Reducing Pressures on the Puget Sound Ecosystem from Wastewater
Draft 9/8/2011

The Challenge

Pollution of the rivers, creeks, bays and open waters of Puget Sound comes from a variety of sources and travels along many pathways. This Section focuses on the potential for pollution from wastewater collection, treatment, and disposal – the system that is designed to collect and treat used water and human waste from homes and businesses and, in some cases, wastewater from industrial processes and urban stormwater. Essentially, everything that goes down a sink or is flushed down a toilet ends up in the wastewater system. This includes not just human waste but also a wide range of household cleaning products and chemicals and personal care products.

Wastewater management involves a spectrum of approaches and treatment technologies that can be used to effectively treat sewage in different situations. In every case, the selected approach and technology must be tailored to local site conditions and take into account such factors as development densities, capital, maintenance and operation costs, and protection of public health and water resources. Generally, wastewater treatment is either through a permitted wastewater treatment plant or though an on-site septic system.

Wastewater treatment plants (WWTP) are centralized facilities that use sewer collection systems to serve the region's most populated and densely developed areas. These systems typically discharge treated effluent to surface water. On-site sewage systems , more commonly known as septic tanks, are decentralized or distributed systems that serve small communities, areas of limited development, and individual properties.

Both types of systems are part of the region's permanent wastewater infrastructure. There are roughly 100 WWTP that discharge to surface waters and [number] that discharge to ground water in the Puget Sound region. There are about 300 large on-site sewage systems (LOSS), and more than a half million small on-site sewage systems (OSS) in the Puget Sound basin. Wastewater treatment systems play a critical role protecting public health and water quality, but they need proper management, operation, and maintenance to ensure effective treatment and to protect the infrastructure investments.

Comment [EDM1]: Checking numbers

Ten Puget Sound facilities include Combined Sewer Overflows (CSOs) as part of their sewage and stormwater system. CSOs often are located in older parts of cities. Sewage and stormwater flow through a single piping system to a sewage treatment plant. During heavy rainfall events the system can be overwhelmed and is then designed to "overflow" untreated wastewater and stormwater at specific outfalls. In some locations, these CSO outfalls have been associated with sediment contamination. Untreated wastewater also is discharged to Puget Sound from some boats, ships and vessels.

Strategies for reducing pressures on Puget Sound from wastewater include efforts to prevent and control pollution from on-site sewage systems (i.e., large and small septics), centralized wastewater treatment plants, and boats and vessels. They also include consideration of more overarching

approaches to promote more watershed based and integrated approaches to better manage the regions wastewater treatment needs.

C4. Prevent, reduce and/or eliminate pollution from decentralized wastewater treatment systems.

There are more than 500,000 septic tank systems in the Puget Sound region. The vast majority of these systems are very small. The typical septic design for a 3-4 bedroom home is 360-480 gallons-per-day, and because of water efficiency measures such as low flow showers and faucets, most of these systems operate at closer to 250 gallons-per-day. Larger systems can range up to 100,000 gallons per day peak daily design flow. These systems are not connected to centralized wastewater treatment plants. Instead wastewater is treated entirely on-site; solids are collected in the septic tank and must be periodically removed through pumping, and treated water is discharged, or leached, below the surface of the soil through a drainfield.

Septic systems are made up of collection piping, treatment components, and drainfields. Until the mid 1990s, the majority of septic systems were traditional, gravity fed designs where raw wastewater from toilets, sinks, washing machines and showers enters the septic tank, which is a holding tank generally made of pre-cast concrete or fiberglass. The septic tank separates the wastewater into three general components -- solids or "sludge", floatables or the "scum layer", and a zone of relatively clear water. Anaerobic bacteria (able to live in an oxygen-free environment) perform the first treatment of the wastewater, generating gas that is vented through the vent stack of the building's plumbing, and breaking the solids into a liquid form. The oxygen-free conditions inside the septic tank also deactivate some of the disease-causing microorganisms that are found in sewage.

From the septic tank, the liquid portion of the wastewater flows into the drainfield, which is generally a series of perforated pipes or slotted panels that are usually surrounded by a layer of gravel or sand. The drainfield provides secondary treatment of the sewage by allowing aerobic (oxygen-using) bacteria to continue deactivating the disease germs that remain in the wastewater. The drainfield also provides filtration of the wastewater as gravity draws the water downwards through the soil layers. In addition, evaporation of water occurs through the layer of soil covering the drainfield.

More recently, the vast majority of new septic systems and many system replacements are so-called “alternative systems.” Generally, and alternative system augments the traditional gravity-fed design with pressure distribution devices. These further screen solids from the effluent sent to the drainfield and use pumps to pressurize and distribute the effluent evenly over the drainfield to promote greater soil treatment.

Maintenance of all septic systems is needed to prevent failures; and the maintenance is more intense and critical for alternative systems, which are more technically and mechanically complex with pumps and other system components, that must function properly for the system to work. When septic systems do not function properly, they can pollute groundwater and streams, shorelines and the open waters of the Sound. Untreated bacteria, viruses and chemicals threaten human health, contaminate

shellfish and other organisms, and can disrupt the functions of a healthy ecosystem. In addition, even properly operating systems can leach excess nutrients into Puget Sound; an issue that needs further study and action to address.

Strategies to prevent, reduce and/or eliminate pollution from septic systems focus on providing stable funding for system operation and maintenance (including assistance for individual home owners), and for local inspection programs to locate failing systems and ensure their repair or replacement.

Relationship to recovery targets

The 2020 target for the management of OSS is to inventory all OSS, fix all failures, and be current with inspections at 95 percent in Marine Recovery Areas and other areas with equivalent enhanced O&M programs. The target also calls on local health jurisdictions to expand these designated areas and programs to cover 90 percent of the region's unsewered marine shorelines by 2020.

Three other targets closely associated with the management of wastewater are (1) improved water quality and pollution controls to achieve a net increase of 10,800 harvestable shellfish acres; (2) ensuring human-related contributions of nitrogen do not result in more than 0.2 mg/l reductions in dissolved oxygen levels anywhere in Puget Sound by 2020; and (3) ensuring that all monitored Puget Sound beaches meet enterococcus (a pathogen associated with fecal matter) standards by 2020.. Other pollution sources and management programs also directly influence progress toward these ecosystem recovery targets.

C4.1 Effectively manage and control pollution from small on-site sewage systems.

The Washington Department of Health (DOH) administers the state rule for small septic systems which have peak flows of less than 3,500 gallons per day (Chapter 246-272A WAC). This is the vast majority of all systems in Puget Sound. Local health jurisdictions adopt and implement this rule to regulate and permit septic systems at the local level. Homeowners are responsible for operating, monitoring, and maintaining their systems to make sure they function properly.

Under the state rule, local health jurisdictions in the Puget Sound region are required to develop and carry out comprehensive plans to help ensure that septic systems are properly managed, with emphasis on operation and maintenance (O&M) activities and geographic areas where septic systems pose an increased public health risk. The local O&M programs are designed and implemented differently in each county and are applied strategically to different types of systems, sensitive areas, and other situations (e.g., time-of-sale inspections) on the basis of public health risk and other criteria.

As part of the planning process, local health jurisdictions also are required to designate and protect marine recovery areas (Chapter 70.118A RCW). Marine Recovery Areas (MRAs) must be designated when the local health officer determines that existing septic systems are a significant factor contributing to concerns associated with the degradation of shellfish growing areas, marine waters listed by the Department of Ecology for low-dissolved oxygen levels or fecal coliform, or marine waters where nitrogen has been identified as a contaminant of concern. The focus in marine recovery areas is to: (1)

Find existing failing systems and ensure that system owners make necessary repairs, and; (2) find unknown systems and ensure that they are inspected and functioning properly, and repaired if necessary.

[Side bar on successes of local programs in Henderson Inlet; Kitsap County; other examples?]

Performance Objectives for Ongoing Programs

All twelve Puget Sound counties have developed local management plans and submitted them to the Department of Health for approval, and nine counties have designated one or more marine recovery areas. [Placeholder to insert MRA map.]

Since [date] local health jurisdictions have identified [number] previously unknown septic systems and have identified and ensure repair/replacement of [number] failing systems. [number] O&M inspections have been conducted since [date] and local health jurisdictions average [number] O&M visits per year.

Work in programs for small septic systems is focused on ensuring a programs is focused on continuing to implement existing O&M requirements in local plans, finding and ensuring repair of failing systems and on strengthening work in marine recovery areas and other areas covered by enhanced O&M, and designating additional areas for enhanced O&M as appropriate. DOH will continue to provide state pass-through funding to help implement the management plans and technical support to help implement the management plans and rules

Near-Term Actions

C4.1 NTA 1: DOH, in consultation with LHJs, will evaluate the effectiveness of the state OSS rule, identify potential changes, and outline recommendations to the State Board of Health by 2013.

Performance measure: done or not

NTA C4.1 NTA 2: DOH will coordinate with LHJs and other interests to develop standards of practice for O&M providers in the Puget Sound region by [date]. These standards will focus on providing standard criteria and guidance for successful O&M activities.

Performance measure: standards complete or not; number of O&M inspections completed per standards?

NTA C4.1 NTA 3: DOH will evaluate public domain OSS treatment technologies for nitrogen reduction and develop standards and guidance for their use if testing results indicate the technologies are effective and reliable by [date].

Performance measure: evaluation complete or not; standards and guidance (if appropriate) done or not; number of OSS where nitrogen reduction technologies are deployed.

C4.2 Effectively manage and control pollution from large on-site sewage systems.

Comment [EDM2]: Should there be an action related to inspections? An inspection target?

Should there be an action related to establishment of additional MRAs or enhanced O&M areas?

Should there be an action on increasing state pass-through funding to local health jurisdictions?

Comment [EDM3]: Related to the study of OSS contribution (or not) to pollution in the second to last bullet under emerging issues; should these be combined in one NTA? Should the study be elevated to an NTA?

DOH directly regulates and permits large on-site sewage systems (LOSS) with flows between 3,500 and 100,000 gpd (chapter 246-272B WAC).

DOH adopted a revised LOSS rule in 2011. Among other changes, the expanded LOSS program consolidates all LOSS permitting authority at DOH, requires annual operating permits for all LOSS, and requires protection of public health and the environment. The rule is structured to regulate and permit LOSS in different situations ranging from newly constructed LOSS to existing LOSS that have never been documented or permitted.

Performance Objectives for Ongoing Programs

DOH's priority is to implement the new LOSS rule to effectively manage LOSS and protect water quality and public health with priority emphasis on the Puget Sound basin. DOH will inventory and permit LOSS and work with LOSS owners to evaluate systems and ensure adequate treatment and develop technical guidelines and standards for LOSS design and O&M, system evaluations, document submittals and other program activities.

Add other objectives for the current LOSS program – e.g., inventory objectives, inspections, etc. and timing Can draw from existing GMAP goals as much as possible]

Near-Term Actions

None. Near-term work in this area is focused on implementation of existing program requirements and the new LOSS rule.

C4.3 Improve and expand funding for on-site system maintenance, repair and replacement.

Funding for proper operation and maintenance of on-site sewage systems and for replacement of failing systems is an ongoing challenge. The work is expensive, the average cost for a homeowner to replace a failing system ranges from [do we have numbers?] and can be as high as $40,000.

Funding assistance currently is comprised from a variety of grant and loan programs, including a new $4.2 million state program to help homeowners and small businesses in the 12 Puget Sound counties repair, replace or improve their existing onsite septic systems. Since 2007, this program has funded replacement of 345 failing septic systems in Puget Sound. In addition Enterprise Cascadia offers low interest loans to homeowners and businesses in Jefferson, Kitsap and Mason Counties for septic repair or replacement. While these programs have helped, eligibility for them can be constrained by the age and location of the system, the income level of the homeowner, and other criteria. Additional and more reliable sources of funding assistance are needed to support both operations and maintenance and repair or replacement of failing systems.

Performance Objectives for Ongoing Programs

[Are there any performance objectives from ongoing programs for funding assistance? Does Enterprise Cascadia/Shorebank have existing performance objectives?]-

Near-Term Actions

NTA C4.3 NTA 1: LHJs will work with DOH, policy makers and other interests to develop legislation that will allow the county treasurer to collect local board of health fees needed to implement on-site management plans via property tax statements. The funding authority will allow inspection, monitoring, reporting, education and compliance activities and associated technology and infrastructure. Funding authority is needed for entire county OSS management areas and should not be limited to MRAs or special study areas.

Performance measure:

NTA C4.3 NTA 2: DOH, Ecology, and Puget Sound Partnership will help evaluate options and support proposals to fund a unified, self-sustaining, low-interest loan program in the Puget Sound region to help homeowners repair and replace on-site sewage systems.

Performance measure:

Emerging Issues and Future Challenges for Reducing Pressures on Puget Sound from On-Site Systems

In addition to the specific ongoing program activities and near-term actions described above, there are a number of ideas for future work that might be considered to better address the Puget Sound regions wastewater treatment needs and further reduce pressures on the Puget Sound ecosystem. These ideas should be an ongoing part of the regional discussion about how to best address wastewater treatment needs in the Puget Sound basin, and may inform future funding decisions, programmatic priorities and guidance, and/or may become near-term actions in future Action Agenda cycles.

Many of these ideas have to do with exploring potential future funding to ensure local health jurisdictions can effectively oversee and administer programs for reliable operation, maintenance, repair and replacement for on-site systems. They include:

- Evaluate other approaches and mechanisms (e.g., a flush tax or use of the state revolving fund) to establish a regional funding mechanism to provide stable, reliable funding to support local septic management plans and O&M programs.

- Evaluate funding options to help local governments with projects involving septic system conversions to more centralized treatment and to decommission abandoned septic systems. In older neighborhoods in some cities residences remain on septic systems even though surrounding, newer neighborhoods are served by centralized wastewater treatment. It can be difficult to convert these neighborhoods to centralized treatment – often individual homeowners do not have adequate resources or incentives to work together to fund conversation, utilities have little incentive to convert older neighborhoods, and local governments do not have the resources to subsidize these efforts.

- Evaluate and discuss models and ways to engage private wastewater companies and public utilities in septic system management as pilot projects or in new working relationships.

Other ideas raise a range of issues related to targeting technical and financial assistance, considering cumulative impacts, and improving treatment technologies.

- Identify priority areas around Puget Sound needing focused technical and financial assistance to solve chronic sewage problems. Explore options to provide targeted technical and financial assistance to solve these problems.

- Revise the definition of septic system failure to account for cumulative impacts of septic systems. We need to address situations where the cumulative effect of pollution from OSS in a community has a significant effect on water quality, even though the individual systems do not meet the traditional definition of failure (i.e., sewage that surfaces or backs up into a structure). This may be the case, for example, where it is clear that a certain neighborhood is creating water quality impacts but no individual septic system in that area is failing.

- Objectively evaluate impacts of OSS for pollutants of concern other than fecal coliform, like nitrogen and toxic chemicals, and update regulations and management plan guidance to address these findings. [what is the problem with OSS and nitrogen; is it causing low DO, we're not sure]

- Work with OSS industry and others to develop new, affordable and reliable technologies that reduce nutrient and fecal coliform concentrations in OSS effluent. [May be best addressed as a science need in the BSWP.]

- Work to develop cost effective ways to effectively separate urine from wastewater. [Need more detail on this; may be best addressed as a science need in the BSWP.]

C5. Prevent, reduce and/or eliminate pollution from centralized wastewater systems.

Centralized wastewater treatment facilities are regulated through National Pollution Discharge Elimination System (NPDES) permits administered by EPA and Ecology under the federal Clean Water Act and state regulations. Untreated wastewater from municipal, industrial, and government facilities contains a broad spectrum of pollutants, including nutrients and pathogens. Wastewater treatment removes or transforms many, but not all, contaminants. Depending on the amount and types of treatment treated wastewater can contain a variety of contaminants, including personal care products, caffeine, endocrine-mimicking chemicals, pharmaceuticals, and industrial chemicals.

Approximately 100 municipal and industrial wastewater treatment plants discharge to the marine waters of Puget Sound and the Straits of Georgia and Juan de Fuca and to rivers and other water bodies in the Puget Sound watershed. The combined daily discharge of treated wastewater to Puget Sound is

Comment [EDM4]: Confirm number

over 430 million gallons per day. In addition, during wet weather events, combined sewer overflows located in some older urban areas of ten Puget Sound cities sometimes discharge mixed stormwater and untreated domestic and industrial wastewater when conveyance or treatment plant capacities are exceeded.

The effectiveness of pollutant removal at treatment plans varies with the treatment technology and to some degree the age of the treatment facility. Treatment effectiveness also depends on the amount and types of contaminants in the wastewater that the treatment facilities receive from residents and businesses. Municipal facilities have traditionally focused on removing pathogens, biochemical oxygen demand, toxic chemicals and suspended solids with a primary objective of protecting human health. Industrial facilities typically have systems customized to the exact composition of their wastewater and /or discharge to municipal systems after pre-treatment on site. In Puget Sound most of the municipal wastewater treatment plants use secondary treatment technology, and few have needed to install advanced treatment technology to meet current discharge limits. All new facilities constructed in recent years have been built with advance treatment.

Relationship to recovery targets

The 2020 target most associated with centralized wastewater treatment is the larger Puget Sound nutrient target. The target is that the combination of all human sources must not contribute to dissolved oxygen depletion more than 0.2 mg/L anywhere in Puget Sound. This may be more stringent than the state water quality standards or it could be identical to the standards. Potential human contributions to oxygen depletion in areas of Puget Sound include wastewater treatment plan discharges, on-site wastewater systems, stormwater, and other sources. Computer models will be required to quantify progress towards the target.

Two other targets closely associated with the management of wastewater are (1) improved water quality and pollution controls to achieve a net increase of 10,800 harvestable shellfish acres, and (2) ensuring that all monitored Puget Sound beaches meet enterococcus (a pathogen associated with fecal matter) standards by 2020. As with the dissolved oxygen target, other pollution sources and management programs also directly influence progress toward these ecosystem recovery targets.

C5.1 Reduce the concentrations of contaminant sources of pollution conveyed to wastewater treatment plants through education and appropriate regulations, including improving pre-treatment requirements.

Preventing sources of pollution conveyed to wastewater treatment plants will be a key part of reducing the overall threat to Puget Sound. Strategies and actions related to reducing sources of toxics are addressed in strategy C1 and include developing safer alternatives for chemicals in use, advancing programs to help prevent chemicals from entering the Puget Sound environment, education and technical assistance, and other strategies.

Performance Objectives of Ongoing Programs

In addition, effective implementation of the pre-treatment program plays a vital part in ensuring contaminants aren't conveyed to wastewater treatment plants in amounts excess of the plants treatment capacity or acceptance requirements. Pretreatment programs are focused on working with businesses and industrial facilities that discharge wastewater to municipal treatment plants. The programs are focused on preventing the introduction of pollutants that could interfere with treatment plant processes, impact receiving water or biosolids quality, and/or threaten workers' safety.

Near Term Actions

C5.1 NTA 1: Ecology will require increased annual monitoring for the full priority pollutant scan for all industrial users in pretreatment programs by 2013.

Performance metric: done or not; number of industrial users who complete an annual full priority pollutant scan.

Comment [EDM5]: Other suggestions:

King County: this should be focused on specific pollutants or specific areas where additional monitoring may be warranted

C5.2 Reduce pollution loading to Puget Sound by preventing and reducing Combined Sewer Overflows.

Combined sewer systems are wastewater collection systems designed to carry sanitary sewage (consisting of domestic, commercial, and industrial wastewater) and stormwater in a single piping system to a treatment facility. In periods of rainfall or snowmelt, total wastewater flows can exceed the capacity of the sewer collection systems and/or treatment facilities. When this occurs, the combined sewer system is designed to overflow directly to nearby streams, lakes, and harbors, discharging untreated sewage and stormwater. These overflows are called combined sewer overflows (CSOs) and can cause contribute to water and sediment quality problems.

Contaminants in CSOs can include pathogens, oxygen consuming pollutants, solids, nutrients, toxic chemicals, and floatable matter – all of which can harm the health of people, fish and wildlife. CSOs can contribute to shellfish harvesting restrictions, contaminated sediment, impairment of the aquatic habitat, and aesthetic degradation due to unsightly floating materials associated with raw sewage. Ten Puget Sound cities have combined sewage and storm collection systems.

CSO control is a vital part of the statewide effort to reduce and control stormwater discharges. CSO reduction programs are in place in 11 cities in Washington. Ecology estimated that, in 1988, the average volume of untreated CSOs discharged to the state waters was 3.3 billion gallons of untreated discharges per year. Since then, Washington has made progress in addressing this pressure, with a reduction of CSOs to less than one billion gallons in 2009.

A number of communities have been successful in controlling and reducing their CSOs completely and the remaining communities continue to make progress in CSO control. Strategies for controlling CSOs include separation, storage or treatment of flows. More recently, "green" stormwater infrastructure (GSI) has been used alone or in concert with other control strategies as a cost effective approach for some CSO reduction projects. Many different tools, including a variety of stormwater control strategies, could be used to reduce pressures on the Puget Sound ecosystem from CSOs.

Performance Objectives of Ongoing Programs

One of EPA's National Priorities for enforcement and compliance assurance for FY 2008-2010 addresses CSOs and sanitary sewer overflows (SSOs). The priority focuses on enforcement of the Clean Water Act and the codified CSO Control Policy which requires the reduction of CSO discharges as prescribed in the CSO policy, which requires that CSO discharges to be reduced to a level that does not contribute to violations of the water quality standards.

Ecology's regulation requires that CSO discharges be controlled to an average of one discharge per year per outfall, consistent with the EPA's CSO policy. As of February 2011 the following Puget Sound CSO facilities have been determined to meet this standard: Anacortes, Bellingham, Bremerton, and LOTT (in Olympia). Other facilities are under permits or compliance orders to meet the standard: Everett (estimated compliance date 2017), King County (estimated compliance date 2030), Mount Vernon (estimated compliance date 2015), Port Angeles (estimated compliance date 2015), Seattle (estimated compliance date 2025), and Snohomish (no estimated compliance date).

Ecology's work on CSOs is focused on ensuring that facilities in compliance remain in compliance and in providing technical assistance to facilities that are developing compliance plans and activities to ensure they meet their compliance dates.

Near Term Actions

None. Near-term work in this area is focused implementation of existing program requirements.

Comment [EDM6]: Other suggested NTAs for consideration:

Bolster incomplete combined sewer overflow reduction programs by using green stormwater infrastructure techniques to reduce stormwater flows. (from PSSU)

Focus early prioritization of compliance dates for CSOs with larger components of industrial wastewater dischargers or where there is a sediment cleanup site. (from PFPS)

C5.3 Improve the reliability of the wastewater collection system by reducing inflow, infiltration and exfiltration.

Most sewers in the Puget Sound region are not combined sewers; most are designed to convey only wastewater. However, because of the ages of the systems, many of these "separated" sewers also convey groundwater and stormwater that enter through leaky pipes, improper storm drain connections, and other means. There is some evidence that a substantial portion of excess water entering conveyance lines derives from side sewers that connect individual homes and businesses to the collection system. Excess water that flows into sewer pipes from groundwater and stormwater is called infiltration and inflow, or I/I. Groundwater (infiltration) can seep into sewer pipes through holes, cracks, joint failures, and faulty connections. Stormwater (inflow) can rapidly flows into sewers via roof drain downspouts, foundation drains, storm drain cross-connections, and through holes in manhole covers. Most I/I is caused by aging infrastructure that needs maintenance or replacement. This excess water takes up capacity during peak flows that could otherwise be used for wastewater treatment alone and generates the need to build added capacity in pipelines, treatment plants, and other wastewater facilities.

Performance Objectives of Ongoing Programs

Wastewater treatment providers manage inflow and infiltration as part of the overall maintenance of the conveyance system; however where I/I derives largely from side sewers or individual homes or

businesses opportunities for centralized utilities to find and repair the sources of I/I can be limited, and present funding challenges. NPDES permits do not necessarily specify a target for the percent of water delivered to treatment plants that comes from I&I rather than through wastewater. Permittees are required to report I&I in their annual reports to Ecology. I&I levels are reviewed along with any permit violations or sanitary sewer overflows (SSOs). SSOs are considered spills and must be reported to Ecology. Ecology may issue a compliance order to plants that have multiple problems, and I&I controls would be one of several actions required. Currently one plant in South Puget Sound is under a compliance order. Recent permits added a new requirement that permittees pressure test force mains for exfiltration. Plants that have high levels of I&I in the winter are more likely to produce exfiltration in the summer months. In addition, permits stipulate that any gravity sewers close to water bodies must pressure test once per permit cycle.

Near Term Actions

NTA C5.3 NTA 1: [Who] In accordance with NPDES permits issued under the Clean Water Act, will reduce SSOs [by how much] in all areas of Puget Sound, beginning with MRAs by [date]. [Add increment of progress by 2013.]

Performance metric: reduction in SSOs in MRAs and overall

NTA C5.3 NTA 2: [Who] will reduce inflow and infiltration in centralized wastewater collection systems in all areas of Puget Sound [by how much],beginning with watersheds with declining baseflows or watersheds closed to additional withdrawals or otherwise water stressed, by [date]. [Add increment of progress by 2013.]

Performance metric: reduction in I&I in priority watersheds and overall

NTA C5.3 NTA 3: [Who] will reduce exfiltration in all areas of Puget Sound [by how much], beginning with watersheds and marine waters where bacteria concentrations violate water quality standards, by [date]. [Add increment of progress by 2013.]

Performance metric: reduction in exfiltration in priority watersheds and overall

NTA C5.3 NTA 4: [Who] will complete evaluations of I/I project effectiveness in Puget Sound Basin and review evaluations from elsewhere to determine the potential effectiveness of I/I reduction programs by [date].

Performance metric: done or not

C5.4 Implement priority upgrades of municipal and industrial wastewater facilities in urban and urbanizing areas to increase the effectiveness of treatment and reduce pollution loads to Puget Sound.

EPA has delegated authority to Ecology to administer the Clean Water Act provisions for the National Pollutant Discharge Elimination System (NPDES). This includes both individual permits to discharge and

Comment [EDM7]: Other considerations:

PFPS suggests this should be a 75% reduction.

King County suggests that there are existing regs on SSOs and this should be covered under existing programs/is not needed

Comment [EDM8]: Other considerations:

PFPS suggests this should be a 50% decrease in I/I.

King county suggests that NTAs for I/I should focus on I/I from side sewers and individual homes/businesses and maybe there NTAs should focus on something like more rigorous inspection of sewers during sale of homes and/or for new development. However, this may be controversial since inspections cost approximately 1K and repairs also are expensive.

Comment [EDM9]: Other considerations:

PFPS suggests this should be a 50% decrease in exfiltration.

general permits that cover multiple dischargers in particular categories of sources (e.g., municipal stormwater permits). All wastewater treatment plants that discharge to Puget Sound have individual NPDES permits, which are highly tailored to meet water quality standards for the pollutants in the discharge.

Ecology also is responsible for establishing Total Maximum Daily Loads (TMDLs) for impaired water bodies that are identified as not meeting state water quality standards. In marine waters such as Puget Sound, TMDLs require that contributions from the combined total of human point and nonpoint sources cannot cause dissolved oxygen levels to fall below particular concentrations; where concentrations naturally fall below these levels, the combined total of all human sources cannot cause more than a 0.2 mg/L depletion at any time. Marine waters with measured concentrations below the thresholds must be assessed to determine whether human contributions are contributing to the low levels or whether the low levels result from natural conditions. Through implementation of the TMDL program, Ecology can identify when and where wastewater treatment discharge limits for individual treatment plans must be lowered to achieve water quality goals.

To support TMDL processes in Puget Sound, Ecology is carrying out a number of studies to determine how nitrogen from a variety of sources affects dissolved oxygen levels in South Puget Sound and other areas with low levels of dissolved oxygen. These studies are a critical first step in determining what will be needed to improve water quality. The results of the studies may show that human-related sources of nitrogen need to be reduced to keep South Puget Sound and other regions healthy. If reductions are needed, the study will also help determine where reductions might need to occur and what actions might be needed, such as upgrading wastewater treatment plans to advanced treatment. These studies also will identify areas where nonpoint sources, include contamination from onsite systems and polluted runoff, need to be reduced.

Performance Objectives of Ongoing Programs

[Placeholder for information on objectives of existing programs such as TMDL completion goals/schedule? Other performance goals for the program?]

Near Term Actions

NTA C5.4 NTA 1: The Department of Ecology will complete the South Sound Dissolved Oxygen Study by August 2012. If the study shows that something needs to be done to protect dissolved oxygen levels in South Puget Sound, Ecology will initiatie a plan to improve water quality. Ecology will complete the Puget Sound Dissolved Oxygen Model in 2012, which will identify any other areas of concern in Puget Sound

Performance metric: complete or not

NTA C5.4 NTA 2: The Department of Ecology will accelerate other ongoing efforts, including the TMDL process, to identify areas where enhanced wastewater treatment may be needed. In

Puget Sound, results from TMDLs and water cleanup plans for Budd Inlet/Deschutes River will be available in 2013.

Performance metric: complete or not

NTA C5.4 NTA 3: EPA and Ecology will advocate for continued funding of State Revolving Fund sources to support wastewater infrastructure upgrades.

Performance metric:

C5.5 Ensure all centralized wastewater treatment plants meet discharge permit limits through compliance monitoring, technical assistance, and enforcement where needed.

NPDES permit holders, including all wastewater treatment plants that discharge to Puget Sound must report compliance in Daily Monitoring Records (DMRs) submitted to Ecology. Ecology reviews these DMRs and also inspects facilities for compliance.

Ecology's goal is that all WWTPs maintain compliance with permits written to meet standards for all permit limits. Consistent with this goal, Ecology recognizes wastewater treatment plants for perfect performance – that is, meeting every permit condition, every day, for an entire year. In 1995 only 14 plants in Washington State were in full compliance with permit requirements; in 2010, over 100 plants were in full compliance.

Comment [EDM10]: Looking for Puget Sound numbers.

When violations are found, Ecology's goal is to ensure plants return to compliance quickly. EPA guidance defines a major violation as any parameter violated by a permittee for 3 months in a row. In that case, Ecology's permit manager initiates contact with the permittee and takes a range of action to ensure a return to compliance. Ecology may issue enforcement orders if a permittee is unable to correct the violation. Ecology's goal is to inspect major plants once a year and minor plants every two years.

Comment [EDM11]: Other considerations: PFPS suggests a NTA around increasing fines and penalties for permit violations.

Near Term Actions

None. Near-term work in this area is focused on implementing the requirements of existing programs.

C5.6 Promote appropriate reclaimed water projects to reduce pollutant loading to Puget Sound.

Reclaimed water is derived from domestic wastewater and small amounts of industrial process water or stormwater. The process of reclaiming water, sometimes called water recycling or water reuse, involves a highly engineered, multi-step treatment process that speeds up nature's restoration of water quality. The process provides a high-level of disinfection and reliability to assure that only water meeting stringent requirements leaves the treatment facility.

Reclaimed water can be used for a wide variety of beneficial uses such as irrigation, industrial process and cooling water, toilet flushing, dust control, construction activities and many other uses of non-potable water supplies. Reclaimed water also can be used as resource to create, restore and enhance wetlands, recharge groundwater supplies and increase the flows in rivers and streams. Reclaimed water

is classified based on intended use. Class A reclaimed water must meet strict standards. Reclaimed water must not cause a violation of state water quality standards.

Performance Objectives of Ongoing Programs

Expansion of reclaimed water programs will be a vital part of Puget Sound recovery. In 2006 the Legislature directed the Ecology to adopt a rule for reclaimed water use by 2010. Currently this rulemaking is delayed per the Governor's directive placing a moratorium on rulemaking; the earliest the rulemaking can be adopted under that moratorium is 2013. When final, the rule will provide a consistent, predictable, and efficient regulatory process. It also will encourage the generation and beneficial use of reclaimed water while preserving and protecting public health, the environment, and existing water rights.

Near Term Actions

NTA C5.6 NTA 1: The Departments of Ecology will resume the Reclaimed Water Rule no earlier than 2013 or as directed by the Governor. The intent of this rule is to encourage the appropriate use of reclaimed water.

Performance metric:

NTA C5.6 NTA 2: The Department of Ecology will develop materials that describe the full range of beneficial uses for reclaimed water, best and appropriate uses, and public health issues (in consultation with the Department of Health) to expand market demand for reclaimed water. The draft guidance document developed for the rule is also on hold with the Reclaimed Water Rule until 2013 at the earliest.

Performance metric:

NTA C5.6 NTA 3: As part of the future Reclaimed Water Rule, The Partnership and the Department of Ecology will develop a comprehensive outreach and education approach to promote the appropriate use of reclaimed water, including incentives for reclaimed water use where appropriate, and reduce barriers to reclaimed water projects.

Performance metric:

Comment [EDM12]: Other considerations: PFPS recommends a commitment that we will require water reclamation and re-use as plants retrofit or upgrade in Puget Sound sub-basins with susceptibility to nutrient over-enrichment especially hood canal, Whidbey Basin and South Puget Sound.

Emerging Issues for Centralized Wastewater Management

In addition to the specific ongoing program activities and near-term actions described above, there are a number of ideas for future work that might be undertaken to address the Puget Sound region's ongoing need for centralized wastewater treatment and to further reduce pressures on the Puget Sound ecosystem. These ideas should be an ongoing part of the regional discussion about how to best address wastewater treatment needs in the Puget Sound basin, and may inform future funding decisions, programmatic priorities and guidance, and/or may become near-term actions in future Action Agenda cycles. They include:

- Consideration of whether increasing nutrient removal requirements should be applied through the water quality based programs such as TMDL implementation, or whether Ecology pursue a revision in secondary treatment technology standards for new treatment plants and upgrades at treatment plants that discharge to Puget Sound before all TMDLs are complete. Some stakeholders advocate requiring advanced secondary treatment (largely for nitrogen removal) and/or tertiary treatment (largely additional chemical treatment or other forms of polishing) for all WWTPs that discharge to Puget Sound; others are concerned about making such a large investment (and thereby precluding other needed investments) without specific documentation that such treatment is needed to protect water quality.

- Exploration of the feasibility, pros/cons of moving or eliminating some outfalls where specific water quality conditions or aquatic resource issues are of concern, through, for example, an outfall siting analysis by an interdisciplinary team. This could be particularly relevant to shellfish bed restoration, since some shellfish growing areas are closed simply because of their proximity to an outfall, and the potential for pollution this proximity raises, rather than any specific documented water quality problem.

- Better understanding and addressing other contaminants of concern. Due to new detection and sampling methods and new products and consumption patterns we are increasingly aware of chemicals that are present in effluents from wastewater treatment plants at very low concentrations that have threats to environmental health. These include pharmaceuticals, personal care products, caffeine, natural hormones, and other chemicals. We should better understand where this is occurring and the impacts of these chemical in the environment and continue to refine source control and wastewater treatment programs to address chemicals of concern.

- Replacement of aging infrastructure. [Need to add more detail on this issue.]

C6. Rethinking How we Plan for and Approach Wastewater Control and Management

Planning, regulatory and permitting approaches to controlling potential pollution from wastewater have evolved largely in separate programs, with state and local health departments generally leading the efforts related to on-site sewage systems and federal and state governments generally leading efforts related to centralized wastewater treatment, with state oversight. Over time, growth management and other planning processes have also begun to influence wastewater strategies by defining where certain types of infrastructure are appropriate.

While coordination across programs and among planning, permitting and regulatory agencies is already a goal, the differences in the underlying systems can sometimes create unintended consequences. For example, growth management guidelines generally prevent extension of collection systems for

centralized wastewater treatment outside of urban growth boundaries; however, in many jurisdictions there are areas outside urban growth boundaries that have approaching urban densities which were developed before growth management planning. This often happens along marine and freshwater shorelines, where the desirability of the location resulted in narrow lot sizes and dense populations. These non-conforming or legacy uses generally are grandfathered in under growth planning, and can create cumulative impacts from multiple on-site systems along the shoreline.

Relationship to recovery targets

Comprehensive improvements to wastewater management have the potential to affect many recovery targets. The four targets most closely associated with wastewater management are: (1) inventorying all OSS, fixing all failures, and being current with inspections at 95 percent in Marine Recovery Areas and other areas with equivalent enhanced O&M programs and expanding these designated areas and programs to cover 90 percent of the region's unsewered marine shorelines by 2020; (2) improved water quality and pollution controls to achieve a net increase of 10,800 harvestable shellfish acres; (3) ensuring human-related contributions of nitrogen do not result in more than 0.2 mg/l reductions in dissolved oxygen levels anywhere in Puget Sound by 2020; and (4) ensuring that all monitored Puget Sound beaches meet enterococcus (a pathogen associated with fecal matter) standards by 2020. Other pollution sources and management programs also directly influence progress toward these ecosystem recovery targets.

C6.1 Include assessment of cumulative impacts in planning and permitting for centralized and decentralized wastewater systems in comprehensive plans.

[Short background paragraph on what this sub-strategy is trying to accomplish]

Performance Objectives for Ongoing Programs

[Placeholder for a description of the main related ongoing programs, if any, their performance objectives. The goal is to clearly describe what ongoing programs are already in place and what they are already doing to help protect/recover Puget Sound to put the NTAs in context.]

Near Term Actions

> NTA C6.1 NTA 1: The Departments of Commerce, Ecology and Health will encourage communities to more comprehensively provide for wastewater treatment on a watershed basis, using water budgeting tools and striving to use all water resources available (including reclaimed water) to meet the needs of people and the environment by aligning existing plans and planning process to more effectively meet wastewater treatment and management needs. This might take the form of a pilot program in a watershed that has or will soon have a full TMDL assessment and a water cleanup plan.
>
> *Performance metric: Pilot project done or not?*

NTA C61 NTA 2: The Departments of Commerce, Ecology and Health will identify shoreline areas outside urban growth boundaries where residential densities are great enough that it may be appropriate to extend centralized wastewater collection systems and that are in close enough proximity to centralized treatment that extension of infrastructure may be feasible. The goal of this effort is completion of one pilot project by 2012.

Performance metric: pilot program in place or not.

C7. Control and manage pollution from discharges of wastewater from boats & vessels

Commercial vessel operation is a major Puget Sound use, and recreational boating is widely popular in the Puget Sound and promotes appreciation of the Sound's resources, public access and wellbeing, and economic development. Operation of vessels and boats in marine and fresh waters can contribute to water quality problems if pollution is improperly contained and disposed. Discharge of untreated or partially treated human wastes from vessels sends toxic chemicals as well as pathogens, such as fecal coliform and viruses, into the water and increases human health risks. Excessive amounts of nutrients from vessel sewage exacerbates the known nutrient and low dissolved oxygen problems in Puget Sound.

Section 312 of the Clean Water Act provides states with a tool to protect their citizens and aquatic habitats through a "no-discharge zone" designation for vessels. No discharge zones can be designated to protect aquatic habitats where pump-out facilities are available. EPA designates no discharge zones based on petitions from states. The availability of sewage pump-out stations, the importance of the waterbody for human health and recreation, and the desire for more stringent protection of a particular aquatic ecosystem are important considerations in the designation of no-discharge zones (NDZs) for vessel sewage.

Relationship to Recovery Targets

Controlling discharges from boats and vessels is most closely related to three recovery targets: (1) improved water quality and pollution controls to achieve a net increase of 10,800 harvestable shellfish acres; (2) ensuring human-related contributions of nitrogen do not result in more than 0.2 mg/l reductions in dissolved oxygen levels anywhere in Puget Sound by 2020; and (3) ensuring that all monitored Puget Sound beaches meet enterococcus (a pathogen associated with fecal matter) standards by 2020. Other pollution sources and management programs also directly influence progress toward these ecosystem recovery targets.

C7.1 Establish No Discharge Zones for commercial and/or recreational vessels in all parts of Puget Sound that have nutrient and/or pathogen problems, have high vessel use, or are significant sources for shellfish production.

[Short background paragraph on what this sub-strategy is trying to accomplish]

Performance Objectives for Ongoing Programs

[Placeholder for a description of the main related ongoing programs, if any, their performance objectives. The goal is to clearly describe what ongoing programs are already in place and what they are already doing to help protect/recover Puget Sound to put the NTAs in context.]

Near Term Actions

C7.1 NTA 1: [By date] the Departments of Ecology and Health will conduct an evaluation and draft a petition to EPA to establish a No Discharge Zone for commercial and recreational vessels to eliminate bacteria, nutrients, and pathogens from being discharged to all or parts of Puget Sound. Prioritize areas of the Sound that have nutrient and/or pathogen problems, have high vessel use, are significant for shellfish production, and/or that are otherwise especially vulnerable.

Comment [EDM13]: PFPS suggests "June 2014"

Performance metric: done or not?

C7.1 NTA 2: The Departments of Ecology and Health, with NEP grant funding, will coordinate with Washington State Parks' Clean Vessel Program to assist in construction, repair and monitoring of pumpout stations to meet requirements of the No Discharge Zone petition.

Comment [EDM14]: PFPS suggests "so these areas are constructed by June 2014."

Performance metric: number of pumpout stations improved? Amount of monitoring? Whether there are stations adequate to support a no discharge zone designation?

Overall Science Needs Related to Wastewater Management

- Support for DOH's ongoing work on technologies for nutrient reduction from OSS
- Fate and impact of micropollutants on groundwater quality from reclaimed water discharges to land or wetlands.
- Effect of wastewater plant designs on micropollutant removals.