ecology did consider that such costs would be attributable to its establishment of the NDZ and it considered the benefits of doing so. Though EPA considered the costs as described above, EPA did not conduct a "cost-benefit" analysis because CWA section 312(f)(3) assigns the determination of benefits to the State rather than to EPA.

As explained in Ecology's report, "Ecology concludes, based on reasonable understanding of the quantified and qualitative costs and benefits likely to arise from the rule, that the benefits of the rule are likely greater than the costs." In the analysis, EPA did not consider retrofit costs, whereas Ecology did. Ecology estimated that the total 20-year present value for retrofit costs are approximately $511 million to $551 million, of which between $113 million to $153 million is the estimated cost to business and government. The bulk of anticipated retrofit costs fall to recreational vessels, for which the NDZ is already in effect. For the second category – pumpout costs – Ecology determined that the total 20-year present value costs are estimated to be between $191 million and $212 million, the majority of which (about $148 million) are expected to be incurred by tugboats and similar vessels.

In its analysis, Ecology assumed that pumpouts for tugboats and commercial fishing vessels would cost "approximately $1 thousand per pumpout via truck, every two weeks, for each vessel." Additionally, Ecology estimates that lost revenue for tugboats would amount to approximately $2,500 to $3,000 per pumpout, but only in such cases where billable work was forgone to pumpout. EPA's estimates were roughly in line with Ecology's, as EPA estimated that an individual pumpout for a tugboat would cost about $900 in fees, plus roughly $1,800 in lost revenue. As noted above, Ecology assumed the same cost to each commercial fishing vessel of $1,000 per pumpout every two weeks. EPA's estimate for commercial fishing vessel pumpout fees was substantially lower, since these vessels can access less expensive pumpout facility options and are expected to pump out a small volume of sewage daily (rather than every two weeks). Installing a smaller holding tank that is pumped out more frequently would allow for less displacement of fish hold space for the vessel, so EPA does not expect that these vessels would only pump out every two weeks.

For small commercial passenger vessels, Ecology estimated that each vessel would incur annual pumpout costs of $25,000. EPA's analysis determined an annual pumpout facility use

cost of nearly $92,000 per vessel. This discrepancy is likely due to EPA's overestimation of the number of passengers and crew onboard these vessels. As noted earlier, Ecology reported that most vessels carry 60 or fewer passengers, whereas EPA conservatively assumed a value of 187 (over triple Ecology's estimate). Using 60 as the input for average crew/passengers, EPA's facility use cost estimate drops to about $33,000, which is comparable to Ecology's estimate.

Lastly, Ecology acknowledged that recreational vessel operators will incur costs related to pumping out, including facility use fees, fuel costs, and the value of time to pump out. However, Ecology was not able to quantify these costs.

Ecology's cost benefit analysis considered environmental and public health benefits and benefits to the shellfish industry (and avoided costs due to preventing illness), as well as costs to retrofit vessels. EPA notes that even though the scope of the State's analysis was broader than EPA's, Washington State still determined the benefits of establishing the NDZ outweigh the costs.

Conclusion on Cost

EPA determines that the expected costs to affected vessels, both recreational and commercial, to access and use pumpout facilities do not materially alter EPA's determination that adequate facilities are reasonably available in the Puget Sound NDZ.

Recreational vessel operators in Puget Sound can access a substantial number of free and/or low-cost pumpout facilities distributed throughout the NDZ and have been doing so since the NDZ took effect for these vessels in May 2018.

For commercial vessels, EPA determines that the costs attributable to using pumpout facilities would not result in an unreasonable financial burden nor affect the reasonable availability of such facilities. Commercial vessels with holding tanks installed prior to the designation of the NDZ already access pumpout facilities or discharge offshore, including an estimated 25% of tugboats, 50% of commercial vessels, and 95% of excursion vessels. For tugboats and commercial fishing vessels that do not already have holding tanks installed, the anticipated percent increase in baseline operating costs for each vessel represents a small fraction of the vessel's annual revenue. While excursion vessels experience the highest cost increase based on conservative estimates of the average volume of per passenger sewage generated daily and the numbers of passengers per vessel, only three of the 63 excursion vessels would be expected to even incur these new costs after application of EPA's conservative assumptions in the cost analysis.

Additionally, the NDZ applies to all vessels, and therefore does not provide a competitive advantage or disadvantage to any particular entity. Instead, such costs will be folded into the existing "cost of doing business" in Puget Sound, which Washington State has already determined to be reasonable and warranted in exchange for the benefits of the vessel sewage discharge prohibition. While EPA does not consider the above costs to be prohibitive to the continued operations of these vessel classes in Puget Sound, it is possible that some individual vessels may bear more significant adverse effects due to issues such as vessel design configuration. However, the exclusion of a small number of vessels resulting from an NDZ

designation does not preclude a determination that adequate pumpout facilities are reasonably available in Puget Sound as a whole. Further, cost to pump out would not be significantly different if there were increased pumpout capacity because available capacity is not a limiting factor based on EPA's screening analysis demonstrating that pumpout capacity already exceeds the volume of sewage generated that would need to be pumped out.

Reasonableness of Available and Adequate Sewage Treatment Facilities in Puget Sound

This section explains EPA's assessment of the extent to which adequate sewage treatment facilities are available in Puget Sound to support the NDZ.

EPA's final determination in February 2017 assessed the availability of adequate treatment facilities. However, the Court remanded the issue after concluding that the administrative record was insufficient in explaining EPA's assessment with respect to treatment of sewage from commercial vessels. Upon remand, EPA reviewed and re-considered information in the existing administrative record, invited the parties in the litigation to provide updated data and information, and conducted additional fact-finding to inform its further consideration of the issue.

EPA invited updated data and information related to the locations where pumped out vessel sewage is treated, a description of how sewage treatment facilities are regulated by the State, how the State ensures compliance with State and federal requirements, and any information related to pumped out vessel sewage that is not treated at a regulated treatment facility. EPA also invited updated data and information on the capacity of sewage treatment facilities to accommodate the incremental increases in vessel sewage that could reasonably be attributed to the establishment of the Puget Sound NDZ. In the December 10, 2020 invitation, EPA explained its expectation that information from Ecology would be particularly relevant since it is the primary regulatory authority for sewage and the protection of water quality under the Washington Revised Code. *See* RCW 90.48.

On January 8, 2021, the parties in the litigation provided updated data and information. Among other things, Ecology explained that, on average, *Puget Sound treatment plant actual flows are about 47% of design capacity, thereby demonstrating that sufficient capacity exists at regulated treatment facilities to accommodate vessel sewage from a Puget Sound NDZ*. In addition, Ecology provided information identifying the various treatment facilities where pumped out sewage is sent and how such facilities are appropriately regulated under State and federal law to provide safe and sanitary treatment of vessel sewage from all vessels, commercial and recreational, in Puget Sound and even in the summer, when vessel sewage volumes are highest. Ecology's 2016 NDZ petition and January 2021 supplement included multiple tables (see Appendix C) summarizing data collected on available pumpout options for recreational and commercial vessels. The January 2021 supplement is particularly relevant as it contains information that captures the time period since May 10, 2018, when the Puget Sound NDZ came into effect (with the exception of certain commercial vessels which were exempted for five years before needing to comply with the NDZ requirements).

Analysis of Adequate Sewage Treatment in Puget Sound

Based on review and consideration of the expanded administrative record, EPA concludes that there is adequate – safe and sanitary -- treatment capacity to accommodate sewage generated from all commercial and recreational vessels operating in Puget Sound. Land-based sewage treatment operations along the shores of Puget Sound waters are operating well below design treatment capacity (actual flow average per month is only 47% of WWTP design capacity). These treatment facilities are subject to a regulatory infrastructure to assure that sewage is adequately treated prior to discharge. Adequate treatment facilities are located throughout Puget Sound that provide more than sufficient capacity for the treatment of vessel sewage generated all year round. The adequacy of the treatment capacity and infrastructure is described primarily in materials provided by Ecology. The tables provided in Ecology's January 2021 submission and referenced in the ensuing analysis can be found in Appendix C.[5]

Table 3 of Ecology's January 2021 submission provides information on the commercial vessel stationary pumpouts in Puget Sound, including the location of the pumpout facilities, the vessels serviced, and the disposition of sewage – all of which is disposed at National Pollutant Discharge Elimination System (NPDES) permitted WWTPs.

Table 4 provides information related to mobile vessel pumpout (removal) services in Puget Sound, including the areas serviced by each company, the vessels serviced, the capacity of each facility, and where each company disposes of pumped out sewage. All of these pumpout companies transfer removed vessel sewage to NPDES-permitted WWTPs for treatment, except for the pumpout boat located at Point Roberts Marina, which transfers its collected vessel sewage to a Large Onsite Septic System regulated by the Washington Department of Health.

Table 5 lists the number of pumpout truck companies by county and identifies the typical disposal location for each county (mainly NPDES-permitted WWTPs). As Ecology noted in its 2021 submission, because pumpout trucks travel to a variety of docks and commercial vessel sites, they can transfer sewage removed from vessels to various terrestrial NPDES-permitted WWTPs throughout Puget Sound. Some pumpout trucks may also discharge to "biorecycling" facilities, which are regulated by an Ecology-issued Biosolids Permit per the Washington Administrative Code 173-308.

State and Federal Wastewater Regulatory Structure

This section contains a description of the State and federal regulatory structure that helps to ensure the adequate treatment of sewage at the following three categories of treatment

[5] Table 1 of Ecology's January 2021 submission provides updated information on pumpout and treatment facilities for recreational vessels. In its 2017 NDZ determination, EPA previously concluded that adequate treatment facilities for recreational vessels were reasonably available. The Court's remand directed EPA to assess whether adequate treatment facilities for commercial vessels were reasonably available. Notwithstanding the scope of the Court's remand, EPA agrees with Ecology's analysis which concluded that all sewage from recreational vessels is treated at facilities that are adequately regulated to ensure safe and sanitary treatment.

facilities in Washington State: NPDES permitted wastewater treatment plants, septic systems and biorecycling/biosolid facilities.

NPDES Permitted Wastewater Treatment Plants

In Washington State, EPA authorized the Washington Department of Ecology to administer through provisions of State law, the NPDES permitting, compliance and enforcement programs under the CWA.[6] Ecology's January 2021 submission describes the State's comprehensive regulatory program that addresses facility planning, performance standards, permitting, operations and maintenance, and compliance. Notwithstanding Ecology's NPDES permit authorization, EPA provides ongoing oversight of Ecology's NPDES permitting program and retains independent authority to enforce NPDES permits and to object to permits issued by Ecology. 40 CFR 123.44(c).

Ecology's January 2021 submission provides a thorough explanation of how the State regulates WWTPs via NPDES permits consistent with the requirements of 40 CFR Part 123 and WAC 173-220 and 221. Ecology must comply with State and federal laws and regulations when administering Washington's NPDES permits program. This includes issuing permits with technology-based effluent limitations and, when necessary, water-quality based effluent limitations to assure compliance with applicable water quality standards. NPDES permits also impose requirements including, but not limited to, discharge monitoring requirements to demonstrate compliance with effluent limits, reporting of effluent data and immediate reporting of non-compliance events, requiring planning or source controls when flows and pollutant loadings reach 85% of plant capacity, requiring licensed operators as well as operations and maintenance of wastewater treatment plants, and many other permit requirements to insure that WWTPs treat wastewater in a safe and sanitary way.

Combined Sewer Overflows

Washington has established requirements for the control of combined sewer overflows (CSOs) at WAC 173-245. CSOs occur during or after heavy precipitation events that exceed older sewer collection systems' capacity, designed to receive both domestic sewage and storm water, to deliver collected flows for treatment. The State law requirements, however, ensure that all CSOs comply with technology-based effluent limitations and Washington's applicable water quality standards at WAC 173-201A. Washington's requirements are consistent with EPA's CSO control policy. 33 U.S.C. § 1342(q); 59 FR 18688 (Apr. 11, 1994). As Ecology explained in its January 2021 submission to EPA, all NPDES permits for communities with CSOs require the community to implement the CSO control policy's "Nine Minimum Controls" as basic technology-based standards for each CSO outfall. NPDES permits additionally require communities to "achieve and maintain" compliance with the State's performance standard for CSO discharges, per WAC 173-245.

Ecology's January 2021 submission identified three jurisdictions (the Cities of Seattle and Everett and King County) in Puget Sound that are not in current compliance with the water

[6] Ecology is authorized to issue NPDES permits for discharges into the waters of Washington State except that EPA retains NPDES permitting authority for Indian Country and federal facilities within the State.

quality-based federal and State requirements for CSO control. EPA is a party to the enforcement consent decrees with King County and with the City of Seattle that established the judicially enforceable requirements to bring the jurisdictions into compliance. *U.S. v. King County*, No. 2:13-cv-677 (W.D. Wash.), Dkt #6; U.S. v. City of Seattle, No. 2:13-cv-678 (W.D. Wash.), Dkt #6. This important work, which will be completed over the next few years, will reduce the number of CSO events by an expected 95% to 99%. *See* https://www.epa.gov/enforcement/seattle-washington-and-king-county-washington-settlement.

In its January 2021 submission, Ecology noted that while CSO events are undesirable, they are still preferable to discharges from marine sanitation devices. CSO discharges occur at known locations and the municipal dischargers are required to provide prompt notification for which the State can and does take public health measures to prevent exposure via warnings against swimming, fishing, and shellfish harvesting in the CSO discharge area. By contrast, absent a NDZ, discharges of vessel sewage may occur anywhere in Puget Sound and at any time, and are not subject to notification requirements, even if discharging adjacent to a swimming or shellfish harvest area.

Importantly, CSOs occur during wet weather events when there are large quantities of stormwater in combined sewer systems (i.e., during the rainy season, which generally occurs November-April in the Puget Sound region). By contrast, the peak vessel sewage capacity needs in Puget Sound, which are associated with recreational boating season run May-September, during the summer dry season. Because higher WWTP flows due to rain and wet weather events occur primarily during the winter months, CSO events do not affect the treatment capacity available during the summer when more vessels require pumpout and treatment services for vessel sewage.

EPA concurs with Ecology's assessment that there is adequate capacity for sewage treatment to accommodate a Puget Sound NDZ and that it is unlikely that pumped vessel sewage will be sent to a WWTP during a CSO event. Although possible, this does not alter the fact that facilities are reasonably available for the safe and sanitary treatment of vessel sewage to support a Puget Sound NDZ, CSOs notwithstanding.

NPDES Compliance and Enforcement

Both EPA and Ecology have authority to enforce compliance with permitting requirements for WWTPs. *See* 33 U.S.C. § 1319, RCW 90.48 and WAC 173-220-230. NPDES permits contain terms and conditions related to compliance monitoring, including requirements to sample effluent and report sampling results to Ecology. As the authorized regulatory authority, Ecology reports that domestic WWTPs generally achieve a high rate of compliance with their NPDES permits (98-99% compliance rates). Ecology takes enforcement action against permittees when needed to ensure compliance and has agency-wide and program-specific compliance assurance protocols and procedures, including on-site inspections.

Septic Systems

Septic systems, also called onsite sewage systems, convey, store, and provide subsurface soil treatment of sewage. In Washington State, onsite sewage systems are regulated based on the

design flow of the system. According to Table 4 of Ecology's January 2021 submission, one of the mobile pumpout companies transfers collected vessel sewage to a Large Onsite Sewage Systems (LOSS).

LOSS convey, store, and provide subsurface sewage treatment with a design flow of 3,500-100,000 gallons per day. In Washington State, all LOSS systems must obtain and renew annual operating permits from the Washington State Department of Health (DOH). The LOSS rule (WAC 246-272B, developed under RCW 70.118B) requires LOSS owners and anyone proposing to construct a LOSS to comply with applicable sections of the State's Water Pollution Control Act (RCW 90.48), including surface and groundwater standards in accordance with RCW 90.48.035. The State's LOSS rule includes the following: design, review and approval requirements for construction; permit process requirements; engineering requirements; technical standards; and operations, maintenance monitoring, and reporting requirements to meet wastewater treatment standards.

Washington DOH has inspection and enforcement authority for LOSS, including the assessment of civil penalties and issuance of orders, to ensure compliance with the applicable laws and regulations. In addition, pursuant to RCW 90.48, Ecology has authority to take enforcement action if there is a discharge from a LOSS to State waters. LOSS operators need either a wastewater certification from Ecology (WAC 173-230), an approval by a local health jurisdiction, or be qualified to operate a LOSS using proprietary technology, depending on the type of LOSS (WAC 246-272B-07200).

Onsite Sewage Systems (OSS) have flows of less than 3,500 gallons per day and usually treat wastewater from private homes and restaurants. *See* WAC 246-272A. Pursuant to RCW 43.20.050, the Washington State Board of Health establishes minimum requirements for the DOH and local health jurisdictions, integrating public health and environmental protection.

Per the Washington OSS rule, local health jurisdictions are responsible for permitting all OSS and must develop written onsite management plans. Particularly relevant to the NDZ, the counties that border Puget Sound must include a strategy to protect shellfish growing areas, aquifers, and water quality standards for groundwater; identify operations, maintenance, and monitoring requirements for OSS in Marine Recovery Areas; enforce OSS permit application, operation and maintenance, and repair requirements; in addition to other OSS owner responsibilities. The OSS rule includes other requirements such as system design, sizing, installation, plus soil and site evaluation. OSS installers and pumpers must be approved by local health officers prior to providing services within a local health jurisdiction. Local health jurisdictions must enforce the requirements of WAC 246-272A or refer to a local prosecutor's office of the attorney general. DOH may take enforcement action if a local health jurisdiction is unable to or fails to enforce an OSS rule. OSS must be inspected every one to three years, depending on the type of treatment system.

Biorecycling/Biosolids

According to Table 5, some commercial vessel pumpout trucks discharge to biorecycling facilities, which are regulated under a biosolids permit issued by Ecology pursuant to WAC 173-308, in accordance with CWA section 405 and 40 CFR Part 503.

The Ecology biosolids permit requires treatment, standards, monitoring, management, recordkeeping, and reporting for all sewage discharges. The biorecycling facility uses pathogen reduction measures and vector attraction for land application as a beneficial use and, according to the Ecology January 2021 submission, the discharges do not drain to surface waters and lagoon filtrate is applied at agronomic rates.

EPA concurs with Ecology's assessment that facilities are reasonably available for the safe and sanitary treatment of vessel sewage to support a Puget Sound NDZ, including in situations where sewage is treated by septic systems and biorecycling facilities.

Analysis of Treatment Capacity

EPA considered capacity to pump out and treat sewage from Puget Sound recreational and commercial vessels and determined that adequate capacity exists to accommodate the incremental increase of sewage generated from vessels in the Puget Sound NDZ.

Pumpout Trucks

Table 5 provides updated information for commercial vessel pumpout truck companies by county. The information includes the number of pumpout truck companies in each county, websites for each county, as well as the typical disposal location for truck companies operating in each county. Ecology contacted local health departments with shorelines in Puget Sound regarding how pumpout trucks operate in their areas and where their sewage is offloaded (mainly to NPDES-permitted wastewater treatment plants). Irrespective of whether pumpout trucks deliver sewage to a WWTP or a biorecycling facility, all pumpout trucks take pumped out vessel sewage to a regulated treatment facility.

Sewage pumpers and trucks are certified by county health departments per WAC 246-272A and applicable county code. Regulations provide requirements for licensure, pumping operations, and reporting. Pumpout trucks are certified or licensed with each county annually, typically involving an annual application, fee payment, proof of insurance and bonding, and a truck inspection. Most counties also require pumpout truck drivers/pumpers to complete an educational requirement such as passing an exam on sewage handling. Reporting requirements regarding sewage disposal location vary by county.

Recreational Vessels

According to Ecology's January 2021 submission, an individual recreational vessel produces an estimated 1,092 gallons of sewage per year. Using a conservatively high estimate of 43,677 recreational vessels in Puget Sound, Ecology estimated recreational vessels produce roughly 47.7 million gallons of sewage per year, with greater volumes generated during the May-September boating season. Washington State Parks estimated roughly 11 million gallons of vessel sewage were pumped out through CVA Grant Program pumpouts in 2019. Ecology's submission acknowledged that this figure is imprecise but likely biased high because of

inconsistent flow monitoring equipment. The estimate by Washington State Parks does not include sewage from pumpout boats or from pumpouts not included in the CVA Grant Program.

Commercial Vessels

Certain commercial vessels are not yet subject to the Puget Sound NDZ due to a five-year delayed implementation to allow sufficient time for planning and compliance. Ecology's 2016 NDZ petition identified approximately 676 commercial vessels likely to regularly need pumpout services over time. Washington State Ferries, U.S. military vessels, and certain other vessels, which already have holding tanks and use large-scale pumpout facilities when moored, were excluded from EPA's calculations because dedicated pumpout facilities exist for these vessels.

EPA estimated Puget Sound commercial vessel sewage volumes using the Tool to assess costs described earlier in this document. The cost assessment methodology in the Tool provides default estimates of sewage generation rates (gallon/person/day) by vessel class. *See infra pp.7-12.* The difference in rates is largely attributable to the efficiency of marine heads installed onboard different vessel classes but is also dependent on the sources of information available to EPA. In applying the methodology to Puget Sound, EPA assumed a sewage generation rate of 16 gallons per person per day for tugboats and commercial fishing vessels. For the remaining vessel classes, EPA assumed sewage generation rates between 7 and 11 gallons. Applying the Tool described above generated an estimated annual generation of 24.94 million gallons of sewage by commercial vessels that would need to be pumped out (removed and treated) because of the Puget Sound NDZ. This estimate does not include sewage generated by vessels with dedicated pumpout facilities, such as Washington State Department of Transportation ferries and U.S. military vessels. EPA notes that this is likely an overly high estimate based on the conservative values selected for the Tool. For more details on tool functionality and assumptions made by EPA to calculate this estimate, see the cost discussion, above.

Commercial vessels operate year-round, generally nearest to the urbanized areas on the shores of Puget Sound that are serviced by large wastewater treatment plants with high design capacity.

Total Capacity

Taken together, EPA estimates Puget Sound recreational vessels produce between 11 and 48 million gallons of sewage per year[7], plus roughly 25 million gallons per year from commercial vessels, for a (conservatively high) total of 36-73 million gallons of sewage per year needing pumpout facilities in order to comply with the NDZ.

Ecology, as the authorized NPDES regulatory authority, projects that the design capacity flow for all Puget Sound WWTPs is a peak flow of 708.8 million gallons per day, averaged over a 30 day period (see p.14 of Ecology's January 8, 2021 submission). As of 2016, actual average monthly flow was 335.7 million gallons per day – 47% of the design capacity (based on permit defined design capacity and actual flows as reported to Ecology in NPDES Discharge Monitoring Reports).

[7] See discussions of recreational and commercial vessel sewage generation rates, above.

Not surprisingly, however, monthly average actual WWTP flows vary seasonally. During the May-September recreational boating season, monthly average actual WWTP flows are 3.618 million gallons per day; monthly average actual flows during the October-April period are 6.006 million gallons per day. WWTP design capacity flow averages 10.5 million gallons per day, indicating *there is ample capacity for the safe and sanitary treatment of vessel sewage throughout the course of the year, with additional capacity during the summer boating season.* According to Ecology, "[t]reatment capacity is more than adequate because Puget Sound WWTPs have hundreds of millions of gallons of design capacity per day and pumped vessel sewage is estimated to be tens of millions of gallons per year" (Ecology's January 2021 submission, p. 3).

During the peak vessel sewage volume season, EPA agrees with Ecology's determination that "[f]or commercial vessels, the volume generated by the 676 commercial vessels that are likely to be in regular need of pumpout facilities in the NDZ is minimal as compared to the significant capacity at the WWTPs in the Puget Sound area" (Ecology's January 2021 submission, p. 14). WWTP capacity dwarves the additional vessel sewage generated by a Puget Sound NDZ, especially considering that the summer boating season occurs when there is maximum design capacity. During the non-peak volume season, when recreational vessel use diminishes, the overall treatment capacity available for sewage from commercial vessels remains and effectively increases as a proportion of all vessel demand for treatment relative to the use by recreational vessels.

In its January 2021 submission, AWO raised "the serious potential that future restrictions on nutrient loading by the Washington Department of Ecology will preclude shoreside treatment plants from accepting any additional sewage effluent," citing materials from a Puget Sound Nutrient General Permit Advisory Committee meeting. EPA is aware of and has reviewed the preliminary draft General Permit. The preliminary draft General Permit will likely establish action levels for Total Inorganic Nitrogen that would trigger WWTPs to implement measures to improve or optimize treatment. Accordingly, the draft General Permit does not suggest reductions in treatment capacity but rather enhancements of treatment performance. All terrestrial WWTPs will likely be required to report annually on their plans and actions to optimize nitrogen reductions. The preliminary draft General Permit is focused on improving treatment, and nothing in the draft permit places restrictions or limits on the *quantity* of sewage that a WWTP can accept. The permit is further evidence of Ecology's efforts to ensure that all sewage (transferred from a vessel or generated on land) is treated in a safe and sanitary manner.

EPA concurs with Ecology's assessment that there is adequate capacity to pump out and treat sewage from recreational and commercial vessels to accommodate the incremental increase of sewage generated from a Puget Sound NDZ.

Conclusion

After considering the information presented by the parties to the litigation, the existing administrative record, and additional fact-finding to inform its further consideration of the issue, EPA determines that there are adequate sewage treatment facilities with available capacity to accommodate vessel sewage that must be pumped out as a result of the Puget Sound NDZ.

EPA determines that Puget Sound sewage facilities are regulated at the federal, state, and local levels and in Indian Country and that there are adequate treatment facilities reasonably

available in Puget Sound. Existing WWTPs can accommodate the extra sewage that is estimated to be generated under a Puget Sound NDZ.

EPA's Use of a Ratio of Commercial Vessels to Pumpout Facilities

This section explains EPA's use of a ratio of commercial vessels to pumpout facilities in the determination that adequate pumpout facilities are available in Puget Sound to support the NDZ. In review of EPA's methodology for determining the availability of pumpout facilities, the Court's remand directed EPA to explain why a ratio of commercial vessels to pumpout facilities was helpful to its determination and why the particular ratio cited by EPA supported its conclusion that pumpout facilities are reasonably available in Puget Sound.

In its 2017 determination, EPA considered the availability of sewage pumpout facilities for recreational and commercial vessels separately, in part because EPA acknowledged that commercial vessels serve a different purpose and face different constraints than recreational vessels. Puget Sound has a larger and more complex commercial vessel constituency than many other, previously designated, NDZs. Accordingly, EPA engaged AWO and commercial vessel groups to understand their unique concerns and constraints prior to making a decision regarding this NDZ. The information submitted by Ecology also bifurcated recreational and commercial vessel and respective pumpout capabilities, in part because of the State's outreach and stakeholder engagement efforts.

In its determination, EPA explained its rationale for the use of a ratio of pumpout facilities to recreational vessels, the most conservative estimate of which was one pumpout facility per 171 recreational vessels (1:171), not including mobile pumpout services. EPA concluded that this ratio was well below the minimum ratio of 600 recreational vessels per pumpout facility that the Fish and Wildlife Service recommended was reasonable under the CVA and therefore determined that adequate pumpout facilities were reasonably available in Puget Sound for recreational vessels, in addition to other factors described in this document and in the record. EPA described its methodology for developing the ratios of pumpout facilities to vessels in its final determination. 82 FR 11219-20.

Regarding commercial vessels, EPA found that there were at least 56 pumpouts available for commercial vessels in Puget Sound, including both stationary and mobile pumpout facilities. Based on the estimated 631 commercial vessels in Puget Sound, this created a ratio of 11 commercial vessels per pumpout facility (11:1). *Id.* EPA has since updated its analysis based on new information regarding vessel populations (567 vessels) and the available pumpout facilities (69 facilities), reflecting facility closures and available facilities that were newly identified (see the cost section of this supplemental record for more detail on inputs to the analysis).

Unlike the CVA ratio for recreational vessels, EPA was unable to rely on an existing benchmark to determine an appropriate ratio for commercial vessels. Whether the number of available pumpout facilities is adequate is, at its core, a question of whether these pumpout facilities can meet the demand from vessels. In the screening analysis conducted by EPA as part of the Agency's review of cost, EPA projected that, based on available data and information,

there are no days when existing pumpout capacity does not meet the demand for pumpout services.

In its 2017 determination, EPA noted that the 11:1 ratio for commercial vessels supports a "reasonable availability" determination because it is significantly lower (by a factor of 27) than the conservative (low) end of the CVA technical guidance that there should be "one pumpout station for every 300-600 boats," and 54 times lower than the high end of the CVA technical guidance. In addition, mobile pumpout services can be scheduled by appointment to accommodate vessel needs and itineraries and are sufficiently diversified such that they do not experience seasonal fluctuations (e.g. during the summer boating season). As further supported by the screening analysis conducted in the cost assessment, the identification of a vessel to pumpout facility ratio is informative but not critical to EPA's determination of the reasonable availability of pumpout facilities to service commercial vessel sewage needs in Puget Sound.

Unless and until EPA establishes otherwise by rulemaking, any determination about the reasonable availability of pumpout facilities would be unique to each proposed NDZ and require consideration of a range of factors relevant to the pumpout needs and capacity for each NDZ. As the Court observed, EPA's affirmative determination of the reasonable availability of pumpout facilities in Puget Sound was more nuanced than the simple calculation of a ratio. *AWO,* Dkt. #66 at 32-33. Indeed, EPA considered other factors including the State's certificate of need, geographic distribution of pumpout facilities, type of commercial vessels serviced, hours of operation, capacity, draught requirements, time to pump out, dock access, seasonality, impact to large cruise ships, impact on vessel itineraries, and information on vessel population and vessel usage in Puget Sound, in addition to whether treatment of wastes from such pumpout facilities is in conformance with federal law. *See* EPA's implementing regulations in 40 CFR 140.4(a).

Although no two NDZs are the same, prior EPA determinations of reasonable availability that considered pumpout facility to vessel ratios are informative. For example, in its 2014 determination related to the establishment of a NDZ for the New York State (NYS) area of Lake Erie, EPA calculated the ratio of commercial vessels to commercial pumpout facilities. (79 FR 35347). In its determination, EPA stated:

> "Assuming, conservatively, that 100 large commercial vessels use the NYS area of Lake Erie and given that at least four companies with as many as ten pumpout trucks are able to provide pumpout services to these vessels at both New York ports, the ratio of pumpout facilities to commercial vessels is at least 4:100, or 1:25. While the CVA guidance applies, by its terms, only to recreational vessels, the ratio it recommends is instructive for purposes of determining the reasonable availability of pumpout services for large commercial vessels as well. In light of the relatively low ratio of pumpout companies to large commercial vessels (and the even lower ratio of pumpout trucks to large commercial vessels), adequate pumpout facilities for the safe and sanitary removal of sewage for large commercial vessels are reasonably available for the New York State area of Lake Erie."

The ratio of pumpout facilities to commercial vessels in Puget Sound (11:1) is lower than the 25:1 ratio in the NYS areas of Lake Erie (although, as explained, other non-ratio factors were also considered for each determination). Other NDZ determinations have also relied on a ratio of vessels to facilities, whereby this ratio was compared to the ratio of 1 facility for every 300-600 vessels recommended in EPA's 1994 guidance. For two NDZs in New Jersey, a ratio of 1 facility for every 200-300 vessels was used based on a New Jersey CVA steering committee recommendation (63 FR 30742 and 63 FR 30740). These determinations provide further support for EPA's determination that pumpout facilities are reasonably available for commercial vessels in Puget Sound.

The 11:1 commercial vessel to pumpout ratio is a surrogate for pumpout capacity. Upon remand, EPA has again analyzed volume demand and capacity; the screening analysis detailed above now more quantitatively demonstrates that there is sufficient capacity to treat the volume of sewage from the NDZ. *See supra,* pp. 15-16.

Given the widespread availability and flexibility of these services, including but not limited to the resulting overall ratio of 11 commercial vessels per pumpout facility, EPA re-affirms its earlier determination that adequate pumpout facilities for the safe and sanitary removal and treatment of sewage for commercial vessels are reasonably available for the waters of Puget Sound. EPA further notes that the estimated ratio may be conservative, given that several mobile pumpout boats and pumpout trucks described above may also provide commercial pumpout services. This determination is further supported by EPA's screening analysis, which demonstrates that sufficient capacity would always be available in Puget Sound to meet the demand for pumpout services from commercial vessels.

Conclusion

After consideration of the issues remanded by the Court – assessment of cost due to pump out of vessel sewage, assessment of whether adequate sewage treatment facilities are reasonably available, and addressing EPA's use of a ratio of commercial vessels to pumpout facilities to determine whether adequate treatment and removal facilities are reasonably available – EPA reaffirms its determination that adequate facilities for the safe and sanitary removal and treatment of vessel sewage (pumpout facilities) are reasonably available in Puget Sound.

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List of Appendices

Appendix A – Microsoft Excel file of Cost Tool available upon request

Appendix B - Definitions and Source Information for “Sewage Gen & Pumpout Int” Tab of Cost Tool

Appendix C – Tables provided by Ecology in its January, 2021 submission

Appendix B: Definitions and Source Information for "Sewage Gen & Pumpout Int" Tab of Cost Tool

The contents of this section include definitions and source information for data used within the "Sewage Gen & Pumpout Int" tab of the No-Discharge Zone Cost Analysis Tool. The research underlying these values was conducted previously by Eastern Research Group (ERG) on behalf of EPA, and the definitions and source information provided below explains how each value was determined by ERG. The "a-l" superscript notations correspond to the rows in the "Sewage Gen & Pumpout Int" tab for ease of reference.

The Vessel General Permit (VGP) eNOI database referenced in this section is EPA's database for all vessels that have submitted a Notice of Intent, Notice of Termination or annual report under EPA's 2013 Vessel General Permit. In instances where the database was queried, entries were not included: (1) if a Notice of Termination was submitted for the vessel, or (2) if the vessel did not visit US ports.

[a] Large cruise ships

A large cruise ship is defined in Part 5.1 of the Vessel General Permit (VGP) as a passenger ship, used commercially for pleasure cruises, that provides overnight accommodations to passengers, and is authorized by the Coast Guard to carry 500 or more passengers. Vessel numbers were estimated using the VGP eNOI database to search for "large cruise ship (500+ passengers)". This analysis assumes 54% of large cruise ships have advanced wastewater treatment systems (sophisticated Type II MSDs) based on the Friends of the Earth (2016) "Cruise Ship Report Card." Average number of passengers/crew was also obtained from the "Cruise Ship Report Card" for vessels entering U.S. waters only. Number of days operating in U.S. waters was calculated based on 31 cruise ships in Alaska from May through September assumed operating in U.S. waters 60% of the time, and 17 additional cruise ships operating in U.S. waters other than Alaska 2 days per week and 52 weeks per year. Sewage generation rate was obtained from U.S. EPA's 2008 "Cruise Ship Discharge Assessment Report."

[b] Medium and small cruise ships (excursion vessels)

A medium cruise ship is defined in Part 7 of the VGP as a passenger ship, used commercially for pleasure cruises, that provides overnight accommodations to passengers, and is authorized by the Coast Guard to carry 100 to 499 passengers. Vessel numbers were estimated using the VGP eNOI database to search for "medium cruise ships (100-499 passengers)". This analysis assumes 45% of small cruise ships have advanced wastewater treatment systems (sophisticated Type II MSDs), based on the Friends of the Earth (2016) "Cruise Ship Report Card." Number of days operating in U.S. waters was estimated from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits." Average number of passengers/crew from information provided by 23 medium/small cruise ships. Sewage generation rate was considered comparable to large cruise ships and was transferred from there.

[c] Passenger ferries with overnight accommodations

Passenger ferries with overnight accommodations were characterized by looking at five Alaska Marine Highway ferries and one Great Lakes ferry. The Great Lakes ferry (Badger) uses a Type

III MSD, and the remainder use Type II MSDs (Lake Carriers Association, 2010). Average number of passengers/crew calculated based on the six ferries. Number of days operating in U.S. waters was estimated from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits"; assumes vessels generate sewage while underway and discharge to shore-side facilities while in port. Sewage generation rate was transferred from large cruise ships.

[d] Passenger vessels without overnight accommodations (ferries)

The number of vessels was calculated based on a total of 7,833 inspected passenger vessels without overnight accommodations, 89% of which were less than 65 feet in length (U.S. EPA, 2010). It was assumed that 15% of these passenger vessels greater than 65 feet in length (107 vessels) use Type II MSDs based on information provided by the Passenger Vessel Association. It was also assumed that 15% of passenger vessels less than 65 feet in length (868 vessels) operate Type I MSDs. Remainder of all vessels (greater than or less than 65 feet length) were assumed to use Type III MSDs. The estimate for average number of passengers/crew was based on information provided by internet searches for 17 passenger vessels ranging from dinner cruise vessels, tour boats, wedding party boats, and shuttles. Number of days operating in U.S. waters was estimated from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits." The sewage generation rate was determined based on telephone conversation between Eastern Research Group (ERG) and the Victoria Clipper (3,000-liter sewage holding tanks are 80% full after a 3-hour trip with 300 persons). Total time passengers are on board the vessel was estimated at 10.5 hours per day: (3000 L/trip x 0.8 x 1/3.8 L/gal)/300 persons x 1/3hrs/trip x 10.5 hrs/day = 7.3 gal/day/person

[e] Cargo/container/tanker ships

Vessel numbers were estimated using the VGP eNOI database. Vessels included were listed as "bulk carrier," "general cargo," "hopper barge," "oil gas tanker," "tank barge," or "other barge." The estimate for number of passengers/crew was obtained from Chamber of Shipping of America (2010). Number of days operating in U.S. waters was estimated from a U.S. EPA Region 9 analysis of USCG port data that indicates 2.3 days per port call, and telephone contact with Horizon Lines indicating vessels make port calls every 2 weeks. Per capita sewage generation rate of 11 gallon/day/person was selected as the median of sewage generation rates provided by Chamber of Shipping of America (2010) (median selected rather than mean as the better indicator of the middle).

[f] Great Lakes freighters

Number of vessels and number of passengers/crew were obtained from the Lake Carriers Association (2010). This includes 54 total vessels with two having Type III MSDs and 52 having Type II MSDs. Number of days operating in U.S. waters was estimated from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits." Sewage generation rate was transferred from cargo/container/tankers ships.

[g] Off-shore utility vessels

Off-shore utility vessels include school ships, research vessels, offshore supply vessels, industrial vessels, and mobile offshore drilling units. Of the 11,034 vessels, 5,610 are tug and tow boats,

and 50% are greater than 65 feet in length and 50% are less than 65 feet in length (U.S. EPA, 2010). As a conservative estimate, it was assumed that all utility vessels greater than 65 feet in length have Type II MSDs and that all utility vessels less than 65 feet in length have Type I MSDs. It was also assumed that all utility vessels have a minimum of 4 crew members. Number of days operating in U.S. waters was obtained from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits." Sewage generation rate was transferred from cargo/container/tanker ships.

[h] **Public vessels, unclassified**

Public vessels include lighthouse tenders, hospital ships, law enforcement vessels, and ice breakers. Of the 622 total vessels, 7% are less than 65 feet in length (U.S. EPA, 2010). As a conservative estimate, it was assumed that all public vessels greater than 65 feet in length have Type II MSDs and that all public vessels less than 65 feet in length have Type I MSDs. It was assumed that public vessels have a minimum of 4 crew members. Number of days operating in U.S. waters was obtained from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits" with an assumption that while vessels are in port, they do not discharge to shoreside facilities. Sewage generation rate was transferred from cargo/container/tanker ships.

[i] **Tugboats/push boats**

Total number of tugs is 5,424 (U.S. Army Corp of Engineers, December 2009). It was assumed that all tugboats have Type II MSDs based on telephone conversation between Eastern Research Group (ERG) and AEP River, a barge company. Average number of crew was estimated based on this conversation, as well. The value for number of days operating in U.S. waters was based on an assumption of daily operation, except for 15 days out of service per year for maintenance, based on telephone conversation with AEP River. Sewage generation rate was transferred from cargo/container/tanker ships.

[j] **Commercial fishing vessels**

Of the 69,944 commercial fishing vessels, 89% are less than 65 feet in length (U.S. EPA, 2010). As a conservative estimate, it was assumed that all commercial fishing vessels greater than 65 feet in length have Type II MSDs and that all commercial fishing vessels less than 65 feet in length have Type I MSDs. The number of crew – seven -- includes a captain, first mate, engineer, boatswain, and three deck hands according to the U.S. Bureau of Labor Statistics (2009). Number of days operating in U.S. waters was obtained from U.S. EPA's 2007 "Category 2 Vessel Census, Activity, and Spatial Allocation Assessment and Category 1 and Category 2 In-Port/At-Sea Splits." Sewage generation rate was transferred from cargo/container/tanker ships.

[k] **Military vessels**

Approximate total number of U.S. military vessels is 6,265 and includes Navy, Coast Guard, Marines, Army, Military Sealift Command, and Air Force vessels (U.S. EPA, 1999). Of the total vessels, only 587 report discharging graywater, which was used as a surrogate for the number of vessels with installed toilets. Average number of crew and days operating in U.S. waters was obtained from EPA's "Phase I Final Rule and Technical Development Document of Uniform National Discharge Standards (UNDS); Graywater: Nature of Discharge" report (1999).

[1]**Recreational vessels**

Recreational vessel numbers were taken from the US Coast Guard (2016) "2015 Recreational Boating Statistics Report". Only registered vessels that are mechanically propelled were included (11,034,479). Rowboats (97,067), canoes/kayaks (419,536), motor-less sailboats (110,261), and other watercraft which were not mechanically propelled (205,706) were excluded. The number of vessels with MSDs was estimated based on the assumptions laid out in the "Clean Vessel Act: Pumpout Station and Dump Station Technical Guidelines," where 20% of vessels between 16 and 25 feet, 50% of vessels between 26 and 39 feet and 100% of vessels 40 feet and over have an MSD. Of these vessels, the National Marine Manufacturers Association (NMMA) assumes that 9% have type I MSDs, 0.1% have type II MSDs, and 90.9% have type III MSDs (Comments on Petition to Revise the Performance Standards for Marine Sanitation Devices, Docket Number EPA-HQ-OW-2010-0126-0041.1). Eight persons were assumed for a typical recreational vessel having a Type II MSD based on best engineering judgement, since recreational vessels requiring a Type II MSD would either be larger or support more passengers. Sewage generation rate was transferred from large cruise ships and is a likely overestimate for recreational vessels.

Appendix C: Ecology Tables

Table 1. Recreational Pumpouts in the Puget Sound NDZ (from Ecology's 2021 submission)

Facility name	Location	Water Body	Category	Contact Phone	Latitude	Longitude	Type of Facility	Number of Moorage Slips	Number of Moorage Buoys	Number of Stationary Pumpouts	Number of Portable Pumpouts	Number of Boat Pumpouts	Number of Dump Stations	Hours of Operation	Max Vessel Length (ft)	Min Depth at Low Tide (ft)	Where Treated	Regulatory Structure	Note
Port of Allyn Dock at North Bay Case Inlet	Allyn	North Bay Case Inlet	Public Stationary	(360) 275-2430	47°23'0.53'	122°49'30.48"	Public Marina	250 LF	0	1	0	0	1	24 hours	50 feet	20 feet	North Bay/Case Inlet Water Reclamation Facility	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
NorthWest Marine Center (formerly Marine Servicenter)	Anacortes	Puget Sound	Public Stationary	(360) 293-8200	48°30'06"	122°36'02"	Private Marina	8	0	3	0	0	Unknown	Variable	60	20+	Anacortes WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Anacortes - Cap Sante Marina	Anacortes	Puget Sound	Public Stationary	(360) 293-0694	48°30'39"	122°36'13"	Public Marina	950	0	2	4	0	2	24 hours	90	12	Anacortes WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Skyline Marina	Anacortes	Puget Sound	Public Stationary	(360) 293-5134	48°29'18"	122°40'37"	Private Marina	50	0	2	0	0	1	Mon-Friday	100	10	Anacortes WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
City of Bainbridge Island, Eagle Harbor Waterfront Park (Dock at 301 Shannon Drive SE)	Bainbridge Island	Puget Sound	Public Stationary	(206) 786-7627	47°37'15"	122°31'10"	Public Marina	15	16	2	0	0	1	24 hours	150	5	Bainbridge Island WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated. 1 new stationary pumpou addedt.
Eagle Harbor Marina	Bainbridge Island	Puget Sound	Public Stationary	(206) 842-4003	47° 36' 58.82" N	122° 30' 46.22" W	Private Marina	125	0	0	1	0	0	24 hours	60	6	Central Kitsap WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Harbour Marina	Bainbridge Island	Puget Sound	Public Stationary	(206) 842-6502	47°37'25"	122°31'37"	Private Marina	50	0	1	0	0	1	24 hours	60	15	Bainbridge Island WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Winslow Wharf Marina	Bainbridge Island	Puget Sound	Private	(206) 842-4202	47°37'40"	122°31'20"	Private Marina	225	0	1	1	0	1	9:00 am - 5:00 pm	80	12	Bainbridge Island WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Allyn North Shore Dock	Belfair	Hood Canal	Public Stationary	(360) 275-2430	47°25'15.02 "	122°54'7.75"	Public Marina	6	0	2	0	0	0	24 hours (Closed October-April)	50	3	North Bay/Case Inlet Water Reclamation Facility	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Bellingham Cruise Terminal – Port of Bellingham	Bellingham	Puget Sound	Public Stationary	(360) 676-2500, ext. 304	48°43'18"	122°30'47"	Public Dock	400 LF	0	3 (1 for ferries, 2 for others)	0	0	0	24 hours	150	30	Bellingham WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Squalicum Harbor-Port of Bellingham	Bellingham	Puget Sound	Public Stationary	(360) 676-2542	48°45'13"	122°30'29"	Public Marina	1200	0	2	8	0	8	24 hours	100	25	Bellingham WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Seacrest Marina	Between Marysville and Everett	Puget Sound	Public Stationary	(425) 252-4823	48°01'52"	122°11'17"	Private Marina	110	0	1	0	0	0	24 hours	40 ft	5	Everett WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Blaine Harbor-Port of Bellingham	Blaine	Drayton Harbor	Public Stationary	(360) 647-6176	48°59'26"	122°45'56"	Public Marina	629	0	0	6	0	4	8:00 am - 5:00 pm	120	12	Blaine WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated. 2 new portable pumpouts added.
Semiahmoo Marina	Blaine	Drayton Harbor	Public Stationary and boat	(360) 371-0440	48°59'22"	122°46'02"	Private Marina	297	0	1	1	1	0	24 hours	75	12	Blaine WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Bremerton Yacht Club	Bremerton	Phinney Bay	Private	(360) 479-2662	47° 35' 14.17"	122° 39' 45.78"	Private Marina	193	0	1	1	0	0	unknown	65	3	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Bisolids Permit	
Port of Brownsville	Bremerton	Burke Bay	Public Stationary and boat	(360) 692-5498	47°38'58"	122°36'46"	Public Marina	403	0	2	1	1	2	24 hours	65	25	Central Kitsap WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Pleasant Harbor Marina	Brinnon	Hood Canal	Public Stationary	(360) 796-4611	47°39'70"	122°55'07"	Private Marina	285	0	1	1	0	0	8:00 am - 8:00 pm 24hrs if no assistance needed	120	8	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	
Port of Coupeville	Coupeville	Penn Cove	Public Stationary	(360) 678-5020	48°13'29"	122°41'34"	Public Marina	12	4	1	0	0	0	24 hours	80	2	City of Coupeville WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Deer Harbor Marina	Deer Harbor	San Juan Islands	Public Stationary	(360) 376-3037	48°37'14"	123°0'17"	Private Marina	125	2	1	0	0	0	8:30 am - 4:30 pm	150	5	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	Details updated.
City of Des Moines Marina	Des Moines	Puget Sound	Public Stationary	(206)-824-5700	47°24'06"	122°19'58"	Public Marina	840 wet & dry	0	1	1	0	1	24 hours	75	Unknown	Midway Sewer District System WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Rosario Resort Marina	Eastsound	San Juan Islands	Public Portable	(360) 376-2152	48° 38' 48"	122°52'13"	Private Marina	36	8	0	1	0	0	9am-5pm	140	12	Mobile Pumpout Service to Rosario WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.

Facility name	Location	Water Body	Category	Contact Phone	Latitude	Longitude	Type of Facility	Number of Moorage Slips	Number of Moorage Buoys	Number of Stationary Pumpouts	Number of Portable Pumpouts	Number of Boat Pumpouts	Number of Dump Stations	Hours of Operation	Max Vessel Length (ft)	Min Depth at Low Tide (ft)	Where Treated	Regulatory Structure	Note
Port of Edmonds	Edmonds	Puget Sound	Public Stationary	(425) 774-0549	47°48'36"	122°23'31"	Private Marina	100	0	2	0	0	2	24 hours	110	13	Edmonds WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Everett Marina	Everett	Puget Sound	Public Stationary	(425) 259-6001	47°59'51"	122°13'26"	Public Marina	1969	0	2	0	0	2	24 hours	143	11	Everett WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Everett Marine Park & Boat Ramp	Everett	Puget Sound	Public Stationary	(425) 259-6001	47°59'52"	122°13'26"	Public Marina	198	0	3	0	0	2	24 hours	143	14,18	Everett WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Sandy Point Marina	Ferndale	Strait of Georgia	Public Stationary	(360) 384-4373	48° 47' 48.46" N	122° 42' 24.06" W	Private Marina	72	0	0	1	0	0	24 hrs (pumpout)	40	15-30 at marina, tide dependent shallow at canal entrance	Lummi Sewer and Water District (Sandy Point WWTP)	Federal Permit - EPA	Details updated.
Port of South Whidbey	Freeland	Puget Sound	Public Stationary	(360) 331-5494	48°02'18"	122°24'11"	Public Marina	34	0	1	0	0	1	24 Hours	70	6	Pumpout Service to Coupeville WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Gray Goose Landing	Friday Harbor	San Juan Islands	Private		48°31' 59"	122°49' 39"	Private Marina	10	0	1	0	0	0	unknown	unknown	unknown	Friday Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Friday Harbor Marina	Friday Harbor	San Juan Islands	Public Stationary (plus boat)	(360) 378-2688	48°32'21"	123°00'48"	Public Marina	500	0	1	1	1	2	24 hours	64	10	Friday Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Warbass Way Marina	Friday Harbor	San Juan Islands	Private	N/A (llg@rockisland.com)	48°31' 59"	122°49' 39"	Private Marina	50	0	1	0	0	0	Varies	Unknown	Unknown	Friday Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	15 slip connections to the pumpout.
Arabella's Landing Marina	Gig Harbor	Gig Harbor	Public Stationary	(253) 255-5050	47°20'03"	122°35'00"	Private Marina	47 slips + 160 LF	0	1	0	0	0	24 hours	120	8	City of Gig Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
City of Gig Harbor Jeresich Dock	Gig Harbor	Gig Harbor	Public Stationary	(253) 851-6170	47°19'54"	122°34'46"	Public Marina	1160 LF	0	1	0	0	1	Variable	50	19	City of Gig Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
City of Gig Harbor Maritime Pier	Gig Harbor	Gig Harbor	Public Stationary	(253) 851-6174	47°19' 47"	122° 34' 42"	Public Marina	40 LF	0	1	0	0	1	24 hours	70	16	City of Gig Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Murphy's Landing Marina	Gig Harbor	Gig Harbor	Public Stationary	(253) 851-3093	47°20'13"	122°35'19"	Private Marina	85	0	1	0	0	0	Year Round Monday Wed Friday	66	10	City of Gig Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Driftwood Keys Club	Hansville	Hood Canal	Public Stationary	(360) 638-2077	47°54'26"	122°35'11"	Private Marina	97	0	1	0	0	1	24 hours	40	10	Large Onsite Sewage System	WAC 246-272B / RCW 70.118B / RCW 90.48	
Harbour Village Marina	Kenmore	Lake Washington	Public Stationary	(425) 485-7557	47°45'35"	122°15'77"	Private Marina	135	0	1	0	0	1	24 hours	50	6	West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Kingston	Kingston	Puget Sound	Public Stationary	(360) 297-3545	47°47'38"	122°29'58"	Private Marina	311	4	1	1	0	1	Variable	90	15	Kitsap County Kingston WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	portable hose cart with stanchions accessible from each transient slip
Carillon Point Marina	Kirkland	Lake Washington	Public Stationary	(425) 822-1700	47°39'21"	122°12'34"	Private Marina	200	0	1	0	0	0	24 hours	90	6	King County South WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
La Conner Landing Marine Services	La Conner	Swinomish Chanel	Public Stationary	(360) 466-3118	48°23'48"	122°29'47"	Public Marina	200 LF	0	2	0	0	0	Variable	80	Unknown	La Conner WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Skagit, La Conner Marina	La Conner	Swinomish Chanel	Public Stationary	(360) 466-3118	48°24'04"	122°29'48"	Public Marina	497	0	2	0	0	2	24 hours	60	10	La Conner WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Shelter Bay	La Conner	Swinomish Chanel	Public Stationary	(360) 333-2952	48°22'59"	122°30'53"	Private Marina	320	0	1	0	0	0	24 Hours	70	5	La Conner WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Penrose Point State Park	Lakebay	Puget Sound	Public Stationary	(253) 884-2514	47°15'29"	122°45'15"	Public Marina	380 LF	8	1	0	0	1	24 hours	30	3	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	

Facility name	Location	Water Body	Category	Contact Phone	Latitude	Longitude	Type of Facility	Number of Moorage Slips	Number of Moorage Buoys	Number of Stationary Pumpouts	Number of Portable Pumpouts	Number of Boat Pumpouts	Number of Dump Stations	Hours of Operation	Max Vessel Length (ft)	Min Depth at Low Tide (ft)	Where Treated	Regulatory Structure	Note
Islands Marine Center	Lopez Island	San Juan Islands	Public Stationary	(360) 468-3377	48°30'55"	122°54'56"	Private Marina	56	Unknown	5	0	0	1	Variable	80	30	Fisherman's Bay Sewer District WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Blake Island State Park	Manchester	Puget Sound	Public Stationary	(360) 731-8330	47°32' 21"	122°29'56"	Public Marina	1500 LF	24	1	0	0	1	24 hours	40	10	Large Onsite Sewage System	WAC 246-272B / RCW 70.118B / RCW 90.48	
Twin Bridges Marina (dry stack)	Mt Vernon	Puget Sound	Public Stationary	(360) 466-1443	48° 27' 19"	122°30'34"	Private Marina	1160 LF	0	1	1	0	1	24 hrs	34	7	La Conner WWTP or City of Burlington WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Mystery Bay State Park	Nordland	Admiralty Inlet	Public Stationary	(360) 385-1259	48°03'27"	122°41'42"	State Park Marina	1000 LF	7	1	0	0	0	24 hours	55	4	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Biosolids Permit	
City of Oak Harbor Marina	Oak Harbor	Puget Sound	Public Stationary	(360) 279-4575	48°17'12"	122°38'03"	Public Marina	420	0	2	2	0	2	24	75	12	City of Oak Harbor WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Deception Pass State Park	Oak Harbor	Puget Sound	Public Stationary	(360) 675-3767	48°24'06"	122°37'30"	State Park Marina	2400 LF	11	1	0	0	0	24 hours	40 ft	10	Naval Base Oak Harbor WWTP	Federal Permit - EPA	
City of Olympia, Percival Landing Park	Olympia	Budd Inlet	Public Stationary	(360) 753-8380	47°02'55"	122°54'19"	Public Marina	980 LF	0	1	0	0	1	24 hours	50	8	LOTT WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Olympia - Swantown Marina	Olympia	Budd Inlet	Public Stationary	(360) 528-8049	47°03'31"	122°53'46"	Public Marina	733	0	1	0	0	1	24 hours	100	12	LOTT WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Westbay Marina	Olympia	Budd Inlet	Public Stationary	(360) 943-2022	47°03'56"	122°54'47"	Private Marina	350	0	1	0	0	1	24 hours	50	4	LOTT WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Zittel's Marina	Olympia	Nisqually Reach	Public Stationary	(360) 459-1950	47°09'56"	122°48'28"	Private Marina	200	0	0	2	0	1	Variable	45	8	LOTT WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
West Beach Resort	Orcas	San Juan Islands	Public Stationary	(877) 937-8224	48°41'18"	122°57'35"	Private Marina	750 LF	10	1	0	0	0	Variable	55	4.5	Anacortes WWTP.	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated. 1 new stationary pumpout added.
West Sound Marina	Orcas	San Juan Islands	Public Stationary	(360) 376-2314	48°37'46"	122°57'36"	Private Marina	580	0	1	0	0	0	Variable	40	5	Holding tank, pumped out, likely to Rosario WWTP.	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Point Roberts Marina	Point Roberts	Strait of Georgia	Public Stationary plus boat	(360) 945-2255	48°58'21"	123°03'46"	Private Marina	920	0	2	1	1	1	24 hours	200	7	Large Onsite Sewage System	WAC 246-272B / RCW 70.118B / RCW 90.48	Details updated.
Port of Port Angeles Boat Haven	Port Angeles	Port Angeles Harbor	Public Stationary	(360) 457-4505	48°07'33"	123°27'07"	Public Marina	443	0	2	0	0	2	24 hours	160	10	City of Port Angeles WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Port Hadlock Marina	Port Hadlock	Admiralty Inlet	Public Stationary	(360) 385-6368	48°01'54"	122°44'43"	Private Marina	160	0	slips plumbed throughout marina	1	0	1	24 hrs	150	15	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	
Port Ludlow Bay Marina	Port Ludlow	Port Ludlow Bay	Public Stationary	(360) 437-0513	47°55'17"	122°41'08"	Private Marina	300	0	1	1	0	1	24 hours	100	15	Port Ludlow WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Bremerton	Port Orchard	Sinclair Inlet	Public Stationary	(360) 876-5535	47°33'48"	122°37'21"	Public Marina	321	0	2	1	0	1	24 hrs	130	20	Bremerton WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Bremerton, Port Orchard Marina	Port Orchard	Sinclair Inlet	Public Stationary and boat	(360) 876-5535	47° 32' 35.92" N	122° 38' 16.60" W	Public Marina	unknown	0	2	0	1	1	unknown	130	12 ft.	South Kitsap Water Reclamation Facility (Port Orchard WWTP)	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Port Townsend - Boat Haven	Port Townsend	Admiralty Inlet	Public Stationary	(800) 228-2803	48° 6' 25.87" N	122° 46' 26.68" W	Public Marina	375	0	1	0	0	0	unknown	100	Unknown	Holding tank, pumped out, likely to Port Townsend WWTP.	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Port Townsend, Point Hudson Marina	Port Townsend	Admiralty Inlet	Public Stationary	(800) 228-2803	48°06'57"	122°44'58"	Public Marina	32 slips and 800 LF	0	1	0	0	1	24 hours	100	8	Port Townsend WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	

Facility name	Location	Water Body	Category	Contact Phone	Latitude	Longitude	Type of Facility	Number of Moorage Slips	Number of Moorage Buoys	Number of Stationary Pumpouts	Number of Portable Pumpouts	Number of Boat Pumpouts	Number of Dump Stations	Hours of Operation	Max Vessel Length (ft)	Min Depth at Low Tide (ft)	Where Treated	Regulatory Structure	Note
Liberty Bay Marina	Poulsbo	Liberty Bay	Public Stationary	(360) 779-7762	47°43'27"	122°38'36"	Private Marina	152	0	1	1	0	1	8:00 am - 6:00 pm	80	6	City of Poulsbo to Central Kitsap WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Poulsbo Marina	Poulsbo	Liberty Bay	Public Stationary	(360) 779-9905	47°43'58"	122°39'52"	Public Marina	130	0	2	2	0	1	8:00 am - 4:30 pm	80	7	City of Poulsbo to Central Kitsap WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Port Townsend Herb Beck Marina, Quilcene	Quilcene	Quilcene Bay	Public Stationary	(360) 765-3131	47°48'07"	122°51'56"	Public Marina	40	0	1	0	0	0	24 hours	40	6	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	
Port Orchard Railway Marina	Reno	Puget Sound	Public Stationary	(360) 876-2522	47°32'29"	122°38'43"	Private Marina	60	0	1	0	0	0	24 hours	150	0	South Kitsap Water Reclamation Facility (Port Orchard WWTP)	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Roche Harbor Resort	Roche Harbor	Puget Sound	Public Stationary (plus boat)	(360) 378-2155	48°36'43"	123°09'25"	Private Marina	377	0	1	0	1	0	24 hours	80	15	Roche Harbor Resort WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Ballard Mill Marina	Seattle	Lake Union	Public Stationary	(206) 789-4777	47°39'44"	122°22'58"	Private Marina	117	0	1	Unknown	0	0	24 hours	50	15	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Boat Street Marina	Seattle	Lake Union	Public Stationary	(206) 634-2050	47°38'9"	122°18'8"	Public Marina	90	0	1	0	0	1	24 hours	70	>15	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Elliott Bay Marina	Seattle	Elliott Bay	Public Stationary plus boat	(206) 285-4817	47°37'36"	122°23'31"	Private Marina	1250	0	1	1	1	1	24 hours	160	30	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Fishermen's Terminal - Port of Seattle	Seattle	Lake Union Ship Canal	Public Stationary	(206) 787-3395	47°39'33"	122°22'39"	Public Marina	350	0	1	0	0	0	7:00 am - 9:00 pm	100	0	West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Gas Works Park Marina	Seattle	Lake Union	Public Stationary		47° 38' 49.1" N	122° 19' 57.44" W	Private Marina	70	0	1	0	0	0	unknown	unknown	unknown	West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Morrison's North Star Fuel Dock/Diamond Marina	Seattle	Lake Union	Public Stationary	(206) 284-6600	47°38'41"	122°20'38"	Private Fuel Dock	500 LF for fueling & pumpout only	0	3	0	0	0	Variable	200	>15	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Parkshore Marina	Seattle	Lake Washington	Public Stationary	(206) 725-3330	47°31'20"	122°15'40"	Private Marina	183	0	1	1	0	0	24 hours	50	5	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Seattle - Bell Harbor Marina	Seattle	Puget Sound	Public Stationary	(206) 787-3914	47°36'31"	122°20'48"	Public Marina	47	0	1	1	0	1	24 hours	100	22	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Port of Seattle - Harbor Island Marina	Seattle	Puget Sound	Public Stationary	(206) 787-7236	47° 34' 6.82" N	122° 20' 49.13" W	Public Marina	97	0	1	0	0	1	Shilshole Bay Marina staff respond as needed	70	12	West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Port of Seattle - Shilshole Bay Marina	Seattle	Shilshole Bay	Public Stationary	(206) 787-3006	47°40'33"	122°24'46"	Public Marina	1410	0	4	0	0	2	24 hours	75 (to access pumpout)	16	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
The Fairview Marinas	Seattle	Lake Union	Public Stationary	(888) 673-1118	47°37'54"	122°19'51"	Private Marina	165	0	1	0	0	0	24 hours	40	>15	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Port of Port Angeles John Wayne Marina	Sequim	Sequim Bay	Public Stationary	(360) 417-3440	48°03'56"	123°02'23"	Public Marina	300	0	1	0	0	2	24 hours	100	12	Large Onsite Sewage System	WAC 246-272B / RCW 70.118B / RCW 90.48	Details updated.
Captain's Landing on Blind Bay	Shaw	San Juan Islands	Public Stationary	(360) 468-2288	48°35'4"	122°55'4"	Private Marina	Unknown	0	1	0	0	0	unknown	50	unknown	Pumped out of holding tank, pumper truck takes it to Anacortes WWTP.	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated. 1 new stationary pumpout added.
Jarrell Cove State Park	Shelton	Case Inlet	Public Stationary	(360) 426-9226	47°16'53"	122°53'16"	State Park Marina	1040 LF	14	1	0	0	0	24 hours	40	4	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Biosolids Permit	Details updated.

Facility name	Location	Water Body	Category	Contact Phone	Latitude	Longitude	Type of Facility	Number of Moorage Slips	Number of Moorage Buoys	Number of Stationary Pumpouts	Number of Portable Pumpouts	Number of Boat Pumpouts	Number of Dump Stations	Hours of Operation	Max Vessel Length (ft)	Min Depth at Low Tide (ft)	Where Treated	Regulatory Structure	Note
Jarrell's Cove Marina	Shelton	Case Inlet	Public Stationary	(360) 426-8823	47°17'03"	122°53'12"	Private Marina	38 slips & 1815 LF	0	1	0	0	0	10:00 am - 6:00 pm	100	5	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Biosilds Permit	Details updated.
Port of Shelton, Oakland Bay Marina	Shelton	Oakland Bay	Public Stationary	(360) 426-1151	47°13'24"	123°06'18"	Public Marina	109	0	1	0	0	Unknown	24 hours	50	20	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Biosilds Permit	
Port of Silverdale	Silverdale	Dyes Inlet	Public Stationary	(360) 698-4918	47°38'30"	122°41'41"	Public Marina	1780 LF	0	1	0	0	1	6:00 am - 10:00 pm	150	10	Central Kitsap WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Stuart Island State Park/Reid Harbor & Prevost Harbor Marine Parks	Stuart Island	San Juan Islands	Public Stationary	(360) 378-2044	48°40'30"	123°12'00"	Barge mounted pumpout	0	12	1	0	0	1	24 hours	60	4	Roche Harbor Resort WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
16th Street Moorage (now Dock St Marina)	Tacoma	Thea Foss Waterway	Public Stationary	(253) 572-2524	47°14'73"	122°26'00"	Public Marina	320 LF	0	1	0	0	1	8:00 am - 12:00 am	130	15	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Breakwater Marina, Inc.	Tacoma	Puget Sound	Public Stationary	(253) 752-6663	47°18'27"	122°30'48"	Private Marina	182	0	0	1	0	1	7:00 am - 8:00 pm	unknown	15	Tacoma North End WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Chinook Landing Marina	Tacoma	Commencement Bay	Public Stationary	(253) 627-7676	47°16'50"	122°24'09"	Private Marina	213	0	1	0	0	1	8:30 am - 5:00 pm	65	8	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Crow's Nest Marina (aka Marina at Brown's Point)	Tacoma	Commencement Bay	Public Stationary	(253) 272-2827	47°17'37"	122°25'14"	Private Marina	140	0	1	1	0	1	Variable	40	38	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Delin Docks	Tacoma	Thea Foss Waterway	Public Stationary	(206) 391-6431	47°15'00"	122°25'48"	Private Marina	144	0	3	0	0	1	8:00 am - 12:00 am	60	6	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Dock Street Marina (combined 16th Street, Marina 17 and Albers)	Tacoma	Thea Foss Waterway	Public Stationary	(253) 572-2524	47°14'29"	122°26'00"	Public Marina	78	0	2	0	0	2	8:00 am - 12:00 am	130	6	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Dock Street Marina 17	Tacoma	Thea Foss Waterway	Public Stationary	(253) 572-2524	47°14'29"	122°26'00"	Public Marina	77	0	2	0	0	2	8:00 am - 12:00 am	130	6	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Dock Street Marina Albers	Tacoma	Thea Foss Waterway	Public Stationary	(253) 572-2524	47°14'29"	122°26'00"	Public Marina	78	0	2	0	0	2	8:00 am - 12:00 am	130	6	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Foss Harbor Marina	Tacoma	Thea Foss Waterway	Public Stationary and boat	(253) 272-4404	47°15'22"	122°26'01"	Private Marina	402	0	1	0	1	1	8-5 M-S Sun 9-4, Summer hours extended by 2.	90	60	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Foss Landing Marina	Tacoma	Thea Foss Waterway	Public Stationary	(253) 627-4344	47°14'38"	122°25'55"	Private Marina	190	0	1	0	0	0	8:00 am - 5:00 pm	75	5	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Foss Waterway Seaport Authority	Tacoma	Thea Foss Waterway	Public Stationary	(253) 272-4404	47°15'27"	122°26'07"	Public Marina	1768 LF	0	1	0	0	0	24 hours	90	60	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Narrows Marina	Tacoma	Puget Sound	Public Stationary and boat	(253) 564-3032	47°14'39"	122°33'23"	Private Marina	204	0	1	0	1	1	Variable	40	1	Chambers Creek WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Point Defiance Marina Complex	Tacoma	Puget Sound	Public Stationary	(253) 591-5325	47°18'22"	122°30'48"	Public Marina	1225 LF	0	1	0	0	0	24 hours	60	16	Tacoma North End WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Tacoma Fuel Dock/Commencement Bay Marine services	Tacoma	Thea Foss Waterway	Public Stationary	(253) 383-0851	47°15'20"	122°25'58"	Private Marina	930 LF	0	2	0	0	0	8-4:30	120	no restriction	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Tyee Marina	Tacoma	Commencement Bay	Public Stationary	(253) 383-5321	47°17'42"	122°25'28"	Private Marina	650	0	2	0	0	2	Variable	65	65	Tacoma Central WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Alderbrook Resort and Spa	Union	Hood Canal	Public Stationary	(360) 898-2252	47°21'00"	123°04'05"	Private Marina	1500 LF	0	1	0	0	0	By appointment	85	12	Alderbrook Resort WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated.
Hood Canal Marina	Union	Hood Canal	Public Stationary	(360) 898-2252	47°21'54"	123°05'67"	Private Marina	30	0	1	0	0	0	9:00 am - 5:00 pm	45	5	Bio Recyling facility, in Union WA	WAC 173-308 / RCW 70.95 / Biosilds Permit	Details updated.
Twanoh State Park	Union	Hood Canal	Public Stationary	(360) 275-2222	47°22'49"	122°58'30"	State Park Marina	100 LF	7	1	0	0	0	24 hours	40	3	Large Onsite Sewage System	WAC 246-272B / RCW 70.118B / RCW 90.48	
Day Island Yacht Club	University Place	Puget Sound	Private	(253) 565-3777	47° 14' 27	122° 33' 34"	Private Marina		0	1	unknown	0		unknown	unknown	unknown	Chambers Creek WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	
Quartermaster Marina	Vashon	Quartermaster Harbor	Public Stationary	(206) 463-3624	47° 23' 28"	122° 27' 56"	Private Marina	100	0	1	0	0	0	9:00 am - 5:00 pm	50	2	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	Details updated.
Lake Union SkyLaunch Marina, operated by Seattle Boat Co.	Seattle	Lake Union	Public Stationary	(425) 641-2090	Unknown	Unknown	Private Marina	Dry stack storage	0	1	0	0	0	24 hours (closed for winter)	No restrictions	Unknown	Seattle City Sewer - West Point WWTP	NPDES or SWDP / RCW 90.48 / WAC 173-201 / WAC 221/216/219	Details updated. 1 new stationary pumpout added.
Quartermaster Yacht Club	Vashon	Quartermaster Harbor	Public Stationary	(206) 979-2125	Unknown (23428 Vashon Way SW)	Unknown	Private Marina	115	0	1	0	0	0	Variable	40	4	Onsite Septic system	WAC 246-272A / RCW 43.20 / RCW 43.7	New entry. Pumpout connections along dock approx. every 50ft, 2 visitor slips.

a. The pumpout facilities listed in Appendix A primarily came from the Washington State Parks Pumpout Database with a few additions that were identified during this study. This should still be considered a partial listing. Other marinas, such as private facilities, may also have pumpout facilities.
b. Hours of operation listed as 'variable' refers to pumpout facilities whose hours vary by season, day of the week, or are not open on some days of the week.
c. WA State Ferries, Washington DOC ferries, the Victoria Clipper, and mobile pumpouts have been removed from this list since the 2016 version. Those facilities are included in other tables.
d. WWTP = Wastewater Treatment Plant; SWDP = State Waste Discharge Permit.
e. Pumpout cells shaded in blue indicate an increase since the 2016 version of this table.

Table 2. Commercial Marine Work Companies that Pump Out Commercial Vessels in Puget Sound (from Ecology's January 2021 submission)

Company	# Trucks or Vessels	Vessels serviced	Additional Pumping Details
Marine Vacuum Services	~15-17 Trucks (3,000-5,000 gallons each) + poly tanks	Services all of Puget Sound and all types of commercial vessels (has been pumping sewage from tugs, large fishing vessels, Navy, USCG, some smaller vessels, etc. and has poly tanks for use at docks)	Pumped vessel sewage is brought back to the main Seattle facility then discharged to the King County sewer system (likely West Point or South Treatment Plants), under a discharge permit. The company completes monthly and annual reporting, required by the permit. Annual 2019 marine sewage pumped: 297,386 gallons. Company charges vessels by the hour and by the gallon.
Washington Marine Cleaning	~7 Trucks (3,000-7,500 gallons each)	Services all of Puget Sound and all types of commercial vessels (has been pumping sewage from Navy, USCG, ferries, fishing vessels, tug boats, etc.)	No further information.
NRC, a US Ecology Company	~5 Trucks (2,200 -3780 gallons each) + 20,000 gallon poly tanks	Can service all of Puget Sound, typically Bellingham, Pier 90, Fisherman's Terminal (has been pumping sewage from fishing vessels etc.; and has poly tanks for use at docks)	Company discharges to King County WWTPs, under a King County Public Health Liquid Waste Pumping/Hauling certification and annual Septage Disposal Permit. Company documents scale tickets from the WWTP and Bills of Lading. Annual 2019 marine sewage pumped: 900 tons (28,579 gallons) Pumping rates are for time and materials and disposal costs (2019 King County disposal rate: $31.65 per ton plus NRC's 20% markup)
Pumpout is performed by Emerald's parent company CleanHarbors	~17 Trucks (3,000-6,500 gallons each)	Services all of Puget Sound and all types of commercial vessels (has been pumping sewage from tugs, fishing vessels, smaller vessels, etc.)	Company sends the vessel sewage to the King County South WWTP and has a septage permit with King County (# KC-2019-01). Annual 2019 marine sewage pumped: 58,000 gallons Company keeps the weight ticket and Bill of Lading for each load, including information on the vessel of origin and the amount of sewage. Company invoices customers per load Pumping costs estimated at $1,700 for about 6 hours of work and 1,500 gallons of sewage ($0.25/gallon King County rate).
Arrow Launch Services	2 Mobile Barges (3,000 gallons each)	Services all of Puget Sound docks and anchorages and all types of commercial vessels, one barge usually in Anacortes, one in Port Angeles, can travel all of Puget Sound (has been pumping sewage from ATB tugs, oil tankers, bulkers, etc.)	Company pumps vessel sewage, typically from tankers, and brings it to the closest shore location with available pumper truck services. The pumper truck company then takes the sewage to the closest WWTP for disposal. With only about 2 or 3 pumping events a year, the company estimates that the annual vessel sewage pumped is less than 10,000 gallons. Company charges for time and materials (hourly rate for boat and staff) and what the pumper truck company charges.
Certified Cleaning Services Inc.	8 Vacuum tankers (2 x 3000, 5 x 5000, 1 x 6300 gallons)	Services fishing vessels in Puget Sound	Company takes pumped sewage in trucks to Qualco anaerobic digester in Monroe, WA. Company keeps records using Bill of Lading but annual volume was not readily available at the time of inquiry. Company charged for time and materials plus the disposal costs at Qualco.
Sound Marine and Industrial Services Inc.	5 Trucks (3,000-7,000 gallons each) + 1,500-20,000 gallon tanks	Services all of Puget Sound and all types of commercial vessels (tugs, large fishing vessels, USCG, etc. and has 1500 – 20,000 gallon tanks for use on docks)	Company currently takes pumped vessel sewage to the Tenelco facility in Snohomish County. Annual volume was not readily available but the company indicated it is at least 100,000 gallons but may be 2 or 3 times as much. Company charged for time and materials plus the disposal costs at Tenelco ($0.25/gallon).

The blue-shaded record represents a new company that was identified in 2020.

Table 3. Commercial Vessel Stationary Pumpouts (from Ecology's January 2021 submission)

Owner	Facility Location	Latitude	Longitude	Vessels Served[1]	Discharge Location
WA State Ferries	Anacortes	48° 30' 26" N	122°40' 30" W	WSDOT Ferry	Anacortes City Sewer (Anacortes WWTP)
WA State Ferries	Friday Harbor	48° 32' 08" N	123°00' 51" W	WSDOT Ferry	Friday Harbor Sewer (Friday Harbor WWTP)
WA State Ferries	Port Townsend	48° 06' 52"N	122° 45' 08" W	WSDOT Ferry	Port Townsend Sewer (Port Townsend WWTP
WA State Ferries	Mukilteo	47° 57' 00" N	122 18' 12" W	WSDOT Ferry	Mukilteo Sewer (Mukilteo WWTP)
WA State Ferries	Edmonds	47° 48' 47" N	122°40' 30" W	WSDOT Ferry	Edmonds City Sewer (Edmonds WWTP)
WA State Ferries	Seattle-Coleman Dock	47° 36' 9" N	122°23' 37" W	WSDOT Ferry	King County Sewer (West Point WWTP)
WA State Ferries	Fauntleroy	47° 31' 24" N	122°23' 37" W	WSDOT Ferry	King County Sewer (West Point WWTP)
WA State Ferries	Pt. Defiance	47° 18' 22" N	122°30' 46" W	WSDOT Ferry	Tacoma City Sewer (Tacoma Central WWTP)
Alaska Marine Highway	Port of Bellingham (3 pumpouts)	48°43'22.2"N	122°30'49.8"W	One serves Alaska Ferries and two serve all other commercial vessels	Bellingham City Sewer (Bellingham WWTP)
Victoria Clipper	Port of Seattle	47°36'48"N	122°21'12"W	Victoria Clipper	King County Sewer (West Point WWTP)
McNeil Island WDOC ferries	Steilacoom	47°10'20.4"N	122°36'12.9"W	Department of Corrections Ferries and may serve others	Steilacoom sewer/ Pierce County Treatment Plant (Tacoma North WWTP)
U.S. Navy	Bremerton	47°33'17"N	122°39'17"W	U.S. Navy Vessels	Bremerton City Sewer (Bremerton WWTP)
U.S. Navy	Everett	47°59'26.4"N	122°13'05.2"W	U.S. Navy Vessels	Everett City Sewer (Everett WWTP)
Navy Supply Center, Puget Sound	Manchester	47°33'57.3"N	122°32'38.5"W	U.S. Navy Vessels	Kitsap County – Manchester WWTP

[1] All except for the Port of Bellingham's two pumpouts are dedicated to the certain vessel types.

Table 4. Mobile Vessel Pumpout Services Available to Puget Sound Vessels (from Ecology's January 2021 submission)

Company	Service Areas	Number of Boats	Cost	Primary Type of Vessels Serviced	Capacity	Where Is Pumped Sewage Disposed?
Port of Brownsville[1]	Brownsville	1	$5	Vessels within their marina	300 Gallons	Central Kitsap Wastewater Treatment Plant
Foss Harbor Marina[1]	Foss Harbor Marina Area – Tacoma	1	Free (with purchase of gas)	Vessels within their marina	400 Gallons	Tacoma Central Wastewater Treatment Plant
Seattle Sanitation Services/SaniTug	Lake Union (Portage Bay to the Ship Canal) and Shilshole Marina - Seattle	2	$20-$25 (more for big tanks)	Personal and commercial vessels	200 & 300 Gallons	King County West Point or Brightwater Wastewater Treatment Plant
Narrow's Marina[1]	Narrow's Marina area - Tacoma	1	$5	Vessels within their marina	70 Gallons	Chambers Creek Wastewater Treatment Plant
Pelican Pump	Olympia Area	1	$20 & up	Primarily liveaboards (potentially others)	350 Gallons	Pumpouts at Swantown Marina and West Bay Marina (Lott Wastewater Treatment Plant)
Point Roberts Marina[1]	Point Roberts	1	$5	Vessels within their marina	350 Gallons	Large Onsite Septic System
Rose Head Service	Port Everett Only	1	$18 & up	All vessels	300 Gallons	Public pumpouts to Everett Water Pollution Control Facility (WWPT)
Port of Friday Harbor's Pumpty Dumpty[1]	Port of Friday Harbor and nearby Marinas	1	$5	All within Harbor (has served passenger vessels 80-90 ft)	190 Gallons	Friday Harbor Wastewater Treatment Plant
Port of Bremerton[1] and Port Orchard Marinas	Port Orchard and Bremerton	1 at each location	Free ($5 if unattended)	Vessels within their marina	45 Gallons	South Kitsap Water Reclamation Facility (Port Orchard WWTP)
Phecal Phreak[1]	Roche Harbor Marina	1	Free as part of moorage fee	Marina tenants & guests	300 Gallons	Roche Harbor Resort Wastewater Treatment Plant
Elliott Bay Marina	Seattle	1	$25 & up	Vessels within their marina	250 Gallons	King County West Point Wastewater Treatment Plant
SS Head	Seattle Area (Shilshole to Portage Bay)	2	$25 and up	Mostly liveaboard	300 Gallons each	Public pumpouts at Fisherman's Terminal and Shilshole – typically Seattle City Sewer, to West Point WWTP
Pump Me Out	Seattle Area (Shilshole to Lake Union)	2	$35-$45	Liveaboards and other vessels (has served towboats and fishing boats)	350 & 365 Gallons	Generally public pumpouts - typically Seattle City Sewer, to West Point WWTP
Semiahmoo Marina[1]	Semiahmoo Marina and Drayton Harbor – Blaine	1	Liveaboards $5, Guests Free	Recreational and liveaboard vessels	40 Gallons	Blaine Wastewater Treatment Plant
Sanitation Offloading Solutions (SOS)	Greater Anacortes Area & La Conner	1	$35 & up	Recreational and liveaboard vessels	350 Gallons	Public pumpouts at marinas (likely to Anacortes WWTP or La Conner WWTP)
Pumpout Seattle	Lake Union, Salmon Bay, Shilshole Marina, Portage Bay, Lake Washington, Duwamish River	3	$25 & up	All vessels	300 Gallons	Seattle City Sewer, to West Point WWTP
NW Mobile Pump Out and Marine Environmental Services	Gig Harbor, Liberty Bay, Port Madison, Bainbridge Island, Commencement Bay	2	$20-30 (more for bigger tanks)	Recreational and commercial vessels	200 & 300 Gallons	Public and marina pumpouts in Poulsbo, Bainbridge and Gig Harbor (Bainbridge Island WWTP or Gig Harbor WWTP)

[1]Mobile pumpout boats that are installed under Washington State Parks grants are not allowed to service commercial vessels.

Blue-shaded records represent new mobile Pumpout options since 2018.

Table 5. Commercial Vessel Pumpout Truck Companies by County (from Ecology's January 2021 submission)

County	Number of Pumper Companies	Website	Typical disposal location
Clallam	4	http://websrv7.clallam.net/forms/uploads/ehOnsiteMaintenanceProviders2.pdf	Port Angeles WWTP (except one to Biorecycling facility)
Island	18	https://www.islandcountywa.gov/Health/EH/Documents/Current%20Licensed%20MSP's.pdf	La Conner WWTP
Jefferson	7	https://www.jeffersoncountypublichealth.org/DocumentCenter/View/1313/List-of-Certified-Septic-System-Pumpers-PDF?bidId=	Depends on location, *likely* Port Townsend WWTP or permitted biosolids facility (Biosolids Permit per WAC 173-308)
King	41	https://www.kingcounty.gov/depts/health/environmental-health/piping/onsite-sewage-systems/professionals/~/media/depts/health/environmental-health/documents/oss/list-of-certified-liquid-waste-pumper-hauler.ashx	King County South WWTP or a WWPT within Pierce County
Kitsap	17	https://kitsappublichealth.org/recordsearch/contractorlist.aspx?intlicensetypeid=8	*Likely* Central Kitsap WWTP
Mason	32	https://www.co.mason.wa.us/forms/Env_Health/pumpers.pdf	Bio-Recycling North Ranch
Pierce	42	https://www.tpchd.org/home/showpublisheddocument?id=1040	Depends on location, likely Pierce County WWTPs or Tacoma WWTP
San Juan	9	http://www.sanjuanco.com/DocumentCenter/Home/View/8644	Anacortes WWTP
Skagit	18	https://www.skagitcounty.net/HealthEnvironmental/Documents/SepticProviders.pdf	Burlington or La Conner WWTPs
Snohomish	25	http://www.snohd.org/DocumentCenter/View/2413/2020-Septic-Contractors-List?bidId=	King County, Anacortes and La Conner WWTPs
Thurston	23	https://www.co.thurston.wa.us/health/ehoss/pdf/PumperList.pdf	*Likely* Budd Inlet WWTP
Whatcom	13	http://wa-whatcomcounty.civicplus.com/DocumentCenter/View/2040	One of three permitted biosolids beneficial use facilities (Biosolids Permit per WAC 173-308)

Blue-shaded records represent additions since the 2016 petition. It is unclear how many of the pumper trucks in those counties service vessels. All webpages have been updated and verified.