BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

Petition for Corrective Action or	)
Withdrawal of Authorization from the	)
State of Washington to Issue National	)
Pollutant Discharge Elimination System	)
Permits	)

OVERVIEW

For the reasons detailed below, Northwest Environmental Advocates ("NWEA") hereby petitions the U.S. Environmental Protection Agency ("EPA") to remove authority from the State of Washington Department of Ecology ("Ecology") to issue National Pollutant Discharge Elimination System ("NPDES") permits or, alternatively, to take other corrective action. Ecology's consistent failure to issue NPDES permits that comply with Clean Water Act ("CWA" or "Act") requirements to ensure that discharges will not cause or contribute to violations of water quality standards is perpetuating and exacerbating pollution in Puget Sound. Even as Ecology has produced well over a decade of studies that have concluded that inadequately-treated municipal sewage discharges of nitrogen are causing and contributing to serious water pollution problems in the Sound, the agency continues to regularly reissue at least 103 NPDES permits without the pollution limits that are required by law. As a result, Puget Sound is suffering from increasing water quality impairments measured as low levels of dissolved oxygen, algal blooms that result in further depressions of dissolved oxygen and have other deleterious effects, the replacement of the Sound's forage fish with jellyfish, and other food web and water quality changes. These effects constitute the dischargers' causing and contributing to violations of water quality standards pursuant to Ecology-issued permits that unlawfully authorize the discharges.

As this petition demonstrates, Ecology's issuance of permits in violation of federal and state law is inexcusable in light of the evidence of impairment to the waters and species that depend upon them in Puget Sound, some of which are listed as threatened or endangered under

the Endangered Species Act ("ESA"). The municipal wastewater treatment plants at issue include those that discharge to the Sound directly, which according to Ecology are responsible for 81 percent of the Puget Sound anthropogenic nitrogen loads in the summer and 59 percent annually.[1] Sewage treatment plants and some industries that discharge to tributaries of the Sound are a part of those tributaries' contribution to the Sound's anthropogenic nitrogen loading, estimated to be 19 percent in summer and 41 percent in winter. Yet of all these sources, permits for only two of the direct dischargers to the Sound have effluent limitations for nitrogen and neither is intended to protect Puget Sound water quality.

In addition, Ecology has both pointed to a potential Total Maximum Daily Load ("TMDL") as the possible basis for including pollution limits in future NPDES permits and declined to commit to turning its studies and modeling results into a TMDL. Likewise, Ecology has concurrently told EPA that the state will use dissolved oxygen as a surrogate for excess nutrient pollution in lieu of adopting numeric nutrient criteria in its water quality standards, as requested by EPA, and has completely failed to use the dissolved oxygen impairments in Puget Sound to control the very sources of nutrients it has identified are the greatest cause of the pollution problem. Ecology has stated that it may use "alternative management approaches" in lieu of developing a TMDL but it has not defined these approaches, it has not stated when it will use these approaches, it has not committed to these approaches, and it has not demonstrated that these approaches will result in NPDES permit conditions that will ensure that water quality standards are met. In addition, Ecology has failed to apply state law requirements that require use of all known, available, and reasonable technology to control pollution.

This petition is brought pursuant to the Administrative Procedure Act, 5 U.S.C. §§ 553(e) and 555(e), to request EPA take the following actions: (1) initiate formal proceedings under 40

---

[1] These nitrogen loads are measured as dissolved inorganic nitrogen (DIN). *See* Ecology, *Puget Sound Dissolved Oxygen Model: Nutrient Load Summary for 1999-2008* (Nov. 2011) (hereinafter "*Nutrient Load Summary*") *available at* https://fortress.wa.gov/ecy/publications/documents/1103057.pdf at xvi-xvii (last accessed Oct. 18, 2016).

C.F.R. § 123.64(b) to correct the State of Washington's NPDES program or, in the alternative, withdraw EPA's authorization to administer the program from Ecology; (2) formally respond to this petition in writing, as required by 40 C.F.R. § 123.64(b)(1); (3) make a determination that Washington is not administering the NPDES program consistent with federal law because it has not developed a regulatory program for developing water quality-based effluent limits in NPDES permits, in its operations it has failed to exercise control over activities required to be regulated, and has repeatedly issued permits that fail to conform to federal regulatory and statutory requirements; (4) notify the State of Washington that it is failing to administer the NPDES permit program in accordance with the CWA and implementing regulations; and (5) schedule a public hearing regarding these violations pursuant to 33 U.S.C. § 1342(c)(3); 40 C.F.R. § 123.64(b)(1).

Table of Contents

I. INTRODUCTION

The Clean Water Act and its implementing regulations require that states, or EPA, establish water quality standards that fully protect the beneficial uses of a state's waters. The Act also requires states, or EPA, to issue discharge permits that ensure that these standards are not violated, including narrative aspects of those standards. While the Act also provides for states, or EPA, to assess the respective responsibilities of multiple point source dischargers and nonpoint runoff sources to control pollution within a Total Maximum Daily Load ("TMDL"), where a state, or EPA, has failed to make such an assessment, permit writers must still consider the collective pollutant loading of all sources as well as the existing pollution controls on those sources, if there are any, when they issue discharge permits. In addition, because the purpose of the Act is to protect the beneficial uses, permit writers are required to issue permits based on the information they have and only in the instance where they have none at all may they, instead, place conditions into permits that require gathering of information upon which pollution limits may be established in lieu of requiring pollution controls.

Puget Sound is a highly polluted waterbody with many dischargers and nonpoint sources of runoff contributing to its water quality problems. One of those problems is the discharge of nutrients,[2] which lowers levels of dissolved oxygen in the water directly and contributes to the growth of algae that in turn causes further depressions in oxygen levels upon its death and decay. Nonetheless, of the 103 municipal and industrial discharges to Puget Sound and its tributaries discussed in this petition, only two direct dischargers to the Sound have nitrogen effluent limits.

---

[2] While this petition focuses on nitrogen, it is unknown whether in the absence of excess nitrogen, excess phosphorus would prove to also be causing water quality problems across the Sound or its tributaries if the nitrogen were controlled. As discussed, *infra* generally, phosphorus is certainly a known problem for dissolved oxygen in some freshwater tributaries to the Sound. And, it is possible that both nitrogen and phosphorus are co-limiting. *See, e.g.*, P.H. Doering, *et al.*, *Phosphorus and nitrogen limitation of primary production in a simulated estuarine gradient*, 124 Mar Ecol Prog Ser, 271 (1995); R.L. North, *Evidence for phosphorus, nitrogen, and iron colimitation of phytoplankton communities in Lake Erie*, 52 Limnol. Oceanog. 315 (2007). Of the 103 permits evaluated for this petition, 62 have some form of monitoring required for phosphorus and 41 have none.

An additional six permittees that discharge to tributaries of Puget Sound have nitrogen effluent limits and one has limits to protect groundwater. And only six municipal discharge permits have any meaningful form of water quality-based effluent limits ("WQBEL").[3] The Clean Water Act was not written to rely on technology-based effluent limits ("TBEL") alone.

In 2009, a task force comprised of representatives of EPA and state agencies—the State-EPA Nutrient Innovations Task Group (hereinafter "State-EPA Task Group")—concluded that "efforts to control nutrients have been hard-fought but collectively inadequate," particularly in light of growing populations.[4] The efforts to control nutrients to Puget Sound have been particularly inadequate given the region's significant population growth. The U.S. Geological Survey has calculated a 25 percent increase in population of the area between 1991 and 2005.[5]

Ecology's failure to use the NPDES permit program to protect and restore the waters of Puget Sound puts the lie to long-ago statements by leaders of both Washington and EPA. Upon approving Washington's request to administer the permitting program in 1973, EPA Administrator Russell E. Train wrote to Governor Daniel J. Evans:

> I personally am encouraged by the following statements in your November 7 letter to Mr. Agee:
>
> > "The NPDES is the heart of our nation's effort to eliminate the blight of water pollution. Successful implementation of its provisions is imperative. That achievement can come about only if the best efforts of both the state and federal governments are provided. By my submission, the State of Washington is so committed."
>
> Speaking on behalf of the Environmental Protection Agency and its staff, let me

---

[3] This statement does not include chlorine limits, which may be a mix of technology- and water quality-based effluent limits nor ammonia limits, discussed *infra* at 34. Five of the six municipal permits with WQBELs are for discharges to tributaries; LOTT is the only direct discharger to the Sound with a WQBEL. One of these WQBELs is for lead (Yelm) and the remaining five are for copper (LOTT, Buckley, Enumclaw, Orting, Mt. Vernon).

[4] State-EPA Nutrient Innovations Task Group, *An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group* (Aug. 2009) (hereinafter "*An Urgent Call to Action*"), *available at* https://www.epa.gov/sites/ production/files/documents/nitgreport.pdf (last accessed Oct. 17, 2016) at 1.

[5] USGS, *Puget Sound*, Development Prototype: Puget Sound Ecosystem Portfolio Mode at https://geography.wr.usgs.gov/pugetSound/ps.html (last accessed Jan. 17, 2017).

> assure you that we will do everything possible, including the minimization of time-consuming procedures and paper shuffling, to aid you in your commitment to eliminate the blight of water pollution.[6]

As this petition will show, the State of Washington has not used its best efforts to eliminate the blight of water pollution through the NPDES program and EPA has failed to take the necessary actions—let alone do everything possible—to ensure that the permitting program works in Washington.

II. STANDARD FOR WITHDRAWAL OF APPROVAL OF A STATE NPDES PERMIT PROGRAM: EPA JURISDICTION AND AUTHORITY

The Clean Water Act allows states to implement the NPDES program in lieu of EPA if they so desire. 33 U.S.C. § 1342(b). The EPA Administrator is required to approve such a request by the Governor of a state so long as the state demonstrates that it has the authority to issue permits that, *inter alia*, "apply, and insure compliance with, section[] 1311[.]" *Id.* §§ 1342(b)(1)(A), 1311(b)(1)(C) (discharges subject to NPDES permits must include "any more stringent limitation, including those necessary to meet water quality standards"); 40 C.F.R. § 123.1(c). Thereafter, the state is required to implement its NPDES program "at all times . . . in accordance with this section [402]." *Id.* § 1342(c)(2); 40 C.F.R. § 123.1(f).

The CWA provides that "[w]henever the Administrator determines . . . that a State is not administering a program . . . in accordance with requirements of this section, [s/]he shall notify the State and, if appropriate corrective action is not taken . . . the Administrator shall withdraw approval of such program." 33 U.S.C. § 1342(c)(3); *see also* 40 C.F.R. § 122.63(a). EPA's regulations set forth a number of circumstances under which EPA may withdraw NPDES program approval when the operations of the state program fail to comply with federal law including "[r]epeated issuance of permits which do not conform to the requirements of this part,"

---

[6] Letter from Russell E. Train, Administrator, EPA, to Governor Daniel J. Evans (Nov. 14, 1973) (approving request to administer NPDES program), *available at* http://www.northwestenvironmentaladvocates.org/nweafiles/NPDES_Letters/WA%20NPDES%20Approval%20Letter.pdf (last accessed Oct. 17, 2016).

id. § 123.63(a)(2)(ii), and "[f]ailure to exercise control over activities required to be regulated under this part," *id.* § 123.63(a)(2)(i). In addition to the state's operations, EPA may withdraw permit authorization from a state that has "fail[ed] to develop an adequate regulatory program for developing water quality-based effluent limits in NPDES permits." *Id*. § 123.63(a)(5).

Where EPA is aware that a state program does not comply with CWA requirements, it has both the authority and the obligation to initiate withdrawal proceedings. *See Save the Valley, Inc. v. U.S. EPA*, 99 F. Supp. 2d 981, 985 (S.D. Ind. 2000); *Save the Valley, Inc. v. U.S. EPA*, 223 F. Supp. 2d 997 (S.D. Ind. 2002).

III. STATUTORY AND REGULATORY BACKGROUND

The Clean Water Act, 33 U.S.C. §§ 1251–1387, "is a cornerstone of the federal effort to protect the environment." *Waterkeeper Alliance, Inc. v. U.S. EPA*, 399 F.3d 486, 490 (2d Cir. 2005). Congress passed the Act with the goal of not just reducing, but *eliminating*, all water pollution. *Id.* (citing 33 U.S.C. § 1251(a)(1)). To achieve this goal, the CWA prohibits the "discharge of any pollutant" from a point source—"any discernible, confined and discrete conveyance"—to navigable waters "except in compliance with law." 33 U.S.C. §§ 1311, 1362.

A. Water Quality Standards

The CWA requires that states, or EPA, adopt water quality standards. Such standards must consist of the designated uses, the water quality criteria for waters based upon such uses, and antidegradation requirements.[7] The standards must protect the public health or welfare, enhance the quality of water and wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water, taking into consideration their use and value of public water supplies, and agricultural, industrial, and other purposes including navigation.[8]

---

[7] 33 U.S.C. § 1313(c)(2)(A). *See also* 40 C.F.R. §§ 131.2, 131.3(i), 131.6.

[8] 33 U.S.C. § 1313(c)(2)(A).

Water quality criteria must be adopted that protect the designated uses.[9] Water quality criteria are expressed as constituent concentrations, levels, and/or narrative statements, representing a quality of water that supports the designated uses.[10] Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.[11] For waters with multiple use designations, the criteria shall support the most sensitive use.[12]

Under the CWA's "antidegradation policy," state standards must also protect existing uses of waters and prevent their further degradation. 40 C.F.R. § 131.12; *see also* WAC 173-201A-010(1)(a) ("All surface waters are protected by numeric and narrative criteria, designated uses, and an antidegradation policy.").

B. NPDES Permits

The primary way to achieve compliance with the CWA's general pollutant discharge prohibition is by obtaining an NPDES permit. 33 U.S.C §§ 1311(a), 1342. Every NPDES permit must establish "effluent limitations" for the pollutants being discharged. *Waterkeeper Alliance*, 399 F.3d at 491 (citing *S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians*, 541 U.S. 95, 102 (2004)). Technology-based effluent limitations are based on "a series of increasingly stringent technology-based standards," depending on the type of pollutant being discharged. *Natural Res. Def. Council v. U.S. EPA*, 822 F.2d 104, 123–24 (D.C. Cir. 1987); *see also Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 219–21 (2009). The most stringent federal technology-based standard that applies to municipal sewage discharges is referred to as "secondary treatment," as defined by the EPA Administrator pursuant to section 304 of the Act. 33 U.S.C. § 1311(b)(1)(B); *see also id.* § 1311(h) (modifications for marine discharges).

---

9 40 C.F.R. § 131.11(a)(1).

10 40 C.F.R. § 131.3(b).

11 40 C.F.R. § 131.11(a)(1).

12 *Id*.

1. Discharges are Prohibited from Causing or Contributing to Violations of Water Quality Standards; Reasonable Potential Findings Are Required

If the technology-based limits required by the statute and regulations are not sufficient to ensure that a discharge will not cause or contribute to violations of water quality standards, NPDES permits must include water quality-based effluent limits ("WQBEL"). 33 U.S.C. §§ 1311(b)(1)(C), 1342(a)(2) ("[T]here shall be achieved . . . any more stringent limitation, including those necessary to meet water quality standards . . . established pursuant to any State law or regulations [.]"); *see also, id.* §§ 1311(e), 1312(a), 1313(d)(1)(A), (d)(2), (e)(3)(A); 40 C.F.R. §§ 122.4(a), (d).[13] The agency issuing an NPDES permit "is under a specific obligation to require that level of effluent control which is needed to implement existing water quality standards without regard to the limits of practicability." S. Rep. No. 92-414, at 43 (1971). Because WQBELs are set irrespective of costs and technology availability, they further the technology-forcing policy of the CWA. *See Natural Res. Def. Council v. U.S. EPA*, 859 F.2d 156, 208 (D.C. Cir. 1987) ("A technology-based standard discards its fundamental premise when it ignores the limits inherent in the technology. By contrast, a water quality-based permit limit begins with the premise that a certain level of water quality will be maintained, come what may, and places upon the permittee the responsibility for realizing that goal."); *see also Riverkeeper, Inc. v. U.S. EPA*, 475 F.3d 83, 108 (2d Cir. 2007) (Sotomayor, J.) (referencing the Act's "technology-forcing imperative"), *rev'd sub nom by Entergy Corp*, 556 U.S. 208.

WQBELs must be set at a level that achieves water quality standards developed by the states for waters within their boundaries. *See* 33 U.S.C. §§ 1313(a)(3), (c)(2)(a); 40 C.F.R. Part 131; *PUD No. 1 of Jefferson Cnty. v. Wash. Dept. of Ecology*, 511 U.S. 700, 704–707 (1994); WAC 173-220-130(1)(b)(i) and (iii), (2), (3)(b); *Port of Seattle v. Pollution Control*, 90 Pd.3d 659, 677 (Wash. 2004) ("NPDES permits may be issued only where the discharge in question

[13] The federal regulations are made applicable to states by 40 C.F.R. § 123.25(a).

will comply with state water quality standards."); *Defenders of Wildlife v. Browner*, 191 F.3d 1159, 1163 (9th Cir. 1999).

EPA's permitting regulations mirror the statutory requirement for WQBELs. 40 C.F.R. §§ 122.4(d), 122.44(d). NPDES effluent limitations must control all pollutants that are or may be discharged at a level "which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 C.F.R. § 122.44(d)(1)(i). Accordingly, WQBELs in NPDES permits must be "derived from" and comply with all applicable water quality standards. 40 C.F.R. § 122.44(d)(1)(vii). WQBELs are typically expressed numerically, but when "numeric effluent limitations are infeasible," a permit may instead require "[b]est management practices (BMPs) to control or abate the discharge of pollutants." 40 C.F.R. § 122.44(k)(3). However, "[n]o permit may be issued: . . . [w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States." 40 C.F.R. § 122.4(d).

When EPA or states establish WQBELs, they must translate applicable water quality standards into permit limitations. As the Second Circuit recently held in striking down a one-sentence narrative WQBEL, "[n]o permit may be issued when the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States. [40 C.F.R.] § 122.4(d). Thus, permits must establish limits on discharges that will lead to compliance with water quality standards." *Natural Res. Def. Council v. U.S. EPA*, 808 F.3d 556, 565 (2nd Cir. 2015) (striking down EPA's Vessel General Permit); *see also Trustees for Alaska v. U.S. EPA*, 749 F.2d 549, 556–57 (9th Cir. 1984) (holding that a permit must do more than merely incorporate state water quality standards—it must translate state water quality standards into the end-of-pipe effluent limitations necessary to achieve those standards). As the D.C. Circuit put it, "the rubber hits the road when the state-created standards are used as the basis for specific effluent limitations in NPDES permits." *American Paper Inst., Inc. v. U.S. EPA*, 996 F.2d 346, 350 (D.C. Cir. 1993). NPDES "permits authorizing the discharge of pollutants may

issue only where such permits *ensure* that every discharge of pollutants will comply with all applicable effluent limitations and standards[.]" *Waterkeeper Alliance, Inc.*, 399 F.3d at 498 (emphasis in original).

Although numeric criteria are easier to translate into permit limitations, permit writers must also translate state narrative standards. *See id.* EPA regulations clearly specify that compliance with narrative criteria must be evaluated and that limits must be established to ensure they are met. *See* 40 C.F.R. §§ 122.44(d)(1) (limits must be included to "[a]chieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality"); 122.44(d)(1)(i) (limitations must include all parameters "including State narrative criteria for water quality"); 122.44(d)(1)(ii) (reasonable potential must be evaluated for "in-stream excursion above a narrative or numeric criteri[on]"); 122.44(d)(1)(v) (WET tests required where reasonable potential exists to cause or contribute to a narrative criterion excursion unless chemical-specific pollutants are "sufficient to attain and maintain applicable numeric and narrative State water quality standards"); 122.44(d)(1)(vi) (options for establishing limitations where reasonable potential exists for a discharge to cause or contribute to an excursion above a narrative criterion) (emphases added). Using narrative criteria to develop effluent limits is not necessarily easy. As the court in *American Paper* found, in upholding these regulations, faced with the conundrum of narrative criteria "some permit writers threw up their hands and, contrary to the Act, simply ignored water quality standards including narrative criteria altogether when deciding upon permit limitations." 996 F.2d at 350 (emphasis added). But the court found not only that EPA's permitting regulations insofar as they pertained to narrative criteria were sound, it also concluded that "[EPA's] initiative [to require compliance with narrative criteria] seems a preeminent example of gap-filling in the interest of a continuous and cohesive regulatory regime[.]"). *Id*. at 353.

EPA guidance supports its own regulations, explaining that a WQBEL is "[a]n effluent limitation determined by selecting the most stringent of the effluent limits calculated using all

applicable water quality criteria (e.g., aquatic life, human health, wildlife, translation of narrative criteria) for a specific point source to a specific receiving water." EPA, *NPDES Permit Writers' Manual*, Appendix A at A-17 (Sept. 2010) (emphasis added) (hereinafter "*EPA Manual*").[14] More recently, the Second Circuit, in reviewing an EPA permit to cover discharges of invasive species for which no state has numeric criteria, held that "EPA is required to establish WQBELs that ensure compliance with narrative criteria, designated uses, and antidegradation policies that comprise state water quality standards." *NRDC*, 808 F.3d at 565.

2. Reasonable Potential Findings and Derivation of Water Quality-Based Effluent Limitations

The first step in establishing a WQBEL is determining if one is required, a process referred to as a "reasonable potential analysis." 40 C.F.R. § 122.44(d)(1) ("Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."). Because a single discharge of a pollutant may not be the only source of a waterbody's impairment, a permit writer must assess the impacts of the discharge collectively with other sources of the same pollutant. Therefore, the federal regulations require the permit writer to assess the role of other sources in causing any potential violation of water quality standards. *Id.* at § (d)(1)(ii) ("When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution[.]"). If, having conducted this evaluation, the permit writer determines that a discharge "causes, has the reasonable potential to cause, or contributes to an

[14] *Available at* http://www.epa.gov/npdes/pubs/pwm_app-a.pdf (last accessed Oct. 18, 2016).

instream excursion above the allowable ambient concentration of a State numeric criteri[on] within a State water quality standard for an individual pollutant, the permit must contain effluent limits for that pollutant." *Id.* § (d)(1)(iii). Where a state finds a reasonable potential to cause or contribute to a violation of narrative criteria for which the state has no numeric criteria, the federal regulations provide methods for establishing effluent limits. *Id*. at § (d)(1)(vi)(A-C).

When EPA finalized the rule language of § 122.44(d)(1), it explained why meeting its requirements is essential to meeting the requirements of the Act:

> Where a discharge has a reasonable potential to cause or contribute to an excursion above a water quality criterion, effluent limitations are necessary to ensure that water quality standards will always be met. This connection is inherent in section 301(b)(1)(C) of the Clean Water Act which requires that water quality standards be achieved through effluent limitations.

54 Fed. Reg. 23868, 23872 (June 2, 1989). In its 2010 permit writers' guidance many years later, EPA described the requirements of § 122.44(d)(1)(i):

> Wording the requirements of the regulation another way, a reasonable potential analysis is used to determine whether a discharge, alone or in combination with other sources of pollutants to a waterbody and under a set of conditions arrived at by making a series of reasonable assumptions, could lead to an excursion above an applicable water quality standard.

EPA Manual, *supra* n. 14 at 6-23 (emphasis added).

A waterbody need not be impaired in order for a discharge to present a reasonable potential to cause or contribute to violations of water quality standards. The Environmental Appeals Board (EAB) has explained the plain meaning of the permitting regulations and the policy rationale behind them:

> NPDES regulations do not support the City's contention that a permit authority must include effluent limits only for the pollutants discharged into receiving waters that are identified as impaired on the state's 303(d) list.
>
> * * *
>
> NPDES permitting under CWA section 301 applies to individual discharges and represents a more preventative component of the regulatory scheme [than 303(d)] in that, under section 301, no discharge is allowed except in accordance with a permit. Moreover, the CWA's implementing regulations require the Region to include effluent limits in discharge permits based on the reasonable potential of a discharge facility to cause or contribute to exceedances of water quality standards, even if the receiving water body is not yet on a state's 303(d) list. *See* 40 C.F.R.

> § 122.44(d)(1)(i). Although a 303(d) listing could presumably establish that water quality standards are being exceeded, necessitating an appropriate permit limit, the Region is not constrained from acting where a water body has not yet been placed on the 303(d) list. *Id.; see also In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 599 (EAB 2010) (explaining that the NPDES regulations require a "precautionary" approach to determining whether the permit must contain a water quality-based effluent limit for a particular pollutant), *aff'd*. 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013).

In re: City of Taunton Department of Public Works, NPDES Appeal No. 15-08, slip op. at 11 (EAB May 3, 2016) at 38-39.

Last, a waterbody may be impaired but not listed on the state's EPA-approved 303(d) list. The key here is impairment, not the technicality of 303(d) listing. *See In re: City of Taunton* at 38 ("NPDES regulations do not support the City's contention that a permit authority must include effluent limits only for the pollutants discharged into receiving waters that are identified as impaired on the state's 303(d) list."). Moreover, the finding of reasonable potential has repeatedly been deemed to be a low bar in order to ensure that NPDES permits protect water quality. EPA regulations require that NPDES limits "must control all pollutants" that "may be discharged at levels" that will cause or contribute to violations. 40 C.F.R. § 122.44(d)(1)(i) (emphasis added). The emphasis is regulation of discharges that *may* be a problem. As the EAB observed of EPA's action of issuing a permit with nutrient limits,

> the Region observed that "[e]ven if the evidence is unclear that a pollutant is currently causing an impairment, a limit may be required if the pollutant has the reasonable potential to cause, or contribute to an exceedance of a water quality standard (i.e., the permit limit may be preventative)." Response to Comments at 36. The Region also noted that "the pollutant need not be the sole cause of an impairment before an NPDES limit may be imposed; an effluent limit may still be required, if the pollutant 'contributes' to a violation." *Id*. (citing *In re Town of Newmarket*, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013), 16 E.A.D. ___). Ultimately, the Region concluded that the City's discharges cause, have a reasonable potential to cause, or contribute to nitrogen-related water quality violations in the Taunton Estuary and Mount Hope Bay. . . . As such, CWA regulations required the Region to impose a nitrogen limit in the Permit. *See* 40 C.F.R. § 122.44(d)(1)(vi)[.]

In re: City of Taunton at 37.

IV. THE WATERS OF PUGET SOUND ARE IMPAIRED BY DISCHARGES OF NITROGEN

The discharge of nitrogenous wastes removes oxygen from water. As organic nitrogen deanimates into ammonium and then goes through the process of nitrification to become nitrate, it consumes oxygen in the process. Nitrogen also fuels excessive algae growth in surface waters. When the algae die, they sink to the bottom of a waterbody where they are consumed by bacteria. These bacteria, combined with the natural respiration of other oxygen-breathing organisms, use up the available oxygen in the lower water column, gradually reducing the dissolved oxygen concentration to unhealthy levels. This hypoxic water becomes trapped in the bottom waters due to naturally occurring density stratification of the water column, because the denser hypoxic water sinks to the bottom, while the lighter, oxygen-rich water remains above it. Warm weather and high levels of sunlight exacerbate hypoxic conditions; therefore, they tend to occur during summer months. High temperatures also lower levels of dissolved oxygen in water. In addition, some of the algae blooms are toxic and generate a range of paralytic, diarrheic, and neurotoxic effects on people and animals. In these and other ways the discharge of nitrogen causes a broad range of water quality impairments and adverse effects on the food chain of designated uses.

In Puget Sound, nitrogen levels have steadily increased independent of nitrogen coming from the ocean, which is also a source. *See, e.g.*, Christopher Krembs, *et al.*, *Can long term-nitrogen increases affect pelagic food web processes and the vertical structure of biogeochemical processes in Puget Sound?,* 2014 Salish Sea Ecosystem Conference (April 30, 2014) at 1 (hereinafter "*Food Web Processes*").[15] Moreover, nitrogen entering the Sound from municipal discharges and rivers generally feeds the nutrient levels at the surface of the water, unlike ocean sources. It is also at this surface layer where the microbial food web—driven by sunshine, warmth, and nutrients—explodes on a seasonal basis. Normally the surface layer

[15] *Available at* http://cedar.wwu.edu/cgi/viewcontent.cgi?article=1018&context=ssec (last accessed Jan. 5, 2017).

would be dominated by phytoplankton diatoms that construct themselves with silica, using carbon and nitrogen. These diatoms, in turn, support a population of copepods that transfer their energy to forage fish, such as herring, when consumed.

In Puget Sound, however, the increase in surface nitrogen has driven widespread algal blooms of the red-orange Noctiluca, a zooplankton (dinoflagellate) that derives its color from the phytoplankton it consumes, including the diatoms that are essential to the Sound food web (as well as the copepods themselves). *See, e.g.*, Christopher Krembs, *What PS marine monitoring data could be telling us? Stimulating a discussion* (Dec. 16, 2013) at 40 (hereinafter "*Krembs Presentation*");[16] *Food Web Processes, supra* n.15 at 3. Most diatoms are photosynthetic; their consumption by the Noctiluca thus results in measured decreases in chlorophyll-a levels in the Sound. *Id*. at 12. Their consumption also results in measured reductions in silica to nitrogen ratios, favoring the growth of non-silicified phytoplankton. *Id*. at 5. Finally, because diatoms typically sink to the benthos after their blooms as do the fecal exports of copepods, whereas Noctiluca largely recycles and retains its wastes at the surface, the explosion of Noctiluca in the Sound results in less export of nutrients and silica to the benthos. *Id*. at 8; *Krembs Presentation* at 41.

In Puget Sound, the change from a diatom-based surface foodweb to one based on Noctiluca is dramatic. The Noctiluca are capable of eating the entire population of diatoms in one day. *Id*. at 32; *Food Web Processes, supra* n. 15 at 6. The end result is both a starving of the benthos as well as a starving of the surface layer. *Id*. at 9, 14; *Krembs Presentation* at 46. The Noctiluca out-competes the copepods for diatoms thus resulting in a lower quality diet for species at higher trophic levels. *Id.* at 42-44. And it has the effect of retaining the nutrients near the surface. *Food Web Processes* at 9, 14. In sum, scientists hypothesize that:

Nitrogen additions to Puget Sound change nutrient ratios Si:N:P and encourage

---

[16] *Available at* http://www.ecy.wa.gov/programs/eap/mar_wat/pdf/NOAA_WORKSHOP.pdf (last accessed Jan. 5, 2017).

> larger energy transfer through the microbial food web. This has consequences for phytoplankton species composition, food availability for higher tropic level, biogeochemical cycles, benthic-pelagic coupling and oxygen demand at depth.

Krembs Presentation at 48.

A. A Brief History of Discharges to Puget Sound

Washington has long blinded itself to the problems of discharging untreated or inadequately treated wastes to Puget Sound as described by Dave Nunnallee, a Municipal Unit Supervisor, at Ecology's Northwest Regional Office Water Quality Program:

> Frankly, [in the early 1970s through the mid-1980s] we weren't too concerned about Puget Sound. The problem was the rivers and small streams that were receiving industrial and municipal wastewater that was not fully treated, or maybe not treated at all in many cases. Puget Sound, of course, had a much greater level of dilution. We did have a few problem areas in confined embayments, particularly if there was a large discharger. For instance, in Bellingham Bay there was a confined area where a pulp mill discharged, which was a problem. We had these little hot spots here and there in Puget Sound, but, overall, we really didn't have much of a concern for it.
>
> * * *
>
> [S]econdary treatment was available long before the environmental movement got going around the mid 1960s, but it just wasn't deemed to be necessary. Initially, we, as an agency, officially agreed with Metro, that secondary treatment was not necessary in Puget Sound, and we supported them on that position after the federal government passed the law requiring secondary treatment of every municipality. We supported King County in seeking a waiver from that. We also supported the many other wastewater plants that discharged into Puget Sound because, both in the testing we had done, and the great deal of the testing that Metro had done, we really couldn't identify problems. Once you get a short distance away from the outfalls, you couldn't see many effects there. So, we encouraged the entities to apply for their waivers, not thinking it was that big a water-quality issue.
>
> * * *
>
> Faced with the prospect of having to make decisions on a number of requests for waiver of the federal secondary law, Ecology's top management requested an Attorney General's formal opinion on the subject. The AG's opinion essentially stated that existing Washington law did require the equivalent of secondary treatment under the AKART requirement—all known available and reasonable treatment technology. This was Ecology's assistant attorney general's opinion, and it changed everything. This opinion was written in 1983, and from that point on, Ecology required all primary dischargers to begin the process of upgrading to secondary treatment.

Ecology, *Historically Speaking: An Oral History In Celebration of the first 35 years*, 1970-2005

(July 2005)[17] at 165-171.

A few years after Ecology's self-reflections, EPA headquarters reviewed Ecology's permitting program. *See* Memorandum from Deborah G. Nagle, Acting Director, Water Permits Division, Office of Wastewater Management, to Michael Bussell, Director, Office of Water and Watersheds, Region 10 Re: *2009 Regional National Pollutant Elimination System (NPDES) Program Review for Region 10* (Jan. 13, 2011).[18] EPA concluded, incorrectly, that "[t]he permit writer develops technology-based limits and water-quality based limits if the latter are more stringent." *Id.* at 12. Contrary to the findings set out in the instant petition, EPA reviewed 13 permits and concluded that:

> In general, [Ecology] has very good fact sheets and permits. The fact sheets are robust and do a good job of documenting the basis for the permits and permitting decisions. In addition, the permits reviewed appear to be generally consistent with core NPDES tenets. The quality of the fact sheets and permits appear, in part, to be a function of the state's good set of permitting tools, including templates, spreadsheets, policies, and permit writer's manual.

Id. at 13. Yet, despite this praise, EPA also found that there was no "clear discussion of which pollutants were evaluated and why." *Id*. at 50 (EPA also found the fact sheets' evaluation of the antidegradation policy was boilerplate and that Ecology failed to identify receiving water impairments). And, in a stunningly incorrect interpretation of the CWA and its own regulations, EPA also found that Washington's issuance of permits without WQBELs to sources that are known to contribute to violations of water quality standards was legal: "In Washington, if a facility is not causing water quality impairment, the discharge is allowed until a TMDL is developed." *Id.* EPA used Ecology's NPDES permit for the Yakima Sewage Treatment Plant as an example of this unlawful principle:

> [Ecology] was not able to determine [reasonable potential] for the Yakima

---

[17] *Available at* https://fortress.wa.gov/ecy/publications/publications/0501006.pdf (last accessed Oct. 16, 2016).

[18] *Available at* https://www3.epa.gov/npdes/pubs/pqr_region_10_report.pdf (last accessed Oct. 17, 2016).

> Sewage Treatment Plant effluent to cause or contribute to the DO impairment due to multiple point and nonpoint sources that also contribute to the DO problem in the area. The state had already identified the need for a DO TMDL to determine point source WLA and nonpoint load allocations before the issuance of the permit. The permit includes technology-based effluent limits in the permit that ECY believes will prohibit the facility from further impairment of the Yakima River.

Id. at 23.

Despite EPA's bizarre and unsupported finding that Washington could legally delay effluent limits until TMDLs were completed, it also attached a description of the "central tenets" of the NPDES permitting program as Appendix A of its review that makes clear that certain of these tenets simply cannot be waived by states. This appendix describes the actual legal requirement to address water quality standards in the issuance of NPDES permits, regardless of the absence of a TMDL or the confounding circumstance of multiple pollution sources, as follows:

> The CWA requires every state to develop water quality standards to protect receiving water, including designated uses, water quality criteria, and an antidegradation policy. The NPDES regulations at 40 CFR 122.44(d) require that limits MUST be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the state's water quality standards. States will likely have unique implementation policies for determining the need for and calculating water quality-based effluent limits; however, <u>certain tenets may not be waived by the state procedures. Those include</u>
> - Where valid, reliable, and representative effluent data or in-stream background data are available, they MUST be used in applicable reasonable potential and limits derivation calculations. Data may not be arbitrarily discarded or ignored.
> - Where calculations indicate reasonable potential, a specific numeric limit MUST be included in the permit. Additional studies or data collection efforts may not be substituted for enforceable permit limits where *reasonable potential* has been determined.
> - Where the preponderance of evidence clearly indicates the potential to cause or contribute to an exceedance of state water quality standards (even though data might be sparse or absent), a limit MUST be included in the permit (e.g., a new POTW plans to chlorinate its effluent and in-stream chlorine toxicity is anticipated).
> - Where a technology-based is limit is required (because of an ELG or BPJ) AND the limit is not protective of water quality standards, a water quality-based effluent limitation (WQBEL) MUST be developed and included in the permit regardless of whether data indicate reasonable potential (i.e., a technology-based limit cannot authorize a discharge that would result in a violation of water quality standards).
> - Where the permit authorizes the discharge of a pollutant that results in a new or

> increased load to the receiving water, the state must ensure that the new or increased load complies with the antidegradation provisions of the state's water quality standards.
> - The final calculated limit placed in the permit MUST be protective of water quality standards, and MAY NOT be adjusted to account for *treatability* or analytical method detection levels.

Id. at A-3 (italics and capitalization in original, underlining emphasis added). EPA makes very clear in this document that one central tenet that cannot be waived by state policies is that effluent limits are required where the evidence clearly indicates the potential of a source to cause or contribute to violations of water quality standards. Therefore, EPA's findings in this 2009 review of Washington's NPDES program stand in stark contrast to its own summary of applicable legal requirements. Any new review of Ecology's permitting program conducted pursuant to this petition must be based on those legal requirements that embody the fundamental principles of the Clean Water Act.

B. Ecology Has Conducted Extensive Studies on the Water Quality Effects of Nutrient Pollution in Puget Sound

Ecology has been studying and modeling dissolved oxygen levels in Puget Sound for many years—at least since the early 1990s—and, therefore, over many five-year permit cycles.[19] By 2001, Ecology had constructed a model[20] from which it had drawn the following conclusions:

> [M]any sites in South Puget Sound would be sensitive to nutrient addition or eutrophication. This assessment is based on indicators, including: persistent density stratification; low dissolved oxygen concentrations; high levels of fecal coliform bacteria; high ammonium concentrations; and non-measurable levels of dissolved inorganic nitrogen during the phytoplankton growth season.
>
> Additionally, the South Puget Sound basin has physical characteristics that make

---

[19] *See* Attachment A: Ecology Documents Pertaining to Nitrogen Discharges to Puget Sound. In addition, the U.S. Geological Survey completed an evaluation of nutrient transport in the major rivers of the Puget Sound in 1998. *See* S.S. Embrey and E.L. Inkpen, *Water-Quality Assessment of the Puget Sound Basin, Washington, Nutrient Transport in Rivers, 1980-93*, Water-Resources Investigations Report 97-4270 (1998), *available at* http://pubs.usgs.gov/wri/1997/4270/report.pdf (last accessed Dec. 1, 2016).

[20] *See, e.g.*, Ecology, *A three-dimensional water quality model of South Puget Sound, available at* http://www.ecy.wa.gov/programs/eap/sps/psrc_2001_pelletier_poster.ppt (last accessed Oct. 17, 2016).

> it susceptible to eutrophication effects. These features include: shallow bathymetry; slow flushing times; physical stability; numerous inlets with poor circulation; and a large ratio of shoreline to basin. Along with these features, high projected human population growth and subsequent development in the region demand close observation of South Puget Sound water quality variables.

Ecology, *Assessing Sensitivity to Eutrophication of the Southern Puget Sound Basin; Spatial and Seasonal Perspectives* (2001).[21] Ecology also concluded that "[d]issolved oxygen levels . . . reach the biological stress level (5 mg/L) in Case and Carr Inlets, and drop to harmful levels (2 mg/L) in Budd Inlet" and "[p]hytoplankton production is limited by nitrogenous nutrients during the growing season. Nutrient addition experiments resulted in a substantially greater rate of primary production (up to 300%), especially in late summer." *Id*. By the next year, 2002, Ecology was reporting that the "South Puget Sound is sensitive to nutrient addition, confirming the potential for serious water quality degradation due to increased nutrient loads. Both point and nonpoint sources contribute significantly." Ecology, *South Puget Sound Water Quality Study Phase 1* (Oct. 2002) at vii.[22] The agency also concluded that "[a]lthough individual sources may not have a measurable influence, their combined impact could lead to significant water quality degradation, such as reduced dissolved oxygen concentrations, reduced water clarity, altered species composition, and formation of algal scums." *Id.*

By 2008, Ecology was able to report to the public that, with regard to nutrients, some watersheds were "[s]uffering from low dissolved oxygen, high plant growth, excessive phosphorus," primarily from point sources, and that in Puget Sound the problem could be similarly summarized, particularly with regard to the contribution from point sources:

- Low dissolved oxygen in many marine waters – fish kills, algae growth
- Excessive nitrogen, BOD
- South Puget Sound DO Study – 80% from point sources

---

[21] *Available at* http://www.ecy.wa.gov/programs/eap/sps/psrc_2001_bos_poster.ppt (last accessed Oct. 17, 2016).

[22] *Available at* https://fortress.wa.gov/ecy/publications/summarypages/0203021.html (last accessed Oct. 17, 2016).

Dave Peeler, Ecology, *TMDLs and Water Quality in the Pacific Northwest Update on State Regulatory Policies and Priorities* (Aug. 11, 2008) at 12.[23] Ecology's Mr. Peeler went on to include that "[r]atcheting down on discharge permits" was evidently required while nonpoint source controls were a question mark. *Id*.

As of 2012, Washington's EPA-approved 303(d) list of impaired waters included 140 segments of Puget Sound impaired for dissolved oxygen, over 70 of which are in South and Central Puget Sound. *See* Ecology, *South Puget Sound Dissolved Oxygen Study Water Quality Model Calibration and Scenarios* (March 2014) (hereinafter "*2014 DO Scenarios*") at 35, 36.[24] The agency's explanation for these impairments is that:

> Portions of South and Central Puget Sound are on the Clean Water Act Section 303(d) list of impaired waters because observed dissolved oxygen (DO) measurements do not meet the numeric criteria of the Washington State water quality standards. There are not violations across the entire South or Central Puget Sound. Human sources of nutrients can increase algae growth, which can decrease oxygen as the additional organic matter decays. Low oxygen can impair fish and other marine life.

Id. at 9. In addition to the measured impairments that have been placed on the 303(d) list,[25] Ecology's model predicts an array of violations of the dissolved oxygen standards, based on decreases greater than 0.2 mg/L below predicted natural conditions, caused by the impact of all current human sources. *See id.* at 17, fig. ES-3. (*See infra* at 58 for description of applicable

---

[23] *Available at* http://www.lawseminars.com/materials/08TMDLWA/tmdlwa%20m%20Speaker%2006%20Peeler%208-11%20new.pdf (last accessed Dec. 1, 2016).

[24] *Available at* https://fortress.wa.gov/ecy/publications/documents/1403004.pdf (last accessed Oct. 17, 2016). An additional 547 segments are listed as Category 3, having insufficient data on which to conclude impairment. *See* 2012 WQ Search Tool, Washington State Water Quality Assessment, 303(d)/305(b) Integrated Report, *available at* https://fortress.wa.gov/ecy/approvedwqa (set at dissolved oxygen for marine waters in WRIA Nos. 1-18) (last accessed Oct. 17, 2016).

[25] It is important to note that this 303(d) list for marine waters is extremely outdated. Submitted by Ecology to EPA on December 28, 2011, EPA referred to it as the 2010 list. *See* Letter from Daniel D. Opalski, Director, Office of Water and Watersheds, EPA, to Kelly Susewind, Ecology, Re: *Approval of Washington State 2010 303(d) List* (Dec. 21, 2012) *available at* https://www3.epa.gov/region10/pdf/water/303d/washington/final_WA_2010_approval_letter.pdf (last accessed Oct. 17, 2016). No new marine data have been reviewed and submitted to EPA since then, including in the most recent submission to EPA on September 28, 2015.

standards, including role of predicted natural conditions.) And, beyond that, Ecology predicts a greater increase in dissolved oxygen impairments associated with current NPDES permittees' discharging at maximum allowable levels under the terms of their permits in the future. *Id.*

Ecology's latest model predicts "minimum DO [that] naturally falls below the applicable numeric criterion throughout most of South and Central Puget Sound." *Id*. at 89. Levels of dissolved oxygen are predicted to be as low as 4.58 mg/L in waters for which the numeric criterion is set at 7 mg/L; 3.92 mg/L in waters for which the numeric criterion is set at 6 mg/L; and as low as 4.95 mg/L in waters for which the numeric criterion is set at 5 mg/L. While these predictions of so-called "natural conditions" can be viewed as currently supplanting the numeric criteria and adding an additional increment of 0.2 mg/L depression to these predicted natural dissolved oxygen levels, even this result does not eliminate the anthropogenic effect on dissolved oxygen levels as restricted by Washington's water quality standards. *See id.* at 90, fig. 45.[26]

C. Narrative Criterion Violations In Puget Sound

In addition to impairments of dissolved oxygen, the waters of Puget Sound are also

---

[26] EPA's approval of this criterion, WAC 173-201A-210(1)(d)(i), has been challenged by NWEA in the Western District of Washington. *NWEA v. EPA*, Case No. 2:14-cv-00196-RSM. The predicted natural conditions and the predicted natural conditions lowered by 0.2 mg/L, both of which Ecology considers to be meeting water quality standards, are levels of dissolved oxygen that have not been approved as protective of aquatic life by EPA. Nor have these levels been assessed by the National Marine Fisheries Service and U.S. Fish and Wildlife Service pursuant to EPA's obligations under section 7 of the Endangered Species Act. While EPA has no 304(a) recommended criteria for marine dissolved oxygen that applies to Puget Sound, it did publish recommended criteria for the Atlantic coast. EPA, *Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Saltwater): Cape Cod to Cape Hatteras* (Nov. 2000) http://www.waterboards.ca.gov/water_issues/programs/tmdl/records/state_board/2013/ref4080.pdf (last accessed Oct. 17, 2016). That criteria document concluded that:

> If the DO exceeds the chronic protective value for growth (4.8 mg/L), the site meets objectives for protection. If the DO is below the limit for juvenile and adult survival (2.3 mg/L), the site does not meet objectives for protection. When the DO is between these values, the site requires evaluation of duration and intensity of hypoxia to determine suitability of habitat for the larval recruitment objective.

Id. at v.

impaired by the effects of nitrogen manifested in algal blooms, food web changes, acidification, and large numbers of jellyfish masses. According to Ecology, it has,

> frequently document[ed] extensive algal blooms, Noctiluca blooms, and jellyfish masses at the surface. Many of the phytoplankton blooms show high abundances of autotrophic flagellates. In contrast, depth-integrated algal biomass (chlorophyll a) shows a significant steady decline from 1999 to 2011. These seemingly opposing observations - high algal biomass and Noctiluca at the surface and decreasing biomass below the surface - could be clues to a shifting food-web structure and nutrient fluxes in Puget Sound.

Laura Friedenberg, *et al., Increasing nutrients, changes in algal biomass, and large Noctiluca blooms in Puget Sound: Is eutrophication fueling the microbial food web?*, Publication No. 13-03-019 (April 2013) (citations omitted) (hereinafter "*Friedenberg Publication*").[27] *See also*, Chrisopher Krembs, *et al., South Puget Sound – 2011 and 2012 in review: Aerial and water column observations from Ecology's long-term monitoring program* (2012) ("Concentrated, frequent, vast algal bloom and jellyfish patches at the surface and low oxygen water at depth [in South Puget Sound] have been persistent features for years.");[28] Susan S. Pool *et al.*, *Physical, Chemical, and Biological Conditions during Noctiluca Blooms in an Urban Fjord, Puget Sound* (2015) ("Puget Sound's water quality has shown long term increases in nutrients, and excessive phytoplankton blooms in response to human influences have been well documented. Near the surface, human influences and ecosystem responses to human pressures are most visible.").[29] Ecology has documented extensive violations of narrative criteria through its Eyes Over Puget Sound ("EOPS") program.[30] *See* Attachment B: Compilation of EOPS Reports.

Notwithstanding its significant effort to gather these data, Ecology has failed to use

---

[27] *Available at* https://fortress.wa.gov/ecy/publications/documents/1303019.pdf (last accessed Oct. 17, 2016).

[28] *Available at* https://fortress.wa.gov/ecy/publications/documents/1203052.pdf (last accessed Oct. 31, 2016).

[29] *Available at* https://fortress.wa.gov/ecy/publications/documents/1503040.pdf (last accessed Oct. 31, 2016).

[30] *Available at* http://www.ecy.wa.gov/programs/eap/mar_wat/surface.html (last accessed Jan. 20, 2017).

documentation of these water quality impairments for its 303(d) list[31] and, because it presumably uses the 303(d) list as evidence that a discharge might be contributing to a violation of water quality standards necessitating a WQBEL, this failure undermines the NPDES program. Control of nitrogen that is impacting dissolved oxygen would also likely ameliorate the deleterious effects of nitrogen on algal blooms and decomposition, poor water clarity, inhibited submerged plant growth, stress to aquatic life, and other measures of noncompliance with narrative criteria. Ecology's failure to adequately identify the breadth of impairments based on all applicable water quality standards combined with the exclusive focus on near-field water quality in its NPDES permitting program, *see infra* at 70, undermines its ability to use the CWA to establish necessary pollution controls on discharges to Puget Sound.

1. Algal Growth Fed by Nitrogen in Puget Sound Causes Deleterious Conditions

Excess nutrients in Puget Sound cause algal blooms, particularly in combination with warm temperatures and sunlight. *See, e.g.,* Ecology, *Effects of Nitrogen, Algal Blooms and Eutrophication, Nitrogen in the Puget Sound Ecosystem, Nitrogen Home, Environmental Assessment Program;*[32] *see also,* Encyclopedia of Puget Sound, Puget Sound Institute, University of Washington., *Harmful algal blooms in Puget Sound.*[33] Excess algae, fueled by

---

[31] This is demonstrated in two ways. First, Ecology's 303(d) listing methodology makes no mention of narrative methods of assessing dissolved oxygen impairment and no mention of algal growth or any other manifestation as evidence of a violation of narrative criteria. *See Ecology, Water Quality Program Policy, Assessment of Water Quality for the Clean Water Act Section 303(d) and 305(b) Integrated Report, WQP Policy 1-11* (revised July 2012) (hereinafter "*2012 Integrated Report*"). *Available at* http://www.ecy.wa.gov/programs/wq/303d/WQpolicy1-11ch1.pdf (last accessed Oct. 17, 2016). Second, Ecology's 303(d) list, accessible on its website, has no choice of parameter for narrative criteria or algal growth or similar manifestation of violations of the state's narrative criteria, antidegradation policy, or designated use support. While the sole listing for total nitrogen on Ecology's entire 303(d) list cites as a basis a study that "describes impairment of aesthetic uses (odor and excessive aquatic plants)," the listing itself is for nitrogen. *See* Listing ID No. 40865, Sunday Lake.

[32] *Available at* http://www.ecy.wa.gov/programs/eap/Nitrogen/Effects.html (last accessed Oct. 17, 2016).

[33] *Available at* https://www.eopugetsound.org/articles/harmful-algal-blooms-puget-sound (last accessed Oct. 17, 2016).

excess nitrogen, can harm water quality in several ways. First, some species of algae produce toxins that are released during growth and death phases harm humans and animals. Second, algae creates stressful conditions for aquatic life by destabilizing dissolved oxygen levels, causing them to rise during the day and decrease dramatically at night. Third, the density of algal growth can decrease the penetration of sunlight through the water, affecting other plant species that die and decay, lessening oxygen production and causing oxygen depletion. Fourth, the death of these lower plants as well as the algae consumes oxygen from the decaying organic material, causing levels of oxygen that cannot support life. Fifth, excess algae disrupts the normal food web and alters species compositions. Last, excess algae affects human recreation through formation of mats and surface scums.

These harmful algal blooms in Puget Sound have been increasing over at least the last two decades. *See, e.g.*, Encyclopedia of Puget Sound, Puget Sound Institute, University of Washington, Puget Sound Science Review, *Harmful Algal Blooms*.[34] Among Ecology's findings that support this position are the following:

- Although ocean boundary conditions significantly drive water quality in Puget Sound macro-nutrients have continued to steadily increase independent of ocean variability.
- Changes in the silicate to dissolved inorganic nitrogen (Si:DIN) ratio are considered a sign of human nutrient inputs. A decline in the Si:DIN ratio paired with the measured increase in nitrate will increasingly favor the growth of non-silicified phytoplankton species such as the dinoflagellate Noctiluca.
- Over the last two years, Ecology's EOPS reports have documented extensive near-surface blooms of Noctiluca and other dinoflagellates in Puget Sound. Noctiluca is frequently associated with eutrophication of coastal environments.
- Noctiluca blooms reduce chlorophyll a concentrations in the water column. The impact of Noctiluca grazing on phytoplankton biomass appears in Ecology's Victoria Clipper ferry transect data.
- Despite large, frequent surface blooms of dinoflagellates, chlorophyll a concentrations have significantly declined and sub-surface clarity has significantly increased.

---

[34] *Available at* https://www.eopugetsound.org/science-review/section-3-harmful-algal-blooms (last accessed Oct. 18, 2016).

- Changes in the lower food web structure may have much larger implications for ecosystem functioning.

See Friedenberg Publication, supra n. 27.

Not only do monitoring efforts in Puget Sound detect extensive algal blooms but Ecology's models also predict them:

> The April model predictions include algal blooms in Sinclair Inlet, Oakland Bay, and Totten Inlet. EOPS aerial photos show a red phytoplankton bloom in Sinclair Inlet, brown algal bloom in Oakland Bay, and red-brown bloom in Totten Inlet. The June model predictions include algal blooms in Port Madison (Central Puget Sound), Filucy Bay (near McNeil Island), and Henderson Inlet. EOPS aerial photos show a Noctiluca (a dinoflagellate) bloom in Port Madison accumulating at surface in filaments following large eddies, phytoplankton bloom in Filucy Bay across from McNeil Island in colors of green and brown, and green and red phytoplankton bloom in Henderson Inlet. The EOPS photos represent ground truth of algal blooms in these two periods as predicted by the model.

2014 DO Scenarios, *supra* n. 24 at 76. In summary, there is ample evidence that algal blooms in Puget Sound are caused, in part, by anthropogenic nutrient contributions, a violation of Washington's narrative criterion at WAC 173-201A-260(2).

2. Nitrogen Increases Are Altering the Puget Sound Food Web

As discussed above, the increase in nitrogen[35] that is causing more extensive and longer-lasting algal blooms in Puget Sound, is having a ripple effect on its food web. Planktonic copepods —small crustaceans that feed directly on phytoplankton (microscopic photosynthesizing organisms that fix carbon and release oxygen, such as diatoms)—are essential to the food web in the Sound as around the world. Some species of copepods are of particular

[35] *See, e.g.,* Christopher Krembs *et al. Changes in nutrient ratios drive changes in pelagic and benthic assemblages, and benthic-pelagic coupling in Puget Sound: A compelling hypothesis linking water quality and the benthos* (2014), *available at* https://fortress.wa.gov/ecy/publications/documents/1403024.pdf (last accessed Jan. 5, 2017) (hereinafter *"Changes in Nutrient Ratios"*); Ecology, *Marine Water Condition Index* (May 2012), *available at* http://www.ecy.wa.gov/biblio/1203013.html (last accessed Jan. 5, 2017) at 66 ("Overall, nutrient concentrations increased over the 10-year period") (internal citation omitted); Christopher Krembs, *What PS marine monitoring data could be telling us? Stimulating a discussion* (Dec. 16, 2013) at 9 *available at* http://www.ecy.wa.gov/programs/eap/mar_wat/pdf/NOAA_WORKSHOP.pdf (last accessed Jan. 5, 2017) (hereinafter "*Krembs Presentation*").

importance in the Northwest because they are rich food sources consumed by forage fish such as herring that are, in turn, consumed by juvenile salmon. Salmon are designated uses and a failure to support them is a violation of water quality standards.

Like the algae exploding across the Sound, copepods feed at the surface of the water, releasing fecal pellets and other wastes that drift to the bottom. *See Food Web Processes, supra* n.15 at 6. Diatoms themselves sink to the benthos, thereby dominating export of nitrogen to the sediment. *Krembs Presentation, supra* n. 16 at 12. In contrast to the copepods, however, the nitrogen-fueled Noctiluca export less organic material—the remains of the diatoms—to the benthos, retaining more nutrients at the surface. *Id*. at 8-9, 13, 14. The measured decline in the Sound's benthic quality correlates with a decline in benthic abundance and taxa richness. *Id*. at 14. This increase in near-surface nutrient cycling is fed by nutrient inputs from rivers and discharges that enter the Sound primarily at its surface, as compared to the ocean nutrients. *See, e.g.*, Julia Bos, *et al., A Decade on the Edge of Puget Sound: Examining Boundary Stations in the Strait of Juan de Fuca*, 2009 Puget Sound Georgia Basin Ecosystem Conference (2009) ("a relative increase in the DIN:P ratio in the latter half of the decade at Puget Sound stations. . . . suggest[s] elevated Puget Sound nutrient concentrations are not driven by incoming ocean water.").[36]

Moreover, as nitrate concentrations increase due to anthropogenic inputs, a decline in the Si:DIN ratio paired with the measured increase in nitrate increasingly favors the growth of non-silicified phytoplankton species such as the dinoflagellate Noctiluca. *See, e.g., Friedenberg Publication, supra* n. 27; *Changes in Nutrient Ratios, supra* n. 35; *Krembs Presentation, supra* n. 16 at 14-19, 26. As a result, the phytoplankton biomass in Puget Sound has suffered a 14-year decline. *See Food Web Processes* at 6; *see also* Christopher Krembs, *How did the east-pacific temperature anomaly affect water quality trends in the urban fjord, Puget Sound,* 2014-2016

[36] *Available at* http://depts.washington.edu/uwconf/psgb/proceedings/papers/p3_bos.pdf.

Pacific Anomalies Workshop (Jan. 2016).[37]

3. Nitrogen Increases Are Causing Increased Acidification of the Sound

Nitrogen is also causing increased acidification of Puget Sound. *See* Richard A. Feely, et al., *The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary*, 88 Estuarine, Coastal and Shelf Science 442 (May 15, 2010).[38] While part of this effect is from the ocean, it is also from anthropogenic sources within the Sound. *Id*. at 448 ("[I]t may be possible to mitigate the continued development and impacts of corrosive conditions by addressing and reducing the regional-scale anthropogenic stressors that contribute to their formation, such as additional nutrient inputs associated with development and urbanization.") The increase in algal blooms at the surface results in a greater amount of algae sinking to the bottom of Puget Sound, where the decaying material consumes more oxygen from the water. In addition, this dead algae, which has absorbed carbon dioxide from the air when alive, now releases that carbon dioxide at the water's bottom, resulting in increased acidification of the water. As a result, Puget Sound acidification is greater than that in the Pacific Ocean.

In fact, in the context of controlling the erosive effects of acidification in Puget Sound, the state has already taken a position that nutrient discharges from point and nonpoint sources require restrictions. In 2012, Governor Christine O. Gregoire issued an Executive Order responding to recommendations from the 2012 Blue Ribbon Panel on Ocean Acidification. *Executive Order 12-07, Washington's Response to Ocean Acidification* (Nov. 27, 2012).[39] The Order required the Director of Ecology to:

---

[37] *Available at* http://www.nanoos.org/resources/anomalies_workshop/workshop2/docs/posters/Christopher_Krembs-Poster.pdf.

[38] *Available at* http://faculty.wwu.edu/~shulld/ESCI%20432/Feely2010.pdf (last accessed Feb. 4, 2017).

[39] *Available at* http://www.governor.wa.gov/sites/default/files/exe_order/eo_12-07.pdf (last accessed Feb. 4, 2017).

> Reduce nutrients and organic carbon in locations where these pollutants alone, or in combination with other pollutants, are causing or contributing to multiple water quality problems in our marine waters. . . . In implementing this directive, Ecology with its partners shall prioritize watersheds with the most significant water quality problems, regardless of the source(s) – urban storm water, septic tanks, large and small sewage treatment facilities, or rural runoff from agricultural lands. This effort shall be carried out in consultation with other agencies, affected local and tribal governments, federal agencies, landowners, and the environmental community. These efforts shall:
>
> i. build on existing programs;
>
> ii. utilize, where appropriate, the voluntary stewardship program established by RCW 36.70A.710; and
>
> iii. utilize other approaches, including technical assistance, funding, permitting and enforcement, where most appropriate and effective.

Id. at 4 (emphasis added). This Executive Order echoed the report and recommendations of the Blue Ribbon Panel itself:

> It is important to understand that some of these actions [the advanced treatment of nutrients] are already being taken at some locations due to existing water quality problems other than ocean acidification. For example, the LOTT sewage treatment plant is already removing nitrogen from its effluent due to extremely low dissolved oxygen levels in Budd Inlet. The Panel's recommendation that stringent controls be imposed only after further scientific analysis of the relationship between local nutrient and organic carbon loading and local acidity relates to combating acidification per se. It does not bear on the use of these controls to address other water quality problems.
>
> * * *
>
> Action 5.2.2: If determined necessary based on scientific data, reduce nutrient loading and organic carbon from point source discharges. Nutrient and organic carbon originating from point sources (including municipal wastewater treatment facilities, large stormwater discharges, some industrial discharges, and concentrated animal feedlots) account for the majority of local nutrient inputs into Washington's marine waters. Discharges from these large point sources are comprehensively regulated by individual or general permits issued under the National Pollutant Discharge Elimination System program. These permits impose specific effluent limits, monitoring and reporting requirements, and other conditions on permitted discharges.

Washington State Blue Ribbon Panel on Ocean Acidification, *Ocean Acidification: From Knowledge to Action Washington State Blue Ribbon Panel on Ocean Acidification, Washington State's Strategic Response* (Nov. 2012) (emphasis added) at 50-51.[40] This report relied, in turn,

[40] *Available at* https://fortress.wa.gov/ecy/publications/documents/1201015.pdf (last accessed Feb. 4, 2017).

on a report to the panel. *See* Center for Ocean Solutions, *Washington State's Legal and Policy Options for Combating Ocean Acidification in State Waters* (July 2012) at 10 ("[O]verall, wastewater treatment plants account for the majority of nitrogen inputs into Puget Sound and the surrounding Strait of Juan de Fuca. As such, improved wastewater management may have a disproportionately large impact on water quality and chemistry in these heavily affected waters.") (internal citations omitted);[41] *see also id.* at 11 ("Washington State laws compel Ecology to require treatment of wastes with all known, available, and reasonable treatment methods prior to their discharge or entry into waters of the State, regardless of the quality of the water to which wastes are discharged or proposed for discharge, and regardless of the minimum water quality standards established for said waters. In fulfilling this mandate, Ecology could require tertiary treatment including nitrification-denitrification (N-DN) for POTWs to address coastal eutrophication. Nationally, such treatment is now required on a case-by-case basis depending upon the condition of the receiving water body and the beneficial uses for which it has been designated.") (internal citations omitted).

4. Jellyfish Cause Deleterious Conditions in the Waters of Puget Sound

Poor water quality in Puget Sound is also associated with increases in jellyfish that are, in turn, associated with declines in fish. *See* Correigh Greene, *et al.*, *Forty years of change in forage fish and jellyfish abundance across greater Puget Sound, Washington (USA): anthropogenic and climate associations*, 525 Mar Ecol Prog Ser 153 (2015).[42] This recent study involved a 40-year evaluation of jellyfish and forage fish abundance in Puget Sound that found trends in abundance of all forage species in four subbasins of the Sound. The historically-dominant forage fishes (Pacific herring and surf smelt) have declined in two subbasins (Central

[41] *Available at* http://www.ecy.wa.gov/water/marine/oa/2012report_app8.pdf (last accessed Feb. 4, 2017).

[42] *Available at* http://www.int-res.com/abstracts/meps/v525/p153-170/ (last accessed Oct. 17, 2016).

and South Puget Sound) by up to two orders of magnitude. *See also Krembs Presentation*, *supra* n.16 at 44. While two other species of forage fish (Pacific sand lance and three-spine stickleback) increased in all four of the subbasins, jellyfish-dominated catches increased three- to nine-fold in Central and South Puget Sound, and their abundance positively tracked human population density across all basins. The strongest predictors of forage fish declines were human population density and commercial harvest. Forage fish support salmonids, sea birds, and marine mammals; jellyfish do not. *See, e.g.*, Jerome Spitz, *et al.*, *Proximate composition and energy content of forage species from the Bay of Biscay: high- or low-quality food?,* 67 ICES Journal of Marine Science 909 (2010).[43] This trend in relative declines/ abundance may explain plummeting populations of species higher in the Puget Sound food chain, such as Chinook salmon and orca whales. Regardless, the abundance of jellyfish is itself a violation of the narrative criterion and population losses in forage fish are a violation of designated use support and Tier I of the antidegradation policy. Ecology's failure to consider the narrative criteria, antidegradation policy, and designated uses when developing its 303(d) list of impaired waters does not excuse its permit writers from establishing permits that comply with all aspects of water quality standards.

The significant increase in jellyfish in Puget Sound that is associated with population density is likely due, at least in part, to nutrient enrichment. *See e.g.*, Anthony J. Richardson, *et al., The Jellyfish Joyride: Causes, Consequences and Management Responses to a More Gelatinous Future*, 24 Trends in Ecology and Evolution, 312, 314 (2009);[44] Jennifer E. Purcell *et al., Anthropogenic Causes of Jellyfish Blooms and Their Direct Consequences for Humans: A*

---

[43] *Available at* https://academic.oup.com/icesjms/article/67/5/909/610336/Proximate-composition-and-energy-content-of-forage.

[44] *Available at* http://www.swansea.ac.uk/bs/turtle/reprints/Richardson%20et%20al%202009%20TREE%20-%20The%20Jellyfish%20Joyride.pdf (last accessed Nov. 23, 2016).

Review, 350 Mar Ecol Prog Ser 153, 163 (2007).[45] Jellyfish are known to have a high tolerance for low dissolved oxygen concentrations and their "polyps can survive and asexually propagate even during prolonged exposure to hypoxic conditions." Robert H. Condon, *et al., Effects of Low Dissolved Oxygen on Survival and Asexual Reproduction of Scyphozoan Polyps (Chrysaora quinquecirrha)*, 451 Hydrobiologia 89 (2001).[46] *See also* Jennifer E. Purcell, *et al., Pelagic Cnidarians and Ctenophores in Low Dissolved Oxygen Environments: A Review*, in *Coastal Hypoxia: Consequences for Living Resources and Ecosystems* (Rabalais, N.N. and Turner, R.E., eds), at 77–100, American Geophysical Union (2001) ("some [jellyfish] species occur in high densities at very low dissolved oxygen concentrations.").[47]

D. Human Nutrient Sources Are Causing and Contributing to Violations of Water Quality Standards in Puget Sound

Ecology has concluded that nitrogen is causing the violations of dissolved oxygen in Puget Sound. *See, e.g.*, *2014 DO Scenarios, supra* n. 24 at 13. The agency has also concluded that "[t]he dominant human sources are through marine point source discharges of treated municipal wastewater. Watershed inflows from tributaries, which include both natural and human components, deliver nitrogen to the surface waters of South and Central Puget Sound." *Id*. at 13-14; *see also* Ecology, *Puget Sound and the Straits Dissolved Oxygen Assessment Impacts of Current and Future Human Nitrogen Sources and Climate Change through 2070* (March 2014) (hereinafter "*Future Impacts*")[48] at 7 ("Human nitrogen contributions from the

---

[45] *Available at* http://faculty.wwu.edu/~shulld/ESCI%20432/Purcell2007.pdf (last accessed Nov. 23, 2016).

[46] *Available at* https://www.researchgate.net/publication/226843892_Effects_of_low_dissolved_oxygen_on_survival_and_asexual_reproduction_of_scyphozoan_polyps_Chrysaora_quinquecirrha (last accessed Nov. 23, 2016).

[47] *Available at* https://www.researchgate.net/publication/234155004_Pelagic_cnidarians_and_ctenophores_in_low_dissolved_oxygen_environments_A_review (last accessed Nov. 23, 2016).

[48] *Available at* https://fortress.wa.gov/ecy/publications/documents/1403007.pdf (last accessed Oct. 17, 2016).

U.S. and Canada to the Salish Sea have the greatest impacts on DO in portions of South and Central Puget Sound. Marine point sources cause greater decreases in DO than watershed inflows now and into the future."). By 2014, Ecology had also concluded that:

> Wastewater treatment plants deliver 3,250 kilograms/day (kg/d) of total nitrogen (TN) to South Puget Sound and 24,740 kg TN /d to Central Puget Sound. Watersheds deliver 2,410 kg TN/d to South Puget Sound and 2,910 kg TN/d to Central Puget Sound. Natural sources within the watersheds deliver 1,510 kg TN/d to South Puget Sound and 2,530 kg TN/d to Central Puget Sound. Atmospheric deposition to the marine water surface discharges an additional 360 kg TN/d. Comparing the natural and anthropogenic loads from sources within the South and Central Puget Sound, anthropogenic sources contribute about 6 times the nutrient loading compared to natural loads. External anthropogenic load entering the Edmonds open boundary from north is relatively high at approximately 40,000 kg TN /d.

Id. at 15 (emphasis added). As a result of modeling, Ecology concluded:

> Compared with natural conditions, current human nutrient loads to South and Central Puget Sound (both internal and external to model domain) cause >0.2 mg/L decreases in daily minimum oxygen concentrations in portions of Totten, Eld, Budd, Carr, and Case inlets of South Puget Sound (Figure ES-3a). We also found violations in East Passage in Central Puget Sound.

Id. at 16. And the agency found that "marine point sources alone cause >0.2 mg/L depletion [beyond purported natural conditions] in more regions than human sources in watershed inflows alone." *Id*. (citations omitted).

Other findings of Ecology's modeling studies include the following:

- A 25 percent nitrogen load reduction would eliminate nearly all of the violations in East Passage and Case Inlet, and would reduce the magnitude and extent of violations in the other South Puget Sound inlets.
- A 50 percent nitrogen load reduction would further decrease the maximum depletion, and a 75 percent load reduction would eliminate all violations except in Eld Inlet, where the maximum violation would be 0.24 mg/L below purported natural conditions.
- Central Puget Sound sources influence at least East Passage, Carr, and Case Inlets.
- South Puget Sound sources decrease oxygen in Carr, Case, Totten, Eld, and Budd Inlets.
- Central Puget Sound sources may decrease oxygen in Totten, Eld, and Budd inlets but the proportion of Central Puget Sound sources reaching South Puget Sound has not yet been determined.
- Results indicate that current sources of nitrogen violate the water quality standards.

- Results indicate that marine point sources have a greater impact than human sources within watersheds.
- South Puget Sound nitrogen sources have the largest impact on finger inlets.
- There is a possible under-estimation of violations due to possible over-prediction of DO (though not statistically significant) in the bottom layers of shallow inlets.
- Human sources decrease dissolved oxygen by up to 0.38 mg/L below natural conditions. Violations occur for up to 13 weeks.
- In the spring, chlorophyll a levels reflect strong algae growth, particularly in the shallow regions of South and Central Puget Sound.
- East Passage also exhibits strong algae growth, potentially spurred by vertical mixing near the Tacoma Narrows sill. Surface dissolved oxygen levels increase while DIN decreases during high algae growth.

See id. at 20-21. In summary, human sources of nitrogen from point sources discharging directly and indirectly to Puget Sound are causing and contributing to violations of water quality standards in the Sound.

E. Continued Nutrient Discharges, in Combination with Other Influences, Are Predicted to Make Puget Sound Water Quality Worse in the Future

Ecology has concluded that "nutrient concentrations in Puget Sound have significantly increased and nutrient ratios have steadily changed over the last 13 years despite the strong influence of the ocean on Puget Sound water quality." *Friedenberg Publication, supra* n. 27 (citations omitted). Ecology's modeling has demonstrated that this trend will continue into the future. In addition, Ecology determined that:

> If marine point sources (internal to model domain) discharged at their maximum permitted loads every day of the year, maximum loads would cause >0.2 mg/L depletions in more regions of the South Sound inlets and in a large portion of Central Puget Sound[.]

Future Impacts, supra n. 48 at 18. The model was run using the maximum permitted loads, resulting in predicted dissolved oxygen depletions above the currently-allowable 0.2 mg/L level in Oakland Bay, Totten Inlet, Eld Inlet, Budd Inlet, Case Inlet, and Carr Inlet in the South Puget Sound and Colvos Passage and the region between Tacoma and Seattle in the Central Puget

Sound. *See 2014 DO Scenarios*, *supra* n. 24 at 100.

In addition, Ecology looked at how future nutrient contributions could worsen dissolved oxygen declines in Puget Sound in combination with population increases, ocean conditions, and climate change. Its report concluded that,

> Human nitrogen contributions from the U.S. and Canada to the Salish Sea have the greatest impacts on DO in portions of South and Central Puget Sound. Marine point sources cause greater decreases in DO than watershed inflows now and into the future. Both loads will increase as a result of future population growth and land use change. Most of the Salish Sea reflects a relatively low impact from human sources of nitrogen. However, future human nutrient contributions could worsen DO declines in regions of Puget Sound.

Future Impacts, *supra* n. 48 at 7. Ecology noted that Pacific Ocean trends, climate change, and sediment-water interactions would further decrease levels of dissolved oxygen. *Id*.

F. Ecology's Failure to Control Nitrogen through NPDES Permits is Inconsistent with Priorities Established by EPA

Ecology's failure to include WQBELs to control nitrogen in NPDES permits issued to dischargers to Puget Sound and its tributaries is inconsistent with the priorities that EPA and Ecology established in their partnership agreements. The most recent agreement between EPA and Ecology states that the two agencies "are dedicated to the protection, cleanup, and restoration of Puget Sound" as one of five mutual priorities, including "toxics and nutrients prevention, reduction, and control." EPA, Ecology, *Environmental Performance Partnership Agreement State Fiscal Years 2016–2017, July 1, 2015–June 30, 2017* (revised July 2015) (hereinafter "*2015 PPA*") at 17, 19.[49] The 2015 PPA notes the importance of EPA's involvement in protecting and restoring Puget Sound because it has "unique complexities, substantial challenges, and because they rely upon strategic, multi-agency coordination to achieve success. These priorities require focused energy and creative leadership by both agencies, along with our many partners, to make real progress on protecting human health and the environment, and

[49] *Available at* https://fortress.wa.gov/ecy/publications/documents/1501005.pdf (last accessed Oct. 18, 2016).

improving our quality of life." *Id*. at 17. The 2015 PPA asserts that the adoption of an Action Agenda by the Puget Sound Partnership is "a blueprint for restoring Puget Sound to a healthy state by 2020," which is a mere three years from today. *Id*. at 19. The agreement goes on to say that "Ecology is leading studies to identify how human activities (along with natural factors) affect low dissolved oxygen levels in Puget Sound. The results of the studies may show we need to reduce human related sources of nitrogen to keep Puget Sound healthy. If reductions are needed, the studies will also help determine where the reductions might need to occur." *Id*. at 19-20. It is silent on the matter of Ecology's permits but states that EPA-issued NPDES permits in Puget Sound are, by definition, "high priority." *Id*. at 46. In the 2015 PPA, EPA also agreed to review some of Ecology's permits and to "not hold NPDES permits issued by Ecology to a higher standards than required by the CWA and federal regulations." *Id*. Finally, EPA agreed to help seek funding for Ecology to "estimate toxics loading from point sources to Puget Sound." *Id*. at 47.[50]

The previous PPA contains nearly exactly the same content and language, however it asserted that the Puget Sound nutrient studies "will be completed in 2013" and that "Ecology will provide EPA with a schedule for completing the South Puget Sound DO Technical Study by July 21, 2013." EPA, Ecology, *Environmental Performance Partnership Agreement State Fiscal Years 2014 – 2015, July 1, 2013 – June 30, 2015* (revised July 2013) at 21, 52. It also stated that "Ecology and EPA will continue to work together on addressing priority nutrient problems to reduce current loadings of nitrogen and phosphorus to surface waters through existing programs and state priorities." *Id*. Apparently, based on the evidence, NPDES permit limits for the

[50] On its website, EPA Region 10 discusses the low dissolved oxygen in Puget Sound and under a section entitled "What are we doing about it?," states that "[l]ocal governments grants and loans from the Washington Department of Ecology are upgrading wastewater treatment plants to remove nutrients and improve local marine water quality." *Salish Sea*, Marine Water Quality, EPA at https://www.epa.gov/salish-sea/marine-water-quality (last accessed Feb. 8, 2017). It is unclear to which treatment plants—plural—EPA refers.

primary anthropogenic source of nitrogen is not a priority.

Ecology submits semi-annual and end-of-year reports to EPA on the status of the work it has committed to do with EPA's funding through the PPAs. The most recent report available covers up to June 2012. *See* Ecology, *WA State Performance Partnership Agreement, July 2011-June 2013, Water Quality Program Status Report for January-June 2012* (Sept. 2012). It reports on no activities pertaining to the content or quality of Ecology's NPDES permits. Ecology does state that it " is developing an integrated approach to nutrient control that utilizes existing programs and controls, as well as newly developed efforts through the Nonpoint Source Control Program, to control and prevent anthropogenic sources of nutrients from impacting waterbodies in Washington. Ecology is also leading the South Sound Nutrient study (supported by PSP and funded by EPA) which focuses on dissolved oxygen, by determining what amount of nitrogen loading can be permitted to meet acceptable DO levels. (9/12)" *Id.* at 9-10. Other PPAs and reports on PPA progress include similar language, despite the passage of time.

There is little evidence of any pollution controls that have reduced loading of nutrients to Puget Sound or its tributaries. Certainly, as this petition demonstrates, point sources have not been regulated to effect that outcome. With regard to nonpoint sources, Ecology has used some of its 319 federal grant funding to support the use of best management practices to reduce temperature and fecal coliform. In doing so, it has used EPA's spreadsheet model Spreadsheet Tool for Estimating Pollutant Load (STEPL) to estimate the nitrogen load reductions associated with implementation of those practices, which it has reported annually. For example, Ecology estimated that in 2014 nonpoint sources reduced nitrogen loading to Puget Sound watersheds by 694 kilograms per year (nitrogen type not specified). *See* Ecology, *Year 2014 Report on Activities to Implement Washington State's Water Quality Plan to Control Nonpoint Source Pollution* (May 2015), at 15-18. To put this purported reduction into perspective, all U.S. and Canadian watershed sources of nitrogen to Puget Sound and the Straits together are estimated at 72,475 kilograms per day (measured as annual load of dissolved inorganic nitrogen). *Nutrient*

Load Summary, *supra* n. 1 at 108.

V. THE DEPARTMENT OF ECOLOGY HAS KNOWINGLY FAILED AND CONTINUES TO FAIL TO ISSUE NPDES PERMITS TO CONTROL NITROGEN DISCHARGES TO PUGET SOUND

Despite Ecology's long-standing knowledge of Puget Sound's nitrogen-driven water quality impairments, the agency has regularly issued NPDES permits to nitrogen discharges without nitrogen permit limits and relatively little in the way of nitrogen monitoring requirements. Ecology relies heavily on an illegal state policy to not establish WQBELs for discharges that cause or contribute to violations of water quality standards where the agency has not completed a TMDL. And, since the mid-1990s, Ecology has deliberately avoided developing any TMDLs for dissolved oxygen in Sound tributaries to which municipalities discharge. Those TMDLs that Ecology has developed often fail to meet the basic definition of a TMDL and none establishes nutrient limits. As a consequence, Ecology's permitting program has instituted almost no controls on nitrogen discharges to Puget Sound or its tributaries. In addition, Ecology has consistently ignored requirements of state law pertaining to the use of AKART for all dischargers.

A. Any Existing Ammonia or Nitrogen Limits on Puget Sound Permits are Not Adequate Water Quality-Based Limits

Of the 103 sources evaluated here, 67 are municipal and 8 are industrial—a total of 75—direct dischargers of nitrogen to Puget Sound and an additional 28 municipal dischargers to Sound tributaries authorized by Ecology NPDES permits.[51] *See* Attachment C: List of 103 Permits Reviewed. Of these 103 permits, only seven *appear* to establish surface water quality-based limits on nitrogen.[52] Only two of those with nitrogen limits are for discharges to marine or

[51] EPA issues permits in Washington to federal dischargers and dischargers on tribal lands.

[52] The seven permits with surface water nitrogen limits are: LOTT, Orting, Everett (Snohomish River outfall), Lake Stevens, Snohomish, North Bend, and Duvall. Fort Flagler State Park, Yelm, and Sequim have total nitrogen limits based on groundwater protection.

estuarine waters, neither one of which is based on protection of Puget Sound.[53] Another 18 permits have effluent limits for ammonia, 10 for impacts to dissolved oxygen[54] and eight for ammonia toxicity.[55] These ammonia limits are intended to address the discharges' near-term effect of nitrification—the process in which ammonia and ammonium consume oxygen to change to nitrite and nitrate—on dissolved oxygen levels. They are not the equivalent of nitrogen controls intended to protect water quality of Puget Sound.[56]

Excluding the LOTT permit, the six permits with nitrogen limits and the 10 permits with dissolved oxygen-related ammonia limits are among a group of 14 permits with effluent limits that exist only as a direct result of Ecology's having completed three TMDLs to address dissolved oxygen in parts of the Snohomish River Estuary,[57] Snoqualmie River,[58] and Puyallup

---

[53] The two discharges to marine waters with nitrogen limits are: LOTT (Budd Inlet) and Lake Stevens (Ebey Slough).

[54] The 10 permits with ammonia limits to address dissolved oxygen in Sound tributaries are: Carbonado, Enumclaw, Orting, South Prairie, Sumner, Wilkeson, Everett (Snohomish River outfall only), Marysville (Snohomish River outfall only), Carnation, North Bend.

[55] The four municipal and four industrial permits with ammonia limits to address ammonia toxicity are: Eatonville, Buckley, Cherrywood Mobile Home Manor, Ferndale, BP Cherry Point, Phillips 66 Ferndale, Shell Oil, and Tesoro. An ammonia limit for Yelm is based on "expected performance." *See* Ecology, *Fact Sheet for NPDES Permit WA0040762, City of Yelm Wastewater Treatment and Water Reclamation Facility* (June 24, 2005) at 14.

[56] The Sequim permit demonstrates that controlling nitrogen discharges and ammonia discharges can be at odds. Discussing 30 exceedances of ammonia limits and 11 exceedances of total nitrogen limits, Ecology's fact sheet states: "These violations were caused in part by Ecology's issuing the 2005 permit with a total nitrogen limit design to protect groundwater quality. The City made operational changes to meet these limits but lowering aeration rates to meet total nitrogen levels invariably led to higher ammonia concentrations. As influent flows approached the design flow, monthly violations of ammonia or total nitrogen effluent limits became more common. The City's 2010 WWTP upgrade gave it the ability to meet both ammonia and total nitrogen limits." Ecology, *Fact Sheet for NPDES/Reclaimed Water Permit WA0022349 for City of Sequim Reclaimed Water Facility* (Feb. 27, 2014) at 11 n 1.

[57] The Snohomish River Estuary TMDL establishes wasteload allocations used in permits for Everett (Snohomish River outfall only), Lake Stevens, Marysville (Snohomish River outfall only), and Snohomish.

[58] The Snoqualmie River TMDL establishes wasteload allocations used in permits for Carnation, Duvall, North Bend, and Snoqualmie.

River[59] in 1993, 1994, and 1999 respectively.[60] These TMDLs—developed 17 to 23 years ago—are the only TMDLs that address, albeit inadequately, nutrients or dissolved oxygen in Puget Sound tributaries.[61] All six permits with apparent nitrogen limits that are based on these TMDLs have effluent limits that Ecology now terms "NBOD+CBOD" (nitrogenous biochemical oxygen demand plus carbonaceous biochemical oxygen demand), which sounds as if they limit total oxygen demand including nitrogen. But, in fact, consistent with Ecology's persistent and narrow focus on evaluating dissolved oxygen as only a matter of near-field effects, *see infra* at 75, each of these permits now defines the "CBOD" portion of this equation as only the five-day, not the total, BOD. *See, e.g.*, Ecology, *Fact Sheet for NPDES No. WA0020303 City of Orting Wastewater Treatment Plant* (Dec. 13, 2011). Moreover, as the TMDLs were intended to only protect against lowered dissolved oxygen in the waterbody segments covered, and not in any downstream waters including Puget Sound, and were not intended to control nitrogen loading to the Sound, each of these permits also allows for trading between the carbonaceous and nitrogenous effects on dissolved oxygen. *See id.* at 14 ("The city of Orting has requested that Ecology allow it to trade a portion of its ammonia [wasteload allocation ("WLA")] for an increase in BOD_5. As a result, Ecology is establishing an effluent limit for NBOD + CBOD."); *see also* Ecology, *Fact Sheet for NPDES Permit WA0029548, City of Snohomish Wastewater*

---

[59] The Puyallup TMDL establishes wasteload allocations for Carbonado, Enumclaw, Orting, South Prairie, Sumner, and Wilkeson, all of which discharge to Puget Sound tributaries.

[60] Ecology, *Snohomish River Estuary Total Maximum Daily Load* (Aug. 1999) *available at* https://fortress.wa.gov/ecy/publications/documents/9957.pdf (last accessed Oct. 18, 2016); Ecology *Puyallup River Total Maximum Daily Load for Biochemical Oxygen Demand, Ammonia, and Residual Chlorine* (June 1993) *available at* https://fortress.wa.gov/ecy/publications/documents/96326.pdf (last accessed Oct. 18, 2016); Ecology, *Snoqualmie River Total Maximum Daily Load Study* (May 1994) *available at* https://fortress.wa.gov/ecy/publications/documents/9471.pdf (download precluded due to file corruption)(last accessed Oct. 18, 2016).

[61] This discussion does not include TMDLs for phosphorus in lakes or where Ecology has determined that low levels of dissolved oxygen are solely a function of temperature impacts.

Treatment Plant (Oct. 30, 2012) at 23 ("Because the combination of $CBOD_5$ and ammonia determine the effluent's total oxygen demand, different combinations of the two parameters can also meet the TMDL allocation. Ecology established a WLA exchange rate for Snohomish Estuary Dischargers of 2.1 pounds of $CBOD_5$ for each pound of ammonia[.]"). As a consequence, none of these six permits actually establishes nitrogen limits.

Moreover, only two marine water segments in Puget Sound are *ostensibly* associated with EPA-approved dissolved oxygen TMDLs: Ebey Slough, part of the Snohomish TMDL,[62] and the TMDL for Henderson Inlet, which did not set load or wasteload allocations for low dissolved oxygen but, instead "recommend[ed] several actions to improve water quality," rendering it not a TMDL. Ecology, *Henderson Inlet Watershed Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Temperature Total Maximum Daily Load Study* (March 2006) at ix, 100 (modeling dissolved oxygen dynamics in Henderson Inlet was not proposed), 112 ("Modeling will be necessary to develop load and wasteload allocations of nutrients in order to complete a Total Maximum Daily Load analysis of dissolved oxygen in Henderson Inlet.").[63]

The Snohomish River Estuary TMDL is an example of Ecology's thinking in the 1990s that Puget Sound could hold an unlimited amount of waste, a perspective it has not shed to date and that seriously undermines the integrity of its permitting program. The Everett Snohomish permit issued pursuant to the TMDL covers two outfalls. While there is an NBOD+CBOD

---

[62] The Snohomish TMDL purportedly covers Port Gardner and Inner Everett Harbor. Snohomish River Estuary TMDL at 7. However, "the success of the TMDL relies upon the eventual diversion of most of the City of Everett discharge to deepwater in Port Gardner," *id*. at 13, demonstrating that, in fact, the TMDL was not based on addressing any impairment, present or future, in the marine waters of Puget Sound, a point made clear by the statement that "downstream or seaward loading is not included," *id.* at 11. Moreover, the TMDL allocations are limited to ultimate carbonaceous biochemical oxygen demand and ammonia nitrogen, thus falling well short of addressing nitrogen loadings to Puget Sound. *See id.* at 11.

[63] *Available at* https://fortress.wa.gov/ecy/publications/documents/0603012.pdf (last accessed Oct. 18, 2016).

(purported total biological oxygen demand) limit for the city's freshwater outfalls (Nos. 15 and 25) that discharge to the river, there are no nitrogen limits for the marine outfall (No. 100) that discharges to Port Gardner Bay in Puget Sound. As Ecology reports in the fact sheet for Everett's just-reissued 2015 permit, "[p]art of the City's response to the TMDL was to partner with Kimberly-Clark and the City of Marysville to construct the deep water outfall (outfall 100) in Port Gardner and to redirect flow[.]" Ecology, *Fact Sheet for NPDES Permit WA0024490 City of Everett Water Pollution Control Facility* (July 29, 2015) at 36 (emphasis added). As a result, Ecology has now applied the total wasteload allocation of nitrogen established by the TMDL to the remaining discharge to the river, *id*., and determined—wholly without analysis—that technology-based controls are sufficient for discharges to the marine waters of the Sound. The result is that the overall allowable discharge of nitrogen from this municipality to Puget Sound has increased, uncontrolled by a TMDL that was never intended to address the marine impairments in the first place.

An identical scenario unfolded as the result of Ecology's issuance of a purported ammonia-nitrogen TMDL for the Green/Duwamish River in 1992. *See* Ecology, *Total Maximum Daily Load Duwamish Waterway and River* (undated) at 1 ("No loading capacity for ammonia-N has been determined for the Duwamish Waterway and River. The WLA for ammonia-N from the Renton WWTP has been set at 4804 pounds per day, for emergency conditions and short-term maintenance. Otherwise, the Renton WWTP WLA is 0 pounds per day.").[64] As Ecology put it, "King County responded to this TMDL by relocating their South Plant WWTP outfall to the Puget Sound." Ecology, *Fact Sheet for NPDES Permit WA0029581, King County's South*

[64] *Available at* https://fortress.wa.gov/ecy/publications/documents/9210204.pdf (last accessed Oct. 18, 2016). Removal of the sewage discharge has not resolved the low dissolved oxygen of the Duwamish and Green Rivers. *See* Ecology, *Water Quality Improvement Project Duwamish-Green Basin: Ammonia- Nitrogen*, WRIA 9, Water Quality Improvement Projects *available at* http://www.ecy.wa.gov/programs/wq/tmdl/DuwamishTMDL.html (last accessed Oct. 18, 2016).

Wastewater Treatment Plant (July 1, 2015) at 30.

The Puyallup River TMDL was not, in fact, intended to address any impairment. Rather, its intent was preventative and therefore, by definition, stops short of establishing the wasteload allocations that are needed to protect the Sound. Covering 10 municipal dischargers, four industrial sources, and four fish hatcheries, the wasteload allocations for BOD_5 and ammonia were based on mixing zone analyses and TBELs, not total loading. *See* Memo from Greg Pelletier, EILS Program, Watersheds Assessment Section, Ecology, to Bill Backous, Southwest Regional Office, Ecology Re: *Addendum to the 1993 Puyallup River TMDL Report* (July 22, 1994) at 6, 7, 9 (concluding that adoption of the "proposed mixing zone WLAs" would result in a surplus of dissolved oxygen and ammonia throughout the river system to be allocated to future loads).[65] However, according to Ecology, "[l]ater, new information became available that raised questions regarding the ability of the river to assimilate capacity [sic] additional 5-day Biochemical Oxygen Demand (BOD5) and ammonia loads." Ecology, *Water Quality Improvement Project, Puyallup River Basin Area: Multi-parameter* (hereinafter "*Puyallup Website*").[66] As a result, Ecology issued a moratorium on using the reserve capacity. *See* Letter from Kelly Susewind, Southwest Region Manager, Water Quality Program, Ecology to Karen Dinicola, Citizens for a Healthy Bay, Re: *Stay of Reserve Allocations for BODS and Ammonia* (Dec. 1, 2000).[67] The moratorium is based on data showing "that dissolved oxygen levels violated water quality standards on several days" in 2000. *Puyallup Website, supra* n. 55. Therefore, to the extent these 18 permits were based on the TMDL, they are not adequate to

---

[65] *Available at* https://fortress.wa.gov/ecy/publications/documents/94e36.pdf (last accessed Oct. 18, 2016).

[66] *Available at* http://www.ecy.wa.gov/programs/wq/tmdl/puyallup/do-bod-ammonia.html (last accessed Oct. 18, 2016).

[67] *Available at* http://www.ecy.wa.gov/programs/wq/tmdl/puyallup/moratorium-gen.pdf (last accessed Oct. 18, 2016).

ensure attainment of water quality standards.

The remaining purported TMDLs that Ecology has developed for low dissolved oxygen in Puget Sound watersheds clearly steer away from establishing the much-needed limits for municipal discharge permits and barely, if at all, meet the definition of a TMDL. The Bear-Evans watershed TMDL ostensibly addresses dissolved oxygen impairments.[68] While observing that temperature and nutrients are two of the causes of low dissolved oxygen, the TMDL contains no nutrient load allocations, *id*. at 92 and 100, and merely includes "[r]ecommendations for increased shading, water cooling, and seasonal instream flows . . . as measures to help DO criteria compliance," *id*. at 24. The Johnson Creek Watershed TMDL[69] concluded that low dissolved oxygen was a natural condition, *id*. at 7, despite a finding that there is "a significant amount of runoff from field application of dairy nutrients into surface water," *id*. at 13. There are no permitted sources discharging to the waters covered in this permit therefore the wasteload allocations are zero. *Id*. at 11. For the Nisqually Watershed, despite Ecology's concluding that total phosphorus and nitrogen inputs included anthropogenic sources, the outcome of the purported TMDL was that:

> No load or wasteload allocations will be given in this report for dissolved oxygen or nutrients due to the difficulty in differentiating between natural and anthropogenic sources of nutrients. Recommendations for nutrient controls are included in this report. As per the Washington State Water Quality Standards, dissolved oxygen levels at McAllister RM 5.8 represent natural water quality conditions and shall constitute the dissolved oxygen water quality criteria for McAllister Creek.

Ecology, *Nisqually Watershed Bacteria and Dissolved Oxygen TMDL* (June 2005) at 46.[70]

---

[68] Ecology, *Bear-Evans Watershed Temperature and Dissolved Oxygen Total Maximum Daily Load Water Quality Improvement Report* (Sept. 2008), *available at* https://fortress.wa.gov/ecy/publications/documents/0810058.pdf (last accessed Oct. 18, 2016).

[69] Ecology, *Johnson Creek Watershed Total Maximum Daily Load* (June 2000), *available at* https://fortress.wa.gov/ecy/publications/documents/0010033.pdf (last accessed Oct. 18, 2016).

[70] *Available at* https://fortress.wa.gov/ecy/publications/documents/0510040.pdf (last accessed Oct. 18, 2016).

The Stillaguamish River Basin TMDL established wasteload allocations, measured as BOD_5, for six point sources discharging to creeks within the watershed but stopped short of establishing wasteload allocations for nutrients because "[s]pecific load allocations and wasteload allocations for sources along the two reaches of the mainstem Stillaguamish River identified with DO problems cannot be calculated" despite efforts to model nitrogen, carbon, and phosphorus and despite findings that some point sources are depressing downstream oxygen levels. Ecology, *Stillaguamish River Watershed Fecal Coliform, Dissolved Oxygen, pH, Mercury, and Arsenic Total Maximum Daily Load (Water Cleanup Plan)* (April 2005)[71] at 113, 114 ("For example, Arlington WWTP effluent appears to have an effect on downstream DO concentrations and stimulates periphyton biomass production. The current NPDES permit for the Arlington WWTP five-day BOD load has technology-based limits, and nitrogen and phosphorus loads are not addressed. If seasonal permit limits were 'performance- based' to better reflect the effluent BOD_5 quality since the 1998 upgrade (less than 10 mg/L) and if nitrogen and phosphorus monitoring and treatment planning were written into the permit, then better management alternatives for the effluent treatment and disposal could be developed when natural conditions in the river are better defined.").[72]

Most recently, Ecology issued a TMDL for Clarks Creek,[73] intended to meet dissolved oxygen standards by reducing untreated stormwater, controlling elodea density, and shading

---

[71] *Available at* https://fortress.wa.gov/ecy/publications/documents/0510044.pdf (last accessed Oct. 18, 2016).

[72] The purported TMDL also noted that: "Phosphorus loading in both the lower North Fork and the South Fork Stillaguamish has increased according to trend analyses performed on the Ecology monthly monitoring data. The QUAL2Kw model simulations also suggested that nonpoint and tributary sources in the reach can be significant during low-flow periods. The DO target may not be met until nutrient loads from these sources are reduced or excluded." *Id.* at 114.

[73] Ecology, *Clarks Creek Dissolved Oxygen and Sediment Total Maximum Daily Load* (Dec. 2014), *available at* https://fortress.wa.gov/ecy/publications/documents/1410030.pdf (last accessed Oct. 18, 2016).

streams. *Id*. at 115. Ecology assigned wasteload allocations in the TMDL, as CBOD limits to one hatchery and the surrogate measure of reductions in untreated stormwater volume to three stormwater sources, rather than establishing nutrient load reductions. *Id.* at 114-115. The Clarks Creek TMDL simply perpetuates the limitations of all of Ecology's preceding TMDLs and ensures that any NPDES permits based on any wasteload allocations in those TMDLs is not adequate to meet the requirements for water quality-based permitting.

B. Ecology Continues to Issue the Majority of NPDES Permits for Discharges to Puget Sound and its Tributaries Without Nitrogen Limits

For the vast majority of permits discharging nitrogenous wastes to Puget Sound and its tributaries (approximately 81), Ecology has explicitly asserted that no water quality-based effluent limit is required. Each of these permits includes a statement identical or similar to the following in its fact sheet: "This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water." Ecology, *Fact Sheet for NPDES Permit No. WA0037214 City of Tacoma North End Plant No. 3* (Nov. 10, 2003) at 14; *see also* Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0037214 City of Tacoma North End Plant No. 3* (June 1, 2009) ("Based upon our data review, we believe that the City can safely accept and study loadings (BOD and TSS) higher than its rated capacity."). In other words, Ecology has repeatedly, over numerous permit terms, failed to establish WQBELs for nitrogenous wastes well after its own studies had established that dissolved oxygen levels in Puget Sound are depressed due to these wastes, claiming without basis that technology-based limits are sufficient.

In addition, in some cases, Ecology cited to future TMDLs as a rationale for not including required effluent limits. For example, for the King County Renton South discharge, Ecology stated that it "included additional nutrient monitoring in the proposed permit. Ecology

will use this data if a TMDL is developed for dissolved oxygen; such a TMDL will likely establish waste load allocations for nutrients." Ecology, *Fact Sheet for NPDES Permit WA0029581 King County South Wastewater Treatment Plant* (July 1, 2015) at 39.[74] For the Sound's largest single discharger, Ecology said something similar, while not even conceding a TMDL would, in fact, result in identified reductions:

> Ecology is in the process of modeling the impacts of nutrient discharges from wastewater treatment plants and non-point sources on dissolved oxygen levels in the south Puget Sound. Ecology plans to publish the results of this study in the next several years. The results may impact nutrient control in future permits but since the study is not yet complete, the proposed permit does not include nutrient limits. The proposed permit requires nutrient monitoring to provide data to better inform future permitting decisions.

Ecology, *Fact Sheet for NPDES Permit WA0029181, West Point Wastewater Treatment Plant (WWTP) and Combined Sewer Overflow (CSO) System* (Dec. 19, 2014) at 72. Other fact sheets that cite future TMDLs as the basis for not including current effluent limits include: Carylon Beach, LOTT, Tamoshan, Tacoma Central, Salmon Creek (Burien), King Renton South, Bremerton, Carnation, Arlington, and Friday Harbor.

In yet other instances, Ecology used an unlawful policy that merely capped, but did not reduce, discharges of biological oxygen demand. *See infra* at 82. For example, it concluded that no effluent limits were required for the Tamoshan discharge despite its discharging to waters listed on the 303(d) list for dissolved oxygen because "no TMDL has been conducted, [and therefore] no net increase in the discharge of BOD will be allowed." Ecology, *Fact Sheet for NPDES Permit WA0037290, Facility Name: Tamoshan Sewage Treatment Plant* (Aug. 21, 2003)

---

[74] In this same fact sheet, Ecology acknowledged the role of TMDLs in establishing limits to meet water quality standards:

> In 1992 Ecology issued an ammonia-nitrogen TMDL in the Green/Duwamish system that identified a zero ammonia-nitrogen wasteload allocation for King County's Renton South Plant (except during emergencies and planned short-term maintenance). King County responded to this TMDL by relocating their South Plant WWTP outfall to the Puget Sound.

(hereinafter "*Tamoshan 2003 Fact Sheet*") at 10.[75] Ecology provided no analysis of whether it could legally issue a permit that allowed Tamoshan to continue to contribute to the water quality standards violation.

In 50 of the 103 permits evaluated, Ecology further justified not including nitrogenous effluent limits because, it stated, "[t]he amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water." While in a vague sense this is true, this is mostly meaningless and does not suffice for a finding of no reasonable potential. First, the total oxygen demand of the wastewater is the combination of the CBOD and the nitrogen-based oxygen demand. Calculating them separately does not constitute an evaluation of the effect of the discharge on dissolved oxygen in the receiving water. Second, the total oxygen demand potential of the ammonia discharge requires multiplication because the demand caused by nitrification is 4.57 times that of the ammonia mass. Third, the impact of ammonia discharges on receiving water oxygen levels depends on how much of an oxygen demand is released and how fast that oxygen demands occurs relative to how fast oxygen is brought back into the water from aeration. For example, if the aeration rate is very high, ammonia would quickly be re-aerated, resulting in a smaller oxygen sag, relatively close to the point of discharge. If, on the other hand, aeration is slower, the sag would be greater and extend for a longer period and further away from the point of discharge. In order to understand the oxygen demand of a given ammonia discharge, the permit writer requires information on the depth of the waterbody, its velocity (to understand aeration and nitrification rates), temperature, background levels (to understand assimilative capacity), along with the CBOD (not $CBOD_5$).[76]

---

[75] *Available at* https://fortress.wa.gov/ecy/wqreports/public/f?p=110:1000:2502823666440602::NO:RP:P1000_FACILITY_ID,P1000_FACILITY_NAME:88993798,TAMOSHAN%20STP

[76] For example, Ecology discussed these issues in its Snoqualmie River Basin TMDL at 9: "High water temperatures can naturally create lower D.O. concentrations because of decreased

Given the fact that this boilerplate phrase is used verbatim in nearly every permit fact sheet and accompanied by no further explanation, it is unlikely that it reflects any actual analysis by the permit writers. Unlike permit limits for NBOD+ CBOD, an ammonia-only limit does not address the discharge of nitrogen in the form of nitrate nor the oxygen demand of the nitrification process by ammonia.

C. The LOTT Facility: The Only Direct Discharge to Puget Sound with Nitrogen Limits

The only NPDES permit for a discharge to Puget Sound with water quality-based nitrogen effluent limits is the LOTT sewage treatment plant that discharges to Budd Inlet, which suffers from particularly poor water quality caused, in part, by the replacement of its estuary with the algae-filled, human-made Capitol Lake. Its 1987 permit was the first to mandate the first steps to nitrogen removal by requiring the submission of engineering plans for nitrogen removal facilities, according to a compliance schedule, after which Ecology intended to set limits. *See* Ecology, *NPDES Permit No. WA-003706-1 to City of Olympia, LOTT Sewage Treatment Plant* (Sept. 25, 1987) at 2-3. The requirement for nitrogen controls resulted from a study completed on July 31, 1986—30 years ago. *See* Ecology, *Fact Sheet for Permit No. WA-003706-1* (Aug. 1987) at 3, citing the results of Ecology/URS Corporation, Southern Puget Sound Water Quality Assessment Study, *Comprehensive Circulation and Water Quality Study at Budd Inlet* (July 31, 1986).[77] The study was initiated to determine the cause of low dissolved oxygen in Budd Inlet of Puget Sound; the severity of the impairment was identified as related to

---

gas solubility. However, primary productivity also increases in summer. Photosynthesis can create D.O. supersaturation during the day, and respiration can cause depressed D.O. concentrations at night in productive reaches. Oxygen demand rates also increase with temperature and can cause greater oxygen depletion. Furthermore, D.O. losses from lower reaeration rates can occur when velocities are reduced in pool areas during low flows."

[77] *Available at* https://fortress.wa.gov/ecy/publications/documents/86e37.pdf (last accessed Oct. 18, 2016).

the magnitude and duration of algal blooms that were a result of nitrogenous compounds primarily discharged by LOTT.

The subsequent 1993 LOTT permit was the first to contain a water quality-based nitrogen limit. *See* Ecology, *Fact Sheet for Draft NPDES Permit No. WA-003706-1* (April 15, 1993) at 18. Ecology concluded that "[o]ther than complete discharge elimination the only acceptable option was to establish seasonal nitrogen removal of at least 90 percent using best available technology and to limit the discharge at the facility to 22 mgd average wet weather flow (AFFW). The 90 percent removal was based on mass removal from the effluent." *Id*. This effluent quality was anticipated to be the equivalent of a total inorganic nitrogen (TIN) concentration of 3.0 mg/L. *Id*. at 26. However, Ecology determined later that LOTT could be expected to achieve a 4.0 mg/L TIN limit 90 percent of the time and thus established this as an "interim limitation" to be in place for the first two years of operation. *Id*. Ecology concluded that this limit was to "the best of our ability to predict . . . protective of Budd Inlet." *Id*. at 27. As a consequence, the fact sheet stated that LOTT's performance would be reevaluated and that the limits "will be set as low as possible to protect Budd Inlet from the impacts of nitrogen addition." *Id*. at 27.

The most recent 2005 LOTT permit reduced limits during the summer season based on the utility's use of its Hawks Prairie Reclaimed Water Satellite Plant while increasing discharge during the winter season. *See* Ecology, *Fact Sheet for NPDES Permit WA0037061, LOTT Alliance, Budd Inlet Wastewater Treatment Plan* (Sept. 1, 2005) at 1. The new limits of TIN remained at a 3.0 mg/L monthly average from April through October with interim and final summer loading limits. *Id*. at 22.

However in issuing this most recent permit, Ecology also impermissibly failed to evaluate what water quality-based limits were required to ensure that the discharge met water quality standards, instead observing that in the absence of a TMDL no effluent limit could be

established:

> A TMDL is underway for the Deschutes River/Capital Lake/Budd Inlet system. Depending on the outcome of the TMDL, the waste load allowed to be discharged into Budd Inlet from LOTT will change in this permit. The final water quality based limits determined by the TMDL will likely differ from the estimated final limits in this permit. These water quality based final limits cannot be determined until the TMDL is completed. Once the TMDL is complete, this permit will be modified or reissued to incorporate the new waste load limits. The Department is committed to a timely update to this permit once the TMDL is complete.

Id. at 1.[78] While Ecology uses the word "may" in its characterization of the outcome of the TMDL throughout the fact sheet, it is fairly clear from the same document that the agency understands that, if completed, the TMDL *will* require further reductions. For example, Ecology

---

[78] *See also id. at* 15 ("These final water quality based limits [from the TMDL] may decrease the allowed summer time flows and loadings. These decreases may lower the permitted discharge levels during the critical season, but the actual extent of the decrease cannot be determined until the TMDL is complete."); *id.* at 10 ("When the TMDL is complete, this permit will include water quality-based limitations."); *id*. at 12 ("A TMDL has started for this waterbody. The TMDL will cover the Deschutes River, Capitol Lake, and Budd Inlet. It will cover listings for fecal coliform bacteria, temperature, dissolved oxygen, nutrients, pH, and fine sediment. In 2003 the TMDL effort verified some listings, updated datasets, did recon field studies, and scoped further studies. In 2004 the primary field studies were being done. In 2005 analyses and modeling will be done. Reports will follow. Following completion and approval of the TMDL, the waste load allocations developed by the TMDL will be incorporated into the permit. These final water quality based limits may decrease the allowed summer time flows and loadings. These decreases may lower the permitted discharge levels during the critical season, but the actual extent of the decrease cannot be determined until the TMDL is complete."); *id*. at 14 ("a TMDL for dissolved oxygen in Budd Inlet is underway. In cases like this, it is the Department's practice not to permit any increases in loading to an impaired waterbody that may exacerbate the impairment. Under this guidance, found in the Water Quality Program Permit Writer's Manual (92-109, revised July 2002) Chapter VI, Section 3.3.11, past discharge data from the plant is used to derive a 'performance limit' which represents the existing loadings."); *id*. at 14 ("The performance-based limits will be imposed as interim and final limits. The final limits will be modified to water quality based limits when the TMDL is completed."); *id*. at 15 ("More precise final water quality-based limits for BOD will be identified through the waste load allocation process as part of the TMDL. Once waste load allocations are available, the Department will in a timely manner modify this permit to incorporate those limits."); *id*. at 19 ("Final water quality-based permit limits will be determined when the Budd Inlet TMDL is completed."); *id*. at 28 ("The Department proposes that this permit be issued for up to five years, with the clear intention that the effluent limits will be adjusted by permit modification once the Budd Inlet TMDL process is complete. If the TMDL drives significant changes to the permit, the permit may be revoked and a new permit issued instead."); *id*. at 39 ("With the TMDL for Budd Inlet nearing completion, the Permittee may have even more challenging limits and waste load restrictions in the permit in the next couple of years.").

concluded in 2009 that "[t]he combined effects of current nonpoint sources and the maximum permitted point sources would cause more extensive and severe violations of the water quality standards." Ecology, *Modeling Dissolved Oxygen in Budd Inlet and Capitol Lake* (June 2009).[79] LOTT agrees. *See* LOTT Clean Water Alliance, *TMDL Participation (*hereinafter "*TMDL Participation*"*)* ("LOTT's discharge is one of the few permitted discharges into Budd Inlet. The Water Cleanup Plan could affect LOTT's allowable discharges. If discharge reductions are required, they could be significant and costly for LOTT and its ratepayers.").[80] Given that Ecology knows that the LOTT facility continues to cause or contribute to violations of water quality standards, the issuance of a permit to do so is illegal.

Ecology began working on the Budd Inlet TMDL in April 2003. *Id*. The agency completed a technical study nine years later, in 2012.[81] Although slated to be completed the next year, not only is it not yet completed 14 years after it was started, but now it is not expected to be completed until 2019. *See* Ecology, *Budd Inlet and Capitol Lake (Phase 2) Dissolved Oxygen and Total Phosphorus TMDL Timeline*.[82] Yet, according to LOTT, Ecology is using the computer model that was prepared for LOTT's 1996-98 Scientific Study of Budd Inlet, decades ago. *See TMDL Participation*, *supra* n. 80.

Meanwhile, Ecology reissued the LOTT permit in 2011 with no changes in the effluent limits for nitrogen and no full fact sheet on the basis that a full analysis was not warranted:

---

[79] *Available at* https://fortress.wa.gov/ecy/publications/publications/0903034.pdf (last accessed Oct. 17, 2016). Ecology also concluded that replacing Capitol Lake with an estuary would improve but not resolve Budd Inlet's problems with water quality.

[80] *Available at* http://lottcleanwater.org/about-lott/wastewater-treatment/regulatory-permits/tmdl-participation/ (last accessed Oct. 17, 2016).

[81] Ecology, *Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report Water Quality Study Findings* (June 2012), *available at* https://fortress.wa.gov/ecy/publications/documents/1203008.pdf (last accessed Oct. 17, 2016).

[82] *Available at* http://www.ecy.wa.gov/programs/wq/tmdl/deschutes/advisorycomm/31716DAGmtgBIandCapLkTimeline.pdf (last accessed Oct. 18, 2016).

> The previous fact sheet explains the basis for the discharge and reclaimed water limitations and conditions of the reauthorized permit and remains as part of the administrative record.
>
> * * *
>
> Since the issuance of the current permit, Ecology has not received any additional information which indicates that environmental impacts from the discharge of wastewater or beneficial use of reclaimed water warrant a complete renewal of the permit.
>
> * * *
>
> Ecology . . . determined that it should not rank the facility as a high priority for permit renewal. Ecology assigns a high priority for permit renewals in situations where water quality would benefit from a more stringent permit during the next five-year cycle.
>
> The permit reauthorization process, along with the renewal of high priority permits, allows Ecology to reissue permits in a timely manner and minimize the number of active permits that have passed their expiration dates.

Ecology, *Addendum to the Fact Sheet for National Pollutant Discharge Elimination System (NPDES) and Reclaimed Water Permit No. WA0037061* [LOTT] (Aug. 17, 2011). In response to a public comment that the facility's limits ought to meet CWA requirements now, Ecology stated:

> Once the TMDL is complete, it is likely limits in the NPDES permit will be modified and the TMDL will drive the new permit limits. . . . Unfortunately the TMDL was not complete prior to the permit expiring and needing to be renewed. At present, wasteload allocations for the TMDL are planned to be determined over the next year. The final Water Quality Improvement Report is planned to be submitted to EPA in January 2013. The permit will be modified once the wasteload allocations are final.

Id. at 5-6. Again, Ecology's record demonstrates that it believes that the TMDL will result in more stringent effluent limits, that it issues NPDES permits that fail to meet water quality standards because TMDLs have not been completed, and that the date for completion of this particular TMDL continues to slip. LOTT itself has discussed meeting a total inorganic nitrogen limit of 2.25 mg/L rather than the current 3.0 mg/L, yet Ecology issued the most recent permit without change. *See* LOTT Alliance, *Capital Budget and Capital Improvements Plan* (2007).[83]

[83] *Available at* http://www.lottcleanwater.org/pdf/cip07.pdf (last accessed June 22, 2016).

As is discussed *infra* at 82, the absence of a TMDL cannot excuse an agency from issuing a permit that includes the effluent limitations necessary to ensure that the discharge does not cause or contribute to violations of water quality standards.

D. Ecology's Permits for Discharge of Nutrients to Puget Sound Violate State Requirements to Use AKART

AKART is a technology-based requirement of Washington law that supplements[84] the requirements of the CWA:

> 'AKART' is an acronym for 'all known, available, and reasonable methods of prevention, control, and treatment.' AKART shall represent the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge.

WAC 173-201A-020. The AKART standard is required of all dischargers. RCW 90.54.020(3)(b), 90.54.040; WAC 173-220-130(1)(a); WAC 173-221-010. AKART is also required by Washington's antidegradation policy in its water quality standards. WAC 173-201A-300(2)(d).

Enhanced secondary and tertiary treatment for the removal, control, and treatment of nutrients are known methods of removing nitrogen and phosphorus from effluent. *See, e.g.,* Ecology, *Technical and Economic Evaluation of Nitrogen and Phosphorus Removal at Municipal Wastewater Treatment Facilities* (June 2011) (hereinafter "*Evaluation of Nutrient Removal at WWTP*").[85] These treatments are available methods for removal, control, and treatment of nitrogen. *See, e.g., id.; see also* EPA, Science Advisory Board, *Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board* (Dec. 2007)

---

[84] *See, e.g.*, *ITT Rayonier, Inc. v. DOE,* Pollution Control Hearings Board No. 85-218 (1986) at 7 (AKART is "not [] the equivalent of any federal formulation, but rather as an independent criterion.").

[85] *Available at* https://fortress.wa.gov/ecy/publications/documents/1110060.pdf (last accessed Oct. 17, 2016).

(hereinafter "*SAB 2007 Report*").[86] Finally, these treatments are at least potentially reasonable methods for the removal, control, and treatment of nitrogen. *See Puget Soundkeeper Alliance v. State of Washington*, 102 Wn. App. 783, 792-793, 9 P.3d 892, 897 (2000) (the "reasonableness" prong of AKART limits Ecology "to requiring a system that is both economically and technically feasible."). Ecology cannot determine that nutrient controls are not economically or technically feasible without first making some effort to conduct an evaluation. Therefore, unless demonstrated otherwise for a specific source, the use of enhanced secondary and/or tertiary treatment for removal of nitrogen from sewage is, in fact, AKART.

Yet, Ecology routinely concludes that secondary treatment to meet federal technology-based treatment standards "meets the requirements of AKART." *See, e.g.*, Ecology, [draft] *Fact Sheet for NPDES Permit WA0022527, Vashon Wastewater Treatment Plant* (Sept. 27, 2016) at 10 (Ecology concludes that "[f]ederal and state regulations define technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for domestic wastewater."). Given the Pollution Control Hearings Board's (PCHB) decision in *ITT Rayonier*, it is unclear why Ecology continues to conflate state and

---

[86] *Available at* https://yosemite.epa.gov/sab/sabproduct.nsf/C3D2F27094E03F90852573B800601D93/$File/EPA-SAB-08-003complete.unsigned.pdf (last accessed Nov. 2, 2016). *See id.* at 198-199 ("Biological Nutrient Removal and Enhanced Nutrient Removal technologies for N and P removal are being implemented to reduce N and P concentrations in sewage treatment plant effluent discharge by 50 to 80%. Sewage treatment plant upgrades designed to remove phosphorus typically include enhanced chemical precipitation applied alone or in combination with biological phosphorus treatment and membrane filtration. These types of sewage treatment plant unit operations, which can achieve effluent discharge phosphorus concentrations as low as 0.1 mg/L total phosphorus or less, now constitute the BMP for phosphorus removal at sewage treatment plants."); 199 ("the SAB Panel has calculated that upgrades for large sewage treatment plants in the MARB to achieve total N concentration limits of 3 mg/L could create reductions in N flux from sewage treatment plants . . . about a 64% reduction in annual N flux from sewage treatment plants.") (emphasis added) (internal citations omitted).

federal technology-based requirements.

Ecology routinely cites its own rules to limit AKART to secondary treatment yet those rules clearly establish that any of the requirements of WAC 173-221 are in addition to and supplement the rules of WAC 173-220-130, including the AKART requirements set out at WAC 173-220-130(1)(a). If that were not clear enough, the rules go on to require AKART in an entirely separate and redundant section of this chapter that refers only to domestic wastewater facilities. *See* WAC 173-221-020.[87] *See also In the Matter of City of Bellingham v. Washington Ecology*, PCHB No. 84-211 Final Findings of Fact, Conclusion of Law and Order (June 19, 1985) at 26 ("[N]othing appears in these terse changes [to RCW 90.48.260 amendments of 1979 and 1983] which, in any way, indicates a conscious legislative decision to retreat from the technology-based approach to treatment. Nothing distinguishes between the treatment of discharges to salt water and other discharges. Nothing suggests a separate standard to be applied to municipalities as opposed to commercial and industrial operations."); 27 ("RCW 90.52.040 applies to municipalities."). While the rules interpret AKART in numeric terms with regard to four specific parameters discharged by municipalities (BOD, total suspended solids, fecal coliform, and pH) at levels that reflect federal secondary treatment requirements, the remainder of the parameters and pollutants discharged by municipal treatment facilities are subject to AKART as narrative requirements set out at WAC 173-220-130(1)(a) and WAC 173-221-020. The rules require the permit writer to make a determination that the permit will implement

[87] "Waters of the state shall be of the highest possible quality. Regardless of the quality of the waters of the state, all wastes and other materials and substances proposed for discharge into said waters shall be provided with all known, available, and reasonable methods of treatment prior to discharge. Even though standards of quality would not be violated, wastes and other materials and substances shall not be allowed to enter such waters which will reduce the existing quality thereof, except (1) in those situations where it is clear that overriding considerations of the public interest will be served, and (2) they receive all known, available, and reasonable methods of treatment prior to discharge."

AKART before issuing the permit. WAC 173-220-130(1)(1) ("[a]ny permit issued by the department shall apply and insure compliance with . . .").

In the case of a recent challenge to a permit for a municipal discharge to the Spokane River, Ecology asserted that tertiary treatment for the removal of nutrients is AKART. As the PCHB concluded:

> The advanced tertiary treatment technology employed at the Facility is AKART and will result in high quality removal of PCBs, as well as address the requirements of the DO TMDL and the 1998 Dissolved Metals TMDL. By providing tertiary treatment, the Facility offers the most advanced treatment of effluent available and deploys the best currently available treatment technology to reduce the discharge of PCBs to the Spokane River at potentially undetectable levels.

Sierra Club v. Washington, PCHB No. 11-184, Findings of Fact, Conclusions of Law and Order (July 19, 2013) at 9 (emphasis added) (internal citations omitted), 25 (reiterating that state-of-the-art tertiary treatment constitutes AKART). The treatment technology determined to be AKART for Spokane County was a "step-fed nitrification/denitrification treatment system with membrane filtration and chlorination, also referred to as advanced tertiary treatment." *Id*. at 9. This finding is consistent with an early definition of AKART by the PCHB. *See ITT Rayonier, Inc. v. DOE*, PCHB No. 85-218 (1986) at 15 ("In general, this [AKART] standard requires that pollutant discharges be limited to levels achievable by proven technology."); *see also In the Matter of City of Bellingham* at 4 ("technology-based limits on effluent provide a hedge against unknown long-term adverse consequences of discharges which are not accounted for in present water quality standards."). Tertiary treatment is proven technology and therefore constitutes AKART under state law for municipal dischargers regardless of the quality of the receiving water.[88] Enhanced secondary and tertiary treatment for the removal of nutrients are not unusual,

[88] In *IIT Rayonier*, the PCHB also observed that costs may not be a relevant factor in determining AKART "until an advanced level of technology" is demanded and noted in that instance "[t]he level of technology required here is not unusual, innovative or even highly advanced." *Id*. at 17.

innovative (necessarily), or highly advanced. If tertiary treatment is within a zone of reasonableness for a municipal discharger to the Spokane River, it is unclear why it is not within the same zone of reasonableness for a municipal discharger to Puget Sound.

The state requirement to meet AKART also pertains to the lawfulness of Ecology's mixing zones in NPDES permits. Not only is AKART a state technology-based effluent limitation, but AKART is part of the state's antidegradation policy and thus a part of state water quality standards. WAC 173-201A-300(2)(d) (The purpose of the antidegradation policy is to "[e]nsure that all human activities that are likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART)"). As a consequence, Ecology permit writers are also legally precluded from issuing permits with mixing zones for nitrogenous wastes and impacts to dissolved oxygen to Puget Sound dischargers for several reasons. First, under Washington law, a mixing zone may only be authorized where a "discharger shall be required to fully apply AKART." WAC 173-201A-400(2); *BNSF Railway Co. v. Washington Ecology*, PCHB No. 11-150, Order on Summary Judgment (Dec. 4, 2012) at 20 ("Ecology's regulation governing mixing zones does require a showing that the applicant has fully implemented AKART before a mixing zone may be granted."). The most current methodology for preventing, controlling, or abating the nitrogenous waste pollutants—DIN, Total Kjeldahl Nitrogen, nitrate+nitrite, ammonia, ammonium, etc.—is one or more forms of enhanced secondary and/or tertiary treatment. *See, e.g.*, Ecology, *Control of Toxic Chemicals in Puget Sound Phase3: Pharmaceuticals and Personal Care Products in Municipal Wastewater and Their Removal by Nutrient Treatment Technologies* (Jan. 2010) (hereinafter "*Phase 3 Nutrient Treatment Removal of Toxics*");[89] Ecology, *Evaluation of Nutrient Removal at WWTP*, *supra* n. 85. Extremely few

[89] *Available at* https://fortress.wa.gov/ecy/publications/publications/1003004.pdf (last accessed Oct. 17, 2016).

of the permittees that discharge nitrogenous wastes to Puget Sound or its tributaries currently employ either of these treatments. Therefore, they are not using AKART to prevent, control, or abate the pollutants they discharge and they cannot be authorized mixing zones for nitrogenous wastes under Washington law.

Second, "[n]o mixing zone shall be granted unless the supporting information clearly indicates the mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health as determined by the department." WAC 173-201A-400(4). The cumulative discharge of nitrogenous wastes to Puget Sound by all permittees has been determined to violate dissolved oxygen standards, to substantially interfere with the existing and designated uses, and to be damaging to the ecosystem, all findings that legally preclude a permit writer from authorizing a mixing zone. The mixing zone rule places the burden to justify a mixing zone on the permit writer yet in no fact sheet reviewed has Ecology attempted to demonstrate that the use of a mixing zone will not have the effect of authorizing damaging pollution.

Third, Ecology permit writers could not authorize a mixing zone for nitrogenous wastes because to do so would violate water quality criteria for which the mixing zone was authorized. *See* WAC 173-201A-400(5). Finally, by issuing mixing zones unlawfully, Ecology is issuing permits that are not consistent with the requirements to assess reasonable potential. *See* 40 C.F.R. § 122.44(d)(1)(ii) ("When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria . . . the permitting authority shall use procedures which account for . . . <u>where appropriate, the dilution of the effluent in the receiving water</u>.") (emphasis added). In permits to discharge wastes that are causing or contributing to violations of water quality standards in Puget Sound, it is not appropriate to consider dilution. Thus, all of Ecology's permits to Puget Sound

dischargers of nitrogenous wastes that are based on mixing zones are unlawful.

VI. ECOLOGY'S REFUSAL TO CONTROL NITROGEN POLLUTION IN PUGET SOUND IS CONTRARY TO THE CLEAN WATER ACT AND IMPLEMENTING REGULATIONS

NPDES permits are required to implement any applicable water quality standards. 33 U.S.C. § 1311(b)(1)(C); 40 C.F.R. §§ 122.4, 122.44(d). States, such as Washington, that are authorized to issue NPDES permits must apply and insure compliance with these requirements. 33 U.S.C. § 1342(b)(1)(A). Although nutrients are a known national water quality problem that affects Washington waters and despite EPA's having urged the states to adopt numeric nutrient criteria, Ecology has asserted its preference to regulate nutrient pollution through its water quality effects, primarily on dissolved oxygen. This preference, however, has not been manifested in water quality-based effluent limits in the NPDES permits that Ecology has issued to Puget Sound dischargers.

A. Applicable Water Quality Standards

Water quality standards are defined as the designated beneficial uses of a water body, in combination with the numeric and narrative criteria to protect those uses, and an antidegradation policy. 40 C.F.R. § 131.6. The CWA requires numeric criteria adopted in water quality standards to protect the "most sensitive use." 40 C.F.R. § 131.11(a)(1).

However, since that is not always possible, the task of evaluating whether standards have been met also requires an assessment of the impacts to designated beneficial uses. In *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 114 S. Ct. 1900, 1912 (1994), the U.S. Supreme Court underscored the importance of protecting beneficial uses as a "complementary requirement" that "enables the States to ensure that each activity—even if not foreseen by the criteria—will be consistent with the specific uses and attributes of a particular body of water." The Supreme Court explained that numeric criteria "cannot reasonably be expected to anticipate all of the water quality issues arising from every activity which can affect

the State's hundreds of individual water bodies." *Id.*[90] In short, a permitting agency cannot ignore the narrative criteria and use only numeric criteria where either numeric criteria do not exist or where the numeric criteria fall short of providing full support for designated uses.

Washington's water quality standards for marine waters including Puget Sound are intended to be "consistent with public health and public enjoyment of the waters and the propagation and protection of fish, shellfish, and wildlife, pursuant to the provisions of chapter 90.48 RCW." WAC 173-201A-010(1). As in federal law, Washington's regulations make the legal definition of a water quality standard very clear: "All surface waters are protected by numeric and narrative criteria, designated uses, and an antidegradation policy." WAC 173-201A-010(1)(a). In addition, the state rules clarify that:

---

[90] EPA regulations implementing section 303(d) of the CWA reflect the independent importance of each component of a state's water quality standards:

> For the purposes of listing waters under §130.7(b), the term "water quality standard applicable to such waters" and "applicable water quality standards" refer to those water quality standards established under section 303 of the Act, including numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements.

40 C.F.R. § 130.7(b)(3). When EPA adopted these regulations it clearly stated the expectations it had of states:

> In today's final action the term "applicable standard" for the purposes of listing waters under section 303(d) is defined in § 130.7(b)(3) as those water quality standards established under section 303 of the Act, including numeric criteria, narrative criteria, waterbody uses and antidegradation requirements. In the case of a pollutant for which a numeric criterion has not been developed, a State should interpret its narrative criteria by applying a proposed state numeric criterion, an explicit State policy or regulation (such as applying a translator procedure developed pursuant to section 303(c)(2)(B) to derive numeric criteria for priority toxic pollutants), EPA national water quality criteria guidance developed under section 304(a) of the Act and supplemented with other relevant information, or by otherwise calculating on a case-by-case basis the ambient concentration of the pollutant that corresponds to attainment of the narrative criterion. Today's definition is consistent with EPA's Water Quality Standards regulation at 40 CFR part 131. EPA may disapprove a list that is based on a State interpretation of a narrative criterion that EPA finds unacceptable.

> Compliance with the surface water quality standards of the state of Washington requires compliance with chapter 173-201A WAC, Water quality standards for surface waters of the state of Washington, chapter 173-204 WAC, Sediment management standards, and applicable federal rules.

WAC 173-201A-010(4). The designated uses for marine waters are set out at WAC 173-201A-612, Table 612.

Current dissolved oxygen criteria applicable to Puget Sound waters are set out at WAC 173-201A-210(1)(d). Table 210(1)(d) sets out criteria ranging from 4.0 mg/L to 7.0 mg/L depending upon which of four categories of water quality has been assigned to the waterbody, ranging from "fair quality" to "extraordinary quality." In addition, "[w]hen a water body's D.O. is lower than the criteria in Table 210 (1)(d) (or within 0.2 mg/L of the criteria) and that condition is due to natural conditions, then human actions considered cumulatively may not cause the D.O. of that water body to decrease more than 0.2 mg/L." WAC 173-201A-210(1)(d)(i). The following general policies also apply:

> Upstream actions must be conducted in manners that meet downstream water body criteria. Except where and to the extent described otherwise in this chapter, the criteria associated with the most upstream uses designated for a water body are to be applied to headwaters to protect nonfish aquatic species and the designated downstream uses.

WAC 173-201A-260(3)(b). And, the following narrative criterion applies:

> Toxic, radioactive, or deleterious material concentrations must be below those which have the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health[.]

WAC 173-201A-260(2)(a) (hereinafter "narrative criterion").

Finally, Washington's water quality standards contain an antidegradation policy, the purpose of which is to "[r]estore and maintain the highest possible quality of the surface waters of Washington" and "apply to human activities that are likely to have an impact on the water quality of a surface water." WAC 173-201A-300(2)(a), (c). To ensure this outcome, Tier I of the antidegradation policy "is used to ensure existing and designated uses are maintained and

protected and applies to all waters and all sources of pollution." *Id*. (2)(e)(i). Tier I requires:

> (1) Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in this chapter.
> (2) For waters that do not meet assigned criteria, or protect existing or designated uses, the department will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

WAC 173-201A-310. Federal regulations explain the meaning of "existing uses" that may not be designated uses: Tier I requires the maintenance and protection of "[e]xisting instream water uses and the level of water quality to protect the existing uses[.]" 40 C.F.R. § 131.12(a)(1). Existing uses are "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." 40 C.F.R. § 131.13(e).

B. Ecology Has Forgone the Development of Numeric Nutrient Criteria in its Water Quality Standards Claiming that it Uses Dissolved Oxygen and Algal Growth as Surrogates

EPA has repeatedly urged states to adopt numeric nutrient criteria with little effect. *See, e.g.,* EPA Office of Inspector General, *Evaluation Report: EPA Needs to Accelerate Adoption of Numeric Nutrient Water Quality Standards*, Report No. 09-P-0223 (Aug. 26, 2009).[91] As the Inspector General's report found, "[i]n 1998, EPA stated that a critical need existed for improved water quality standards, given the number of waters that were impaired from nutrients" yet that effort has been "ineffective" and EPA "has not held the States accountable." *Id*. at At a Glance, 5.

The history of EPA's effort began in 1998, when it outlined a strategy to describe how the agency would develop nutrient information and work with the states to adopt numeric nutrient criteria in order to implement President Bill Clinton and Vice President Al Gore's Clean Water Action Plan, released in February 1997. *See* EPA, *National Strategy for the Development*

---

[91] *Available at* https://www.epa.gov/sites/production/files/2015-01/documents/oigreport-nutrients.pdf (last accessed Oct. 17, 2016).

of Regional Nutrient Criteria (June 1998). EPA published 304(a) recommended criteria for nutrients in early 2001. 66 Fed. Reg. 1671 (Jan. 9, 2001). At the time, EPA recommended that states develop nutrient criteria plans to demonstrate how and when they would adopt numeric nutrient crieria. *Id.* In 2001, EPA issued a memo that provided additional guidance to states for developing nutrient criteria plans, the role of the plans, and EPA's expectations for the time frame in which states would develop their plans and adopt nutrient criteria. *See* Memorandum from Geoffrey Grubbs, Director, Office of Science and Technology, EPA Re: *Development and Adoption of Nutrient Criteria into Water Quality Standards* (Nov. 14, 2001). In the memo, EPA reminded states and EPA regions that the federal register notice had stated that:

> EPA intends to propose to promulgate nutrient water quality criteria, relying substantially on EPA's section 304(a) water quality criteria, by the end of 2004, where States and authorized tribes have not substantially completed their adoption of such criteria according to the plan completed by the end of 2001, if the Administrator determines that such new or revised standards are necessary to meet the requirements of the Clean Water Act.

Id. at 9 (quoting the federal register notice).

In 2007, EPA issued a national update on states' development of numeric nutrient criteria and described EPA's commitment to accelerating the pace of progress. Memorandum from Benjamin Grumbles, Assistant Administrator, Office of Water, EPA, Re: *Nutrient Pollution and Numeric Water Quality Standards* (May 25, 2007).[92] EPA pointed out that numeric nutrient criteria were important for a number of reasons including making it "easier to write protective NPDES permits." *Id.* at 2. The memo noted that to be effective, nutrient criteria needed to address "*causal* (both nitrogen and phosphorus) and *response* (chlorophyll-a and transparency) variables" and noted that alternatives to these four parameters were acceptable if they were scientifically defensible and protective of the designated uses. *Id.* at 2-3 (emphasis in original).

---

[92] *Available at* https://www.epa.gov/sites/production/files/documents/nutrient_policy2007.pdf (last accessed Oct. 17, 2016).

Washington was classified as "just starting" the criteria adoption process. *Id*. at 8.

A year later, EPA published the first national report on progress made by states, again reiterating the importance to writing NPDES permits and citing hypotic events in Washington's Hood Canal as an example of the importance of numeric nutrient criteria. EPA, *State Adoption of Numeric Nutrient Standards (1998–2008)* (Dec. 2008)[93] at 4. The report noted that Washington had established no dates by which it intended to adopt numeric criteria for nutrients. *Id*. at A-55.

In 2011, EPA published yet another memo reaffirming its commitment to partnering with states to address nitrogen and phosphorus pollution and setting out a framework for states to use to reduce nitrogen and phosphorus pollution while also developing numeric criteria. The framework provides for: prioritizing watersheds on a statewide basis for nitrogen and phosphorus loading reductions, ensuring effectiveness of point sources permits for "Municipal and Industrial Wastewater Treatment Facilities that contribute to significant measurable N & P loadings," integrating innovative approaches onto agricultural practices, identifying and using government tools to assure reductions in stormwater and septic systems, verifying that load reductions are in place and the measures implemented are effective, and developing a plan for adoption of numeric nutrient criteria. Memorandum from Nancy Stoner, Acting Assistant Administrator, Office of Water, EPA, to Regional Administrators, Regions 1-10, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* (March 16, 2011).[94]

More recently, EPA issued yet another memorandum to states urging the same exact

---

[93] *Available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/P1002TQ0.PDF?Dockey=P1002TQ0.PDF (last accessed Oct. 17, 2016).

[94] *Available at* https://www.epa.gov/sites/production/files/documents/memo_nitrogen_framework.pdf (last accessed Oct. 18, 2016).

actions set out in the 2011 Stoner framework and reminding states that controlling nutrient pollution is a "pressing need" to address a "growing threat." *See* Memorandum from Joel Beauvais, Deputy Assistant Administrator, Office of Water, EPA to State Environmental Commissioners, State Water Directors, Re: *Renewed Call to Action to Reduce Nutrient Pollution and Support for Incremental Actions to Protect Water Quality and Public Health* (Sept. 22, 2016).[95] Once again EPA has asked states to identify high-priority actions they will take, to prioritize watersheds for nutrient load reductions, to develop numeric nutrient criteria, and to use the "important tool under the CWA . . . [of] issuing NPDES permits for point sources that limit nutrient dischargers into priority waters." *Id*. at 4.

In 2013, EPA developed a website to show state progress on developing numeric nutrient criteria. The site shows that Washington has made no progress. *See* EPA, *State Development of Numeric Criteria for Nitrogen and Phosphorus Pollution.*[96] In response to EPA's urging the development of numeric nutrient criteria, Ecology has claimed that it need not establish numeric criteria because it is relying on dissolved oxygen and algal growth instead:

> Due to a lack of data in estuaries and the known highly complex relationship between nutrients and trophic health in marine systems, statewide criteria were not recommended for marine waters. Ecology has chosen an alternative pathway for the control of nutrient concentrations in marine systems that relies on other indicators and triggers for trophic health, and more water body specific modeling to select nutrient threshold values.
>
> * * *
>
> A primary driver in marine waters for setting the agency's priorities is the failure to comply with dissolved oxygen criteria. Paramount to this issue is the role that is played by excessive nutrient contributions from tributaries and point sources in these waters. Several large sectors of Puget Sound have been modeled to date with the focus on where problems with dissolved oxygen and excess algal production have been found to exist.

---

[95] *Available at* https://www.epa.gov/sites/production/files/2016-09/documents/renewed-call-nutrient-memo-2016.pdf (last accessed Oct. 18, 2016).

[96] *Available at* https://www.epa.gov/nutrient-policy-data/state-development-numeric-criteria-nitrogen-and-phosphorus-pollution#tb5 (last accessed Oct. 17, 2016), state search set to "Washington."

Ecology, *Nutrient Criteria Development in Washington State: Phosphorus* (April 2004)[97] at 37. EPA responded to this purported plan by documenting a "mutual agreement" that Washington would complete numeric nutrient criteria in "agreed upon timeframes." Letter from Michael F. Gearheard, Director, Office of Water and Watersheds, Region 10, EPA to Dave Peeler, Water Quality Program Manager, Ecology, Re: *EPA/State Mutual Agreement on Numeric Nutrient Criteria Development Plan for Washington State* (Sept. 14, 2005) at 1. Nothing in Washington's plan, however, even suggested that the state intended to develop numeric criteria for nutrients let alone established a timeframe in which it would do so. It is mystifying as to why EPA "applaud[ed]" the state for this "significant commitment of time and resources towards completion of this endeavor," in the absence of any state commitment whatsoever.

Moreover, as this petition demonstrates, Ecology has wholly misled EPA in claiming to use an "alternative pathway" to control nutrients. In fact, many years of data collection, studies, and modeling have been completed and Ecology's so-called alternative pathway has yielded no TMDLs with wasteload allocations, no alternative management strategies either consistent or inconsistent with the Clean Water Act, and only two direct dischargers to Puget Sound—of the 75 municipal and industrial direct dischargers—with effluent limits for nitrogen, neither of which is intended to protect water quality of the Sound. And, in one permit fact sheet, Ecology even stated that no phosphorous limit would be included in the permit specifically due to the state's lack of a numeric criterion:

> The TMDL does not require a waste load allocation for soluble reactive phosphorus (SRP), however it includes a recommended goal of 3 lb/day for this discharge. Ecology does not enforce recommended waste load allocation goals as permit limits. Additionally, Washington has not yet adopted numeric criteria for phosphorus. Therefore this permit does not include a phosphorus limit. The permit continues to require phosphorus monitoring to assess potential compliance measures in the future.

---

[97] *Available at* https://fortress.wa.gov/ecy/publications/publications/0410033.pdf (last accessed Oct. 17, 2016).

Ecology, *Fact Sheet for NPDES Permit WA0032182 King County Carnation Wastewater Treatment Facility* (Dec. 13, 2013) (emphasis added).

C. NPDES Permits Issued by Ecology Fail to Conform to Clean Water Act Requirements to Ensure They do Not Cause or Contribute to Violations of Water Quality Standards

The NPDES permits that Ecology issues to dischargers to Puget Sound and its tributaries fall far short of meeting CWA requirements. First, Ecology relies on the use of TBELs for carbonaceous oxygen-demanding materials as a substitute for conducting reasonable potential analysis on nitrogenous oxygen-demanding materials when these technology-based limits were never established for the purpose of controlling the discharge of the nitrogenous wastes and do not, in fact, perform that function. Second, Ecology pays lip service in its fact sheets that accompany the permits to the need to evaluate far-field effects on water quality when addressing discharges' impacts on dissolved oxygen, yet not a single permit conducts this analysis. Third, Ecology also mentions in its fact sheets the requirements to address narrative criteria but in no case does one of its fact sheets actually address the impacts of the discharges on narrative criteria compliance. Fourth, none of Ecology's permits use procedures, as required, to account for existing controls, or lack thereof, on point and nonpoint sources of nitrogen. Last, while referring to Washington's antidegradation policy in its fact sheets, in no instance does Ecology evaluate compliance with Tier I of the antidegradation policy when issuing permits.

1. Technology-Based Limits for Carbonaceous Oxygen-Demanding Materials are Not Intended to and Do Not Prevent the Discharge of Nitrogenous Oxygen-Demanding Materials

Every permit issued by Ecology to a municipal sewage treatment plant has TBELs on the five-day level of oxygen demand of the effluent (BOD_5) or the five-day level of oxygen demand with any nitrogenous portion chemically suppressed ($CBOD_5$). They may, in addition, have water quality-based limits for BOD_5 or $CBOD_5$ and they may have water quality-based limits on ammonia to prevent toxicity to aquatic life. None of these limits individually or together is

sufficient to comprise limits on nitrogenous oxygen-demanding materials discharged to Puget Sound directly or via its tributaries.

The first step in water quality-based permitting is to determine whether the TBELs are adequate to ensure the discharge does not violate water quality standards. By definition, the TBELs for the discharge of oxygen-demanding materials do not address nitrogenous materials. Ultimate or total biological oxygen demand is comprised of two components: carbonaceous and nitrogenous. The carbonaceous portion of the waste dominates the initial oxygen demand of the discharge with little or no contribution from the nitrogenous materials in the first five days. Given that TBELs are generally set at either the five-day level of oxygen demand of the effluent, whether BOD_5 or the $CBOD_5$, these limits logically do not control the effects of the discharge after the five day period, namely when the discharge demonstrates the majority of its effects from the nitrogen content. While the use of the BOD_5 limit, as opposed to the $CBOD_5$ limit, allows an operator to run a facility to passively remove nitrogenous wastes without penalty, that limit does not function as a limit on the discharge of nitrogenous wastes nor does it quantify the degree to which they may unintentionally be limited.

Therefore, when Ecology routinely asserts in its NPDES permit fact sheets that the use of BOD_5 or $CBOD_5$ TBELs "will ensure that dissolved oxygen criteria are met in the receiving water,"[98] it is failing entirely to account for the effect on dissolved oxygen from the discharge of nitrogenous wastes. In making such statements, Ecology is effectively pretending that it has not actually concluded in its numerous studies that nitrogen in Puget Sound is causing violations of the dissolved oxygen water quality standards.

---

[98] *See, e.g.*, Ecology, *Boston Harbor Fact Sheet* (Feb. 1, 2012) at 20 ("With technology-based limits, this discharge results in a small amount of biochemical oxygen demand (BOD_5) relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.") This language is repeated in nearly every fact sheet.

Ecology's failure to conduct a reasonable potential analysis for nitrogen discharges is not saved by the off-repeated and vacuous observation in its fact sheets that "[t]he amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water," *id*., if no further evaluation is made of whether there is reasonable potential for that ammonia-based nitrogen to cause or contribute to violations of water quality standards and to place effluent limits on it if it is. Nor is it saved by the inclusion of water quality-based ammonia or "ammonia as N" effluent limits, *see supra* 40. Of the 14 dischargers with effluent limits related to three TMDLs developed in the 1990s, *see supra* 41, eight have ammonia limits but no nitrogen limits.[99] As the State-EPA Task Group observed in 2009, "[a]lthough 43.5 percent of POTW permits have limits for ammonia, limiting ammonia generally does not reduce overall nitrogen loadings because nitrates and nitrites continue to be discharged." *An Urgent Call to Action*, *supra* n. 4, at 14 (emphasis added).

Despite its failure to conduct this required analysis when issuing NPDES permits, Ecology simultaneously appears to agree that the BOD_5 and $CBOD_5$ effluent limits do not provide any limits on the nitrogenous oxygen demand created by discharges of treated sewage to Puget Sound and that the BOD_5 test and limit simply do not provide any useful information on either the total nitrogen oxygen demand (NOD) or Ultimate BOD, nor any limit on either. As Ecology's guidance makes clear,

> unless Ecology identified a problem in receiving water quality, a facility has no obligation to remove nitrogenous oxygen-demanding substances from its wastewater. USEPA's longstanding 30 mg/L BOD_5 effluent limit was not intended to force removal of nitrogenous pollutants. It was intended for carbonaceous pollutants. The newer federal rule and Chapter 173-221 WAC clarify that intent, and eliminate the need for facilities to remove these

[99] Of the discharges subject to the Puyallup TMDL, only Orting has NBOD+CBOD limits; Carbonado, Enumclaw, South Prairie, Sumner, and Wilkerson do not. Of the discharges subject to the Snohomish River Estuary TMDL, Everett, Lake Stevens, and Snohomish have NBOD+CBOD limits; Marysville does not. Of the discharges subject to the Snoqualmie TMDL, Duvall and North Bend have NBOD+CBOD limits; Carnation and Snoqualmie do not.

nitrogenous pollutants.

Ecology, *Water Quality Program Permit Writer's Manual* (rev. Jan. 2015) (hereinafter "*Ecology Manual*") at 148 (emphasis added).[100]

WQBELs are required to ensure that permits that allow discharges of nutrients to Puget Sound do not contribute nutrients that cause or contribute to violations of water quality standards in part because EPA has rejected attempts to amend the definition of technology-based secondary treatment to include removal of nitrogenous wastes. EPA has repulsed such efforts based explicitly on its assertion that WQBELs are and would continue to be established to address nitrogen in individual permits—the very action that has not taken place in Washington. *See, e.g., Maier v. EPA*, 114 F.3d 1032, 1036 (10th Cir. 1997) ("The EPA maintained that [nitrogen oxygen demand (NOD)] would be better dealt with on a case-by-case basis in NPDES permitting. The EPA therefore characterized NOD controls as a form of "advance treatment" to be imposed by permit where necessary. The EPA also noted that total impact on dissolved oxygen level (ultimate BOD) is to be considered in the NPDES permitting process.") (internal citations omitted).[101] The basis for EPA's steadfast position has been that:

> The CWA requires application of effluent limitations for nutrients that are met by using advanced treatment where necessary to meet applicable water quality standards. . . . Specifically, where secondary treatment is insufficient to protect the quality of the receiving waterbody, POTWs must meet any more stringent water quality-based effluent limits derived to achieve water quality standards.
>
> The EPA's long-held view, consistent with the requirements of the CWA, is that given the site-specific variation in technological feasibility and costs of nutrient treatment systems, as well as how aquatic ecosystems respond to nutrient

---

[100] *Available at* https://fortress.wa.gov/ecy/publications/documents/92109.pdf (last accessed Oct. 18, 2016).

[101] EPA contradicted itself, however, in the Nutrient Innovations Task Group Report in which numerous EPA managers and staff from headquarters and regional offices participated. The report concluded that of the tools available to reduce nutrient loading, "establish[ing] technology treatment requirements for nutrients" was ranked among the top five. *An Urgent Call to Action, supra* n. 4 at 21, C-6 (emphasis added).

> additions, POTW nutrient discharges are best addressed through water quality-based permitting.
>
> * * *
>
> In many areas water quality-based permit limits can prevent or correct nutrient-related impairments more effectively than national technology-based nutrient limits due to site-specific variability of waterbody response to nutrients.

Letter from Michael H. Shapiro, Deputy Assistant Administrator, Office of Water, EPA, to Ann Alexander, Natural Resources Defense Council (Dec. 14, 2012) at 6. In fact, based on EPA's assertions, the Tenth Circuit Court of Appeals concluded that "the EPA and the States approved to administer the NPDES permit program routinely impose NOD and nutrient limitations on POTWs on a case-by-case basis by permit." *Maier* at 1043 (emphasis added), *see also id.* at 1044 ("Congress has, in this closely related statutory section, provided for water quality-based permitting as a gap-filling measure [that] gives strong support to the EPA's exercise of delegated authority to fill the gap where it has concluded that NOD should not be part of standard secondary treatment."); 1045 ("[it] is being dealt with—by permit."). No such routine use of WQBELs for nitrogen is in evidence for Puget Sound.[102]

With regard to discharges of nitrogenous wastes to Puget Sound, neither Ecology, nor EPA in its oversight role, can rely on technology-based limits established to control carbonaceous oxygen-demanding effects to provide assurance that discharges of nitrogenous materials will not cause or contribute to violations of water quality standards pertaining to nitrogen-driven oxygen demand. Instead, each permit that is causing or contributing to the violations of water quality standards in Puget Sound must contain a WQBEL for nitrogen.

2. Nitrogen Discharges Must be Evaluated for Their Far-Field Effects on Water Quality and Failing to Conduct this Analysis is a Failure to Assess Reasonable Potential

A permitting agency does not resolve the question of whether a discharge is causing or

[102] It is also not true with regard to the nation. As of 2009, only 4 percent of the 16,500 municipal discharge permits contained numeric limits for nitrogen and only 9.9 percent of them had phosphorus limits. *See An Urgent Call to Action, supra* n. 4 at 14.

contributing to a violation of standards by merely looking at whether the point of discharge is on the state's 303(d) list for a parameter or pollutant discharged or affected by a parameter or pollutant in the discharge. *See supra* 13. Instead, the agency must consider the nature of the parameter or pollutant discharged and how it is anticipated to affect water quality. Nitrogen discharges are among those pollutants that have a far-field effect, generally many days after discharge, creating impacts on dissolved oxygen and algal growth—which can be both deleterious by itself and contribute to lowered dissolved oxygen—far away from the point of discharge. *See, e.g.*, *EPA Manual*, *supra* n. 14, at 176 ("Nutrients are another class of pollutants which would be examined for impacts at some point away from the discharge. The special concern is for those water bodies quiescent enough to produce strong algae blooms. The algae blooms create nuisance conditions, dissolved oxygen depletion, and toxicity problems (i.e., red tides or blue-green algae); *id*. at 198 ("[pollutants] such as BOD may not reach full effect on dissolved oxygen until several days travel time down-river.").

EPA Region 5 has spelled out the process for evaluating and deriving effluent limits for nutrients consistent with federal law more clearly and specifically:

> EPA expects that Illinois EPA will follow 40 CFR § 122.44(d) when it develops permits for nutrient discharges. Specifically, Illinois EPA must: (1) determine whether nutrient discharges will cause, have a reasonable potential to cause, or contribute to an excursion beyond the criteria [in state water quality standards] in proximate and downstream waters; and (2) set nutrient effluent limitations which are derived from and comply with [state water quality standards], as applicable, when it makes an affirmative determination. In addition, Illinois EPA must: (1) determine whether nutrients, either alone or in combination with carbonaceous biochemical oxygen demand (CBOD) and ammonia, will cause, have a reasonable potential to cause, or contribute to an excursion beyond the criteria [at state water quality standards] in proximate and downstream waters; and (2) set nutrient effluent limitations which, either alone or in combination with limits on CBOD, ammonia, and/or dissolved oxygen, are derived from and comply with [state water quality standards] when it makes an affirmative determination.

Letter from Tinka G. Hyde, Director, Water Division, Region 5, EPA to Marcia Willhite, Illinois Environmental Protection Agency (Jan. 21, 2011) at 2 (citations omitted).

For pollutants such as nutrients, the Environmental Appeals Board (EAB) has held that a source's contributing to loading of a pollutant that has been identified to be causing a water quality impairment is sufficient to support a reasonable potential determination:

> The plain language of the regulatory requirement (that a permit issuer determine whether a source has the "reasonable potential to cause or contribute" to an exceedance of a water quality standard) does not require a conclusive demonstration of "cause and effect." *See In re Upper Blackstone Water Pollution Abatement Dist*., NPDES Appeal Nos. 08-11 through 08-18 & 09-06, slip op. at 31-34 & n.29 (EAB May 28, 2010), 14 E.A.D. ___.

In re Town of Newmarket, NPDES Appeal No. 12-05, slip op. at 54 n.23 (EAB Dec. 2, 2013). For this reason, a near-field dilution analysis that only addresses the most immediate oxygen-consuming effects of the discharge is inconsistent with legal requirements. In a recently-issued draft fact sheet, Ecology appeared to recognize this limitation:

> Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). . . . a pollutant such as BOD_5 is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

Ecology, *Fact Sheet for Hartstene Pointe Wastewater Treatment Plant National Pollutant Discharge Elimination System (NPDES) Permit WA0038377* (May 16, 2016) (hereinafter "*Hartstene Pointe Fact Sheet*") at 21.[103] Yet, on the very next page of the fact sheet, Ecology explained how it had "determined the impacts of dissolved oxygen deficiency . . . using the dilution factors in the above table." *Id*. at 22, tbl 10. Any consideration of dilution concerns near-field impacts and is irrelevant to far-field analysis. For Ecology to have failed to evaluate the effects of the discharge on dissolved oxygen beyond an initial dilution analysis is for

---

[103] *Available at* https://fortress.wa.gov/ecy/wqreports/public/f?p=110:1000:237560 9562720548::NO:RP:P1000_FACILITY_ID,P1000_FACILITY_NAME:12422,HARTSTENE%20POINTE%20STP. This language is common to Ecology fact sheets issued with NPDES permits.

Ecology to have failed to conduct the very investigation that it acknowledged is required. In lieu of conducting the required reasonable potential analysis, Ecology merely observed that:

> With technology-based limits, this discharge results in a small amount of BOD_5 relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

Id. at 22. Relying on a dilution analysis for a far-field pollutant and basing effluent limits on TBELs that are not intended to address the pollutant and parameters at issue is the equivalent of failing to conduct the analysis required by the regulations. Ecology's establishing limits based on BOD_5 or $CBOD_5$ ignores the separate effects of carbonaceous oxygen demand and nitrogenous oxygen demand on Puget Sound waters and controls only the former. The full effect of nitrogenous oxygen demand, which is key to assessing ultimate or total BOD—the combination of both—requires an evaluation over the longer period of time in which the two processes exert a higher maximum negative effect on oxygen levels. In addition, the nitrogen has even greater longer term effects by stimulating the growth of algae that, upon its death and decay, exerts an even more significant oxygen demand than the original waste material of the discharge.[104]

Permitting agencies such as Ecology are required to evaluate a discharge's reasonable potential to cause or contribute to violations of water quality standards using information

---

[104] For this reason, the exact location and impairment status of the point in Puget Sound of any given discharge is irrelevant. In addition, Ecology has carved the South Puget Sound up into hundreds or thousands of segments or grid cells and it does not and cannot expend the resources to obtain data for that number of small areas of Puget Sound. The state cannot separate a waterbody into minute pieces for modeling or 303(d) listing purposes and then simultaneously point to the absence of data for all the pieces as a rationale to avoid regulation.

Ecology has divided Puget Sound into an unknown number of waterbody segments, with each grid cell sized at approximately 2,460 feet by 3,660 feet. *See 2012 Integrated Report, supra* n. 29 at 5. For purposes of modeling, Ecology has divided the South Sound into 2,623 grid cells, each 500 meters square, up to Edmonds. *See, e.g.*, Ecology, *South Puget Sound Dissolved Oxygen Study Circulation Modeling Overview* (Oct. 28, 2009), *available at* http://www.ecy.wa. gov/puget_sound/docs/102809_SPSDOS_hydromodelpresentation.pdf at 9 (last accessed Oct. 18, 2016).

available on the content of a discharge and the quality and circumstances of a receiving waterbody.[105] The fact sheets issued with NPDES permits for Puget Sound dischargers demonstrate that—as a matter of routine—Ecology does not assess whether discharges of nitrogenous wastes have the reasonable potential to cause or contribute to violations of water quality standards in Puget Sound.

In order to determine if discharges of nitrogenous wastes to Puget Sound had reasonable potential to contribute to violations of water quality standards, Ecology permit writers need only

---

[105] Writing of Kentucky's failure to use available information as the basis for WQBELs, EPA supports our reading of its regulations:

> KDOW [the state agency] states that it had insufficient data to conduct the RPA for these pollutants and, therefore, is requiring five quarters of effluent monitoring for these pollutants, coupled with in-stream chemical and biological monitoring.
>
> * * *
>
> KDOW does not consider available, valid, and representative data showing that the proposed discharges have the reasonable potential to cause or contribute to violations of WQS. Given the existence of information indicating that reasonable potential exists, KDOW's proposal to conduct the RPA during the permit term does not comply with the CWA and its implementing regulations, which require that the permit contain WQBELs for all discharges that have reasonable potential to cause or contribute to a violation of WQS (40 CFR § 122.44(d)(1)(iii, iv, vi)).
>
> * * *
>
> KDOW can characterize the effluent using data from similar discharges . . . or other sources of information about the likely composition of the effluent. KDOW could have independently sought to obtain such data or rejected the application as not sufficient and required additional data from the applicant.
>
> * * *
>
> Given the existence of information indicating that reasonable potential does exist, KDOW's approach of deferring an RPA to the middle of the permit term is inadequate.

Letter from James D. Giattina, Director, Water Protection Division, Region 4, EPA to Sandy Gruzesky, Kentucky Department for Environmental Protection, Re: *Notice of Specific Objection – Xinergy Corporation (KY0108014)* (Oct. 22, 2010) (hereinafter "*Gruzesky Letter*") at 3 – 4. Unlike in the Kentucky example, Ecology does not even acknowledge its obligation to conduct a reasonable potential analysis on nitrogenous oxygen demand pollutants contributing to violations of water quality standards and it ignores, entirely, the data that it does have and the modeling that it has completed. As EPA points out in this letter, there is a distinction between a situation where there is no information whatsoever and where there is sufficient information to connect the content of the effluent and the quality of the receiving water. *See id.* at 4, fn. 6.

have looked to the results of the agency's own studies, discussed *supra*. Certainly by 2002, for portions of the Sound, and not later than early 2014 for the remainder, reasonable potential had already been determined for *any* discharge of nitrogenous wastes to Puget Sound. By 2014, Ecology had determined that removing all point source discharges would still result in violations of water quality standards both in the present and projected into the future. *See supra*.

In summary, with the exception of 14 permits with effluent limits triggered by TMDLs, only six of which have NBOD+CBOD limits, and the LOTT permit, the majority of the 103 permits—88 permits or 85 percent—have no even purported limits on nitrogenous wastes. Removing from this group those with only ammonia WQBELs but no nitrogen limits yields 96 permits or 93 percent without limits on nitrogenous wastes. In addition, none of the seven permits with existing nitrogen limits has been evaluated with regard to what nitrogen limits are necessary to ensure that the sources are not causing or contributing to violations of water quality standards in Puget Sound, fully 100 percent of the evaluated permits. The LOTT permit clearly does not meet water quality standards. *See supra* 51.

Of the 103 permits issued by Ecology, approximately two thirds (69) have been issued in the last five years and are current, approximately 16 are due to be renewed this year, and 17 have been administratively extended.[106] The vast majority—91 permits—were issued by Ecology after 2008, a date by which there can be no question that the state knew water quality-based nitrogen limits were required for discharges of nitrogen to Puget Sound. Of this group, 17 permits were last issued with an "addendum" in lieu of a full fact sheet on the basis that the discharge was a "low priority" and effluent limits did not require reassessment, *see infra* at 88.

3. Ecology's Permits Routinely Fail to Evaluate Whether Discharges Will Cause or Contribute to Violations of Narrative Criteria

Despite Ecology's claim to EPA that it relies, in part, on algal growth to control nutrients,

[106] The oldest administratively extended permit in this group dates to 2003.

Ecology does not. First, Ecology does not identify waters as violating the narrative criterion for algal growth, as discussed above. Second, in its permit evaluations, Ecology routinely cites the applicability of narrative criteria, *see e.g. Hartstene Pointe Fact Sheet, supra* n. 103 at 13, asserts that it "must consider the narrative criteria," and finally concludes that it "considers narrative criteria" but it never explains *how* it considered the narrative nor sets out the results of that purported evaluation, *see, e.g., id.* at 21. Ecology makes no reference to the procedures established in 40 C.F.R. § 122.44(d)(1)(vi) for interpreting and applying narrative criteria.[107] Ecology's claim to use algal growth as a basis for nutrient regulation is false.

4. Ecology's Permits Routinely Fail to Use Procedures That Account for Existing Controls on Point and Nonpoint Sources of Nitrogen Pollution

Federal regulations require permit writers to "use procedures which account for existing controls on point and nonpoint sources of pollution." 40 C.F.R. § 122.44(d)(1)(ii). Ecology, however, has failed to consider the complete lack of controls on nitrogen for every point source discharge of nitrogen to Puget Sound waters except one, and has routinely failed to consider the lack of controls on nonpoint source pollution sources of nitrogen including on-site septic systems, agriculture, and logging. Even in an instance where a fact sheet generally identified "[s]ignificant nearby non-point sources of pollutants [that] include storm water and septic systems," neither the draft fact sheet nor the draft permit demonstrated that existing controls, or lack thereof, on these admittedly significant sources was taken into account in choosing to not establish an effluent limit in the permit on nitrogen. *Hartstene Pointe Fact Sheet supra* n. 103 at 5. For the sole permit with a nitrogen limit, the LOTT facility, the permit limits were not set on

[107] EPA has emphasized the requirement to ensure compliance with narrative criteria in its review of state-issued permits. *See, e.g.*, *Gruzesky Letter*, *supra* n. 105 at 2 ("NPDES regulations at 40 CFR 122.44(d)(1)(vi) are clear that NPDES permits must contain provisions implementing narrative WQS, and the RPA that must be completed for numeric WQS, must also be completed for narrative standards.").

the basis of considering any other sources of nitrogen and their respective controls as discussed above, *supra* 54.

5. Ecology Permits Routinely Violate Tier I of the Antidegradation Policy in Washington's Water Quality Standards

Under Washington's Tier I requirements of its antidegradation policy, Puget Sound's impairments, which fail to fully support existing and designated uses, are a prohibited level of water quality. *See* WAC 173-201A-310(1). When Tier I is violated, according to its own standards, Ecology must "take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards." *Id*. (2). There can be no more appropriate and definitive steps than to comply with federal law that requires WQBELs that are sufficient to ensure permitted discharges do not cause or contribute to violations of water quality standards. Ecology's failure to include such WQBELs for nitrogen discharges in Puget Sound permits is a routine and repeated violation of Tier I of the antidegradation policy in its water quality standards and therefore a violation of 40 C.F.R. § 122.4(d).

D. Ecology Routinely Fails to Include Nutrient Limits in Permits on the Basis of Basis of Uncertainty, Technical Difficulty, or Lack of a TMDL

A permit writer cannot simply not include an effluent limit because to do so is challenging. Not only do the statute and regulations clearly not allow this outcome but federal courts agree. For example, the Second Circuit recently cited with approval its decision in *Waterkeeper Alliance,* 399 F.3d 498, for the proposition that "NPDES permits 'may issue only where such permits *ensure* that every discharge of pollutants will comply with all applicable effluent limitations and standards.'" *Natural Res. Def. Council,* 808 F.3d 578 (emphasis in original). Moreover:

> Even if determining the proper standard is difficult, EPA cannot simply give up and refuse to issue more specific guidelines. *See Am. Paper Inst., Inc. v. EPA*, 996 F.2d 346, 350 (D.C. Cir. 1993) (articulating that, even if creating permit limits is difficult, permit writers cannot just "thr[o]w up their hands and, contrary to the Act, simply ignore[] water quality standards including narrative criteria

> altogether when deciding upon permit limitations"). Scientific uncertainty does not allow EPA to avoid responsibility for regulating discharges. *See Massachusetts v. EPA*, 549 U.S. 497, 534 (2007) ("EPA [cannot] avoid its statutory obligation by noting the uncertainty surrounding various features of climate change and concluding that it would therefore be better not to regulate at this time.").

Id. The First Circuit and EAB have agreed too that uncertainty does not excuse the permit authority from its obligation to set permit limits:

> The Act's TMDL and interim planning process both contemplate pollution control where multiple point sources cause or contribute to water quality standard violations. 33 U.S.C. § 1313(d), (e). Under earlier legislation, including the 1965 Federal Water Pollution Control Act, when a water body failed to meet its state-designated water quality standards, pollution limits could not be strengthened against any one polluter unless it could be shown that the polluter's discharge had caused the violation of quality standards. *See EPA v. California ex rel. State Water Res. Control Bd.*, 426 U.S. 200, 202-03 (1976). This standard was ill-suited to the multifarious nature of modern water pollution and prevented the imposition of effective controls. *Id.* In 1972, Congress declared that the system was "inadequate in every vital aspect," and had left the country's waterways "severely polluted" and "unfit for most purposes." S. Rep. No. 92-414, at 3674 (1971). The CWA rejected the earlier approach and, among other things, introduced individual pollution discharge limits for all point sources. 33 U.S.C. 1311(b). To maintain state water quality standards, the Act establishes the TMDL and continuing planning processes, which target pollution from multiple sources. *Id*. § 1313(d), (e). . . . We thus reject the notion that in order to strengthen the District's discharge limits, the EPA must show that the new limits, in and of themselves, will cure any water quality problems.

Upper Blackstone Water Pollution Abatement District v. U.S. EPA, 690 F.3d 9 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2382 (2013); *see also In re: City of Taunton* at 61-62.

Certainly establishing the relative responsibilities for pollution controls where there are multiple dischargers is made more complicated by the lack of a TMDL. However, the absence of a TMDL does not alter the requirement that permits comply with the statute and regulations that, in turn, require compliance with water quality standards. The lack of a TMDL is no defense for a permitting agency's failure to find reasonable potential and to establish a WQBEL. As the First Circuit has explained in upholding the EAB,

> TMDLs take time and resources to develop and have proven to be difficult to get just right; thus, under EPA regulations, permitting authorities must adopt interim

> measures to bring water bodies into compliance with water quality standards. *Id*. § 1313(e)(3); 40 C.F.R. § 122.44(d); *see also, e.g.*, 43 Fed. Reg. 60,662, 60,665 (Dec. 28, 1978) ("EPA recognizes that State development of TMDL's and wasteload allocations for all water quality limited segments will be a lengthy process. Water quality standards will continue to be enforced during this process. Development of TMDL's . . . is not a necessary prerequisite to adoption or enforcement of water quality standards . . . .").

Upper Blackstone, 690 F.3d 9, n 8. The First Circuit also explained that waiting for the completion of exhaustive studies is equally unacceptable:

> [N]either the CWA nor EPA regulations permit the EPA to delay issuance of a new permit indefinitely until better science can be developed, even where there is some uncertainty in the existing data. The five-year term limit requires the EPA or state permitting authority to re-ensure compliance with the Act whenever a permit expires and is renewed. . . . The Act's goal of "eliminat[ing]" the discharge of pollutants by 1985 underscores the importance of making progress on the available data. 33 U.S.C. § 1251(a)(1).
>
> * * *
>
> In almost every case, more data can be collected, models further calibrated to match real world conditions; the hope or anticipation that better science will materialize is always present, to some degree, in the context of science-based agency decisionmaking. Congress was aware of this when it nonetheless set a firm deadline for issuing new permits.
>
> As in many science-based policymaking contexts, under the CWA the EPA is required to exercise its judgment even in the face of some scientific uncertainty. The Supreme Court has recognized this dimension of EPA decisionmaking in the context of the Clean Air Act. In *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Court held that the EPA cannot "avoid its statutory obligation by noting the [presence of] uncertainty." *Id*. at 534. If "scientific uncertainty is so profound that it precludes EPA from making a reasoned judgment . . . EPA must say so. That EPA would prefer not to regulate greenhouse gases because of some residual uncertainty . . . is irrelevant. The statutory question is whether sufficient information exists to make an endangerment finding." *Id*.

Id. Likewise, the EAB recently held the same:

> Where TMDLs have not been established, water quality-based effluent limitations in NPDES permits must nonetheless comply with applicable water quality standards. In discussing the relationship between NPDES permitting and TMDLs, EPA has explained that the applicable NPDES rules require the permitting authority to establish necessary effluent limits, even if 303(d) listing determinations and subsequent TMDLs lag behind. 54 Fed. Reg. 23,868, 23,878, 23,879 (June 2, 1989); *see also In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 604-05 (EAB 2010) (expressly rejecting the idea that the permitting authority cannot proceed to determine permit effluent limits where a TMDL has yet to be established) , *aff'd*. 690 F.3d 9 (1st Cir. 2012), *cert.*

denied, 133 S. Ct. 2382 (2013).

In re: City of Taunton at 11; *see also id.* at 40-41 (citing, *inter alia*, 54 Fed. Reg. 23,868, 23,879 (June 2, 1989) that clarifies in the preamble to 40 C.F.R. § 122.44 that subsection (d)(1)(vii) "do[es] not allow the permitting authority to delay developing and issuing a permit if a wasteload allocation has not already been developed and approved"); *In re: Upper Blackstone Water Pollution Abatement District,* 14 E.A.D. 577, 599 (EAB 2010) (explaining that the use of the words "may" and "contribute" in the reasonable potential regulation "requires water quality-based effluent limits even when there is some degree of uncertainty regarding both the precise pollutant discharge levels and the potential causal effects of those discharges," a "precautionary approach."); *id.* at 604 ("The regulations specifically contemplate that permit issuers will establish numeric permit limits when there is no TMDL or wasteload allocation."); *id*. at 606 (citing *Natural Resources Defense Council, Inc. v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977) that "this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all."); *see also Ecology Manual, supra* n. 100 at 193 ("In the absence of a basin TMDL and the resultant WLA, the permit writer must develop an individual WLA.").[108]

In contrast to this established law, Ecology claims that it need not include a WQBEL when a discharge causes or contributes to a violation of water quality standards and a TMDL has not yet been completed. It sets out this policy in its Permit Writer's Manual in a discussion that asserts two "basic principles." The first principle is that "[a] water body listed on the 303(d) list

[108] *See also id.* at 194 (where a permit writer determines that a discharge is causing or contributing to a violation of water quality standards for a waterbody segment that is not currently on the state's 303(d) list, "the permit writer should develop interim effluent limits based on existing performance (no increase in loading) to be placed in the permit . . . A final limit based on the water quality criteria is calculated and placed in the permit (with a compliance schedule). The compliance schedule must be as short as practicable and must include specified required actions that demonstrate reasonable progress toward attainment of the final limit or water quality criteria.").

is not a presumption of impairment unless the listed section is the point of discharge." *Ecology Manual*, *supra* n. 100 at 194. While this statement is less than clear, Ecology means that a discharge to a non-listed segment that flows into a downstream listed segment is not a discharge that contributes to a violation of water quality standards. This is incorrect. In fact, Washington's water quality standards require that "[u]pstream actions must be conducted in manners that meet downstream water body criteria." WAC173-201A-260(3)(b); *see also* 40 C.F.R. § 131.10(b) ("the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters."). In addition, Ecology cannot rely on near-field 303(d) listings to evaluate far-field effects. Nor can Ecology rely on the 303(d) list alone as the basis for understanding receiving water quality.

In its second basic principle, Ecology creates an exception to the law for minor contributors to violations of water quality standards:

> A point source discharging to a water body with multiple sources (point and nonpoint) of impairment, which is a minor source of the impairment, and may gain relief from a TMDL is not required to have a final limitation as the numeric water quality criteria before a TMDL is completed.

Ecology Manual, supra n. 100 at 194. This is an exception with no legal basis.

The text of the permitting manual, however, goes far beyond these two unlawful principles. Ecology creates another exemption that is not justified or supported by law:

> If the pollutant is a far-field pollutant, is present in the discharge and is the subject of a TMDL in progress, the permit writer may defer any water quality-based limits on the pollutant until the TMDL is completed and a WLA is assigned. When the WLA is assigned the permit writer may modify the permit or incorporate the WLA at the next reissuance, depending on timing.

Id. at 196. This assertion is clearly at odds with the established case law, much of which, incidentally, concerns far-field pollution. Likewise, Ecology's policy that it has the discretion to not include a WQBEL if a TMDL has not been started yet, is also contrary to law. Ecology

asserts that the permit writer may ask the question: "Can the effluent be treated or can the effluent or pollutant(s) be removed seasonally at a cost which is economically achievable or reasonable"? *Id*. at 197 fig 23. This question and the options that flow from its answers are at odds with federal law. First, requirements to establish WQBELs are not an economic exercise; they are required regardless of the cost. *See, e.g., In re City of Attleboro, MA Wastewater Treatment Plant*, 2009 WL 5326324, NPDES Appeal No. 08-08 (Envtl. App. Bd. Sept. 2009) ("[T]he legal standard is that cost and technological considerations are not factors in setting water quality-based effluent limits. Rather, section 301 (b)(1)(C) of the CWA requires unequivocal compliance with applicable water quality standards, and does not recognize an exception for cost or technological infeasibility."); *NRDC v. EPA*, 859 F.2d 156, 208 (D.C. Cir. 1988). Second, the "unsure" response to the question states that the permit need only contain an interim limit of no additional loading, allowing the source to continue to cause or contribute to violations. The "no" response suggests that yet another question must be posed that has no basis in legal requirements for establishing WQBELs: "Are there options for effluent trading or mitigation by treating uncontrolled sources?" Once again, Ecology's response is that if there are no trading options, the permit's interim and final effluent limits are established merely to "prevent increase in loading." *Id*.

Delaying an effluent limit due to the time needed to develop a TMDL, as Ecology urges on its permit writers, is parallel to allowing a discharge to use a compliance schedule to meet an effluent limit due to the time needed to develop a TMDL, an approach EPA has long determined is prohibited. *See* Memorandum from James A. Hanlon, Director, Office of Wastewater Management, EPA, to Alexis Strauss, Director, Water Division, EPA Region 9 Re: *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits* (May 10, 2007) at 3 ("A compliance schedule based solely on time needed to develop a Total Maximum Daily Load is not appropriate, consistent with EPA's letter of October 23, 2006 to Celeste Cantu, Executive

Director of the California State Water Resources Control Board, in which EPA disapproved a provision of the Policy for Implementation of Toxic Standards for Inland Waters, Enclosed Bays, and Estuaries for California.").

In practice, while Ecology generally ignores the issue of dissolved oxygen violations in Puget Sound and the contributions of nitrogenous wastes to those violations in its fact sheets, on occasion Ecology indicates that in the absence of a TMDL it cannot establish effluent limits, as illustrated by the LOTT permit, *supra* 51. For example, a fact sheet for an NPDES permit issued to Carlyon Beach states that "Ecology has included some additional monitoring of nutrients in the proposed permit to establish a baseline for this discharger. It will use this data in the future as it develops TMDLs for dissolved oxygen and establishes WLAs for nutrients." Ecology, *Fact Sheet for National Pollutant Discharge Elimination System (NPDES) Permit WA0037915 Carlyon Beach Wastewater Treatment Plant* (August 2012) at 23. Similarly an NPDES permit issued to Tamoshan found that a water quality-based limit was not required "[b]ecause the discharge is to waters that are 303(d) limited for dissolved oxygen and no TMDL has been conducted, no net increase in the discharge of BOD will be allowed." *Tamoshan 2003 Fact Sheet*, *supra* n. 75. This rationale was not questioned when Ecology reauthorized the permit in 2008. *See* Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for National Pollutant Discharge Elimination System (NPDES) Permit No. WA0037290* (undated). Yet in no instance does Ecology cite to a federal or state regulation that allows permits to be issued on the basis of "no net increase" in a pollutant where the discharge is contributing to a violation of water quality standards and a TMDL has not been established.

E. Permits May Not be Derived on an Wholly Extralegal Basis

Ecology claims to meet the requirements of federal and state law but some of the fact sheets for its permits assert that:

Ecology does not develop effluent limits for all reported pollutants. Some

> pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

See, e.g., *Hartstene Pointe Fact Sheet, supra* n. 103 at 11. Three of these rationales—whether a pollutant is treatable, whether a pollutant is controllable at the source, and whether a pollutant is listed in regulation— are not a legal basis upon which Ecology can avoid establishing a WQBEL if one is otherwise warranted. Ecology's fact sheets do not explain which, if any, pollutants have been subject to these rationale for not developing effluent limits. Therefore neither the public nor EPA can discern whether Ecology has relied upon this informal—and illegal—policy to issue permits.

F. Ecology Has a History of "Reauthorizing" Rather than "Renewing" NPDES Permits Without New Evaluations, Contrary to Legal Requirements

The age of Ecology's permits for dischargers to Puget Sound and its tributaries are not the reason that the permits it issues fail to control nitrogen inputs. In fact, the vast majority of Ecology-issued permits are up-to-date rather than administratively continued. While in many instances Ecology simply fails to mention the discharge of nitrogenous wastes, refers pointlessly to the usefulness of knowing about ammonia-based nitrogen, and asserts without substantiation that TBELs are sufficient to meet water quality standards—all of which are discussed above—Ecology also uses another tactic to issuing permits that fail to meet legal requirements that it terms "reauthorization." In this approach, Ecology claims that nothing about the discharge or facility has substantially changed since the last permit was issued, rendering the permit at issue a "low priority." For example, Ecology deemed the issuance of an NPDES permit to Chambers Creek a low priority requiring a mere six-page fact sheet—despite reasonable potential assessments for five toxic pollutants—because, it stated:

> The existing permit requirements, including discharge limitations and monitoring, do not need to be changed substantially to protect the receiving water quality. The previous fact sheet addressed conditions and issues at the facility at the time the previous permit was issued, and statements made reflected the status in 1999.

> Since the issuance of the previous permit, Ecology has not received any information which indicates that environmental impacts from the discharge have changed. The reauthorized permit is similar to the previous permit issued on December 2, 2002.

Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for NPDES Permit No. WA0039624* [Chambers Creek] (undated) at 1. Ecology's statements disregard all the studies conducted on Puget Sound water quality. According to Ecology, the concept of 'reauthorization' as compared to 'renewal' of a permit means that:

> The discharge limits and conditions in effect at the time of expiration of the previous permit are carried over largely unchanged to this reauthorized permit. Assessment of compliance and inspections of the facility during the previous permit term indicate that the facility should not be placed on a high priority for permit renewal. Ecology assigns a high priority for permit renewals in situations where water quality would materially benefit from a more stringent permit during the next five-year cycle.
>
> The permit reauthorization process, in concert with the routine renewal of high priority permits, allows Ecology to reissue permits in a timely manner and minimize the number of active permits that have passed expiration dates. A system of ranking the relative significance of the environmental benefit to be gained by renewing a permit rather than reauthorizing a permit is followed during Ecology's annual permit planning process. Each permit that is due for reissuance is assessed and compared with other permits that are also due for reissuance. The public is notified and input is sought after the initial draft ranking has tentatively established which permits are likely to be completely renewed and which are likely to be reauthorized. All relevant comments and suggestions are considered before a final decision is made regarding the type of reissuance for each permit.

Id. at 2.

Ecology has continued to use 'reauthorization' to address both large and small discharges up to the present. *See, e.g.*, Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0037087* [Tacoma Central Wastewater Treatment Plant (#1)] (Sept. 29, 2010) (failing to note that Tacoma Central is one of the largest municipal discharges to Puget Sound); Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0022772* [Salmon Creek Wastewater Treatment Plant] (March 1, 2013) (merely noting that increased nutrient monitoring will be used to assess Puget Sound water quality and, *id*. at 7, "to inform a Total Maximum Daily Load study

should one become necessary."); Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0038075* [Rustlewood Wastewater Treatment Plant] (Sept. 30, 2014).

Ecology has offered a recent and startling example of its use of this mechanism in a draft permit for the Tamoshan facility. A draft permit 'reauthorization' was issued on January 18, 2017 based on the assertion that "[s]ince the issuance of the current permit, Ecology has not received any additional information, which indicates that environmental impacts from the discharge warrant a complete renewal of the permit." Ecology, *Addendum to the Fact Sheet for the Thurston County Public Works Tamoshan Wastewater Treatment Plan NPDES Permit WA0037290* (Jan. 18, 2017) at 1. Ecology also summarily concludes that "[t]he discharge meets applicable . . . water quality standards, and other legally applicable requirements." *Id*. It asserts that "the previous fact sheet explains the basis for the discharge limits and conditions of the reauthorized permit," *id*. at 2, yet the previous fact sheet was also a truncated three-page analysis, *see* Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for NPDES Permit No. WA0037290* [Tamoshan] (undated). In fact, the last full fact sheet issued by Ecology admitted that Tamoshan discharges to waters impaired for dissolved oxygen. *See Tamoshan 2003 Fact Sheet*, *supra* n. 75 at 10. Faced with these facts, Ecology musters an excuse that is utterly divorced from applicable law governing the issuance of permits:

> Ecology continues to improve the modeling that allows us to assess the degree to which wastewater treatment plants may be causing or contributing to violations of water quality standards in Budd Inlet and Puget Sound. As improved modeling results becomes available, Ecology intends to develop a coordinated permitting strategy to reduce nitrogen discharges to these waters. Ecology's ultimate decision to set permit limits for nitrogen discharges may affect all of the facilities and permits in the region.

Id. at 2. Nowhere does Ecology clarify what purported improvements in its modeling are required in order for the agency to develop a "coordinated permitting strategy," nor why it believes that the requirements of the law cease to apply to this permit until such date as it determines a "strategy" or makes an "ultimate decision."

One consequence of Ecology's using an intentionally truncated evaluation of permits' compliance with the CWA and its implementing regulations is its failure to evaluate the need for nitrogen controls, while creating the impression that Ecology is managing a fully compliant NPDES program with timely permits.

G. Monitoring Requirements in Ecology NPDES Permits are Inadequate

Finally, the NPDES permits issued by Ecology to dischargers of nitrogen to Puget Sound and its tributaries contain inadequate monitoring to support future effluent limitations. As the State-EPA Task Group observed, *all* municipal sewage treatment plants should be required to monitor nitrogen and phosphorus effluent levels. *See An Urgent Call to Action, supra* n. 4 at 27. Of the 103 permits evaluated, 25 have no requirement to monitor nitrogen discharges (i.e., through Kjeldahl Nitrogen (TKN), nitrate+nitrite) even to support their re-applications. As stated above, 41 dischargers have no phosphorous monitoring requirements.

The LOTT permit, the only discharger with a nitrogen limit—expressed in concentrations and loading for total inorganic nitrogen (TIN)—has monitoring and reporting requirements for nitrate + nitrite and TKN, both as concentrations. Unlike the other dischargers without nitrogen effluent limits, the LOTT facility's monitoring is five days a week during the critical period and once weekly otherwise. Ecology, *National Pollutant Discharge Elimination System Waste Discharge and Reclaimed Water Permit No. WA0037061* [LOTT] (Aug. 26, 2011) at 9.

VII. CONTROL OF NUTRIENT DISCHARGES WILL HAVE AN ADDED BENEFIT OF SIGNIFICANTLY REDUCING DISCHARGES OF REGULATED AND UNREGULATED TOXICS

It has long been known that Puget Sound suffers from high levels of toxic pollutants that have poisoned the food chain in part because the Sound does not flush all pollutants to the ocean. For example, in 1986—30 years ago—the Puget Sound Water Quality Authority ("Authority") noted that "[w]ater and pollutants are recirculated within Puget Sound, and some inlets and bays experience only limited tidal exchange" and "contaminants may not be readily flushed out of

Puget Sound as was once believed." Puget Sound Water Quality Authority, *1987 Puget Sound Water Quality Management Plan* (Dec. 10, 1986) at ix, 2-1; *see also* URS Company, *Southern Puget Sound Water Quality Assessment Study: Circulation and Flushing in South Puget Sound* (July 1986). The Authority cited the results of a NOAA computer model that showed almost half of the modeled parcels of water discharged to the East Passage (between Vashon Island and Des Moines) were still south of the Admiralty Inlet after three months and after six and twelve months, 25 and 5 percent remained respectively. *Id*. at 2-2.

Puget Sound's hydrological isolation from the Pacific Ocean causes it to accumulate toxic contaminants that would otherwise leave the ecosystem and enter the ocean. A group of scientists highlighted the concern:

> Puget Sound is unique among of our nation's estuaries in being a deep fjord-like structure (resulting from its formation by glaciers) that contains many urban areas within its drainage basin. Because there are several sills that restrict exchange with oceanic waters, Puget Sound is relatively poorly flushed compared to other urbanized estuaries of North America. Thus, toxic chemicals that enter Puget Sound have longer residence times within the system, and this entrainment of toxics can result in biota being exposed to increased levels of contaminants for a given input, compared to other large estuaries. This hydrologic isolation also puts the Puget Sound ecosystem at higher risk from other types of pollutants that enter the system, such as nutrients and pathogens. The problems in Puget Sound associated with contaminants are exacerbated by the added problem of biological isolation. Because Puget Sound is a deep, almost oceanic habitat, the tendency of a number of species to migrate outside of Puget Sound is limited relative to similar species in other large urban estuaries. This high degree of residency for many marine species, combined with the poor flushing of Puget Sound, results in a more protracted exposure to contaminants. <u>It is this combination of hydrologic and biologic isolation that makes the Puget Sound ecosystem highly susceptible to inputs of toxic chemicals compared to other major estuarine ecosystems</u>.")

Tracy K. Collier, *et al.*, *Toxic Chemical Contaminants and Puget Sound* (emphasis in original).[109] Ecology agrees with this characterization of Puget Sound: "underwater formations help keep the waters in the Sound, similar to a giant bathtub with a slow moving drain: Most of

---

[109] *Available at* http://depts.washington.edu/uwconf/2007psgb/2007proceedings/papers/12e_colli.pdf (last accessed Oct. 18, 2016).

what goes into the Sound stays there and circulates within the estuary." Ecology, *Saving the Sound*.[110]

In 1987, the Authority also identified levels of toxic contaminants as a concern in the water column, surface microlayer, and sediments, with adverse effects manifested in biota through tissue abnormalities such as fin erosion, protrusions, kidney and gill lesions, and liver tumors and changes in species composition. *Id*. at 2-25–2-31. The region's population stood at 2.9 million at the time of this report, *id*. at 1-1, today there are 4.3 million people surrounding the Sound.

Concerns about toxic contamination remain. While levels of some chemicals have gone down, others are going up. *See, e.g.*, EPA, *Puget Sound Georgia Basin Transboundary Ecosystem Indicator Report* (2006)[111] at 129-132 (showing that polybrominated diphenyl ethers (PBDEs) in harbor seals had increased 1500 percent between 1984 and 2003, findings that EPA said were consistent with those of state agencies that have demonstrated "elevated [persistent bioaccumulative toxic] contamination of sediments and bottom fishes in the urbanized bays of central Puget Sound compared to southern Puget Sound and the Georgia Basin."). EPA has also reported that killer whales in Puget Sound "are some of the most contaminated marine mammals in the world because they have bioaccumulated these chemical contaminants through the entire food web," and that "[t]oxic chemical concentrations in Killer Whales and contamination of food sources" are among the reasons the species has been listed under the Endangered Species Act. *Id*. at 119-120.[112]

---

[110] *Available at* http://www.ecy.wa.gov/puget_sound/overview.html (last accessed Oct. 18, 2016).

[111] *Available at* http://www.epa.gov/pugetsound/pdf/indicators_report.pdf (last accessed Aug. 8, 2015).

[112] A summary of the overall concern is set out in a petition and two letters to EPA concerning the agency's failure to ensure that Washington's aquatic life criteria for toxic contaminants are updated. *See* Northwest Environmental Advocates, *Petition for Rulemaking Under the Clean*

A. Puget Sound is Contaminated by High Levels of Toxic Chemicals Discharged by Municipal Sewage Treatment Plants

Twenty-six years ago, in 1990, the Puget Sound Water Quality Authority claimed that "controls, in the form of permits issued to municipal and industrial dischargers of wastewater, are in place to reduce the discharge of conventional pollutants to Puget Sound. These permits are presently being strengthened to reduce the discharge of toxic pollutants into the Sound." Puget Sound Water Quality Authority, *Puget Sound Update: First Annual Report of The Puget Sound Ambient Monitoring Program* (May 1990) at 29.[113] Ecology more recently commented that "[d]espite a ban on some harmful chemicals in the 1970s and numerous cleanup efforts, toxic chemicals continue to persist and circulate throughout the Puget Sound ecosystem and are still being introduced via stormwater runoff, municipal sewage treatment plants, and atmospheric deposition." Ecology, *Control of Toxic Chemicals in Puget Sound Phase 3 Data and Load Estimates* (April 2011) at 1.[114] Other than the construction of secondary treatment facilities as a form of technology-based requirements, little in the way of regulatory action has been taken to control the levels of toxics in municipal effluent.

Beginning in 2006, the Washington Department of Ecology began conducting studies to quantify the amount and to identify the primary sources of toxic chemicals in the Sound. Its so-called Phase 2 study "confirmed that surface runoff remained the largest single contributor of

---

Water Act to Update the Water Quality Criteria for Toxics in the State of Washington (Oct. 28, 2013) *available at* http://www.ecy.wa.gov/programs/wq/ruledev/wac173201A/comments/0070c.pdf (last accessed Oct. 18, 2016); Letter from Nina Bell, NWEA to Gina McCarthy, Administrator, EPA Re: *Follow Up to October 28, 2013 Northwest Environmental Advocates' Petition for Rulemaking on Water Quality Criteria for Toxics in the State of Washington* (Aug. 31, 2015); Letter from Nina Bell, NWEA, to Gina McCarthy, Administrator, EPA, Re: *Second Follow Up to October 28, 2013 Northwest Environmental Advocates' Petition for Rulemaking on Water Quality Criteria for Toxics in the State of Washington* (Feb. 9, 2016).

[113] *Available at* https://www.eopugetsound.org/sites/default/files/features/resources/1990PugetSoundUpdateOptimized.pdf (last accessed Oct. 18, 2016).

[114] *Available at* https://fortress.wa.gov/ecy/publications/publications/1103010.pdf (last accessed Oct. 18, 2016).

toxic chemicals to Puget Sound." *Id.* at 2. Ecology then proceeded to seek more refined loading estimates through its Phase 3 studies that ended in 2011. In April 2011, Ecology published a report demonstrating that:

> Forested land uses were characterized by lower concentrations of nitrate+nitrite nitrogen, total phosphorus, total mercury, total arsenic, total copper, and total suspended solids. The commercial basins were characterized by relatively high concentrations of total PCBs, total zinc, total lead, and total PBDEs. Residential and agricultural basins had similar chemical signatures and generally exhibited higher concentrations than forested basins and lower concentrations than commercial basins. During baseflow conditions, the differences among the land uses were less pronounced[.]
>
> * * *
>
> Stormwater runoff, particularly from commercial/industrial subbasins, did not meet water quality criteria or human health criteria for several parameters. These include dissolved copper, lead, and zinc; total mercury; total PCBs; bis(2-ethylhexyl) phthalate; several carcinogenic PAHs; and one pesticide.

Id. at xix. Ecology's conclusion appeared to be only that yet more studies could be done; there were no regulatory recommendations. *See id.* at xxii.

Ecology began evaluating the inputs of toxics specifically from municipal sewage treatment facilities many years ago as part of its purported effort to "restore the environmental health of Puget Sound by 2020." Ecology, *Summary Technical Report Control of Toxic Chemicals in Puget Sound Phase 3: Loadings from POTW Discharge of Treated Wastewater* (Dec. 2010) at 3.[115] To assess toxics loadings, Ecology evaluated samples from 10 municipal dischargers to Puget Sound, two to tributaries, and eight directly to the Sound. *Id*. at 1. The ten facilities comprise approximately 48 percent of the total treated municipal wastewater discharged to the Sound in which a total of 230 chemicals were detected. *Id*. Ecology concluded that the results of the study were similar to previous studies and that these municipal dischargers "are a significant secondary source of toxic chemicals." *Id*. at 35. In addition, Ecology opined that:

---

[115] *Available at* https://fortress.wa.gov/ecy/publications/documents/1010057.pdf (last accessed Oct. 18, 2016).

> Future determination of the most effective and efficient actions for controlling or managing toxic threats should include evaluation of the effects of the chemicals, the new loading estimates of those chemicals, and the many other interdependent variables that characterize the pathways that facilitate chemical movement through the environment to Puget Sound.

Id. at 2. Ecology has developed no region-wide analysis of a regulatory approach to address its study findings and control or manage toxics pollutants, let alone implemented one.

Most recently, National Marine Fisheries Service scientists assessed the occurrence and concentrations of a broad range of so-called contaminants of emerging concern—otherwise known as unregulated toxic contaminants—from three estuarine areas in Puget Sound, evaluating effluent, ambient water, and juvenile Chinook salmon. *See* James Meador, *et al.*, *Contaminants of emerging concern in a large temperate* estuary, 213 Environmental Pollution 254 (June 2016).[116] The study found some of the highest concentrations of these chemical compounds in the country in the effluent, having detected 81 of 150 contaminants. *Id*. Forty-two of the compounds were found in fish tissue and the authors concluded that a number of compounds were found in water and tissue at concentrations that may cause adverse effects to fish growth, reproduction, or behavior. *Id*. While the study aimed to evaluate levels of toxics in the Puyallup River estuary in Tacoma's Commencement Bay and Sinclair Inlet in Bremerton as compared with the reference site of the Nisqually River estuary near Tacoma, the authors found that fish and water in the Nisqually contained high concentrations of some of the compounds. The scientists also noted that the relatively high pH of marine waters often makes the contaminants more bioavailable by fish than in freshwater. *Id*. at 263. Based on the volume of wastewater and toxic loading from Bremerton Westside and Tacoma Central evaluated in the study, the researchers estimated that nearly 121 kilograms (267 pounds) of emerging contaminants are discharged to the Sound each day from 106 sewage treatment plants, the

---

[116] *Available at* http://www.sciencedirect.com/science/article/pii/S0269749116300884 (last accessed Oct. 18, 2016).

equivalent of roughly 44,000 kilograms (97,003) pounds per year. *Id*. at 260.

Despite these and numerous other studies done over the last decades, Ecology has established almost no water quality-based effluent limits on toxics for discharges to Puget Sound or its tributaries. In many cases Ecology cannot correctly analyze whether a discharge of a toxic pollutant is causing or contributing to violations of water quality standards because it lacks information about the receiving water quality and because it has carved the Sound up into many little pieces. In such instances it simply assumes that the background concentration is zero. Of the 103 permits evaluated, 22 explicitly cited this assumption. *See, e.g.* Ecology, *Fact Sheet for NPDES Permit WA0030317, Kitsap County Sewer District No. 7* at 24 ("The following toxic pollutants are present in the discharge: . . . ammonia, and heavy metals. . . . No valid ambient background data were available for ammonia or metals, therefore Ecology used zero for background."). In nearly every instance where Ecology determined that there might be reasonable potential for a discharge to cause or contribute to a violation of water quality standards, Ecology established a mixing zone in order to avoid establishing water quality-based limits on the toxic pollutants.[117] *See, e.g.*, *Tamoshan 2003 Fact Sheet*, *supra* n. 75 at 14 (reasonable potential analysis for arsenic, cadmium, copper, lead, mercury, nickel, silver, and zinc completed on the basis of a mixing zone). Of the 95 municipal NPDES permits to discharge to Puget Sound and its tributaries, only six have WQBELs for one or more toxic chemical,

[117] Ecology also justifies use of mixing zones for waters that are failing to meet dissolved oxygen standards. *See, e.g., Tamoshan 2003 Fact Sheet, supra* n. 75 at 10 ("Because the discharge is to waters that are 303(d) limited for dissolved oxygen and no TMDL has been conducted, no net increase in the discharge of BOD will be allowed."); at 27 (Ecology's response to a public comment that a mixing zone is not appropriate for waters impaired by chronically depressed dissolved oxygen levels: "A mixing zone is allowed under the federal and state regulations. The calculation of the dilution factors and the size of the mixing zone followed the regulations and the policies adopted for calculating the dilution and mixing zone. The parameters used in determining a dilution factor take into account the local conditions of current, temperature, salinity, and depth of water over the diffuser.").

excluding chlorine and ammonia toxicity.[118] One effluent limit is for lead and five are for copper;[119] with the exception of LOTT's discharge to Budd Inlet, these discharges with limits are all to Sound tributaries.[120]

Ecology has effectively relied on the mixing zone "dilution solution" to toxics, despite evidence dating back decades that pollution does not flush to the Pacific Ocean but, instead, continues to recirculate within the Sound with far-field effects, and that those toxics are causing high levels of contamination in designated uses at the top of the food chain. In 2008, the organization People for Puget Sound issued a report on Ecology's use of mixing zones for toxic chemicals in discharges to the Sound. People for Puget Sound, *Toxic Chemicals in Puget Sound: The Impact of Mixing Zones on Permitted Discharges* (June 2, 2008). The report found that, for seven chemicals evaluated, three had no effluent limits in any of 103 municipal and industrial

---

[118] Permits for Eatonville, Buckley, Cherrywood Mobile Home Manor, BP Cherry Point, Phillips 66 Ferndale, Shell Oil, Tesoro, and Ferndale have toxicity-based ammonia limits.

[119] Permits with WQBELs for toxic chemicals include: copper limits for LOTT, Buckley, Enumclaw, Orting, Mt. Vernon (emergency outfall only) and lead limits for Yelm (emergency Nisqually River outfall only).

[120] It would appear from the fact sheet for Sumner that this facility has a copper limit. Ecology, *Fact Sheet for NPDES Permit WA0023353, City of Sumner Wastewater Treatment Facility* (Feb. 7, 2008). The fact sheet states that the previous 2001 permit had a total recoverable copper limit of 15 µg/L average monthly and 21 µg/L maximum daily. *Id*. at 6. It also had 25 violations of the monthly average limit. *Id*. at 7. Ecology determined that copper "continues to be a parameter of concern," *id*., reasonable potential was assessed and an effluent limit calculated, *id*. at 16. The fact sheet shows that the original permit included an "interim" limit roughly twice the "final" limit. *Id*. Today that same permit contains no copper limit. *See* Ecology, *National Pollutant Elimination System Waste Discharge Permit No. WA0023353* [Sumner] (March 24, 2008, modified Nov. 16, 2009, July 18, 2011). The effluent limit was removed by permit modification based on new data, use of a "metal translator for copper, and new mixing zone results" despite Ecology's concerns that "Sumner will need to continue monitoring for copper in the effluent because reasonable potential calculations show the concentration of copper at the edge of acute mixing zone is very close to the water quality criterion." Ecology, *Statement of Basis for NPDES Permit No. WA0023353* [Sumner] (July 14, 2011) at 3, 4 (emphasis added). From this statement and others in the Statement of Basis it is clear that Ecology will always opt in favor of no toxic effluent limit even when there is a question as to whether one is needed. Moreover, Ecology opined that "[i]f a permit limit for total copper were to be imposed, it would be 29.8 (average monthly) and 43.5 µg/L (maximum daily)," despite the fact that such a limit would violate the antibacksliding principle. *Id*. at 4.

discharges evaluated (bis(2-ethylhexyl)phthalate, arsenic, and cadmium), six sources had copper limits, two had lead limits, five had mercury limits, and four had zinc limits.[121] *Id*. at 8. It concluded that most of the few permits with toxic effluent limits were for facilities that discharge to Sound tributaries. *Id*.

This use of mixing zones is contrary to water quality standards and policies. The PCHB has held that "[t]he granting of a mixing zone, which allows the discharge of pollutants at a greater concentration than the calculated effluent limit, is an exception to the water quality standards and is to be granted sparingly." *Puget Soundkeeper Alliance v. Washington Ecology*, PCHB No. 13-137c, Findings of Fact, Conclusions of Law, and Order (July 23, 2015) at 43 (emphasis added). In fact, citing EPA concerns and the effects of discharges of toxic pollutants on contamination of sediments, the PCHB held that "[g]iven their persistence and ability to bioaccumulate and biomagnify, a mixing zone for PCBs should rarely, if ever, be granted." *Id.* at 46. This binding interpretation of Ecology regulations apparently matters not at all to Ecology permit writers who continue to routinely use mixing zones for toxic contaminants. *See, e,g*, Ecology, *[draft] Fact Sheet for NPDES Permit No. WA0022527 Vashon Wastewater Treatment Plant* (Sept. 27, 2016) at 21 ("Ecology determined the impacts of dissolved oxygen deficiency, nutrients, pH, fecal coliform, chlorine, ammonia, metals, other toxics, and temperature as described below, using the dilution factors in the above table."); Ecology, *[draft] Fact Sheet for NPDES Permit No. WA0024074 City of Mount Vernon Wastewater Treatment Plant* (Sept. 27, 2016) at 28 (exact same language), 29 (pertains to ammonia, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc, and cyanide for the protection of aquatic life), 31 (pertains to antimony, bis(2-ethylhexyl)phthalate, chloroform, copper, cyanide, mercury,

[121] Discrepancies between the higher number of toxic effluent limits in this 2008 report and the findings set out in this petition are due to termination of permits, permits issued by EPA, and removal of effluent limits for toxic pollutants in renewed permits.

nickel, selenium, thallium, and toluene for the protection of human health). Ecology continues to use mixing zones for toxic contaminants that allow the agency to issue permits without water quality-based pollution controls on toxics to dischargers to Puget Sound and its tributaries. There is no evidence that Ecology will change its policies any time in the future despite the state's purported concern about toxic contamination in the Sound, its sediments, and its species.

EPA created the concept of the mixing zone but it also has asserted that they can only be used when "where appropriate." 40 C.F.R. § 122.44(d)(1)(ii). It is well past time for EPA to determine if Ecology's use of mixing zones for toxic contaminants discharged to Puget Sound is appropriate in light of the effects of those contaminants.

B. Nutrient Controls Will Reduce the Discharge of Toxics

This petition is not intended to be an exhaustive treatise on the unlawfulness of Ecology's failure to control toxic pollutants in its permitting of discharges to Puget Sound. It has merely demonstrated that Ecology has failed to use NPDES permits to control toxics in Puget Sound and why it will likely continue to fail to do so in the future, despite its purported interest in reducing the Sound's toxic loading. This demonstration underscores the vital importance of nutrient controls' being placed on discharges—as they are legally required to be—because to do so will also coincidentally, and beneficially, remove toxics from waste streams prior to discharge.

EPA and Ecology have evaluated the efficacy of nutrient removal technology to concurrently remove toxic pollutants from municipal effluent. In 2008, the agencies conducted a one-day screening study on five sewage treatment plants, four of which discharge to the Sound. Two of the plants provide secondary treatment, and three employ advanced (tertiary) treatment for nitrogen and phosphorus removal. Two of the plants produce tertiary-treated reclaimed water. *See* Ecology, *Phase 3 Nutrient Treatment Removal of Toxics, supra* n. 89 at v. Of the 172 organic compounds evaluated, secondary treatment alone was found to achieve high removals for hormones and steroids. Comparing secondary treatment to methods of nutrient

removal, the study found that while approximately 21 percent of the compounds were reduced to below reporting limits by conventional secondary treatment, a full 53 percent were reduced to below reporting limits by the use of at least one advanced nutrient-removal technology. The study concluded that advanced nutrient reduction and tertiary filtration provide removal of pharmaceuticals and personal care products and that there are differences between the efficacy of the technologies. *Id*.

CONCLUSION

This petition demonstrates that Washington is not administering the NPDES program consistent with federal law because it does not have a regulatory program for developing water quality-based effluent limits in NPDES permits. In addition, Washington's operations in administering the program have demonstrated that the state has failed to exercise control over activities that are required to be regulated, namely the currently unregulated large scale discharge of nitrogen from multiple point sources to Puget Sound and its tributaries. This petition has also demonstrated that Washington has repeatedly issued permits that fail to conform to federal regulatory and statutory requirements because the state routinely issues permits that have no water quality-based nitrogen limits, as required by federal regulations.

Ecology's website succinctly states the case that underlies this petition in describing the results of one of its numerous studies on how nitrogen discharges from permitted sources affect Puget Sound:

> The study found that low oxygen concentrations naturally occur through much of South and Central Puget Sound. However, human contributions from marine point sources and within watershed inflows decrease oxygen as much as 0.2 to 0.4 mg/L below natural conditions in portions of Totten, Eld, Budd, Carr, and Case Inlets, and East Passage in Central Puget Sound.
>
> * * *
>
> Fish need oxygen: In areas with low levels of dissolved oxygen, fish and other marine life become stressed and die or are forced to flee their habitat. There are many areas in Puget Sound with very low levels of dissolved oxygen.
>
> Nitrogen is the main pollutant that causes low dissolved oxygen levels:

> Discharges from wastewater treatment plants, septic systems and other sources add nitrogen to Puget Sound. Excess nitrogen causes excess algae growth. As the algae dies and decays, they rob the water of dissolved oxygen. Once released into Puget Sound, nitrogen moves around. Nitrogen discharged at one spot may cause low dissolved oxygen levels many miles away.[122]

Seeing the handwriting on the wall, five years ago Ecology published a report on implementing nutrient removal at the state's municipal sewage treatment plants. *See Evaluation of Nutrient Removal at WWTP*, *supra* n. 85. As the report commented, "[c]ommon water quality problems associated with high levels of these nutrients are reduced concentrations of dissolved oxygen, daily swings in pH, and algae blooms. . . . Studies have shown that municipal sewage treatment plants are significant contributors to these problems." *Id*. at ES-1.

In issuing its NPDES permits, Ecology seeks to have it both ways. It acknowledges what is both commonly known and scientifically proven—that discharges of nitrogen (and toxics) are causing violations of water quality standards in Puget Sound at distances far from the point of discharge—and at the same time it continues to issue NPDES permits as if it were in utter ignorance of these facts. The Clean Water Act and its implementing regulations prohibit such contradictory results.

Nine years ago, EPA's Science Advisory Board found that nutrient controls at municipal sewage treatment plants were both cost effective and reliable:

> In the Chesapeake Bay watershed, nutrient reductions from sewage treatment plant upgrades were determined to be as cost effective as, and more predictable than, the estimated reductions achieved through implementation of agricultural non-point source BMPs. The Chesapeake Bay Commission (2004) . . . stated that "this technology-based approach provides the highest degree of confidence for consistent, long-term reductions. Furthermore, the cost of this technology has continued to decline in recent years."

SAB 2007 Report, *supra* n. 86, at 199 (emphasis added). Seven years ago, the State-EPA

---

[122] Ecology, *Saving Puget Sound, South Puget Sound Dissolved Oxygen Study*, *at* http://www.ecy.wa.gov/puget_sound/dissolved_oxygen_study.html (last accessed Oct. 18, 2016) (emphasis added).

Nutrient Innovations Task Group concluded that nutrient pollution demands:

- **Acting** on what we know
- **Fully using** the tools we have
- **Exploring** new authorities that we need
- **Demanding** of each other, from the local to national levels, stronger, multi-sector cross-state engagement and support for a shared commitment to environmental protection, public health, and shared economic opportunities.

In short, urgent action is needed.[123]

Today, we demand that EPA act on what it knows and fully use the regulatory tools provided—nay required—by the Clean Water Act.

We therefore hereby request that the U.S. Environmental Protection Agency take the following actions:

(1) initiate formal proceedings under 40 C.F.R. § 123.64(b) to correct the State of Washington's NPDES program or, in the alternative, withdraw EPA's authorization to administer the program from Ecology;

(2) formally respond to this petition in writing, as required by 40 C.F.R. § 123.64(b)(1);

(3) make a determination that Washington is not administering the NPDES program consistent with federal law because it has not developed a regulatory program for developing water quality-based effluent limits in NPDES permits, and in its operations it has failed to exercise control over activities required to be regulated, and it has repeatedly issued permits that fail to conform to federal regulatory and statutory requirements;

(4) notify the State of Washington that it is failing to administer the NPDES permit program in accordance with the CWA; and

(5) schedule a public hearing regarding these violations pursuant to 33 U.S.C. § 1342(c)(3); 40 C.F.R. § 123.64(b)(1).

---

[123] *An Urgent Call to Action, supra* n. 4 at 34 (emphasis in original).

Respectfully submitted,

Nina Bell, Executive Director
Northwest Environmental Advocates
P.O. Box 12187
Portland, OR 97212

Dated this day, the 13th of February, 2017.

Enclosed: CD with attachments (listed below)
CD with most recent permits and fact sheets for 103 NPDES permits.

Attachment A:	Ecology Documents Pertaining to Nitrogen Discharges to Puget Sound
Attachment B:	Compilation of EOPS reports (2011, 2012, 2013, 2014, 2015, 2016)
Attachment C:	List of 103 Permits Reviewed

List of Attachments to Petition for Corrective Action or Withdrawal of NPDES Permitting Authority from the State of Washington Department of Ecology

1. Ecology, *Puget Sound Dissolved Oxygen Model: Nutrient Load Summary for 1999-2008* (Nov. 2011)

2. State-EPA Nutrient Innovations Task Group, *An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group* (Aug. 2009)

3. Letter from Russell E. Train, Administrator, EPA, to Governor Daniel J. Evans (Nov. 14, 1973)

4. EPA, *NPDES Permit Writers' Manual* (Sept. 2010)

5. Ecology, *Control of Toxic Chemicals in Puget Sound Phase3: Pharmaceuticals and Personal Care Products in Municipal Wastewater and Their Removal by Nutrient Treatment Technologies* (Jan. 2010)

6. Ecology, *Technical and Economic Evaluation of Nitrogen and Phosphorus Removal at Municipal Wastewater Treatment Facilities* (June 2011)

7. Ecology, *Historically Speaking: An Oral History In Celebration of the first 35 years*, 1970-2005 (July 2005)

8. Memorandum from Deborah G. Nagle, Acting Director, Water Permits Division, Office of Wastewater Management, to Michael Bussell, Director, Office of Water and Watersheds, Region 10 Re: *2009 Regional National Pollutant Elimination System (NPDES) Program Review for Region 10* (Jan. 13, 2011)

9. Ecology, *A three-dimensional water quality model of South Puget Sound* (2001)

10. Ecology, *Assessing Sensitivity to Eutrophication of the Southern Puget Sound Basin; Spatial and Seasonal Perspectives* (2001)

11. Ecology, *South Puget Sound Water Quality Study Phase 1* (Oct. 2002)

12. Ecology, *South Puget Sound Dissolved Oxygen Study Water Quality Model Calibration and Scenarios* (March 2014)

13. WQ Search Tool, Washington State Water Quality Assessment, 303(d)/305(b) Integrated Report, *available at* https://fortress.wa.gov/ecy/wats/ approvedsearch.aspx

14. Letter from Daniel D. Opalski, Director, Office of Water and Watersheds, EPA, to Kelly Susewind, Ecology, *Re: Approval of Washington State 2010 303(d) List* (Dec. 21, 2012)

15. EPA, *Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Saltwater): Cape Cod to Cape Hatteras* (Nov. 2000)

16. Laura Friedenberg, *et al., Increasing nutrients, changes in algal biomass, and large*

Noctiluca blooms in Puget Sound: Is eutrophication fueling the microbial food web?, Publication No. 13-03-019 (April 2013)

17. Ecology, *Water Quality Program Policy, Assessment of Water Quality for the Clean Water Act Section 303(d) and 305(b) Integrated Report,* WQP Policy 1-11 (revised July 2012)

18. Listing ID No. 40865, Sunday Lake, *available at* https://fortress.wa.gov/ecy/wats/UIEpaSearch/ViewApprovedListing.aspx?LISTING_ID=40865

19. Ecology, *Effects of Nitrogen, Algal Blooms and Eutrophication, Nitrogen in the Puget Sound Ecosystem, Nitrogen Home, Environmental Assessment Program,* http://www.ecy.wa.gov/ programs/eap/Nitrogen/Effects.html

20. Encyclopedia of Puget Sound, Puget Sound Institute, University of Washington., *Harmful algal blooms in Puget Sound,* https://www.eopugetsound.org/articles/harmful-algal-blooms- puget-sound

21. Puget Sound Science Review, Encyclopedia of Puget Sound, Puget Sound Institute, University of Washington, *Harmful Algal Blooms*, https://www.eopugetsound.org/science-review/ section-3-harmful-algal-blooms.

22. Greene C, Kuehne L, Rice C, Fresh K, Penttila D, *Forty years of change in forage fish and jellyfish abundance across greater Puget Sound, Washington (USA): anthropogenic and climate associations*, Mar Ecol Prog Ser 525:153-170 (2015)

23. Ecology, *Puget Sound and the Straits Dissolved Oxygen Assessment Impacts of Current and Future Human Nitrogen Sources and Climate Change through 2070* (March 2014)

24. EPA, Ecology, *Environmental Performance Partnership Agreement State Fiscal Years 2016–2017, July 1, 2015 –June 30, 2017* (revised July 2015)

25. EPA, Ecology, *Environmental Performance Partnership Agreement State Fiscal Years 2014 – 2015, July 1, 2013 – June 30, 2015* (revised July 2013)

26. Ecology, *WA State Performance Partnership Agreement, July 2011-June2013, Water Quality Program Status Report for January-June 2012* (Sept. 2012)

27. Ecology, *Fact Sheet for NPDES Permit WA0040762, City of Yelm Wastewater Treatment and Water Reclamation Facility* (June 24, 2005)

28. Ecology, *Fact Sheet for NPDES/Reclaimed Water Permit WA0022349 for City of Sequim Reclaimed Water Facility* (Feb. 27, 2014)

29. Ecology, *Snohomish River Estuary Total Maximum Daily Load* (Aug. 1999)

30. Ecology *Puyallup River Total Maximum Daily Load for Biochemical Oxygen Demand, Ammonia, and Residual Chlorine* (June 1993);

31. Ecology, *Snoqualmie River Total Maximum Daily Load Study* (May 1994), page 9, *available at* https://fortress.wa.gov/ecy/publications/documents/9471.pdf (file corrupted).

32. Ecology, *Fact Sheet for NPDES No. WA0020303 City of Orting Wastewater Treatment Plant* (Dec. 13, 2011)

33. Ecology, *Fact Sheet for NPDES Permit WA0029548, City of Snohomish Wastewater Treatment Plant* (Oct. 30, 2012)

34. Ecology, *Henderson Inlet Watershed Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Temperature Total Maximum Daily Load Study* (March 2006)

35. Ecology, *Fact Sheet for NPDES Permit WA0024490 City of Everett Water Pollution Control Facility* (July 29, 2015)

36. Ecology, *Total Maximum Daily Load Duwamish Waterway and River* (undated)

37. Ecology, *Water Quality Improvement Project Duwamish-Green Basin: Ammonia-Nitrogen*, WRIA 9, Water Quality Improvement Projects, http://www.ecy.wa.gov/programs/wq/tmdl/DuwamishTMDL.html

38. Ecology, *Fact Sheet for NPDES Permit WA0029581, King County's South Wastewater Treatment Plant* (July 1, 2015)

39. Memo from Greg Pelletier, EILS Program, Watersheds Assessment Section, Ecology, to Bill Backous, Southwest Regional Office, Ecology Re: *Addendum to the 1993 Puyallup River TMDL Report* (July 22, 1994)

40. Ecology, *Water Quality Improvement Project, Puyallup River Basin Area: Multi-parameter*, http://www.ecy.wa.gov/programs/wq/tmdl/puyallup/do-bod-ammonia.html

41. Letter from Kelly Susewind, Southwest Region Manager, Water Quality Program, Ecology to Karen Dinicola, Citizens for a Healthy Bay, Re: *Stay of Reserve Allocations for BODS and Ammonia* (Dec. 1, 2000)

42. Ecology, *Nisqually Watershed Bacteria and Dissolved Oxygen TMDL* (June 2005)

43. Ecology, *Bear-Evans Watershed Temperature and Dissolved Oxygen Total Maximum Daily Load Water Quality Improvement Report* (Sept. 2008)

44. Ecology, *Johnson Creek Watershed Total Maximum Daily Load* (June 2000)

45. Ecology, *Stillaguamish River Watershed Fecal Coliform, Dissolved Oxygen, pH, Mercury, and Arsenic Total Maximum Daily Load (Water Cleanup Plan)* (April 2005)

46. Ecology, *Clarks Creek Dissolved Oxygen and Sediment Total Maximum Daily Load* (Dec. 2014)

47. Ecology, *Fact Sheet for NPDES Permit No. WA0037214 City of Tacoma North End Plant*

No. 3 (Nov. 10, 2003)

48. Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0037214 City of Tacoma North End Plant No. 3* (June 1, 2009)

49. Ecology, *Fact Sheet for NPDES Permit WA0029581 King County South Wastewater Treatment Plant* (July 1, 2015)

50. Ecology, *Fact Sheet for NPDES Permit WA0029181, West Point Wastewater Treatment Plant (WWTP) and Combined Sewer Overflow (CSO) System* (Dec. 19, 2014)

51. Ecology, *Fact Sheet for NPDES Permit WA0037290, Facility Name: Tamoshan Sewage Treatment Plant* (Aug. 21, 2003)

52. Ecology, *NPDES Permit No. WA-003706-1 to City of Olympia, LOTT Sewage Treatment Plant* (Sept. 25, 1987)

53. Ecology, *Fact Sheet for Permit No. WA-003706-1* [LOTT] (Aug. 1987)

54. Ecology/URS Corporation, Southern Puget Sound Water Quality Assessment Study, *Comprehensive Circulation and Water Quality Study at Budd Inlet* (July 31, 1986)

55. Ecology, *Fact Sheet for Draft NPDES Permit No. WA-003706-1* (April 15, 1993)

56. Ecology, *Fact Sheet for NPDES Permit WA0037061, LOTT Alliance, Budd Inlet Wastewater Treatment Plan* (Sept. 1, 2005)

57. Ecology, *Modeling Dissolved Oxygen in Budd Inlet and Capitol Lake* (June 2009)

58. LOTT Clean Water Alliance, *TMDL Participation,* http://lottcleanwater.org/about-lott/ wastewater-treatment/regulatory-permits/ tmdl-participation/

59. Ecology, *Budd Inlet and Capitol Lake (Phase 2) Dissolved Oxygen and Total Phosphorus TMDL Timeline*

60. Ecology, *Deschutes River, Capitol Lake, and Budd Inlet Temperature, Fecal Coliform Bacteria, Dissolved Oxygen, pH, and Fine Sediment Total Maximum Daily Load Technical Report Water Quality Study Findings* (June 2012)

61. Ecology, *Addendum to the Fact Sheet for National Pollutant Discharge Elimination System (NPDES) and Reclaimed Water Permit No. WA0037061* [LOTT] (Aug. 17, 2011)

62. LOTT Alliance, *Capital Budget and Capital Improvements Plan* (2007)

63. EPA Office of Inspector General, *Evaluation Report: EPA Needs to Accelerate Adoption of Numeric Nutrient Water Quality Standards*, Report No. 09-P-0223 (Aug. 26, 2009)

64. EPA, *National Strategy for the Development of Regional Nutrient Criteria* (June 1998)

65. Memorandum from Geoffrey Grubbs, Director, Office of Science and Technology, EPA Re: *Development and Adoption of Nutrient Criteria into Water Quality Standards* (Nov. 14, 2001)

66. Memorandum from Benjamin Grumbles, Assistant Administrator, Office of Water, EPA, Re: *Nutrient Pollution and Numeric Water Quality Standards* (May 25, 2007)

67. EPA, *State Adoption of Numeric Nutrient Standards (1998–2008)* (Dec. 2008)

68. Memorandum from Nancy Stoner, Acting Assistant Administrator, Office of Water, EPA, to Regional Administrators, Regions 1-10, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions* (March 16, 2011)

69. Memorandum from Joel Beauvais, Deputy Assistant Administrator, Office of Water, EPA to State Environmental Commissioners, State Water Directors, Re: *Renewed Call to Action to Reduce Nutrient Pollution and Support for Incremental Actions to Protect Water Quality and Public Health* (Sept. 22, 2016)

70. EPA, State Development of Numeric Criteria for Nitrogen and Phosphorus Pollution, https://www.epa.gov/nutrient-policy-data/state-development-numeric-criteria-nitrogen-and-phosphorus-pollution#tb5

71. Ecology, *Nutrient Criteria Development in Washington State* (April 2004)

72. Letter from Michael F. Gearheard, Director, Office of Water and Watersheds, Region 10, EPA to Dave Peeler, Water Quality Program Manager, Ecology, Re: *EPA/State Mutual Agreement on Numeric Nutrient Criteria Development Plan for Washington State* (Sept. 14, 2005)

73. Ecology, *Fact Sheet for NPDES Permit WA0032182 King County Carnation Wastewater Treatment Facility* (Dec. 13, 2013)

74. Ecology, *Boston Harbor Fact Sheet* (Feb. 1, 2012)

75. Letter from Michael H. Shapiro, Deputy Assistant Administrator, Office of Water, EPA, to Ann Alexander, Natural Resources Defense Council (Dec. 14, 2012)

76. Letter from Tinka G. Hyde, Director, Water Division, Region 5, EPA to Marcia Willhite, Illinois Environmental Protection Agency (Jan. 21, 2011)

77. Ecology, *Fact Sheet for Hartstene Pointe Wastewater Treatment Plant National Pollutant Discharge Elimination System (NPDES) Permit WA0038377* (May 16, 2016)

78. Ecology, *South Puget Sound Dissolved Oxygen Study Circulation Modeling Overview* (Oct. 28, 2009)

79. Ecology, *Water Quality Program Permit Writer's Manual* (rev. Jan. 2015)

80. Letter from James D. Giattina, Director, Water Protection Division, Region 4, EPA to Sandy Gruzesky, Kentucky Department for Environmental Protection, Re: *Notice of Specific Objection – Xinergy Corporation (KY0108014)* (Oct. 22, 2010)

81. Memorandum from James A. Hanlon, Director, Office of Wastewater Management, EPA, to Alexis Strauss, Director, Water Division, EPA Region 9 *Re: Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits* (May 10, 2007)

82. Ecology, *Fact Sheet for National Pollutant Discharge Elimination System (NPDES) Permit WA0037915 Carlyon Beach Wastewater Treatment Plant* (August 2012) at 23.

83. Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for National Pollutant Discharge Elimination System (NPDES) Permit No. WA0037290* [Tamoshan] (undated)

84. Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for NPDES Permit No. WA0039624* [Chambers Creek] (undated)

85. Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0037087* [Tacoma Central Wastewater Treatment Plant (#1)] (Sept. 29, 2010)

86. Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0022772* [Salmon Creek Wastewater Treatment Plant] (March 1, 2013)

87. Ecology, *Addendum to the Fact Sheet for NPDES Permit No. WA0038075* [Rustlewood Wastewater Treatment Plant] (Sept. 30, 2014)

88. Ecology, *National Pollutant Discharge Elimination System Waste Discharge and Reclaimed Water Permit No. WA0037061* [LOTT] (Aug. 26, 2011)

89. Ecology, *Western Washington NPDES Phase I Stormwater Permit Final S8.D Data Characterization 2009-2013* (Feb. 2015)

90. NWEA, *Petition for Rulemaking Under the Clean Water Act to Update the Water Quality Criteria for Toxics in the State of Washington* (Oct. 28, 2013)

91. Letter from Nina Bell, NWEA to Gina McCarthy, Administrator, EPA Re: *Follow Up to October 28, 2013 Northwest Environmental Advocates' Petition for Rulemaking on Water Quality Criteria for Toxics in the State of Washington* (Aug. 31, 2015)

92. Letter from Nina Bell, NWEA, to Gina McCarthy, Administrator, EPA, Re: *Second Follow Up to October 28, 2013 Northwest Environmental Advocates' Petition for Rulemaking on Water Quality Criteria for Toxics in the State of Washington* (Feb. 9, 2016)

93. Puget Sound Water Quality Authority, *1987 Puget Sound Water Quality Management Plan* (Dec. 10, 1986)

94. URS Company, *Southern Puget Sound Water Quality Assessment Study: Circulation and Flushing in South Puget Sound* (July 1986).

95. Tracy K. Collier, *et al.*, *Toxic Chemical Contaminants and Puget Sound* (emphasis in original) *Available at* http://depts.washington.edu/uwconf/2007psgb/2007 proceedings/papers/12e_colli.pdf

96. Ecology, *Saving the Sound*, http://www.ecy.wa.gov/puget_sound/overview.html

97. EPA, *Puget Sound Georgia Basin Transboundary Ecosystem Indicator Report* (2006)

98. Puget Sound Water Quality Authority, *Puget Sound Update: First Annual Report of The Puget Sound Ambient Monitoring Program* (May 1990)

99. Ecology, *Control of Toxic Chemicals in Puget Sound Phase 3 Data and Load Estimates* (April 2011)

100. Ecology, *Summary Technical Report Control of Toxic Chemicals in Puget Sound Phase 3: Loadings from POTW Discharge of Treated Wastewater* (Dec. 2010)

101. James Meador, *et al.*, *Contaminants of emerging concern in a large temperate* estuary, 213 Environmental Pollution 254 (June 2016)

102. Ecology, *Fact Sheet for NPDES Permit WA0030317, Kitsap County Sewer District No. 7* (June 30, 2011)

103. Ecology, *Fact Sheet for NPDES Permit WA0023353, City of Sumner Wastewater Treatment Facility* (Feb. 7, 2008)

104. Ecology, *National Pollutant Elimination System Waste Discharge Permit No. WA0023353* [Sumner] (March 24, 2008, modified Nov. 16, 2009, July 18, 2011)

105. Ecology, *Statement of Basis for NPDES Permit No. WA0023353* [Sumner] (July 14, 2011)

106. Ecology, *South Puget Sound Dissolved Oxygen Study, Saving Puget Sound*, http://www.ecy.wa.gov/puget_sound/dissolved_oxygen_study.html

107. Ecology, *Fact Sheet for NPDES Permit WA0022527, Vashon Wastewater Treatment Plant* (Sept. 27, 2016)

108. Susan S. Pool *et al.*, *Physical, Chemical, and Biological Conditions during Noctiluca Blooms in an Urban Fjord, Puget Sound* (2015)

109. Chrisopher Krembs, *et al. South Puget Sound – 2011 and 2012 in review. Aerial and water column observations from Ecology's long-term monitoring program* (2012)

110. Christopher Krembs *et al. Changes in nutrient ratios drive changes in pelagic and benthic assemblages, and benthic-pelagic coupling in Puget Sound: A compelling hypothesis linking water quality and the benthos* (2014)

111. Christopher Krembs, *How did the east-pacific temperature anomaly affect water quality*

trends in the urban fjord, Puget Sound, 2014-2016 Pacific Anomalies Workshop (Jan. 2016)

112. Christopher Krembs, *et al.*, *Can long term-nitrogen increases affect pelagic food web processes and the vertical structure of biogeochemical processes in Puget Sound?* 2014 Salish Sea Ecosystem Conference (April 30, 2014)

113. EPA, Science Advisory Board, *Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board* (Dec. 2007)

114. P.H. Doering, *et al.*, *Phosphorus and nitrogen limitation of primary production in a simulated estuarine gradient*, 124 Mar Ecol Prog Ser, 271 (1995)

115. R.L. North, *Evidence for phosphorus, nitrogen, and iron colimitation of phytoplankton communities in Lake Erie*, 52 Limnol. Oceanog. 315 (2007)

116. Anthony J. Richardson, *et al., The Jellyfish Joyride: Causes, Consequences and Management Responses to a More Gelatinous Future*, 24 Trends in Ecology and Evolution, 312, 314 (2009)

117. Jennifer E. Purcell *et al., Anthropogenic Causes of Jellyfish Blooms and Their Direct Consequences for Humans: A Review*, 350 Mar Ecol Prog Ser 153, 163 (2007)

118. Robert H. Condon, *et al., Effects of Low Dissolved Oxygen on Survival and Asexual Reproduction of Scyphozoan Polyps (Chrysaora quinquecirrha*), 451 Hydrobiologia 89 (2001)

119. Jennifer E. Purcell, *et al., Pelagic Cnidarians and Ctenophores in Low Dissolved Oxygen Environments: A Review*, in *Coastal Hypoxia: Consequences for Living Resources and Ecosystems* (Rabalais, N.N. and Turner, R.E., eds) American Geophysical Union (2001)

120. Ecology, *[draft] Fact Sheet for NPDES Permit No. WA0024074 City of Mount Vernon Wastewater Treatment Plant* (Sept. 27, 2016)

121. People for Puget Sound, *Toxic Chemicals in Puget Sound: The Impact of Mixing Zones on Permitted Discharges* (June 2, 2008)

122. USGS, *Puget Sound*, Development Prototype: Puget Sound Ecosystem Portfolio Mode, https://geography.wr.usgs.gov/pugetSound/ps.html

123. Ecology, *Year 2014 Report on Activities to Implement Washington State's Water Quality Plan to Control Nonpoint Source Pollution* (May 2015)

124. Ecology, *Addendum to the Fact Sheet for the Thurston County Public Works Tamoshan Wastewater Treatment Plan NPDES Permit WA0037290* (Jan. 18, 2017)

125. Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for NPDES Permit No. WA0037290* [Tamoshan] (undated)

126. Richard A. Feely, et al., *The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary*, 88 Estuarine, Coastal and Shelf Science 442 (May 15, 2010)

127. Governor Christine O. Gregoire, *Executive Order 12-07, Washington's Response to Ocean Acidification* (Nov. 27, 2012)

128. Washington State Blue Ribbon Panel on Ocean Acidification, *Ocean Acidification: From Knowledge to Action Washington State Blue Ribbon Panel on Ocean Acidification, Washington State's Strategic Response* (Nov. 2012)

129. Center for Ocean Solutions, *Washington State's Legal and Policy Options for Combating Ocean Acidification in State Waters* (July 2012)

130. Jerome Spitz, et al., *Proximate composition and energy content of forage species from the Bay of Biscay: high- or low-quality food?,* 67 ICES Journal of Marine Science 909 (2010)

131. *What are we doing about it?*, Marine Water Quality, EPA

132. Ecology, *Marine Water Condition Index* (May 2012)

133. Christopher Krembs, *What PS marine monitoring data could be telling us? Stimulating a discussion* (Dec. 16, 2013)

134. Julia Bos, *et al., A Decade on the Edge of Puget Sound: Examining Boundary Stations in the Strait of Juan de Fuca*, 2009 Puget Sound Georgia Basin Ecosystem Conference (2009)