9/3/20 REVISED DRAFT

Evolving Recommendations: Considerations for PSNGP Development

Document purpose: The AC has been engaged in a months-long process to develop a set of recommendations to Ecology that will frame conceptual approaches to the first PSNGP. Everything in this document is subject to further discussion by the caucuses/interest groups and the committee. This document will be thoroughly discussed at the AC meeting on September 30 and will not be finalized until the AC meeting on October 21, 2020.

Background information including committee purpose and list of members: in cover letter

This committee makes these recommendations for the purpose of achieving actual, not perceived, water quality improvements. This committee has explored where the flexibilities are for the first permit term. Our final recommendations collectively provide a justifiable and defensible solution for the wide variety of plants that will be covered under the PSNGP. The following combination of approaches comprise the AC's recommendations for how to best achieve Ecology's goal to prevent nutrient-related water quality problems in Puget Sound from continuing to worsen during the first permit term, while also allowing contracted plant capacity to be utilized to support smart growth and comply with Growth Management Act requirements.

Contents:

I. Overall considerations for developing the first PSNGP

1. The requirements of the first PSNGP must result in meaningful progress toward water quality improvements
    a. The permit should level the playing field to ensure that all plants are making a reasonable effort in both the short and long terms
    b. Early steps taken during the first PSNGP should lead to successful implementation in the second and third five-year permit terms
    c. Plants that currently implement nutrient reduction technology should not be required to make additional improvements during the first PSNGP
2. The requirements of the first PSNGP must be practical and achievable, and may be scalable by plant size, type, or other category

   a. Plants want to stay in compliance, and be able to accommodate new connections associated with existing capacity agreements and/or future population growth during the PSNGP data collection and planning process

   b. Avoid immediate need to impose additional wastewater rates; requirements should not force plants to incur new loans during the first PSNGP unless they are already at or near capacity and/or are currently in the process of planning and designing expansion or other upgrades

3. Plants need time to achieve nutrient reductions, and few immediate improvements are expected, but we will make progress to address the DO problems in Puget Sound

4. Ecology needs to be sufficiently staffed to implement the PSNGP and individual permits, oversee and interpret increased monitoring, and review optimization reports and facility design and planning documents

II. How to calculate and implement a cap during the first PSNGP

5. Establish a target load, not a percent removal target, for each plant to support the goal of preventing further increases in nutrients and improving water quality

   a. Total inorganic nitrogen (TIN) is the best metric for capping the load

   b. Continue the same loading metric into the second PSNGP to support trading

6. Both seasonal and annual loads should be established if sufficient data are available

   a. Annual load reductions will be needed, but seasonal load reductions are most achievable with Biological Nutrient Reduction (BNR)

7. Use narrative limits or targets rather than a hard cap, using something similar to the adaptive management approach employed in the Industrial Stormwater General Permit (ISGP) where tiered actions are triggered by monitoring data and would achieve long term reductions sooner instead of being a permit violation

   a. Use ranked averages, not straight percentiles, from the existing data

   b. The non-parametric, 95th percentile triggers actions for an annual load limit

   c. The non-parametric, 99th percentile triggers actions for a seasonal load limit

   d. Define what actions are acceptable for each trigger; the actions must be appropriate and achievable for the individual plant, and be defensible and enforceable

      i. Start with low cost controls and process changes; then evaluation of side stream treatment or small investments; and then implementation of side stream treatment or other more significant changes or progress toward plant upgrades

8. Allow a short term increase in loads to gain more meaningful long term solutions

9. No additional first permit term targets should be established for plants that are already operating nutrient removal technologies
10. Provide more time for plants whose plans Ecology approved in the past five years
11. To keep water quality from continuing to degrade, do not allow any increase in nutrient loads during the first permit term and use the cap as a hard interim limit at current loading rates until achievement of water quality based effluent limits (WQBELs) is required; do not allow flow expansions without commensurate actions that reduce nitrogen loads
12. Set the limit for each plant's Ecology-approved full rated flow capacity or otherwise clarify how plants will accommodate expected growth, and whether there can be any future expansions or reversion of cap limits
    a. To avoid allowing a large load increase for plants not using existing capacity, cap this calculation at a percentage above the current maximum monthly flow (e.g., 150%)
    b. Use caution in applying 2020 data; COVID-19 has created unusual flow patterns
13. Require plants approaching or beyond 85% of their rated design capacity to make more progress toward long term reductions during the first permit term by completing more detailed engineering designs
14. Require the largest plants with the largest loads to make more progress during the first permit term toward long term reductions by completing more detailed engineering designs
15. A cap should be established for each individual plant, but bubble permits can be considered for municipalities that operate more than one treatment plant.
16. Set a performance goal rather than a cap for a plant that is already implementing nutrient removal technology; effluent concentrations that exceed 10 mg/L will trigger additional actions
17. Both seasonal and annual caps should be established for plants with sufficient data; either one year of monthly or three years of quarterly data are the bare minimum needed for the calculation
18. Use the best available data including relevant that data plants have collected that was not permit-required, and therefore is not in PARIS
19. Plants with the least amount of data should not have a cap set; data gathered during the first two years of this permit term should be applied according to the same method to set the cap for the remainder of the permit term
20. This approach should be used to calculate the cap for all plants:
    a. A representative load is most accurately determined using the flow for the day of the sample collection
    b. Use same (non-parametric) approach for all plants

i. Allow a waiver for a different approach if a compelling reason is provided by an individual plant

ii. Use historical data to the greatest extent possible; gather adequate baseline data for every plant

iii. Use a 12-month average but taking the peak of available data

iv. Investigate two phases of seasonality: critical June-August versus May-October

v. Calculate the average using a robust enough method should be that the seasonal variation would not show up as a trend in loads

vi. Consider the photo period versus temperature for seasonal loading

vii. When using the bootstrapping approach, ensure plant operators understand how their monitoring data will be compared to the calculated cap, and can readily explain it to a non-technical audience

21. PSNGP cap calculation does not need to specifically address CSO events; use monthly averages

III. How to assess compliance with the cap during the first PSNGP

22. Consider bubble permits for limited geographic areas

23. Require application of all known, available, and reasonable treatment technologies to protect and restore water quality and fishery uses

    a. New opportunities exist for upgrades using known technologies to remove both nutrients and other chemicals of emerging concern (CECs) from discharges, a priority need identified by the Southern Resident Killer Whale Task Force final recommendations

24. Follow the ISGP approach of tiered actions that are required for plants that exceed targets set in the permit; plants that implement the actions in the required timeframe are not in violation

    a. Clearly define this hierarchy of actions and how they are triggered

    b. Couple this with tracking each plant's meaningful progress through optimization and evaluation/implementation of side-stream treatment

25. Where plants are experiencing rapid growth (as documented by new connections), allow them to increase loadings but require earlier studies, design work, and detailed engineering reports

26. Focus on a plant's overall pattern, not a single day, for assessing compliance

    a. Be clear about the length of time that an exceedance is considered a violation, i.e., what is the maximum penalty that can be assessed

27. Excursions that occur during experiments or pilot trial activities related to the optimization plan should be exempt from cap compliance calculations

28. During pilot trials, a plant may reduce nutrients but correspondingly cause intermittent problems with other regulated parameters such as BOD, TSS or pH; provide plants with assurance that these instances will not result in penalties for individual permit violations

29. Use enforcement strategies that will keep plants accountable for implementing required and appropriate adaptive management approaches that are triggered by monitoring results

IV. How to conduct monitoring to provide consistent data needed for permit decisions

30. Better and consistent data collection is needed across plants during the first PSNGP for both influent and effluent to inform and evaluate process changes and optimization, produce accurate loading estimates and inform the SSM

    a. It is important for the water quality monitoring to inform the final objectives – WQBELs – and also measure optimization progress

    b. Additional data collection is needed prior to calculating caps for some plants to meet in the first PSNGP

    c. Provide a thorough Sampling and Analysis Plan (SAP) to ensure standard methods and comparable data

        i. Develop the SAP in consultation with experienced plant operators and laboratory personnel; include parameters; locations; instrumentation; frequency/sampling intervals; and protocols/methods of sampling

        ii. Have each plant identify and address internal and external factors that might influence variation and skew data

31. The first PSNGP will have new monitoring requirements overlaid on individual permit requirements to address the wide variety of and variability in the available data, and the paucity of data in PARIS for many plants

32. The monitoring will trigger required actions when targets are exceeded

33. Large plants (>10MGD) will sample 3-4 times each week; medium plants (3-10 MGD) will sample weekly; small plants (<3 MGD) will sample monthly

    a. Allow reduced sampling frequency once loading variability is adequately documented and the plant's request is approved by Ecology (Plants would still need to maintain the monitoring needed to support plant operations, refine processes, continue to calculate loads, and demonstrate compliance)

    b. Allow a moderate decrease of sampling in winter after baseline data are collected and Inflow/Infiltration (I/I) influence is well understood

34. Randomize the timing of the sample collection

35. These influent data are needed: frequent ammonia and BOD, monthly TKN

36. These effluent data are needed: TIN, TKN, DOC, and BOD

37. Get the best possible assessment of each plant's actual loads by calculating a range using instantaneous flow measurements, not just monthly average flow, multiplied by the concentration from composites
38. Standardize or normalize daily flow monitoring calculations
39. Correlate concentration and flow with calculated error bars
40. Assist smaller plants with funding for accreditation and additional testing

V. How to require optimization and adaptive management in the first PSNGP

41. In the context of the PSNGP, the purpose of optimization and adaptive management is to evaluate existing treatment processes for opportunities to reduce nutrients to the greatest possible extent and as soon as possible through operational adjustments and design efficiencies
    a. Do not require a costly optimization approach that might then need to be reversed when WQBELs are established; plants should not invest in short term solutions that will not be useful long term
    b. Investments in optimization should not exceed $10,000/MGD of plant capacity
    c. Have plants explore using existing equipment to change processes to drive nitrification/denitrification and to reduce overall nutrients as much as possible at a minimal cost (i.e., <25,000 for small plants and <$100,000 for large plants) while still maintaining other permit requirements
    d. The largest plants with the largest loads should be required to invest more
    e. Provide incentives for plants to reduce nutrients sooner than required
42. Provide a menu of options; define actions that plants can implement but provide flexibility for each facility to do the best and most efficient optimization in this interim period before WQBELs are established
    a. Provide guidance for plants to develop the optimization plan
    b. Define in a detailed guidance document what optimization techniques shall be considered for the tiers of BMPs
        i. Have individual plants evaluate and rank in order of feasibility for their sites
        ii. Plants would not need to try all of the approaches, but they would need to explain why a given technique is not viable at the plant
        iii. Allow plants to select from the menu within each category
        iv. Have plants develop or use existing SOPs for all optimization approaches
        v. Enforceable optimization plans provide detail on how plants will attempt to achieve the cap through the selected techniques

vi. Be specific enough that each plant can knows how to submit a compliant plan

vii. Review each plant's plan in a timely fashion

viii. Provide the framework but allow flexibility for amendments

c. Encourage pilot trials and do not penalize plants for failed experiments

d. Encourage networking and information sharing among plants

e. Investigate minor retrofits as part of the optimization plan

f. Ensure adequate monitoring is implemented to evaluate the plan

g. Include appropriate Ecology review/approval or advance notification prior to trying out new approaches to avoid penalties for upsets during trials or adjustments

h. Pay close attention to which approaches are short term and which are long term

i. Complete an economic assessment as part of the optimization plan considering the challenges at the individual plant

j. Explain/justify why certain techniques are deemed infeasible for a plant and introduce other innovative approaches that might be tried

k. Consider other factors such as protecting sensitive habitats in the context of overall Puget Sound goals

l. Avoid unintended consequences to plants that are in different phases of planning, design, construction, operations

m. Provide performance incentives to encourage optimization, but do not penalize plants who have already gone above and beyond to reduce their nutrient loadings

n. Provide financial support for the smallest plants

o. Initial evaluations could provide the basis for future engineering reports

43. Plants should document the changes they try out and identify what works best for nutrient reduction at their facility

a. Each year after completing the plan, plants would report what was tried, share what was learned, and list what is planned

b. Plants that do not know what their current nutrient loadings are will have a hard time evaluating the impact of operational changes; this experimentation, assessment and reporting should be delayed for a year at such plants

c. Reporting can be only once in the 5-year permit cycle at plants implementing nutrient reduction technologies or with effluent concentrations below 10 mg/L; and at the smallest plants (<3MGD) in locations that are not expected to have near-field effects

d. Ecology should make it easy for all of the operators to submit a compliant report

44. Conduct a Sound-wide study in the first 2-3 years of the permit to assist plants in identifying optimization opportunities and expected short- and long-term pollutant reductions
    a. Have a single entity evaluate all of the plants, learn what has worked best for plants elsewhere, and identify appropriate strategies if optimization for nutrients is not feasible at a plant
    b. Collect reports on optimization efforts ("we tried this, here is the result") and share findings with plants
    c. Compare plants' capabilities with SSM nutrient reduction goal
    d. Inform side stream treatment, plant footprint re-purposing, outside fence opportunities, and advanced treatment needs
    e. Identify which plants may need more time to design and build upgrades; which are most at risk for not meeting demand for capacity; which have inadequate land area for expansion; which plants need a complete rebuild
45. Include, in the first year of the permit, evaluation of side-stream treatment opportunities to add nutrient reduction capacity and, if considered technically and economically feasible, require their implementation if cap targets are exceeded
46. Use a tiered approach (like ISGP) based on plant size and/or percent capacity available
    a. Largest plants and those near 85% capacity should be presumed to have reached their cap, and be required to make more progress toward future upgrades sooner
    b. Plants at or near capacity and with less flexibility might focus on doing more planning to get upgrades online sooner rather than optimizing their current operations
47. Allow plants to use their own ingenuity to meet nutrient reduction goals

VI. How to approach short- and long-term planning requirements for facilities

48. Allow plants to contribute to and participate in a Sound-wide evaluation and planning study to complete and coordinate the first planning steps
49. Plants that are already operating nutrient reduction technologies are not required to do additional planning in the first PSNGP
50. Keep plants accountable for both making improvements during the first permit term and taking steps toward making necessary improvements in future permit terms and plan in phases: high level analysis followed by feasibility study followed by engineering report
    a. Allow plants to move forward from whatever planning stage they are in
51. Provide time and flexibility to address planning needs and avoid growth moratoriums; consider a matrix of growth rates and available current plant capacities
52. Require an initial nutrient reduction evaluation focused on low cost optimization with cost estimates for future upgrades

a. Include nitrogen, phosphorus, and carbon in the nutrient reduction evaluation

b. If data are available, plants submit the report at the end of the first year of the PSNGP; if data are not available, the plant should collect one year of data and then submit a report at the end of the second year

c. Thereafter, plants submit annual reports that describe how the nutrient reduction evaluation report has been implemented and evaluated

53. Require a long-term nutrient reduction evaluation in the first PSNGP that considers, at minimum, technologies that will reduce the plant's effluent TIN concentrations (1) to around 8-10 mg/L, and (2) to around 3-4 mg/L, and submit this study by the end of 2023

    a. This will be a high level evaluation or feasibility study (10% conceptual planning design) that estimates future costs, documents specific initial and long-term site constraints, and identifies potential implementation challenges

    b. For plants at or above 85% design capacity, require a formal engineering report per WAC 173-240-060and implementation of feasible side-stream treatment during the first permit

54. GMA Comprehensive Plan updates are due in 2024 and plans for plant upgrades need to be in this update but do not need to be required by the permit; just require affirmation in the last year of the permit that future plant upgrades are represented in the 2024 update, (20-year) Capital Facilities Plan, and (6-year) Capital Improvements Plan

    c. Jurisdictions will start work on plans in 2021; for this exercise, planners should assume their plants are at capacity and plan to provide sewage treatment for current and expected population without impacting water quality

    d. Requirements in the first PSNGP should work with the comprehensive planning timeline to update GMA checklist to include the requirement for nutrient reduction

    e. Assure plants and planners that their ultimate targets in the 15- to 20-year timeline ahead will be met by either the 8-10 mg/L or 3-4 mg/L approach (or something in between)

        i. Address collaboration in the short term, perhaps first, to see what can be accomplished with the equipment plants have now

        ii. Make a regional plan for equitable rate structures to address funding shortages and ensure environmental justice in plant upgrades

        iii. Consider a special State legislative session ask for grants to help plants with equipment, consulting help, and planning for the first PSNGP

        iv. Ask for federal funding for this critical infrastructure

f. Any city/county that cannot accommodate expected growth without keeping their nutrient loads in check must make a six-year plan to provide the required services; GMA actions are triggered when a plant reaches 85% of its rated capacity

55. Provide a compliance schedule to plan and build the infrastructure needed to accommodate future growth and meet eventual WQBELs

VII. How to approach "outside the fence" practices to reduce nutrient inputs in the first PSNGP

56. Allow and encourage plants to achieve nutrient reductions by other means than biological and other nutrient removal technologies, such as building satellite plants; looking for other discharge locations (*i.e.*, recycled or reclaimed water); expanding regular maintenance and line replacements and other I/I reduction efforts; investigating opportunities for source control; using approaches similar to how industrial pretreatment programs work; requiring separate plumbing and/or other building scale solutions; and/or implementing other innovative techniques

57. Allow and encourage each jurisdiction to come up with a comprehensive set of solutions that works for their plant and community and give plants credit for achieving these reductions

58. Consider a regional approach to coordinating septage intakes to determine how and where septage would be best disposed of to reduce nitrogen discharges to Puget Sound while still providing septage hauling services

VIII. Outstanding questions or concerns to address in parallel with PSNGP issuance

59. Increase outreach to the development community and the public

60. Create a clearinghouse of information for various plant sizes

61. Provide a reward structure for the greatest reductions in nitrogen, the soonest

62. Encourage plants to evaluate new investments for their nutrient impact, similar to how purchases are currently evaluated for energy efficiency, carbon footprint, and greenhouse gas emissions

63. Expand the pool of skilled plant operators

64. Develop a state funding strategy to lessen the burden on individual utilities and their ratepayers

    a. Address anticipated funding shortages and ensure environmental justice in plant upgrades

    b. With an expected increase in federal infrastructure spending, the U.S. Environmental Protection Agency's Clean Water State Revolving Fund could be tapped to generate water quality improvements and jobs across the region while addressing nutrient, DO, CEC, and acidification impairments

65. Apply emerging science during the first PSNGP term and establish WQBELs for plants

66. Get more science to address near versus far field contributions and seasonality
67. Develop a bigger picture for trading, in consultation with Tribes early in the process
    a. Use the Sound-wide study to identify plants' capacities, nutrient levels, and expected abilities to meet their caps
    b. Determine equivalency factors to be used in future trading
        i. The "currency" needs to be place-specific, because near-field and far-field pounds per day are not the same
        ii. Percent removal cannot be used for trading; it must be a mass loading
    c. Consider (1) setting a regional limit, (2) creating incentives for source reductions, (3) allowing arrangements for public and private trades, and (4) allowing some utilities to pay into a fund
68. Implement a Sound-wide comprehensive nutrient reduction plan to address other sources
69. Consider allowing the smallest (<1 MGD) plants to make demonstrable permanent reductions in other sources of nutrients as an alternate approach to trading
70. Match new PSNGP with individual permit requirements, particularly for monitoring
71. Improve Ecology's schedule and priorities for updating permits that are overdue for reissuance
72. Put monitoring and planning requirements in permits overdue for reissuance now, and focus on optimization efforts and side-stream treatment evaluation