BEFORE THE WASHINGTON
DEPARTMENT OF ECOLOGY

Petition for Rulemaking to Adopt a Presumptive	)
Definition of "All Known, Available, and Reasonable	)
Treatment" as Tertiary Treatment for Municipal Sewage	)
Dischargers to Puget Sound and its Tributaries	)

INTRODUCTION

Northwest Environmental Advocates ("NWEA") hereby petitions the Washington Department of Ecology ("Ecology") to propose and adopt a rule establishing technology-based effluent limits for the discharge of nutrients and toxics from municipal wastewater treatment facilities that discharge to Puget Sound and its tributaries. This petition asks Ecology to update 31-year old discharge standards for sewage treatment that are based on 100-year old technology. Through this rulemaking, Ecology should amend its existing regulations to establish presumptive limits (and a process for rebutting that presumption) for year-round enhanced secondary and tertiary treatment of sewage as the minimum technology-based treatment necessary to meet the State of Washington's requirement for use of "All Known, Available, and Reasonable Treatment," also known as "AKART."

Ecology has been studying the effects of excess nutrient pollution on Puget Sound water quality since the late 1980s. Despite the passage of 30 years, Ecology has yet to turn those studies into regulatory actions to protect the Sound from the discharge of nutrients in treated sewage. By 2008, Ecology and the U.S. Environmental Protection Agency ("EPA") had agreed that Ecology's requiring sewage treatment plants to use only 100-year old secondary treatment was out-of-date and did not reflect the advances in treatment technology that remove nutrients from sewage. In 2010, Ecology and EPA demonstrated how nutrient removal technology also removes a wide variety of toxic pollutants, including pharmaceuticals and personal care

products. In 2011—over seven years ago—Ecology published a technical and economic evaluation of using those advanced treatments at Washington's sewage treatment plants. Despite Ecology's concerns about Puget Sound water quality, its prediction of a significant increase in nutrients discharged to Puget Sound, and its conclusion that nutrient removal technology is readily available and often economical, Ecology has taken no action to update its outdated regulations and permit requirements as required by AKART.

"Enhanced secondary and tertiary treatment"[1] describes a variety of methods by which municipal sewage treatment plants remove nutrient pollution—nitrogen and phosphorus—and toxic contaminants prior to discharge. Over 30 percent of sewage treatment systems in the United States use greater levels of treatment than secondary. These methods include biological nutrient removal ("BNR"), such as using bacteria for nitrification followed by denitrification; physical separation, such as sedimentation and filtration; and use of chemicals to precipitate phosphorus. The precise combination of tertiary treatment methods appropriate for a given facility is based on a wide range of factors including the existing type and configuration of secondary treatment.

The requirement that all dischargers meet the AKART standard has been a legal requirement since 1945, when Washington declared its policy to maintain "the highest possible standards" of state waters in order to establish as a priority the protection of public waters for public enjoyment, wildlife, and industrial development. Washington's AKART standard for treatment of discharges is in addition to requirements established by the federal Clean Water Act.

[1] For purposes of this petition, the use of the phrase "tertiary treatment" refers to both enhanced secondary and tertiary treatment technologies.

AKART must be assessed and applied each time Ecology, or the EPA, issues a National Pollutant Discharge Elimination System ("NPDES") permit to a discharger in Washington.

In addition to AKART's being a legal requirement for all permitted dischargers, use of nutrient removal technology for human sewage is key to protecting water from nutrient pollution. Ecology's failure to implement AKART for discharges to Puget Sound and its tributaries has resulted in its not maintaining these waters to the highest possible standards as required by state law. Instead, the unrestricted discharge of nutrient pollution to the Sound has caused dangerously low levels of dissolved oxygen, increased algal blooms, fundamental changes to the Sound's food web, and increased local acidification. Moreover, Ecology has predicted that the significant increase in nutrient pollution discharged from municipal sewage treatment plants due to population growth, along with the local effects of climate change, will increase the adverse impacts on Puget Sound.

In violation of the long-standing statutory duty to apply AKART, Ecology routinely issues NPDES discharge permits that require only the use of secondary treatment by the very sewage dischargers that Ecology has identified as the leading anthropogenic source of nutrient pollution in the Sound. As a result, dischargers to the Sound continue to use decades-old technologies that do not remove known pollutants. Over the last decades, tertiary treatment has become increasingly known, available, and economically feasible, yet Ecology consistently fails to evaluate whether such advanced pollution treatment technology is required pursuant to AKART when it issues permits for the discharge of pollution to Puget Sound and its tributaries. Moreover, Ecology consistently relies on its own manifestly outdated technology-based regulations as the basis for not evaluating, let alone requiring, pollution reduction in municipal sewage beyond secondary treatment as required by AKART.

This petition is brought pursuant to RCW 34.05.330, which provides for individuals to petition state agencies to adopt administrative rules, and RCW 90.48.035, which provides for the Department of Ecology to promulgate rules and regulations it deems necessary to carry out the policy enunciated in RCW 90.48.010. NWEA requests that Ecology initiate a rulemaking to amend WAC 173-221 (Discharge Standards and Effluent Limitations for Domestic Wastewater Facilities) to include effluent limits for the discharge of nitrogen at 3.0 mg/L and phosphorus at 0.1 mg/L or lower. In addition, the amended rules should establish that each facility will use the tertiary treatment technology and other operational changes necessary to reduce the discharge of toxics associated with municipal sewage discharges. Finally, the amended rules should provide the process and standards for rebutting the assumption that tertiary treatment is "reasonable" and establishing the alternative technology-based treatment standards that will be required in those rare instances when Ecology makes such a finding.

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I. SUBJECT OF THE REQUESTED RULE

This petition seeks action by Ecology to institute a formal rulemaking proceeding to define AKART for the approximately 107 municipal sewage treatment plants discharging to Puget Sound and its tributaries as year-round[2] tertiary treatment to remove nutrient pollution and toxic contaminants, and establish effluent limitations of 3.0 mg/L for total nitrogen and 0.1 mg/L (or lower) of total phosphorus.[3, 4] The rule should establish a presumption that tertiary treatment

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[2] According to Ecology, "seasonal removal generally would provide only about 60 percent of the nitrogen removal provided by year-round removal, on an annual mass basis." Ecology, *Technical and Economic Evaluation of Nitrogen and Phosphorous Removal at Municipal Wastewater Treatment Facilities* 17-10 (June 2011) (hereinafter "Washington Nutrient Removal Evaluation 2011") *available at* https://fortress.wa.gov/ecy/publications/documents/1110060.pdf (last accessed Sept. 13, 2018).

[3] It is assumed that use of enhanced secondary and tertiary treatment will also result in lower levels of total suspended solids ("TSS"), five-day biochemical oxygen demand ("BOD"), and fecal coliform such that the effluent levels set out in WAC 173-221-040, and the alternative effluent levels set out in WAC 173-221-050, for TSS, BOD, and fecal coliform should be reduced appropriately. For example, the Spokane County sewage treatment plant, which has both phosphorus and ammonia limits produces wastewater "utilize[ing] membranes producing a $CBOD_5$ of less than 2 mg/L and typically a TSS with a comparable single digit concentration." Ecology, *Fact Sheet for NPDES Permit WA-009331-7 Spokane County Regional Water Reclamation Facility* 11 (Nov. 28, 2011) (hereinafter "Spokane Fact Sheet") *available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=20868 (last accessed Oct. 3, 2018).

Similarly, citing the Water Environment Research Foundation's 2004 publication *Reduction of Pathogens, Indicator Bacteria, and Alternative Indicators by Wastewater Treatment and Reclamation Processes*, Ecology has determined that "treatment systems incorporating biological nutrient removal and associated long solids retention times had a greater reduction in pathogenic organisms than activated sludge systems without nutrient removal." Ecology, *Fact Sheet for NPDES Permit WA0032247 Brightwater Wastewater Treatment System* 82 (March 1, 2018) (hereinafter "Brightwater Fact Sheet"), *available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=227803 (last accessed Oct. 4, 2018).

[4] 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. 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

is "reasonable" and the specific numeric limits are achievable unless Ecology affirmatively demonstrates, through compelling evidence to the contrary, that the owner/operator(s) of an individual sewage treatment plant would face severe economic hardship if required to install such treatment technology, even on an attenuated compliance schedule. The amended rules should provide the process and standards for rebutting the assumption that tertiary treatment is "reasonable" and establishing the alternative technology-based treatment standards that will be required in those rare instances when Ecology makes such a finding.[5]

Removal of nutrients and toxics from municipal discharges of treated sewage is essential for protecting water quality of Puget Sound and its tributaries. As Ecology stated so simply and matter-of-factly a dozen years ago, the problem is that "[f]ish need oxygen . . . There are many areas in Puget Sound with very low levels of dissolved oxygen." Ecology, *Public Notice, South Puget Sound Dissolved Oxygen Study* (Oct. 2006).[6] The pollutant causing the problem was known: "Nitrogen is the main pollutant that causes low dissolved oxygen levels . . . Once released into Puget Sound, nitrogen moves around. Nitrogen discharged at one spot may cause low dissolved oxygen levels many miles away." *Id*. The source was known: "Discharges from

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(1995); R.L. North, *Evidence for phosphorus, nitrogen, and iron colimitation of phytoplankton communities in Lake Erie*, 52 Limnol. Oceanog. 315 (2007).

[5] For example, Tetra Tech recently concluded that achieving 7.0 mg/L total nitrogen was "achievable at most WWTPs by simply optimizing existing activated sludge systems largely irrespective of their original design, with minimal capital costs." Memorandum from Victor D'Amato, Tetra Tech, to Tina Laidlaw, EPA Region 8, *Re: State of Montana wastewater system nutrient reduction cost estimates* 2 (Oct. 21, 2016) (hereinafter "Tetra Tech 2016") *available at* https://deq.mt.gov/Portals/112/Water/WQPB/Standards/NutrientWorkGroup/NutrientWorkGrouppresentations/Montana%20Major%20and%20Minor%20WWTP%20nutrient%20costs%20v.2.pdf (last accessed Sept. 13, 2018).

[6] *Available at* https://fortress.wa.gov/ecy/publications/publications/0610073.pdf (last accessed Oct. 12, 2018).

wastewater treatment plants, septic systems, and other sources add nitrogen to Puget Sound." *Id*. And, in 2006, Ecology was well aware of the need for timely action:

> About $200 million worth of investments in wastewater treatment plants are being planned, designed, or constructed right now in South Puget Sound, including work by Tacoma, LOTT (Lacey, Olympia, Tumwater and Thurston County), Shelton, Buckley, Enumclaw, and Sumner. King County is investing heavily in the Brightwater plant. As the population in the Puget Sound region grows, the capacity of wastewater treatment plants will need to increase. The population in the Puget Sound area is expected to increase from 4.2 million in 2005 to 5.1 million in 2020. That is a 21 percent increase in the next 15 years and a 51 percent increase between 1991 and 2020.

Id. (citing Washington State Office of Financial Management). Ecology remains acutely aware of the need to address nitrogen discharges today, despite having taken no regulatory actions:

> There are over 4.5 million people living in the Puget Sound region right now and the Washington Office of Financial Management estimates around 1.7 million more people will move to the region by 2040. That additional number of people means there could be more than a 40 percent increase of nutrients discharged to Puget Sound from humans over the next several decades.

Ecology, *Reducing nutrients in Puget Sound*[7] (citation omitted) (hereinafter "Ecology, Reducing Nutrients").

Puget Sound is also suffering from high levels of toxic pollution that have poisoned the food chain. EPA reports that "Southern resident killer whales [in Puget Sound] have been found to carry some of the highest PCB and PBDE concentrations reported in animals. The levels in blubber exceed those known to affect the health of other marine mammals." EPA, *Southern Resident Killer Whales, Salish Sea*.[8] Despite Ecology's extensive studies on both regulated and unregulated toxic pollutants in Puget Sound—including pharmaceuticals, personal care products,

[7] *Available at* https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients

[8] *Available at* https://www.epa.gov/salish-sea/southern-resident-killer-whales (last accessed Oct. 5, 2018) (hereinafter "EPA SR Killer Whales").

endocrine-disrupting chemicals, nanomaterials, metals, and persistent organic pollutants—Ecology has established almost no effluent limits on toxics for discharges to Puget Sound and its tributaries. *See* NWEA, *Petition for Corrective Action or Withdrawal of Authorization from the State of to Issue National Pollutant Discharge Elimination System Permits* 94 – 101 (Feb. 13, 2017)[9] (hereinafter "NWEA Petition to EPA"). Yet Ecology and EPA have also evaluated the efficacy of nutrient removal technology to concurrently remove toxic pollutants from municipal sewage concluding that while approximately 21 percent of the 172 compounds evaluated 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. Ecology, *Control of Toxic Chemicals in Puget Sound Phase 3: Pharmaceuticals and Personal Care Products in Municipal Wastewater and Their Removal by Nutrient Treatment Technologies* v (Jan. 2010) (hereinafter "Phase 3 Nutrient Treatment Removal of Toxics").[10]

Although the discharge of nutrient pollution—primarily nitrogen and phosphorus—is a major concern with regard to sewage treatment facilities, "[w]astewater treatment plants that employ conventional biological treatment processes designed to meet secondary treatment effluent standards typically do not remove total nitrogen (TN) or total phosphorus (TP) to an extent sufficient to protect certain receiving waters." EPA, *Municipal Nutrient Removal Technologies Reference Document Volume 1–Technical Report* ES-1 (Sept. 2008)[11] (hereinafter "EPA Technical Reference 2008"). Enhanced secondary and tertiary treatment, on the other

[9] *Available at* https://www.northwestenvironmentaladvocates.org/newblog/download/puget-sound-201702/.
[10] *Available at* https://fortress.wa.gov/ecy/publications/publications/1003004.pdf (last accessed Oct. 5, 2018).
[11] *Available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/P100GE8B.PDF?Dockey=P100GE8B.PDF (last accessed Sept. 13, 2018).

hand, include biological, chemical, and physical means of removing nutrient pollution from sewage. Enhancing the secondary treatment process with biological nutrient removal "removes total nitrogen (TN) and total phosphorus (TP) from wastewater through the use of microorganisms under different environmental conditions in the treatment process" through the use of bacteria. EPA, *Biological Nutrient Removal Processes and Costs* 1 (June 2007)[12] (hereinafter "EPA Biological Removal 2007"). As EPA describes, "[t]otal effluent nitrogen comprises ammonia, nitrate, particulate organic nitrogen, and soluble organic nitrogen." Bacteria can be used for nitrification to convert ammonia to nitrite and then to nitrate, as well as in the process of denitrification, which converts nitrate to nitrogen gas. *Id*. Organic nitrogen cannot be removed through a biological process but, rather, requires the use of sedimentation or filtration. *Id*. at 2. For phosphorus, which is present in sewage as dissolved and particulate form, biological removal relies on microbial organisms that withdraw phosphorus in excess of their growth requirements to remove dissolved phosphorus. The particulate form is removed through chemical precipitation and filtration. *Id*.; *see also EPA Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus* 9 – 10 (April 2007)[13] (hereinafter "EPA Advanced Wastewater for P 2007"). The use of both enhanced secondary and tertiary treatment together often results in lower total phosphorus levels at reduced costs. *Id*. at 9. Finally, constructed wetlands may be used to further remove nutrients prior to discharge.

The best technology that combines enhanced secondary and tertiary treatment for nitrogen and phosphorus will differ by facility, based on such factors as the configuration of

[12] *Available at* https://www.epa.gov/nutrient-policy-data/biological-nutrient-removal-processes-and-costs (last accessed Sept. 17, 2018).
[13] *Available at* https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1004JC4.TXT (last accessed Sept. 13, 2018).

existing treatment works, other needed upgrades including for capacity, available land, and costs, among other considerations. Nevertheless, there are typical effluent limits associated with advanced nutrient removal technologies that Ecology should adopt by rule as AKART for domestic sewage treatment because they are routinely achieved by sewage treatment plants across the country. Over ten years ago, EPA's Science Advisory Board determined that existing technology was being used to achieve total nitrogen discharge concentrations of 3.0 mg/L. *See* EPA, Science Advisory Board ("SAB"), *Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board* 199 (Dec. 2007)[14] (hereinafter "SAB Report"). In 2011, Ecology published an evaluation that assumed concentrations of nitrogen of 3.0 mg/L were readily available. *See Washington Nutrient Removal Evaluation 2011, supra* n. 2, at ES-2. More recently, a consultant to EPA concluded the same. *See Tetra Tech 2016*, *supra* n. 5 (3.0 mg/L total nitrogen can be achieved through "biological nitrogen removal: nitrification/ denitrification via anoxic/oxic zone or cycle retrofits, addition of a denitrification filter, or optimization for plants approaching [limits of technology]"). The chosen goal of 3.0 mg/L total nitrogen for this Tetra Tech 2016 report was "based on widely-accepted [limits of treatment] for systems specifically designed for biological nitrogen removal," and "generally must be met by investing in additional treatment facilities (e.g., reactors, mixers, recycle lines), although some plants with current effluent concentrations approaching 3.0 mg/l may be able to optimize to meet [it]." *Id*.; *see also EPA Biological Removal 2007, supra* n. 12, at 5 (limit of technology is 3 mg/L but some facilities can achieve lower concentrations of total nitrogen).

[14] *Available at* https://yosemite.epa.gov/sab/sabproduct.nsf/C3D2F27094E03F90852573B800601D93/$File/EPA-SAB-08-003complete.unsigned.pdf (last accessed Nov. 2, 2016).

The SAB also determined that achieving total phosphorus concentrations as low as 0.1 mg/L or less through use of "enhanced chemical precipitation applied alone or in combination with biological phosphorus treatment and membrane filtration," among other things, "constitute the [best management practice] for phosphorus removal at sewage treatment plants." *SAB Report, supra* n. 14*,* at 199. EPA Region 10 found in a review of 23 facilities across the U.S. that "[t]he total phosphorus concentrations achieved by some of these WWTPs are consistently near or below 0.01 mg/l." *EPA Advanced Wastewater for P 2007, supra* n. 13, at 3; *see also id*. at 7 – 8 (the vast majority of facilities reviewed average phosphorus concentrations well under 0.1 mg/L); *Washington Nutrient Removal Evaluation 2011, supra* n. 2, at ES-2. In its report pertaining to Montana, Tetra Tech confirmed treatment plants' ability to achieve total phosphorus concentrations of 0.1 mg/L using "chemical precipitation with tertiary filtration" and to achieve concentrations of 0.05 mg/L total phosphorus using "high dose chemical precipitation with advanced solids removal process." *Tetra Tech 2016, supra* n. 5, at 1-2; *see also EPA Biological Removal 2007, supra* n. 12, at 5 (limit of technology for total phosphorus is 0.1 mg/L but some facilities can achieve lower concentrations).

While not elaborating on the effluent levels achieved, in 2004 EPA stated that over 30 percent of the nation's sewage treatment plants achieved pollution control treatment beyond secondary treatment. EPA, *Primer for Municipal Wastewater Treatment Systems* 4 (Sept. 2004) (hereinafter "EPA Primer").[15] In 2013, the Washington Pollution Control Hearings Board ("PCHB"), found that "state of the art tertiary treatment works . . . constitutes AKART." *Sierra Club v. Washington*, PCHB No. 11-184, Findings of Fact, Conclusions of Law and Order (July

[15] *Available at* https://www3.epa.gov/npdes/pubs/primer.pdf (last accessed Oct. 22, 2018).

19, 2013) at 25. As this petition will illustrate further, in light of the evidence underscoring the achievability of the nutrient limits this petition requests be put into rule there is simply no rationale for concluding that secondary treatment remains AKART.

II. OVERVIEW OF THE LAW: AKART IS A LONGSTANDING WASHINGTON REQUIREMENT TO USE ALL KNOWN, AVAILABLE, AND REASONABLE TREATMENT METHODS TO PREVENT DISCHARGES OF POLLUTION

Since 1945, Washington State has declared a public policy of maintaining the waters of the state to "the highest possible standards." Laws of 1945, Ch. 216, § 1. To implement that policy, for more than 70 years Washington has required the use of all known, available, and reasonable treatment methods to prevent and control in-state water pollution. *See* Laws of 1945, Ch. 216; *see also* RCW 90.48.010.

AKART in Washington law is both a procedural and substantive requirement. The procedural requirement applies to Ecology. That agency must make an AKART determination each time it issues an NPDES permit to a discharger under section 402 of the Clean Water Act and RCW 90.48.162 authorizing a discharge of treated sewage to state waters. It must then establish effluent limits in the permit that are consistent with the AKART determination. RCW 90.48.520 ("In order to improve water quality by controlling toxicants in wastewater, the department of ecology shall in issuing and renewing state and federal wastewater discharge permits review the applicant's operations and incorporate permit conditions which require all known, available, and reasonable methods to control toxicants in the applicant's wastewater."). *See also* RCW 90.48.010 ("the state of Washington will exercise its powers, as fully and as effectively as possible, to retain and secure high quality for all waters of the state."); RCW 90.52.040 (the Director of Ecology "shall . . . require wastes to be provided with all known, available, and reasonable methods of treatment prior to their discharge or entry into waters of the

state."); RCW 90.54.020(3)(b) ("wastes and other materials and substances shall not be allowed to enter such waters which will reduce the existing quality thereof, except in those situations where it is clear that overriding considerations of the public interest will be served.").

In 1983, faced with questions pertaining to whether sewage discharged to Puget Sound required secondary treatment, the Washington Attorney General issued an opinion making clear that Ecology must evaluate AKART each time it issues an NPDES permit:

> Such statutory directions [to implement AKART] to the Department of Ecology, however, clearly do bring into play the expertise of the department as administrator of the state's water pollution control system. *Accord, Weyerhaeuser v. Southwest Air Pollution Control Authority*, 91 Wn.2d 77, 586 P.2d 1163 (1978). The precise level of treatment required by those general standards involves, primarily, engineering determinations; *i.e*., as to what treatment methods are "known," what treatment methods are "available," and what treatment methods are "reasonable" with respect to the particular installation in light of the factual circumstances surrounding it. To make those determinations a review must be conducted by the department of existing engineering technologies in order to enable it to decide which methods of treatment--including but not limited to "secondary treatment" as above defined--are suitable with respect to the waste situation involved in the particular case. *Cf*., *Weyerhaueser*, *supra*.

Washington Attorney General Opinion, AGO 1983 No. 23, at 14 (footnotes omitted) (hereinafter "Attorney General 1983").

Notwithstanding this stated need for Ecology to evaluate engineering and economic issues pertaining to AKART at the individual facility level, the State of Washington has long relied on first defining AKART by classes of dischargers, particularly municipal dischargers. In 1977, Congress amended the Clean Water Act, to allow EPA to grant waivers from secondary treatment requirements to municipal sewage treatment plants discharging to marine waters. Clean Water Act § 301(h). Certain Washington dischargers sought these waivers, which gave rise to the Washington Attorney General's 1983 opinion in which it found that Ecology was

prohibited from concurring in any such waivers by Washington's AKART requirements. *Attorney General 1983* at 6.

Despite the Attorney General's opinion, some municipalities continued to seek section 301(h) waivers. *See e.g*., Ecology Memorandum from Art Johnson to Carol Fleskes, Re: *Comments on the Reapplication for a 301(h) Marine Waiver by the City of Tacoma for the North End Wastewater Treatment Plant* (April 10, 1984).[16] As Ecology persisted in asserting a generic determination, subject to individualized assessments, that AKART required secondary treatment, the PCHB upheld its discretion to do so:

> [Ecology's] response [to the Attorney General's 1983 opinion] was to make a generalized engineering determination, expressed in its municipal strategy document, that secondary treatment is ultimately required of all municipalities by the State Standard [of AKART]. However, it provided for case-by-case evaluation of each municipal discharge to determine if the generalized determination is appropriate for that source at the time the question is asked. Thus, in its denial of concurrence [of the marine discharge waiver] here, [Ecology] stated that secondary treatment is "normally 'reasonable' unless compelling evidence to the contrary is presented."
>
> This approach essentially establishes a generic treatment level as appropriate for the entire class of municipal dischargers and, then, allows for a sort of variance from this level on a showing of "compelling evidence."

Port Angeles v. Ecology, PCHB No. 84-178, Final Findings of Fact, Conclusions of Law & Order (1985) at 22 – 23. Ecology subsequently adopted a new WAC Chapter 173-221, establishing discharge standards and effluent limitations based on secondary treatment for municipal sewage treatment plants. WSR 87-23-020 (Order 87-26) (filed Nov. 12, 1987). This chapter has not been revised since that date.

[16] *Available at* https://test-fortress.wa.gov/ecy/publications/documents/84e14.pdf (last accessed Oct. 24, 2018).

Whether Ecology could rely solely on such discharge standards established by rule for a class of dischargers to ensure that AKART was met for each individual source at the time of permit issuance was addressed years later. In *Marine Environmental Consortium et al. v. State of Washington*, PCHB Nos. 96-257, 96-258, 96-259, 96-260, 96-261, 96-262, 96-293, 96-264, 96-265, 96-266, and 97-110, Second Order on Summary Judgment (1997), the PCHB addressed this issue with regard to net pens. *Id*. at 3. Citing *Weyerhaeuser* for its holding that a regulation cannot be considered in isolation and that an agency must still meet all statutory requirements, the PCHB held that the purpose and scope language for the entire industrial discharge standards chapter did not relieve Ecology of ensuring that an individual source met the statutory AKART requirements. *Id*. at 6. In *Marine Environmental Consortium*, the missing link between Ecology's assertion that AKART was met because of the purpose and scope language and the standards for the class of dischargers themselves was the lack of any underlying engineering determinations to support Ecology's standards as being AKART. *Id.* at 8. Here, the missing link between Ecology's municipal sewage treatment standards and the requirement to meet AKART is the sheer age of the regulations—31 years old—which itself precludes any plausible argument that these discharge standards represent all known and available treatment technology.

AKART is also a substantive requirement that applies to all dischargers: "Regardless of the quality of the waters of the state, all wastes and other materials and substances proposed for entry into said waters shall be provided with all known, available, and reasonable methods of treatment prior to entry." RCW 90.54.020(3)(b); *see also* WAC 173-201A-500 ("it shall be required that all activities which discharge wastes into waters within the state, or otherwise adversely affect the quality of said waters, be in compliance with the waste treatment and

discharge provisions of state or federal law.").[17] AKART applies to all discharges including those from sewage treatment plants. *See* WAC 173-201A-020 ("The concept of AKART applies to both point and nonpoint sources of pollution."); *see also* RCW 90.48.010 (AKART applies to "industries and others"); RCW 90.52.040 (no exceptions to AKART); RCW 90.54.020(3)(b)(3) (no exceptions to AKART other than municipal sewage treatment dischargers located on five enumerated rivers); *Attorney General 1983*, at 13-14 ("All waste proposed for discharge into public waters must be provided with 'all known, available, and reasonable methods of treatment' prior to being discharged into those waters—regardless of the quality of the waters."); *In the Matter of City of Bellingham v. Washington Ecology*, PCHB No. 84-211 Final Findings of Fact, Conclusion of Law and Order 27 (June 19, 1985) ("RCW 90.52.040 applies to municipalities.").

In order to implement AKART, Ecology must require dischargers to use increasingly more stringent treatment as technological advancements become known, available, and reasonable in order to prevent, control, and abate the discharge of pollutants. *See* WAC 173-201A-020 ("AKART shall represent *the most current* methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge.") (emphasis added); *see also Attorney General 1983* fn. 19 (citing *Weyerhaeuser v. Southwest Air Pollution Control Authority*, 91 Wn.2d 77, 586 P.2d 1163 (1978)) ("The use of the encompassing

[17] AKART applies as a technology-based requirement, regardless of the quality of the receiving water. *See* RCW 90.52.040 (Ecology shall require AKART "regardless of the quality of the water of the state to which wastes are discharged or proposed for discharge, and regardless of the minimum water quality standards established by the director for said waters"); RCW 90.54.020(3)(b) ("Regardless of the quality of the waters of the state, all wastes and other materials and substances proposed for entry into said waters shall be provided with all known, available, and reasonable methods of treatment prior to entry."); RCW 90.48.520 (Ecology is required to incorporate permit conditions that require AKART "regardless of the quality of receiving water and regardless of the minimum water quality standards."); *Attorney General 1983* at 7.

word "all" [in AKART] indicates to us that the existing "state of the art" or "best available" treatment technologies are required to be used."); *Puget Soundkeeper v. State*, 102 Wash. App. 783, 789, 892, 895 (2000) ("[T]he statutory scheme envisions that effluent limitations will decrease as technology advances."). By requiring that dischargers implement and incorporate new technologies as they become available, AKART insures that water quality continues to improve as "reductions in effluent limits are driven by advances in technology." *Id.; see also Attorney General 1983* at 14 (AKART "include[s] but *[is] not limited to* 'secondary treatment'") (emphasis added). By definition, technology that is known, available, and reasonable will change over time.

In fact, the PCHB has already determined that tertiary treatment is AKART for municipal sewage discharges, concluding that:

> The advanced tertiary treatment technology employed at the [Spokane] 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 (internal citations omitted), id. at 25 (reiterating that "state of the art tertiary treatment works . . . 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.

In addition, Ecology is required to apply AKART when it issues NPDES permits under the federal Clean Water Act because the AKART standard is incorporated into the state's antidegradation policy and implementation methods, components of the state's federally-

approved water quality standards. One stated purpose of the state's 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)." WAC 173-201A-300(2)(d). *See also* 40 C.F.R. §§ 122.4(d) (NPDES permits must comply with water quality standards), 131.6(d) (water quality standards include antidegradation policy). Washington's water quality standards also place a premium on the implementation of AKART before a discharger may take advantage of any dilution analysis available under the state's mixing zone policy that relaxes the applicability of water quality standards in a defined area. *See* WAC 173-201A-400(2) ("A discharger shall be required to fully apply AKART prior to being authorized a mixing zone."); WAC 173-201A-400(13)(a) (AKART's role re-emphasized for any discharger seeking an exceedance from the mixing zone policy's numeric size and overlap criteria). Finally, Washington's antidegradation policy places a premium on improving the definition of AKART by the "use and demonstration of innovative pollution control and management approaches that would allow a significant improvement in AKART for a particular industry or category of action." WAC 173-201A-320(4)(iii).

III. NEED FOR THE REQUESTED RULE

The need for the proposed rulemaking is that, although AKART is required by state law, Ecology consistently refuses to apply that requirement to municipal sewage dischargers to Puget Sound and its tributaries. Instead, Ecology hides behind its current regulations that require only secondary treatment for the abatement of nutrient pollution—an old technology that is woefully outdated and that no longer represents all known, reasonable, and available methods of addressing Puget Sound's nutrient and toxics problem. This can be seen, for example, in the block quote below from the Carnation Wastewater Treatment Plant fact sheet, which is typical of

Ecology's truncated treatment of this issue when renewing NPDES permits for this and similar facilities:

> Federal and state regulations define technology-based effluent limits for municipal 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 municipal wastewater.

Ecology, *Fact Sheet for NPDES Permit WA0032182 King County Carnation Wastewater Treatment Facility* 15 (Dec. 13, 2013)[18] (hereinafter "Carnation Fact Sheet").

We do not oppose Ecology's reliance on adopted administrative rules when performing its AKART analysis on a case-by-case basis. In fact, we endorse that approach in this petition. But for many reasons, the current rules are simply out-of-date, limited in scope, and are no longer protective of the Sound and its tributaries, and must be updated to reflect the current state of pollution-abatement technology and the grave threats facing the Sound. In asking that Ecology establish by rule that tertiary treatment is the presumptive minimum AKART requirement, we are asking Ecology to follow its own precedent in which Ecology determined that secondary treatment was AKART for marine discharges of treated sewage. Permit writers will still be required to conduct an engineering and economic evaluation of AKART for each permit prior to its issuance. However, this individual evaluation will be greatly streamlined by Ecology's adoption of a presumptive rule because the record for the rulemaking will support those individual evaluations.

[18] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=98877 (last accessed Oct. 4, 2018).

In this section, we explain the need for the proposed rule. We begin in sub-section A with a discussion of Ecology's longtime failure to apply AKART in the specific context of nutrient pollution from municipal wastewater facilities that discharge to Puget Sound and its tributaries. In large part, this failure appears to be based on a confusion between federal minimum requirements under the Clean Water Act, on the one hand, and the more stringent AKART requirement mandated by state law, on the other. And Ecology's failure to apply AKART is especially troubling given that many wastewater facilities already recognize that more protective technologies—namely, tertiary treatment—is available. Next, in sub-section B, we discuss the benefits of defining AKART by rule rather than doing so on a case-by-case basis when renewing discharge permits for these facilities. Then, in sub-section C, we discuss why an examination of existing technology would result in an Ecology determination that tertiary treatment is the default definition of AKART for sewage treatment facilities. Finally, in sub-section D, we explain that while Ecology has failed to use the water quality-based approach to nutrient and toxics pollution reduction in Puget Sound, it has identified using the technology-based AKART as a viable and cost-effective regulatory approach. Together, these considerations demonstrate a clear need for the proposed rulemaking.

A. Ecology Consistently Fails to Implement AKART Requirements When Issuing NPDES Permits to Discharge Treated Sewage to Puget Sound and its Tributaries

As illustrated with the example of the *Carnation Fact Sheet*, *supra* n. 18, Ecology consistently fails to make AKART determinations when it issues NPDES permits to sewage treatment facilities. In this sub-section, we will first discuss how Ecology incorrectly conflates the federal requirement for secondary treatment with Washington AKART requirements. We will then demonstrate that even when municipalities have installed or evaluated the installation

of technology beyond secondary treatment, Ecology fails to recognize that as AKART. And, finally, we will discuss how, whether a facility has added treatment beyond secondary or not, Ecology's evaluation of AKART is entirely conclusory and in no instance goes beyond merely noting that a facility has installed various treatment methods.

1. Ecology Incorrectly Conflates Federal Secondary Treatment Requirements with Washington's AKART Obligations

Despite Washington law's unequivocal mandate to implement AKART through increasingly stringent technology-based requirements for permittees, Ecology consistently avoids its AKART obligations, relying instead on the federal minimum technology-based requirement of secondary treatment for sewage treatment plants. Ecology's conflation of federal minimum standards with the separate and distinct Washington statutory obligations results in sewage treatment plants' discharging large quantities of nutrients that impair water quality of the Sound.[19] As a result, the proposed rule is needed to both clarify the requirements for the measures that wastewater treatment facilities must implement to comply with AKART, but also to ensure that Ecology meets its duty to ensure compliance with these requirements in each permitting decision. RCW 34.05.330(4)(b); WAC 82-05-020(1)(C)(ii).

[19] Ecology has also forgone the use of water quality-based approaches to address nutrient pollution in the Sound, making its failure to apply the AKART standard all the more damaging, although the AKART requirement exists apart from any pollution load reductions triggered by such water quality-based approaches. We hereby incorporate by attachment in their entirety the following two petitions and their attachments: (1) NWEA, *Petition for Corrective Action or Withdrawal of Authorization from the State of to Issue National Pollutant Discharge Elimination System Permits* (Feb. 13, 2017) *available at* https://www.northwestenvironmentaladvocates.org/newblog/download/puget-sound-201702/; (2) NWEA, *Petition for Rulemaking to the Department of Ecology Seeking a Total Maximum Daily Load and Wasteload Allocations for Nitrogen in Puget Sound* (Oct. 10, 2017) (hereinafter "NWEA Petition to Ecology") *available at* https://www.northwestenvironmentaladvocates.org/newblog/download/petition-ecology-puget-sound-nitrogen-tmdl/.

That Ecology conflates federal minimum standards with the more stringent AKART requirement can be seen in the fact that every fact sheet associated with the 69 Ecology-issued NPDES permits that authorize the discharge of municipal treated sewage to Puget Sound uses the following language to justify the use of secondary treatment alone as adequate to meet the AKART requirement:

> Federal 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.

See e.g., Ecology, *Fact Sheet for NPDES Permit WA0022527, Vashon Wastewater Treatment Plant* 10 (March 1, 2017)[20] (hereinafter "Vashon Fact Sheet"). This boilerplate conclusion that secondary treatment is AKART for purposes of state law is incorrect for several reasons.

First, Ecology conflates federal and state requirements for technology-based treatment as if they are the same. They have never been. AKART is a separate and distinct requirement from the mandates of the federal Clean Water Act, which together are intended under Washington law to "extinguish the sources of water quality degradation" while "preserving and exercising state powers." RCW 90.48.010; *see also ITT Rayonier, Inc. v. DOE*, PCHB No. 85-218, at 7 (1986) (AKART as a more stringent state law requirement is "not . . . the equivalent of any federal formulation, but rather as an independent criterion."). *See also* WAC 173-221-010(2) ("This chapter also supplements 40 C.F.R. Part 133; Secondary Treatment Regulation. Wherever this chapter is more stringent than the federal regulation, the requirements of this chapter shall take precedence."). Therefore, it is irrelevant that the federal government has determined that

[20] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=198298 (last accessed Sept. 13, 2018).

secondary treatment meets the Clean Water Act's technology-based requirements for purposes of meeting Washington's requirement to use AKART.[21]

Second, the reasonableness test in AKART involves Ecology's "requiring a system that is both economically and technically feasible." *Puget Soundkeeper* at 793, citing *Weyerhaueuser.* Even though Ecology's own NPDES permit fact sheet glossaries likewise describe AKART as "requir[ing] an engineering judgement and an economic judgment," Ecology's use of a boilerplate AKART determination for each facility demonstrates that in each instance it fails to exercise both its engineering and economic judgment. *See e.g*., Ecology, *Fact Sheet for NPDES Permit WA0024490, City of Everett Water Pollution Control Facility* 58 (July 29, 2015) (App. C).[22] The boilerplate citation to secondary treatment performance standards in federal and state regulations as adequate to meet AKART implies that technology for the treatment of municipal sewage will remain fixed in stone and that new technological developments will not change Ecology's determination of what technology is "known," what technology is "available," and what technology is "reasonable." It is unlikely that Ecology can determine whether use of an advanced wastewater treatment technology is "reasonable" without any analysis. Rather, it is patently unreasonable for Ecology permit writers to assume that the AKART analysis need not be completed, particularly as the passage of time makes the agency's assumption of secondary treatment's being AKART increasingly suspect.

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[21] This again demonstrates the need for this rulemaking. *See* RCW 34.05.330(4)(c); WAC 82-05-020(1)(C)(iii). Ecology must be clear that the requirements for technology-based effluent limits under the federal Clean Water Act and the requirements to achieve AKART under state law are separate and distinct. Establishing presumptive numeric effluent limits based on tertiary treatment and the process for otherwise applying AKART for nutrients and toxics through a rulemaking would make this distinction clear.

[22] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=157707 (last accessed Sept. 13, 2018).

Third, Ecology incorrectly and misleadingly cites its own municipal sewage discharge regulations in WAC chapter 173-221 for the proposition that secondary treatment is adequate to meet the AKART mandate. In fact, Ecology's reliance on this provision demonstrates the need for this rulemaking. The purpose of Chapter 221 is "to implement RCW 43.21A.010, 90.48.010, and 90.52.040 by setting discharge standards which represent 'all known, available, and reasonable methods' of prevention, control, and treatment for domestic wastewater facilities which discharge to waters of the state." WAC 173-221-010(1). At the same time, Chapter 221 makes explicit that its specific discharge requirements are "supplement[ary]" to the more general rules at WAC 173-220-130. *Id.*; *see also* WAC 173-220-130(2) ("In any case where an issued permit applies the effluent standards and limitations described in subsection (1)(a) of this section, the department shall make a finding that any discharge authorized by the permit will not violate applicable water quality standards."). Therefore, the general AKART rules apply to those pollutants for which Chapter 221 does not specifically establish a discharge standard, unless they are in conflict. WAC 173-221-010(1). Thus, Ecology is required to apply the AKART standard to all of the pollutants discharged from wastewater treatment facilities. This necessarily includes nutrients and toxics. Nothing in Chapter 221 changes this.

Indeed, the secondary treatment standards set out in this chapter pertain only to four parameters: biological oxygen demand ("BOD"), total suspended solids ("TSS"), fecal coliform, and pH. *See* WAC 173-221-040 (setting out domestic wastewater facility discharge standards for BOD, TSS, fecal coliform, and pH); *see also* Ecology, *Water Quality Program Permit-*

Writer's Manual 126 (revised July 2018) (hereinafter "Permit-Writer's Manual").[23] Therefore, this chapter does not establish discharge standards for nutrients, such as nitrogen and phosphorus, or toxic contaminants that represent AKART for municipal sewage treatment plants. As this chapter is explicitly supplementary to WAC 173-220-130 and the federal secondary treatment regulations, *see* WAC 173-221-010(1) and (2), any pollutants for which the chapter does not establish specific AKART discharge standards continue to be governed by the general requirement to meet AKART. The fact that the regulations set forth some municipal-specific standards does not mean that AKART does not apply to municipalities in general. *See Sierra Club*, PCHB No. 11-184 at 25 (finding that Spokane County's "state of the art tertiary treatment works . . . constitutes AKART"); *Bellingham* (1985) at 26 ("Nothing suggests a separate standard to be applied to municipalities as opposed to commercial and industrial operations."); *id*. at 27 ("RCW 90.52.040 applies to municipalities."). Nutrient and toxic pollutants are not one of the four parameters for which effluent limitations are set out in this chapter and therefore Ecology's definition of AKART in rules as secondary treatment does not apply to these pollutants. To find otherwise is contrary to PCHB precedent.

Last, Ecology itself already published an extensive analysis of the technological and operational upgrades that would be required for eight general categories of existing municipal sewage treatment plants to achieve effluent concentrations of 3.0 mg/L total nitrogen and 0.1 mg/L total phosphorus. *See Washington Nutrient Removal Evaluation 2011, supra* n. 2, at ES-2 (referring to those effluent levels as "generally accepted performance of established nutrient removal technologies"). Ecology identified the facilities, their location, and their existing

[23] *Available at* https://fortress.wa.gov/ecy/publications/publications/92109.pdf (last accessed Oct. 12, 2018).

treatment methods. *Id*. The analysis provided by Ecology in this report is inconsistent with its boilerplate conclusion in NPDES fact sheets that secondary treatment is AKART for purposes of state law.

In fact, Ecology's use of boilerplate and conclusory statements in each NPDES permit fact sheet ignores the decades of technological advancements in sewage treatment, particularly for the removal of nutrients, that are now available and feasible, both technically and economically. These statements also demonstrate Ecology's procedural failure to make an AKART determination each time it issues an NPDES permit for a discharger because a boilerplate assertion intrinsically lacks the required technical and economic evaluation.

2. Even When Municipal Dischargers Install or Evaluate the Installation of More Than Secondary Treatment, Ecology Fails to Make AKART Determinations

Ecology has even failed to make an AKART determination for municipal dischargers that have already installed technological treatment well beyond the federal secondary treatment standards. For example, in the summer of 2017, Pierce County's Chambers Creek sewage treatment plant completed installation of an ammonia-nitrogen removal technology called "Demon." *See* Benjamin Minnick, Daily Journal of Commerce, *Chambers creek sewage treatment plant finishes $342M expansion and adds Demon*, (June 22, 2017)[24]; *see also* World Water Works, *World Water Works Announces DEMON Nitrogen Removal Treatment System* (December 31, 2014 news release announcing the availability of the DEMON treatment for removal of nitrogen from wastewater that has been used in more than 30 systems).[25] The

[24] *Available at* http://www.djc.com/news/co/12101613.html (last accessed Sept. 13, 2018).
[25] *Available at* https://www.worldwaterworks.com/in-the-news/?archive=34 (last accessed Sept. 13, 2018).

availability of nutrient removal technology was known to Pierce County when it completed an Environmental Impact Statement in 2010. *See* Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan, Chapter 8 Final Environmental Impact Statement* 1-9 (Nov. 2010)[26] ("Nitrogen has been identified as seasonally limiting in marine waters. . . . increas[ing] the likelihood and frequency of potentially harmful algal blooms and possible depletion of oxygen in the Sound. . . . Consequently, Ecology has begun to notify wastewater utilities that nitrogen control will be a part of future discharge permit requirements."). Project construction began in 2010 and was completed in May 2017. *See also* Pierce County, *Wastewater Treatment Plant Expansion.*[27]

In assessing the likelihood that nitrogen removal technology would have to be installed, Pierce County determined that there was a 100 percent likelihood of Ecology's requiring restrictions on the summer discharge of ammonia—a nitrogenous waste that is also toxic—by the years 2026-2040 and a 50 percent probability by the years 2015 to 2025. *See* Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan* Chapter 9, at 9-5, table 9-3 (Nov. 2010)[28] (hereinafter "EIS Chapter 9"). The county assessed the risk of effluent limits for winter ammonia at 75 percent probability by the later time period and 25 percent by the earlier period. And it assessed the probability of summer and winter effluent limits for total inorganic nitrogen by the later period at 75 and 25 percent respectively. *Id*. Pierce County developed these probabilities "based upon an assessment of the Washington State Department of

[26] *Available at* https://www.co.pierce.wa.us/DocumentCenter/View/7875/F-Chap-8_EIS?bidId= (last accessed Sept. 13, 2018).
[27] *Available at* http://www.piercecountywa.gov/1659/Wastewater-Treatment-Plant-Expansion (last accessed Aug. 20, 2018).
[28] *Available at* https://www.co.pierce.wa.us/DocumentCenter/View/7876/F-Chap-9_Recommended-Plan (last accessed Sept. 12, 2018).

Ecology's (Ecology) actions and comments regarding effluent toxicity (ammonia limitations) and dissolved oxygen (DO) in the receiving body (TIN limitations) with respect to both the Chambers Creek Regional Wastewater Treatment Plant and other plants in south Puget Sound." *Id*. The County also assessed the probability of receiving a compliance order from Ecology to address so-called toxic pollutants of emerging concern such as pharmaceuticals, unregulated manufacturing chemicals, and personal care products. *See id*. at 9-7 to 9-8.

Notwithstanding the conclusions of Pierce County that it needed to install nitrogen removal treatment technology, Ecology used the same boilerplate AKART determination when it issued an NPDES permit to the facility that requires only secondary treatment in compliance with the federal minimum. *See* Ecology, *Fact Sheet for NPDES Permit WA0039624, Pierce County Chambers Creek Wastewater Facility* 6 – 7 (Aug. 21, 2003).[29] In 2008, Ecology issued a "reauthorized" NPDES permit for this facility, with a highly truncated seven-page fact sheet, on the basis that "[s]ince 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 2008) (hereinafter "Chambers Creek 2008 Fact Sheet").[30] This conclusion was remarkable considering Ecology's multiple reports finding that excess nitrogen discharged by municipal facilities is causing multiple adverse effects on Puget Sound waters and designated uses. *See e.g., NWEA Petition to EPA* § IV*, supra* n. 19, at 16 – 40. In 2009,

[29] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=17122 (last accessed Sept. 12, 2018).
[30] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=17125 (last accessed Sept. 13, 2018).

Ecology began requiring this facility to conduct monthly nutrient monitoring. Ecology, *Statement of Basis Pierce County Public Works & Utilities Chambers Creek Wastewater Treatment Plan NPDES Permit No. WA0039624* (June 1, 2009).[31] Yet the facility's own decision to install nitrogen removal technology, citing Ecology's urging to address the need for nitrogen removal, demonstrates that AKART for this facility is well beyond secondary treatment and, at a minimum, is the treatment technology that the facility has, in fact, installed. The use of this more advanced treatment demonstrates that Ecology has violated both the procedural and substantive provisions of Washington's AKART requirements. Moreover, the most recent 2010 modification of the now-expired-but-administratively-continued discharge permit includes no requirement that the Chambers Creek facility actually use the nitrogen removal technology it has installed and includes no effluent limitations pertaining to nitrogen that it discharges. *See* Ecology, *NPDES Discharge Permit No. WA0039625 [Chambers Creek]* (May 28, 2008, revised June 10, 2009, July 10, 2009, June 25, 2010) (hereinafter "Chambers Creek 2008 Permit").[32]

Other municipal dischargers to Puget Sound have evaluated options for installing nutrient removal technology without any apparent direction from Ecology and certainly without Ecology's establishing any regulatory requirement. As Ecology has shown no inclination to revise permits to include nutrient removal, however, these efforts appear to have come to a halt. King County, for example, completed an evaluation of nutrient removal at its South Plant eight years ago. King County, *Assessment of Potential Nitrogen Removal Technologies at the South Treatment Plant and Their Impact on Future Water Reuse Program Development (South Plant*

[31] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=17123 (last accessed Sept. 13, 2018).
[32] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=17120 (last accessed Oct. 23, 2018).

Nitrogen Removal Study), Final Report (June 2010).[33] The county noted that while its effort was stimulated by Ecology's 2006 "major study" of nutrient effects on Puget Sound "it is not clear how Ecology will use the results of its studies to establish future regulatory limits." *Id*. at ES-1. The study looked at four broad nitrogen removal alternatives in evaluating two "potential permitting scenarios": (1) a summer effluent limit of 8 mg/L of total inorganic nitrogen ("TIN"), and (2) a year-round effluent limit of 3 mg/L TIN. *Id*. Four alternative technology configurations were used to achieve each effluent limit in order to evaluate the relative costs and physical footprint of each.[34] *Id*. at ES-2. In addition, ten cost and non-cost criteria were evaluated.[35] *Id*. at ES-3. Despite this report's having been completed eight years ago, there are no indications that King County is planning to install nutrient removal technology. And, notwithstanding the results of the county's evaluation demonstrating that nutrient removal technology is both known and available and providing an analysis that Ecology could use to determine whether it was reasonable, five years later Ecology issued its most recent permit for the South Plant. Ecology, *Fact Sheet for NPDES Permit WA0029581, King County South Wastewater Treatment Plant* 20, 24 (July 1, 2015).[36]

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[33] Document obtained from King County through public records request.

[34] The assessment evaluated the following four technology configurations to meet the 8 mg/L effluent limit: (1) Modified Ludzak-Ettinger ("MLE"); (2) MLE-membrane bioreactor (MBR); (3) MLE- Integrated Fixed Film Activated Sludge ("IFAS"); (4) Biological Aerated Filter ("BAF")/ Denitrifying Filter ("DNF"). The assessment evaluated the following four technology configurations to meet the 3 mg/L effluent limit: (1) Bardenpho; (2) Bardenpho-MBR; (3) Bardenpho-IFAS; and (4) BAF/DNF. *Id*. at ES-3, tables ES.1 and ES.2.

[35] The four alternatives for each nutrient limit scenario were evaluated based on the following cost and non-cost criteria: (1) onsite capital costs, (2) operation and maintenance (O&M) costs, (3) risk, (4) future flexibility, (5) footprint, (6) energy, (7) odor, (8) compatibility with existing processes, (9) biosolids quality, and (10) reclaimed water quality/quantity.

[36] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=149903 (last accessed Nov. 6, 2018).

Similarly, King County evaluated nutrient removal at its West Point facility. King County, *Assessment of Potential Nitrogen Removal Technologies at the West Point Plant and Their Impact on Future Water Reuse Program Development (West Point Nitrogen Removal Study), Final Report* (March 2011).[37] The chosen nutrient removal goals were the same as the South Plant evaluation, as were the technology configurations considered. *Id*. at ES-2, ES-4. Due to limited land availability, the report also considered three addition technology configurations.[38] *Id*. at ES-4. This report cites six technical documents as references including a 1992 book, *Design and Retrofit of Wastewater Treatment Plants for Biological Nutrient Removal*.[39] *Id*. at vi. Notwithstanding the county's findings that nutrient removal technology is both known and available and its providing an analysis that Ecology could use to determine whether use of the technology was reasonable, four years after the county's evaluation, Ecology issued a new permit to the West Point facility without nutrient removal requirements and without an AKART analysis. Ecology, *National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0029181* [West Point] (Dec. 19, 2014)[40]; Ecology, *Fact Sheet for NPDES Permit WA0029181 West Point Wastewater Treatment Plant (WWTP) and Combined Sewer Overflow (CSO) System* (Dec. 19, 2014).[41]

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[37] *Available at* https://www.kingcounty.gov/~/media/services/environment/wastewater/resource-recovery/docs/West_Point_Nitrogen_Removal_Study.ashx?la=en (last accessed Oct. 2, 2018).
[38] The additional approaches considered were: (1) Post-secondary MBR; (2) Replacement MBR; and (3) Replacement BAF/DNF. *Id*. at ES-4.
[39] C. W. Randall, J. L. Barnard, H. D. Stensel. (1992) *Design and Retrofit of Wastewater Treatment Plants for Biological Nutrient Removal*, Technomic Publishing Company, Inc.; Lancaster.
[40] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=135861 (last accessed Oct. 3, 2018).
[41] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=135860 (last accessed Oct. 3, 2018).

King County operates two facilities that employ "advanced treatment," namely filtration. The county's Carnation facility uses "five Zenon ZeeWeed 500 ultra-filtration MBR units in parallel." *Carnation Fact Sheet, supra* n. 18, at 7. Its effluent limits, however, are based on secondary treatment. Ecology, *National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0032182* [Carnation] 5 (Dec. 13, 2013).[42] Likewise, the county's new Brightwater facility uses MBR—with Ecology's approval—in part because Ecology found that "[t]he MBR alternative provides for year-round nitrification and denitrification, thereby reducing the amount of nitrogen discharged to Puget Sound." *Brightwater Fact Sheet, supra* n. 3, *at* 12. Nevertheless, Ecology's permit requires that the facility only meet secondary treatment standards. Ecology, *National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0032247* [Brightwater] 8 (June 10, 2011).[43]

The City of Tacoma has, as well, evaluated nitrogen removal at its Central Treatment Plant and North End Treatment Plant. City of Tacoma, *Nitrogen Removal Study Final* 1-1 (July 2012).[44] Its study concluded that the average concentration of Total Kjeldahl Nitrogen ("TKN") discharged by the Central Plant is 33 mg/L and the average concentration of TKN from the North End Plant is currently 24.8 mg/L. *Id*. at 1-4. Similar to the studies done by King County, Tacoma evaluated the implications of meeting a year-round effluent limit of 3 mg/L TIN and a summertime effluent limit of 8 mg/L TIN. *Id*. According to the study, this is not the first of its kind to look at nutrient removal from Tacoma sewage treatment facilities: "In previous studies,

[42] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?Id=98878 (last accessed Oct. 12, 2018).
[43] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?Id=227804 (last accessed Oct. 12, 2018).
[44] Document obtained from City of Tacoma by public records request.

nitrogen removal limits of 3 mg/L TIN and 8 mg/L TIN had been identified as representative of potential TIN permit levels for Puget Sound discharging WWTP based on capabilities of existing process technology." *Id*. at 1-8. Technologies evaluated for Tacoma that were not included in the King County studies include: (1) post-secondary Bardenpho MBR; (2) post-secondary MLE MBP; (3) post-secondary BAF/DNF; (4) high purity oxygen ("HPO") conversion to MLE; and (5) side stream treatment ("SST"). *Id*. at 1-11, table 1.3.

The permits for Tacoma's facilities have long been expired. Ecology, *National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0037087* [Tacoma Central] 1 (Oct. 6, 2010) (permit expired Oct. 31, 2015)[45]; Ecology, *National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0037214* [Tacoma North] 1 (June 4, 2009)[46] (permit expired June 30, 2014). Ecology has simply taken no action to issue the permits or to require nutrient removal from the effluent despite, as the study notes that "[t]he City and Ecology have partnered to fund a study to help quantify the cost and complexity of various nitrogen removal scenarios." *Id*. at 2-1. Not only was this study to inform Tacoma of the alternatives for removal of nitrogen at its facilities, but it was to "[s]erve as a case study for municipal WWTPs discharging to Puget Sound potentially requiring nitrogen removal." *Id*. In light of this, as well as other studies, it would be disingenuous of Ecology to claim that it is not aware of known and available pollution removal technologies beyond secondary treatment of municipal sewage.

A final example of how municipalities' understanding of AKART is ahead of Ecology's is the City of Bellingham. In 2009, Bellingham issued a plan to address future needs for

[45] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=15953 (last accessed Oct. 3, 2018).
[46] Available at https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=16060 (last accessed Oct. 3, 2018).

municipal sewage treatment. *See* City of Bellingham, *Comprehensive Sewer Plan* (June 2009).[47] Bellingham notes that "[Ecology] has identified metals and toxins as a potential issue on the horizon once the new non-diffused outfall goes into service. Nutrient limitations are not on the horizon within the planning period." *Id*. at 2-24. Yet Bellingham considered how it could meet future nutrient limits by using existing technology. *Id.* at 10-14. In evaluating options for facility expansion, the ability to add nitrogen removal "should future permits require nitrogen removal" was considered. *Id*. at 10-8, table 10.4 (process not amendable), 10-10, table 10.5 (process more flexible), 10-12, table 10.6 (conversion to MBR provides nitrogen removal). In contrast to Bellingham's attempt to look to the future, the word "nitrogen" shows up only twice in the 2014 Ecology fact sheet accompanying its renewal of this permit, both boilerplate language. *See* Ecology, *Fact Sheet for NPDES Permit WA0023744 [Bellingham] Post Point WWTP* (May 15, 2014).[48] As municipalities continue to plan for investments in sewage treatment for the future, Ecology's inability to inform them of their need to remove nutrients from wastewater discharges harms these efforts and postpones the inevitable date by which they will install nutrient removal technology.

3. Ecology's AKART Findings Are Entirely Conclusory

Ecology could choose to implement its responsibility to make AKART determinations on a permit-by-permit basis. However, after decades of failing to do so, the likelihood that it will is close to nonexistent. When NWEA has raised the issue of AKART in public comments on draft

[47] *Available at* https://www.cob.org/documents/pw/utilities/comprehensive-sewer-plan.pdf (last accessed Oct. 4, 2018).
[48] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=121126 (last accessed Oct. 5, 2018).

municipal discharge permits, Ecology has rejected the premise that Washington law requires AKART for all pollutants:

> [NWEA] Comment summary: Comment argues that the use of enhanced secondary and/or tertiary treatment for removal of nitrogen is AKART and cites the cases, *City of Bellingham v. Washington Ecology*, PCHB No. 84-211 and *Sierra Club v. Washington*, PCHB No. 11-184 in support.
>
> [Ecology] Response: Chapter WAC 173-221 WAC establishes and defines AKART for POTWs (domestic wastewater treatment plants) by setting discharge standards which represent "all known, available, and reasonable methods" of prevention, control, and treatment for domestic wastewater facilities which discharge to waters of the state. WAC 173-221-040 defines secondary treatment as AKART for all domestic wastewater treatment facilities and establishes effluent quality requirements. The listed parameters are BOD5, TSS, Fecal coliform, and pH. The regulation does not include nutrient removal in the definition of AKART for domestic wastewater facilities. Nutrients are not included in the WAC for AKART. The legal cases cited by the commenter do not apply broadly to all domestic wastewater facilities. The cases involved legal questions specifically applicable to the facilities or receiving waters involved in those cases.

Ecology, *Fact Sheet for NPDES Permit WA0020907 Bainbridge Island Wastewater Treatment Plant* 66 (August 1, 2017)[49] (hereinafter "Bainbridge Island Fact Sheet"). *See also* Ecology, *Fact Sheet for NPDES Permit WA0030520 Central Kitsap Wastewater Treatment Plant* 72 (August 1, 2017)[50] (hereinafter "Central Kitsap Fact Sheet") (same); Ecology, *Fact Sheet for NPDES Permit WA0024074 City of Mount Vernon Wastewater Treatment Plant* 73 *(*March 1, 2017)[51] (hereinafter "Mount Vernon Fact Sheet") (same); Vashon *Fact Sheet, supra* n. 20, at 63 (same); Ecology, *Fact Sheet for Hartstene Pointe Wastewater Treatment Plant NPDES Permit*

[49] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=211829 (last accessed Sept. 13, 2018).
[50] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=211832 (last accessed Sept. 13, 2018).
[51] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=199837 (last accessed Sept. 13, 2018).

No. WA0038377 at 43 (Nov. 7, 2017)[52] (hereinafter "Hartstene Pointe Fact Sheet") ("Ecology concludes that the technology-based standards included in this permit are appropriate."). In response to NWEA comments regarding the need to meet AKART on the Lynden sewage treatment plant, Ecology used the identical text and added the following:

> The commenter seems to have missed the description of Lynden's treatment plant processes on page 8 of the fact sheet. "Lynden upgraded the plant in 2002 and 2003 to include a new headworks building, anoxic tanks to assist with nitrogen removal, clarifiers, effluent filters, an ultraviolet disinfection system, and an effluent pump station." The use of enhanced secondary treatment can be effective for nitrogen removal too. It is clear that Lynden's WWTP processes meet the definition of enhanced secondary treatment as well as AKART.

Ecology, *Fact Sheet for NPDES Permit No. WA0022578 City of Lynden Wastewater Treatment Plant* 57 (Sept. 7, 2017) (hereinafter "Lynden Fact Sheet").[53] Here, Ecology asserts that the installation of "anoxic tanks to assist with nitrogen removal" is AKART although the fact sheet presents no analysis underpinning Ecology's assertion. Moreover, the final permit for the Lynden sewage treatment plant does not include any effluent limits that pertain to a requirement for nitrogen removal or ammonia or that require the use of the anoxic tanks the facility has installed. *See* Ecology, *NPDES Discharge Permit No. WA0022578* [Lynden] 6 (Sept. 7, 2017)[54] (effluent limits only for BOD5, TSS, total residual chlorine, pH, and fecal coliform). Ecology's "finding" that the installation of anoxic tanks to assist with nitrogen removal is AKART does not illuminate its decision to make findings that secondary treatment is AKART for every other facility.

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[52] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=226286 (last accessed Sept. 13, 2018).
[53] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=216063 (last accessed Sept. 13, 2018).
[54] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=216064 (last accessed Sept. 13, 2018).

Similarly, Ecology notes that the Mount Vernon facility uses "a Modified Ludzack-Ettinger (MLE) process mode. The MLE process allows for simultaneous nitrification and denitrification to remove nitrogen from the wastewater." *Mount Vernon Fact Sheet, supra* n. 51, at 11. Yet it also states that "[n]itrogen removal is not required by the permit." *Id*. at 16. Likewise, Ecology notes that for Central Kitsap, "[t]he existing activated sludge system was expanded and modified to provide biological nitrogen removal, which increases the capability of the facility to achieve optimal nitrification conditions," yet the facility has no nitrogen effluent limits. *Central Kitsap Fact Sheet, supra* n. 50, at 33. In these cases, Ecology mentions the facilities' attempts to achieve some level of nitrogen removal without conducting an AKART analysis or even determining that use of these technologies is AKART for the respective facilities.

Ecology's consistent failure to assess AKART at the time it issues individual permits, its failure to recognize AKART for specific facilities that have installed or evaluated the use of greater than secondary treatment, its conflation of federal secondary treatment regulations with Washington's AKART requirements, its incorrect reading of its own regulations, and its disregard for legal precedent all demonstrate the need for the proposed rulemaking.

B. If Ecology Were to Make AKART Determinations on a Permit-by-Permit Basis, it Would Fail to Fully Evaluate the Benefits Part of the Reasonableness Test

The reasonableness test in an AKART determination includes an economic assessment of the use of known and available treatment technology. *See infra* at 64. Economic assessments must evaluate all costs, including those of inaction, to all affected parties or sectors as well as to the environment. Thus, the economic assessment of determining AKART for municipal sewage dischargers must include the costs to various parties of installing such treatment and the benefits

to the environment, human health, and various economic sectors from the pollution abatement. As a result, the proposed rule will likely prove not only to provide the most certainty and clarity for the regulated facilities, but will also be the most efficient use of Ecology's resources as it works to improve water quality in Puget Sound.

In this sub-section, we will begin by discussing how rulemaking in Washington requires a cost-benefit test, one that is unlikely to be properly assessed, if assessed at all, by Ecology in the individual facility permitting process. Next we will review the benefits from using AKART for nutrient and toxics pollutants respectively. And, finally, we will discuss how using AKART for nutrient and toxic pollutants provides a substantial and direct benefit to a group of Washington policy initiatives established by Washington Governors and the Washington Legislature.

1. Rulemaking Requires a Cost-Benefit Test That Will Likely Not Occur or Will Likely be Inadequate if Assessed Only by Individual Permit

This petition seeks a rulemaking by Ecology pursuant to RCW 34.05.330. Rulemaking in Washington is governed by the Administrative Procedure Act ("APA") that requires a preliminary cost-benefit analysis. RCW 34.05.328(1)(c). In adopting a rule, an agency must "[d]etermine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented." *Rios v. Washington Dep't of Labor & Indus*., 145 Wash. 2d 483, 500 n. 10, 39 P.3d 961, 970 n. 10 (2002) (citing RCW 34.05.328(1)(c) in concluding that "our state's APA expressly requires a cost-benefit analysis" for rulemakings.). Thus, rulemaking will help meet the requirements of assessing AKART, which requires an assessment of both costs and benefits. *Permit-Writer's Manual, supra* n. 23, at 95.

Governed by these requirements of the APA, a rulemaking by Ecology to establish a rebuttable presumption that AKART for municipal dischargers to Puget Sound is tertiary treatment provides multiple benefits compared to the agency's assessing AKART on a permit-by-permit basis. Determining what types of sewage treatment technology are both "known" and "available" is readily achieved through rulemaking, provided that Ecology keeps the rule updated or performs a permit-by-permit update in the future. The test of whether such known and available treatment technologies are "reasonable" involves a specific finding for each permit, pertaining to technical concerns and economic concerns.

While there are technical and economic considerations that are specific to each facility, the hazard of evaluating the economic concerns solely on a permit-by-permit basis is that Ecology would be likely to ignore the "qualitative and quantitative benefits" that must be examined were Ecology to address AKART in a rulemaking. The benefits part of the cost-benefit evaluation needs to value the abatement of nitrogen discharges from over one hundred municipal sewage treatment plants discharging to the Sound collectively, their combined effect on the water quality of Puget Sound, and the effects of water quality changes on the general public, the environment, and a variety of economic sectors. And, according to EPA, the benefit of controlling municipal sources of nutrient pollution should consider that "nitrogen and phosphorus may be expensive to control after they are released to the environment. Preventing them from entering the system is potentially a more cost-effective strategy for addressing nutrient pollution and its impacts." EPA, *A Compilation of Cost Data Associated with the*

Impacts and Control of Nutrient Pollution ES-1 (May 2015) (hereinafter "EPA Compilation of Nutrient Costs").[55]

Ecology has spent many years and many millions of dollars evaluating these very effects. *See, e.g,. NWEA Petition to Ecology* § II.D*, supra* n. 19, at 18 – 56. However, in each individual permit that it has issued, Ecology has asserted that it need not evaluate the facility's contribution of nutrients to the Sound. *See e.g., Bainbridge Island Fact Sheet, supra* n. 49, at 23 (Ecology analysis limited to summary conclusion that "[t]he amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water."); *Central Kitsap Fact Sheet, supra* n. 50, at 26 (same); *Mount Vernon Fact Sheet*, *supra* n. 51, at 28 (same but ignores Puget Sound); *Vashon Fact Sheet, supra* n. 20, at 22 (same); *Hartstene Pointe Fact Sheet, supra* n. 52, at 25 (same); *Lynden Fact Sheet, supra* n. 53, at 24 (same). *See also NWEA Petition to EPA* § VI.C and D*, supra* n. 19, at 70 – 87.

In responding to comments from NWEA on proposed individual discharge permits, Ecology has likewise asserted that—from both a water quality-based and a technology-based perspective—it need not evaluate a source's contribution to the nitrogen problem in Puget Sound:

> [NWEA] Comment summary:[56] There is no WQBEL that is intended to ensure that the discharge does not cause or contribute to violations of dissolved oxygen

[55] *Available at* https://www.epa.gov/sites/production/files/2015-04/documents/nutrient-economics-report-2015.pdf (last accessed Sept. 13, 2018).

[56] The Ecology response also pertains to NWEA comments that are summarized by Ecology as follows: "Given that this discharger is a known source of nitrogen to Puget Sound, and therefore it is contributing to violations of water quality standards, the permit is required to also contain water quality-based effluent limits for total nitrogen." *Bainbridge Island Fact Sheet, supra* n. 49, at 64. "The BOD5 effluent limit does not provide any limits on the ammonia nitrogen oxygen demand created by the discharge that is causing or contributing to violations of water quality standards in Puget Sound." *Id.* at 65. "The proposed permit does not 'account for existing

> standards or the narrative criterion by discharges of nitrogenous oxygen-demanding materials.
>
> [Ecology] Response: Ecology has assessed the reasonable potential for the discharge to violate water quality standards and found that the discharge would not do so.
>
> While treated municipal wastewater may be the dominant human source of nitrogen for Puget Sound, the largest overall source of nitrogen is the exchange of marine water with the waters of the Sound. 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 Puget Sound. In 2014, Ecology completed the report *Puget Sound and the Straits Dissolved Oxygen Assessment – Impacts of Current and Future Human Nitrogen Sources and Climate Change through 2070*. Since then, Ecology incorporated into its models a more state-of-the-science methodology for accounting for sediment/water column interactions. This model improvement could affect both predictions of water quality impairments (now largely based upon model results), and estimates of nitrogen reductions needed to improve water quality.
>
> As improved modeling results becomes available, Ecology intends to develop a coordinated permitting strategy that will reduce nitrogen discharges to Puget Sound in a cost-effective manner, to achieve the greatest environmental results with the lowest cost to the public. Ecology's ultimate decision to set permit limits for nitrogen discharges to Puget Sound may affect all the permits in the region, and must be based on accurate science. For the most recent information on Ecology's Puget Sound Nutrient Source Reduction Project, please see
>
> http://www.ecy.wa.gov/puget_sound/reducing-nutrients.html.
>
> Ecology concludes that the technology-based limits included in this permit are appropriate.

Bainbridge Island Fact Sheet, supra n. 49, at 64. *See also Central Kitsap Fact Sheet, supra* n. 50, at 70 –71(same); *Mount Vernon Fact Sheet, supra* n. 51, at 69 (virtually the same); *Lynden*

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controls on point and nonpoint sources of pollution.' Specifically, the commenter refers to nitrogen pollution from septic systems and other wastewater treatment plants." *Id*. "The fact sheet does not sufficiently explain the consideration and analysis of narrative criteria, specifically in regard to nutrient pollution in Puget Sound." *Id.* "The antidegradation policy requires this permit to include effluent limits for nitrogen to protect Puget Sound water quality." *Id*.

Fact Sheet, supra n. 53, at 53 (same); *Vashon Fact Sheet, supra* n. 20, at 57 (same); *Hartstene Pointe Fact Sheet, supra* n. 52, at 43 (same and adding: "Hartstene Point does not discharge to a 303d listed water body. While Ecology has listed areas of Puget Sound as impaired, including the area north of the discharge point, the facility does not discharge to an area that is listed as impaired on the state's 303d list."); Ecology, *Fact Sheet for NPDES Permit WA0037061 LOTT Alliance Budd Inlet Wastewater Treatment Plant* 54 (March 10, 2018)[57] (hereinafter "LOTT Fact Sheet") (same with different first paragraph ("Ecology has assessed the reasonable potential for the discharge to violate water quality standards in the near field and found that the discharge would not violate standards.") and adding: "For Budd Inlet, Ecology expects to have draft allocations available for review in 2018. Once the Total Maximum Daily Load (TMDL) is approved, Ecology will modify or reissue this permit to incorporate the new wasteload allocations. The modified permit will contain a compliance schedule if one is needed. Ecology is committed to a timely update to this permit once the TMDL is approved."). Ecology's refusal to consider the combined effect of all nitrogen discharges on Puget Sound when it issues individual permits is precisely why it must evaluate the costs and benefits of controlling nitrogen using treatment technology in a rulemaking. Nitrogen is a pollutant with a far-field effect that cannot be evaluated using Ecology's narrow focus on the point of discharge. *See NWEA Petition to EPA* § VI.C.2*, supra* n. 19, at 74 – 79.

[57] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=227797 (last accessed Sept. 13, 2018).

2. Benefits Associated with Using Known and Available Treatment Requirements for Nutrient Pollution

The benefits to defining AKART as the use of tertiary treatment to remove nutrient pollutants from treated sewage are measured in reduced levels of depressed dissolved oxygen, reduced algal blooms, reduced local acidification, and reduced effects to the Puget Sound food web. Ecology has determined that municipal sewage discharges are the largest anthropogenic source of nitrogen to Puget Sound. *See, e.g,.* Ecology, *Puget Sound Dissolved Oxygen Model: Nutrient Load Summary for 1999-2008* (Nov. 2011)[58] (municipal dischargers are responsible for 81 percent of the Puget Sound anthropogenic nitrogen loads in the summer and 59 percent annually). Ecology and other agencies have also determined that nitrogen pollution is causing significant adverse effects on the Sound. *See e.g., NWEA Petition to EPA* § IV *, supra* n. 19, at 16 – 40. The economic benefits associated with controlling nitrogen pollution will, therefore, accrue to multiple sectors of the Washington economy and the environment. *See infra* at 72 – 89.

Excess nitrogen and phosphorus, known as nutrient pollution, cause an overstimulation and overabundance of plant and algal growth that, in turn, causes oxygen concentrations in the water to decline below levels needed to support many aquatic organisms. EPA has asserted that "nitrogen and phosphorus pollution is one of the most serious and pervasive water quality problems" in the United States. EPA, *Fiscal Year 2014 National Water Program Guidance* 13 (2013).[59] Citing its 2009 report, *An Urgent Call to Action: Report of the State-EPA Nutrient*

[58] *Available at* https://fortress.wa.gov/ecy/publications/documents/1103057.pdf at xvi-xvii (last accessed Sept. 13, 2018).
[59] *Available at* http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100H2WM.txt (last accessed Sept. 13, 2018).

Innovations Task Group,[60] EPA expects that "the rate and impact of nutrient pollution will continue to accelerate when coupled with continued population growth. Several scientific studies indicate that global climate change, mainly warming conditions, is expected to exacerbate the nutrient pollution problem." *EPA Compilation of Nutrient Costs, supra* n. 55, at I-2 (citations omitted).

Nutrient-induced hypoxia has a deleterious effect on shellfish and fish populations: "Degradation in oxygen is one of the most serious threats to aquaculture . . . lead[ing] to reduced growth and mortality." Organization for Economic Co-Operation and Development, *Agriculture's Impact on Aquaculture: Hypoxia and Eutrophication in Marine Waters* 17 (2012)[61]; *see also id*. at 27 – 29, Table 4 (examples of mortality and losses related to eutrophication-driven hypoxia). Around the globe, "[f]rom the middle of the 20th century to today, there have been drastic changes in dissolved oxygen concentrations and dynamics in many marine coastal areas. No other environmental variable of such ecological importance to balanced ecosystem function as dissolved oxygen has changed so drastically, in such a short period of time." *Id*. at 7.

In Puget Sound, Ecology has determined that the Sound is impaired by algal blooms, food web changes, local/ocean acidification, and large blooms of jellyfish and has determined that "[t]he dominant human sources are through marine point source discharges of treated municipal wastewater." Ecology, *South Puget Sound Dissolved Oxygen Study Water Quality*

[60] *Available at* https://www.epa.gov/sites/ production/files/documents/nitgreport.pdf (last accessed Sept. 13, 2018)
[61] *Available at* https://www.oecd.org/tad/sustainable-agriculture/49841630.pdf (last accessed Sept. 13, 2018).

Model Calibration and Scenarios 13 (March 2014).[62] Ecology expects nutrient contributions to grow and other related conditions to worsen such that in the future nitrogen will further exacerbate the Sound's depressed levels of dissolved oxygen. *See id*. at 36 – 37.

Nutrient pollution has been identified as the leading cause of algal blooms and other associated environmental harm in Puget Sound. An extensive discussion of nutrient pollution in the Sound can be found in *NWEA Petition to EPA* § IV*, supra* n. 19, at 16 – 40. Nutrient pollution may also create harmful algal blooms that can poison humans and other living creatures: "About 50 known species of phytoplankton produce toxins. As toxins move through the food web, they bioaccumulate in the tissues of large fish and marine mammals. Humans can contract illnesses from eating contaminated shellfish and fish, and medical treatment can be expensive." Washington Sea Grant, *Soundtoxins Manual: Puget Sound Harmful Algal Bloom Monitoring Program* 1 (2016).[63] In Puget Sound, monitoring for toxic algae focuses on four target phytoplankton species: (1) *Pseudo-nitzschia* species (causing amnesic shellfish poisoning, or ASP); (2) *Alexandrium species* (causing paralytic shellfish poisoning, or PSP); (3) *Dinophysis* species (causing diarrhetic shellfish poisoning, or DSP); and (4) *Heterosigma akashiwo* (causing fish kills). *Id*. at 2. Toxins produced by harmful algal blooms concentrate in the food web and continue to cause harm after blooms have subsided:

> Harmful algal bloom (HAB) toxins cause sickness and death in both humans and marine wildlife. Using scat, we found that both Steller and California sea lions living on the northern Washington coast are exposed to HAB toxins in all months of the year, including in the winter when algal blooms typically do not occur, and that several different fish species are exposing the sea lions to these toxins. These

[62] *Available at* https://fortress.wa.gov/ecy/publications/documents/1403004.pdf (last accessed Sept. 13, 2018).
[63] *Available at* https://wsg.washington.edu/wordpress/wp-content/uploads/Sound-Toxins-Manual-2016.pdf (last accessed Sept. 13, 2018).

> findings are significant because they indicate that even outside of the typical algal bloom season, HAB toxins are circulated through the marine food web and can affect top-predators like marine mammals.

Encyclopedia of Puget Sound, *Year-round algal toxin exposure in free-ranging sea lions.*[64]

3. Benefits Associated with Using Known and Available Treatment Requirements for Toxics Pollution

Tertiary treatment of municipal sewage also removes many toxic pollutants, including both regulated and unregulated toxics such as personal care products and pharmaceuticals, often called "contaminants of emerging concern." Puget Sound suffers from high levels of toxic pollution. An extensive discussion of toxic pollution in the Sound can be found in *NWEA Petition to EPA* § VII.A, *supra* n. 19, at 91 – 100. In 2016, research demonstrated that juvenile Puget Sound chinook and Pacific staghorn sculpin are contaminated with pharmaceuticals and other drugs from treated sewage discharged to Puget Sound, estimated at 97,000 pounds per year. *See* James P. Meador *et al., Contaminants of emerging concern in a large temperate estuary,* 213 Environmental Pollution 254 (June 2016).[65] New research following on these findings has evaluated the contaminants' effects on fish. *See* James P. Meador *et al., Adverse metabolic effects in fish exposed to contaminants of emerging concern in the field and laboratory*, 236 Environmental Pollution 850 (2018).[66] In this new study, fish fed the drugs at the same level as found in the Puyallup River and Sinclair Inlet estuaries experienced reduced growth rates and metabolism disruptions, a "pattern generally consistent with starvation" that

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[64] *Available at* https://www.eopugetsound.org/articles/year-round-algal-toxin-exposure-free-ranging-sea-lions (last accessed Aug. 23, 2018), *citing* A. M. Akmajian, *et al., Year-round algal toxin exposure in free-ranging sea lions*, 583 Marine Ecology Progress Series 243-258 (2017).
[65] *Available at* https://www.sciencedirect.com/science/article/pii/S0269749116300884 (last accessed Sept. 13, 2018).
[66] *Available at* https://www.sciencedirect.com/science/article/pii/S0269749117346729 (last accessed Sept. 13, 2018).

"may result in early mortality or an impaired ability to compete for limited resources." *Id.* The responses in the Chinook salmon were more pronounced than the sculpin, a result "which is supported by the disparity in accumulated [contaminants of emerging concern]." *Id.* In their conclusions, the scientists cited earlier findings:

> A recent study concluded that juvenile Chinook salmon migrating through contaminated estuaries in Puget Sound exhibited a strong reduction in survival (two-fold) compared to those migrating through uncontaminated estuaries Meador (2014). Some of the lowest survival rates for juvenile Chinook occurred in estuaries that have WWTP discharges into the estuary or nearshore areas where Chinook reside before moving into open water. The aforementioned study provided data on a few well-known contaminants such as PAHs, butyltins, metals, and PCBs that were considered as markers of contaminant exposure for these impacted local estuaries, but not linked causally to adverse effects (Meador, 2014). Given the large number of compounds delivered to these estuarine areas from WWTPs and other sources and their potential for adverse effects on several physiological processes, a more detailed accounting of potential effects and rates of survival for all biota in these areas is warranted.

Id. at 859. Canadian researchers have made similar findings pertaining to the wide array of unregulated pharmaceuticals and synthetic personal care products discharged by municipal sewage treatment plants. *See e.g.,* Jeremy Krogh *et al*., *Pharmaceuticals and Personal Care Products in Municipal Wastewater and the Marine Receiving Environment near Victoria Canada*, Frontiers in Marine Science, 4(415) at 18 (2017).[67]

Among the unregulated pollutants in municipal sewage are natural and synthetic estrogens that can cause biological effects at extremely low concentrations. *See* Jenna Corcoran *et al*, *Pharmaceuticals in the aquatic environment: A critical review of the evidence for health*

[67] *Available at* https://www.frontiersin.org/articles/10.3389/fmars.2017.00415/full (last accessed Sept. 13, 2018).

*effects in fis*h, 40(4) Critical Reviews in Toxicology 287 (2010).[68] A long-term study from the United Kingdom on the effects of sewage on fish, both caged and wild, concluded that biological responses to estrogens and xenoestrogens (chemicals with an estrogen-like effect) resulted in significant vitellogenin induction (*i.e*. feminization of the male). *See* Trevor P. Rodgers-Gray *et al*., *Long-Term Temporal Changes in the Estrogenic Composition of Treated Sewage Effluent and Its Biological Effects on Fish,* 34 Environ. Sci. Technol., 1521 (2000)[69]; *see also* Subir Kumar Juin *et al*., *Effect of fish vitellogenin on the growth of juvenile catfish, Clarias gariepinus (Burchell, 1822)* 7 Aquaculture Reports 16 (2017).[70] Additionally, wild salmon smolts exposed to low levels of estrogenic substances such as those that "may occur from current discharges into river" resulted in stunted growth. *See* J.T.M Arsenault *et al*, *Effects of water-borne 4-nonylphenol and 17β-estradiol exposures during parr-smolt transformation on growth and plasma of IGF-I of Atlantic salmon (Salmo salar L.),* 66 Aquatic Toxicology 255 (2004)[71]; *see also* James J. Nagler *et al.*, *High Incidence of a Male-Specific Genetic Marker in Phenotypic Female Chinook Salmon from the Columbia River*, 109 Environmental Health Perspectives 67, 69 (Feb. 2001)[72] ("a high proportion of phenotypic female chinook salmon from the Hanford Reach of the Columbia River . . . carry male-specific DNA within their genome. . . . the most

[68] *Available at* https://www.researchgate.net/publication/41941505_Pharmaceuticals_in_the_Aquatic_Environment_A_Critical_Review_of_the_Evidence_for_Health_Effects_in_Fish (last accessed Sept. 13, 2018).
[69] *Available at* https://pubs.acs.org/doi/abs/10.1021/es991059c (last accessed Sept. 13, 2018).
[70] *Available at* https://www.sciencedirect.com/science/article/pii/S2352513416300801 (last accessed Sept. 13, 2018).
[71] *Available at* https://www.sciencedirect.com/science/article/pii/S0166445X03002121 (last accessed Oct. 12, 2018).
[72] *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1242053/ (last accessed Sept. 13, 2018).

likely possibility is that these fish are genetically male (i.e., XY) and have been sex reversed." "[E]nvironmental estrogens remain valid candidates for causing the effects reported.").

However, evaluating only endocrine disruption can overlook other health impacts. A study of the integrated health effects (reproductive, endocrine, immune, genotoxic, and nephrotoxic) of long-term effluent exposure to various concentrations of treated municipal effluent demonstrated that genotoxic and immunotoxic effects occurred at concentrations lower than those required to induce recognizable changes in the structure and function of the reproductive endocrine system. *See* Katherine Liney *et al.*, *Health Effects in Fish of Long-Term Exposure to Effluents from Wastewater Treatment Works*, 114 Environmental Health Perspectives 81 (2006).[73]

Nutrient removal technology has been evaluated by Ecology and EPA and found to be efficacious in its ability to concurrently remove a wide array of toxic chemicals. *Phase 3 Nutrient Treatment Removal of Toxics, supra* n. 10, at ix (concluding that this study's results were "consistent with findings of published studies which reported that additional [wastewater treatment plant] nutrient removal provides better removal of PPCPs than is achieved by secondary treatment technologies alone."), 4 – 5 (reviewing existing studies that demonstrate removal of pharmaceuticals and personal care products); *see also EPA Advanced Wastewater for P 2007, supra* n. 13; *NWEA Petition to EPA* § VII.B*, supra* n. 19, at 100 – 101. Ecology's own study showed that different nutrient removal technologies resulted in different levels of removal for three categories of toxics: pharmaceuticals and personal care products, hormones and steroids, and semi-volatile organics. *Phase 3 Nutrient Treatment Removal of Toxics, supra* n. 10,

[73] *Available at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1874182/ (last accessed Sept. 13, 2018).

at 43, table 26 (grouping treatment results that achieved at least an 80 percent reduction in the concentrations of pollutant categories). There are additional studies that support these findings. For example, Canadian researchers have shown that the efficacy of removing the female sex hormones estradiol and estrone from treated sewage was greatly improved in sewage treatment plants that achieved nitrification. *See* Servos *et al., Distribution of estrogens, 17β-estradiol and estrone, in Canadian municipal wastewater treatment plants,* 336 Science of the Total Environment, 155 (Jan. 2005).[74] Likewise, tertiary treatment has been found to be the most effective method to remove estrogenic hormones from the discharge water. *See* Lucy Kirk *et al*, *Changes in estrogenic and androgenic activities at different stages of treatment in wastewater treatment works*, 21 Environmental Toxicology and Chemistry 972 (2002).[75]

Tertiary treatment also provides the possibility of disinfecting municipal effluent prior to discharge with ultraviolet light rather than chlorine, the use of which can result in the discharge of residual chlorine and produce toxic organochlorines. *See EPA Advanced Wastewater for P 2007, supra* n. 13, at 3; *see also* William Brungs, *Effects of Residual Chlorine on Aquatic Life*, 45 Water Pollution Control Journal 10 (1973)[76]; U.S. Geological Survey, *Dioxins and Furans in Bed Sediment and Fish Tissue of the Willamette Basin, Oregon, 1992-95*, at 3 (1998).[77] Chlorination of treated sewage also may be linked to the creation of antibiotic-resistant bacteria, as chlorination concentrates resistant genes in the surviving bacterial pool. *See* Shi *et al.*,

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[74] *Available at* https://www.sciencedirect.com/science/article/pii/S0048969704004565 (last accessed Sept. 13, 2018).
[75] *Available at* http://onlinelibrary.wiley.com/doi/10.1002/etc.5620210511/full (last accessed Sept. 13, 2018).
[76] *Available at* https://www.researchgate.net/publication/18583554_Effects_of_Residual_Chlorine_on_Aquatic_Life (last accessed Sept. 13, 2018).
[77] *Available at* https://pubs.usgs.gov/wri/1997/4082d/report.pdf (last accessed Sept. 13, 2018).

Metagenomic insights into chlorination effects on microbial antibiotic resistance in drinking water, 47 Water Research 111 (2013).[78]

4. Benefits to Washington Policy Initiatives from Using Known and Available Treatment for Nutrient Pollution

The State of Washington, frequently aligned with agencies of the federal government, has asserted numerous policy initiatives pertaining to protection of Puget Sound resources, resources that would be supported by a rulemaking to determine that tertiary treatment is required by the state's AKART mandate. These policy initiatives include, but are not limited to: the Governor's Washington Shellfish Initiative; the Governor's Southern Resident Killer Whale Task Force; the Governor's Washington State Blue Ribbon Panel on Ocean Acidification and the Washington Legislature's Marine Resources Advisory Council; the Legislature's creation of the Governor's Salmon Recovery Office; and Ecology's Puget Sound Nutrient Source Reduction Project. Each of these initiatives could potentially address significant parts of the nutrient and toxic problems in the Sound. However, to date, they have collectively reflected the lack of action and progress necessary to truly address these issues, and therefore serve to do little more than further demonstrate the need for the concrete, specific steps called for in this petition.

Governor Jay Inslee established the Washington Shellfish Initiative in 2011 and has triggered a Phase II to address, *inter alia*, pollution problems, ocean acidification impacts, and research effects of harmful algal blooms on shellfish. Washington Governor Jay Inslee, *Gov. Inslee's Shellfish Initiative.*[79] The Governor's office asserts that it has reduced pollution by

[78] *Available at* https://www.sciencedirect.com/science/article/pii/S0043135412006896 (last accessed Sept. 13, 2018).
[79] *Available at* https://www.governor.wa.gov/issues/issues/energy-environment/shellfish (last accessed Sept. 17, 2018).

installing sewage pump outs for boaters and it has tackled ocean acidification by issuing a comprehensive strategy. *Id*. Despite Ecology's extensive studies of Puget Sound nutrient and toxic pollution, the work plan for the strategy's Phase II does not mention these pollutants. Despite Ecology's having found that nonpoint sources are smaller contributors to nutrient pollution in Puget Sound as compared to municipal sewage discharges, the initial "white paper" specifically called out nutrient pollution from nonpoint sources. *See* State of Washington, *Washington Shellfish Initiative* 4 (Dec. 9, 2011).[80] The Shellfish Initiative does, however, urge implementation of the 42 actions recommended by the Washington State Blue Ribbon Panel on Ocean Acidification, including "water quality programs that reduce nutrient and organic carbon loading." State of Washington, *Washington Shellfish Initiative — Phase II Work Plan* 5 (Jan. 2016).[81] It asserts support for early warning systems for harmful algal blooms. *Id*. at 8. It suggests that shellfish cultivation can be used in water pollution trading where waters are impaired for excess nutrients or low dissolved oxygen. *Id*. at 9.

On March 14, 2018 the Governor signed Executive Order 18-02[82] directing state agencies to take several immediate actions to benefit southern resident killer whales, and establishing a task force to develop longer-term action recommendations for orca recovery and future sustainability. *See* Washington Governor Jay Inslee, *Southern Resident Killer Whale Recovery*

[80] *Available at* https://www.governor.wa.gov/sites/default/files/documents/WSI_WhitePaper2001.pdf (last accessed Oct. 5, 2018).
[81] *Available at* https://www.governor.wa.gov/sites/default/files/ShellfishWorkPlan.pdf (last accessed Oct. 5, 2018).
[82] *Available at* https://www.governor.wa.gov/sites/default/files/exe_order/eo_18-02_1.pdf (last accessed Oct. 5, 2018).

and Task Force.[83] The Executive Order states that "[b]oth Southern Residents and Chinook salmon populations are adversely impacted by warming oceans and ocean acidification due to climate change. Presence of contaminants and accumulation of pollutants in Washington's waters are also linked to the decline of Southern Residents." *Executive Order 18-02, supra* n. 82, at 1 – 2. The task force created by the Executive Order has not yet issued its report. However, in its most recent draft, it has proposed Recommendation No. 30, "Identify, prioritize and take action on chemicals that impact orcas and their prey" and Recommendation No. 32, "Improve effectiveness, implementation, and enforcement of National Pollutant Discharge Elimination System (NPDES) permits to address direct threats to Southern Resident orcas and their prey." Orca Task Force, *Orca Task Force Recommendations* 24, 26 (Oct 24 draft) (hereinafter "Draft Recommendations").[84] The task force proposes to "[d]irect the Department of Ecology to convene discussions and develop a plan to address pharmaceuticals, identifying priorities, source control, and wastewater treatment methods." *Id*. at 24. It goes on to propose that Ecology should develop a plan by 2025—a full six years in the future—to "identify new policies and actions to decrease the load of priority [chemicals of emerging concern] to Puget Sound" including "enhanced treatment." *Id*. at 24 – 25. It correctly notes that "wastewater treatment options" likely must be considered for control of pharmaceuticals. *Id*. at 24.

While Recommendation No. 32 is focused on discharge permits, it demonstrates broad ignorance about Ecology's NPDES program. Where permits have no effluent limits—as is true for toxics and nutrients—there is nothing to inspect, implement, or enforce, the very actions the

[83] *Available at* https://www.governor.wa.gov/issues/issues/energy-environment/southern-resident-killer-whale-recovery-and-task-force (last accessed Oct. 5, 2018).
[84] *Available at* https://www.governor.wa.gov/sites/default/files/Draft_recommendations_OrcaTaskForce_10-24-18.pdf (last accessed Oct. 25, 2018).

task force emphasizes the most. *See id*. at 26 – 27. The task force also focuses on the need to "update aquatic life water quality standards," which it believes will result in "[i]mproved permit requirements." *Id.* at 26. But it fails to recognize that nearly all existing NPDES permits for municipal sewage dischargers to Puget Sound and its tributaries do not have effluent limitations on toxic contaminants with established water quality standards because Ecology uses regulatory mixing zones to avoid such limits. *See NWEA Petition to EPA, supra* n. 19, at 97 – 100. The task force asserts that new water quality standards will "drive improved technology requirements under the existing 'best available technology' standard"[85] that would include "deployment of improved treatment technologies with already planned or required upgrades to wastewater treatment facilities." *Draft Recommendations, supra* n. 84, at 26. But this discussion fails to recognize both that Ecology routinely ignores AKART now and that AKART is not based on water quality standards.

The task force also does not appear to understand the lengthy timeframe for the development of new criteria for such currently unregulated toxics as polybrominated diphenyl ethers ("PBDE") for which EPA has not established recommended criteria under section 304(a) of the Clean Water Act. Yet, Task Force materials identify sewage treatment plants as likely the greatest source of PDBEs to Puget Sound. *See* Steve Martin, Governor's Salmon Recovery Office, Penny Becker, WDFW, *Contaminants in SRKW* 19 (June 14, 2018)[86] (chart showing a range of 6,600 to 19,300 unknown units of PDBEs from sewage treatment plants as compared with surface runoff (4,100 – 8,000) and air deposition (2,300 – 5,600)); *see also* Ecology, P*uget*

[85] Presumably the task force is referring to AKART.
[86] *Available at* https://www.governor.wa.gov/sites/default/files/SRKW_TF_14June_WorkingGroupPresentations.pdf (last accessed Sept. 18, 2018).

Sound Regional Toxics Model: Evaluation of PCBs, PBDEs, PAHs, Copper, Lead, and Zinc 37 (2015)[87] (Table 3: median loads of total PBDEs in kg/year: 9.91 from sewage facilities, 4.56 from surface runoff, 3.49 from atmospheric deposition).

On the whole, the task force appears to not understand that because Ecology's NPDES program rarely regulates the discharge of toxic contaminants even where water quality standards are in place, nutrient restrictions are the most likely surrogate for toxics regulation and the most likely to be controlled though the use of effluent limits derived from the AKART mandate. Instead, the task force's proposals relegate the discussion of nutrients to two notes, first that there is an "opportunity to understand" the separate but related impacts of nutrients from such issues as climate change, *Draft Recommendations, supra* n. 84, at 15, and, second, that in its second year the task force "will look at nutrient loading/water quality," *id*. at 23. That the task force fails to understand the relationship of updated treatment requirements under AKART to orca protection does not, however, negate its fundamental truth.

In 2012, Governor Christine Gregoire appointed the Washington State Blue Ribbon Panel on Ocean Acidification because "Washington is particularly vulnerable to ocean acidification. In addition, acidification has significant implications for Washington's marine environment, our state and local economies, and tribes." Washington State Blue Ribbon Panel on Ocean Acidification, *Ocean Acidification: From Knowledge to Action, Washington State's Strategic Response* xiv (Nov. 2012) (hereinafter "Blue Ribbon Report")[88]; *see also* Governor Christine Gregoire, *Executive Order 12-07, Washington's Response to Ocean Acidification* (Nov. 27,

[87] *Available at* https://fortress.wa.gov/ecy/publications/documents/1503025.pdf (last accessed Sept. 18, 2018).
[88] *Available at* https://fortress.wa.gov/ecy/publications/documents/1201015.pdf (last accessed Sept. 18, 2018).

2012).[89] Local and ocean acidification is of sufficient concern that, in 2013, the Washington State Legislature established the Marine Resources Advisory Council "to act as a state body to maintain a sustainable and coordinated focus on ocean acidification." Marine Resources Advisory Council, *Ocean Acidification in Washington State*.[90]

The Blue Ribbon Panel called for "[r]educing inputs of nutrients and organic carbon from local sources [that] will decrease acidity in Washington's marine waters that are impacted by these local sources and thereby decrease the effects of ocean acidification on local marine species." *Blue Ribbon Report*, *supra* n. 88, at 43. In 2012, it called for use of a water quality-based TMDL, or "pollution budget," to be developed but also stated that:

> We should not put nutrient control efforts on hold while this scientific work is done, however. On the contrary, the Panel recommends that existing nutrient and organic carbon reduction programs be enhanced and strengthened; these pollutants are already lowering dissolved oxygen levels and causing a variety of significant ecosystem impacts in some areas. Additionally, local sources of nutrients and organic carbon often contain dangerous bacteria, pathogens, toxic metals, and other harmful pollutants. Finally, the decomposition of organic material and nutrient-stimulated algae can eventually release carbon dioxide into the water, thereby lowering pH and causing acidification.
>
> Given the impacts of ocean acidification and the multiple benefits of nutrient and carbon source reduction, the Panel recommends enhanced actions to control and reduce local sources. Acidification presents an additional reason to accelerate and strengthen these existing programs.

Id. at 44 – 45.

In its 2017 update, the Blue Ribbon panel reported that "local human-derived nutrient sources contribute significantly to ocean acidification conditions in certain areas of Puget Sound, though spatial variability exists. To effectively reduce the risks presented by ocean acidification,

[89] *Available at* https://www.governor.wa.gov/sites/default/files/exe_order/eo_12-07.pdf (last accessed Sept. 19, 2018).
[90] *Available at* http://oainwa.org/mrac/ (last accessed Sept. 19, 2018).

. . . finding local strategies to reduce nutrient inputs will be needed" and that "[w]ithout additional action soon, even more severe economic, social, and environmental consequences are on the horizon." Marine Resources Advisory Council, *2017 Addendum to Ocean Acidification: From Knowledge to Action, Washington State's Strategic Response* 4 (Dec. 2017).[91] The addendum noted:

> The impact of regional anthropogenic nitrogen and organic carbon sources varies widely in time and space. Regional anthropogenic nutrient loadings decreased pH and the aragonite saturation state in some areas, particularly in several South Puget Sound shallow inlets and bays. The impact of regional anthropogenic nutrient sources is predicted to be greatest at the bottom of the water column.

Id. at 15. The addendum also broadened the original report's recommended action No. 5.2.1 that previously pertained to on-site sewage systems to read as follows: "If it is scientifically determined that nutrients from sewage systems are contributing to local acidification, identify opportunities to reduce stress on or improve treatment of sewage systems," a change to clarify the need "to minimize nutrient loading due to sewage systems and provide leeway to look at various methods to achieve effective results rather than prescribe a set solution [of advanced technologies for on-site systems]." *Id*. at 33. Despite the failure of Ecology to implement either water quality-based or technology-based nutrient reductions via effluent limitations in NPDES permits for municipal sewage discharges, the panel urged continued support for "nutrient reduction plans and strategies" and "use [of] Washington's existing water quality standards rule to reduce and control local-based nutrient sources." *Id*. at 34. The panel itself noted that "[t]here are few regional sewage treatment plants that strip nutrients from waste. If it is determined nutrient input is a contributing issue, there will have to be a systematic change of operations."

[91] *Available at* http://oainwa.org/assets/docs/2017_Addendum_BRP_Report_fullreport.pdf (last accessed Sept. 19, 2018).

Revising the Blue Ribbon Panel: Recommendations on Ocean Acidification, *Blue Ribbon Panel "Refresh" Meeting Summary* 13 (March 17, 2017).[92] Ecology subsequently issued its report on "how regional freshwater/land-derived sources of nutrients generally impact acidification in the Salish Sea." Ecology, *Salish Sea Model: Ocean Acidification Module and the Response to regional Anthropogenic Nutrient Sources* 7 (June 2017).[93] Its conclusion:

> [I]ncreased dissolved inorganic nitrogen (DIN), phytoplankton biomass, and non-algal organic carbon caused by regional anthropogenic nutrient sources can constitute significant contributors to acidification in the Salish Sea. Predicted impacts due to regional anthropogenic nutrient sources include changes in pH and DIC in both bottom and surface waters that are comparable in magnitude to published estimates of the changes caused by increasing global atmospheric [partial pressure of] pCO_2.
>
> The [aragonite saturation state, a form of calcium carbonate used by shell-building organisms] Ωarag decreased, on average, due to regional anthropogenic nutrient sources. The impact is predicted to be greatest at the bottom of the water column. Regional anthropogenic nutrient sources account for up to about 43% of the total anthropogenic depletion of Ωarag at the bottom, and up to about 15% of the total anthropogenic depletion of Ωarag at the surface. Regional anthropogenic nutrient loadings increased pH and Ωarag in some areas, particularly in several South Puget Sound shallow inlets and bays.

Id. at 7 – 8. In short, Ecology has determined that nutrients are a "contributing issue" to ocean acidification.

In 1998, the Washington State Legislature established the Governor's Salmon Recovery Office to "coordinate state strategy to allow for salmon recovery to healthy sustainable population levels with productive commercial and recreational fisheries," RCW 77.85.030(1), because "repeated attempts to improve salmonid fish runs throughout the state of Washington

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[92] *Available at* http://oainwa.org/assets/docs/2017_BRPRefresh_Summary_FINAL.pdf (last accessed Sept. 19, 2018).
[93] *Available at* https://fortress.wa.gov/ecy/publications/documents/1703009.pdf (last accessed Oct. 5, 2018).

have failed to avert listings of salmon and steelhead runs as threatened or endangered under the federal endangered species act," RCW 77.85.005. The reasons for severely reduced populations of salmonids are complex but among them is water quality. According to the Governor's Salmon Recovery Office, "[t]oxic chemicals are concentrating in the water and entering the food chain. Low oxygen levels caused by nitrogen discharged from septic tanks, sewage treatment plants and other sources are threatening the Sound. Water quality for rivers and streams throughout Puget Sound has remained essentially unchanged for at least the past 10 years." State of Salmon in Watersheds 2016, *Puget Sound water*.[94] (This index of water quality "does not include non-standard elements like metals" and "[f]or nutrient[s] . . . results are based on expected conditions in a given region."[95])

Finally, in 2017, Ecology began its Puget Sound Nutrient Reduction Project. According to Ecology, this initiative is meant to be a "collaborative process" using "state-of-the-art computer modeling tools and water quality data to evaluate meaningful nutrient reduction options." *Ecology, Reducing Nutrients*, *supra* n. 7. The project is meant to "improve Puget Sound's water quality by reducing human sources of nutrients, and make it more resilient to negative effects from climate change and Washington's increasing population pressures over the next several decades." *Id.* Ecology intends the project to have two phases: Phase I, running from 2018 through 2021, will focus on collaboratively developing a nutrient reduction plan; and Phase II, running from 2021 through 2031 and beyond, will see that plan implemented. Dustin

[94] *Available at* https://stateofsalmon.wa.gov/puget-sound/water/ (last accessed Sept. 19, 2018).
[95] State of Salmon in Watersheds 2016, *How we Measure*, *available at* https://stateofsalmon.wa.gov/about-this-report/how-we-measure/ (last accessed Sept. 19, 2018).

Bilhimer, *What is the Puget Sound Nutrient Source Reduction Project?* (July 19, 2017).[96] This project will generally focus on increasing dissolved oxygen levels in the Sound to more natural levels as the marker for success. *Id.* While the goal of this project is laudable, it is not intended to address the specific issue addressed in this petition—namely, the unquestioned legal requirement that all sewage treatment facilities in Washington must implement the currently available treatment technology. Instead, Ecology's project is focused on the additional water quality-based actions, if any, that must be taken *in addition* to the implementation of this legal technology-based minimum to achieve the desired water quality in Puget Sound. Thus, the goals of this petition and of the Puget Sound Nutrient Reduction Project are complementary and there is no reason to wait for the project's results before conducting rulemaking to identify the necessary technology-based changes that are required regardless of what other measures Ecology may later identify.

In addition to this work at the state level, combining the two related priorities—salmon and orcas—the Washington Department of Fish and Wildlife ("WDFW") and the National Marine Fisheries Service ("NMFS") recently developed a list of West Coast chinook stocks that are important to the recovery of endangered Southern Resident killer whales. Lack of prey not only causes starvation but also results in whales using blubber stores for energy, fat that is contaminated by toxic pollution that threatens their long-term health and reproductive success. NMFS, *Killer Whale Priority Chinook salmon stocks - Questions & Answers.*[97] According to

[96] https://www.ezview.wa.gov/Portals/_1962/Documents/PSNSRP/1_Bilhimer_What%20is%20the%20Puget%20Sound%20Nutrient%20Source%20Reduction%20Project.pdf (last accessed Sept. 24, 2018).

[97] *Available at* https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/Killer_whale_priority_chinook_salmon_q_a.html (last accessed Oct. 3, 2018).

NMFS, "[t]he list gives extra weight to salmon runs that Southern Residents have been documented as preying on, especially during winter when the whales may have a harder time finding sufficient food." NMFS, *Prioritizing West Coast Chinook salmon stocks for Southern Resident killer whale recovery*.[98] The stocks were scored with weights given to the areas of highest SR whale use, including the Salish Sea, "treated as twice as important as the other areas." NMFS, WDFW, *Southern Resident Killer Whale Priority Chinook Stocks Report* 5 (June 22, 2018).[99] The two highest ranked chinook stocks are the fall runs in Northern Puget Sound (Nooksack, Elwha, Dungeness, Skagit, Stillaguamish, Snohomish rivers) and Southern Puget Sound (Nisqually, Puyallup, Green, Duwamish, Deschutes river and Hood Canal systems) (total score 5.0). *Id*. at 7. The spring runs in Northern Puget Sound are given a total score of 3.88 and the spring runs in Southern Puget Sound are 1.88. *Id.* at 7, 8.

C. An Examination of AKART for Municipal Sewage Discharges Would Result in a Determination that Tertiary Treatment is the Default Definition of AKART

Advanced treatment beyond secondary treatment is not unusual in the United States. According to EPA in 2004, "[o]ver 30 percent of the [16,000] wastewater treatment facilities today produce cleaner discharges by providing even greater levels of treatment than secondary." *EPA Primer, supra* n. 15, at 4. As discussed above, in Washington, the PCHB has already determined that tertiary treatment is AKART for municipal sewage discharges in a case pertaining to the Spokane County sewage treatment plant. *Sierra Club,* PCHB No. 11-184, at 9,

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[98] *Available at* https://www.westcoast.fisheries.noaa.gov/stories/2018/18_07182018_prioritized_salmon_stocks_for _srkw_recovery.html (last accessed Oct. 3, 2018).
[99] *Available at* https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/killer_whales/recovery/srkw_priority_chinook_stocks_conceptual_model_report___list_22june2018.pdf (last accessed Nov. 6, 2018).

25. There is nothing unique about Spokane's facility that suggests that this conclusion would be a one-time finding should Ecology conduct an AKART assessment at another facility. The simple fact is that tertiary treatment should be considered AKART for most, if not all, facilities that discharge to Puget Sound and its tributaries.

In this sub-section, we begin by explaining how secondary treatment is 100-year old technology that does not remove nutrient or toxic pollution, as compared to tertiary treatment. We then set out the facts that demonstrate tertiary treatment is both "known" and "available." Next, we discuss why in an analysis, Ecology is likely to find that tertiary treatment is "reasonable" for most sewage treatment plants. And finally, we explain that the technology-based approach of AKART is essential because Ecology has consistently failed to use the water quality-based approaches available to clean up nutrient and toxics pollution in Puget Sound.

1. Tertiary Treatment Removes Nutrient Pollution and Toxics that the Outdated Technology of Secondary Treatment Does Not

Secondary treatment of sewage is a pollution abatement technology that is over a century old. *See* P.F. Cooper, *Historical Aspects of Wastewater Treatment, in Decentralized Sanitation and Reuse: Concepts, Systems and Implementation* (2001) at 27-28.[100] The first use of activated-sludge treatment systems to separate, aerate, and oxidize wastewater date from approximately 1913-1914, with the first full-fledged sewage treatment systems having come on-line in 1920. *Id*. This secondary treatment technology became the underpinning for modern sewage treatment around the world. However, it was also noted long ago—in the 1950s and 1960s—that secondary treatment did not reliably or predictably remove nitrogen or ammonia. *Id* at 29.

[100] *Available at* http://www.bvsde.paho.org/bvsacd/leeds/cooper.pdf (last accessed Oct. 5, 2018).

Likewise, "[t]he problem of how to remove phosphorus in activated sludge processes was solved [in 1974 and] is now applied worldwide." *Id*. at 30.

It is now well understood that secondary treatment is not adequate to ensure the removal of either nitrogen or phosphorus from sewage prior to discharge. *See e.g*., *EPA Technical Reference 2008, supra* n. 11, at 1-1 ("Wastewater treatment plants (WWTPs) that use conventional biological treatment processes designed to meet secondary treatment effluent levels do not remove nitrogen or phosphorus to any substantial extent."); *EPA Primer, supra* n. 15, at 8 ("Conventional secondary biological treatment processes do not remove the phosphorus and nitrogen to any substantial extent—in fact, they may convert the organic forms of these substances into mineral form, making them more usable by plant life."). Tertiary treatment, in contrast to the aeration and oxidation methods used by secondary treatment, is effective at removing nitrogen and phosphorus from wastewater. *See e.g., id* at 1-2; *Washington Nutrient Removal Evaluation 2011, supra* n. 2. Although tertiary treatment methods vary by facility, this stage of treatment includes use of biological nutrient removal that involves "modifications of suspended-growth treatment systems so that the bacteria in these systems also convert nitrate nitrogen to inert nitrogen gas and trap phosphorus in the solids that are removed from the effluent," or a process of ammonification followed by nitrification and denitrification. *EPA Technical Reference 2008, supra* n. 11, at 1-2 (citation omitted). Organic nitrogen is removed by sedimentation or filtration. *Id*. Existing secondary treatment can also be modified to support denitrification and enhanced biological phosphorus removal. *See* EPA, *Case Studies on Implementing Low-Cost Modifications to Improve Nutrient Reduction at Wastewater Treatment*

Plants DRAFT – Version 1.0, at 10 (August 2015)[101] (hereinafter "EPA Case Studies 2015"). Modifications can also be to process, configuration, or chemical changes or to include natural treatment wetlands prior to discharge. *Id*. at 10-11. EPA concluded that these low or no-cost modifications "can be implemented at existing WWTPs to significantly reduce effluent nutrient discharges with minimal negative impacts on operations. In fact, in most cases, the secondary impacts are overwhelmingly positive and include energy efficiency, lower operational costs, and improved process stability." *Id.* at 11.

2. Tertiary Treatment Technology is Both "Known" and "Available"

Tertiary treatment to remove nutrients from wastewater is a well-known technology across government and industry, according to EPA. The agency has detailed how, by 1965, the South Tahoe Public Utility District in Nevada had installed "an innovative advanced tertiary treatment plant, which treated sewage to drinking water standards." *EPA Technical Reference 2008, supra* n. 11, at 1-4. In 1978, "the Tahoe-Truckee Sanitation Agency built a state-of-the-art tertiary treatment plant in Truckee." *Id*. In 1978, the U.S. and Canada Great Lakes Water Quality Agreement established that sewage treatment plants discharging over one million gallons a day in the basins of Lakes Ontario and Erie should achieve effluent concentrations of 0.5 mg/L total phosphorus. *Id.* at 1-5 – 1-6. Also in 1978, the Upper Occoquan Sewage Authority in Virginia brought its Advanced Wastewater Treatment on-line, with monthly average nutrient limits of 0.1 mg/L for total phosphorus and 1.0 mg/L for total Kjeldahl nitrogen (TKN). *Id*. at 1-7.

[101] *Available at* https://www.epa.gov/sites/production/files/2015-08/documents/case_studies_on_implementing_low-cost_modification_to_improve_potw_nutrient_reduction-combined_508_-_august.pdf (last accessed Oct. 5, 2018).

For over a decade, EPA has supported the use of enhanced secondary and tertiary treatment and its scalability for sewage treatment plants. In 2007, EPA urged use of nutrient removal technologies, concluding that "[t]here appear[s] to be no technical or economic reason that precludes others from using any of the tertiary treatment technologies that are employed at [23 American municipal] WWTPs. Any of these technologies may be scaled as necessary to fulfill treatment capacity needs after consideration of site specific conditions." *EPA Advanced Wastewater for P 2007, supra* n. 13, at 3. EPA emphasized that "there are no apparent reasons why any of these [advanced] filtration technologies may not be installed in either small or large-scale applications. Selection of a filtration technology includes the usual considerations such as: desired effluent quality; reliability of treatment equipment; capital, operating and maintenance costs; equipment footprint, and future expandability." *Id* at 9. That same year, EPA issued a report on using enhanced biological nutrient removal technology based on approximately 70 existing facilities in the U.S. *See EPA Biological Removal 2007, supra* n. 12, at 7 – 8 (Ex. 6 lists over 40 Maryland retrofitted wastewater facilities using BNR), 9 (Ex. 7 lists over 20 such facilities in Connecticut), 5 (Ex. 4 lists an additional four facilities).

The next year, in 2008, EPA published an extensive document "about available technologies that can be used to remove nitrogen and phosphorus from municipal wastewater" for the purpose of "help[ing] permit writers develop appropriate discharge permit limits with a full understanding of available technologies, their variability, and their ability to meet the proposed limits in the most sustainable way." *EPA Technical Reference 2008, supra* n. 11, at 2-1. In 2015, EPA issued a draft report to encourage the use of nutrient removal through "relatively low-cost modifications" for "non-advanced" facilities that "may not be specifically designed for nutrient removal." *EPA Case Studies 2015, supra* n. 101, at 2-15. EPA determined

that a number of modifications are possible and include aeration modifications, process modifications, configuration modifications, chemical modifications, and discharge modifications. *Id*. at 10 –11. EPA concluded that "[n]o-or-low-cost activities can be implemented at existing WWTPs to significantly reduce effluent nutrient discharges with minimal negative impacts on operations. . . . [I]n most cases, the secondary impacts are overwhelmingly positive and include energy efficiency, lower operation costs, and improved process stability." *Id.* at 11. It also concluded that "[l]ow-cost nutrient reduction improvements are most feasible for activated sludge plants, where excess capacity (volumetric and/or aeration) can typically be leveraged to facilitate nitrification and denitrification without requiring physical infrastructure modifications." *Id.* Finally, it concluded that "[m]odestly improved phosphorus reduction often co-occurs as a result of improvements in biological nitrogen removal." *Id*. While EPA continues to evaluate ways to remove nutrients from treated sewage,[102] it has already provided multiple evaluations of the many options that are known, available, and found to be reasonable at many facilities across the country.

Nitrogen removal treatment technology is also known to Puget Sound dischargers. Pierce County has determined on its own volition[103] that best practice nitrogen removal at its Chambers Creek facility would produce effluent with 1.5 mg/L nitrate, 2 mg/L total inorganic nitrogen, and 0.5 mg/L ammonia. *See EIS Chapter 9*, *supra* n. 28, at 9-11. Similarly, the LOTT facility in Olympia, which discharges to Budd Inlet, known to be impaired by nutrients and low levels of

[102] *See* EPA, *National Study of Nutrient Removal and Secondary Technologies, available at* https://www.epa.gov/eg/national-study-nutrient-removal-and-secondary-technologies (last accessed Sept. 17, 2018).

[103] Ecology's 2008 NPDES permit for Chambers Creek contains no effluent limits to reflect the installation of nutrient removal technology and the accompanying fact sheet is silent. *See Chambers Creek 2008 Fact Sheet, supra* n. 30; *Chambers Creek 2008 Permit, supra* n. 32.

dissolved oxygen, has implemented nutrient controls for many years that are neither AKART nor water quality-based effluent limits. According to EPA, the LOTT facility has achieved an average of monthly averages of 2.2 mg/L total inorganic nitrogen between April 2003 and September 2006 (during seasons when effluent limits apply). *EPA Advanced Wastewater for P 2007, supra* n. 13, at 69; *see also LOTT Fact Sheet, supra* n. 57, at 9 ("The biological nutrient removal system uses the four-stage Bardenpho process to remove nitrogen."); Ecology, *NPDES Permit No. WA0037061* [LOTT] 6 (Feb. 16, 2018)[104] (spring/fall and summer effluent limitations for Total Inorganic Nitrogen of 3 mg/L and 338 and 288 pounds/day respectively). LOTT's effluent limit is not based on meeting water quality standards. *LOTT Fact Sheet, supra* n. 57, at 54 ("Ecology has assessed the reasonable potential for the discharge to violate water quality standards in the near field and found that the discharge would not violate standards.").[105] In addition, as previously discussed, *supra* at 25 – 30, King County, Tacoma, and Bellingham are examples of Puget Sound area municipalities that have evaluated the numerous existing nutrient removal technology options to achieve effluent levels of 3.0 mg/L total nitrogen. None of the engineering reports completed for these municipalities has concluded that the technology to achieve this level does not exist.

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[104] *Available at* https://fortress.wa.gov/ecy/paris/DownloadDocument.aspx?id=227796 (last accessed Sept. 14, 2018).

[105] *See also EPA Advanced Wastewater for P 2007, supra* n. 13, at 70. Rather, it is based on available technology, albeit not necessary AKART: "[t]he proposed permit includes effluent limits for Total Inorganic Nitrogen (TIN) derived from the engineering report on the design of the nitrogen removal process." *LOTT Fact Sheet, supra* n. 57, at 22; *see also id*. at 55 ("Ecology concludes that the technology and performance-based limits included in this permit are appropriate."). Moreover, Ecology suggests that it may require a more stringent effluent limit for nitrogen in the future, stating that it "is completing a TMDL, referenced above, to establish effluent limits for the following nutrient: Nitrogen." *Id*.

Likewise, on the eastern side of Washington State, Spokane County's tertiary treatment—established to meet wasteload allocations to protect the Spokane River and Lake Spokane—achieves effluent quality of 0.05 mg/L phosphorus and average ammonia concentrations as low as 0.25 mg/L for control of nitrogen. *See Spokane Fact Sheet, supra* n. 3, at 11. Because this and other facilities in Washington already use enhanced secondary and tertiary treatment, the latter of which has been determined by the PCHB to be AKART, it is beyond contention that treatment technology to remove nitrogen and phosphorus beyond the discharge quality achieved by secondary treatment is both "known" and "available" in Washington State.

3. Tertiary Treatment is "Reasonable" for Most Sewage Treatment Plant Discharges

Whether a treatment technology is "reasonable" is a technical and economic determination. *See Puget Soundkeeper* at 793 (2000); *see also Permit-Writer's Manual, supra* n. 23, at 84 (AKART "requires an engineering judgement and an economic judgment."). When Ecology denied the requests for marine waivers from secondary treatment requirements in the 1980s, it determined reasonableness for each of the municipalities on three factors: "(1) planning status, (2) environmental or siting constraints, and (3) economics. The economics factor was an analysis of resulting rate structure after meeting secondary treatment and a comparison to rates in other municipalities in the state and nation." *Id.* at 91. The City of Bellingham appealed Ecology's denial of a waiver to the PCHB. Upholding the denial, the PCHB cited Ecology's July 24, 1984 letter denying the waiver based on the three factors set out above and determined that secondary treatment "is normally 'reasonable' unless compelling evidence to the contrary is presented." *Bellingham* (1985) at 12. This high burden of proof is consistent with the Attorney

General's opinion that Ecology's AKART determinations "are, of course, to be made in light of the foundation policy that 'waters of the state' shall be of high quality and be maintained to the 'highest possible standards to insure the purity of all waters of the state' consistent with various environmental and economic objectives." *Attorney General 1983* fn. 20. The engineering analysis must be completed pursuant to WAC 173-240. *See Permit-Writer's Manual, supra* n. 23, at 94.

According to Ecology, the reasonableness test imbedded in an AKART determination "requires estimates of the costs of the proposed treatment technologies; estimates of pollutant removal levels; and profit, cost, and revenue data." *Id.* at 92. Citing EPA's tests, Ecology states that the "economic reasonableness test is intended to be a cost-benefit test and benefits are measured in terms of amounts of pollutants removed." *Id*. Ecology further cites the PCHB opinion in *Bellingham* (1985) for the proposition that two tests apply within the economic reasonableness criterion: (1) whether the treatment in question "would involve significantly greater costs than for others obliged to obtain the same levels of treatment," and (2) whether the treatment in question is "within the economic ability of the source to meet the costs of treatment." *Id.* at 115. Ecology concurs that both tests apply to municipal dischargers, asserting with regard to the first test that "[o]ne measure of cost is cost per pound of pollutants removed. Another measure–which is applicable to STPs–is cost per user." *Id*. With regard to the second test, Ecology states that "[f]or municipalities, ability to pay is measured by the impact of the treatment technology's cost on user rates." *Id.* Finally, Ecology notes that,

> In setting AKART effluent limits, pollution reduction benefits (as measured by amounts of pollution reduction) are also to be considered. Greater amounts of pollution reduction make a given level of cost more reasonable.

Id. Based on the findings of the EPA and Ecology reports on treatment technology cited in this petition, and the costs to the economy and environment of Washington if no action is taken, it is likely that use of tertiary treatment will be found to be economically reasonable.[106]

This petition requests that Ecology make a rebuttable determination that tertiary treatment is AKART, allowing for municipal dischargers to demonstrate to the contrary. This is precisely the approach used by Ecology with regard to the marine variance requests in the 1980s. As described by the PCHB,

> [Ecology's] response was to make a generalized engineering determination, expressed in its municipal strategy document, that secondary treatment is ultimately required of all municipalities by the State Standard. However, it provided for case-by-case evaluation of each municipal discharge to determine if the generalized determination is appropriate for that source at the time the question is asked. Thus, in its denial of concurrence here, [Ecology] stated that secondary treatment is "normally 'reasonable' unless compelling evidence to the contrary is presented."

Bellingham (1985) at 31. The PCHB concluded that Ecology's establishing "a generic treatment level as appropriate for the entire class of municipal dischargers" was consistent with the State Act. *Id.* at 32. EPA would likely agree as it has noted that while the cost of tertiary treatment "is

[106] EPA has provided assistance to states seeking to value the benefits associated with nutrient pollution reduction. *See* EPA, Benefits Assessment Tools - Valuing Reductions in Surface Water Nutrient Pollution, available at https://www.epa.gov/nutrient-policy-data/benefits-assessment-tools-valuing-reductions-surface-water-nutrient-pollution (last accessed Sept. 13, 2018). This consists of four tools: (1) Measuring Nutrient Reduction Benefits for Policy Analysis Using Linked Non-Market Valuation and Environmental Assessment Models: An Interim Report on Water Quality Modeling (May 8, 2009), *available at* https://www.epa.gov/sites/production/files/2015-10/documents/grants-waterreport.pdf (last accessed Sept. 13, 2018); (2) Measuring Nutrient Reduction Benefits for Policy Analysis Using Linked Non-Market Valuation and Environmental Assessment Models Final Report on Stated Preference Surveys (Feb. 2013), *available at* https://www.epa.gov/sites/production/files/2015-10/documents/grants-surveyreport.pdf; (3) User Manual for the Water Quality Benefits Spreadsheet (Feb. 2013), *available at* https://www.epa.gov/sites/production/files/2015-10/documents/grants-user-manual-benefits-spreadsheet.pdf; and (4) Water Quality Benefits Spreadsheet (Feb. 2013), *available at* https://www.epa.gov/sites/production/files/2015-10/grants-benefits-spreadsheet.xlsm.

a major factor," "[e]xternal costs—costs borne by the public more generally—associated with the impacts from uncontrolled or under-controlled nutrient pollution and delayed action are important considerations." *EPA Compilation of Nutrient Costs, supra* n. 55, at 3.

D. Ecology Previously Identified the Need for this Rulemaking While Consistently Failing to Use the Water Quality-Based Approach to Pollution Reduction to Protect Puget Sound

Although AKART is required regardless of the quality of the water into which pollution is discharged and regardless of the use of water quality-based approaches to controlling water pollution, such as effluent limits to meet water quality standards and Total Maximum Daily Loads ("TMDL"), the need for the implementation of the AKART requirements is heightened by Ecology's complete failure to use those water quality-based approaches. We hereby incorporate by attachment in their entirety to demonstrate that failure the *NWEA Petition to Ecology, supra* n. 19, and the *NWEA Petition to EPA, supra* n. 19. Ecology's denial of NWEA's petition seeking a TMDL for nitrogen in Puget Sound states that Ecology "agrees that Puget Sound is impaired by nutrient pollution and a TMDL may be necessary to address this impairment." Letter from Maia Bellon, Director, Ecology to Nina Bell, Executive Director, NWEA, *Re: Petition for Rulemaking to Adopt a Total Maximum Daily Load and Wasteload Allocation for Nitrogen in Puget Sound* (Dec. 8, 2017). Stating that it will ultimately develop such a TMDL, Ecology asserts that it is engaged in "ongoing efforts [that] will reduce nutrient loading in the near term" that will support such an effort. *Id*. These efforts include "[e]valuat[ing] the treatment technologies at municipal wastewater treatment facilities that discharge to Puget Sound," "[d]etermin[ing] where nutrient removal technologies will have the greatest impact on reduced nutrient loading to Puget Sound," and "identifying necessary point and nonpoint source load reductions with . . . Puget Sound watersheds." *Id*.

In fact, evaluations of treatment technologies for nutrient removal at municipal treatment facilities has, in many cases, already taken place. Extensive engineering analysis was completed for King County's South plant in 2010 and for its West Point plant in 2011, and for Tacoma in 2012. *See supra* at 25 – 30. Yet, despite this analysis, Ecology proceeded to issue new NPDES discharge permits to these facilities with no nutrient removal required. *Id*. Not only can Ecology not point to any regulatory action it has taken to control nitrogen discharges from the largest source of anthropogenic nitrogen to Puget Sound, in its denial letter it only claims to be evaluating, determining, and identifying but never to actually requiring nutrient reductions.

These purported "ongoing efforts" that do not involve any regulatory actions must be viewed in the context of Ecology's long history of similar efforts to evaluate the continued deterioration of Puget Sound water quality while taking no action. As NWEA's earlier petition to Ecology discussed, Ecology and EPA have been studying and modeling dissolved oxygen in Puget Sound since the late 1980s—a period of thirty years. *NWEA Petition to Ecology, supra* n. 19, at 34 – 38. Through that work, Ecology has continued to find that without nutrient controls the effects of nitrogen discharged by sewage treatment facilities on Puget Sound will continue to worsen—predicting nitrogen loading from marine dichargers to double by the year 2070[107]—yet it has taken no action.

At the same time, Ecology's years of investment in studying the effects of nutrient discharges to Puget Sound and possible use of existing nutrient removal technologies on these

[107] Ecology, *Puget Sound and the Straits Dissolved Oxygen Assessment: Impacts of Current and Future Human Nitrogen Sources and Climate Change through 2070, at 78* (March 2014), *available at* https://fortress.wa.gov/ecy/publications/documents/1403007.pdf (last accessed Oct. 23, 2018) (hereinafter "Future Impacts of Nitrogen").

discharges demonstrates that this issue is a top priority of Ecology's. Far from being a new enterprise, rulemaking to establish AKART for municipal sewage treatment plants based on all known and available treatment technologies would correspond identically with Ecology's priorities and investments. Given that there are two, and only two, approaches to regulating pollutants in discharges from NPDES-permitted facilities—the technology-based and the water quality-based approaches—and Ecology has asserted that it cannot yet pursue the latter, if indeed it ever chooses to, that leaves only the technology-based approach. Given that Ecology repeatedly identifies its rules at WAC 173-221 as precluding its identification of AKART as anything beyond secondary treatment, the rules must be amended to reflect the reality of all known and available treatment technologies.

Using the AKART approach in Washington to address Puget Sound pollution is not a novel idea. In 2007, EPA Region 10 made the case for an AKART-based approach to nutrient controls in issuing a report on the technological and economic feasibility of achieving low levels of phosphorus in sewage treatment facility discharges. EPA pointed out that while "[o]ver 1,000 waterbodies in Idaho, Oregon and Washington are identified as being impaired due to excessive nutrient loading," the "[i]mplementation of water quality improvement plans (called Total Maximum Daily Loads (TMDLs)) ha[s] been significantly delayed by arguments about the availability and cost of treatment technologies capable of achieving very low phosphorus targets." *EPA Advanced Wastewater for P 2007, supra* n. 13, at 5. EPA's stated goal for its report—"to obtain and share information about the technology, performance and costs of applying advanced wastewater treatment for phosphorus removal"—is of no utility so long as states, such as Washington, continue to avoid both the development of TMDLs and requiring

nutrient effluent limits based on existing Clean Water Act requirements at 40 C.F.R. 122.44(d). *Id*. at 6.

Ecology itself has contemplated using rulemaking for the AKART approach to controlling nutrient discharges to Puget Sound. In 2008, Ecology and EPA put together a proposal for EPA funding to evaluate AKART for nutrient removal. Ecology/EPA, *AKART evaluation for nutrient removal* (March 17, 2008).[108] Citing Washington's AKART mandate, the grant's purpose was to,

> support the Washington Department of Ecology (Ecology) in defining performance standards representing *all known, available and reasonable treatment (AKART) for removing nutrients from wastewater. The evaluation will utilize currently available information about exemplary wastewater treatment and use commonly applied economic methods for estimating the costs associated with applying treatment to remove nutrients.

Id. at 1 (footnote omitted). The memorandum explains that,

> Secondary treatment which is commonly applied by municipal wastewater treatment plants does not remove enough phosphorus or nitrogen from wastewater to prevent degradation of water quality in the receiving waters. These technology-based requirements are out-of-date and do not reflect the advances in treatment technology that have developed in the decades since Ecology and EPA established secondary treatment requirements.

Id. It also notes that,

> at this time only one of the 65 direct discharges of wastewater into the Puget Sound provides treatment to remove nitrogen. This discharger successfully removes over 90% of the nitrogen from municipal influent at a cost that is affordable to utility users. Providing similar treatment for nutrient removal to other discharges into South/Central Puget Sound could eliminate over 30 million pounds of nitrogen loading a year from reaching estuary waters.

Id.

[108] Document obtained from EPA through Freedom of Information Act request.

Citing the urgency of obtaining the report that would support AKART rulemaking, because "[a]s the State's population increases, nutrient loading increases proportionately, causing additional water quality problems," *id*. at 1, Ecology and EPA discussed the efficiency of using an AKART rulemaking approach in contrast to establishing a water quality-based TMDL: "Defining a discharge requirement for nutrients by regulation may postpone or eliminate the need for the costly TMDL process and generally improve water quality state-wide," *id*. at 2. *See also id*. at 1 ("water quality evaluations are technically complex and have included a costly and time consuming pollutant loading negotiation process (Total Maximum Daily Load or TMDL)."), 3 ("Excessive nutrients currently impair both fresh and marine water quality in many locations and applying AKART-based requirements will achieve improved water quality much faster than the current watershed-by-watershed approach."), 4 ("If this proposal is not funded, the [Water Quality Program] will continue to address water quality problems caused by nutrients through the expensive and time consuming TMDL process on a case-by-case basis."). The memorandum notes that developing a report that recommends a standard of performance for removing nutrients from municipal wastewater to support the rulemaking is estimated to take 12 months because it would build on EPA's extensive national efforts. *Id*. at 2.

The agencies also point out that Ecology needs funding to complete this work because it was identified as a priority by them in 2007. The agencies cited the draft State-EPA agreement, *id*. at 3, (the agreement was finalized with the same language) that committed the agencies to establish nutrient removal as AKART:

> As the population of Washington State continues to increase, nutrient releases of nitrogen and phosphorus to surface waters will become a much larger problem. Advanced technology to treat nitrogen and phosphorus in wastewaters is readily available and may be cost effective for municipal and industrial dischargers. To the extent resources are available, Ecology will work with EPA to do the

> engineering and economic studies that would be necessary to establish technology-based requirements (All Known Available and Reasonable Treatment, Best Available Treatment) and evaluate the feasibility and necessity of requiring all dischargers to treat and reduce nutrients in wastewater. EPA will provide support to Ecology in evaluating treatment options, expected performance, and costs of applying available technologies for nutrient and associated pollutant removal.

EPA and Ecology, *Environmental Performance Partnership Agreement for July 1, 2007 – June 30, 2009*, at 24 – 25 (July 2007). EPA and Ecology also stated that AKART rulemaking would support Governor Gregoire's Government Management, Accountability and Performance ("GMAP") effort that, for Ecology, included deliverables "that depend on the timely completion of this work" to "reduc[e] nutrient loading to the Sound, reducing algae blooms and fish kills and improving aesthetics." *Id*. at 3.

IV. EFFECTS OF THE PROPOSED RULE

The proposed rule would positively affect the following people or groups: (1) people who recreate on or near Puget Sound and whose business interests depend upon recreational uses; (2) people who rely upon good water quality and habitat in Puget Sound for commercial purposes; (3) people who depend on Puget Sound for cultural and spiritual purposes; and (4) people who pay for sewage treatment. Broadly speaking, according to Ecology, "Washingtonians need clean water for": fishing and shellfishing; salmon and wildlife habitat; drinking water; agriculture and livestock; commerce and navigation; and boating, kayaking, canoeing, swimming, and sightseeing. Ecology, *Water Quality Combined Funding Program 2013-2015 Biennium Outcomes Report* (2017)[109] at 1. These needs translate into a "water-dependent economy" that provides 160,000 jobs and $49 billion dollars for the agriculture and food industry; 146,000 jobs

[109] *Available at* https://ecology.wa.gov/DOE/files/20/20a672f5-bb35-4b14-be62-ef37ca629018.pdf (last accessed Oct. 5, 2018).

and $30 billion for the maritime industry; and 199,000 jobs and $21.6 billion for the outdoor recreation industry. *Id.* Removal of nutrient pollutants from municipal sewage prior to discharge to Puget Sound and its tributaries will reduce depressed levels of dissolved oxygen, reduce algal blooms including harmful algal blooms that produce toxins, reduce food web effects, and reduce the discharge of toxics, both regulated and unregulated, all of which adversely affect water-dependent employment.

EPA has urged states to address nutrient pollution by finding that "[c]ontrolling nutrient pollution is costly, but the external costs of not acting or delaying action can also be significant," while noting that "[i]t can also often be difficult to fully complete the chain of reasoning required to link nutrient pollution to an accurate estimate of external costs." *EPA Compilation of Nutrient Costs, supra* n. 55, at 1-3. To remedy the lack of information on cost data associated with nutrient-related pollution impacts, in 2015 EPA compiled its costs to numerous sectors of the economy including: tourism and recreation, commercial fishing, property values, human health, drinking water treatment costs, mitigation, and restoration. *Id*. at ES-2 – ES-3. Finally, EPA gathered data on the cost of controlling nitrogen and phosphorus discharges from sewage treatment plants. *Id*. at IV-3. Of the agency's summary of cost and performance data for such facilities, EPA Region 10 (Washington/Oregon/Idaho/Alaska) comprised the vast majority of the data. *See id*. (table IV-1, 189 treatment plants in Region 10 compared to 105 plants in the remaining nine EPA regions).

We begin in sub-section A with a discussion of how a determination that tertiary treatment is AKART would benefit people in Washington who rely on Puget Sound for commercial purposes. We then turn, in sub-section B, to the benefits that would accrue to people who use Puget Sound for recreational purposes, noting that recreation is also a considerable

economic driver. In sub-section C we discuss how a determination that tertiary treatment is AKART would benefit tribal people. Finally, in sub-section D we provide some preliminary information that indicates that Ecology would find that the rulemaking would have a reasonable effect on utility fees.

A. Determination that AKART is Tertiary Treatment Would Positively Affect People Who Rely for Commercial Purposes on Puget Sound

Although various agencies and entities value Washington's fishing and shellfishing industry to differing extents, all agree that they are an important powerhouse to the state's economy. Washington State's commercial fishing and shellfishing industry generated $1.6 billion annually in 2010, associated with 14,000 jobs through processing and wholesale distribution. *See* WDFW, *Fish, wildlife, and Washington's economy* 1 (2010)[110] (hereinafter "WDFW Fact Sheet"). Washington State is the largest producer of bivalve shellfish in the United States, generating $184 million annually to Washington's 2010 economy from aquaculture and a value of $40 million in wild harvest in 2012. *See* Jay Inslee, Governor, *Washington Shellfish Initiative* (Jan. 2016)[111]; *see also* Pacific Shellfish Institute, *The Economic Impact of Shellfish Aquaculture in Washington, Oregon, and California* ES-2 (2013).[112] In 2015, the shellfish industry employed 3,200 people. Washington Sea Grant, *Shellfish Aquaculture in Washington State* i (2015).[113] Counting indirect employment, the estimated total annual

[110] *Available at* https://wdfw.wa.gov/publications/01145/wdfw_01145.pdf (last accessed Sept. 13, 2018).
[111] *Available at* http://www.governor.wa.gov/sites/default/files/shellfishoverview.pdf (last accessed Aug. 30, 2017).
[112] *Available at* http://www.pacshell.org/pdf/economic_impact_of_shellfish_aquaculture_2013.pdf (last accessed Sept. 13, 2018).
[113] *Available at* https://wsg.washington.edu/wordpress/wp-content/uploads/Shellfish-Aquaculture-Washington-State.pdf (last accessed Sept. 13, 2018).

economic impact of shellfish aquaculture in Washington is $270 million. *Blue Ribbon Report, supra* n. 88, at xv. The Congressional Report on Algal Blooms and Hypoxia in 2013 determined that "annually, [the shellfish] fisheries contribute $72 million to the Washington economy and are important not only to commerce, but to recreational anglers and harvesters as well as local tribes. Thus, any disruption to these fisheries, even short disruptions, can have significant impacts on Washington State." S. Rep. No. 113-121, at 3 (2013).

Commercial fishing also brings significant economic benefits to Washington according to the WDFW. The state estimated a harvest value of its fishery of $65.1 million dollars in 2006. WDFW, *Publications, Washington Commercial Fisheries Economic Value in 2006*.[114] In 2012, WDFW assessed the economic impacts from "commercial and recreational fishing conducted in Washington fisheries directly and indirectly supported an estimated 16,374 jobs and $540 million in personal income in 2006." WDFW, WDFW Publications, *Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State* (hereinafter "WDFW Economic Analysis").[115]

As with shellfish, commercial fishing is dependent upon water quality. According to EPA, the indicator metric of marine species at risk was set at "declining" because "[b]etween 2008 and 2011, 23 new species were identified as threatened or of concern, representing the greatest increase since the list was first established in 2002." EPA, *Marine Species at Risk*.[116] The result is that "[a]s of January 2011, 113 marine species and sub-species were formally listed

[114] *Available at* https://wdfw.wa.gov/publications/01361/ (last accessed Oct. 5, 2018).
[115] *Available at* https://wdfw.wa.gov/publications/00464/ (last accessed Oct. 12, 2018).
[116] *Available at* https://www.epa.gov/salish-sea/marine-species-risk (last accessed Aug. 30, 2017).

as being at risk or vulnerable to extinction, including: 56 birds, 37 fish, 15 mammals, 3 invertebrates, 2 reptiles." *Id*.

In addition to these species, state and federal agencies are finding more indicators that the forage fish populations, upon which commercially-important predators such as salmon rely, are depressed. *See e.g.*, Puget Sound Nearshore Partnership, *Technical Report 2007-03, Marine Forage Fishes in Puget Sound* (2007)[117] at vi ("The status of Puget Sound forage fishes, especially herring stocks, is of general public interest in the region because of the large population of recreational anglers and wildlife watchers. Their societal importance is based largely on their apparent importance to provide forage for creatures higher in the marine food web (Figure 1) that are of either consumptive (e.g., salmon) or non-consumptive (e.g., herons) importance to society."). Forage fish, such as pacific herring, northern anchovy, surf smelt, the Pacific sand land, and longfin smelt have not been well monitored. *Id*. at 12. However, there are indications that water quality degradation is responsible for lowered populations. *Id*. at 17 – 19; *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)[118] ("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."). A recent study of 40 years of jellyfish and forage fish abundance in Puget Sound found downward trends in abundance of all forage species in four subbasins of the Sound. *See* Correigh Greene *et al.*, *Forty years of change in forage fish and jellyfish abundance across greater Puget Sound,*

[117] *Available at* http://www.pugetsoundnearshore.org/technical_papers/marine_fish.pdf (last accessed Aug. 30, 2017).
[118] *Available at* https://fortress.wa.gov/ecy/publications/documents/1203052.pdf (last accessed Aug. 30, 2017).

Washington (USA): anthropogenic and climate associations, 525 Mar Ecol Prog Ser 153 (2015)[119] (The historically dominant forage fishes (Pacific herring and surf smelt) have declined in two subbasins (Central and South Puget Sound) by up to two orders of magnitude while jellyfish-dominated catches increased three- to-nine-fold in those subbasins, with these results positively tracking human population density); *see also NWEA Petition to EPA, supra* n. 19, at 32 – 34.

Lowered levels of dissolved oxygen caused by nutrient pollution can cause adverse economic effects to commercial fisheries. EPA cites a Maryland example where depressed levels of dissolved oxygen caused a 49 percent reduction in crab harvests with an annual lost revenue value of $304,000. *EPA Compilation of Nutrient Costs, supra* n. 55, at III-5. Similarly, hypoxia in Pamlico Sound, NC, resulted in a 13.4 percent decline in brown shrimp, a $1.7 million loss over seven years. *Id*.

According to EPA, "[h]armful algal blooms were the primary examples of nutrient-related impacts found in the literature review. These blooms can lead to beach closures, health advisories, aesthetic degradation, and other impacts that are damaging to tourism industries surrounding affected waterbodies." *EPA Compilation of Nutrient Costs, supra* n. 55, at III-2. Some algal blooms are known to cause adverse health effects and consequently reduce tourism-associated spending in affected areas. EPA chose a Washington example to illustrate that hazardous algal blooms can "have adverse effects in coastal areas" because "algal toxins cause adverse health effects, including amnesic or paralytic shellfish poisoning." *Id*. at III-3. Citing a 2010 study, EPA summarized that "a typical closure (2 to 5 days) results in lost labor income of

[119] *Available at* https://www.nwfsc.noaa.gov/news/events/program_reviews/2016/documents/B6_Greene_et_al.pdf (last accessed Oct. 12, 2018).

$2.23 million and a total spending impact of $6.13 million at the four beaches [in Grays Harbor and Pacific counties]." *Id*. A Congressional committee found that in the Pacific Northwest, "high levels of [neurotoxins] in razor clams, oysters, and Dungeness crabs (which can result in the serious illness called 'amnesic shellfish poisoning' if consumed) cost Washington State at least $10 million to $12 million in lost revenue in 2002 and 2003." S. Rep. No. 113-121, at 3. This committee made "likely conservative estimates" that "commercial fisheries annually lose $38 million as a result of these events. In addition, the public health cost of human illness is estimated at $37 million annually." *Id*. at 2.

The whalewatching industry is similarly dependent upon protection and restoration of water quality in the Sound. The 37-member businesses of the Pacific Whale Watch Association ("PWWA") take about 400,000 passengers every year from 21 different ports in Washington and British Columbia. PWWA operators participated in the first-ever transboundary economic study of the whale watch industry in the Pacific Northwest, which showed that, in 2014, the businesses generated an estimated $144 million in economic impact in the region, with a growth rate of 8.3% annually. These are but a part of the annual $1.5 billion in wildlife watching that is associated with 26,000 jobs in Washington State. *See WDFW Fact Sheet supra* n. 110, at 1. Yet these economic benefits are threatened. As EPA observes, "despite recent births in the second half of 2015 and beginning 2016, there has been a net loss of four Southern Resident Killer Whales (SRKWs) since 2011. This trend along with the continued decline of Chinook salmon, and the noted appearance of emaciation among members of the local pods, are reasons we are downgrading the previous status of SRKWs from a neutral trend to a declining trend." *EPA SR Killer Whales, supra* n. 8.

B. Determination that AKART is Tertiary Treatment Would Positively Affect People Who Rely for Recreational Purposes on Puget Sound

People who recreate on or near Puget Sound and who are affected by excess algal growth, hazardous algae blooms, increases in jellyfish populations, low levels of salmonid populations, the threatened and/or endangered status of populations of various species, concerns about contamination in shellfish and fish, closed shellfish beds, declines in nearshore aquatic species such as starfish and marine birds that people like to observe, declines in orca whale populations, and other deteriorations in water quality and species would be benefited by a determination that AKART requires the abatement of nutrient pollution. Upon implementation of such a determination, these people would experience improvements in water quality and the species that depend upon high quality waters. The number of days in which they could engage in a wide variety of recreational activities would increase, as would the populations and diversity of species available for wildlife watching, photography, and harvesting. People would find recreation more enjoyable without the increasing algal blooms and jellyfish populations that dominate Puget Sound in summer months. Recreational users of Puget Sound, even casual observers who commute on Washington's ferry system, would benefit from reductions in nutrient pollution.

There are significant economic benefits associated with recreational fishing and shellfishing. Washington drew $1.1 billion for sport fishing in 2010, and over 30,000 visitors on a single day to beaches for razor clam digging alone. WDFW, *Fish, wildlife, and Washington's economy, supra* n. 110, at 1, 4. According to a 2008 analysis, recreational shellfish catches in Salish Sea waters in 2006 totaled 1,219,551 pounds of Dungeness crab, 105,921 pounds of shrimp, 345,668 pounds of non-razor clams, and 652,094 pounds of oysters. WDFW, *Economic*

Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State (Dec. 2008), *March 2012 Errata*.[120] This study concluded that recreational fishing in Washington waters generates more than three quarters of the fishing-related jobs in 2006, or 12,850 jobs, and combined with commercial fishing generated $540 million in personal income in 2006 and $424 million in net economic values to approximately three quarters of a million Washington residents. *WDFW Economic Analysis, supra* n. 115, at Executive Summary. The harvest value of Washington fisheries was calculated to be $65.1 million and aquaculture in Washington waters at $81.1 million.[121] *Id*. Another study reported that:

> licensing for recreational shellfish harvesting generates $3 million annually in state revenue and recreational oyster and clam harvesters contribute more than $27 million annually to coastal economies. Overall, Washington's seafood industry generates over 42,000 jobs in Washington and contributes at least $1.7 billion to gross state product through profits and employment at neighborhood seafood restaurants, distributors, and retailers.

Blue Ribbon Report, supra n. 88, at xv (references omitted).

Beach recreation, a facet of the tourism industry, is negatively affected by algal blooms. Eutrophication of freshwater impacted the tourism with up to $1.16 billion in annual losses in the USA. Walter K. Dodds *et al.*, *Eutrophication of U.S. freshwaters: analysis of potential economic damages* 43 Environ Sci Technol 12 (2009).[122] In 2012, high levels of neurotoxic algal blooms in Washington prompted the closure of 31 recreational harvest areas. National Oceanographic and Atmospheric Administration Northwest Fisheries Science Center ("NOAA

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[120] *Available at* https://wdfw.wa.gov/publications/00464/errata_march_2012.pdf (last accessed Sept. 13, 2018).
[121] Some of these economic benefits accrue to the Washington coast on the Pacific Ocean and some to freshwater lakes and rivers.
[122] *Available at* https://www.researchgate.net/publication/24000736_Eutrophication_of_US_Freshwaters_Analysis_of_Potential_Economic_Damages (last accessed Sept. 14, 2018).

Science Center") for the Puget Sound, *Puget Sound Environmental Monitoring Program, Puget Sound Marine Waters - 2012 Overview,* x (2012).[123] The Congressional Senate Report in 2013 reported a conservatively-estimated loss of $4 million in recreation and tourism impacts. S. Rep. No. 113-121, at 2. Loss of recreational opportunities is also a cost that cannot be measured in dollars as it impacts the quality of life of people who live in the Puget Sound region.

Dungeness crab fishing enjoyed by many Washington residents is also harmed by water pollution. WDFW recently sampled Dungeness crab and spot prawns for toxic contaminants "because of the high importance of these species in commercial, subsistence, and recreational fisheries." WDFW, *Toxic Contaminants in Dungeness crab (Metacarcinus magister) and Spot Prawn (Pandalus platyceros) from Puget Sound, Washington, USA* 13 (March 2014).[124] Persistent organic pollutants, such as PCBs and PDBEs, and mercury were highest in samples from urban areas, presumably near municipal outfalls as well as stormwater and other discharges. *Id*. Subsequently, the Washington Department of Health ("WDOH") evaluated the risk of consuming contaminated crab species and issued consumption advisories for crab meat, crab butter or tomalley (hepatopancreas), and spot prawns. WDOH, *Human Health Evaluation of Contaminants in Puget Sound Dungeness Crab (Metacarcinus magister) and Spot Prawn (Pandalus platyceros)* 12 – 18 (May 2016).[125]

The abundance of crab larvae that are essential to healthy crab populations is threatened by poor water quality in the Sound, which affects levels of dissolved oxygen and plankton on

[123] *Available at* http://www.psp.wa.gov/downloads/psemp/PSmarinewaters_2012_overview.pdf (last accessed Sept. 14, 2018).
[124] *Available at* https://wdfw.wa.gov/publications/01608/wdfw01608.pdf (last accessed Oct. 15, 2018).
[125] *Available at* https://www.doh.wa.gov/Portals/1/Documents/Pubs/334-378.pdf (last accessed Oct. 15, 2018).

which crab feed. *See* Encyclopedia of Puget Sound, *Dungeness Crabs*[126] ("Threats to Dungeness crabs include: low dissolved oxygen, variation in temperature and salinity, fisheries, habitat alteration or loss, and pollutants such as insecticides, hydrocarbons from oil spills and heavy metals. Because juvenile crabs rely on estuarine habitats and are also potentially more sensitive to toxins, early life history stages are likely to be more influenced by human activities (Dethier 2006).") (hyperlinks omitted). Recreational, as well as tribal, crab fishing has been closed in the South Puget Sound due to a 97 percent drop in Dungeness crab between 2012 to 2017 and the complete loss of several year-classes. *See* Key Peninsula News, *Crabbing Season Closed in South Sound* (July 1, 2018)[127]; *see also* WDFW, *Dungeness Crab Status in Southern Puget Sound* 9, 10 (April 12, 2018).[128] According to WDFW, this severe drop in crab abundance may be caused by poor water quality, measured as high temperature, low dissolved oxygen, or ocean acidification. *Id.* at 11. Researchers have concluded based on preliminary studies that "higher levels of CO_2 and lower levels of oxygen cause delayed development in early life stages [of Dungeness crab]. The slowest development was observed when both high CO_2 and low oxygen occurred together, a condition that is common in bottom habitats in Washington." Washington Ocean Acidification Center, *Impacts of Ocean Acidification on Washington's Marine Species*.[129] Crab larvae are three times more likely to die when exposed to water with a pH that can already

[126] *Available at* https://www.eopugetsound.org/science-review/3-dungeness-crabs (last accessed Oct. 24, 2018).
[127] *Available at* https://keypennews.com/crabbing-season-closed-in-south-sound/ (last accessed Oct. 15, 2018); *see also* WDFW *Recreational Crab Fishing, available at* https://wdfw.wa.gov/fishing/shellfish/crab/21/ (showing South Puget Sound closed).
[128] *Available at* https://wdfw.wa.gov/commission/meetings/2018/04/apr_1218_fishcomm_briefing.pdf (last accessed Oct. 15, 2018).
[129] *Available at* https://environment.uw.edu/wp-content/uploads/2015/02/Pages-from-2015_0129_WOAC_one-pagers_species_FINAL.pdf (last accessed Oct. 24, 2018).

be found in Puget Sound. NOAA Science Center, *Ocean acidification puts Northwest Dungeness crab at risk, research finds* (May 2016).[130] Elsewhere, harmful algal blooms have resulted in a dramatic decrease in crab larvae abundance. *See* Svetlana Esenkulova *et al., Harmful algae and juvenile salmon in Cowichan Bay.*[131]

This decrease in crab larvae abundance also affects Chinook salmon. *See id.* (decrease in crab larvae concurrent with reduction in feeding by wild Chinook); Encyclopedia of Puget Sound, *Size means survival for young salmon*.[132] Not only are Dungeness crab a "food-web pathway through which contaminants can move from sediments to humans," but their pelagic larvae "are preyed on by many fishes, including copper rockfish and coho and chinook salmon." WDFW, *Species Monitored: Dungeness Crab, Marine Toxic Contaminants, Species & Ecosystem Science*.[133] Approximately one-third of the Chinook salmon sampled in Puget Sound in 2013 were found to have "contaminant concentrations associated with adverse effects, indicating that a significant proportion of juvenile Puget Sound Chinook salmon are at risk for some type of health impairment due to contaminant exposure, potentially affecting their marine survival." Sandra M. O'Neill *et al., Toxic contaminants in juvenile Chinook salmon (Oncorhynchus tshawytscha) migrating through estuary, nearshore and offshore habitats of*

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[130] *Available at* https://www.nwfsc.noaa.gov/news/features/ocean_acidification_dungeness_crab/index.cfm (last accessed Oct. 15, 2018).
[131] *Available at* https://marinesurvivalproject.com/wp-content/uploads/Esenkulova-et-al.pdf (last accessed Oct. 15, 2018); *see also* Salish Sea Marine Survival Project, *Juvenile Salmon Studies*, *available at* https://marinesurvivalproject.com/research_activity/list/juvenile-salmon-studies-ca/ (same) (last accessed Oct. 15, 2018).
[132] *Available at* https://www.eopugetsound.org/magazine/ssec2018/marine-survival-2 (last accessed Oct. 15, 2018).
[133] *Available at* https://wdfw.wa.gov/conservation/research/projects/marine_toxics/dungenesscrab.html (last accessed Oct. 15, 2018).

Puget Sound (Oct. 2015).[134] Toxics not only threaten the health of the salmonids themselves, but WDOH has also issued fish consumption advisories for human consumption of Chinook in all marine areas of Puget Sound with only two exceptions.[135] WDOH, *Fish Consumption Advisories in Washington State*.[136] Ecology's failure to implement AKART for municipal dischargers to Puget Sound is contributing to the poor water quality that is affecting a wide range of recreational species and limiting the amounts of those species that are safe to consume due to toxic contamination.

C. A Determination that AKART is Tertiary Treatment Would Positively Affect Tribal People Who Depend Upon Puget Sound for Cultural and Economic Benefits

There are 20 tribal governments of western Washington that depend upon Puget Sound for their treaty-reserved and constitutionally protected rights to harvest, consume, and manage natural resources including salmon and shellfish in their usual and accustomed grounds and stations.[137] These treaties, signed in 1855 to 1856, secure the fishing rights that the tribes have exercised since time immemorial as well as ceding most of the land that is now western Washington.[138] The tribes have "viewed a guarantee of permanent fishing rights as an absolute

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[134] *Available at* https://wdfw.wa.gov/publications/01796/wdfw01796.pdf (last accessed Oct. 15, 2018).
[135] The exceptions are for so-called blackmouth Chinook in Marine Areas 6 and 7, covering East Juan de Fuca Strait and Deception Pass, Hope Island, and Skagit Bay respectively.
[136] WDOH, *Fish Consumption Advisories in Washington State*, *available at* https://www.doh.wa.gov/ DataandStatisticalReports/HealthDataVisualization/fishadvisory (last accessed Oct. 15, 2018).
[137] The 20 tribes are as follows: Lummi, Nooksack, Swinomish, Upper Skagit, Sauk-Suiattle, Stillaguamish, Tulalip, Muckleshoot, Puyallup, Nisqually, Squaxin Island, Skokomish, Suquamish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, Makah, Quileute, Quinault, and Hoh. *See* https://nwifc.org/ (last accessed Sept. 15, 2017).
[138] *See e.g.*, Treaty of Medicine Creek, 10 Stat. 1132-37, December 26, 1854, proclaimed April 10, 1855; Treaty of Point Elliott, 12 Stat. 927-32, January 22, 1855; proclaimed April 11, 1859;

predicate to entering into a treaty."[139] The fishing rights they secured by treaty have been consistently and expansively enforced by the federal courts.[140]

These treaty rights are damaged when Ecology authorizes discharges of excess nutrients to surface waters that lead to closure of shellfish beds and interference with treaty-protected rights to gather food for commercial, ceremonial, and subsistence purposes. Local ocean acidification caused by excess nutrients also threaten the underlying legal rights of the tribes that depend upon shellfish populations and shellfish propagation. Excess nutrients leading to depressed dissolved oxygen and upsets in pH levels affect the health and survival of salmon. As pH levels change, other pollutants often become more bioavailable, increasing the toxicity of metals, for example. Excessive algae created by anthropogenic contributions of nutrients foul nets used by tribal members to harvest salmon and contribute to even great water quality problems.

Tribal fisheries are also major contributors to Washington's economy. Because tribal commercial fisheries' activities are tracked in the commercial fish ticket system, the data show that tribal fisheries include: ocean non-salmon and salmon treaty allocations, inland shellfish, river salmon and steelhead, and others. In addition, there are tribal harvests for ceremonial and subsistence fisheries, on which no economic price can be placed. As Washington has stated,

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Treaty of Point No Point, 12 Stat. 933-37, January 26, 1855, proclaimed April 29, 1859; Treaty of Makah, 12 Stat. 939-43, January 31, 1855, proclaimed April 18, 1859; Treaty of Yakama, 12 Stat. 951-56; June 9, 1855; proclaimed April 18, 1859; Treaty of Olympia, 12 Stat. 971-74, July 1, 1855 and January 25, 1856; proclaimed April 11, 1859.

[139] *United States v. Washington*, 873 F. Supp. 1422,1437 (W.D. Wash. 1994), *rev'd in part on other grounds*, 135 F.3d 618, *as amended* 157 F.3d 630 (9th Cir. 1998).

[140] *See e.g*, *Missouri v. Holland,* 252 U.S. 416, 434 (1920); *U.S. v. Washington* 384 F. Supp. 312 (1974).

> Ocean acidification also has important cultural implications. To Washington's tribal communities, ocean acidification is a natural resource issue and a significant challenge to their continued identity and cultural survival. With salmon at just a fraction of their former abundance, tribal fishers are depending more on shellfish to support their families; almost all of the commercial wild clam fisheries in Puget Sound are tribal. The tribes also harvest wild shellfish for ceremonial and subsistence purposes.

Blue Ribbon Report at 18.

The continued nutrient pollution of Puget Sound and its tributaries will adversely affect tribal rights and the activities of tribal members. Harvest rates of salmon and steelhead have already been severely reduced over many decades in order to compensate for the precipitous decline in salmon abundance experienced in Washington waters and the related listing of salmonids as threatened and endangered under the Endangered Species Act. For example, the Stillaguamish Tribe of Indians forewent the tribe's traditional first salmon ceremony that welcomes and honors the salmon that are the foundation of their culture from 1985 through 2004.[141] Ecology's failure to implement AKART for municipal dischargers to Puget Sound is contributing to the poor water quality that is seriously undermining treaty-reserved rights to harvest, consume, and manage natural resources including salmon and shellfish.

D. A Determination that AKART is Tertiary Treatment Would Have a Reasonable Effect on Utility Fees

Both Ecology and EPA have recognized the economic feasibility of installing enhanced secondary and tertiary treatment for nutrient removal. For example, EPA has concluded that the cost of phosphorus removal is "affordable for most municipalities as demonstrated by the monthly residential sewer fees charged by the WWTPs. These fees . . . are typically less than

[141] Krista J. Kapralos, Everett Herald, *Stillaguamish Tribe plans first salmon ceremony in 20 years, available at* https://www.heraldnet.com/news/stillaguamish-tribe-plans-first-salmon-ceremony-in-20-years/ (last accessed Oct. 12, 2018).

$30. . . . The monthly residential sewer rates charged to maintain and operate the entire treatment facility ranged from as low as $18 to the highest fee of $46." *EPA Advanced Wastewater for P 2007, supra* n. 13, at 30.

In 2010, Ecology commissioned the development of Washington-specific calculations for installing tertiary treatment. These were estimated to cost a weighted average increase in sewer fees of between $7.29 and $28.43 per month, the equivalent in 2018 dollars of $8.48 to $33.08.[142] *Washington Nutrient Removal Evaluation 2011, supra* n. 2, at ES-8, table ES-3. The Washington PCHB found that fee increases significantly higher than this range were found to be a "reasonable method[] of treatment" in upholding Ecology's requirement that the City of Bellingham install secondary treatment as AKART in the 1980s. *Bellingham* (1985). In *Bellingham*, the PCHB found that an additional high cost estimate of $27.38 per month in fee increases—equivalent to $65.44 in 2018 dollars—to implement secondary treatment at a facility would not "involve significantly greater costs than for others obliged to obtain the same treatment" nor was it beyond the city's ability to bear the costs and was therefore reasonable within the meaning of AKART. *Id.* at 15. Existing Ecology and EPA assessments of the cost of installing tertiary treatment and the PCHB's holding in *Bellingham* establish a credible basis upon which to conclude that in most cases Ecology will find that tertiary treatment is reasonable on a cost basis alone, even without considering the benefits of its installation.

In Ecology's 2011 analysis of the cost of implementing nutrient removal technology in Washington, it evaluated several effluent outcomes. "Objective F" in this Ecology analysis

[142] This adjustment for inflation, as well as others in this petition, was performed using the U.S. Department of Labor Bureau of Labor Statistics CPI Inflation Calculator *available at* https://www.bls.gov/data/inflation_calculator.htm (last accessed Oct. 9, 2018).

describes the request made by this petition: an effluent quality for nitrogen of not more than 3 mg/L and an effluent quality for phosphorus of not more than 0.1 mg/L. *Washington Nutrient Removal Evaluation 2011, supra* n. 2, at ES-3, table ES-1. The range of projected fee increases to meet Objective F effluent levels is $11.46 (for MBR) to $94.66 (for facultative lagoons[143]), or a range of $13.12 to $108.38 in 2018 dollars. Of the 12 year-round nutrient removal plant types, all but the two lagoons types (aerated and facultative) cost under the *Bellingham* high cost estimate of $64.13 ($2018), with a high of $49.99, the equivalent of $57.24 in 2018 dollars, for rotating biological contactor.[144] *See id*.

In deciding to install tertiary treatment at its Chambers Creek sewage treatment plant, Pierce County evaluated the projected costs of nitrogen removal. Best practice nitrogen removal there was determined to be "approximately $48M more beneficial than the second-highest [alternative]" and was considered "defendable and justifiable given anticipated restrictions of effluent discharge in both the near-term (ammonia) and long-term (total nitrogen)." *EIS Chapter 9*, *supra* n. 28, at 9-13. The county estimated monthly increases in typical residential bills would start at a high of $3.93 increase in 2010 to $1.44 in 2015. Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan Chapter 10*, at 10-7 (2010).[145] Adding six

[143] Only six percent of Washington State treatment capacity is currently addressed using aerated and facultative lagoons. *See Washington Nutrient Removal Evaluation 2011, supra* n. 2, at 2-3, fig. 2-1.

[144] The number of rotating biological contactor systems in Washington is not stated in this report. However, these facilities are lumped with trickling filters and trickling filter/solids contact as "fixed film treatment plants" of which there are 20 in Washington representing seven percent of all plants in the state and eight percent of the treatment capacity. *Id.* at 2-4.

[145] *Available at* https://www.piercecountywa.gov/DocumentCenter/View/7877/F-Chap-10_Financial?bidId= (last accessed Aug. 30, 2018).

years of projected monthly increases results in a total monthly increase of $16.41, well within the increase determined to be reasonable in *Bellingham.*[146]

V. THERE ARE NO REASONABLE ALTERNATIVES TO THE PROPOSED RULEMAKING

This petition requests that Ecology update 31-year old rules that set technology-based discharge standards for municipal sewage treatment that are based on 100-year old technology. As described above, these rules are explicitly intended to meet a 73-year old statutory mandate that Ecology require and dischargers implement all known, available, and reasonable treatment technology. By definition, the sheer age of these rules cannot conceivably meet the AKART requirement. In addition, the facts set out in this petition demonstrate that there is no question but that great advances have been made in sewage treatment technology that are not reflected in Ecology's discharge rules. Nevertheless, as also demonstrated in this petition, Ecology has consistently and repeatedly refused to make assessments of AKART in issuing new permits to municipal dischargers to Puget Sound and its tributaries. Moreover, Ecology has specifically relied on its outdated discharge standards rules as an excuse for not making AKART assessments on individual discharge permits.

There is only one possible alternative to the rulemaking this petition requests, namely for Ecology to begin conducting AKART assessments for individual permits. For Ecology to adopt this approach would be a break with state tradition, which for many decades has relied on generic AKART determinations for classes of dischargers as the starting point for Ecology's permitting actions. Moreover, Ecology's willingness to routinely ignore legal precedent

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[146] *See also Tetra Tech 2016, supra* n. 5, at 14 – 15 (showing that for some municipalities in Montana effluent levels of 3.0 mg/L total nitrogen and 0.1 total phosphorus, or even 0.05 total phosphorus, can be achieved with little or no additional cost over current sewer rates).

regarding its obligations under the AKART mandate makes it unlikely that Ecology permit writers will begin taking AKART requirements seriously. Likewise, Ecology's insistence that AKART for sewage treatment is the same as the federal minimum technology-based requirement does not allow for it to change its policy at the level of individual permits. In addition to reflexively relying on its own discharger standards as sufficient to demonstrate AKART, Ecology has even declined to conduct an AKART assessment or to establish effluent limitations beyond secondary treatment when dischargers themselves have chosen to use more advanced treatment technology. Indeed, Ecology has asserted that these rules preclude its making any AKART assessment at the individual permit level. And Ecology has determined repeatedly that the parameter limits in its municipal discharge standards preclude its making AKART assessments for any other parameters or pollutants present in such discharges. Finally, as discussed above, it is unlikely that an AKART assessment at the individual permit level would fully incorporate the widespread benefits of multiple dischargers reducing nutrient and toxic discharges to Puget Sound.

VI. CONCLUSION

For decades, Ecology has failed to implement the statutory mandate to require the best known, available, and reasonable sewage treatment technology in order to maintain the highest possible standards for the quality of public waters in Washington. Instead, it has indiscriminately endorsed the use of a century-old technology of secondary treatment as adequate for the Twenty-First century. In issuing NPDES discharge permits, Ecology has repeatedly used boilerplate language asserting that AKART for all pollutants is the use of secondary treatment rather than making the determination required by statute, the agency's own rules, and case law. As a result, the vast majority of municipal sewage dischargers to Puget

Sound and its tributaries do not currently use any form of modern treatment technology prior to discharging treated sewage and have no plans to install upgraded technology. These dischargers currently do little or nothing to curtail the discharge of nitrogen pollution that causes—according to Ecology itself—significant ecological damage to the Sound. Ecology's failure to implement the AKART requirement is both a procedural violation and a substantive violation of decades-old Washington law that has placed Puget Sound and the surrounding communities at serious risk.

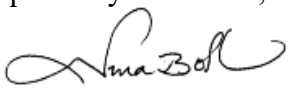
Nutrient loading in the Puget Sound is a present issue that is already severe and that Ecology expects to worsen further as climate change and a growing coastal population put ever-increasing demands water and fishery resources of the Puget Sound. *See Future Impacts of Nitrogen, supra* n. 107. This expectation of worsening conditions is consistent with views around the world, as scientists have noted that "[h]ypoxia is a mounting problem affecting the world's coastal waters, with severe consequences for marine life, including death and catastrophic changes. Hypoxia is forecast to increase owing to the combined effects of the continued spread of coastal eutrophication and global warming." Raquel Vaquer-Sunyer and Carlos M. Duarte, *Thresholds of hypoxia for marine biodiversity*, 105 Proceedings of the National Academy of Sciences of the United States of America 15452 (Oct. 7, 2008).[147] Yet it has been the policy of the State of Washington for over seven decades to ensure that the waters of the state are kept to the highest quality possible. The AKART technology standard must be implemented in order to achieve that policy goal. Tertiary treatment of municipal sewage fulfills all of the necessary prerequisites for being classified as AKART—it is a known solution to

[147] *Available at* http://www.pnas.org/content/pnas/105/40/15452.full.pdf (last accessed Nov. 5, 2018).

nutrient-loading issues and it is available to be implemented by dischargers. Given the financial, environmental, and legal issues at stake, Ecology's adoption of a rule defining AKART as tertiary treatment would be a practical and efficient means by which Ecology can carry out its statutory obligations and protect Puget Sound from further degradation. While the use of secondary treatment is inadequate to address nutrient-loading to Puget Sound, tertiary treatment is not just one option among others but, rather, its implementation is necessary to meet state law.

For all of these reasons, NWEA hereby petitions the Department of Ecology to conduct a rulemaking pursuant to RCW 90.48.035 to establish that AKART for municipal sewage discharged to Puget Sound and its tributaries is presumed to be year-round enhanced secondary and tertiary treatment and to amend WAC 173-221, the discharge standards and effluent limitations for domestic wastewater facilities, to include effluent limits for the discharge of total nitrogen at 3.0 mg/L and total phosphorus at 0.1 mg/L (or lower). In addition, the amended rules should establish that each facility will use the enhanced secondary and/or tertiary treatment technology and other operational changes necessary to reduce the discharge of toxics associated with domestic wastewater discharges. Finally, the amended rules must provide the process and standards for rebutting the assumption that tertiary treatment is reasonable and establishing the alternative technology-based treatment standards that will be required in those rare instances when Ecology makes such a finding.

Respectfully submitted,



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

Dated this day, the 14th of November, 2018.

Enclosed:

Attachment A. Northwest Environmental Advocates, *Petition for Corrective Action or Withdrawal of Authorization from the State of to Issue National Pollutant Discharge Elimination System Permits* (Feb. 13, 2017), including attachments.

Attachment B. Northwest Environmental Advocates, *Petition for Rulemaking to the Department of Ecology Seeking a Total Maximum Daily Load and Wasteload Allocations for Nitrogen in Puget Sound* (Oct. 10, 2017), including attachments.

Exhibits:

1. Ecology, *Fact Sheet for NPDES Permit WA-009331-7 Spokane County Regional Water Reclamation Facility* (Nov. 28, 2011)
2. Ecology, *Fact Sheet for NPDES Permit WA0032247 Brightwater Wastewater Treatment System* (March 1, 2018)
3. P.H. Doering*, et al., Phosphorus and nitrogen limitation of primary production in a simulated estuarine gradient*, 124 Mar Ecol Prog Ser, 271 (1995)
4. R.L. North, *Evidence for phosphorus, nitrogen, and iron colimitation of phytoplankton communities in Lake Erie*, 52 Limnol. Oceanog. 315 (2007)
5. Memorandum from Victor D'Amato, Tetra Tech, to Tina Laidlaw, EPA Region 8, Re: *State of Montana wastewater system nutrient reduction cost estimates* (Oct. 21, 2016)
6. Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan Chapter 10* (2010)
7. Ecology, *Public Notice, South Puget Sound Dissolved Oxygen Study* (Oct. 2006)
8. 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)
9. EPA, *Municipal Nutrient Removal Technologies Reference Document Volume 1– Technical Report* (Sept. 2008)
10. EPA, *Biological Nutrient Removal Processes and Costs* (June 2007)
11. EPA *Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus* (April 2007)
12. EPA, Science Advisory Board, *Hypoxia in the Northern Gulf of Mexico: An Update by the EPA Science Advisory Board* (Dec. 2007)
13. Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan Chapter 9* (Nov. 2010)
14. Ecology, *Fact Sheet for NPDES Permit WA0032182 King County Carnation Wastewater Treatment Facility* (Dec. 13, 2013)
15. Salish Sea Marine Survival Project, *Juvenile Salmon Studies*
16. Ecology, *Fact Sheet for NPDES Permit WA0024490, City of Everett Water Pollution Control Facility* (July 29, 2015)
17. Ecology, *Water Quality Program Permit-Writer's Manual* (2018)

18. Benjamin Minnick, Daily Journal of Commerce, *Chambers creek sewage treatment plant finishes $342M expansion and adds Demon*, (June 22, 2017)
19. World Water Works, *World Water Works Announces DEMON Nitrogen Removal Treatment System*
20. Pierce County, *Chambers Creek Regional Wastewater Treatment Plant Facilities Plan, Chapter 8 Final Environmental Impact Statement* (Nov. 2010)
21. Pierce County, *Wastewater Treatment Plant Expansion*
22. Ecology, *Fact Sheet for NPDES Permit WA0039624, Pierce County Chambers Creek Wastewater Facility* (Aug. 21, 2003)
23. Ecology, *Addendum to the Fact Sheet for the 2008 Reauthorization for NPDES Permit No. WA0039624 [Chambers Creek]* (Undated 2008)
24. Ecology, *Statement of Basis Pierce County Public Works & Utilities Chambers Creek Wastewater Treatment Plan NPDES Permit No. WA0039624* (June 1, 2009)
25. King County, *Assessment of Potential Nitrogen Removal Technologies at the South Treatment Plant and Their Impact on Future Water Reuse Program Development (South Plant Nitrogen Removal Study), Final Report* (June 2010)
26. Ecology, *Fact Sheet for NPDES Permit WA0029581, King County South Wastewater Treatment Plant* (July 1, 2015)
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