



516 Third Avenue, Council
Chambers, 10th Floor,
Seattle, WA 98104

King County

Meeting Agenda

Regional Water Quality Committee

Councilmembers:
Claudia Balducci, Chair
Reagan Dunn, Rhonda Lewis

Sound Cities Association: Vice Chair, Laura Mork, Shoreline; Dave Hamilton, Bellevue; Sarah Moore, Burien; Jessica Rossman, Medina

Alternates: Hanan Amer, Auburn; Melissa Stuart, Redmond

Sewer/Water Districts: Chuck Clarke, Woodinville Water District; Lloyd Warren, Sammamish Plateau Water District

Alternate: Ryika Hooshangi, Sammamish Plateau Water

City of Seattle: Joy Hollingsworth, Eddie Lin
Alternate: Rob Saka

Non-Voting Member: John McClellan, Metropolitan Water Pollution Abatement Advisory Committee

Lead Staff: Jenny Giambattista (206-477-0879)
Committee Clerk: Angelica Calderon (206-477-0874)

3:00 PM

Wednesday, October 7, 2026

Hybrid Meeting

Hybrid Meetings: Attend this King County Council committee meeting in person in Southwest Conference Room 12th Floor King County Courthouse 516 3rd Avenue, Seattle WA 98104, or through remote access. Details on how to attend and/or to provide comment remotely are listed below.

Pursuant to K.C.C. 1.24.035 A. and F., this meeting is also noticed as a meeting of the Metropolitan King County Council, whose agenda is limited to the committee business. In this meeting only the rules and procedures applicable to committees apply and not those applicable to full council meetings.

HOW TO PROVIDE PUBLIC COMMENT: The Regional Water Quality Committee values community input and looks forward to hearing from you on agenda items.



Sign language and interpreter services can be arranged given sufficient notice (206-848-0355).
TTY Number - TTY 711.
Council Chambers is equipped with a hearing loop, which provides a wireless signal that is picked up by a hearing aid when it is set to 'T' (Telecoil) setting.



The Committee will accept public comment on items on today's agenda in writing. You may do so by submitting your written comments to committees@kingcounty.gov. If your comments are submitted before 1:30 p.m. on the day of the meeting, your comments will be distributed to the committee members and appropriate staff prior to the meeting.

HOW TO WATCH/LISTEN TO THE MEETING REMOTELY: There are three ways to watch or listen to the meeting:

- 1) Stream online via this link: www.kingcounty.gov/kctv, or input the link web address into your web browser.
- 2) Watch King County TV on Comcast Channel 22 and 322(HD) and Astound Broadband Channels 22 and 711(HD).
- 3) Listen to the meeting by telephone.

Dial: 1 253 215 8782

Webinar ID: 827 1536 1574

To help us manage the meeting, please use the Livestream or King County TV options listed above, if possible, to watch or listen to the meeting.

To show a PDF of the written materials for an agenda item, click on the agenda item below.

1. [Call to Order](#)
2. [Roll Call](#)
3. [Approval of Minutes](#) **p. 4**
Minutes of September 2, 2026 meeting
4. [Chair's Report](#)
5. [Metropolitan Water Pollution Abatement Advisory Committee \(MWPAAAC\) Report](#)
6. [Wastewater Treatment Division Report](#) **p. 7**

Briefing

7. [Briefing No. 2026-B0113](#) **p. 14**
Puget Sound Institute Briefing on Low Oxygen Impacts in Puget Sound
Joel Baker, Director, UW Puget Sound Institute, University of Washington



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8. [Briefing No. 2026-B0114](#) **p. 34**

Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 8: Resource Recovery

Darren Greve, Government Relations, WTD

Janice Johnson, RWSP Program Manager, WTD

Erika Kinno, Policy and Research Supervisor, WTD

Dr. Shirlee Tan, Environmental Scientist, Seattle-King County Public Health

Kristina Westbrook, Recycled Water Program Lead, WTD

Landon Reigelman, Biosolids Program Lead, WTD

9. [Briefing No. 2026-B0002](#) **p. 190**

Discussion of 2026 Regional Water Quality Committee Work Program

Jenny Giambattista, Council staff

Other Business

Adjournment



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Meeting Minutes Regional Water Quality Committee

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Non-Voting Member: John McClellan, Metropolitan Water
Pollution Abatement Advisory Committee

Lead Staff: Jenny Giambattista (206-477-0879)
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Wednesday, September 2, 2026

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1. **Call to Order**

Vice-Chair Mork called the meeting to order at 3:00 p.m.

2. **Roll Call**

Present: 9 - Dunn, Hamilton, Moore, Mork, Rossman, Warren, Lin, Amer and Stuart

Excused: 5 - Balducci, Clarke, Hollingsworth, Lewis and McClellan

3. **Approval of Minutes**

Mayor Moore moved approval of August 5, 2026, meeting minutes. There being no objections, the minutes were approved.

4. **Chair's Report**

Vice-Chair Mork provided an overview of the agenda.

5. **Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) Report**

This item was not held.

6. **Wastewater Treatment Division Report**

Kamuron Gurol, Director, Wastewater Treatment Division (WTD), Department of Natural Resources and Parks, briefed the committee via PowerPoint presentation on Wastewater Treatment Division (WTD's) Sewer Rate and Capital Work Plan to Continue to Improve Engagement, Transparency, and Accountability and noted changes from last month's

update, and answered questions from the members.

Briefing

7. Briefing No. 2026-B0083

Vision for Clean Water 2100

This matter was Presented

Janice Johnson, Project Manager, Regional Wastewater Services Plan Update, Wastewater Treatment Division (WTD) and Darren Greve, Government Relations, WTD, briefed the Committee via PowerPoint presentation and showed a video on Clean Water and answered questions from the members.

8. Briefing No. 2026-B0102

Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 7: Level of Treatment

This matter was Presented

Darren Greve, Government Relations, Wastewater Treatment Division (WTD), Alison Tarbox, Treatment Planning Program Manager; WTD, Janice Johnson, Project Manager, Regional Wastewater Services Plan Update, WTD, Jacque Klug, Nutrient Management Coordinator, WTD and Tiffany Knapp, Treatment & Separated Conveyance Planning, WTD, briefed the Committee via PowerPoint presentation and answered questions from the members.

9. Briefing No. 2026-B0002

Discussion of 2026 Regional Water Quality Committee Work Program

This matter was Deferred

Jenny Giambattista, Council staff provided updates on the work program.

Other Business

There was no further business to come before the committee.

Adjournment

The meeting was adjourned at 4:46 p.m.

Approved this _____ day of _____.

Clerk's Signature

Regional Water Quality Committee

Item 6

Director's Report:

Wastewater Treatment Division

Capital Project Report

October 7, 2026

Note: Changes from last month’s update are in bold, blue font.

Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
1. Meaningful and Timely Engagement in Development of Sewer Rate. For the 2027 rate process and on-going, Wastewater Treatment Division (WTD) should implement an updated rate process that includes: a. Regular discussions throughout the year with the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC), Regional Water Quality Committee (RWQC), and King County Council at the relevant level of detail for each body on key factors and assumptions affecting the rate and forecast. This includes transparency on capital improvement program assumptions. b. Time for more in-depth review and understanding of costs, discussion of specific rate scenarios/options, and effects during rate discussions with MWPAAC, RWQC, and other stakeholders, at the relevant level of detail for each body. c. Ensure that the long-term rate forecast methodology requested by Motion 16449 is used to develop scenarios to evaluate options.	- To promote meaningful and timely engagement, WTD will host regular meetings with MWPAAC and/or its subcommittees to review: 10-year Capital Improvement Program. - Project prioritization, including transparency on how decisions are made and policy drivers of capital prioritization. - Timely updates on changes in large project costs that may impact rates as information becomes available. - Expenditure forecast assumptions and impacts to different types of projects across the capital program.	Q4 2025 and ongoing	Briefings provided on WTD’s capital project prioritization process and key capital projects impacting the rate in Q3/Q4 2025. Most recently, MWPAAC received a Capital Projects briefing on June 24, 2026. A draft rate engagement calendar for Q4 2026 – Q2 2027 is in development and will be shared with MWPAAC’s Executive Board for input. WTD is meeting with individual Board members to explore what success looks like for engagement for the next rate cycle. A draft sewer rate engagement calendar has been developed. On November 5, WTD will provide a look back at performance 2025 and prior, including items such as accomplishment rate, debt market, etc., to the MWPAAC Rates and Finance Subcommittee (R&F). WTD also plans to brief R&F on drivers, challenges, affordability, predictability, and project updates at the subcommittee’s December 5 meeting.
	Work with King County Executive's Office to schedule early 'look ahead' presentations on known and potential factors affecting the 2027 rate proposal and forecast.	Q1/Q2 2026	“Look Ahead” briefings to MWPAAC scheduled for Q4 2025 and Q1 2026. WTD briefed MWPAAC on 1/28/26 on the rate strategy for 2027 and assumptions. WTD provided a preliminary sewer rate and capacity charge briefing to MWPAAC on 2/5/26 and 2/25/26, and a briefing on WTD’s proposed rate on 3/5.
	As part of the 2027 rate proposal, include options for multiple rate scenarios, including those that offer various capital portfolio options. Scenarios should detail tradeoffs and associated risks and benefits. This should include a discussion about the level of service WTD is able to deliver under each	Q2 2026	WTD presented preliminary scenarios for illustrative purposes to RWQC on 2/4/26 and MWPAAC Rates and Finance Subcommittee on 2/5/26, and as part of WTD’s proposed rate on 3/5/26. Two scenarios, in addition to the Executive’s

Wastewater Treatment Division (WTD’s) Sewer Rate and Capital Work Plan to Continue to Improve Engagement, Transparency, and Accountability – October 7, 2026, Status Update

Note: Changes from last month’s update are in bold, blue font.

Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
	option. - The report on long-term forecasting model required by Motion 16449 was presented to RWQC in September 2025. To increase transparency and credibility in the long-term forecasting model, WTD will work with a MWPAAC work group to identify the model details that should be shared and further refined in order to improve understanding of the assumptions, formulas, data sets, and policy implications embedded in the long-term rate model and allow for informed questions. The MWPAAC work group should identify areas of improvement to continue to align with industry best practices to inform suggestions for improvements. - Work with MWPAAC Executive Board member(s) to develop a process for members to observe WTD Capital Portfolio management staff meetings while not hampering WTD's process and progress.	Q3 2025 and ongoing Q1/Q2 2026	proposed rate, are included in the Technical Memorandum transmitted to Council with proposed Ordinance 2026-0103. An independent consultant selected by MWPAAC members briefed MWPAAC on 1/28/26 and a video of the presentation can be found here. Further briefings on implementation of the long-term forecasting model will be provided to MWPAAC with an opportunity to suggest any further improvements to align with industry standards. A briefing on the long-term forecast model and refinements was presented to MWPAAC’s Rates and Finance Subcommittee on October 1, 2026. WTD is engaged with MWPAAC’s Executive Board to provide an opportunity to observe the Definition and/or Delivery Board meetings in the Portfolio Management process beginning in Q1 2026. MWPAAC’s Executive Board selected two representatives to attend WTD Capital Portfolio management meetings beginning in Q2 2026. The two MWPAAC representatives attended an orientation on WTD’s governance board structure on June 22 and their first WTD Project Oversight Board on July 7, 2026. WTD will identify other governance board opportunities for the MWPAAC representatives for Q4 2026.

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Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
2. Early visibility and transparency on large project planning. Develop mechanisms for MWPAAC and RWQC to engage in the planning and development process for large capital projects prior to decision-making to improve knowledge and confidence.	Develop and implement a process for MWPAAC and RWQC (as requested) to review a limited number of large capital projects selected by MWPAAC that substantively affect the rate. These reviews will happen at key phases in the development of these selected projects, including concept definition, alternatives analysis, alternative selection, and final design. Each engagement will create an opportunity to influence outcomes by collaboratively discussing comments and questions with WTD before a decision in each phase identified above is finalized.	Q1 2026	MWPAAC representatives’ attendance at WTD Project Oversight Board meetings will help inform MWPAAC members regarding WTD’s process for project prioritization and decisions. The topic of alternatives analysis for selected projects will be revisited at the next MWPAAC Executive Board in Q3 2026.
3. Improve multi-year rate predictability. Develop options and implement a mechanism to improve rate predictability to help partner agencies better plan and lessen large changes in rate proposals, especially for the first three years of the rate. A multi-year rate would provide more time for an in-depth review and understanding of costs and how investments are prioritized, and discussion of options and tradeoffs.	Prepare and deliver options for multi-year rate predictability, including options for a multi-year rate commitment. Options should be prepared in discussion with MWPAAC’s Executive Board and partner agencies and in coordination with King County Executive’s Office and county budget process. Any multi-year option should include a process for WTD to update the rate if there are significant changes that impact the rate forecast.	Q3 2025 – Q2 2026 (Options identified by end 2025 and multi-year rate implementation by end of Q2 2027 for 2028 and 2029 rates)	WTD began discussions with MWPAAC’s Executive Board and King County’s budget office in Q3/Q4 2025 on options for rate predictability. MWPAAC received an initial briefing and provided feedback on potential options at its 12/4/25, Rates and Finance Subcommittee meeting. Further discussion of options for rate predictability is planned for MWPAAC’s Rates and Finance Subcommittee on June 4, 2026. Based on feedback from MWPAAC and local agency partners on the options, WTD plans to recommend a two-year rate for 2028-2029 to help with predictability and align with the County’s biennial budget. The sewer contracts still require the Council to adopt the rate annually.
4. Evaluate regulatory requirements and develop options to address financial sustainability. Evaluate consent decree and permit deadlines for major projects and investments associated with multiple and concurrent requirements and identify options to address financial sustainability while optimizing water quality benefits and maintaining permit compliance.	Evaluate the costs/benefits of seeking regulatory changes to improve the environmental and financial sustainability of the regional system.	Q3 2025 – 2026	WTD’s Planning team is coordinating with the King County Prosecuting Attorney’s Office and County Executive’s Office to evaluate potential regulatory changes. WTD is exploring options for an environmentally protective and financially sustainable path in preparation for initiating discussions with regulators. WTD met with Washington State Department of Ecology on June 24 and July 30. WTD met with Ecology staff on September 24 to continue discussions on potential alternative options to better

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Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
	Coordinate on outreach plan with local agency partners, to state and federal government. The outreach plan should address regulatory issues and funding availability from state and federal agencies.	Q3 2025 – 2026	prioritize regulatory requirements under the Clean Water Act, including Integrated Planning. WTD is initiating outreach with its local agency partners on a federal/state outreach strategy. WTD and Seattle Public Utilities (SPU) coordinated on delegation meetings as part of Water Week (April 12 – 18, 2026) in Washington, D.C. Additionally, WTD is coordinating with City of Bellevue on key messages in advance of the city’s D.C. trip in June 2026. WTD shared information with local agency government relations on EPA’s comment period for the Financial Capability Assessment guidance which closed May 26. WTD staff briefed MWPAAC on June 26 regarding the draft discharge permit for West Point Treatment Plant issued by Ecology which includes requirements for nutrients. MWPAAC submitted a comment letter in August 2026 on the draft permit to Ecology. King County is a member of the National Association of Clean Water Agencies which also submitted a comment letter on nutrients requirements to Ecology.
5. Independent, third-party oversight. Provide for independent third-party review for WTD's capital program, including <i>mega</i> capital projects such as the Mouth of Duwamish Combined Sewer Overflow Program.	Develop a proposal in coordination with MWPAAC's Executive Board for review by the Executive's Office to procure an independent consultant to review WTD's capital program, including large capital projects.	Q4 2025 – Q2 2026	WTD provided an opportunity for MWPAAC’s Executive Board to review the scope of work to procure an independent third-party consultant. The King County Auditor’s Office has agreed to serve as the Project Representative. MWPAAC has selected a representative from its Executive Board to participate in the consultant proposal and interview process. The advertisement

Wastewater Treatment Division (WTD’s) Sewer Rate and Capital Work Plan to Continue to Improve Engagement, Transparency, and Accountability – October 7, 2026, Status Update

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Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
			for the independent consultant contract opened on 2/10/26 and closed on 3/11/26. The selected consultant, PMA Consultants , executed a contract with WTD and received notice to proceed on June 11. The consultant held a kick-off meeting on June 25 with the King County Auditor’s Office (KCAO) as the project manager. KCAO and the consultant have met with stakeholders to get their input on focus areas for the third-party review. A briefing to MWPAAC will be scheduled for December 2026/January 2027.
6. Regional Utility Affordability Summit. In partnership with local municipal leaders, prepare a multi-jurisdictional summit to address affordability and access to essential utilities.	Work with RWQC, Sound Cities Association, Seattle, and sewer districts to bring a wastewater perspective to the development and planning of the regional utility affordability summit.	Q3 2025 – Q1 2026	The Regional Utility Rate Summit was held in SeaTac on November 14, 2025, with approximately 150 attendees. WTD participated in the Staff Committee and Steering Committee for planning the Summit and as a participant presenting at the Summit.
	Identify and implement resources to execute follow-up steps agreed upon at the summit.	Q4 2025-Q1 2026	Follow-up will be coordinated with participants, including a potential second summit in 2026. Sound Cities Association (SCA) and County staff participated in a discussion with MWPAAC at its April 28 General Meeting to solicit input on next steps. WTD and SCA staff met in May to consider this initial input and how it would shape a second summit. WTD will continue to gather input from interested parties. The Department of Natural Resources and Parks and WTD met with Sound Cities Association (SCA) on June 16 and again on July 20 regarding a second summit. WTD continues to coordinate with the

Wastewater Treatment Division (WTD’s) Sewer Rate and Capital Work Plan to Continue to Improve Engagement, Transparency, and Accountability – October 7, 2026, Status Update

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Major Recommendations from RWQC Letter	Wastewater Treatment Division Tasks	Working Timeline	
	Develop public engagement strategy for rate payers in coordination with local contract agencies to explain why wholesale WTD rates are increasing and provide opportunities for public engagement.	Q1 2026	Executive’s Office on a Utility Summit with a target timeframe of December 2026. WTD held two sessions in January 2026 with local agency public information officers and similar staff to gather feedback. The sessions included discussion of what local agencies are hearing from customers, more information on current outreach efforts, and ideas for coordination with WTD on rate messages. This feedback will inform WTD’s communications strategy development in Q1/Q2 2026. WTD hosted a virtual meeting local agency public information staff on 4/28/26 and shared a communications tool kit for the proposed 2027 sewer rate. WTD’s Director also participated in an interview with Bellevue TV regarding utility rates. In response to comments received, WTD will develop a bill stuffer or something similar that local sewer agencies can send to customers explaining the King County wastewater rate increase for 2027 and the importance of the regional system in protecting public health and the environment. WTD provided information on the adopted 2027 sewer rate to local agency communications staff to help with coordinated messaging to ratepayers. One local agency has shared these materials with their ratepayers; WTD is encouraging local agencies to use these materials in advance of the 2027 rate taking effect on January 1. Council staff shared the Partner Toolkit materials with RWQC members on September 25.

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There are numerous causes of habitat loss

Key Takeaways

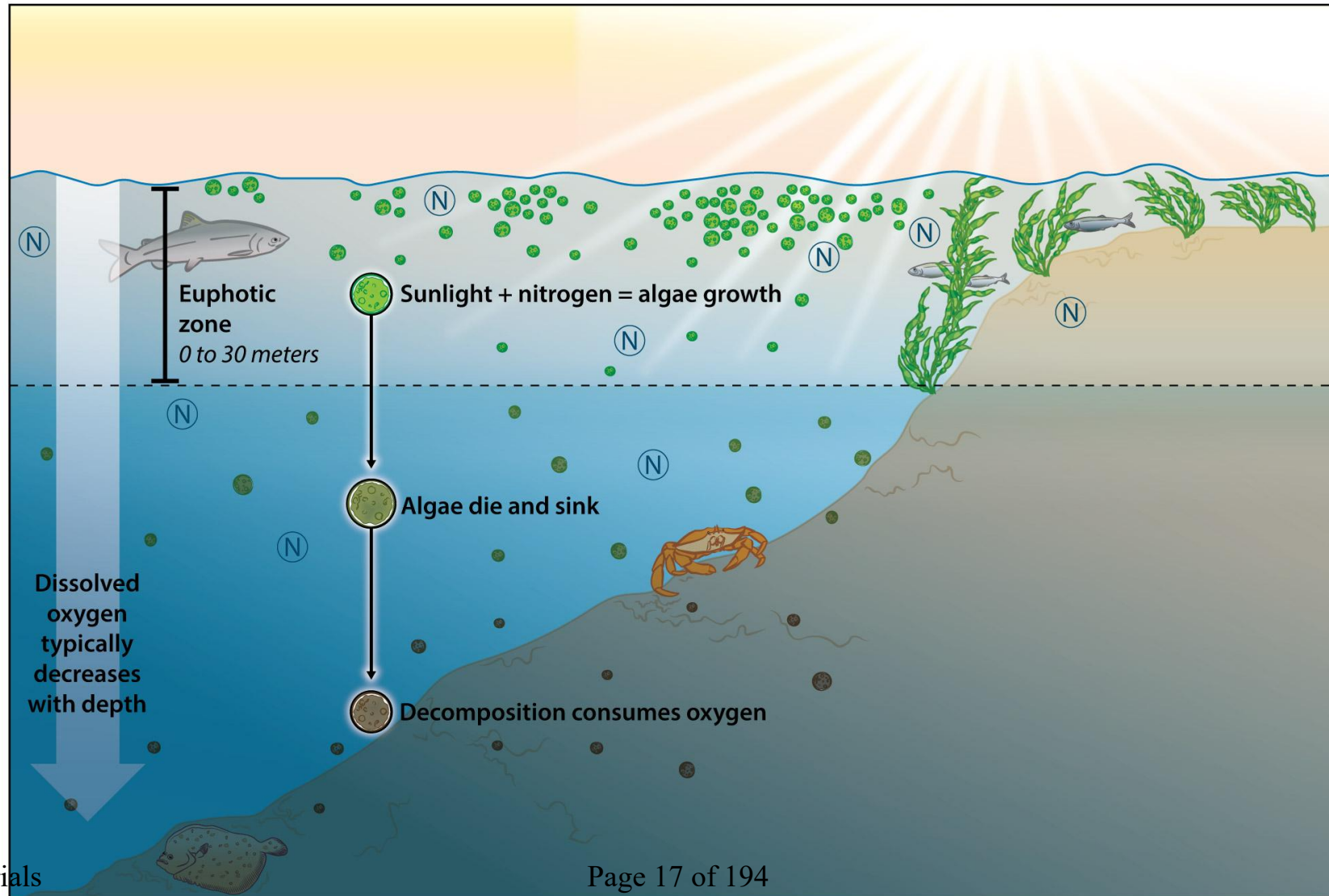
A warmer climate leads to less oxygen available and higher oxygen demands.

UW **demonstrated a risk evaluation tool** to flag species, locations, and times when nutrients from human activities pose some risk to marine life.

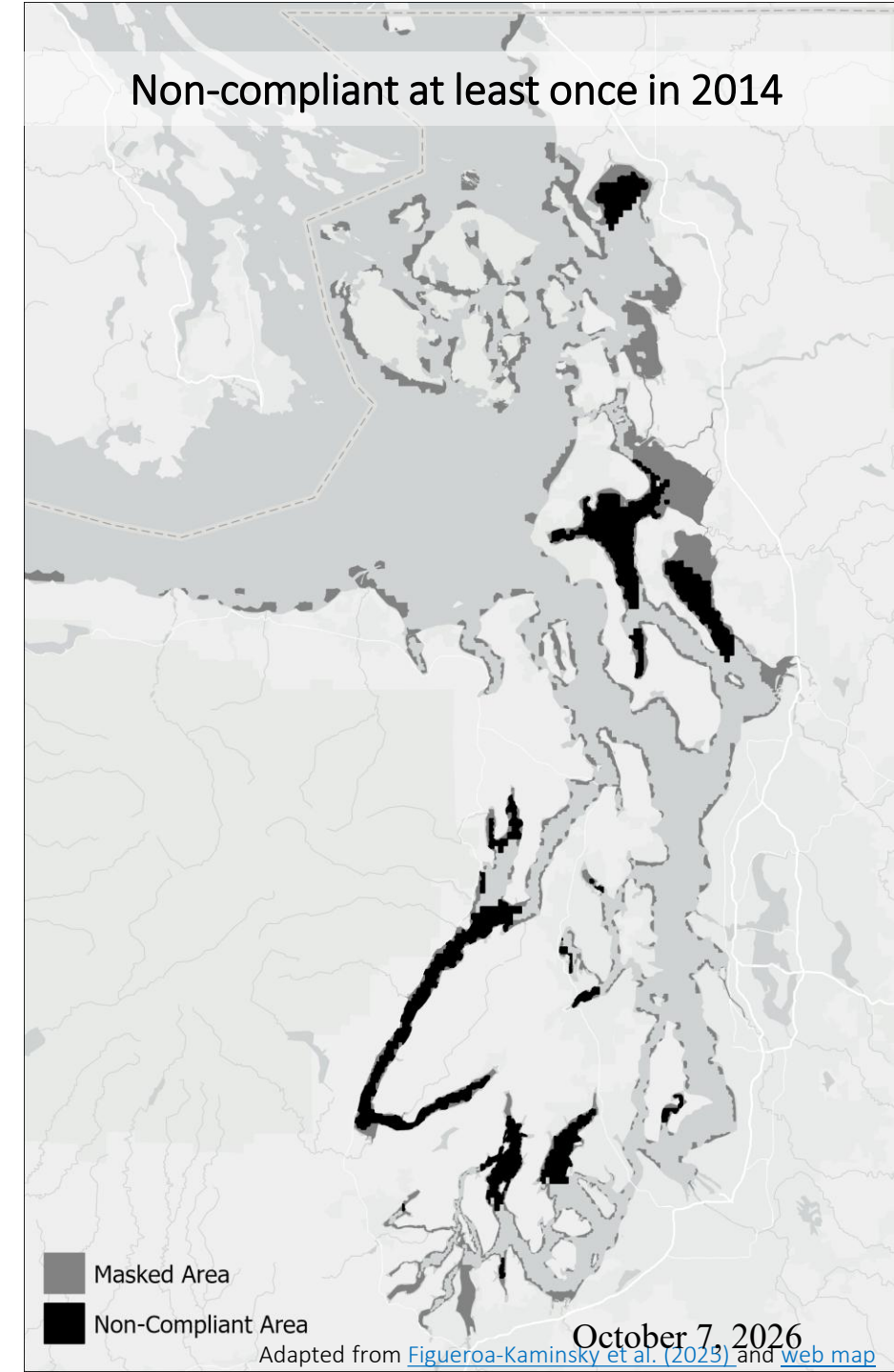
Initial analysis of adult Dungeness crabs, English sole, and Chinook salmon found:

- Risk varied by species primarily because they use different habitats.
- Sound-wide, wastewater and other human sources of nutrients had a relatively modest effect, but impacts were more significant in Hood Canal and several embayments.

Nitrogen supports the base of the food web and also contributes to low dissolved oxygen



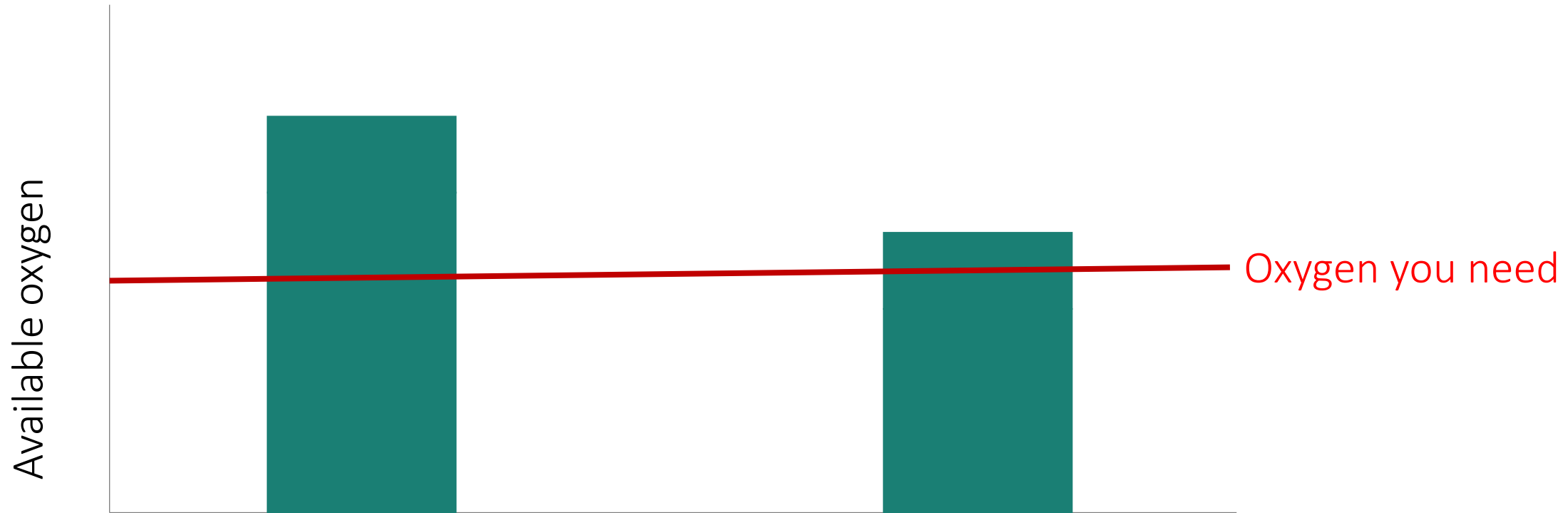
Nutrients from human activities decrease dissolved oxygen in Hood Canal and several embayments



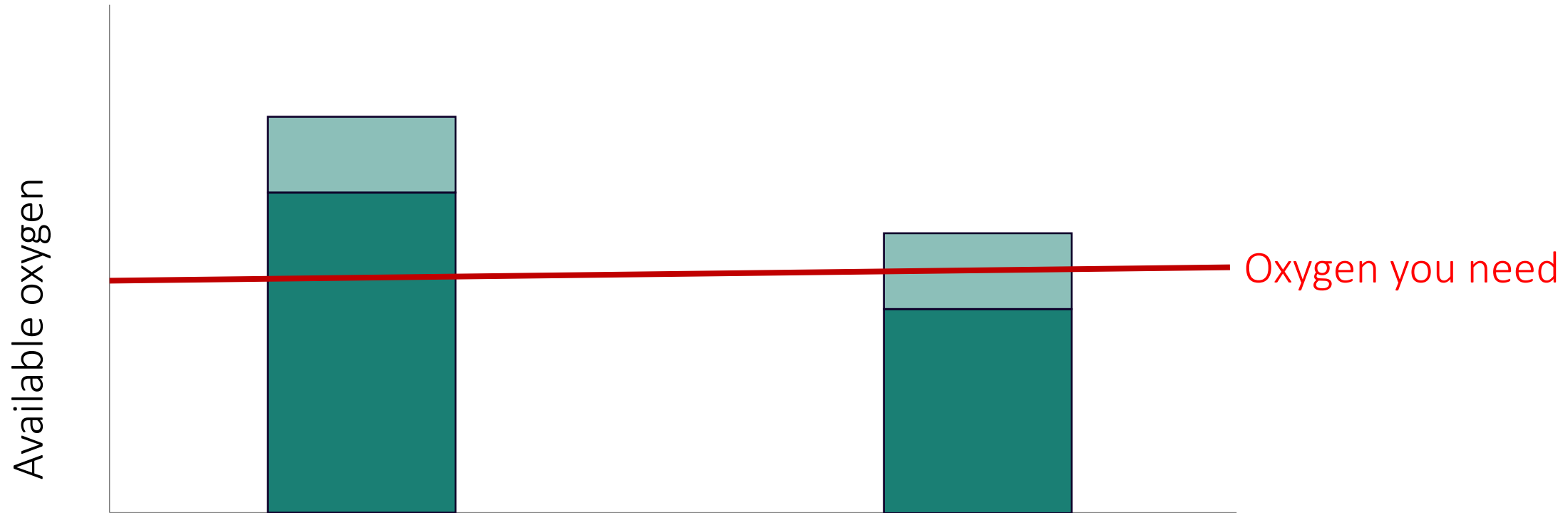
When and where do nutrients from human activities make
a bad day worse for marine life?



Changes in low oxygen are problematic when they fall below physiological thresholds



Changes in low oxygen are problematic when they fall below physiological thresholds



Important to consider species-specific thresholds



English sole



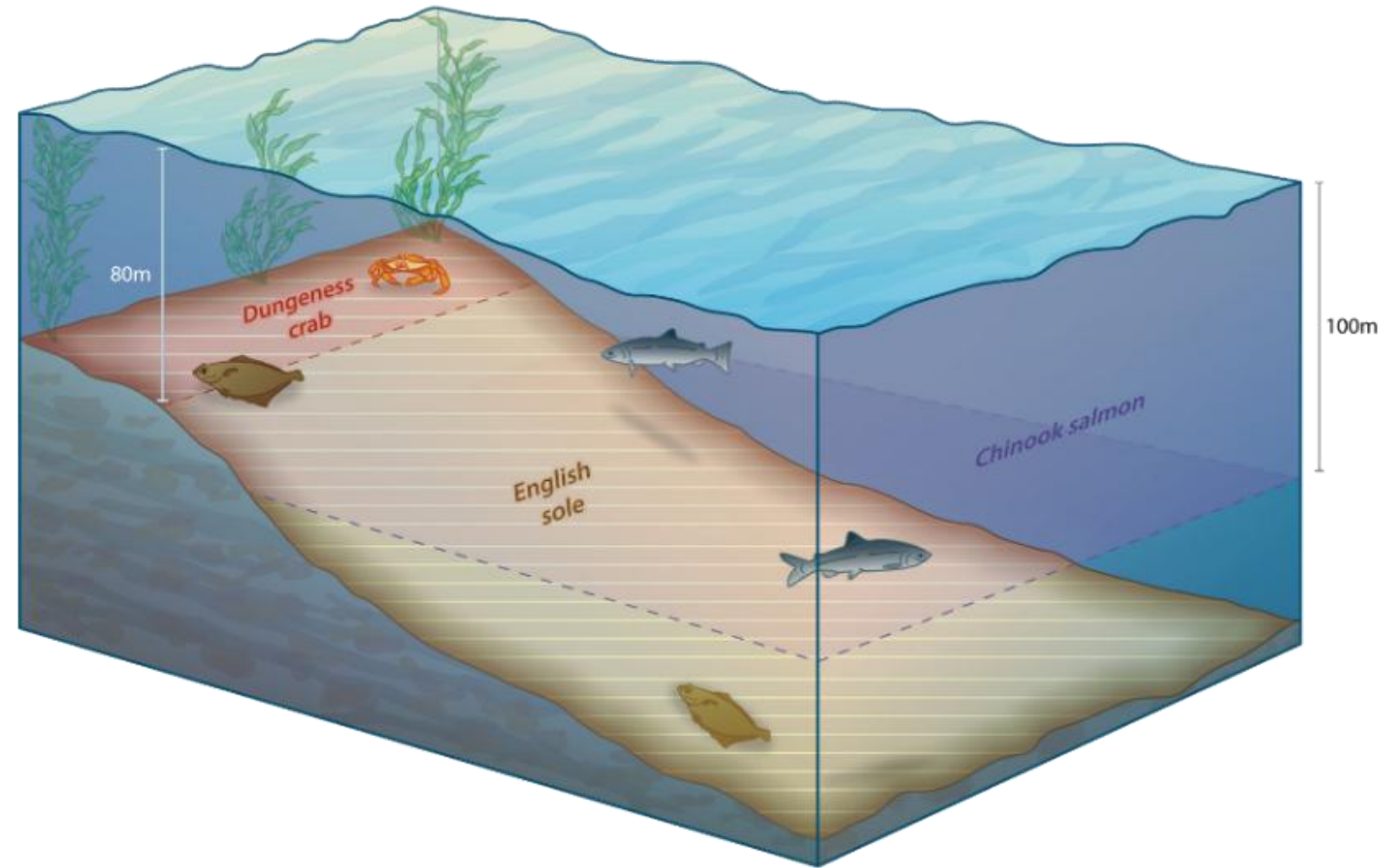
Dungeness crabs



Chinook salmon

Where species live drives exposure to harmful conditions

-  **Dungeness crab:** Area along the bottom of the Sound if < 80 m
-  **English sole:** Area along the bottom of the Sound
-  **Chinook salmon:** Volume in the top 100 m of the water column



Modeled aerobic habitat compression for 2014

Predict when and where the oxygen available for respiration is insufficient to support a species' metabolic demand for **routine activities like feeding and swimming**.

Environmental oxygen (pO_2)



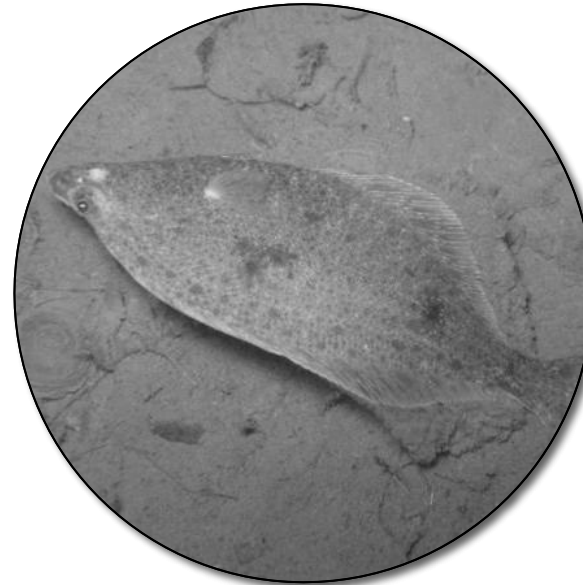
Species-specific and
temperature-dependent oxygen
threshold (p_{crit})



Dungeness crabs



Dungeness crabs



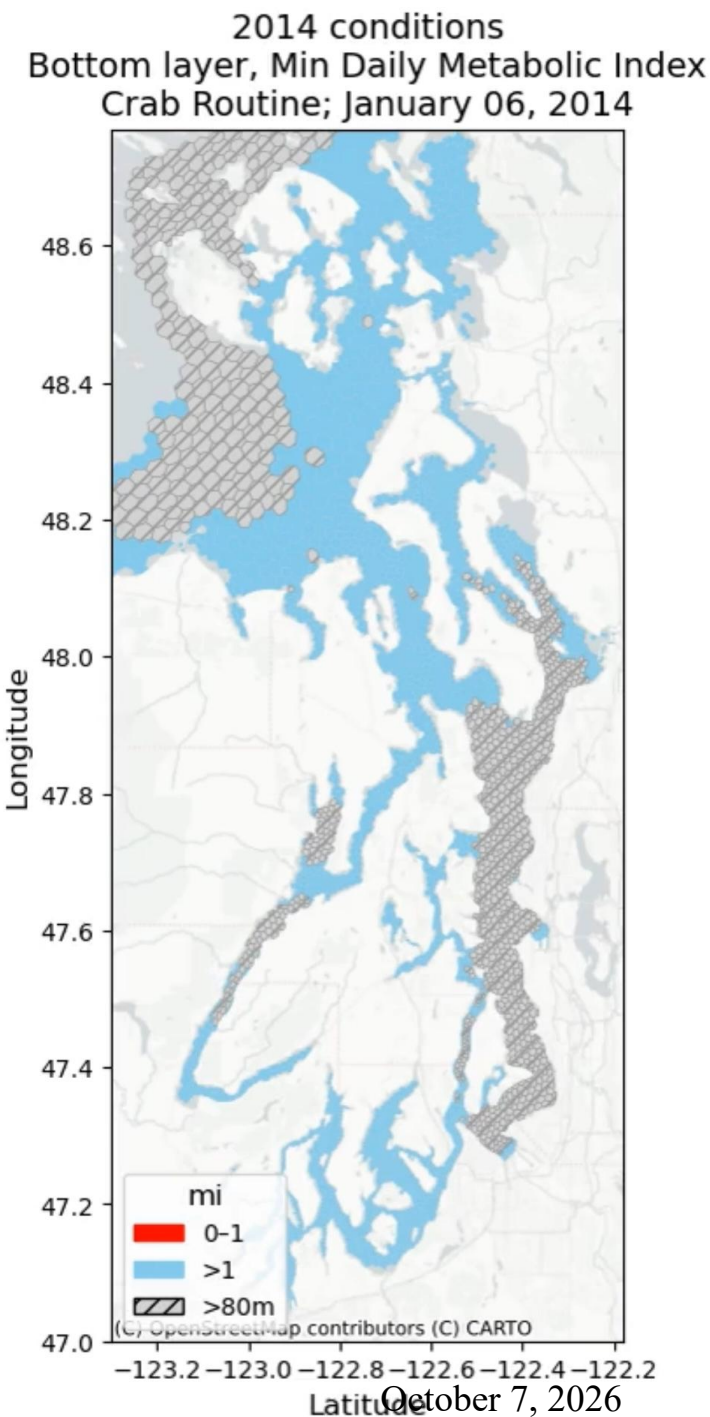
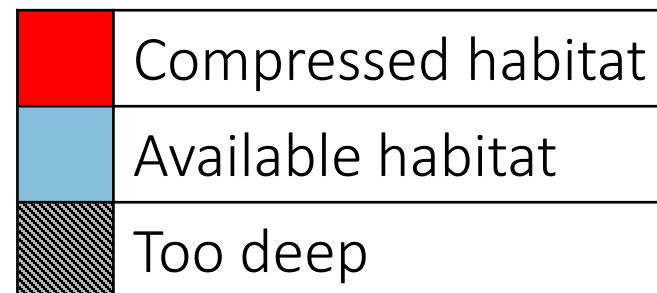
English sole



Chinook salmon

Seasonal aerobic habitat compression

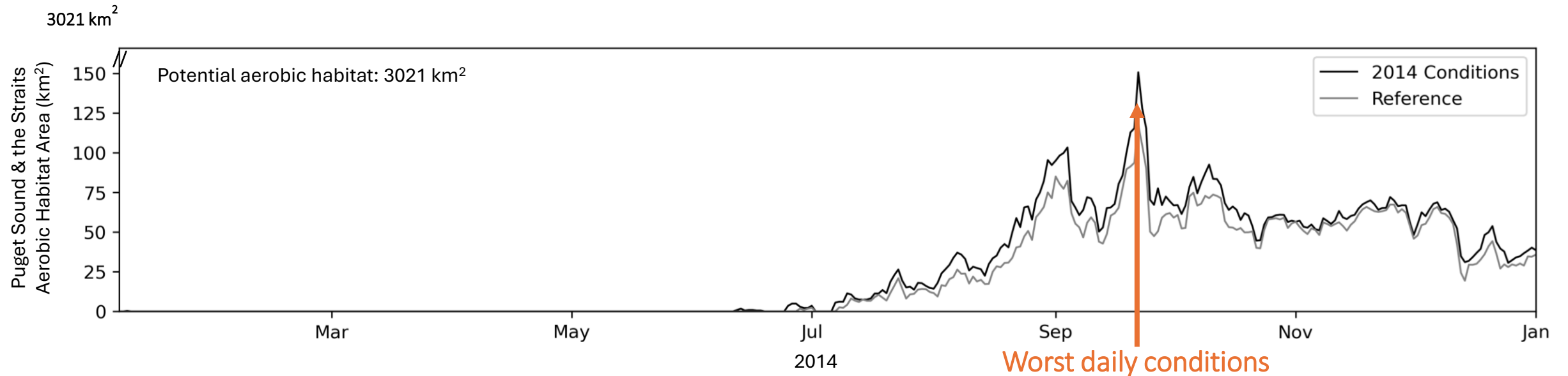
- Hood Canal: summer to end of year
- Several embayments: summer & fall



Worst daily conditions

Dungeness crabs

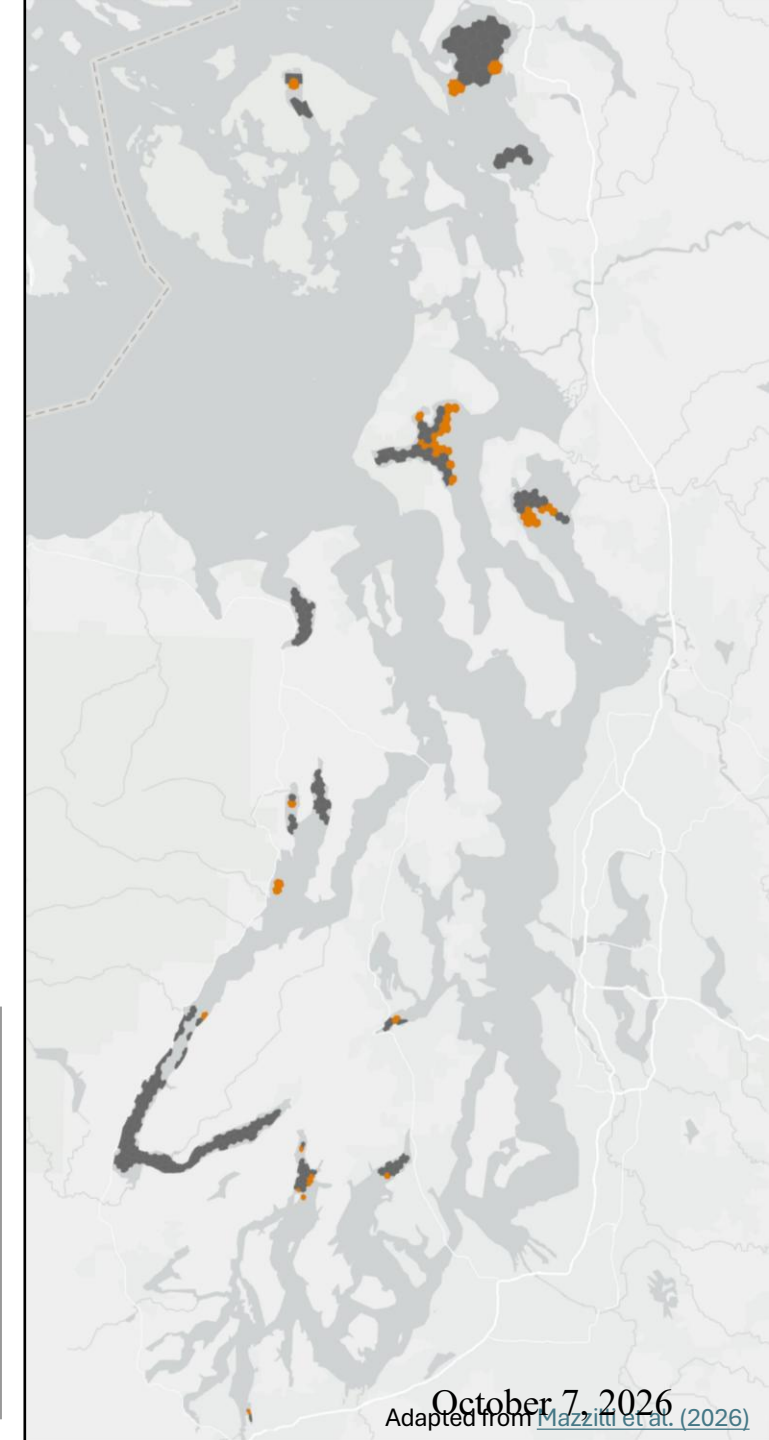
151 km² or 5.0%
of potential aerobic habitat



Loss of habitat due to nutrients from human activities in Washington State

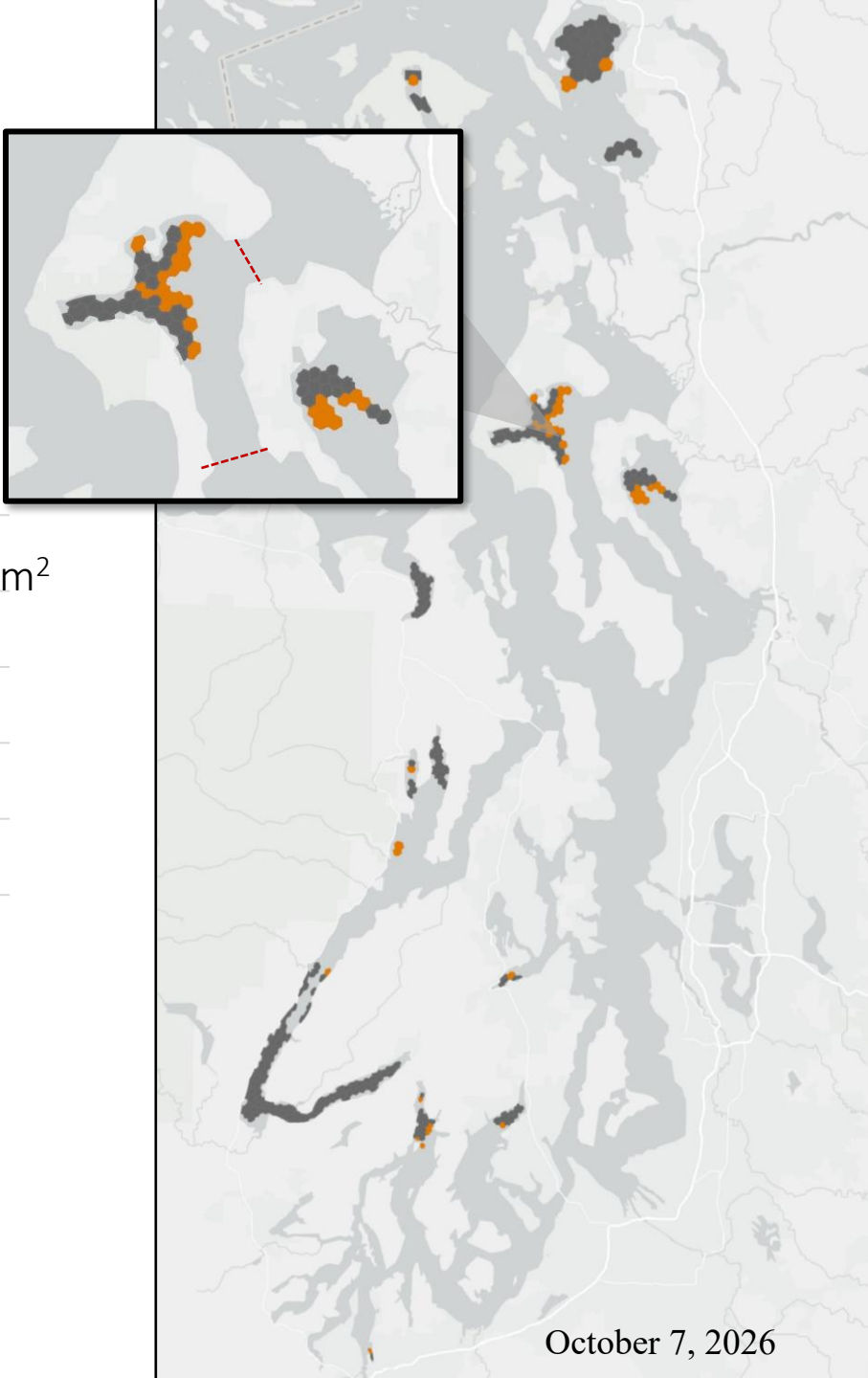
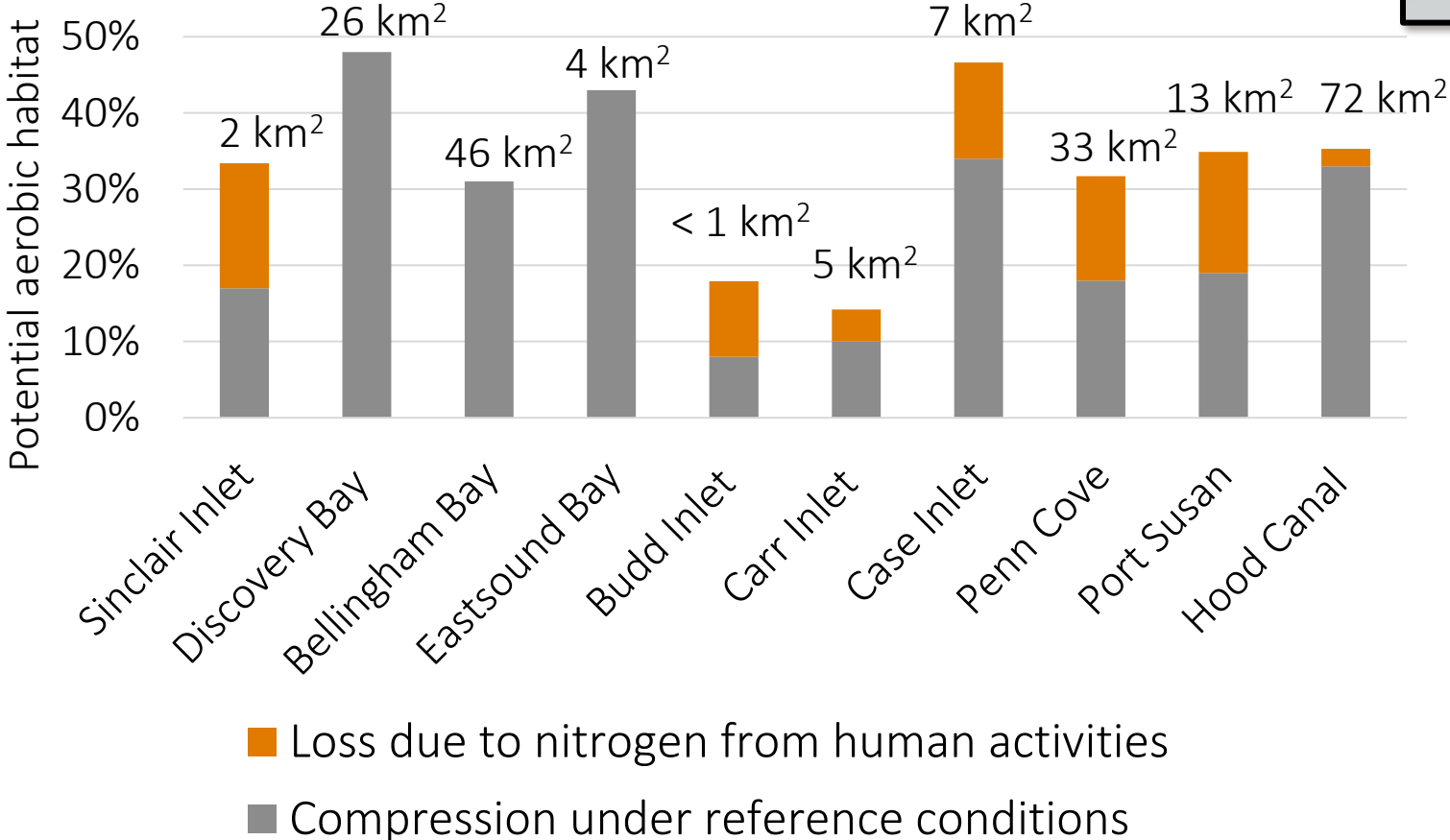
Dungeness crabs (2014)

-  Habitat compression under both Reference and Existing conditions
-  Habitat loss due to nutrients from human activities in Washington



Important to drill down locally

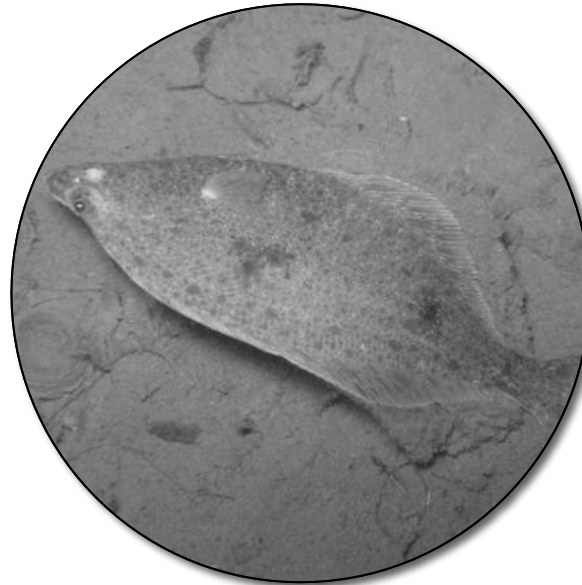
Worst daily conditions for Dungeness crabs



Chinook salmon



Dungeness crabs

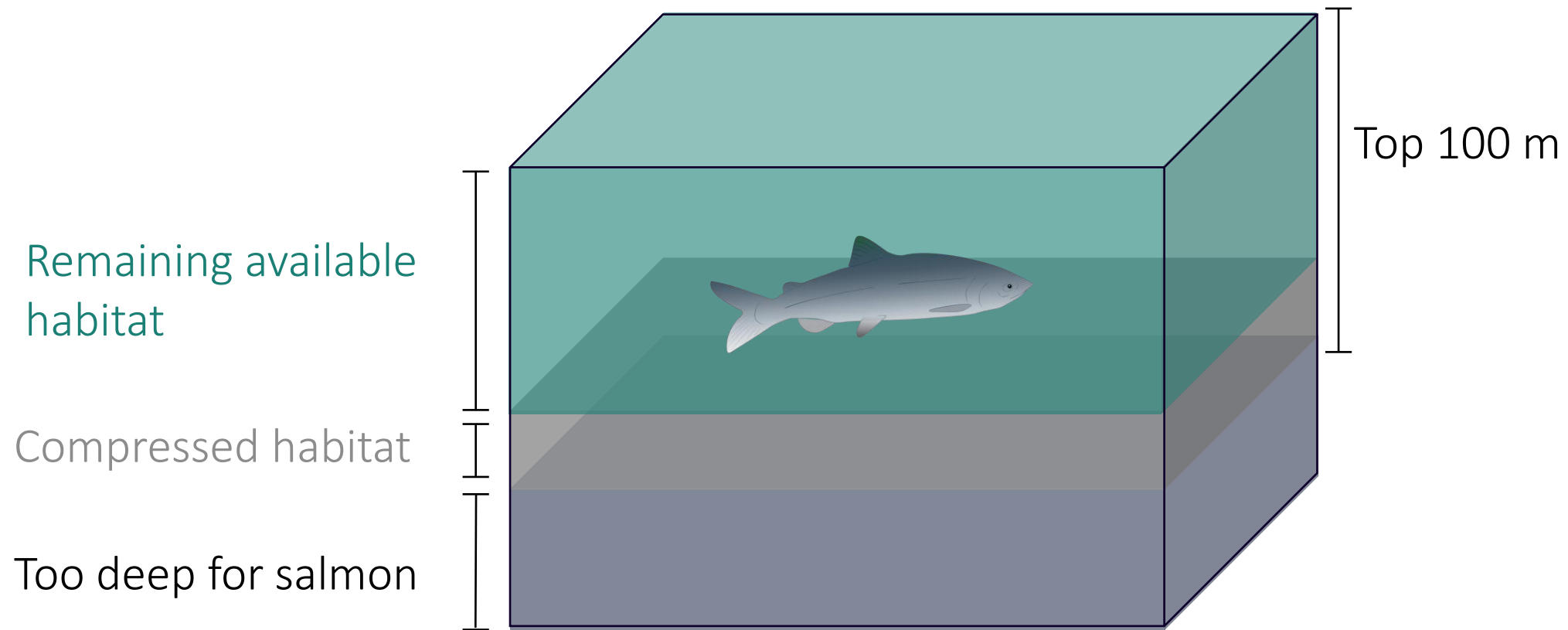


English sole



Chinook salmon

Chinook habitat is vertically compressed, but oxygen remains available above



Key Takeaways

A warmer climate leads to less oxygen available and higher oxygen demands.

UW **demonstrated a risk evaluation tool** to flag species, locations, and times when nutrients from human activities pose some risk to marine life.

Initial analysis of adult Dungeness crabs, English sole, and Chinook salmon found:

- Risk varied by species primarily because they use different habitats.
- Sound-wide, wastewater and other human sources of nutrients had a relatively modest effect, but impacts were more significant in Hood Canal and several embayments
 - Looking at the worst daily conditions within these areas, **nutrients from human activities contributed to the loss of up to:**
 - 16% of Dungeness crab habitat
 - 23% of English sole habitat
 - 2.5% of Chinook salmon habitat

Discussion



UW Puget Sound Institute

Joel Baker, Director

jebaker@uw.edu



Stefano Mazzilli, Senior Research Scientist

mazzilli@uw.edu



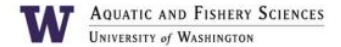
Marielle Kanojia, Director of Engagement

marlars@uw.edu



School of Aquatic and Fishery Sciences

Tim Essington, Professor & Director



Technical Memorandum

Quantifying species-specific changes in
aerobic habitat associated with seasonal
dissolved oxygen depression in Puget
Sound and the Straits

July 21, 2026

Contributing Authors: Stefano Mazzilli, Tim Essington, Marielle Kanojia, Joel Baker

Funding: This Technical Memorandum was funded in part by King County in conjunction with a series of online workshops exploring Puget Sound water quality. Its content does not necessarily represent the views of King County or its employees.

Full report



Summary



Possible Options and Actions: *Resource Recovery*

RWSP Update

Regional Water Quality Committee

October 7, 2026

Policy Analysis Schedule

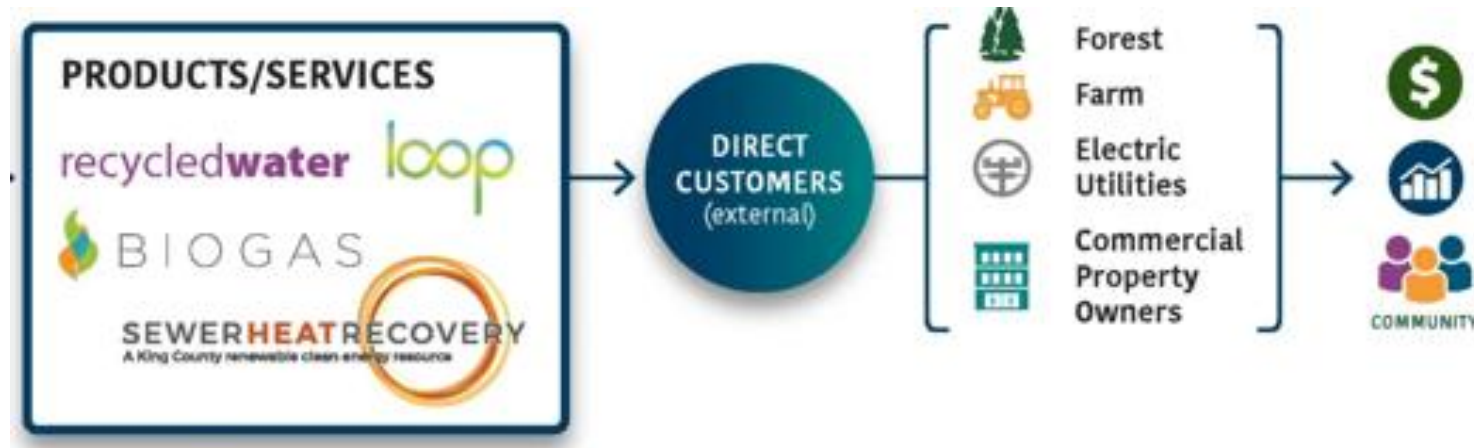
11 groups of Policy Analyses with policy options for MWPAAC & RWQC:

March	Group #1: Separated System Conveyance
April	Group #2: Pollution Source Control & Legacy Pollution
May	Group #3: Asset Renewal & Replacement
June	Group #4: Climate Impact Preparedness & Natural Hazard Resiliency
July	Group #5: Affordability Metrics & Rate Relief Approaches
August	Group #6: Combined System Management
September	Group #7: Treatment (Levels & Capacity)
October	Group #8: Resource Recovery
November	Group #9: Finance / Alternative Rate Structures
December	Group #10: Equity & Social Justice
June 2027	Group #11: Relationship to Contracts

Resource Recovery – Policy questions from RWSP Scoping Document (2024)

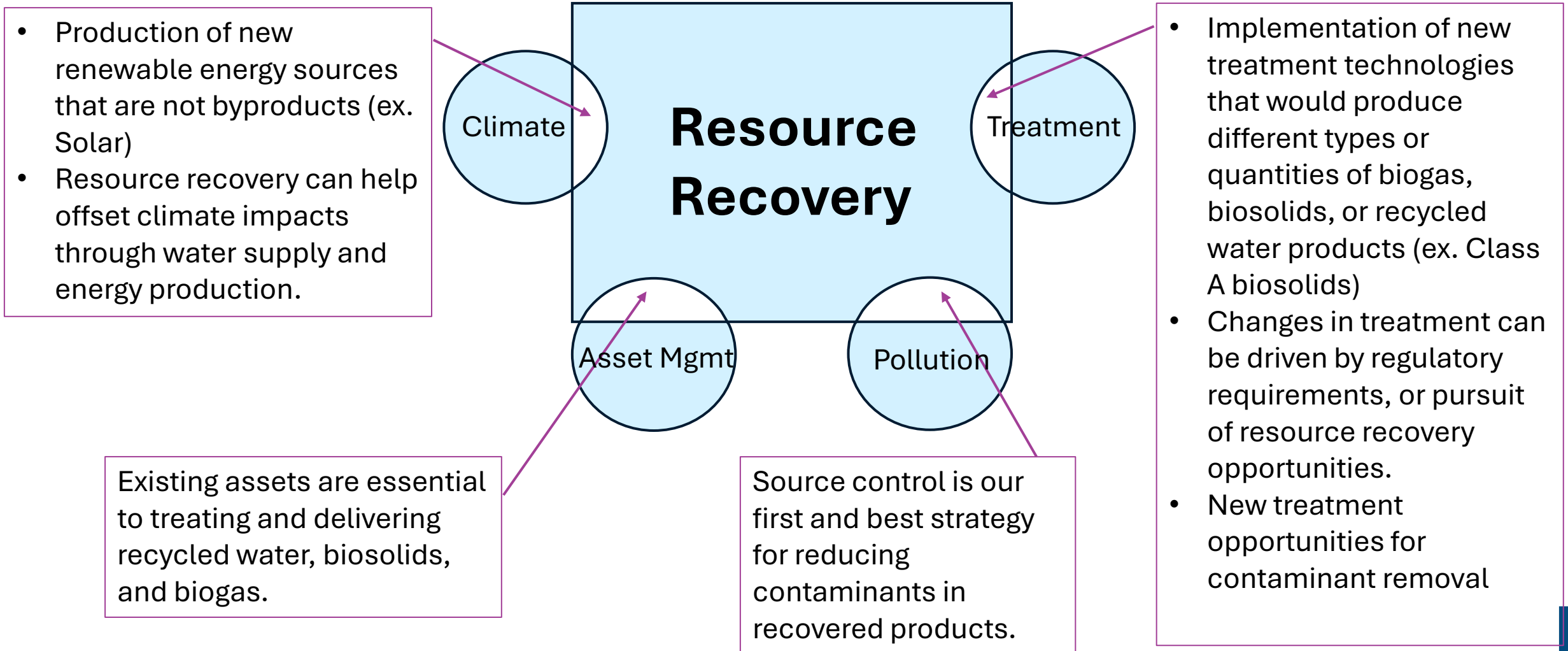
- **Recycled Water** – Under what circumstances should the region expand the use of reclaimed water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?
- **Biosolids** – Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolid recovery policies to get to Class A?
 - *Related question from "Pollution" topic- How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?*
- **Energy production and heat recovery** – Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?
- **New Recovered Resources** – How should WTD maximize recovery of new resources? How should WTD prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

Scope of the Resource Recovery topic



This topic focuses on finding and optimizing uses for **byproducts** of our treatment process while protecting human health and environment.

Overlap with Asset Management, Pollution, Climate, and Treatment Topics



Summary of policies related to Resource Recovery

- RWSP policies provide overarching direction to promote reuse while protecting human health and environment.
 - ***BP 1-10; WRP 1-15; TPP 5, 7-8; CP 6-7; Implementation 5-6***
- King County's Strategic Climate Action Plan provides ambitious commitments and targets for reuse and renewable energy production.
- State and Federal law provide standards that govern production and use of recycled water, biosolids, and renewable energy.

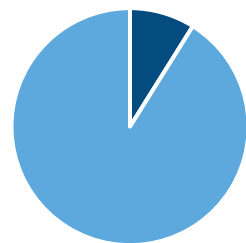
Forecasted Capital Expenditures – Resource Recovery

From the 2027 Sewer Rate Forecast:

- First decade (2026-2036)
 - Resource Recovery projects are about 1.9% of the capital forecast, totaling approximately \$272 million
- Both decades (2026-2046)
 - Resource Recovery expenditures forecast is about \$623 million (2.5% of total capital forecast, based on historical avg. spending, very uncertain)

Average Annual Operating Budget **Expenditures** 2020-25

Resource Recovery products
are 8.9% of WTD’s
total Operating expenditures



■ Resource Recovery ■ WTD

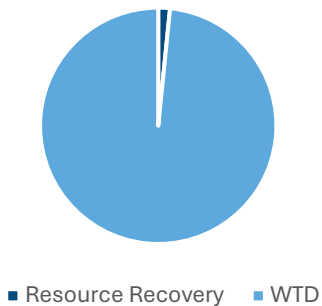
- Biosolids hauling and land application, an operational and regulatory necessity, accounts for most of those expenditures

	Average Annual Program	Average Annual WTD	% of Total WTD Operating Expenditures
Resource Recovery Products Overall	\$16,400,000	\$184,000,000	8.90%
Biosolids	\$13,500,000		7.30%
Biogas	\$2,400,000		1.30%
Recycled Water	\$550,000		0.30%
Sewer Heat Recovery	\$25,000		0.01%

*numbers reflect actuals for past six years; averaged and rounded for simplicity
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Average Annual Operating Budget Revenues 2020-25

Resource Recovery products contribute 1.6% of WTD’s total Operating revenues



- Revenues contribute to WTD’s Operating Budget to offset rates overall
- Biogas sales, specifically sale of the renewable energy attributes (RINs) of the biogas, account for most of those revenues
- RINs revenue is highly variable year-to-year depending on the RINs market; projected to decrease
- Sewer Heat Recovery is a new pilot program; first user has not yet started up their system

	Average Annual Program	Average Annual WTD	% of Total WTD Revenues
Resource Recovery Products Overall	\$9,500,000	\$596,000,000	1.60%
Biogas	\$9,000,000		1.50%
Biosolids	\$380,000		0.06%
Recycled Water	\$111,000		0.02%
Sewer Heat Recovery	\$0		0%

*numbers reflect actuals for past six years; averaged and rounded for simplicity

Recycled Water

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Concerns about Recycled Water

- Concerns about contaminants and potential impact on groundwater
- Concerns about financial impacts to drinking water utilities
- Concerns about cost/benefit; how recycled water benefits the regional system / regional rate payer
- Concerns about who pays

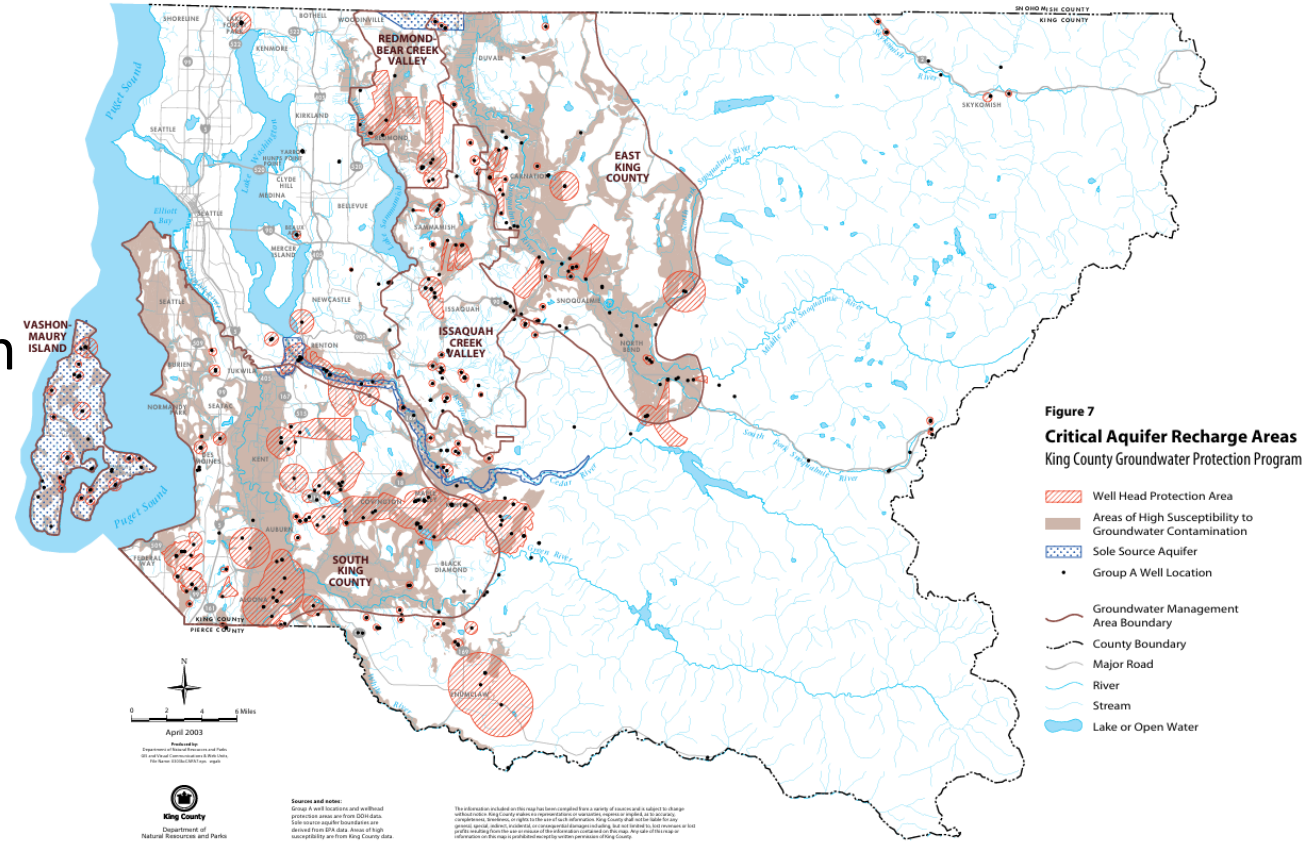
WTD's Recycled Water Safety

We protect groundwater by avoiding RW use in Critical Aquifer Recharge Areas (CARAs) and Well Head Protection Areas

We protect potable water supplies through our Cross-Connection Control program



Image credit: KSBY News



PFAS is a Shared Problem

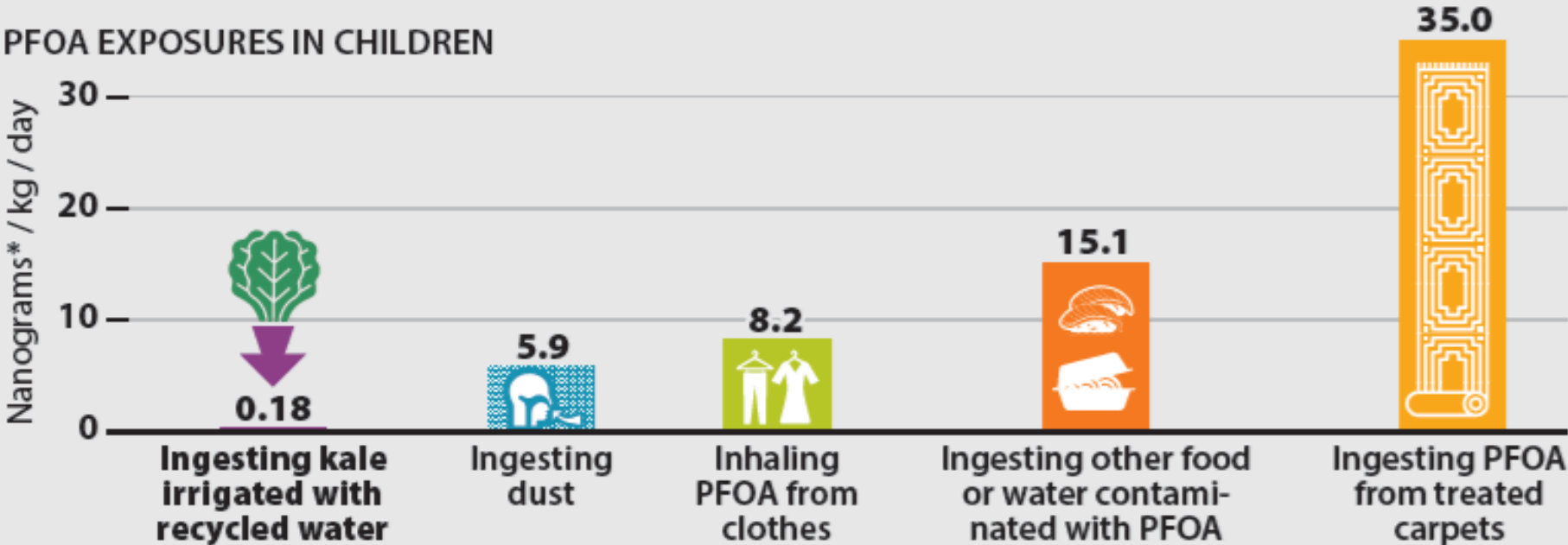
- Reminder: PFAS comes *into the* regional system from Local Sewer Agencies; WTD does not create it.
- PFAS is a shared problem - Source control, in partnership with cities and districts, is the most cost-effective remedy.
- King County does not have PFAS manufacturing facilities nor known heavy industrial PFAS users.
- 2025 PFAS Study: **PFAS levels in King County recycled water and biosolids are low** and fall within the average range for municipal wastewater systems and consistent with everyday household sources.
- WTD has limited options: discharge effluent into Puget Sound, biosolids land application, landfill biosolids (expensive), incinerate biosolids (expensive), safe applications of recycled water in the right way and right locations (e.g. industrial uses, irrigation, etc.).
- Consider relative risks in recycled water and biosolids;
 - The cost/duty to enhance treatment before regulations require it VERSUS a stronger push on source control.
- [King County Council Motion 16434](#) (2023)
 - Current policy direction on CECs to sample; determine significant sources; promote source control through policy, partnership, and education; research treatment technologies.

Lots of chemicals we use every day end up down the drain. We tested for over 200 chemical compounds, including Per- and Polyfluoroalkyl Substances (PFAS). Both river and recycled water had PFAS, but again, only in low amounts.

MORE
PFAS ARE IN
OUR HOMES THAN
IN KALE GROWN
WITH RECYCLED
WATER.

PFOA IN KALE GROWN IN RECYCLED WATER IS SIGNIFICANTLY LESS THAN EXPOSURE FROM OTHER COMMON SOURCES.

Wastewater treatment plants are not sources of Per- and Polyfluoroalkyl substances (PFAS). However PFAS, because of their frequent use in our homes and communities, are present in wastewater and recycled water. Even the highest amount of PFOA, a common PFAS, found in recycled water was a fraction of the amount of PFOA we interact with every day.



*A single grain of sugar weighs approximately 625,000 nanograms.

Public Health focus on PFAS

Almost all of us have PFAS in our bodies

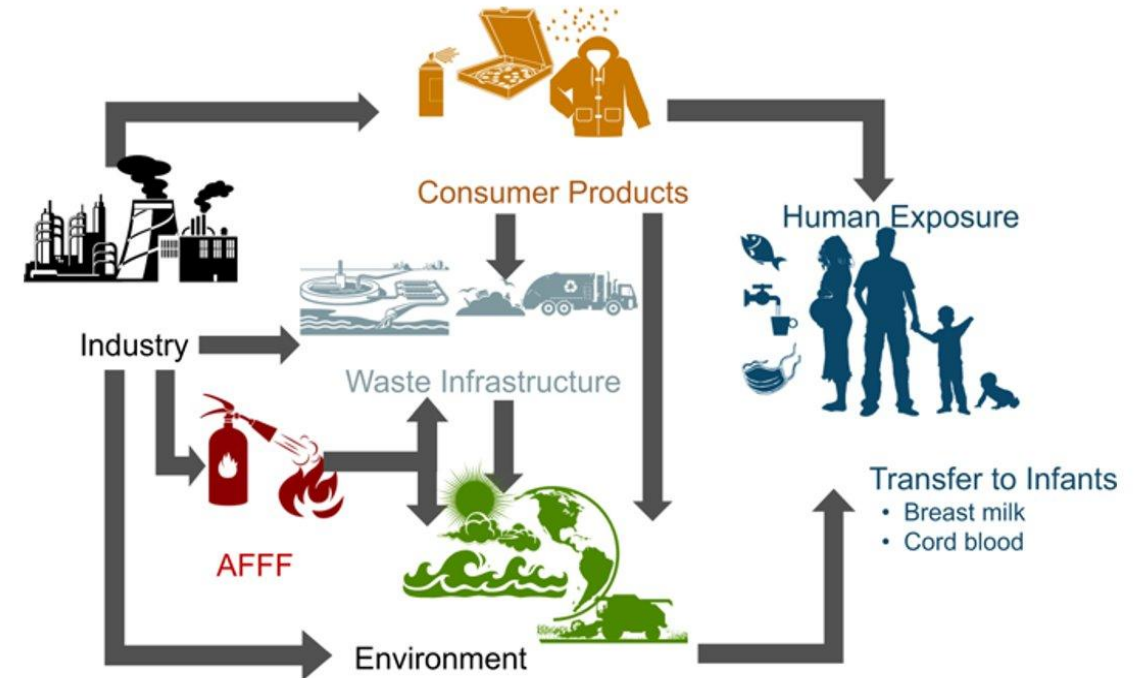


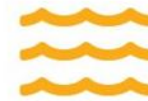
Figure 1 from Sunderland et al. (2019) *Journal of Exposure Science & Environmental Epidemiology* 29(2). doi:10.1038/s41370-018-0094-1

How are we exposed to PFAS?

- **Eating**
- **Drinking**
- **Breathing**
- Skin Contact
- Occupational



Drinking contaminated municipal water or private well water



Eating fish caught from water contaminated by PFAS (PFOS, in particular)



Accidentally swallowing contaminated soil or dust



Eating food grown or raised near places that used or made PFAS



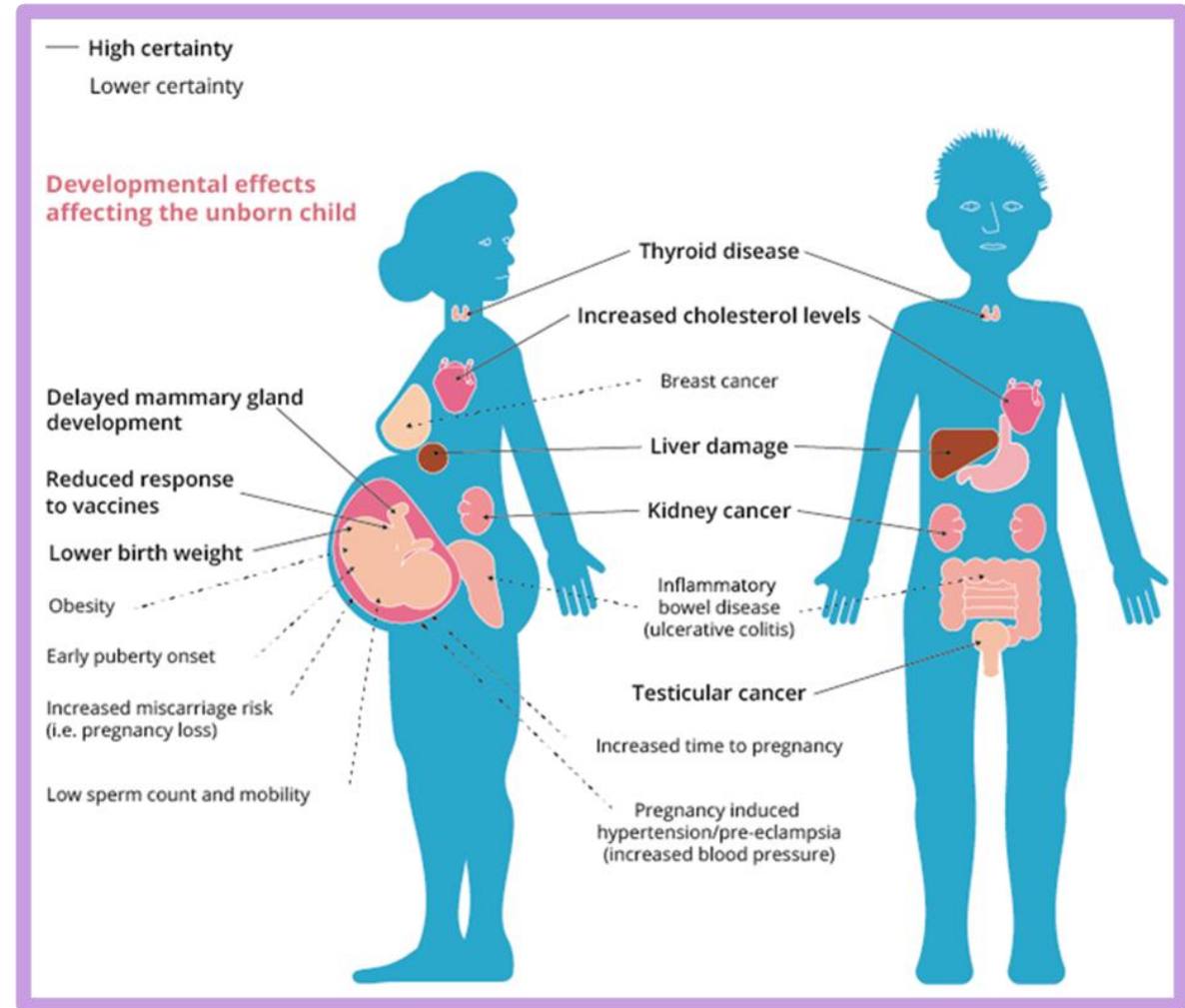
Eating food packaged in material that contains PFAS



Using some consumer products such as stain resistant carpeting and water repellent clothing

Health Impacts

- **Cancers:** increase risk of some cancers (prostate, kidney, testicular)
- **Immune:** reduce ability to fight infections and respond to vaccines
- **Developmental** delays (low birth weight, abnormal puberty, behavioral changes)
- **Reproductive** (reduced fertility, high blood pressure in pregnant people)
- **Metabolic:** high cholesterol/risk of obesity
- **Hormonal:** interference with body's natural hormones



How does Public Health Consider PFAS Risks?

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

We focus on :

- Hazard information (prioritize based on greatest hazards)
- Most likely exposures
 - Largest uses
 - Likelihood human/environmental contact
 - Cumulative exposures
- Consider gaps/uncertainties
- Consider sensitive and vulnerable populations

We work to reduce exposure through:

- Policy
- Exposure reduction actions
- Research
- Guidance
- Weighing risks when necessary



Reclaimed Water

Public Health Recommendations:

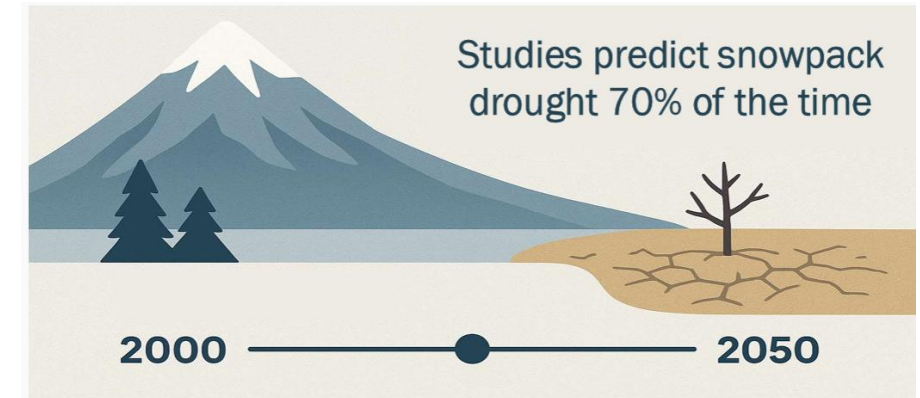
- **Collaborate with Public Health agencies**
- Focus on upstream regulations
 - Chemical assessment and regulation improvements
 - Requirements for manufacturers to utilize the safest chemicals
- Stay up on the latest science and technology
 - Continue research to understand impacts and reduce risks
 - Build on successful practices used by other jurisdictions
 - Consider the most advanced technologies for treatment
 - Keep up on scientific literature
- Prioritize avoiding risks to groundwater/surface water/drinking water, edible crops and other foods
- Stay on top of changes in chemical use and testing that will impact future contamination and regulations



Recycled Water – Problem Statement

- While the Puget Sound region has historically had sufficient fresh water supplies for people, climate change and population growth are stressing our region's fresh water supplies for people, agriculture, and fish.
- Recycled water can benefit the regional wastewater system by reducing reliance on Puget Sound for effluent discharge, instead diverting nutrients for beneficial use and provide a drought-proof water supply.
- Expansion of recycled water production and distribution (currently <1% of WTDs total effluent volume) will require capital investment beyond current levels
- Expansion of recycled water production and distribution will require coordination with drinking water purveyors.

Drought patterns – The future



Source:  DEPARTMENT OF
ECOLOGY
State of Washington

Summertime minimum streamflows in local watersheds are forecasted to decrease due to climate change:

- Cedar River flows 25 percent lower than historical by 2080.
- Snoqualmie River flows 50 - 66 percent lower than historical by 2080.

Recycled Water Current Policies

Relevant policy question: Under what circumstances should the region expand the use of reclaimed water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?

Relevant policies and plans	Description
WRP 1-15	Guiding the county in continuing to develop its program to produce reclaimed water; this includes cost/benefit evaluations for recycled water projects.
TPP 5, 7-8	Undertaking studies to discharge reclaimed water to local water bodies, explore constructing satellite treatment plants, and expand use at existing and new treatment facilities
CP 6-7	Integrate water reuse planning with conveyance and treatment facility planning, evaluate demand management alternative to meet conveyance needs
Implementation 6	Continue to produce reclaimed water for non-potable uses and explore production of reclaimed water at new facilities, and coordinate public education with water conservation education programs
2025 SCAP GHG 55	Public-private ventures will make greater use of recycled water for climate-smart agricultural practices
2025 SCAP Prep 18	Expand the use of recycled water to address drought mitigation

Current Interpretation:

- WTD should continue to produce and actively pursue use of recycled water
- WTD should implement pilot and demonstration projects, and evaluate and implement non-potable recycled water projects on a case-by-case basis
- Evaluate benefits, costs, and rate impacts
- Coordinate with drinking water purveyors, and regional and state agency partners
- Protect public health and safety, and the environment

When should reclaimed water expansion occur ?

Relevant policy question: Under what circumstances should the region expand the use of reclaimed water?

Increased water supply needs due to population growth, climate change, and/or droughts:

- Salmon Recovery needs (flow replacement, multiple low flow years, drought)
- Agricultural water demand rises or farmers lose access to historic supplies
- Willing partners seek projects (cities, commercial/industrial businesses, farmers, and others)
- Water suppliers decide demand displacement is strategic / partnership with drinking water utilities
- Recycled water used to mitigate for new water rights

Regulatory drivers:

- Water quality or quantity limitation that increases need for alternative discharge options (i.e. nutrients, temperature, zero discharge)
- Outfall lease conditions mandate expanded recycled water use
- Treatment processes change for general wastewater reasons, allowing recycled water quality to improve allowing other environmental enhancement uses for lower marginal cost

Range of policy options – Recycled Water

Relevant policy question: Under what circumstances should the region expand the use of reclaimed water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?

Policy Option #1	Policy Option #2	Policy Option #3
Maintain current policies by continuing to serve existing recycled water customers, adding new customers along existing infrastructure, examining and expanding distribution on a case-by-case basis.	Prioritize new strategic investments incrementally to provide flexibility to adapt to current and future needs and increase environmental enhancement uses.	Regionally expand recycled water production and distribution systems to position the County to contribute major support to regional water resource needs.

Goals/
Outcomes:

Opportunistic
and reactive.
Small scale

Incrementally prepares the Region for current and future needs. Ability to scale for potential mid/late-century water needs. Medium scale.

Region is well-positioned for mid-century water needs; may help meet future nutrient regulations.

Biosolids

Resource Recovery – Policy questions from RWSP Scoping Document (2024)

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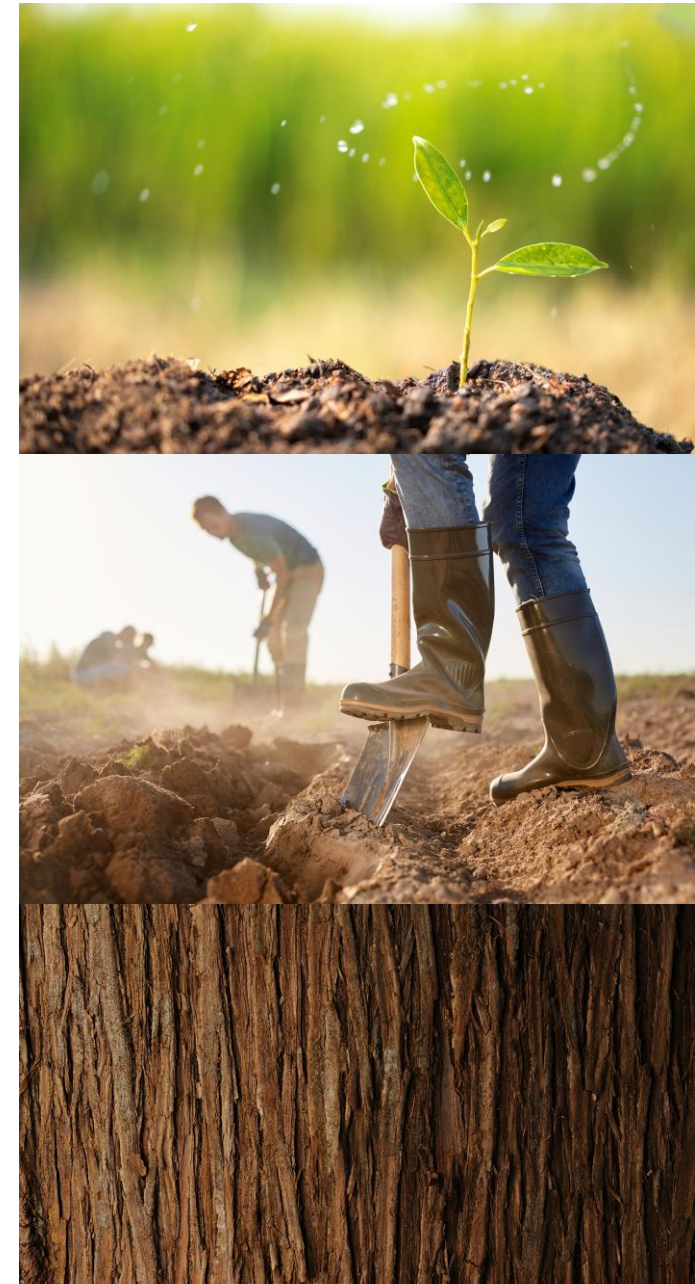
King County WTD Comments to EPA on Draft Guidance to Reduce PFAS Risk in Biosolids

- PFAS risk reduction should focus on sources, not only end-of-pipe utilities
 - EPA should exercise their regulatory authorities to restrict PFAS (not just PFOA and PFOS) in products and processes, requiring safer chemicals be used when available.
- Current and future land use policies should consider all PFAS sources
 - The EPA should avoid placing disproportionate emphasis on municipal biosolids without considering other PFAS pathways, including fertilizers, pesticides, herbicides, soil amendments, irrigation sources, consumer products, and industrial sludge
- Revise and finalize EPA's draft Risk Assessment on PFAS in Biosolids
- EPA should commit to addressing data gaps
- Best management practices should be clear and implementable
- Disposal and incineration alternatives require more complete consideration

Biosolids

Public Health Recommendations:

- **Collaborate with Public Health agencies**
- Focus on upstream regulations
 - Chemical assessment and regulation improvements
 - Requirements for manufacturers to utilize the safest chemicals
- Stay up on the latest science and technology
 - Continue research to understand impacts and reduce risks
 - Build on successful practices used by other jurisdictions
 - Consider the most advanced technologies for treatment
 - Keep up on scientific literature
- Prioritize avoiding risks to groundwater/surface water/drinking water, edible crops and other foods
- Stay on top of changes in chemical use and testing that will impact future contamination and regulations



Biosolids – Problem Statement

- WTD currently produces Class B biosolids, limiting end-use options and constraining the Biosolid program resilience.
- A lack of options by which WTD can beneficially use its biosolids increases operational risks.
- Lack of emergency storage capacity creates additional operational risk and reduces reliability during disruptions (e.g. winter storms closing I-90).
- Expansion of Class A biosolids would diversify options for biosolid end-use, provide greater market flexibility, public acceptance, and potential revenue streams compared to Class B.
- Expanding Class A production will likely require new partnerships and/or capital investments and may be hampered by cost concerns and competing priorities.

Biosolids

Relevant policy question: Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolids recovery policies to get to Class A?

Relevant Policies and Plans	Description
BP 1-10	Guide the county to invest in producing and marketing Class A biosolids while continuing to beneficially use 100% of the biosolids it produces through continued distribution via existing channels. Continue to evaluate alternative technologies to produce highest quality marketable biosolids. Continue to invest in developing new and existing partnerships that diversify beneficial use options and invest in program resilience.
Implementation 5	Continue to produce Class B at South and West Treatment plants and implement same process at Brightwater until new technology can be reliably used. Continue to evaluate alternative technologies with primary objective to identify digester alternatives at West Point.
2025 SCAP GHG 56	Expand use of locally produced compost including biosolids-based.

Current interpretation:

- Maintain and invest in existing Class B program.
- Invest in Class A production and build off success of pilot program instituted under RWSP policies and meet SCAP goal.
- Pursue options that responsibly minimize risk, maximize resilience and reliability, and increase the marketability of biosolids.

Range of policy options - summary

Relevant policy question: Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolids recovery policies to get to Class A?

	Policy Option #1	Policy Option #2	Policy Option #3
	Balance program reliability, risk mitigation, and economic feasibility by maintaining and improving existing Class B program and investing in a modest level of Class A production.	Optimize program with a focus on reliability and risk minimization by maintaining and improving existing Class B program and investing in Class A production beyond the minimum required to acquire basic resilience benefits.	Pursue the most reliable and risk averse beneficial use portfolio and the most marketable biosolids product by investing in the phased adoption of technologies that allow for 100% Class A production.
Goals/ Outcomes:	Maintains and strengthens existing biosolids program with a balanced focus	Maintains and strengthens existing biosolids program with an increased focus on resilience and flexibility	Achieves maximum resilience and reliability for biosolids program

Q & A



King County | Wastewater Treatment

Energy Production and Heat Recovery

Resource Recovery – Policy questions from RWSP Scoping Document (2024)

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- **Related question from "Pollution" topic**- *How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?*

Problem Statement

- WTD currently recovers renewable energy through **biogas** and supports **sewer heat recovery**, but additional wastewater-derived energy recovery opportunities exist.
- Existing infrastructure and operational constraints limit WTD's ability to consistently maximize beneficial use of available renewable energy resources.
- Energy recovery can support County goals related to climate action, operational resiliency, resource recovery, and long-term cost management.
- Expanding energy recovery could require additional capital investment, changes to planning and design practices, and ongoing organizational commitment.
- **Policy direction is needed regarding the role of energy recovery in future wastewater facilities and capital planning.**

Energy production and heat recovery

Relevant policy question: Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

Relevant Policies and Plans	Description
BP 3	Consider new and innovative technologies for energy recovery. Seek to advance beneficial use of methane gas through research and demonstration projects.
BP 10	Where cost effective, beneficially reuse methane for energy and other purposes.
2025 SCAP GHG 25	Improve biogas collection to 75% or more in productive use by 2030.
2025 SCAP GHG 39	Support private sector sewer heat recovery projects.
2025 SCAP GHG 73	Evaluate consuming county produced biogas in County facilities as a bridge fuel to decarbonize facility heat until natural gas is eliminated at all County facilities.
2025 SCAP GHG 76	Optimize biogas and reduce fugitive methane.

Current interpretation:

- Track and monitor WTD biogas production and use.
- Ensure biogas-related systems stay operational as much as reasonably possible.
- Pilot sewer heat recovery through partner-driven projects.

Range of policy options - summary

Relevant policy question: Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

Policy option #1	Policy option #2	Policy option #3
Maintain current energy recovery practices and meet existing Strategic Climate Action Plan/RWSP commitments using existing infrastructure.	Expand beneficial use of biogas and systematically integrate energy recovery (heat, hydro) into planning to improve reliability, cost efficiency, and GHG reduction.	Transition facilities into net-zero or net-positive energy hubs by maximizing recovery of all wastewater-derived energy and embedding energy efficiency and recovery into all capital planning and operations.

**Goals/
Outcomes:** **Continue current
biogas use and
sewer heat recovery
pilot program**

**Maximize biogas use and
expand the sewer heat
recovery portfolio**

**Achieve net-zero/positive
energy wastewater
facilities**

New Recovered Resources

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New Recovered Resources – Problem Statement

- WTD's existing RWSP policies provide direction on currently recovered resources (biosolids, recycled water, biogas)
- There are many more resources that could be recovered
- There are many possible drivers for recovering new resources
- WTD would benefit from policy direction on the conditions under which recovery of new resources should be pursued

When should WTD consider new recovered resources?

- Regulatory compliance benefits
- Operational benefits
- Market drivers
- Revenue for utility
- Environmental benefits
- Community benefits

New Recovered Resources

Relevant policy question: How should WTD maximize recovery of new resources? How do we prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

Relevant policies and plans	Description
N/A	N/A

Current interpretation:

This question focuses on future, not current, recovered resources, and does not have current policies or plans that relate to the topic yet.

Range of policy options - summary

Relevant policy question: How should WTD maximize recovery of new resources? How do we prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

Policy option #1

Implement recovery of new resources if they are cost neutral or revenue positive, or provide operational or regulatory benefit.

Policy option #2

Implement recovery of new resources if triple bottom line analysis shows benefit.

Goals/
Outcomes:

Driver is limited to
benefits to utility

Driver is expanded to
include benefits to
environment or
community

Q & A



King County | Wastewater Treatment

Reference Slides

Recycled Water

Policy option #1 - "Maintain Current Policies"

	Description	Goals/Outcomes	Tradeoffs
#1	Maintain current policies by continuing to serve existing recycled water (RW) customers, adding new customers along existing infrastructure, examining and expanding distribution on a case-by-case basis.	<i>Opportunistic and reactive</i> RW infrastructure is maintained, runs reliably, and customers are served, with focus remaining on irrigation, commercial, and industrial uses. RW system is expanded incrementally on a case-by-case basis through partnerships. Additional environmental enhancement projects are pursued at a pilot scale. RW production remains a relatively small fraction of WTD's total effluent volume.	RW will not significantly reduce WTD's effluent discharges to Puget Sound. RW capacity will not grow large enough to contribute significantly to region's future water resource needs, and WTD will struggle to quickly expand RW if more is needed in future. Environmental benefits of more ambitious RW policies will go unrealized. RW system reliability may remain a challenge if investments are not prioritized. Near term costs remain low

Policy option #2 - "Prioritize Key Investments"

	Description	Goals/Outcomes	Tradeoffs
#2	Prioritize new strategic investments incrementally to provide flexibility to adapt to current and future needs and increase environmental enhancement uses.	Ability to scale RW for potential mid/late-century needs. Critical improvements to treatment and the RW systems to allow WTD to serve meaningfully larger volumes of RW, while preserving fresh water supply. Primarily expanded use and distribution systems from Brightwater, Carnation, and South Plant serving more agricultural, commercial/industrial use, and environmental enhancement uses through partnership with drinking water utilities, businesses, and others. Region gains the flexibility to scale RW further in future.	Projects may not be large enough to offer sizable benefits to nutrient discharge requirements beyond operational flexibility. Expansion will only benefit areas near South Plant, Brightwater, and Carnation Increased environmental enhancement projects can benefit local watersheds Increased costs needed to scale RW to meet new demands in select areas as regional needs under climate change become more clear

Policy option #3 - "Regionally Expand"

	Description	Goals/Outcomes	Tradeoffs
#3	Regionally expand recycled water production and distribution systems, in partnership with drinking water utilities, to position the County to contribute major support to regional water resource needs.	<i>Proactively and ambitiously prepare recycled water to meet regional water needs.</i> Region is well-positioned for mid-century needs. New treatment and distribution assets allowing RW to meet significant non-drinking and environmental water needs across the region, beyond the immediate vicinity of treatment plants. RW is used, in partnership with drinking water utilities, as a regional insurance policy to reduce the impacts of drought emergencies, regulatory mandates, or system capacity constraints to protect public health, environmental outcomes, and system reliability.	RW system will require large and sustained capital and operating investments corresponding to regional scope. Projects will require durable long-term partnerships with drinking water utilities, who accept RW as key to regional supply. RW will be part of the portfolio to meet region's water needs for people and the environment while reducing nutrient loading to Puget Sound

Biosolids

Policy option #1 (Biosolids)

	Description	Goals/Outcomes	Tradeoffs
#1	Maximize program reliability, minimize risk, and balance economic feasibility by maintaining and improving existing Class B program and investing in a modest level of Class A production.	• Maintains and strengthens existing Class B program. • Builds on the success of WTD's Class A compost pilot • Minimize financial burden while unlocking Class A resilience opportunities • Gain necessary baseline resilience benefits from Class A production	• New storage and investment in Class A improves resilience but requires capital investment. • Class B is limited; Class A composting opens broader markets. • Class B is weather-dependent; Class A is less impacted and reduces transportation costs • Partial Class A production carries some level of reliability and regulatory risk

Policy option #2 (Biosolids)

	Description	Goals/Outcomes	Tradeoffs
#2	Optimize program with a focus on reliability and risk minimization by maintaining and improving existing Class B program and investing in Class A production beyond the minimum required to acquire basic resilience benefits.	• Maintains and strengthens existing biosolids program. • Builds on the success of WTD's Class A compost pilot • Find a strategic middle ground between minimum and total production of Class A biosolids. • Gain enhanced resilience benefits from increased Class A production • Reduced hauling costs for Class B product	• Scaling Class A requires more capital investment but reduces operational risks and constraints. • Class A improves community perception, visibility and climate outcomes but takes years to build. • Partial Class A production carries some level of reliability and regulatory risk

Policy option #3 (Biosolids)

	Description	Goals/Outcomes	Tradeoffs
#3	Pursue the most reliable and risk averse beneficial use portfolio and the most marketable biosolids product by investing in the phased adoption of technologies that allow for 100% Class A production.	• Achieve maximum resilience and reliability and invest in a public-oriented Class A portfolio. • Significantly reduced hauling costs for Class B product	• Scaling Class A requires more capital investment but reduces operational risks and constraints. • Shared facilities reduce cost but require joint governance. • Class A improves community perception, visibility and climate outcomes but takes years to build.

Energy Production and Heat Recovery

Policy option #1 (Energy)

	Description	Goals/Outcomes	Tradeoffs
#1	Maintain current energy recovery practices and meet existing Strategic Climate Action Plan and RWSP commitments using existing infrastructure	Maintains current practices Continue optimizing existing biogas systems and selectively piloting new technologies where cost-effective, without major expansion of infrastructure or scope Lowest near-term cost and least disruption to existing capital plans and operations	Limited improvement in energy resilience and GHG reduction beyond existing commitments May leave cost-effective energy recovery opportunities unrealized Continues reliance on project-by-project opportunities rather than systematically integrating energy recovery into capital planning

Policy option #2 (Energy)

	Description	Goals/Outcomes	Tradeoffs
#2	Expand beneficial use of biogas and systematically integrate energy recovery (heat, hydro) into planning to improve reliability, cost efficiency, and greenhouse gas reduction	Strategic expansion and integration of energy recovery into capital planning and design Beneficial use of 100% of biogas produced under typical operating conditions Additional energy recovery revenues and/or avoided energy costs	Requires additional investment and staff capacity for planning, design, and implementation Not all identified opportunities will be technically or economically viable Requires balancing energy recovery with cost-effectiveness, operational needs, and other capital priorities

Policy option #3 (Energy)

	Description	Goals/Outcomes	Tradeoffs
#3	Transition facilities into net-zero or net-positive energy hubs by maximizing recovery of all wastewater-derived energy and embedding energy efficiency and recovery into all capital planning and operations.	Achieve net-zero/positive energy wastewater facilities Maximizes long-term cost stability, emissions reduction, and operational reliability and resilience	Highest capital cost and greatest potential impact to project scope and priorities Requires new standards, operating practices, and sustained organizational commitment Potential conflicts between maximizing energy recovery and WTD's primary wastewater treatment mission would need to be managed

New Recovered Resources

Policy option #1 (New Resources)

	Description	Goals/Outcomes	Tradeoffs
#1	Implement the recovery of new resources if they are cost neutral or revenue positive, or provide operational or regulatory benefit	Recoup and recycle resources that ratepayers flush down the drain for the purpose of fiscal, regulatory, or operational benefit. Revenue could be evaluated as a revenue stream from sale of a product, or as avoided costs for maintenance or upgrades otherwise needed for regulatory compliance, or a combination. Driver is limited to benefits to the utility.	By limiting policy to opportunities that are cost neutral/revenue positive, or provide operational benefit or regulatory compliance, WTD could miss opportunities to provide additional environmental or community benefit.

Policy option #2 (New Resources)

	Description	Goals/Outcomes	Tradeoffs
#2	Implement recovery of new resources if triple bottom line analysis shows benefit	Recoup and recycle resources that ratepayers flush down the drain for the purpose of fiscal, regulatory, and community benefit; while explicitly valuing the community and environmental benefits. Driver is expanded to include community and/or environmental benefits.	• May incur cost, in order to achieve environmental or community benefit, though this is true for most WTD activities. • Will take time and effort develop customers/markets for new products.

Wastewater Treatment Division**Executive Summary****RWSP Update – Group #8, Resource Recovery, Policy Memo #13 – Energy**

This executive summary provides a synopsis of the policy questions, problem statement, issues, challenges, and the options developed for the Resource Recovery – Energy topic of the Regional Wastewater Services Plan (RWSP) Update.

Policy Question

1. Energy production and heat recovery – Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

Problem statement

WTD currently recovers renewable energy from wastewater through biogas utilization and supports sewer heat recovery through a pilot partnership program. Additional opportunities exist to increase beneficial use of biogas and recover energy through sewer heat, treatment-process heat, and potentially microhydro. Expanding energy recovery could reduce greenhouse gas emissions, improve resiliency, and help manage long-term energy costs, but may require additional investment and changes to facility planning and design. Policy direction is needed to establish the appropriate level of effort and investment in wastewater-derived energy recovery going forward.

Policy issues, challenges, and opportunities

WTD has opportunities to expand energy recovery by increasing beneficial use of biogas, facilitating additional sewer heat recovery projects, and evaluating process heat recovery, microhydro, and other technologies. Key policy considerations include whether energy recovery should be more systematically integrated into capital planning and design and paired with deep energy-efficiency improvements to advance net-zero or net-positive energy goals. Policy direction is also needed to define WTD's role in supporting energy recovery opportunities that benefit external customers and communities, and to establish how success should be measured—from maintaining existing practices to maximizing wastewater-derived energy recovery or pursuing net-zero or net-positive facilities.

Policy options

More details for the policy options that answer the questions are described below.

Policy question: Energy production and heat recovery – Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

- a. Policy Option #1: Maintain current energy recovery practices and meet existing Strategic Climate Action Plan and RWSP commitments using existing infrastructure.
Outcome: Continue current biogas utilization and the Sewer Heat Recovery Pilot Program, while optimizing existing systems and selectively piloting new technologies where cost-effective.
- b. Policy Option #2: Expand beneficial use of biogas and systematically integrate energy recovery, including heat and hydro, into planning to improve resiliency, cost efficiency, and greenhouse gas reduction.
Outcome: Maximize beneficial use of biogas, expand the sewer heat recovery portfolio, and make evaluation of energy recovery opportunities a standard part of capital planning and design.
- c. Policy Option #3: Transition facilities into net-zero or net-positive energy hubs by maximizing recovery of wastewater-derived energy and embedding energy efficiency and recovery into capital planning and operations.
Outcome: Achieve net-zero or net-positive energy wastewater facilities by maximizing wastewater-derived energy recovery while significantly reducing facility energy demand.

Relationship to other RWSP topics

Resource Recovery is a foundational part of the Regional Wastewater Services Plan (RWSP) Update and is essential for sustaining the regional wastewater system into the future. As such, it intersects with many RWSP topics as described below:

1. Pollution Source Control & Legacy Pollution
 - Source control is our first and best strategy for reducing contaminants in recovered products.
2. Climate Impact Preparedness & Natural Hazard Resiliency
 - Resource recovery can help offset climate impacts through water supply and energy production.

- While Resource Recovery covers production of some renewable energy resources that are byproducts of the treatment process, the Climate topic covers production of additional renewables that are not byproducts (ex. solar)
3. Asset Renewal & Replacement
 - Existing assets are essential to treating and delivering recycled water, biosolids, and biogas.
 4. Treatment
 - Pursuit of resource recovery opportunities is one possible driver for considering a treatment technology, i.e. resource recovery drives the new treatment technology.
 - It is possible that new treatment technologies would produce different types or quantities of biogas, biosolids, or recycled water product, i.e. a new treatment technology drives (or limits) resource recovery opportunities.
 - New treatment technologies that remove contaminants positively affect resource recovery opportunities.

RWSP Update – Resource Recovery - Energy

Policy Memo #13

A. Policy Question

This memo is focused on the policy questions related to the Energy (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update. The policy question explored in this memo is:

- i. Energy production and heat recovery – Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

B. Problem Statement

WTD currently recovers energy from wastewater through biogas utilization and has begun supporting sewer heat recovery through a pilot partnership program. These efforts provide renewable energy, reduce greenhouse gas emissions, and help offset facility energy costs. However, significant additional opportunities may exist to recover and beneficially use energy from WTD's treatment and conveyance systems.

Biogas produced at treatment facilities is not always fully utilized due to operational constraints, maintenance activities, and limitations in existing utilization infrastructure. Additional opportunities may also exist to recover heat from wastewater and treatment processes, and to generate renewable electricity through technologies such as microhydro. At the same time, WTD faces increasing pressure to reduce greenhouse gas emissions, improve operational resiliency, and manage long-term energy costs while continuing to provide reliable wastewater services.

Energy recovery can support multiple County objectives, including climate action, resource recovery, renewable energy production, and resiliency. WTD would benefit from policy direction regarding the extent to which energy recovery should be expanded, the level of investment appropriate for increasing beneficial use of wastewater-derived energy resources, and whether energy recovery and energy efficiency should become standard considerations in future facility planning, design, and operation.

C. Contextual and Baseline Information

i. What is known about the topic and current conditions

WTD currently recovers energy from wastewater primarily through biogas utilization and sewer heat recovery. These efforts support WTD's mission of recovering valuable resources while providing environmental, operational, and financial benefits. Additional opportunities exist to increase beneficial use of biogas, recover heat from wastewater and treatment processes, and generate renewable electricity from wastewater infrastructure.

The following sections summarize the primary forms of energy recovery currently utilized or available to WTD.

Biogas Recovery and Utilization

WTD's treatment plants produce biogas through the anaerobic digestion of wastewater solids. Biogas is a renewable energy resource consisting primarily of methane and carbon dioxide. WTD currently utilizes biogas through a combination of cogeneration systems that produce electricity and heat, renewable natural gas (RNG) production for sale to third parties, and direct use in boilers and other facility processes.

Biogas represents WTD's largest existing energy recovery opportunity and provides renewable energy for onsite and community use, reduces greenhouse gas emissions, offsets purchased electricity and natural gas, and improves operational resiliency by providing an on-site energy resource that can support critical treatment operations. However, WTD does not currently have the ability to beneficially use all biogas produced at all times at all treatment plants. Additionally, maintenance activities and equipment outages result in more of WTD's biogas being flared.

Sewer Heat Recovery

Wastewater contains significant thermal energy that can be recovered and used to heat or cool buildings through heat pump technology. WTD has supported sewer heat recovery for decades through an installation serving the previously named Boeing Longacres property near South Plant in Renton. In 2020, the Metropolitan King County Council authorized WTD's Sewer Heat Recovery Pilot Program, allowing additional private entities to recover heat from WTD wastewater conveyance facilities under defined agreements.

Sewer heat recovery offers an opportunity to reduce fossil fuel use in buildings while creating beneficial use of a heat resource that would otherwise be discharged to the environment. Because participating property owners are responsible for constructing, owning, and operating their own systems, sewer heat recovery has the potential to provide environmental benefits to the region with limited financial investment by WTD.

Additional Energy Recovery Technologies

In addition to biogas and sewer heat recovery, opportunities exist to recover energy from wastewater treatment and conveyance systems through technologies such as process heat recovery and microhydro generation. WTD already has experience with process heat recovery at West Point and South Plant where the cogeneration systems are designed to capture and reuse heat from the engines. And until recently, exhaust heat from West Point's raw sewage engines was also recovered for use in the plant heating loop. Additional opportunities may exist to capture and reuse thermal energy from treatment processes

and facility operations, reducing purchased energy requirements. Microhydro systems use flowing water to generate renewable electricity and may be feasible at select treatment and conveyance facilities where sufficient flow and hydraulic conditions exist.

While not currently utilized to the same extent as biogas recovery, these technologies may provide additional opportunities to recover renewable energy resources and value from wastewater infrastructure.

ii. Table 1: Current policies in code, contract, or in practice

Relevant Policies in King County Code	Description
BP-3	Consider new and innovative technologies for energy recovery. Seek to advance beneficial use of methane gas through research and demonstration projects.
BP-10	Where cost effective, beneficially reuse methane for energy and other purposes.
2025 Strategic Climate Action Plan (SCAP) GHG 25	Improve biogas collection and increase productive use of biogas.
2025 SCAP GHG 39	Support private sector sewer heat recovery projects.
2025 SCAP GHG 73	Evaluate consuming County-produced biogas in County facilities as a bridge fuel to decarbonize facility heat until natural gas is eliminated at all County facilities.
2025 SCAP GHG 76	Optimize biogas and reduce fugitive methane emissions.

BP-3 and BP-10

RWSP biosolids policies recognize methane gas as a recoverable resource and direct WTD to beneficially use methane for energy and other purposes where cost effective. These policies also encourage WTD to consider and demonstrate innovative technologies that may increase recovery and beneficial use of wastewater-derived energy resources. WTD currently implements these policies through cogeneration, renewable natural gas production, direct use of biogas in treatment plant operations, and evaluation of emerging energy recovery technologies.

SCAP GHG 25

The Strategic Climate Action Plan includes goals related to increasing productive use of biogas. WTD currently pursues this goal through operation and optimization of biogas collection systems, cogeneration facilities, renewable natural gas production, and other beneficial uses of biogas generated through wastewater treatment processes.

SCAP GHG 39

The Strategic Climate Action Plan directs the County to support private-sector sewer heat recovery projects. WTD currently implements this policy through the Sewer Heat Recovery Pilot Program and support for existing sewer heat recovery installations that utilize thermal energy contained in wastewater conveyance systems.

SCAP GHG 73 and GHG 76

The Strategic Climate Action Plan recognizes biogas as a renewable energy resource that can support County decarbonization efforts while improving utilization of wastewater-derived energy. These policies support continued optimization of biogas systems and evaluation of opportunities to increase beneficial use of biogas within County operations.

iii. The system “must-dos”

WTD’s mission statement is “We protect public health and the environment by collecting and cleaning wastewater *while recovering valuable resources* for a thriving Puget Sound region.” [emphasis added]

In addition, all energy recovery systems and projects must continue to support WTD’s primary responsibility of reliably collecting, conveying, treating, and disposing of wastewater while protecting public health and the environment. Energy recovery facilities and projects must also comply with applicable air quality regulations, building and electrical codes, worker safety requirements, wastewater treatment permits, and other regulatory requirements.

There are no known federal or state regulatory requirements that specifically require WTD to recover energy from wastewater. Energy recovery activities are generally discretionary and pursued to achieve environmental, operational, financial, and climate-related benefits.

iv. Current and budgeted expenditures

WTD currently incurs operating expenditures associated with biogas recovery and utilization and the Sewer Heat Recovery Program. Biogas-related activities also generate revenue through the sale of renewable electricity, methane, and Renewable Identification Numbers (RINs), which offset a portion of WTD’s wastewater treatment costs. Biogas, cogeneration, RINs, and sewer heat recovery do not have separate operating budgets; expenditures are tracked through individual tasks and projects. Table 2 and Table 3 below summarize recent expenditures and revenues associated with these activities. Although the Sewer Heat Recovery Program has not yet generated revenue, the first pilot project has been constructed and is nearing operational status. Once operational, WTD will begin receiving annual revenue from the project.

Table 2: Averaged Annual Expenditures for 2020-2025

Resource Recovery Operating Budget Expenditures	Average Annual Program	% of Total WTD Operating Expenditures
Energy Recovery	\$2,400,000	1.3%
Resource Recovery Overall	\$16,400,000	8.9%
WTD Total	\$184,000,000	100.0%

2026-2036 Capital Cost Estimates

Capital cost projections should be understood as high-level placeholders rather than defined future investments. From the 2027 Sewer Rate forecast, for the first decade (2026-2036) the Energy program projects are about 0.4% of the total WTD capital forecast, totaling approximately \$57 million.

This is reflective of historical average spending but with significant uncertainty. At this early stage, project scopes, schedules, and delivery approaches are not yet established, and many elements depend on evolving regulatory direction, partnerships, operational needs, and funding availability. As such, these figures illustrate the possible magnitude of investment rather than a committed plan, and several projects may ultimately shift, be deferred, or not move forward as conditions change.

Table 3: Averaged Annual Revenue for 2020-2025

Resource Recovery Operating Budget Revenues	Average Annual Program	% of Total WTD Operating Revenue
Energy Recovery	\$8,900,000	1.5%
Resource Recovery Overall	\$9,500,000	1.6%
WTD Overall	\$596,000,000	100.0%

v. Summary of science/data (if applicable)

Wastewater contains significant recoverable energy in the form of biogas, thermal energy, and hydraulic energy. Many wastewater utilities throughout North America and internationally recover and beneficially use these energy resources to reduce operating costs, improve resiliency, generate renewable energy, and reduce greenhouse gas emissions.

Biogas recovery through anaerobic digestion is a mature and widely adopted technology. Recovered biogas can be used to generate electricity and heat through cogeneration systems, be upgraded to renewable natural gas for sale to third parties, or used directly in boilers. The wastewater industry has increasingly focused on maximizing beneficial use of biogas and reducing reliance on flaring as a disposal option.

Wastewater and treatment processes also contain thermal energy that can be recovered through heat pump systems. Sewer heat recovery is a proven technology currently deployed in a variety of institutional, commercial, and district energy applications. Similarly, microhydro technologies can generate renewable electricity from wastewater flows where sufficient hydraulic conditions exist.

Many wastewater utilities are increasingly evaluating energy recovery opportunities as part of broader efforts to improve resiliency, reduce greenhouse gas emissions, and manage long-term operating costs. Industry trends have also increasingly emphasized the role of wastewater treatment facilities as resource recovery facilities that recover value from wastewater streams rather than focusing solely on treatment and disposal.

D. Example Practices from Other Jurisdictions/Industry

East Bay Municipal Utility District (EBMUD) – Oakland, California

EBMUD is widely recognized as a leader in wastewater energy recovery. Through a combination of anaerobic digestion, biogas utilization, and acceptance of external organic waste streams, EBMUD produces more renewable energy than is required to operate its wastewater treatment facilities. Biogas is used to generate electricity and heat, allowing the utility to offset energy purchases and export excess electricity. EBMUD demonstrates how wastewater treatment facilities can evolve from energy consumers into net energy producers through strategic investment in energy recovery infrastructure and operational integration.

Sheboygan Regional Wastewater Treatment Facility – Sheboygan, Wisconsin

The Sheboygan Regional Wastewater Treatment Facility has invested in anaerobic digestion and energy recovery systems designed to maximize beneficial use of biogas. The facility utilizes nearly all biogas produced through combined heat and power systems,

reducing reliance on purchased energy and minimizing routine flaring. The utility demonstrates how targeted investments in biogas utilization infrastructure can increase renewable energy production, improve resiliency, and maximize the value of an existing wastewater resource.

Metro Vancouver – British Columbia, Canada

Metro Vancouver has pursued a long-term strategy to increase beneficial use of biogas generated at its wastewater treatment facilities. Through investments in cogeneration systems, renewable natural gas production, and other biogas utilization projects, Metro Vancouver has reduced reliance on flaring while increasing recovery of renewable energy from wastewater treatment processes. As a large regional utility serving a metropolitan area comparable in scale to King County, Metro Vancouver provides a useful example of how energy recovery can be expanded across multiple facilities through coordinated planning and investment.

E. Policy issues, challenges, and opportunities

1. Beneficial use of biogas

Biogas is WTD's largest existing energy recovery resource. While WTD currently utilizes biogas through cogeneration, renewable natural gas production for sale to third parties, and direct use in facility processes, the system does not currently have the ability to beneficially use all biogas produced. Expanding biogas utilization capacity would increase renewable energy benefits, reduce flaring, improve operational resiliency, and maximize the value of a resource generated through wastewater treatment.

2. Expanding sewer heat recovery

Wastewater contains significant thermal energy that can be used to heat and cool buildings. WTD's Sewer Heat Recovery Pilot Program provides a framework for expanding access to this resource while limiting WTD's financial responsibilities. A key policy consideration is the extent to which WTD should actively promote and facilitate additional sewer heat recovery projects throughout the regional system.

3. Integrating energy recovery into capital planning

Historically, energy recovery opportunities have often been evaluated on a project-by-project basis. WTD could choose to more systematically evaluate opportunities for biogas utilization, heat recovery, microhydro generation, and other energy recovery technologies during planning and design of major capital projects. Earlier and more consistent consideration of energy recovery may increase opportunities to incorporate these systems where technically and economically feasible.

4. Integrating energy recovery and energy efficiency

Energy recovery and energy efficiency have traditionally been pursued as separate initiatives. A key policy consideration is whether future facility planning should integrate deep energy-efficiency improvements with energy recovery opportunities to maximize overall facility energy performance and advance net-zero or net-positive energy goals.

5. Defining the role of WTD in regional energy recovery

Some energy recovery opportunities primarily benefit WTD facilities, while others may provide benefits to external customers, communities, or regional energy users. A key policy consideration is the extent to which WTD should actively facilitate, promote, or support energy recovery opportunities beyond its own facilities.

6. Defining success for energy recovery

WTD currently recovers energy through biogas utilization and sewer heat recovery, but future policy direction will influence how success is measured. Potential objectives range from maintaining existing systems to maximizing beneficial use of wastewater-derived energy resources or transforming facilities into net-zero or net-positive energy hubs.

F. Range of policy options

- i. Energy production and heat recovery – Should WTD be expanding its efforts to capture energy and heat? If so, at what level of effort?

Policy Option #1: Maintain current energy recovery practices and meet existing Strategic Climate Action Plan and RWSP commitments using existing infrastructure.

Policy Option #2: Expand beneficial use of biogas and systematically integrate energy recovery (heat, hydro) into planning to improve resiliency, cost efficiency, and greenhouse gas reduction.

Policy Option #3: Transition facilities into net-zero or net-positive energy hubs by maximizing recovery of all wastewater-derived energy and embedding energy efficiency and recovery into all capital planning and operations.

Table 4: Summary of Policy Options

	Description	Goals/outcomes	Tradeoffs
#1	Maintain current energy recovery practices and meet existing Strategic Climate Action Plan and RWSP commitments using existing infrastructure.	Maintains current practices with existing infrastructure. Continue to optimize existing biogas systems and selectively pilot new technologies where cost-effective, without expansion of infrastructure. Lowest near-term cost and least disruption to existing capital plans and operations.	Gas flaring will still happen regularly. No improvement in energy resilience and GHG reduction beyond current measure. May leave cost-effective energy recovery opportunities unrealized. Continues reliance on project-by-project opportunities rather than strategically integrating energy recovery into capital planning.
#2	Expand beneficial use of biogas and systematically integrate energy recovery (heat, hydro) into planning to improve resiliency, cost efficiency, and greenhouse gas reduction.	Capacity to beneficially use 100% of biogas produced; gas flaring reduced to negligible amount. Strategic expansion and integration of energy recovery into capital planning and design. Additional energy recovery revenues and/or avoided energy costs.	Requires additional investment and staff capacity for planning, design, and implementation. Requires balancing energy recovery with cost-effectiveness, operational needs, and other capital priorities.
#3	Transition facilities into net-zero or net-positive energy hubs by maximizing recovery of all wastewater-derived energy and embedding energy efficiency and recovery into all capital planning and operations.	Maximizes long-term cost stability, operational resiliency, and emissions reduction. Grants more energy independence to wastewater facilities.	Highest capital cost and greatest potential impact to project scope and priorities. Requires new standards, operating practices, and sustained organizational commitment.

		Achieve net-zero/positive energy wastewater facilities.	Potential conflicts between maximizing energy recovery and WTD's primary wastewater treatment mission would need to be managed.
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G. Interested and affected parties WTD will engage to gather input

MWPAAC and the component agencies that WTD provides sewerage services to are one of the audiences that need to be engaged on the Energy policy options. Additional engagement with tribes, community-based organizations (CBOs), and environmental non-governmental organizations (NGOs), businesses, industries, and the general public may be conducted during implementation planning.

H. Rate structure considerations (if applicable)

There are no known rate structure considerations for this policy question. Revenues from resource recovery reduce the amount of revenue that needs to be generated from sewer rates but represented less than 2% of WTD's total revenues in 2025.

I. Relationship to contracts

There are no known sewage disposal contract implications for these policy questions.

Implementation of expanded energy recovery could require separate agreements with third parties, such as agreements for sewer heat recovery projects, energy sales, or other beneficial uses of recovered energy. These would generally be project-specific agreements rather than changes to the existing sewage disposal contracts. If future energy recovery activities were determined to affect contractual obligations, costs, or services provided to component agencies, any necessary contract or King County Code changes would be evaluated at that time.

J. Equity and Social Justice (ESJ) impacts

Expanded energy recovery could provide Equity and Social Justice (ESJ) benefits through reduced greenhouse gas emissions, improved energy resiliency, and broader community access to renewable energy benefits. WTD could consider community-based biogas or sewer heat recovery models, similar to community solar, where participating customers or communities help support a project while a portion of the renewable energy or financial benefits is specifically reserved at reduced or no cost for households or community members who otherwise could not afford to participate. ESJ considerations should also include potential rate impacts and the equitable distribution of costs and benefits from future energy recovery investments.

K. Summary of how MWPAAC/RWQC input was addressed

This section will be added into the policy memo as "Step 1" memos are finalized.

L. Planning-level cost estimates

This section will be added into the policy memo as the "Step 2" analysis later.

M. Evaluation of outcomes: identify impacts and outcomes of each option

This section will be added into the policy memo as the “Step 2” analysis later.

Wastewater Treatment Division**Executive summary****RWSP Update – Group #8 Resource Recovery, Policy Memo #14 - Biosolids**

This executive summary provides a synopsis of the policy questions, problem statement, issues, challenges, and the options developed for the Biosolids (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update.

Policy questions

1. Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolid recovery policies to get to Class A?
2. How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?

Problem statement

WTD's narrow focus on producing Class B biosolids and dependence on limited Class B biosolids application sites is increasing its risk in reliably meeting Washington State's beneficial use mandate and supporting around-the-clock wastewater treatment plant operations.¹ With most of WTD's Class B biosolids transported long distances to Eastern Washington and Class B opportunities declining in Western Washington, the time, cost, and logistical complexity of managing Class B material continue to rise. These pressures are compounded by seasonal sporadic logistical disruptions and limited storage capacity, which together threaten the reliability of state-mandated beneficial use. Expanding Class A production capacity would open unrestricted markets, reduce reliance on constrained Class B pathways, and lower operational and regulatory risks.

Pollutants entering the regional wastewater system can end up in biosolids; however, King County's biosolids consistently meet or exceed all applicable federal and state requirements for land application, including pathogen reduction standards, and are verified through regular laboratory testing for metals, nutrients, microbial indicators, and trace organics. The public's concern around certain contaminants of emerging concern (CECs), such as Per- and

¹ Per Chapter 173-308 WAC, biosolids must be used for a beneficial purpose, such as agricultural, silvicultural, or land reclamation uses, unless a generator receives authorization from the Department of Ecology for an alternative non-beneficial use, such as landfilling or incineration.

Polyfluoroalkyl substances (PFAS), in WTD’s biosolids is an issue that WTD continues to address through regular monitoring and risk evaluation in partnership with the Seattle-King County Public Health Department. PFAS is a shared problem; as such a partnership between WTD and its 34 cities and districts focused on source control remains the most cost-effective remedy.

Policy issues, challenges, and opportunities

Policy Issues

Full-scale production and retail of a Class A biosolids product is not explicitly supported by existing King County Code. The Code does direct the County to actively explore alternatives and assess feasibility of Class A products, however it does not indicate how WTD should progress to produce, market and sell Class A biosolids, as a vetted alternative to Class B, nor the scale to which it should.

Challenges

Concerns exist around PFAS in biosolids. It is important to note that contaminants such as PFAS come *into* the regional wastewater system from its 34 local sewer agencies, WTD does not create PFAS in its process to clean wastewater. Despite this, PFAS concentrations in WTD’s biosolids are low and WTD continues to monitor concentrations and risks in partnership with the Seattle-King County Public Health Department.² WTD currently has limited options to manage PFAS in its biosolids – i.e. it can continue to land apply its biosolids, or it can incinerate or landfill its biosolids both of which are very costly and both would violate the State’s beneficial use mandate for biosolids. The Department of Ecology is implementing a required period of analysis for PFAS concentrations in biosolids generated across the state starting in January 2027. The process is expected to result in regulatory standards and limitations for PFAS in biosolids products.

Opportunities

From 1973 to 2019, WTD was engaged in a public-private partnership with a local company, Sawdust Supply, to produce a Class A biosolids-based compost known as “GroCo.” While only a modest percentage of WTD’s biosolids were directed to composting operations, this partnership allowed WTD greater flexibility in coordination of its logistics to beneficially use all its biosolids. GroCo was a well-known and widely popular product within King County during the years it was distributed. Since the closure of Sawdust Supply’s business in 2019,

² In April 2025, WTD engaged an external consultant in a study of PFAS chemicals in King County’s biosolids and related systems. The report is available here: [PFAS data and test results - King County, Washington](#).

WTD has experienced a critical deficit in the Class A market as no alternative partnership could be established. Following the loss of this strategic beneficial use option, WTD engaged in a pilot program to produce a Class A compost product at the South Treatment Plant. In 2025, WTD established proof of concept for its pilot program from the Department of Ecology and received approval to distribute the small quantity of compost successfully generated at its pilot program. Engagement in the RWSP process comes at an opportune time as WTD seeks further guidance on how best, and to what extent, to build off the success of its Class A compost pilot and re-enter the Class A market. In Washington, a variety of utilities are engaged in Class A production and distribution at varying scales. A regional success story, the City of Tacoma's biosolids program is solely centered around Class A production and generates approximately 4,000 dry tons of Class A biosolids a year. Known as TAGRO, Tacoma's product has enjoyed widespread acceptance and popularity in Pierce County and is available for home or business delivery, on-site pick up, and for purchase at a variety of local retailers. During the gardening season, demand for TAGRO has at times surpassed production capacity, underscoring the potential for other Class A products to be brought onto the market. WTD is well positioned with the successful implementation of its pilot program and guidance through the RWSP process to re-engage in the Class A market and emulate the success of local popular Class A biosolids products like TAGRO.

Policy Options / Response to Policy Questions

The policy options described below provide a range of choices for WTD to manage its biosolids program, which involves both the existing Class B biosolids program and the current pilot-scale Class A biosolids program.

Policy question #1:

- a. Policy option #1: Balance biosolids program reliability, risk mitigation, and economic feasibility by maintaining and improving the existing Class B program and investing in a modest level of Class A biosolids production.

Outcomes: WTD achieves baseline resilience necessary to ensure complete and continued mandated beneficial use activities and strategically positions itself to increase efficiency and minimize risk over the coming decades. Reliable emergency storage is acquired and a relatively small portion of WTD's biosolids would be directed towards Class A production to open broader and more local markets. Financial impact is minimized by targeting the minimum investment needed to acquire baseline resilience benefits. Class B hauling costs are not substantially reduced or avoided.

- b. Policy option #2: Optimize biosolids program with a focus on reliability and risk minimization by maintaining and improving existing Class B program and investing in Class A biosolids production to achieve enhanced resilience benefits.

Outcomes: WTD attains a more robust portfolio with an increased focus on reliability and risk minimization beyond what would be provided by Policy Option 1. A strategic middle ground is targeted somewhere between the minimum investment needed to attain basic resilience benefits and full Class A production. Class B hauling costs are substantially reduced.

- c. Policy option #3: Pursue the most reliable and risk averse biosolids beneficial use portfolio and the most marketable biosolids product by investing in the phased adoption of technologies that allow for 100% Class A production.

Outcomes: WTD's beneficial use portfolio is entirely restructured towards Class A biosolids production over a period of time and critical emergency storage needs are satisfied. The redesigned portfolio gives WTD the flexibility to serve existing customers with decreased regulatory requirements and access to broader markets. Distribution becomes significantly less impacted by seasonal and persistent weather disruptions, and as a result, WTD's ability to reliably meet state-mandated beneficial use requirements is meaningfully strengthened. In addition, WTD gains a tangible tool for public engagement. Class B hauling costs are significantly reduced or avoided.

Policy question #2: How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?

This second policy question is primarily addressed in the previously delivered Pollution Prevention Policy Memo wherein a range of options were provided for source control of contaminants entering the regional wastewater system.

Pollutants that enter the regional wastewater system have the potential to enter products recovered by WTD, such as biosolids. Pollutants entering the regional wastewater system may pose a risk to worker safety at the treatment plants, public health, and the environment. Pollutants, particularly those that are persistent, unregulated, and currently lack at-scale removal technologies for use at treatment plants (e.g. PFAS), are best prevented or reduced at the source prior to entering the regional wastewater system using source control strategies. Strong source control policies will help protect against contamination risks in both

Class A and Class B biosolids. WTD can also continue its partnership with Seattle-King County Public Health and maintain its rigorous monitoring of contaminants in biosolids and continue to apply best available science to evaluate risks—particularly those associated with contaminants of emerging concern (CECs), including PFAS.

A core pillar of WTD’s biosolids program is a rigorous monitoring program to ensure the safety and efficacy of its biosolids. Monitoring of required chemical and pathogen concentrations is performed in excess of state and federal requirements and illustrates WTD’s ability to comfortably meet existing regulatory requirements by a wide margin for a safe biosolids product³. In addition to required monitoring, WTD expends additional effort and resources in monitoring a wide array of historical and emerging contaminants, such as PFAS.

Land application of biosolids must be done responsibly using a variety of best management practices (BMPs) and in compliance with all regulatory requirements. Fundamental to WTD’s biosolids land application activities are strict standard operating procedures (SOPs), based on BMPs and regulatory requirements, that limit unintended impacts from the beneficial use of biosolids. Implemented SOPs include practices such as the use of agronomic application rates, routine surface and groundwater quality sampling programs in and around application sites, and the use of application buffers for sensitive features like potable water wells and streams. In addition to these efforts, WTD has a long history of engaging with academic institutions to produce valuable research.⁴ On-going research continues to examine land application of biosolids and potential impacts. Such research includes better understanding PFAS crop uptake on plots applied with biosolids since 1994 as well as more tailored understandings of nutrient fate and transport in silvicultural systems. Insights gained from research are valuable to refining WTD’s biosolids application methodology to ensure efficacy and prevent the occurrence of negative externalities to public and environmental health.

Relationship to other RWSP topics

Resource Recovery is a foundational part of the Regional Wastewater Services Plan (RWSP) Update and is essential for sustaining the regional wastewater system into the future. As such, it intersects with many RWSP topics as described below:

1. Pollution Source Control & Legacy Pollution
 - Source control is our first and best strategy for reducing contaminants in recovered products.

³ [2025 Loop Biosolids Quality Data Summary](#)

⁴ [King County 2025 Resource Recovery Research Report](#)

2. Climate Impact Preparedness & Natural Hazard Resiliency

- Resource recovery can help offset climate impacts through water supply and energy production.
- While Resource Recovery covers production of some renewable energy resources that are byproducts of the treatment process, the Climate topic covers production of additional renewables that are not byproducts (ex. solar)

3. Asset Renewal & Replacement

- Existing assets are essential to treating and delivering recycled water, biosolids, and biogas.

4. Treatment

- Pursuit of resource recovery opportunities is one possible driver for considering a treatment technology, i.e. resource recovery drives the new treatment technology.
- It is possible that new treatment technologies would product different types or quantities of biogas, biosolids, or recycled water product, i.e. a new treatment technology drives (or limits) resource recovery opportunities.
- New treatment technologies that remove contaminants positively affect resource recovery opportunities.

RWSP Update – Resource Recovery - Biosolids

Policy Memo #14

A. Policy questions

This memo is focused on the policy questions related to the Biosolids (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update. The policy questions explored in this memo are:

- i. Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolid recovery policies to get to Class A?
- ii. How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?

B. Problem statement

i. Class A Expansion and Resiliency

WTD's reliance on a Class B biosolids portfolio limits its ability to reliably meet Washington State's beneficial-use mandate.⁵ Class B products require site-specific permits, significant labor for application services, extensive hauling to reach application sites, and face application restrictions, while Class A biosolids can be distributed as an unrestricted commodity. Without investment in Class A production capacity, WTD cannot access these broader markets, reduce its dependence on constrained Class B pathways, and reduce its existing operational and regulatory risks.

Time and financial investment needed to meet the logistical requirements of moving a significant volume of Class B biosolids to land application sites across the state has increasingly become more significant. Presently, more than two thirds of WTD's biosolids are directed to bulk application sites in Eastern Washington for large-scale agriculture. In Western Washington, bulk Class B land application opportunities are limited, and existing forestry land application sites have experienced large fluctuations in demand with general downward progression expected.

As time and labor investments to transport biosolids under ideal conditions are significant, persistent logistical disruptions have the ability to impact the reliability and continuity of state-mandated biosolids beneficial use. Presently, WTD utilizes its hauling fleet for

⁵ Per Chapter 173-308 WAC, biosolids must be used for a beneficial purpose, such as agricultural, silvicultural, or land reclamation uses, unless a generator receives authorization from the Department of Ecology for an alternative non-beneficial use, such as landfilling or incineration.

storage of biosolids and is afforded approximately three days' worth of capacity. In the winter, when mountain passes experience closures, WTD uses a space-constrained site through a temporary agreement with the City of Everett.

ii. Environmental Benefits and Safeguards

Pollutants that enter the regional wastewater system have the potential to be in effluent that is discharged into water bodies and accumulate in sediment and marine life and to enter products recovered by WTD, like recycled water or biosolids.

Pollutants entering the regional wastewater system may pose a risk to worker safety at the treatment plants, public health, and the environment. Pollutants, particularly those that are persistent, unregulated, and currently lack at-scale removal technologies for use at treatment plants, are best prevented or reduced at the source prior to entering the regional wastewater system using source control strategies.

A core pillar of WTD's biosolids program is a rigorous monitoring program to ensure the safety and efficacy of its biosolids. Monitoring of required chemical and pathogen concentrations is performed in excess of state and federal requirements and illustrates WTD's ability to comfortably meet existing regulatory requirements by a wide margin for a safe biosolids product. In addition to required monitoring, WTD expends additional effort and resources in monitoring a wide array of historical and emerging contaminants, such as PFAS.

Land application of biosolids must be done responsibly using a variety of best management practices (BMPs) and in compliance with all regulatory requirements. Fundamental to WTD's biosolids land application activities are strict standard operating protocols (SOPs), based on BMPs and regulatory requirements, that limit unintended impacts from the beneficial use of biosolids. Implemented SOPs include practices such as the use of agronomic application rates, routine surface and groundwater quality sampling programs in and around application sites, and the use of application buffers for sensitive features like potable water wells or streams. In addition to these efforts, WTD has a long history of engaging with academic institutions to produce valuable research. On-going research continues to examine land application of biosolids and potential impacts. Such research includes better understanding PFAS crop uptake on plots applied with biosolids since 1994 as well as more tailored understandings of nutrient fate and transport in silvicultural systems. Insights gained from research are valuable to refining WTD's biosolids application methodology to ensure efficacy and prevent the occurrence of negative externalities to public and environmental health.

C. Contextual and baseline information

i. What is known about the topic and current conditions

Biosolids Production and Existing Beneficial Use Portfolio

WTD produces approximately 130,000 wet tons of Class B biosolids on an annual basis. Production volume is expected to scale with population growth in the service area. Over the past decade, more than two-thirds of biosolids have been directed to the agricultural portion of WTD's beneficial use portfolio and the remaining third is accounted for by the forestry portion of the portfolio. Repeatedly and increasingly, volume directed to agriculture has grown and has become a significantly critical component of WTD's beneficial use strategy.

Figure 1. Loop Biosolids Program Historical Distribution

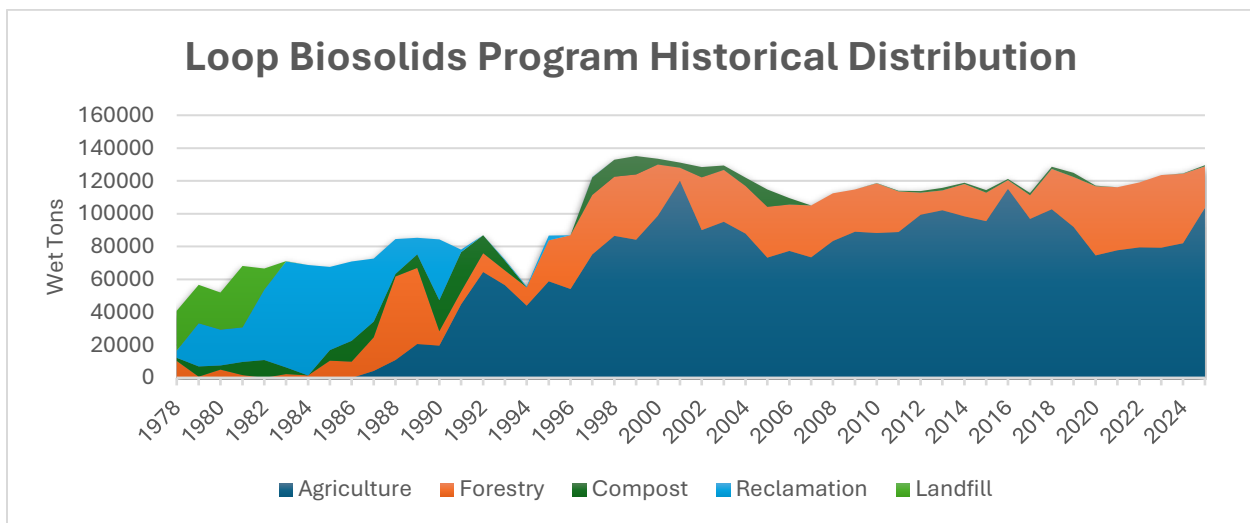
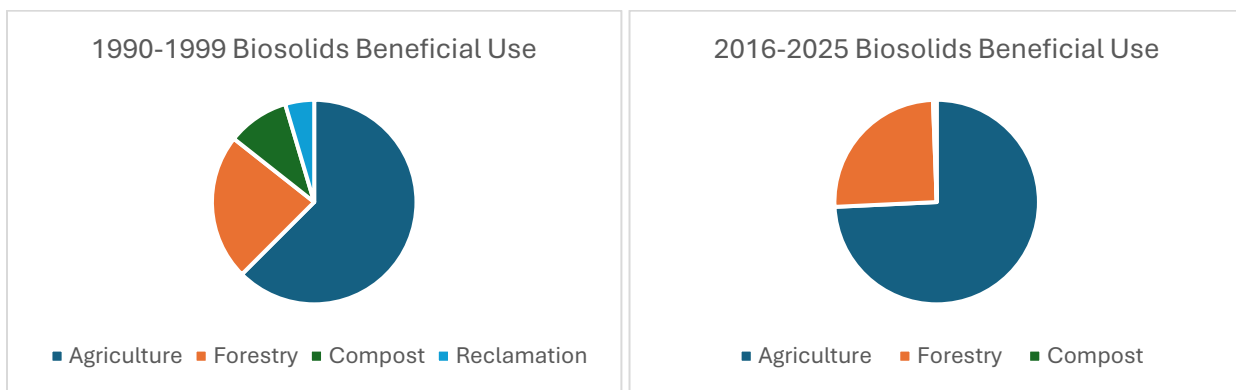


Figure 2. Biosolids Beneficial Use – The decade preceding the original RWSP and the current decade



Class A Biosolids Alternative Option Framework

In August 2020, the King County Council adopted Ordinance 18930, Section 72, Proviso P3, which directed WTD to transmit a report on alternative options for the management of biosolids generated in the processing of wastewater at county facilities, including approaches that may lead to an expansion or diversification of markets for those biosolids. The report evaluated the feasibility, costs, benefits, footprint, and financial viability of shifting either all or a portion of WTD’s biosolids volume to Class A production through different technologies. Additionally, the report also examined existing storage capabilities and future needs. The report identified that an optimized program consisting of existing Class B beneficial use, strategically supported by a Class A composting facility, provided significant operational advantages as well as having the highest ‘triple bottom line’ score when looking closely at factors related to the categories of “social and equity”, “environmental”, and “economic”.

All King County treatment plants currently produce primarily Class B biosolids, which are approximately 99% pathogen-free but restricted to permitted agricultural and forestry sites. WTD’s current beneficial use strategy depends on Eastern Washington partners and are vulnerable to disruptive weather such as winter mountain pass closures and wildfire impacts to haul routes and application sites, site-access limitations, odor concerns, and limited public visibility. Class A biosolids—including compost now produced at pilot scale—are pathogen-free, unrestricted in use, suitable for local markets, less affected by weather, and more compatible with public-facing distribution. Scaling Class A production would help diversify the County’s biosolids portfolio and reduce operational risks such as weather-related transportation interruptions, emergency storage needs, and portfolio concentration.

King County’s Strategic Climate Action Plan (SCAP) calls for expanding the use of locally produced compost, including biosolids-based products. Biosolids management is governed by state standards in Washington Administrative Code (WAC) 173-308, which encourage maximum beneficial use, classify biosolids as a commodity, and require spill-prevention planning, sampling, monitoring, reporting, and agronomic-rate application with protective buffers. Federal regulations under 40 CFR Part 503 set limits for metals and pathogens. King County’s biosolids are tested monthly for metals, nutrients, microbial indicators, trace organics, and per- and poly-fluoroalkyl substances (PFAS), and consistently meet stringent state and federal requirements.

Emergency Storage Dynamics

Hauling dynamics and considerations fluctuate with the seasons. In winter months, the Biosolids Program commonly experiences disruptive mountain pass closures that prevent

access to critical Eastern Washington beneficial use sites. The most critical hauling route includes Snoqualmie Pass on I-90, which has experienced road closures as extreme as four consecutive days in 2022, 2008, 1996, and 1990. Highway 2 is another significant hauling route which saw a road closure of major sections for more than a month last winter.

In addition to mountain pass closures, other extreme weather events have demonstrated tangible negative impacts to logistics. In the wet season, excessive precipitation events, such as those seen during the atmospheric river events in late 2025, can suspend forestry application operations and complicate use of normal hauling routes. During the dry season, wildfire occurrence can cause impacts to haul routes and application sites, especially in Eastern Washington.

Historically, WTD has relied on its fleet of trucks and trailers to serve as emergency storage vessels when logistics to beneficial use sites are disrupted. With a current fleet of 35 truck and trailer combinations and an average output of 11 trucks per day, WTD maintains an approximate three-days of total storage volume. It should also be noted that WTD's existing strategy of using its fleet as storage requires that trucks can be emptied at the same rate they are filled. In the event beneficial use sites are still accessible using alternative routes when routine hauling routes are impacted by closures, storage capacity will be incrementally diminished as trucks take longer to make deliveries due to increased transit times and federally mandated driving hour restrictions.

Aside from WTD's fleet of trucks and trailers, a temporary use agreement with the City of Everett is maintained for the use of a space-constrained site for a limited period during the winter season. This site has proved to be critical but extremely unreliable and incongruent with current hauling strategies. In late 2025, excessive precipitation events prevented access to the site. Additionally, the site cannot be used outside of the winter season which greatly reduces the operational flexibility during the remainder of the year. The City of Everett also reserves the right to unilaterally cancel the temporary use agreement with 30 days' notice.

ii. Current policies in code, contract, or in practice

King County Code (K.C.C. 28.86, Metropolitan Functions) guides WTD's work in biosolids management. The SCAP also directs WTD to pursue biosolids-based composting. The policies relevant to this memo are:

Table 1. Relevant policies

Relevant Policies in K.C.C.	Description
28.86.090 B. BP-1	King County shall strive to achieve beneficial use of wastewater solids. A beneficial use can be any use that proves to be environmentally safe, economically sound and utilizes the advantageous qualities of the material.
28.86.090 B. BP-2	Biosolids-derived products should be used as a soil amendment in landscaping projects funded by King County.
28.86.090 B. BP-3	King County shall consider new and innovative technologies for wastewater solids processing, energy recovery, and beneficial uses brought forward by public or private interests. King County shall seek to advance the beneficial use of wastewater solids, effluent, and methane gas through research and demonstration projects.
28.86.090 B. BP-4	King County shall seek to maximize program reliability and minimize risk by one or more of the following: 1. maintaining reserve capacity to manage approximately one hundred fifty percent of projected volume of biosolids 2. considering diverse technologies, end products, and beneficial uses; or 3. pursuing contractual protections including interlocal agreements, where appropriate.
28.86.090 B. BP-5	King County shall produce and use biosolids in accordance with federal, state and local regulations.
28.86.090 B. BP-6	King County shall strive to produce the highest quality biosolids economically and practically achievable and shall continue efforts to reduce trace metals in biosolids consistent with 40 C.F.R. Part 503 pollutant concentration levels (exceptional quality) for individual metals. The county shall continue to provide class B biosolids and also to explore technologies that may enable the county to generate class A biosolids cost-effectively or because they have better marketability. Future decisions about technology, transportation and distribution shall be based on marketability of biosolids products.
28.86.090 B. BP-7	When biosolids derived products are distributed outside the wastewater service area, the county shall require that local sponsors using the products secure any permits required by the local government body.

28.86.090 B. BP-8	King County shall work cooperatively with statewide organizations on biosolids issues.
28.86.090 B. BP-9	King County shall seek to minimize the noise and odor impact associated with processing, transporting and applying of biosolids, consistent with constraints of economic and environmental considerations and giving due regard to neighboring communities.
28.86.090 B. BP-10	Where cost-effective, King County shall beneficially use methane produced at the treatment plants for energy and other purposes. (Ord. 13680 § 9, 1999).
28.86.180 Implementation 5	a. King County will continue to produce Class B biosolids using anaerobic digestion at the south and west treatment plants and to implement the same process at the Brightwater treatment plant until a new technology can be used reliably. The plan also proposes that the county continue to evaluate alternative technologies to reduce the water content of biosolids while preserving their marketability. The primary objective of this evaluation will be to identify alternatives to digesters at the west treatment plant, a condition of the West Point Settlement Agreement. b. As part of ongoing planning for its treatment plants, King County will periodically evaluate conventional, alternative and new solids processing technologies using criteria such as product quality (class A or B), marketability, odor and other potential community impacts, impact on sewer rates, reliability of the treatment process, amount of land needed for the treatment facility and the number of truck trips needed to transport the biosolids produced. Based on the results of this evaluation and public comment, the executive should recommend one of three biosolids handling scenarios at any of all of the treatment plants: (1) continue using anaerobic digestion; (2) supplement anaerobic digestion with another treatment technology; or (3) replace anaerobic digestion with another treatment technology. c. The estimated cost, schedule and list of biosolids improvement projects shall be included in future RWSP operational master plans, summarized in RWSP annual reports and comprehensive reviews as outlined in K.C.C. 28.86.165. d. The county should continue using a public-private partnership approach to recycling biosolids such as using biosolids on working

	forests in King County to enhance wildlife habitat and generate long-term income from selective timber harvests.
SCAP – GHG 57	Expanding the use of locally produced compost—from food waste, yard debris, and biosolids —offers significant agronomic and climate benefits. It reduces landfill emissions and reliance on fossil fuel-based fertilizers, enhances agricultural productivity, increases carbon storage in soil, and improves soil health and resilience. However, challenges exist to expanding local compost production and use. King County will work with commercial compost producers to address challenges to generating higher-quality, near plastic-free product, and will proactively support increasing local capacity to process compost, including by exploring opportunities to establish compost facilities that can produce organic compost locally. The County will explore providing financial incentives to commercial compost producers and buyers to ensure high-quality compost is readily available at a reasonable cost, and demand for compost increases. King County will lead the effort to increase availability and use of compost and to push for a higher quality product. By 2035 , the County plans to build and operate a facility to produce a high-quality, plastic free, biosolids-based compost and will support this by encouraging farmers to use the product, demonstrating efficient spreading practices, and supporting research on compost in agricultural settings.

WTD currently implements an entirely Class B beneficial use program centered around public-private partnership that satisfies **BP-1** and **Implementation 5**. The Biosolids Program is highly engaged in monitoring compliance matters associated with quality, land application, and other regulatory requirements as required by **BP-5** and **BP-6**. WTD prioritizes being a good neighbor in the communities it operates in. Generation of noise and odor is closely monitored to prevent impacts in order to meet **BP-9**.

As directed by **BP-3**, **BP-6**, and **Implementation 5**, WTD regularly reviews alternative options in furtherance of advancing beneficial use. In considering new and alternative technologies, WTD has implemented a compost pilot to produce Class A biosolids at a small-scale. Successful implementation of the pilot has allowed WTD to initiate the charting of a path for the goals set in **GHG 57**. Creation of a Class A product allows WTD to satisfy **BP-2**, which is not feasible to achieve with Class B biosolids. Further exploration of Class A production is also consistent considering diverse technologies, end products, and beneficial uses as described in **BP-4**.

In addition, WTD engages with a number of organizations in the furtherance of effective biosolids management as required by **BP-8**. Such organizations include Northwest Biosolids, National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), as well as a suite of regionally-focused biosolids groups across the nation.

Where cost-effective, WTD manages biogas as directed by **BP-10** and performs planning in consideration of achieving further beneficial use of generated methane from solids processing.

iii. The system “must-dos”

WAC 173-308 establishes a clear requirement to **maximize the beneficial use of biosolids**. This mandate is grounded in the state’s determination that biosolids are a valuable commodity, not a waste, and therefore must be managed in a way that supports the highest feasible level of beneficial application.

The County’s wastewater treatment infrastructure runs non-stop with an average of 11 trucks of biosolids leaving treatment plants each day. Biosolids beneficial use options and other ancillary infrastructure, such as emergency storage, must be thoughtfully planned for and implemented to ensure reliable and accountable service is provided to WTD’s customers. WTD has experienced a variety of weather-related impacts over recent years that challenge existing logistical frameworks for transportation to beneficial use sites, so careful planning to ensure resilience is critical.

In addition to state law requirements and operational necessity, it is worth noting that WTD’s mission statement is “We protect public health and the environment by collecting and cleaning wastewater *while recovering valuable resources* for a thriving Puget Sound region.” [emphasis added]

iv. Current and budgeted expenditures

Table 2. Averaged Annual Expenditures for 2020-2025

Average Annual Operating Budget Expenditures	Average Annual Program	% of Total WTD Operating Expenditures
Biosolids	\$13,500,000	7.30%
Resource Recovery Overall	\$16,400,000	8.90%
WTD Total	\$184,000,000	100.0%

Expenditures related to the Biosolids Program are heavily tied to WTD’s operating budget. Hauling and land application services, an operational and regulatory necessity, accounts for most of those expenditures.

Capital Cost Estimates for 2026-2036

Capital cost projections should be understood as high level placeholders rather than defined future investments. From the 2027 Sewer Rate forecast, for the first decade (2026-36) Biosolids Program projects are about 0.9% of the total WTD capital forecast, totaling approximately \$124 million.

This is reflective of historical average spending but with significant uncertainty. At this early stage, project scopes, schedules, and delivery approaches are not yet established, and many elements depend on evolving regulatory direction, partnerships, operational needs, and funding availability. As such, these figures illustrate the possible magnitude of investment rather than a committed plan, and several projects may ultimately shift, be deferred, or not move forward as conditions change.

Table 3. Averaged Annual Revenue for 2020-2025

Average Revenues	Average Annual Program	% of Total WTD Operating Revenue
Biosolids	\$380,000	0.06%
Resource Recovery Overall	\$9,500,000	1.60%
WTD Total	\$596,000,000	100.0%

v. Summary of science/data (if applicable)

Biosolids are among the most highly regulated soil amendments in the United States. Under EPA’s 40 CFR Part 503 rules and Washington’s WAC 173-308, they must meet strict limits for metals and pathogens, undergo defined treatment processes, and be subject to routine sampling, monitoring, and reporting. King County’s biosolids consistently meet or exceed all applicable federal and state requirements for land application, including pathogen reduction standards, and are verified through regular laboratory testing for metals, nutrients, microbial indicators, and trace organics. Quality data are routinely reviewed and annually published in the Annual Loop Biosolids Quality Data Summaries created by King County staff.

Available data show that King County’s biosolids are primarily residential in origin and are not industrially impacted. Monthly PFAS testing indicates low concentrations that are below levels that would restrict land application in states that have adopted PFAS-related biosolids limits, providing additional assurance that current use is consistent with emerging national practice and safety expectations.

Additional details regarding biosolids quality data are available at:

- [2025 Loop Biosolids Quality Data Summary](#)
- [PFAS data and test results - King County, Washington](#)

D. Example Practices from Other Jurisdictions/Industry

Class A biosolids offer a more resilient and regulatory-efficient pathway for beneficial use because they can be applied in the same agricultural, forestry, and land-restoration settings as Class B—but without the regulatory constraints that limit when and where Class B can be used. As an unrestricted product, Class A is not subject to site-specific permits, seasonal application windows, or weather-related transportation shutdowns, all of which routinely disrupt Class B distribution. This strengthens year-round reliability, reduces operational vulnerability, and expands the range of local and regional outlets.

Across the region and nationally, utilities that produce Class A biosolids demonstrate the practical advantages of unrestricted-use products. Some examples of these programs are noted below.

Regional Utilities

Tacoma’s **TAGRO** program is a long-standing example: its Class A soil blends and potting mixes are widely used by residents, landscapers, and urban agriculture programs, illustrating how unrestricted biosolids can support strong local markets and high public acceptance. Their well-rounded distribution strategy combines presence in local storefronts, self-pickup from a central processing facility, and delivery service. TAGRO is produced through use of specialized digestion equipment, so requirements are met at the point of dewatering and additional effort is not required. Additional capital investment is necessary for advanced digestion processes, and blending facilities are generally necessary as the product is not ideal for home use without adding additional components that increase usability.

Soundgro, produced by Pierce County, similarly supplies Class A fertilizer products to farms, nurseries, and homeowners, showing how Class A materials can reliably serve both commercial and community-scale users. Class A biosolids can be distributed, stored, and used year-round, support diverse beneficial-use pathways, and maintain strong customer

demand while meeting all regulatory requirements. Soundgro is produced through the use of rotary dryer drums.

Both TAGRO and Soundgro integrate “self-service” distribution as a component of their beneficial use plans and allow residential consumers to bring their own container and scoop what they need for their personal use. Integrating such practices can be a valuable way to engage local gardeners and reduce hauling and other labor needs for Class A distribution.

Utilities and Businesses in other Jurisdictions

On the national stage, few utilities have a track record of responsible biosolids management as long as WTD. An exception is the Milwaukee Metropolitan Sewerage District who has been beneficially using biosolids since 1925 through creation of product known as **Milorganite**. Today, this product is a widely used and successful Class A Exceptional Quality (EQ) that retails nationally in many big box stores. Production is accomplished through the use of rotary kiln dryers which result in a substantially drier product but requires large quantities of energy.

DC Water creates a biosolids product known as **Bloom**. Treatment is achieved in part from an advanced digestion pretreatment process known as thermal hydrolysis (THP). Bloom is similar to TAGRO in that it is a Class A EQ product at the point of dewatering and is also generally blended with other components to make it more suitable for home gardening uses. As with the other products described in this section, Bloom also retails in local stores and maintains a variety of pathways for beneficial use.

Synagro Technologies, Inc., is a corporation with a significant national footprint in the organics management industry. In aggregate, it operates nine composting and seventeen dryer facilities across the country. Products generated from these operations are generally retailed as close as possible to generating facilities.

E. Policy Issues, Challenges, and Opportunities

Policy Issues: Need to Clarify Class A Direction

Full-scale production and retail of a Class A biosolids product is not explicitly supported by existing King County Code. The Code does direct the County to actively explore alternatives and assess feasibility of Class A products but does not indicate how County staff should linearly progress to produce, market and sell Class A, enabling adoption of a vetted Class A alternative to existing Class B beneficial use options.

Challenges: Handling PFAS and Other CECs

Concerns exist around PFAS in biosolids. It is important to note that contaminants such as PFAS come *into* the regional wastewater system from its 34 local sewer agencies, WTD does not create PFAS in its process to clean wastewater. Despite this, PFAS concentrations in WTD’s biosolids are low and WTD continues to monitor concentrations and risks in partnership with the Seattle-King County Public Health Department. WTD currently has limited options to manage PFAS in its biosolids – i.e. it can continue to land apply its biosolids, or it can incinerate or landfill its biosolids both of which are very costly and both would violate the State’s beneficial use mandate for biosolids. The Department of Ecology is implementing a required period of analysis for PFAS concentrations in biosolids generated across the state starting in January 2027. The process is expected to result in regulatory standards and limitations for PFAS in biosolids products.

Opportunities: Entering Back into the Class A Market

From 1973 to 2019, WTD was engaged in a public-private partnership with a local company, Sawdust Supply, to produce a Class A biosolids-based compost known as “GroCo.” While only a modest percentage of WTD’s biosolids were directed to composting operations, this partnership allowed WTD greater flexibility in coordination of its logistics to beneficially use all its biosolids. GroCo was a well-known and widely popular product within King County during the years it was distributed. Since the closure of Sawdust Supply’s business in 2019, WTD has experienced a critical deficit in the Class A market as no alternative partnership could be established. Following the loss of this strategic beneficial use option, WTD engaged in a pilot program to produce a Class A compost product at the South Treatment Plant. In 2025, WTD established proof of concept for its pilot program from the Department of Ecology and received approval to distribute the small quantity of compost successfully generated at its pilot program. Engagement in the RWSP process comes at an opportune time as WTD seeks further guidance on how best, and to what extent, to build off the success of its Class A compost pilot and re-enter the Class A market.

F. Range of policy options

Policy Questions:

- i. Should WTD further expand its efforts to develop Class A biosolids? What changes are needed to biosolid recovery policies to get to Class A?

Policy Option #1: Maximize program reliability, minimize risk, and balance economic feasibility by maintaining and improving existing Class B program and investing in a modest level of Class A production.

This option pursues projects that will provide necessary and critical resilience for WTD's biosolids beneficial use program, while also empowering existing cost-effective Class B strategies to the extent possible. New projects include procuring reliable emergency storage and relatively small expansion of Class A production guided by the success of WTD's composting pilot. This option provides tangible benefits while requiring less expenditure than Policy Options 2 and 3.

Policy Option #2: Optimize biosolids program with a focus on reliability and risk minimization by maintaining and improving existing Class B program and investing in Class A biosolids production to achieve enhanced resilience benefits.

Policy Option #3: Pursue the most reliable and risk averse beneficial use portfolio and the most marketable biosolids product by investing in the phased adoption of technologies that allow for 100% Class A production.

- ii. How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?

This second policy question is primarily addressed in the previously delivered Pollution Prevention Policy Memo wherein a range of options were provided for source control of contaminants entering the regional wastewater system.

Pollutants that enter the regional wastewater system have the potential to enter products recovered by WTD, such as biosolids. Pollutants entering the regional wastewater system may pose a risk to worker safety at the treatment plants, public health, and the environment. Pollutants, particularly those that are persistent, unregulated, and currently lack at-scale removal technologies for use at treatment plants (e.g. PFAS), are best prevented or reduced at the source prior to entering the regional wastewater system using source control strategies. Strong source control policies will help protect against contamination risks in both Class A and Class B biosolids. WTD can also continue its partnership with Seattle-King County Public Health and maintain its rigorous monitoring of contaminants in biosolids and continue to apply best available science to evaluate risks—particularly those associated with CECs, including PFAS.

A core pillar of WTD's biosolids program is a rigorous monitoring program to ensure the safety and efficacy of its biosolids. Monitoring of required chemical and pathogen concentrations is performed in excess of state and federal requirements and illustrates WTD's ability to comfortably meet existing regulatory requirements by a wide margin for a safe biosolids product.⁶ In addition to required monitoring, WTD expends additional effort and resources in monitoring a wide array of historical and emerging contaminants, such as PFAS.

Land application of biosolids must be done responsibly using a variety of best management practices (BMPs) and in compliance with all regulatory requirements. Fundamental to WTD's biosolids land application activities are strict standard operating protocols (SOPs), based on BMPs and regulatory requirements, that limit unintended impacts from the beneficial use of biosolids. Implemented SOPs include practices such as the use of agronomic application rates, routine surface and groundwater quality sampling programs in and around application sites, and the use of application buffers for sensitive features like potable water wells or streams. In addition to these efforts, WTD has a long history of engaging with academic institutions to produce valuable research.⁷ On-going research continues to examine land application of biosolids and potential impacts. Such research includes better understanding PFAS crop uptake on plots applied with biosolids since 1994 as well as more tailored understandings of nutrient fate and transport in silvicultural systems. Insights gained from research are valuable to refining WTD's biosolids application methodology to ensure efficacy and prevent the occurrence of negative externalities to public and environmental health.

⁶[2025 Loop Biosolids Quality Data Summary](#)

⁷[King County 2025 Resource Recovery Research Report](#)

Summary of Policy Options

	Description	Goals/outcomes	Tradeoffs
#1	Maximize program reliability, minimize risk, and balance economic feasibility by maintaining and improving existing Class B program and investing in a modest level of Class A production.	• Maintains and strengthens existing Class B program. • Builds on the success of WTD's Class A compost pilot • Minimize financial burden while unlocking Class A resilience opportunities • Gain necessary baseline resilience benefits from Class A production	• New storage and investment in Class A improves resilience but requires capital investment. • Class B is limited; Class A composting opens broader markets. • Class B is weather dependent; Class A is less impacted and reduces transportation costs • Partial Class A production carries some level of reliability and regulatory risk
#2	Optimize biosolids program with a focus on reliability and risk minimization by maintaining and improving existing Class B program and investing in Class A biosolids production to achieve enhanced resilience benefits.	• Maintains and strengthens existing biosolids program. • Builds on the success of WTD's Class A compost pilot • Find a strategic middle ground between minimum and total production of Class A biosolids. • Gain enhanced resilience benefits from increased Class A production • Reduced hauling expenditures	• Scaling Class A requires more capital investment but reduces operational risks and constraints. • Class A improves community perception, visibility and climate outcomes but takes years to build. • Partial Class A production carries some level of reliability and regulatory risk

#3	Pursue the most reliable and risk averse beneficial use portfolio and the most marketable biosolids product by investing in the phased adoption of technologies that allow for 100% Class A production.	• Achieve maximum resilience and reliability and invest in a public-oriented Class A portfolio. • Significantly reduced/avoided hauling expenditures	• Scaling Class A requires more capital investment but reduces operational risks and constraints. • Shared regional facilities reduce cost but require joint governance. • Class A improves community perception, visibility and climate outcomes but takes years to build.
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G. Interested and affected parties WTD will engage to gather input

MWPAAC and the component agencies that WTD provides sewerage services to are one of the audiences that need to be engaged on the Resource Recovery Biosolids policy options. Additional engagement with tribes, community-based organizations (CBOs), and environmental non-governmental organizations (NGOs), businesses, industries, and the general public may be conducted during implementation planning.

H. Rate structure considerations (if applicable)

There are no known rate structure considerations for this policy question.

I. Relationship to contracts

There are no known contract implications for these policy questions.

J. Equity and Social Justice (ESJ) impacts

While Class B biosolids are generally restricted to large commercial users due to permitting requirements, access restrictions, and other regulatory requirements, Class A biosolids products provide an unrestricted, cost-effective and nutrient-rich soil amendment alternative to synthetic fertilizers for King County residents. Equitable and thoughtful distribution of Class A biosolids within and around King County provides a tangible tool for fighting food insecurity through the provision of an effective and well-studied soil amendment.

WTD engages in rigorous and consistent monitoring that goes significantly beyond the requirements of State and Federal regulations. Ensuring any potential contaminants are properly characterized and understood is a priority for WTD's biosolids program and an important consideration for responsible beneficial use.

The beneficial use of biosolids is also an effective tool for pursuing carbon neutrality and mitigating climate impacts that disproportionately affect frontline communities. During 2025, WTD land applied over 130,000 wet tons of biosolids with an estimated carbon sequestration impact equivalent to taking over 9,000 cars off the road for an entire year.

In addition, WTD's biosolids beneficial use program creates and supports a number of living wage jobs in King County and around the state. Expansion of Class A production and distribution would create similar opportunities in and around King County. Further analysis of ESJ-related impacts and outcomes related to potential policy options will be addressed in the "Step 2" analysis later.

K. Summary of how MWPAAC/RWQC input was addressed

This section will be added into the policy memo as "Step 1" memos are finalized.

L. Planning-level cost estimates

This section will be added into the policy memo as the “Step 2” analysis later.

M. Evaluation of outcomes: identify impacts and outcomes of each option

This section will be added into the policy memo as the “Step 2” analysis later.

Wastewater Treatment Division**Executive summary****RWSP Update - Group #8 Resource Recovery, Policy Memo #15 - Recycled Water**

King County Wastewater Treatment Division (WTD) is updating its Regional Wastewater Services Plan (RWSP) at a time when the region faces increasing pressures from climate change, population growth, regulatory obligations, and long-term water resource uncertainty. WTD operates recycled water systems which could be expanded to play a larger role in addressing these regional challenges, but WTD must determine if, how, and when recycled water should be expanded and how best to safeguard against environmental risks. This executive summary provides a synopsis of the policy questions, problem statement, issues, challenges, and the options developed for the Recycled Water (Resource Recovery) topic of the RWSP Update. Please note this policy memo refers to reclaimed water as “recycled water”.

Policy Questions

1. Under what circumstances should the region expand the use of recycled water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?
2. How can WTD best address environmental concerns while instituting safeguards to protect against environmental risks of contamination?

Problem Statement

WTD’s mission is to protect public health and the environment while recovering valuable resources.¹ In support of this mission, WTD currently operates three recycled water (RW) systems—at South Treatment Plant, Brightwater Treatment Plant, and Carnation Treatment Plant—but the program is small compared to regional wastewater flows (currently less than 1% of WTD’s total effluent volume is recycled).

The Puget Sound region has historically had sufficient freshwater supplies for people, which has reduced the urgency of recycled water expansion. However, climate change and population growth are placing new stresses on the region's freshwater supplies for people, agriculture, ecosystems, and fish, and projected climate impacts will likely intensify

¹ [Mission and commitments - King County, Washington](#)

competition for limited freshwater in the future. Simultaneously, WTD is facing the possibility of much stricter regulations on the nutrient content of its effluent discharges to Puget Sound and would benefit from alternative options for disposal of treated effluent besides marine discharge.

Recycled water can benefit the regional wastewater system by reducing WTD's reliance on Puget Sound for effluent discharge, instead diverting nutrients for beneficial use and providing a drought-proof water supply. Expansion of recycled water production and distribution would require capital investment beyond current levels. Expansion will also require close coordination and long-term partnerships with drinking water utilities, pursuit of public-private partnerships and other opportunities to reduce expansion costs, and careful evaluation of benefits and risks.

Policy issues, challenges, and opportunities

Policy Gaps

King County's RW policies (WRP-1 through WRP-15) emphasize incremental expansion and case-by-case evaluation, but do not prioritize funding approaches, address large-scale RW development, or long-term regional water supply needs.

Challenges

Concerns exist around contaminants (including PFAS) in recycled water and the potential environmental and human health impacts when recycled water is used for irrigation and/or groundwater recharge. It is important to note that contaminants such as PFAS come *into* the regional wastewater system from its 34 local sewer agencies; WTD does not add PFAS in its process to clean wastewater. PFAS concentrations in WTD's effluent and recycled water are very low and WTD continues to monitor concentrations and risks in partnership with the Seattle-King County Public Health Department.² PFAS is a shared problem; as such, source control of these contaminants, in partnership with WTD's cities and districts, remains the most cost-effective remedy. Moreover, WTD currently has limited options to manage the PFAS issue – i.e. it can continue to discharge more than 99% of its effluent into the Puget Sound and/or it can divert some effluent away from the marine environment through distribution and use of recycled water in a myriad of ways. Removing PFAS from effluent at scale is cost prohibitive.

² [PFAS Chemicals in King County's Waste Systems](#)

Challenges also include concerns around regional fairness of cost allocation for recycled water capital investments and potential financial impacts to drinking water utilities from reductions in potable water revenue or stranded investments.

Further challenges include aging infrastructure and a lack of RW storage at Brightwater which limits RW distribution reliability for customers. The RW systems at Brightwater and South Plant run best at higher flow; economies of scale are not currently achieved, and low seasonal demand complicates operations. Additional potential demand exists in Sammamish Valley and the cities of Renton/Tukwila and would require partnerships with drinking water utilities.

Opportunities

Climate change may create emerging demand for supplemental non-potable water supplies for landscape irrigation, farms/agriculture, industry (e.g. commercial/industrial cooling systems to which recycled water is uniquely suited), and ecosystems. Recycled water could reduce potable water demand in strategic areas, enhancing resilience, and act as a strategic insurance policy for mid/late century fresh water supplies.

Regulatory pressure to reduce nutrient discharges into Puget Sound is intensifying, increasing the need for alternatives to marine effluent discharge. Expanded RW use could help address future nutrient discharge regulations, and offer environmental enhancement benefits, including wetland support and potential groundwater recharge.

WTD's recycled water is clean and highly regulated. Washington's Reclaimed Water Rule (WAC 173-219) requires significant treatment, ongoing monitoring, and strict permit compliance. WTD produces "Class A" recycled water—the highest quality level—at all three facilities and conducts both required and voluntary testing. WTD's current RW systems largely serve internal uses, wetland enhancement at Carnation, and external irrigation customers. The list below provides the locations where WTD currently produces Class A recycled water and where expansion opportunities could occur:

- Brightwater: the Plant has underutilized recycled water capacity. Brightwater has a large production capacity (12 MGD) but currently only distributes a fraction of this capacity, and a distribution pipeline has already been built to serve the Sammamish Valley Agricultural Production District. However, recycled water capacity at Brightwater is constrained by a lack of storage, and the conveyance pipeline is aging; distribution interruptions during peak season remain a challenge.
- South Plant: Currently most RW is used internally at the Plant, providing cost avoidance from potable water purchases. However, the Plant is located near potential commercial and industrial businesses; expansion of recycled water in

partnership with the City of Renton could help regional water supplies in the future. Aging infrastructure will need refurbishment to accommodate future expansion.

- Carnation: 100% of effluent is used for wetland enhancement under a legal settlement—operations heavily constrained but environmentally beneficial.

Responses to Policy Questions/Policy Options

Policy question #1 asks: “Under what circumstances should the region expand the use of recycled water?”

Circumstances that may warrant expansion of recycled water include:

1. Opportunities to support drought preparedness and meaningfully advance long-term (i.e. mid/late century) water supply resilience.
2. Opportunities to address environmental needs such as streamflow support during peak summer for salmon recovery and/or wetland enhancement.
3. Demand for non-potable water from industrial/commercial businesses and/or environmental uses located near existing infrastructure.
4. Opportunities to offset or lessen potential future nutrient regulatory requirements of WTD’s effluent discharges into the Puget Sound.

Across all these circumstances, partnerships with the County’s drinking water utilities will be needed to expand use of recycled water. In doing so, combined benefits would accrue to people, farms, and fish across WTD’s service area while reducing reliance on stressed freshwater sources. These benefits include the following:

- Support agriculture with irrigation reliability
- Reduce potable water use in industrial and commercial processes.
- Enhance the environment, such as wetlands and/or salmon habitat.
- Contribute to groundwater recharge, where regulatory frameworks and treatment standards and locations make it safe and feasible.

Policy Question #1 also asks: “which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?” The answer to this part of question #1 lies in the three recycled water policy options described further below *and* the response to policy question #2 which asks “How can WTD best address environmental concerns while instituting safeguards to protect against environmental risks of contamination?”

This second policy question is primarily addressed in the previously delivered *Pollution Prevention Policy Memo* wherein a range of options were provided for source control of

contaminants entering the regional wastewater system. Strong source control policies will help protect against contamination risks from recycled water use. Additionally, WTD can continue producing highly regulated Class A recycled water (a higher treatment level than treatment plant effluent) as a safeguard to protect against contamination through use of recycled water; WTD can also continue its partnership with Seattle-King County Public Health, maintain its rigorous monitoring of contaminants, and continue to apply best available science to evaluate risks—particularly those associated with contaminants of emerging concern (CECs), including PFAS.

Environmental uses of recycled water, such as groundwater recharge and streamflow augmentation, should be paired with safeguards such as treatment upgrades where needed, careful site evaluations, and collaboration with regulatory agencies. As a further safeguard, recycled water use should be avoided in critical aquifer recharge areas (CARAs) where aquifers are used for drinking water supply.

The three policy options described below provide policy makers a range of choices for the continued use and/or expansion of WTD's recycled water.

1. **Maintain current policies** by continuing to serve very limited existing recycled water customers, adding new customers along existing infrastructure, while examining and expanding distribution on a case-by-case pilot-scale basis.
 - a. Outcomes: Recycled water production remains a relatively small fraction of WTD's total effluent volume. Relatively low costs, small-scale of support for local irrigation and internal water use at treatment plants, and small-scale wetlands enhancement at Carnation. RW will not significantly reduce WTD's effluent discharges to Puget Sound. RW capacity will not grow large enough to contribute significantly to region's future water resource needs, and WTD will struggle to quickly expand RW if more is needed in the future.
2. **Prioritize new strategic investments incrementally** to provide flexibility to adapt to current and future needs and increase environmental enhancement uses.
 - a. Outcomes: Prepares the region for current/near-future needs and provides ability to scale for potential mid/late-century water needs. Critical improvements to treatment and the RW systems to allow WTD to serve meaningfully larger volumes of RW in partnership with drinking water utilities to help preserve fresh water supplies. Projects may not be large enough to offer sizable benefits to nutrient discharge requirements beyond operational flexibility. This option will increase costs to scale RW to meet new demands in select areas.

3. **Regionally expand** recycled water production and distribution systems, in partnership with drinking water utilities, to position the WTD to contribute major support to regional water resource needs.
 - a. Outcomes: Region is well-positioned for mid-century water needs. Recycled water is part of broad water portfolio to help meet region's water needs for people and the environment, while reducing nutrient loading to Puget Sound. New treatment and distribution assets allow RW to meet significant non-drinking and environmental water needs across the region, beyond the immediate vicinity of treatment plants. RW is used as a regional insurance policy to reduce the impacts of drought emergencies, regulatory mandates, or system capacity constraints to protect public health, environmental outcomes, and system reliability. Option #3 will require large and sustained capital and operating investments corresponding to regional scope, as well as durable long-term partnerships with drinking water utilities, who accept RW as important to regional water supply.

Relationship to Other RWSP Topics

Recycled Water is a core component of the RWSP Update and directly supports long-term system sustainability and intersects with several RWSP topics, including:

Pollution Source Control & Legacy Pollution: Effective source control is the foundation for producing high-quality recycled water. Reducing contaminants at the source improves the reliability of RW for both process needs and external customers and supports the expansion of recycled water uses and any future regulatory compliance related to CECs.

Climate Impact Preparedness & Natural Hazard Resiliency: Recycled water can increase regional climate resilience by supplementing local water supplies and replacing potable water in appropriate applications.

Asset Renewal & Replacement: Recycled water production and distribution depend on treatment plant assets and conveyance infrastructure. Maintaining and renewing these assets ensures reliable RW availability for internal process uses and external delivery. Asset renewal decisions can directly affect RW system capacity and long-term viability.

Treatment: Recycled water needs can influence decisions about new or upgraded treatment technologies, especially when higher RW production, improved RW quality, or regulatory drivers are goals. Emerging treatment technologies may change the quantity or quality of recycled water produced, expanding RW opportunities.

RWSP Update – Resource Recovery - Recycled Water

Policy Memo #15

A. Policy question

This memo focuses on the policy questions related to the Recycled Water (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update. The policy question explored in this memo is:

- i. Under what circumstances should the region expand the use of reclaimed water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?

An additional policy question that was primarily addressed by the Pollution Policy Memo is:

- ii. How can WTD best support environmental benefits while instituting safeguards to protect against environmental risks of contamination? How should cost considerations be weighed?

B. Problem statement

King County Wastewater Treatment Division's (WTD) mission is to "protect public health and the environment by collecting and cleaning wastewater while recovering valuable resources for a thriving Puget Sound region."³ In support of this mission, WTD operates a recycled water (RW) program ("RW program") which benefits the regional wastewater system by diverting nutrients for beneficial use, reducing WTD's reliance on Puget Sound for effluent discharge, generating revenue, and providing a drought-proof water supply to WTD's RW customers. Currently, the RW program is small relative to the size of the regional wastewater system (less than 1% of WTD's total effluent volume is recycled).

Puget Sound region has historically had sufficient freshwater supplies for people, which has reduced the urgency of recycled water expansion. However, climate change and population growth are placing new stresses on the region's freshwater supplies for people, agriculture, ecosystems, and fish, and projected climate impacts will likely intensify competition for limited freshwater in the future. Simultaneously, WTD is facing the possibility of much stricter regulations on the nutrient content of its effluent discharges to Puget Sound and would benefit from alternative options for disposal of treated effluent besides marine discharge.

³ [Mission and commitments - King County, Washington](#)

The region needs to determine the appropriate scale, purpose, and timing of future RW production and distribution to support long-term regional water supply resilience and meet regulatory obligations. Differing perspectives on the value of recycled water, combined with uncertainty around future water demands, significant capital investment needs, and the importance of sustained coordination with drinking water providers, affect WTD's ability to establish a durable long-term approach. WTD needs a recycled water strategy that balances benefits, costs, risks, and operational feasibility while responding to partner concerns and maintaining flexibility to meet emerging regional needs.

Pollutants that enter the regional wastewater system have the potential to enter products recovered by WTD, such as recycled water. Pollutants entering the regional wastewater system may pose a risk to worker safety at the treatment plants, public health, and the environment. Pollutants, particularly those that are persistent, unregulated, and currently lack at-scale removal technologies for use at treatment plants, are best prevented or reduced at the source prior to entering the regional wastewater system using source control strategies.

Balancing the environmental benefits of recycled water with the need to safeguard public health and protect sensitive resources including groundwater can also be achieved in parallel with source control by continuing to carefully limit recycled water use in Critical Aquifer Recharge Areas and Wellhead Protection Areas, while also maintaining a robust Cross-Connection Control program to protect potable water supplies. However, the presence of PFAS and other contaminants of emerging concern adds complexity: PFAS contamination is a shared regional issue driven largely by everyday household sources. King County does not currently have any PFAS manufacturers or heavy industrial PFAS users, and a recent 2025 PFAS assessment shows that PFAS levels in King County's recycled water fall within typical ranges for municipal systems. As WTD's knowledge on this topic grows, it will continue to monitor the science and be prepared for changes in safety thresholds.

This relative uncertainty underscores the importance of continued source-control partnerships with cities and districts. King County Council Motion 16434 (2023) and current public-health guidance emphasize upstream regulatory actions, improved chemical assessment, and collaboration with health agencies, as well as staying current with emerging science, monitoring advanced treatment technologies, tracking evolving safety thresholds, and following research on ecological and health impacts. These needs must be balanced against costs, and it will remain critical that we are continuing to learn from other jurisdictions successes and challenges while continuing to protect local aquifers and safeguard regional water quality.

C. Contextual and baseline information

i. What is known about the topic and current conditions

Introduction to Recycled Water in Washington

Recycled water (RW, also called “reclaimed water”) is a renewable water resource created from domestic wastewater (sewage) that is then treated and tested to use for specific purposes,⁴ such as irrigation of crops and landscaping, industrial processes, groundwater recharge, and ecosystem restoration. In addition to its benefits as a resilient supplemental water supply, RW allows wastewater utilities to reduce discharges of effluent into local receiving waters and reuse water beneficially, resulting in environmental benefits and potential financial savings.

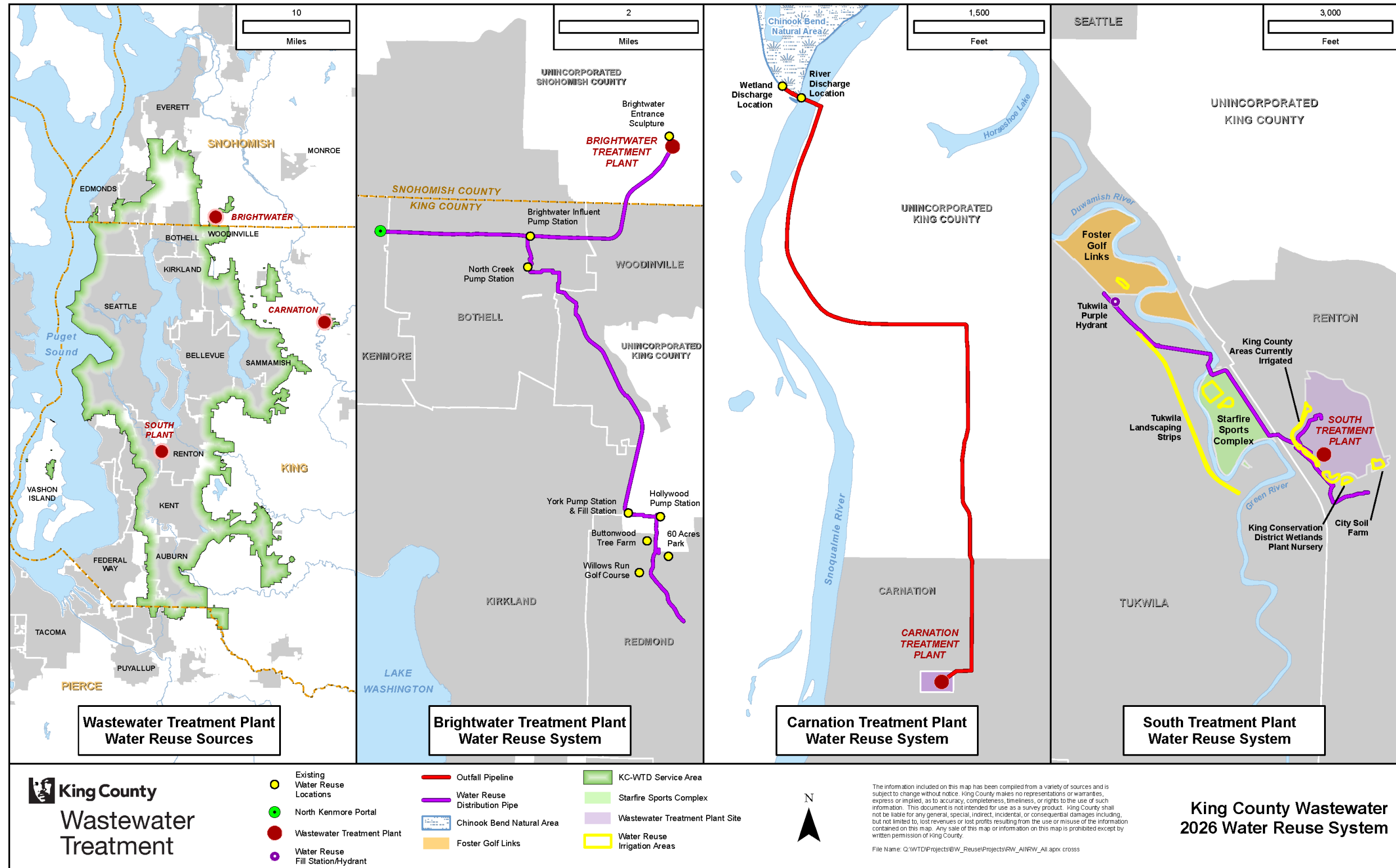
In Washington, RW is regulated by the Departments of Ecology (“Ecology”) and Health under the 2018 Reclaimed Water Rule (Washington Administrative Code [WAC] Chapter 173-219). Each facility that produces RW must obtain a permit from Ecology, which specifies treatment and disinfection requirements sufficient to protect human health and the environment, mandates water quality testing, and confirms that water rights are not affected. Ecology currently manages 29 active RW permits state-wide, with irrigation and groundwater recharge being the two most frequently authorized uses.

WTD’s Recycled Water System

Of King County’s five treatment plants, the three that have active recycled water systems for external use are South Plant, Brightwater, and Carnation. Each system varies in age, volumes of water served, and types of customers and uses served.

⁴ [Reclaimed water - Washington State Department of Ecology](#)

Figure 1: Map of King County Water Reuse Systems



South Plant has WTD's oldest RW system, which was constructed originally as a pilot project in the late 1990s and has since been refurbished and improved to maintain operation. South Plant has 1 million gallons per day (mgd) of capacity to produce RW using sand filters and disinfects RW using sodium hypochlorite. RW is stored onsite in a 550,000-gallon storage tank and can be used to meet in-plant process water demands or distributed to offsite customers. In 2025, approximately 94% of South Plant's annual RW production was used internally (61.7 million gallons per year), and 6% was distributed to offsite customers (3.8 million gallons per year). The current largest offsite customer is Starfire Sports in Tukwila, which uses RW for irrigation of its athletic fields. Smaller users include CitySoil Farms, the City of Tukwila, King Conservation District's wetland plant nursery, and King County Water and Land Resource Division's truck-hauled water for restoration plantings.⁵ The total annual RW volume at STP amounts to approximately 0.1% of treated effluent.

The Brightwater RW system began operation in 2013, soon after the completion of the treatment plant itself. Brightwater's RW system uses membrane bioreactor technology to filter RW and sodium hypochlorite for disinfection, for a total production capacity of 12 mgd. There is currently no RW storage at Brightwater, but storage may be added in future. In 2025, approximately 91% of reused membrane effluent was used internally for process uses (556.3 mg/year), and 9% was distributed offsite as RW to customers (53.5 mg/yr). To convey RW to offsite customers, RW is piped through a 9-mile pipeline to irrigation customers in the Sammamish Valley, including Willows Run Golf Course, 60 Acres Park, and Buttonwood Tree Farm. In 2025, approximately 1% of Brightwater's summertime average effluent flow was recycled.

Carnation Treatment Plant began operations in 2008 and is much smaller than regional treatment plants like South Plant and Brightwater. As part of the negotiations with regulators and other stakeholders when Carnation⁶ was being designed and permitted, WTD agreed to treat all effluent to Class A RW standards and discharge it to a wetland for wetland enhancement purposes rather than discharging effluent directly into the Snoqualmie River whenever possible.⁷ Carnation uses membrane bioreactor filtration and ultraviolet light (UV) for disinfection. During normal operations, 100% of treated effluent is

⁵ South Plant also has a distribution pipeline to Foster Golf Links in Tukwila, but the golf course does not purchase RW from King County most years.

⁶ Throughout this memo, "Carnation" refers to Carnation Treatment Plant, not the City of Carnation, WA.

⁷ Discharges of effluent to the Snoqualmie River are generally only permitted during planned maintenance, emergencies, when the UV disinfection system is not working, or when specifically requested by state resource agencies due to low river flows.

conveyed to Chinook Bend Natural Area Wetland Enhancement Site. In 2025, 26.3 mg/yr of RW was used for wetland enhancement.

Currently, WTD's RW systems are relatively small in scale to the total volumes of wastewater treated by the regional system, and the RW systems are not yet large enough to offset a meaningful portion of effluent discharged into Puget Sound or contribute significantly to the regional water supply. WTD continues to work to expand RW use in a cost-effective and environmentally protective manner.

ii. Current policies in code, contract, or in practice

Table 1: Recycled Water Policies

Relevant Policies in K.C.C.	Description
28.86.100 WRP-1	County shall actively pursue the use of reclaimed water while protecting public health and the environment.
28.86.100 WRP-2	By December 2007, County shall prepare report for Council studying the feasibility of reclaimed water as part of regional water supply
28.86.100 WRP-3	Investigate reclaimed water as a significant new source of supply for fish, nonpotable uses, environmental value, and to defer the need for new potable supplies
28.86.100 WRP-4	County's water reuse program shall be coordinated with regional water supply plans and regional basin plans
28.86.100 WRP-5	County shall implement nonpotable projects on a case-by-case basis. To evaluate, County will develop criteria including: cost, cost recovery, potential uses, rate impacts, environmental benefits and habitat enhancement, risk, demonstration of new technology, and enhancing economic development. Projects that require major capital funding shall be reviewed by RWQC and approved by Council.
28.86.100 WRP-6	County shall work with local water purveyors to evaluate opportunities for water reuse in their service areas
28.86.100 WRP-7	County shall develop a water reuse public education and involvement program

28.86.100 WRP-8	County shall coordinate and communicate with WA Depts of Health and Ecology, and also other federal, state, local, and tribal agencies and community groups
28.86.100 WRP-9	County shall work on a case-by-case basis with WA Depts of Ecology and Health on water reuse projects
28.86.100 WRP-10	County shall hold and maintain the exclusive right to any reclaimed water generated by its treatment plants
28.86.100 WRP-11	County's water reuse program shall not impair any existing water rights unless compensation or mitigation is agreed to
28.86.100 WRP-12	County shall retain the flexibility to produce and distribute reclaimed water at all treatment plants, including options to add levels of treatment
28.86.100 WRP-13	County shall continue to evaluate potential funding of pilot-scale and water reuse projects, in whole or in part, from the wastewater utility rate base
28.86.100 WRP-14	County shall complete an economic and financial feasibility assessment of its reuse program, including: environmental benefits, marginal and stranded costs, the benefits of equitable cost splits between participating agencies and utilities, a review of existing and planned water and wastewater facilities, etc.
28.86.100 WRP-15	County should pursue a program to discharge reclaimed water to Ballard Locks when environmental benefits and financial considerations merit this investment
TPP 5, 7-8	Undertaking studies to discharge reclaimed water to local water bodies, explore constructing satellite treatment plants, and expand use at existing and new treatment facilities
CP 6-7	Integrate water reuse planning with conveyance and treatment facility planning, evaluate demand management alternative to meet conveyance needs
Implementation 6	Continue to produce reclaimed water for non-potable uses and explore production of reclaimed water at new facilities, and coordinate public education with water conservation education programs
2025 SCAP GHG 55	Public-private ventures will make greater use of recycled water for climate-smart agricultural practices

2025 SCAP Prep 18	Expand the use of recycled water to address drought mitigation
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WRP-1 — Actively pursue reclaimed water while protecting public health and the environment

Goals of the Recycled Water program include preserving regional water supplies and ensuring any recycled water reintroduced into the environment will protect the water quality of the receiving water body and the aquatic environment. WTD implements WRP-1 by producing Class A reclaimed water at the South, West Point, Brightwater, and Carnation Treatment Plants, where water is treated to the highest standards set by the Washington Departments of Ecology and Health to ensure protection of public health and the environment in compliance with the requirements each facility's RW Permit. WTD actively develops non-potable supplies for irrigation, industrial use, and ecological enhancement such as wetland recharge, streamflow support, and groundwater replenishment.

WRP-2 — Prepare feasibility report on reclaimed water for regional water supply

Beginning in 2005, WTD collaborated with Cascade Water Alliance to develop the best available data, information, and pragmatic tools that participating water agencies could use to assist in planning for and managing their respective water systems and resources. King County then chose to proceed with a feasibility study to meet the intent of the policy. The *Reclaimed Water Feasibility Study* was completed March 2008. The feasibility study included a review of current and developing recycled water technologies, economic framework for assessing reclaimed water projects, revenue sources for recycled water distribution facilities, environmental and regional benefits of RW, an update of regional market analysis for RW, a business plan for King County's existing and near-term recycled water program, and proposed next step of developing a RW comprehensive plan. A draft *Reclaimed Water Comprehensive Plan* was developed 2008-2012 but WTD was directed by KC Council to put the plan on hold prior to completion.

WTD has also jointly developed recycled water feasibility studies with Covington Water District, City of Bothell, Cascade Water Alliance, City of Renton and a draft study with the City of Kirkland.

WRP-3 — Investigate reclaimed water as a new supply for fish, nonpotable uses, and to defer potable supply needs

WTD continues to investigate recycled water as a resource for salmon habitat and irrigation substitution. The Sammamish Valley Recycled Water Project indicated that

recycled water could reduce diversions from the Sammamish River, protect streamflows for fish, and potentially serve as a non-potable irrigation supply while maintaining soil health and crop quality.

WRP-4 — Coordinate reuse program with regional water supply and basin plans

WTD coordinates recycled water use with basin-level water supply strategies by coordinating and collaborating with agencies such as Washington Water Trust, the Cascade Water Alliance and local water purveyors (such as the Woodinville Water District) as well as integrating recycled water into wetlands. WTD is committed to partnership with the region's drinking water utilities to explore how production and delivery of recycled water could align with drought mitigation, agricultural demand, and habitat restoration.

WRP-5 — Implement nonpotable projects on a case-by-case basis evaluating cost, cost recovery, demand, environmental benefits, and risk

WTD evaluates recycled water projects individually by considering customer needs, environmental outcomes, infrastructure cost, and rate impacts, and then incorporates this cost and benefit evaluation into distribution expansion projects. For example, the Brightwater distribution system evaluation was incorporated into the Brightwater Reclaimed Water Backbone White Paper, ver. 3, March 2006 and the Brightwater Reclaimed Water System Engineering Report, October 2006. During the Reclaimed Water Comprehensive Planning process, 2008-2012, the costs and benefits were quantified for strategies for expansion for the region. More recently, the 2026 Renton RW Feasibility Study evaluated: how South Plant's RW quality compared to the quality needed for specific non-potable irrigation and industrial uses; potential customer demand, concerns, and incentives; infrastructure alternatives and phasing; and costs, rate options, expected cost recovery, and non-monetary benefits. The Renton RW Feasibility study was a collaborative effort jointly funded by WTD and the City of Renton.

WRP-6 — Work with local water purveyors to evaluate reuse opportunities

WTD has collaborated with multiple water purveyors on their water system plans when requested and on joint recycled water feasibility studies. King County has partnered with Covington Water District, the City of Bothell, City of Kirkland, Cascade Water Alliance, and City of Renton on joint recycled water feasibility studies evaluating the potential for recycled water distribution into their service areas. WTD has ongoing communication with Cascade Water Alliance, Woodinville Water District, and City of Seattle to coordinate on their needs and concerns for expansion of recycled water.

WRP-7 — Develop a water reuse public education and involvement program

WTD fulfills WRP-7 through public-facing webpages, fact sheets, fill-station guidance, onsite signage requirements, and major outreach efforts like collaborating on the 2024 Sammamish Recycled Water Project booklet, which educates consumers, farmers, and community groups about recycled water benefits, safety, and permitted uses. WTD also operates CitySoil Farms, a teaching farm and native tree nursery located at South Plant that showcases RW's use in sustainable farming.

WRP-8 — Coordinate with DOH, Ecology, federal, state, local, tribal agencies, and community groups

WTD actively coordinates with the Washington Departments of Ecology and Health in permitting and oversight of recycled water projects and collaborates with multiple partners—including UW researchers, WSU, nonprofits, agricultural producers, and tribal groups—in basin-scale planning and outreach for recycled water use and environmental protection.

WRP-9 — Work with DOH and Ecology on individual reuse projects

WTD works directly with Ecology and Health on a project-by-project basis to ensure recycled water meets Class A standards and all regulatory requirements. WTD communicates with Ecology and Health early in the process so their concerns and guidance can inform the project. This includes review, approval, and monitoring associated with treatment technologies and conveyance systems. WTD provides Ecology and Health information on research studies we have collaborated on with others..

WRP-10 — Maintain exclusive rights to reclaimed water generated at County plants

WTD implements WRP-10 by retaining exclusive ownership and control over recycled water produced at its treatment plants. This ensures the County can manage distribution systems, allocate supply to priority environmental and agricultural uses, and coordinate projects under its regional wastewater authority.

WRP-11 — Ensure reuse does not impair existing water rights unless mitigation occurs

WTD primarily discharges to Puget Sound where no water rights exist. The Carnation Treatment Plant planning evaluated beneficially using recycled water at Chinook Bend Wetland. As part of that work a water rights impairment analysis was completed and a determined that water rights would not be impairment. WTD will implement WRP-11 where recycled water reduces river withdrawals on future projects and thereby aligns with

water-rights protections and streamflow enhancement goals. WTD is committed to ensure uses do not impair rights or require negotiated mitigation.

WRP-12 — Retain flexibility to produce and distribute reclaimed water at all treatment plants

WTD meets WRP-12 by maintaining recycled water production systems at South Plant, Brightwater, and Carnation, and by evaluating expansion opportunities at current and potential future facilities on a case-by-case basis. WTD's ability to adjust recycled water production supports future uses such as environmental enhancement and industrial uses not suited for potable water.

WRP-13 — Evaluate funding of pilot-scale reuse projects from the wastewater utility rate base

WTD has completed pilot-scale projects such as the Sammamish Valley agricultural demonstration; supported through internal resources and external partnerships. Research on CECs and PFAS in recycled water is similarly funded through a combination of utility and research grants.

WRP-14 — Conduct economic and financial feasibility assessments

Feasibility assessments are integrated into RWSP recycled water program reviews and planning documents. WTD evaluates environmental benefits, cost recovery, potential stranded costs, and coordination with wastewater/sewer capital planning as part of its ongoing recycled water program reporting and decision-making.

WRP-15 — Consider reclaimed water discharges to Ballard Locks when beneficial

WTD has evaluated the use of recycled water discharges to enhance lake volume near the Ballard Locks in past studies. At this time, a project to support this need has not been deemed feasible.

TPP 5, 7–8 — Study discharges to water bodies, satellite plants, and expanded reuse at existing/new treatment facilities

WTD implements these provisions by conducting recycled water studies, such as the recent Carnation Wetlands study, exploring satellite facility concepts, and consideration of future expansion of recycled water production at newer facilities such as Brightwater and Carnation.

CP 6–7 — Integrate reuse planning with conveyance and treatment planning and evaluate demand-management alternatives

Recycled water planning is considered in WTD’s conveyance and treatment planning processes. WTD continues to evaluate how recycled water can reduce demand on potable and freshwater systems and help manage seasonal irrigation pressures.

Implementation 6 — Continue producing reclaimed water for non-potable uses and coordinate public education with conservation programs

WTD fulfills implementation 6 by producing recycled water for irrigation and wetland enhancement, while also providing public education and outreach with broader conservation messaging through its recycled water webpages, outreach materials, signage, and engagement with potential recycled water users.

2025 SCAP – GHG 55 — Public-private ventures to expand recycled water for climate-smart agriculture

WTD is advancing the SCAP GHG 55 by working with recreational businesses and tree farms to use recycled water for irrigation in ways that reduce synthetic fertilizer demand and support climate-resilient irrigation needs.

2025 SCAP – Prep 18 — Expand recycled water use for drought mitigation

WTD addresses drought mitigation by supplying recycled water during peak irrigation season, enabling businesses to reduce reliance on potable water sources and increase regional resilience as drought becomes more frequent.

iii. The system “must-dos”

While WTD’s overall RW program is not explicitly required by the state, it is required by King County code (see above Recycled Water Policies, Table 1). In addition, the RW programs at individual facilities are required for different reasons as detailed below.

For Brightwater, the treatment plant’s outfall lease from the WA Department of Natural Resources (DNR) requires WTD to implement “reasonably practical disposal alternatives” to reduce the quantity of effluent discharged to marine waters, including through the “beneficial use of reclaimed water.”⁸ To that end, WTD is required to submit an annual report documenting its progress towards reducing Brightwater’s marine discharges by expanding the use of RW. Further, the WA Supreme Court affirmed in *Cedar River, et. al. v. King County, et. al* that if King County had not agreed to mitigation conditions including the creation of Brightwater’s RW program and distribution system, “it would have been unlikely that King County would have received the DNR easement to allow for the siting and

⁸ WA DNR outfall lease, on file at F:\Resource Recovery\RECYCLED WATER\01-Brightwater\Permitting\DNR lease

construction of the Brightwater outfall.”⁹ Thus, the continuation of Brightwater’s RW program is required to maintain the outfall lease critical for Brightwater’s operations.

For Carnation, the use of RW for wetland enhancement purposes is mandated by the 2006 Final Settlement Agreement between Washington Trout, King County, and the City of Carnation (“parties to the Settlement Agreement”). In response to a legal challenge from Washington Trout to King County’s 2004 Carnation Treatment Plant and Outfall Final Environmental Impact Statement, the parties to the Settlement Agreement agreed to implement the Chinook Bend Project to restore a degraded wetland and discharge treated effluent as RW to the wetland. Carnation is required to discharge RW to the wetland at all times except for narrowly defined exceptions, such as plant upset, emergency, or failure of the UV disinfection system.¹⁰ Carnation’s RW program is regulated under a joint RW/NPDES permit, and continued use of RW for wetland enhancement is a fundamental regulatory obligation for operating this facility.

King County is not under any explicit state or federal mandate to produce RW at South Plant but continues to do so as directed by King County policy and in support of WTD business needs.

Each facility in Washington that produces recycled water must meet the requirements of the Reclaimed Water Rule (“RW Rule”, see WAC Chapter 173-219) and the requirements of that facility’s individual Reclaimed Water permit. All three WTD recycled water facilities (Brightwater, South Plant, and Carnation) specifically produce Class A recycled water, which is the highest quality classification of recycled water and requires biological oxidation, coagulation, filtration, and disinfection (chlorine or ultraviolet light). WTD is also required to conduct continuous water quality testing to confirm that the RW meets strict state health and environmental rules. Implementation for an RW program requires detailed engineering, planning, operation, maintenance, monitoring, and cross-connection control measures. Public notice and comment are required, and enforcement includes inspections, penalties, and corrective actions. In order to serve individual RW customers, WTD and the customer must sign a Use Agreement that further specifies the roles, responsibilities, and requirements for proper RW use. A key component of each User Agreement is the site evaluation, where WTD determines if an individual use type and use location are consistent with the RW Rule, the relevant facility’s RW permit, and is protective of public health and the environment.

⁹ *Cedar River, et. al. v. King County, et. Al.*, 2013

¹⁰ 2006 Final Settlement Agreement between Washington Trout, King County, and the City of Carnation

iv. Current and budgeted expenditures, revenue, and avoided costs

Operating Expenditures

Table 2: Averaged Annual Operating Expenditures for 2020-2025

Average Annual Operating Budget Expenditures	Average Annual Program	% of Total WTD Operating Expenditures
Recycled Water	\$550,000	0.30%
Resource Recovery Overall	\$16,400,000	8.90%
WTD Total	\$184,000,000	100.0%

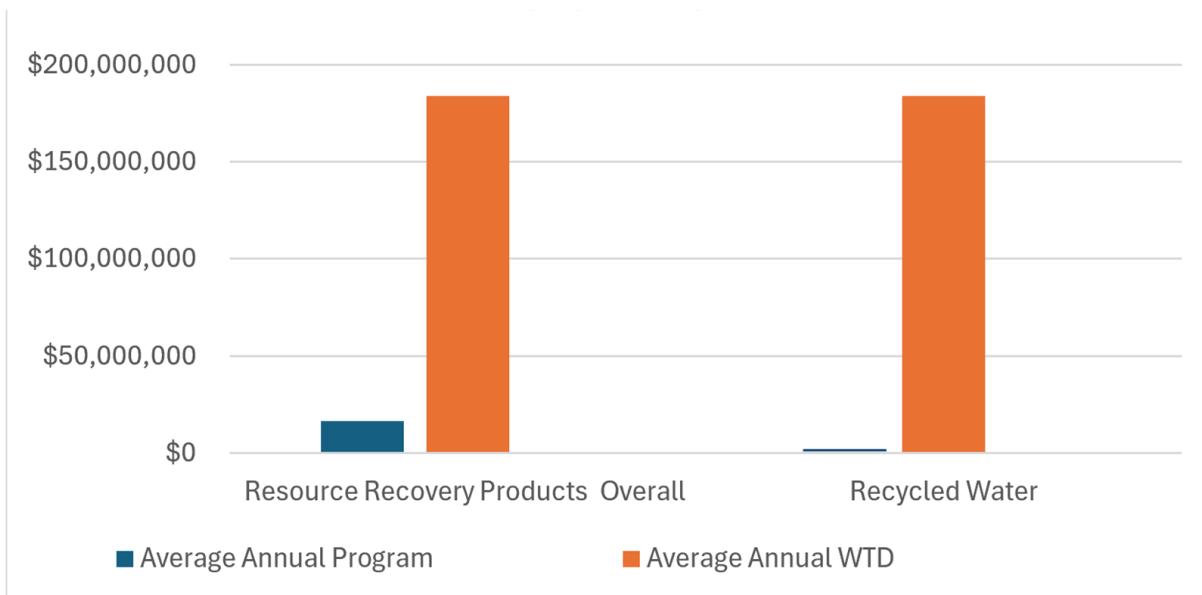
These tables present the program-related operating costs of the Recycled Water (RW) Program, which supports regulatory requirements such as permitting, reporting, and conducting required studies, onboarding customers, meter reading, and facilitating distribution by coordinating with operations staff. They do not include the additional chemical treatment required to produce Class A recycled water, the labor associated with maintaining RW distribution infrastructure, or any costs incurred before 2020. These categories of cost are not tracked within this accounting framework.

Much of the activity and labor associated with RW production supports essential process water needs for South Treatment Plant operations or required treatment for wastewater discharge for Brightwater and Carnation Treatment Plants. As a result, there is no distinct “cost of producing recycled water” when its production is integral to operating the treatment plant. Wastewater treatment requires large volumes of clean water, making WTD the primary user of the recycled water it produces. At South Plant, approximately 94% of recycled water generated is used internally for process needs, based on a recent five-year average. Without access to recycled water, WTD would need to purchase significantly more potable water from local purveyors at higher cost. Thus, one of the key financial benefits of WTD’s RW Program is the avoided cost of potable water purchases.

The original construction costs for the Brightwater and Carnation recycled water distribution systems were incorporated into the overall treatment plant construction budgets. RW availability was a critical regulatory requirement for both facilities, and the associated infrastructure was therefore integral to their approval and construction.

Some labor related to RW systems also directly supports process water availability for plant operations. Operations and maintenance staff do not track those hours separately.

Figure 2: Resource Recovery, Recycled Water, and WTD Expenditures



2026-2036 Capital Cost Estimates

Capital cost projections should be understood as high-level placeholders rather than defined future investments. From the 2027 Sewer Rate forecast, for the first decade (2026-2036) Recycled Water program projects are about 0.6% of the total WTD capital forecast, totaling approximately \$81 million.

This is reflective of historical average spending but with significant uncertainty. At this early stage, project scopes, schedules, and delivery approaches are not yet established, and many elements depend on evolving regulatory direction, partnerships, operational needs, and funding availability. As such, these figures illustrate the possible magnitude of investment rather than a committed plan, and several projects may ultimately shift, be deferred, or not move forward as conditions change.

This uncertainty is typical for long-range capital planning and therefore are best understood as placeholders that illustrate the potential scale of investment rather than commitments to construct the full suite of listed projects.

Revenue

Table 3: Averaged Annual Revenue for 2020-2025

Average Revenues	Average Annual Program	% of Total WTD Operating Revenue
Recycled Water	\$111,000	0.02%
Resource Recovery Overall	\$9,500,000	1.60%
WTD Total	\$596,000,000	100.0%

Revenue generated from recycled water represents a very small share of WTD's overall operating budget. Although the average annual revenue associated with the Recycled Water Program is minimal when compared with WTD's total operating expenditures, it is important to consider the program's cost-avoidance and environmental stewardship benefits in addition to the revenue it generates. In the context of all resource recovery products, recycled water contributes only a small portion of total program revenue, yet it delivers significant operational benefit by reducing potable water purchases and supporting reliable plant operations.

Avoided costs

Because large volumes of clean water are needed as inputs to the wastewater treatment process, WTD is its own largest customer of the recycled water it produces. For example, at South Plant 94% of the RW produced is used for internal process uses (recent 5-year average). If recycled water were not available, WTD would need to purchase more expensive potable water from local drinking water purveyors. Therefore, one of the primary financial benefits of WTD's RW program is the avoided costs it offers to WTD by reducing the agency's need for potable water.

At South Plant the operating cost to produce recycled water (including electricity, chemicals, and labor) has averaged an estimated \$1.40 per hundred cubic feet (\$/ccf) over the last 5 years. Potable water from the City of Renton cost an average of \$3.69/ccf over the same period. Because South Plant used an average of 91,000 ccf/year for internal process uses, the use of RW rather than potable water for internal process demands saved WTD approximately \$209,000/yr in avoided operating costs, or over \$1 million over the 5-year period 2021-2025. Over the lifetime of the South Plant RW system, which began

operating in late 1990s, the production of RW at South Plant has likely saved WTD several million dollars in avoided operating costs.

Disclaimers about how costs are tracked

The original costs of Brightwater's and Carnation's distribution systems were part of those treatment plants' construction and not tracked separately. It is unlikely either treatment plant would have been approved by regulators without RW available to mitigate effects, so those costs were included in the cost of treatment plant construction.

Some labor that may relate to RW systems contributes directly to the availability of process water for plant operation, and O&M staff do not track those hours separately.

v. Summary of science/data

Evidence shows that high-quality Class A recycled water, when properly treated and managed, can safely support a wide range of non-potable and environmental uses. WTD is committed to frequent testing and monitoring of its RW, reviewing the best available scientific research, and staying informed regarding emerging trends in the water reuse sector. The following areas of scientific research are particularly relevant as policy options are considered:

Existing Recycled Water Quality

The Dept of Ecology has set performance standards and requirements that must be met for Class A RW, as shown in Table 4. WTD consistently meets these requirements at all three of its RW facilities.

Table 4: Class A Minimum Biological Oxidation Performance Standards

Parameter^a	Requirement^b
DO	Must be measurably present
BOD	Monthly average: 30 mg/L; weekly average: 45 mg/L <u>(maximum)</u>
CBOD	Monthly average: 25 mg/L; weekly average: 40 mg/L <u>(maximum)</u>
TSS	Monthly average: 30 mg/L; weekly average: 45 mg/L <u>(maximum)</u>
pH	6–9 s.u.
Turbidity ^{c,d}	Monthly average: 2 NTU; sample maximum: 5 NTU <u>(maximum)</u>
Total coliform	7-day median: 2.2 MPN/100 mL or CFU/100 mL <u>(maximum)</u> Sample maximum: 23 MPN/100 mL or CFU/100 mL
Virus removal	Minimum 4-log removal or inactivation

a. Must be measured at the end of the unit process or alternative monitoring location as set in the RW permit.

b. Per WAC 173-219.

c. Sample maximum for turbidity is the highest value for the day that lasts longer than 5 minutes.

d. Standards based on the use of coagulation/filtration treatment.

BOD = biochemical oxygen demand; CBOD = carbonaceous biochemical oxygen demand; CFU = colony-forming units;

DO = dissolved oxygen; mg/L = milligrams per liter; mL = milliliters; MPN = most probable number; NTU =

nephelometric turbidity units; s.u. = standard units; TSS = total suspended solids.

In addition to the chemical parameters for which there are state-set performance standards, there are a number of additional parameters that WTD tests its RW for, either due to monitoring required by its RW permits or voluntary testing, as shown in Table 5.

Table 5: RW Water Quality Parameters Regularly Tested

Parameters Regularly Tested			
State required		Voluntary	
Biological Oxygen Demand (BOD)	Kjeldahl Nitrogen	Antimony	Mercury
Total Suspended Solids (TSS)	Nitrate + Nitrite	Arsenic	Nickel
pH	Ammonia Nitrogen	Barium	Selenium
Dissolved Oxygen	Total Phosphorus (P)	Beryllium	Silver
Turbidity	Total Dissolved Solids (TDS)	Cadmium	Thallium
Total coliform	Cyanide	Chromium	Zinc
Total Chlorine	Total Phenolic Compounds	Copper	SO4
Total Nitrogen (N)	Total Metals	Iron	Hardness
		Lead	Alkalinity
		Manganese	Contaminants of Emerging Concern (CECs)

A few specific parameters of particular interest are discussed below, and detailed results of all of the above parameters are available upon request.

Nutrients

WTD's Class A RW contains elevated levels of nutrients (ammonia, nitrite, nitrate, and phosphorus) which can act as an essential food source for plants and microorganisms. While these nutrients make RW an ideal water resource for irrigation because the RW essentially contains much of the fertilizer plants need to thrive, the levels of nutrients present in the RW are too high for certain other potential uses, such as cooling tower feed water and certain environmental enhancement uses like groundwater recharge. If

additional nutrients are removed by the treatment process in the future, WTD's RW could then be suited for a wider range of non-potable applications beyond irrigation.

Contaminants of Emerging Concern (CECs), including perfluoroalkyl and polyfluoroalkyl substances (PFAS)

Contaminants of emerging concern (CECs) are newly identified or unregulated synthetic and natural chemicals and biological agents found in the environment that may pose risks to human health and ecosystems. The term CEC covers a very broad category of substances ranging from pharmaceuticals, to microplastics, to PFAS (sometimes referred to as "forever chemicals"). Unlike the chemical parameters listed above in Table 5 which have established performance standards, Ecology has not established CECs standards for RW. WTD has voluntarily and proactively tested its influent, effluent, and recovered resources like recycled water and biosolids to better understand the risks posed by CECs.

The pathway by which CECs enter wastewater varies depending on the specific contaminant. For example, residuals from pharmaceuticals can enter wastewater through human waste or when medications are flushed.

For PFAS, the compounds are found in many consumer products, including dental floss, cosmetics, food packaging, rain jackets, non-stick cookware, and household items like paint, stain-resistant furniture, and carpet, and PFAS enters wastewater from these domestic sources. King County's wastewater is not industrially impacted by PFAS, which means our region does not contain PFAS manufacturers and most wastewater comes from residential sources. PFAS are found at low levels in most municipal waste systems across the country that serve residential and commercial users, and a 12-month study found that King County's wastewater have similar levels to other municipal waste systems.¹¹ There is currently no available treatment technology to cost-effectively destroy or remove PFAS that could be deployed at the scale of our regional wastewater system.

As a result, PFAS survives the wastewater treatment process, and these compounds are detected at low levels in WTD's effluent and recycled water. Average total PFAS concentrations in effluent sampled from October 2023 to August 2024 from WTD's three regional plants ranged from 47.3 to 73.2 nanograms per liter (ng/L), with the highest concentrations being seen at South Plant.¹² While the 2023-2024 sampling effort did not test RW specifically, it is assumed that PFAS concentrations in effluent are likely similar to those in RW. In 2021, WTD did specifically test South Plant's RW for PFAS, and the results

¹¹ [PFAS Chemicals in King County's Waste Systems](#)

¹² [PFAS Chemicals in King County's Waste Systems](#)

are presented in Table 6. The sampled concentrations are generally similar to the average range of wastewater treatment systems in areas where there are no PFAS manufacturers or major industrial sources.

To lend context to these values, comparisons are provided in Table 6 to current U.S. Environmental Protection Agency (EPA) drinking water maximum contaminant levels (MCLs) and the Washington Model Toxics Control Act (MTCA) preliminary groundwater clean-up levels. The EPA drinking-water MCLs are requirements which public drinking water systems must meet by 2029 under the current rule. The MTCA preliminary groundwater clean-up levels are applicable to groundwater that is a current or potential potable drinking water source.¹³ It is noted that these EPA and MTCA levels apply to drinking water or groundwater that may become drinking water, and not recycled water for non-potable uses, but this information is included as a reference.

Table 6: South Treatment Plant (STP) RW PFAS Concentrations (2021)

Parameter	STP RW Concentration ^a (ng/L)	EPA drinking-water MCL ^b (ng/L)	MTCA preliminary groundwater clean-up levels (ng/L)
3:3 FTCA	2.03		
5:3 FTCA	29.68		
6:2 FTS	3.19		
HFPO-DA	-		24
N-EtFOSAA	0.42		
N-MeFOSAA	1.22		
PFBA	22.73		8,000
PFBS	33.18		345
PFDA	0.86		
PFHpA	5.15		
PFHxA	45.88		8,000
PFHxS	3.85	10.0	65
PFNA	0.99	10.0	9
PFOA	7.36	4.0	10
PFOS	5.60	4.0	15
PFOSA	ND		
PFPeA	13.38		
PFPeS	0.77		
a. Represents average of four samples.			

¹³ Department of Ecology Toxics Cleanup Program (2023). Guidance for Investigating and Remediating PFAS Contamination in Washington State. Retrieved from: <https://apps.ecology.wa.gov/publications/documents/2209058.pdf>

- b. Based on MCLs as of 10/1/2025; PFAS MCLs originally included additional parameters (i.e., a Hazard Index); EPA recently withdrew those elements.
- c. EPA = U.S. Environmental Protection Agency; MCL = maximum contaminant level; ND = non-detect; ng/L = nanograms per liter;

It is important to evaluate the effects of CECs present in RW once that RW is applied to the landscape. Generally, CECs research shows that recycled water from municipal wastewater treatment plants has a low likelihood of contaminating crops, groundwater, and waterways compared to other sources.¹⁴ Researchers have generally concluded that many CECs preferentially remain and subsequently degrade in soil, with relatively low risk of significant human exposure from plant uptake.^{15, 16, 17} However, more mobile CECs, like PFAS, may be infiltrating groundwater underlying recycled water irrigation areas.^{18, 19} Some researchers have found that carbamazepine, sulfamethoxazole, ibuprofen, PFOS, and PFOA can migrate to groundwater from soil.^{20, 21} Recently published literature concerning the fate and transport of CECs in recycled water continues to emphasize the need for

¹⁴ Kolodziej, Edward P., Douglas P. Collins, Nathan E. Stacey, Richard Jack. 2024. Contaminants of Emerging Concern, Crop Production, and Soil Fertility After Irrigation with Sammamish Valley Recycled Water and Surface Water. [Published on the King County Website.](#)

¹⁵ Kisekka, Ilya, Grattan, Stephen; Salcedo, F.P.; Gan, J.; Partyka, M.L.; Bond, Ronald F.; Bernstein, N.; Radcliffe, John; Adin, Avner. 2024. Assessing the State of Knowledge and Impacts of Recycled Water Irrigation on Agricultural Crops and Soils. *USA: Water Research Foundation* <http://hdl.handle.net/102.100.100/637824?index=1>

¹⁶ Shi, Qingyang, Yaxin Xiong, Parminder Kaur, Nathan Darlucio Sy, Jay Gan. 2022. Contaminants of emerging concerns in recycled water: Fate and risks in agroecosystems, *Science of The Total Environment*. Volume 814. <https://doi.org/10.1016/j.scitotenv.2021.152527>.

¹⁷ Yalin, David, Hillary A. Craddock, Shmuel Assouline, Evyatar Ben Mordechay, Alon Ben-Gal, Nirit Bernstein, Rabia M. Chaudhry, Benny Chefetz, Despo Fatta-Kassinos, Bernd M. Gawlik, Kerry A. Hamilton, Leron Khalifa, Isaya Kisekka, Iftach Klapp, Hila Korach-Rechtman, Daniel Kurtzman, Guy J. Levy, Roberta Maffettone, Sixto Malato, Céila M. Manaia, Kyriakos Manoli, Orah F. Moshe, Andrew Rimelman, Luigi Rizzo, David L. Sedlak, Maya Shnit-Orland, Eliav Shtull-Trauring, Jorge Tarchitzky, Venus Welch-White, Clinton Williams, Jean McLain, Eddie Cytryn. 2023. Mitigating risks and maximizing sustainability of treated wastewater reuse for irrigation. *Water Research X*. Volume 21. <https://doi.org/10.1016/j.wroa.2023.100203>.

¹⁸ Fries, Elke, Olfa Mahjoub, Borhane Mahjoub, Anne Berrehouc, Julie Lions, Mufit Bahadir. 2016. Occurrence of contaminants of emerging concern (CEC) in conventional and nonconventional water resources in Tunisia. *Fresenius Environmental Bulletin*. Volume 25 (9). [Published online.](#)

¹⁹ Delli Compagni, Riccardo, Marco Gabrielli, Fabio Polesel, Andrea Turolla, Stefan Trapp, Luca Vezzaro, Manuela Antonelli. 2020. Risk assessment of contaminants of emerging concern in the context of wastewater reuse for irrigation: An integrated modelling approach, *Chemosphere*, Volume 242, <https://doi.org/10.1016/j.chemosphere.2019.125185>.

²⁰ Delli Compagni et al, 2020.

²¹ Szabo D, Coggan TL, Robson TC, Currell M, Clarke BO. 2018. Investigating recycled water use as a diffuse source of per- and polyfluoroalkyl substances (PFASs) to groundwater in Melbourne, Australia. *Science of The Total Environment*. <https://www.sciencedirect.com/science/article/abs/pii/S0048969718325294?via%3Dihub>

further research regarding off-site transport.²² Understanding agronomic application rates, soil binding capacity, and site-specific geologic considerations would all play a role in determining groundwater contamination potential.

In an effort to better understand risks posed by CECs in WTD's RW, WTD partnered with Washington State University and the University of Washington researchers who led a study comparing the impacts of CECs in WTD RW and Sammamish River water for the irrigation of carrots and kale research plots.²³ Both water sources contained CECs, and while recycled water had higher concentrations, the concentration of CECs in the soils and plants after irrigation was similarly low regardless of water source. A toxicology analysis²⁴ found that health effects from consuming crops grown with recycled water are minimal and not expected to exceed allowable risk ranges.²⁵ So far, researchers have found that industrial discharges, the use of firefighting foams, and waste disposal are clearer sources of PFAS contamination, in particular, but research into recovered resources should continue, given the importance of local conditions.²⁶ WTD should also continue its partnership with Seattle-King County Public Health to coordinate on any public health risk.

The effects of Contaminants of Emerging Concern (CECs) on groundwater quality

While WTD does not currently use RW for groundwater recharge, it is possible WTD could pursue that use of RW in future where it is deemed safe. Therefore, WTD has reviewed scientific research evaluating the effects of other agencies' groundwater recharge programs.

There are 11 facilities currently permitted to use RW for groundwater recharge in Washington, including the Lacey Olympia Thurston Tumwater Clean Water Alliance (LOTT). In 2023, LOTT completed a 10-year study to better understand what residual chemicals may remain in recycled water after treatment, and what happens to those chemicals when reclaimed water is infiltrated into the ground and used to replenish groundwater.²⁷

²² Shi et al., 2022

²³ Kolodziej et al., 2024

²⁴ The study's risk assessment assumed people would eat carrots and kale 350 times a year, 50% of those vegetables would be grown with recycled water, the vegetables would contain the highest quantity of CECs seen in the study, and 100% of those CECs would stay in the body.

²⁵ Kolodziej et al., 2024

²⁶ Peter, Lynda Godwin and Linda S. Lee. 2025. Sources and Pathways of PFAS Occurrence in Water Sources: Relative Contribution of Land-Applied Biosolids in an Agricultural Dominated Watershed *Environmental Science & Technology*. Volume 59 (2). <https://pubs.acs.org/doi/full/10.1021/acs.est.4c09490>

²⁷ LOTT Clean Water Alliance (2023). Reclaimed Water Infiltration Study (Summary & Tasks 1-4) [Reclaimed Water Study | LOTT Clean Water Alliance](#)

LOTT's study found that its treatment processes are effective at removing many residual chemicals in wastewater, but some chemicals (including CECs) do remain after treatment. Residual chemicals are also found in the environment – in areas where reclaimed water is infiltrated to replenish groundwater – and in areas where it is not. LOTT established a monitoring well network on and near its recharge basin site, and conducted a tracer test to understand how reclaimed water moves underground through soil layers and aquifers after it leaves the site. LOTT then sampled the monitoring wells to understand how residual chemical concentrations change as water moves away from the site and created computer models of reclaimed water flow and residual chemical concentrations 100 years into the future. The study evaluated possible risks for humans and wildlife, based on the model and toxicology information for each residual chemical of interest, and found that infiltrating RW into groundwater resulted in very low risk to human health and no identified risks to ecological health. A key finding was that under current conditions, risks from infiltrating reclaimed water into groundwater are low and the water is safe. However, LOTT acknowledged that conditions are expected to change over time and study results will likely need to be revisited in the future.²⁸

Climate change and regional water supply needs for people and the environment

Climate change is anticipated to increase temperatures in the Pacific Northwest and shift the timing and type of precipitation.²⁹ The primary impacts to surface water include a shift towards less snow and more rain, reduced snowpack and earlier spring melt, higher peak streamflow and lower minimum flows, higher water temperatures, and more frequent drought.^{30, 31} Groundwater is strongly influenced by precipitation timing and amounts, and climate driven impacts to groundwater include reductions in the amount of surface water available to recharge aquifers and an increased reliance on groundwater to meet human water demands when surface water is less available. It is expected that these impacts, many of which are already evident in 2026, will continue to intensify throughout the rest of the century.³² These climate change impacts on regional water supply are expected to have wide reaching impacts on water utilities, farmers, and ecosystems.

²⁸ LOTT (2023).

²⁹ Rogers, M., G. Mauger, and S. Salimi (2025). How Does Global Warming Relate to Impacts in Washington State? Report prepared for the Washington Department of Ecology. Climate Impacts Group, University of Washington.

³⁰ Department of Ecology (2026). Overview of the *Washington's Water Future* Initiative. [Microsoft PowerPoint - WWF Tribal Virtual Session 07132026 DRAFT](#) and "

³¹ HDR (2026a). Future Water Needs for People and Environment in the Puget Sound Region under Climate Change

³² HDR (2026a).

The two largest regional water utilities serving King County are Seattle Public Utilities (SPU) and Cascade Water Alliance (CWA), which in turn sell water wholesale to various other public water systems. Both agencies have identified climate change as a risk to be addressed and are actively engaged in planning efforts to better understand climate change's local effects and how it may impact the reliability of their water supplies. Both SPU and CWA have identified that developing alternative water supplies may be desirable or even necessary, but new water supply is only one option of many potential climate change adaptation strategies. Other options, including adjusted operations or new storage could prove more cost-effective for regional water utilities. In this context, recycled water is one potential resource that could contribute to regional needs, which can be considered for feasibility and cost-effectiveness in collaboration with drinking water suppliers.

Climate change's effect on the water supply available to King County farms is more difficult to summarize, as farms rely mostly on private groundwater rights to meet irrigation water demand³³ and farms' water supply access varies widely across the County. Some farms in the Sammamish Valley and Green River Valley Agricultural Protection Districts already lack the water supplies desired for effective irrigation and can therefore only grow dryland crops.^{34, 35} It is expected that increased temperatures and summer droughts will continue to increase evapotranspiration and reliance on irrigation, but more accurate forecasts could help farmers conserve water and optimize yields.³⁶

Stream and rainfall changes related to climate change will also impact King County ecosystems, particularly the aquatic habitat needed for fish including salmonids. Reduced streamflow and increased stream temperature as a result of reduced snowpack will harm fish species and related food chains.³⁷ Under moderate climate change scenarios, the Cedar River and Snoqualmie River are projected to have minimum flows 25 percent lower

³³ AMP Insights (2022). Current and Future Irrigated Agriculture in King County, Washington.

³⁴ AMP Insights (2025). Sammamish Current and Potential Irrigation Water Demand.

³⁵ AMP Insights (2020). Water Rights Assessment for the Lower Green River Agricultural Production District Technical Memorandum.

³⁶ Bumbaco, K.A., G.S. Mauger, L.K. Colligan, L.W. O'Neill, and D.J. Hoekema (2024). 2023 Pacific Northwest Water Year Impacts Assessment. A collaboration among the Washington State Climate Office, Climate Impacts Group, Oregon Climate Service, Idaho Department of Water Resources, and NOAA National Integrated Drought Information System.

³⁷ Yoder, J. and C. Raymond (2022). Climate Change and Streamflow: Barriers and Opportunities. Report prepared for Washington State Department of Ecology Water Resources Program. A collaboration between the State of Washington Water Research Center and Climate Impacts Group.

and 18 percent lower in 2080 than historical, respectively.^{38, 39} Reduced streamflow as a result of reduced snowmelt will be compounded by reduced summer precipitation and likely increases in human water withdrawals for irrigation and agriculture in response to drier, hotter summers. The cultural significance of rivers and fish to local tribes puts these communities at particular risk of climate impacts.⁴⁰

In summary, climate change is expected to have profound effects on King County's water resources, and those effects will likely intensify in future decades. While the largest regional water supplier, SPU, currently projects no need for additional water supplies before 2050, new water supplies may be needed for smaller water utilities, agricultural water users, and/or drought stressed ecosystems. Recycled water has been shown to support water demands such as these in other regions and could potentially do so in King County as well.

D. Example practices from other jurisdictions and relevant industries

Across the United States, there are currently more than 500 facilities that produce RW for purposes including irrigation of crops and landscaping, industrial processes, groundwater recharge, and ecosystem restoration.⁴¹ In addition to its benefits as a resilient supplemental water supply, RW reduces the discharge of pollutants into local receiving waters, which can result in regulatory benefits and financial savings for wastewater utilities. RW has also been employed to support economic development by providing cooling water for new industries without impacting water supplies already dedicated to existing domestic and industrial purposes. While many of the nation's oldest RW facilities are concentrated in the arid Southwestern US due to that region's persistent water scarcity, as climate change accelerates water stress across the world, RW has emerged as a key adaptation strategy in regions that historically had more abundant water supplies, such as the East Coast and Pacific Northwest.

Chesapeake Bay Region, Eastern Virginia

In the Chesapeake Bay watershed in eastern Virginia, numerous wastewater utilities have embraced RW to reduce nutrient discharges to sensitive water bodies while also adding to the resilience of local water supplies through reuse. Utilities in Fairfax and Loudoun

³⁸ Washington State Department of Ecology (2020). Watershed Restoration and Enhancement Plan WRIA 8—Cedar Sammamish Watershed

³⁹ Washington State Department of Ecology (2020). Watershed Restoration and Enhancement Plan WRIA 7—Snohomish Watershed

⁴⁰ Puget Sound Partnership (2024). Puget Sound Salmon Recovery Plan Addendum.

⁴¹ U.S. Environmental Protection Agency (2025). Basic Information about Water Reuse. Available at: <https://www.epa.gov/waterreuse/basic-information-about-water-reuse#basics>

Counties, Virginia both faced regulatory mandates to remove more nutrients (particularly nitrogen) from their wastewater effluent in the early 2000s. After improving their treatment facilities to produce higher-quality effluent, agencies in both counties discovered they could recover significant revenue by selling their improved effluent as RW to nearby industrial and irrigation customers rather than discharging the effluent to local water bodies. Embracing RW has allowed these wastewater utilities to recover significant revenue and support water-intensive economic development that would not have been possible without water reuse.⁴²

Near Norfolk, Virginia, Hampton Roads Sanitation District (HRSD) embraced water recycling to address several overlapping challenges simultaneously. In 2010, HRSD faced a mandate to reduce nutrient discharges to Chesapeake Bay from wastewater and stormwater, with an expected required infrastructure improvement cost of over \$3 billion. At the same time, the region was experiencing declining groundwater levels from over-pumping, and some local water purveyors were facing the loss of up to the half of their historical groundwater allocations. To solve both problems simultaneously, HRSD proposed recycling 50 mgd of wastewater by treating it to drinking-water standards and storing it in the local aquifer for reuse. The plan reduced up to 90% of HRSD's direct nutrient discharges to the Bay and helped ensure adequate groundwater supplies for drinking water utilities. Subsequent economic studies have estimated HRSD's Sustainable Water Initiative for Tomorrow (SWIFT) water recycling program saved the region \$2-5 billion, compared to the cost of meeting regulatory requirements without water reuse.⁴³ HRSD was uniquely positioned as the regional wastewater utility to provide solutions to Hampton Roads' regional problems, because "HRSD managers were insulated from some of the pressures that would have prevented local jurisdictions from paying to solve another city's problems."⁴⁴

Puget Sound Region, Washington

In the Puget Sound region, a similar set of dynamics drove the Lacey, Olympia, Tumwater and Thurston County Clean Water Alliance (LOTT) to embrace water recycling as a key strategy to holistically manage regulatory compliance and water supply needs. LOTT's service area is located at the southern end of Puget Sound and it discharges its treated

⁴² HDR (2026b). Recycled Water in King County and Beyond: Regional Wastewater Services Plan Update, Recycled Water and Climate Change Research.

⁴³ HDR (2026b).

⁴⁴ HDR (2026b).

effluent to Budd Inlet. Beginning in the 1980s, Ecology has placed increasingly strict nutrient discharge requirements on LOTT to protect water quality in Budd Inlet. The region has also experienced significant population growth from the 1980s to the 2000s. In the late 1990s, LOTT identified the production of Class A recycled water as a key strategy to significantly reduce potable water consumption and decrease the volume of effluent being discharged to the Puget Sound. Today, LOTT operates two facilities that produce Class A RW, primarily for irrigation and groundwater recharge. The groundwater recharge facility has been in operation for approximately 10 years, and its recharge function is a key component of a water rights mitigation plan for the Cities of Lacey and Olympia, supporting the cities' abilities to expand regional groundwater withdrawals for drinking water purposes to meet future water demands.⁴⁵ This approach has allowed LOTT to take advantage of “economies of scope” whereby their commitment to solving more than one problem (e.g. nutrient discharge reduction, water supply) results in a multi-benefit solution more cost-effective than addressing each problem individually.⁴⁶

E. Policy issues, challenges, and opportunities

Policy Issues

Existing King County RW policies were written in the 1990s with the intent of giving WTD the direction needed to explore incremental expansion of its distribution systems and to explore new environmental enhancement uses. WTD is directed by code to pursue recycled water projects, while protecting public health and the environment, and to do so on a case-by-case basis in consideration of costs and benefits. While existing policies provide several specific criteria to be considered when evaluating new projects, the criteria do not include any thresholds for accepting or denying projects or prioritize the relative importance of each criterion. For example, WRP-13 and WPR-14 direct the County to consider funding projects partly or fully through the wastewater rate, and to conduct economic feasibility assessments studying “the benefits of equitable cost splits between participating agencies and utilities”, among other factors; these policy leave considerable ambiguity about how projects should be funded and if policy requires any particular funding approach or cost split. In general, policies are directed towards system expansion, but current policies do not address how to evaluate the investments necessary for the maintenance and/or improvement of the existing system. Several of the original

⁴⁵ HDR (2026b).

⁴⁶ Rosenblum, E., F. Marcus, R. Raucher, B. Sheikh, and S. Spurlock (2022). Multi-agency Water Reuse Programs: Lessons for Successful Collaboration. Washington, D.C.: EPA. Retrieved from: https://www.epa.gov/system/files/documents/2022-03/multi_agency_water_reuse_programs-lessons_for_successful_collaboration_march_2022.pdf

policies call for studies which have now been completed, but policies have not yet been updated to reflect the results of those study efforts.

Members of MWPAAC and RWQC have also noted additional topics that existing policies do not fully address. One concern is how risks of contaminants in RW and their potential impact on groundwater resources should be evaluated. Another policy area where clarification was requested is around coordination with drinking water utilities, and how potential impacts from lost venue to drinking water purveyors from customers converting to RW should be considered.

Challenges and opportunities with current facilities

There are a number of challenges and opportunities WTD has identified related to the operation of its existing RW facilities.

At Brightwater, the RW system has experienced recurring interruptions in the delivery of RW during recent summer irrigation seasons. Key factors that have contributed to distribution interruptions include the lack of a dedicated RW storage tank and the age and length of the main RW conveyance pipeline between Brightwater and customer sites in the Sammamish Valley. There are also challenges operating the pipeline when demand is low, such as at the beginning and end of the irrigation season; operators have indicated that the RW system runs more smoothly with higher demand. Investing in an RW storage tank and refurbishing the RW conveyance infrastructure could address many of these distribution reliability issues. Despite these challenges, there are substantial opportunities for the Brightwater RW system. Brightwater's existing permitted capacity (and physical capacity) to produce 12 million gallons per day (MGD) of RW vastly exceeds current average dry-season demand of approximately 1 MGD. Many new customers could be added without needing production capacity improvements. Existing distribution infrastructure conveys RW to Sammamish Valley, where many more irrigators exist that are not yet served with RW. Adding new customers in the Sammamish Valley will require willing partners and coordination with local drinking water utilities.

At South Plant, the existing RW system includes many original components from the 1990s pilot system that are approaching or have reached the end of their useful lives. The most urgently needed improvements are the refurbishment of South Plant's 3 sand filters, and plumbing improvements within South Plant that would increase the amount of RW that can be used for internal process purposes, reducing the demand for potable water. The South Plant RW distribution system extends into the Cities of Renton and Tukwila but is not fully utilized currently. South Plant's current RW demand is low relative to its max capacity, and operators have indicated that system operation would be easier with higher demand.

There are opportunities to connect to additional customers or increase the RW use of existing customers with minimal capital investments. South Plant has a 550,000 gal storage RW tank, so does not have the reliability issues from lack of storage that have challenged Brightwater. The South Plant RW has additional expansion opportunities as identified in the recent *Renton RW Feasibility Study*, including options that mostly utilize existing infrastructure estimated to have low costs and positive cost recovery. As is the case for options to expand Brightwater's system, adding new customers at South Plant will require willing partners and coordination with local drinking water utilities.

At both Brightwater and South Plant, operational opportunities include the need to refurbish existing infrastructure to improve or preserve reliability and pursuing new customer connections that could allow improved economies of scale, because both RW systems are difficult to operate at low flows.

Because Carnation's RW system recycled 100% of treated effluent for wetland enhancement during normal operation, there is limited opportunity for additional improvements.

Challenges and opportunities beyond existing facilities and policies

The Puget Sound region is facing increasing stress from climate-driven impacts to water supply for people, farms, and fish, while WTD simultaneously faces regulatory pressure to continue seeking alternative options for its effluent disposal beyond marine discharge. Expanded RW use has the potential to provide benefits for both water supply and effluent disposal, but current RW infrastructure is too small to offer meaningful benefits at a regional scale.

As Washington State's regulatory framework for recycled water has evolved, there is growing interest in groundwater recharge, environmental augmentation, and indirect potable reuse that could offer new opportunities for recycled water use in King County. The County's existing RW policies are tailored to incremental case-by-case expansion and are therefore not sufficient to determine if it is appropriate to invest in RW on a larger scale to meet larger needs. Challenges include potentially high capital costs, uncertain long-term demand, water quality concerns, and the need for collaborative coordination with drinking water utilities, private sector partners, environmental stakeholders, and regulators. Environmental enhancement potentially offers significant benefits but would require additional investment in treatment capacity to meet regulatory requirements.

WTD would benefit from clearer policies on the appropriate scale of RW investment as it considers when, how, and where to invest in RW over the next 30 years.

F. Range of policy options with associated actions and considerations (including qualitative description of costs)

- i. Under what circumstances should the region expand the use of reclaimed water? Which uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation) are most appropriate?

Many of the circumstances that would drive the need for the region to expand the use of RW are outside of the direct control of WTD. Those circumstances include the County facing increased water supply needs due to population growth, climate change, and/or droughts, which could manifest in the form of:

- Salmon Recovery needs (flow replacement due to multiple low flow years and/or drought)
- Agricultural water demand rises or farmers lose access to historic supplies
- Willing partners seek projects (cities, businesses, farmers, and others)
- Water suppliers decide demand displacement (substituting RW for drinking water for non-potable uses) is strategic and those suppliers seek new partnerships
- Water suppliers wish to use recycled water to mitigate for new water rights (“water for water” mitigation)

In addition, there are a number of regulatory circumstances that could drive WTD to expand RW use:

- Water quality or quantity limitations are imposed on WTD’s effluent discharges that increase the need for alternative discharge options (i.e. nutrients standards, temperature, zero discharge)
- Outfall lease conditions mandate expanded recycled water use
- Treatment processes change, causing recycled water quality to improve and allowing for new uses such as environmental enhancement for lower marginal cost

Any of the above circumstances could potentially justify an expansion of the region’s use of recycled water, and WTD will need to make decisions about potential investments in recycled water expansion while contending with inherent uncertainty about which of the above future circumstances may occur. WTD therefore has focused on providing policy options that represent a range of investment levels to respond to future circumstances. Each policy option also contains a corresponding mix of recycled water uses (e.g., environmental benefits, groundwater recharge, industrial uses, irrigation).

Policy Option #1: Maintain current policies by continuing to serve existing recycled water customers, adding new customers along existing infrastructure, and expanding

distribution on a case-by-case basis. This option focuses on serving existing customers, adding new users along existing infrastructure, and maintaining Chinook Bend Wetland Enhancement Site. New environmental enhancement and pilot projects could be pursued on a case-by-case basis. Costs are relatively low and primarily tied to asset management and incremental improvements. However, this approach limits the County's ability to respond to future water needs, constrains environmental benefits, and does not fully address RW system reliability challenges.

Policy Option #2: Prioritize new strategic investments incrementally by making improvements to treatment and RW infrastructure to allow WTD to serve meaningfully larger volumes of RW and increase environmental enhancement uses. This option provides incremental flexibility to meet potential midcentury water resource needs through targeted investments in RW storage, treatment upgrades at BW and SP, and infrastructure investments to reach new users. Key investments are made proactively to prepare the RW system to scale up more quickly in future if needed, but the largest capital investment are deferred until specific driving circumstances occur. This approach requires improved partnerships with water supply utilities. Benefits include increased flexibility to respond quickly to future needs, improved system reliability, and the ability to pursue groundwater recharge and wetlands enhancement. Costs can be partially offset through RW rates.

Policy Option #3: Regionally expand recycled water production and distribution systems to position the County to contribute major support to regional water resource needs. This option proposes proactively and ambitiously pursuing large-scale RW expansion, additional treatment capacity and enhanced distribution corridors, and increased use WTD effluent for non-potable and environmental uses. It positions RW as a significant component of regional resilience and drought preparedness. Costs are higher and require sustained capital and operating investments, long-term partnerships with drinking water utilities, and potential state-level legislative support. Benefits include significant environmental enhancement, regional water supply diversification, and longer-term system resilience.

Summary of Policy Options

	Description	Goals/outcomes	Tradeoffs
#1	Maintain current policies by continuing to serve existing recycled water (RW) customers, adding new customers along existing infrastructure, and expanding distribution on a case-by-case basis.	RW infrastructure is maintained, runs reliably, and customers are served, with focus remaining on irrigation, commercial, and industrial uses. RW system is expanded incrementally on a case-by-case basis through partnerships. Additional environmental enhancement projects are pursued at a pilot scale. RW production remains a relatively small fraction of WTD's total effluent volume.	RW will not significantly reduce WTD's effluent discharges to Puget Sound. RW capacity will not grow large enough to contribute significantly to region's future water resource needs, and WTD will struggle to quickly expand RW if more is needed in future. Environmental benefits of more ambitious RW policies will go unrealized. RW system reliability may remain a challenge if investments are not prioritized. Near term costs remain low.
#2	Prioritize new strategic investments incrementally to provide flexibility to adapt to current and future needs and increase environmental enhancement uses.	Ability to scale RW for potential mid- to late-century needs. Critical improvements to treatment and the RW systems to allow WTD to serve meaningfully larger volumes of RW, while preserving fresh water supply. Primarily expanded use and distribution systems from Brightwater, Carnation, and	Projects may not be large enough to offer sizable benefits to nutrient discharge requirements beyond operational flexibility. Expansion will only benefit areas near South Plant, Brightwater, and Carnation

		South Plant serving more agricultural, commercial/industrial use, and environmental enhancement uses through partnership with businesses and others. Region gains the flexibility to scale RW further in future.	Increased environmental enhancement projects can benefit local watersheds Increased costs would be needed to scale RW to meet new demands in select areas as regional needs under climate change become more clear
#3	Regionally expand recycled water production and distribution systems to position the County to contribute major support to regional water resource needs.	Region is well-positioned for mid-century needs. New treatment and distribution assets allowing RW to meet significant non-drinking and environmental water needs across the region, beyond the immediate vicinity of treatment plants. RW is used as a regional insurance policy to reduce the impacts of drought emergencies, regulatory mandates, or system capacity constraints to protect public health, environmental outcomes, and system reliability.	RW system will require large and sustained capital and operating investments corresponding to regional scope. Projects will require durable long-term partnerships with drinking water utilities, who accept RW as key to regional supply. RW will be part of the portfolio to meet region's water needs for people and the environment while reducing nutrient loading to Puget Sound

G. Interested and affected parties WTD will engage to gather input

MWPAAC and the component agencies that WTD provides sewerage services to are one of the audiences that need to be engaged on the recycled water policy options. Additional engagement with potable water purveyors, tribes, community-based organizations (CBOs), and environmental non-governmental organizations (NGOs), businesses, industries, and the general public may be conducted during implementation planning.

H. Rate structure considerations (if applicable)

There are no known rate structure considerations for this policy question. Revenues from resource recovery reduce the amount of revenue that needs to be generated from sewer rates but represented less than 2% of WTD's total revenues in 2025.

I. Relationship to contracts

There are no known contract implications for these policy questions.

Under its contracts with its constituent sewer agencies, WTD collects rate revenue for the purpose of wastewater treatment. The question of whether WTD is authorized to spend these funds on recycled water projects has been explicitly raised in litigation and ruled upon by the Washington Supreme Court (*Cedar River, et. al. v. King County, et. al.*, No. 86293-1). Among other claims, appellants in that case challenged "King County's power to use sewage funds to build a distribution system for reclaimed water on the theory that the two activities are distinct and revenues raised for one purpose may not be used for another" and that "the sewage treatment utilities should not have to bear the cost of building the disposal systems for the reclaimed water."

The claim that sewer funds cannot be spent on reclaimed water distribution was dismissed at trial and that ruling was later affirmed and upheld by the Washington Supreme Court, which found that "Disposing of the reclaimed water is a necessary part of operating a sewage treatment plant, and the legislature has strongly urged beneficial use of the resource." While this litigation was specifically related to Brightwater Treatment Plant, the ruling has been interpreted by the County to affirm WTD's larger authority to use sewer funds collected under its contracts on reclaimed water projects. None of the proposed policy options are expected to alter WTD's authority to fund reclaimed water with sewer funds.

J. Equity and Social Justice (ESJ) impacts

WTD's recycled water program currently supports a variety of amenities that benefit the public, including the irrigation of athletic facilities at parks and the enhancement of a wetland with recreational nature trails at the Chinook Bend Natural Area. Recycled water is

also used to irrigate locally grown fruits and vegetables at CitySoil Farm at South Plant, the majority of which are donated to White Center Food Bank.

There are farms in the county that currently lack reliable water supplies but could be served by recycled water in the future, including farms in the Sammamish Valley. Equitable and thoughtful distribution of Class A RW to additional locations in King County has the potential to support new or improved environmental and recreational amenities for public enjoyment and can be a tool for fighting food insecurity.

Some policy options presented in this memo propose expanded environmental enhancement uses of recycled water, which has the potential to support regional goals around climate change adaptation and salmon recovery.

WTD engages in rigorous and consistent safety monitoring of its recycled water that goes significantly beyond the requirements of State regulations. Ensuring any potential contaminants are properly characterized and understood is a priority for WTD's RW program and an important consideration for responsible beneficial use.

Further analysis of ESJ-related impacts and outcomes related to potential policy options will be addressed in the Step 2 analysis later.

K. Summary of how MWPAAC/RWQC input was addressed

This section will be added into the policy memo as Step 1 memos are finalized.

L. Planning-level cost estimates

This section will be added into the policy memo as the Step 2 analysis later.

M. Evaluation of outcomes: identify impacts and outcomes of each option

This section will be added into the policy memo as the Step 2 analysis later.

Wastewater Treatment Division**Executive summary****RWSP Update – Group #8, Resource Recovery, Policy Memo #16 – New Recovered Resources**

This executive summary provides a synopsis of the policy questions, problem statement, issues, challenges, and the options developed for the New Recovered Resources (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update.

Policy questions

1. How should WTD maximize recovery of new resources? How should WTD prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

Problem statement

WTD's existing RWSP policies provide policy direction on WTD's currently recovered resources: biosolids, recycled water, and biogas. However, there are many other resources that can be recovered from wastewater, in various states of technology and market development. Maximizing recovery of resources has obvious benefits for environment, community, and promoting circular economies. In some cases, resource recovery can be a mechanism to achieve regulatory compliance. Resource recovery generally generates some revenue to offset the cost of wastewater treatment. WTD would benefit from policy direction on the conditions under which recovery of new resources should be pursued.

Policy issues, challenges, and opportunities

WTD has options in pursuing recovery of new resources, currently not recovered by the utility. Issues, challenges, and opportunities include cost; over the project lifecycle, does implementation cost money, or is it cost neutral or revenue positive? Also benefits to the utility; does recovering the resource help WTD's operational efficiency, or does it help achieve regulatory compliance? Also environmental benefits; does recovering the resource reduce greenhouse gas emissions, promote a circular economy, or reduce nutrient loading, as examples? Finally, community benefits; are there communities or industries in King County that could benefit from using these recycled resources? Considering recovering new resources through the lens of a "triple bottom line" analysis would assist in answering these questions.

Policy options

More detail for the policy options that answer the questions are described below.

Policy question #1: How should WTD maximize recovery of new resources? How should WTD prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

- a. Policy option #1: Implement the recovery of new resources if they are cost neutral or revenue positive. Implement recovery and sale of new recovered resources that have operational or regulatory benefits (e.g., phosphorus removal from RW).

Outcomes: The driver for recovery of new resources is limited to benefits to the utility (cost, operational, or regulatory benefits).

- b. Policy option #2: Implement recovery of new resources if expanded cost analysis valuing environmental and community co-benefits shows net benefit.

Outcomes: The driver for recovery of new resources is expanded to include benefits to the environment and/or community.

Relationship to other RWSP topics

Resource Recovery is a foundational part of the Regional Wastewater Services Plan (RWSP) Update and is essential for sustaining the regional wastewater system into the future. As such, it intersects with many RWSP topics as described below:

- 1) Pollution Source Control & Legacy Pollution
 - Source control is our first and best strategy for reducing contaminants in recovered products.
- 2) Climate Impact Preparedness & Natural Hazard Resiliency
 - Resource recovery can help offset climate impacts through water supply and energy production.
 - While Resource Recovery covers production of some renewable energy resources that are byproducts of the treatment process, the Climate topic covers production of additional renewables that are not byproducts (e.g., solar)
- 3) Asset Renewal & Replacement
 - Existing assets are essential to treating and delivering recycled water, biosolids, and biogas.

4) Treatment

- Pursuit of resource recovery opportunities is one possible driver for considering a treatment technology, i.e. resource recovery drives the new treatment technology.
- It is possible that new treatment technologies would produce different types or quantities of biogas, biosolids, or recycled water product, i.e. a new treatment technology drives (or limits) resource recovery opportunities.
- New treatment technologies that remove contaminants positively affect resource recovery opportunities.

RWSP Update – Resource Recovery - New Recovered Resources

Policy Memo #16

A. Policy Question

This memo is focused on the policy questions related to the New Recovered Resources (Resource Recovery) topic of the Regional Wastewater Services Plan (RWSP) Update. The policy question explored in this memo is:

- i. How should WTD maximize recovery of new resources? How should WTD prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

B. Problem statement

WTD's existing RWSP policies provide policy direction on WTD's currently recovered resources: biosolids, recycled water, and biogas. However, there are many other resources that can be recovered from wastewater, in various states of technology and market development. Examples include products still in the conceptual research stage, such as renewable electricity derived from microbial fuel cells. On the other end of the spectrum, there are other products already being recovered in other utilities, such as phosphorus recovered for a retail fertilizer product by Clean Water Services in Oregon. Maximizing recovery of resources has obvious benefits for environment, community, and promoting circular economies. In some cases, resource recovery can be a mechanism to achieve regulatory compliance, such as removing and repurposing nutrients (e.g. nitrogen or phosphorus) in order to meet effluent discharge limits for nutrients. Resource recovery generally generates some revenue to offset the cost of wastewater treatment. In some rare instances, resource recovery can be a cost neutral, or even revenue positive, enterprise for a utility. WTD would benefit from policy direction on the conditions under which recovery of new resources should be pursued.

C. Contextual and baseline information

i. What is known about the topic and current conditions

While WTD is currently recovering biosolids, recycled water, biogas, and sewer heat from our wastewater stream, there are many additional resources that can be recovered from wastewater. These additional resources include new ways of utilizing current products; for example, Class A biosolids could be mixed with other materials to create soil blends. New resources fall into three general categories (water, energy, materials) but are wide ranging in terms of the type of resource, the market for the resource, and the level of technology readiness to recover the resources. Some resource production technologies are in early stages of research and development, while others use established production methods at

other utilities around the nation and world. The table on the following pages outlines some known resources that can be recovered from wastewater; currently not being recovered by WTD.

ii. What would “trigger” WTD to consider new recovered resources

There are several reasons why WTD might consider recovering new resources. These include, but are not limited to, the following:

- Regulatory compliance benefits. For example, removing nitrogen or phosphorus from effluent, or phosphorus from biosolids, in order to meet regulatory standards.
- Operational benefits. For example, recovering struvite, a phosphate mineral, to prevent fouling, clogging, and equipment damage.
- Market drivers. For example, peak phosphorus, the moment when maximum global phosphorus production is reached, posing risks to agriculture and food security. Unlike nitrogen, which can be synthesized industrially from air, phosphorus is primarily mined from phosphate rock. Wastewater is a source of phosphorus.
- Revenue benefits. Related to “market drivers” above, this scenario could occur when sale of a resource would bring in more revenue than the marginal cost to recover it.
- Environmental benefits. These benefits overlap with most of these scenarios. At minimum, any new recovered resource is an opportunity to promote a circular economy and reuse resources, which has environmental benefits. Specific examples of environmental benefit include increasing renewable energy production (e.g. microhydro electricity) which offsets fossil fuel use at treatment plants, and/or in the broader community.
- Community benefits. Community benefits also overlap with most of these scenarios, as any benefit to environment and utility affordability would also presumably benefit the community. More specifically, communities or industries in King County could identify a need for a new resource that is found in wastewater. For example, recovery of renewable aviation fuel or cellulose for building materials could benefit specific communities and industries in King County.

Table 1. Selected examples of recoverable resources from wastewater; not currently being recovered by WTD.

*TRL = Technology Readiness Level, a method for estimating technology maturity (see table footnote for TRL details)

Name of resource	Uses	TRL	Explanation	Implementation	Case studies
Carbon dioxide	-Agriculture -Industry	9	Carbon capture; recovered from biogas. Uses include: 1) Agriculture: greenhouse horticulture to stimulate plant growth 2) Industrial: welding, dry ice, pH control, fire suppression, beverage additive 3) Water treatment: pH neutralization 4) Fuel: feedstock for sustainable aviation fuel	-Proven technology, in use at more than 3 dozen locations worldwide. -Obstacles include low market penetration, underdeveloped end user market, transportation of resource	-AquaMinerals, Netherlands -Veas WWTP, Norway -IVAR WWTP, Norway
Carbon dioxide	GHG sequestration	4-9	Carbon capture to recover CO ₂ for geologic sequestration. There are multiple processes such as amine absorption, membrane separation, solvent absorption, and wastewater alkalinity enhancement.	Potential source of carbon offset credits. This technology has been commercialized. -Vendors include Orsted, CREW Carbon.	-Infraserv Höchst, Frankfurt -Fall River Wastewater Treatment Plant, MA. -East Shore Water Pollution Abatement Facility, CT

Name of resource	Uses	TRL	Explanation	Implementation	Case studies
Biogas utilization for fuel	Aviation fuel	3 - 6	Carbon can be captured for direct use or conversion to methanol to generate sustainable aviation fuels. General carbon capture TRL is 8-9. However, the conversion to fuel is 3-6.	-This technology is often employed by deriving biogas from agricultural/organic waste, such as sugarcane. -Some technologies are commercialized but lack integration into the wastewater treatment process. -Vendors include OmnaGen, Syzygy Plasmonics, SynCor	
Phosphorus	Agriculture	9	-Phosphorus can be crystallized and removed as different minerals, depending on chemical composition, including: struvite, vivianite, brushite. -Phosphorus removal can be a solution to operational issues with struvite, which forms naturally in WWTPs and can form plaques on pipes/equipment, causing O&M issues. -Can also be a solution to nutrient limits on phosphorus in effluent or biosolids. -Generally used as fertilizer pellets; primarily as source of phosphorus for plants -Other uses include pigment (vivianite is blue); raw material for LFP batteries.	-Proven technology, in use at many WWTPs worldwide -Vendors include: Centrisys (CalPrex; MagPrex); Veolia (Struvia); Ostara (Pearl system)	-Clean Water Services, OR (Ostara) -Denver Metro Water Recovery (MagPrex) -Brussels; Braunschweig (Struvia) -Metropolitan Water Reclamation District of Greater Chicago (fluidized bed reactors + chemical dosing)

Name of resource	Uses	TRL	Explanation	Implementation	Case studies
Sulfur	-Agriculture -Building	4 - 5	Biodesulfurization uses bacteria to convert H ₂ S into solid elemental sulfur. Use in agricultural applications; and as a binder for concrete.	-Claus sulfur recovery process is the industry standard for conversion of H ₂ S into elemental sulfur; used in oil refineries, natural gas processing plants. The sulfur in the WWTP biogas is too low to make the process cost effective. -Paques Biotechnology (THIOPAQ) is a vendor with slightly different process.	-Five Points Pipeline, Riverdale, CA (dairy biogas pretreatment) -Illinois Casinghead Gas Project (oil & gas) -Eerbeek & Aviko, Netherlands -Cocal industrial WWTP, Brazil
Nitrogen	-Agriculture -Fuel	7 - 9	-Conventional nitrogen removal processes from municipal wastewater are energy and cost-intensive; major constraint is low concentration in wastewater, as compared to urine. -recovery of high concentration aqueous ammonia products can be further processed into fuel, fertilizer.	Several technologies exist including: struvite precipitation, air or steam stripping, bioelectrochemical systems, adsorption, microalgae use.	-Victor Valley, CA, ammonia removal (Anaergia) -Kloten Opfikon WWTP, Switzerland
Metals	Industrial	3 - 6	Various metals recovery, including high value metals (gold, platinum, etc)	Traditional methods include membrane filtration, ion exchange, chemical methods, and filtration. Mostly research and pilot scale.	

Name of resource	Uses	TRL	Explanation	Implementation	Case studies
Cellulose	Building	8	Cellulose fibers can be recovered for use as building materials (façade cladding, sheet piling, decking panels); also in road construction as additive to asphalt	“Cellvation” technology enables production of high grade market ready fibers for use as construction material.	-Utrecht, Netherlands (ReCell)
Biopolymer	-Agriculture -Industrial	4 - 7	EPS (extracellular polymeric substances) biopolymers are complex carbohydrates secreted by microorganisms such as bacteria, fungi and algae. Biopolymers are versatile substances which can be used as: soil improver, for binding/coating in horticulture, flocculate for clay, fire retardant, in paper industry as sizing agent, as ink.	Controlled extraction process separates biopolymers from bacterial biomass granules; thermal chemical treatments precipitate and extract biopolymer from sludge. Vendors include Kaumera (Nereda technology)	-In research phase (Netherlands) -Carbonera WWTP Treviso, Italy (pilot plant), -Blackburn Wastewater Treatment Works, UK (pilot)
Electricity	Multi-use	9	Electricity can be generated using microhydro (small hydroelectric turbine generators placed in water flow)	Microhydro electric turbine generators are in wide use worldwide, including on streams in remote areas to generate off-grid power. Application of this technology in wastewater treatment plants with constant flow (e.g. outfalls) is proven and relatively simple.	-Halton WWTP, Canada -Hydro BPT/Dŵr Uisce project, Ireland

*The TRL (Technology Readiness Level) is based on EERE R 40.112 02 (U.S. Department of Energy). Definitions summarized below:

Level 1: Basic research. The principles observed and reported.

Level 2: Applied research. Initial practical uses identified.

Level 3: Proof of concept validation. Early stage of development

Level 4: Component and/or process validation in laboratory.

Level 5: Component and/or process validated in relevant environment.

Level 6: System/process model or prototype demonstration in relevant environment. Prototype system demonstration.

Level 7: System/process model or prototype demonstrated in operational environment. Pilot system demonstration.

Level 8: System completed and qualified. Pre-commercial demonstration.

Level 9: System proven and ready for full commercial deployment.

iii. Current policies in code, contract, or in practice

There are no current policies in code regarding new recovered resources. One new recovered resource has been authorized since the last RWSP process: the Sewer Heat Recovery Program. This was authorized as a pilot program by the King County Council in 2020 ([Ordinance 19161](#)), and authorized WTD to enter into up to three agreements with private entities wishing to recover heat from WTD’s sewer lines. This pilot program is notable, and unusual as a recovered resource, in that it is designed to be revenue positive. The user designs, builds, owns, and operates their heat recovery system, reimburses WTD for staff time, and pays WTD a nominal fee for the energy transferred into or out of the system.

iv. The system “must-dos”

WTD’s mission statement is “We protect public health and the environment by collecting and cleaning wastewater *while recovering valuable resources* for a thriving Puget Sound region.” [emphasis added]

v. Current and budgeted expenditures

N/A

vi. Summary of science/data (if applicable)

Research and development into resources recoverable from wastewater streams is ongoing. Many are highly established technologies, and other utilities in the U.S. and internationally are already recovering these resources (e.g. phosphorus, microhydro renewable electricity). Other technologies are emerging as initial research projects, and have not been widely implemented (e.g. biopolymers). Marketability of products is also a factor—some recovered resources are highly sought after; others are products in need of a market.

D. Example practices from other jurisdictions/industry

There is a trend across the wastewater industry worldwide, away from using the term “wastewater treatment plant” (WWTP) to “water resource recovery facility” (WRRF). All WRRFs are WWTPs, but not all WWTPs are WRRFs. This marks a shift in the sector away from the goal of pollutant removal from wastewater for *discharge*, to pollutant removal for the purpose of *resource recovery*. Accordingly, there has been a rebranding in recent years of many wastewater treatment facilities--ex. Riverside Park Water Reclamation Facility (Spokane, WA), Rock Creek Water Resource Recovery Facility (Hillsboro, OR). Entire utilities have also been rebranded—ex. Metro Water Recovery (Denver, CO), AlexRenew (Alexandria, VA).

Examples of specific utilities recovering specific resources currently not recovered by WTD can be found in Table 1.

E. Range of policy options with associated actions and considerations (including qualitative description of costs)

Policy question:

- i. How should WTD maximize recovery of new resources? How should WTD prioritize and monetize environmental and other co-benefits when considering cost of recovering new resources?

Policy Option #1: Implement recovery of new resources if they are cost neutral/revenue positive, or provide operational or regulatory benefit.

Policy Option #2: Implement recovery of new resources if triple bottom line* analysis shows benefit.

*Triple Bottom Line Analysis = A business concept that explicitly measures social and environmental impact in addition to financial performance. This is in contrast to a standard “bottom line” analysis which only considers financial performance.

Summary of Policy Options

	Description	Goals/outcomes	Tradeoffs
#1	Implement the recovery of new resources if they are cost neutral or revenue positive. Implement recovery and sale of new recovered resources that also have operational or regulatory benefits (e.g., P removal from RW)	Recoup and recycle resources that ratepayers flush down the drain for the purpose of fiscal, regulatory, and community benefit; while ensuring these efforts pay for themselves monetarily	By limiting policy to opportunities that are cost neutral/positive, or provide regulatory compliance, could miss opportunities to provide additional environmental or community benefit.
#2	Implement recovery of new resources if expanded cost analysis valuing environmental and community co-benefits shows net benefit.	Recoup and recycle resources that ratepayers flush down the drain for the purpose of fiscal, regulatory, and community benefit; while explicitly valuing the community and environmental benefits.	May incur cost, in order to achieve environmental or community benefit, though this is true for most WTD activities. Will take time and effort develop customers/markets for new products.

F. Interested and affected parties WTD will engage to gather input

MWPAAC and the component agencies that WTD provides sewerage services to are one of the audiences that need to be engaged on the New Recovered Resources policy options. Additional engagement with tribes, community-based organizations (CBOs), and environmental non-governmental organizations (NGOs), businesses, industries, and the general public may be conducted during implementation planning. Community and NGO support for recycling is high; WTD would expect to see strong public support for a more proactive policy on pursuing new recovered resources.

G. Rate structure considerations (if applicable)

There are no known rate structure considerations for this policy question. It is possible that recovered resources can generate some limited revenue for WTD, but this is not anticipated to be enough to significantly impact overall WTD budget or rate structure.

H. Relationship to contracts

There are no known contract implications for these policy questions.

I. Equity and Social Justice (ESJ) impacts

Any ability that WTD has to recover and reuse resources that our community flushes down toilets and drains is expected to have positive community impacts. This is particularly true when those resources can be used locally. Specific to frontline communities, the current biosolids compost pilot program is a good example of how recovered resources can be used to benefit our community: compost is being donated to community gardens in underserved areas, to help communities grow their own food, increasing food security and ability to grow culturally sought after crops which may otherwise be difficult to source. Any future recovery and distribution of new recovered resources would be considered with an ESJ lens.

J. Planning-level cost estimates

This section will be added into the policy memo as the “Step 2” analysis later.

K. Summary of how MWPAAC/RWQC input was addressed

This section will be added into the policy memo as “Step 1” memos are finalized.

L. Planning-level cost estimates

This section will be added into the policy memo as the “Step 2” analysis later.

M. Evaluation of outcomes: identify impacts and outcomes of each option

This section will be added into the policy memo as the “Step 2” analysis later.

RWQC Work Program for 2026 October 7, 2026

The suggested agenda topics are based on the latest information available and are subject to change based on the availability of presenters and committee priorities. This work program will stay marked as “draft” to reflect that the committee will adjust the schedule throughout the year to accommodate any necessary changes.

RWSP Policy Analysis and RWQC

WTD is currently working on a multi-year plan to update the Regional Wastewater Services Plan. On January 16, 2025, the King County Council adopted the RWSP Update scope document to guide the update process. The scope document identifies policy questions to be analyzed as part of the RWSP Update. RWQC will have the opportunity to review the policy analysis both before and after the Draft RWSP is released.

Pre-Draft RWSP Update. Beginning in March 2026, the Wastewater Treatment Division (WTD) plans to present the initial analysis of selected policy questions from the RWSP Update scope document. WTD refers to this stage of the analysis for these policy questions as Step 1. Related policy questions will be grouped together. The intent of the initial Step 1 briefings is for members to receive information on each policy question and identify any gaps in the information or options presented by WTD. WTD’s initial analysis of the policy questions will provide a framework for the committee for future discussions on these policy questions. WTD expects the options presented at these initial briefings and any additional RWQC-identified options to be included in the Draft RWSP Update. WTD will accept feedback and suggestions on each group of policy questions during the month the analysis is presented to RWQC.

Beginning in Q4 2026 and continuing through Q3 2027, WTD intends to present cost information to RWQC on a rolling basis for the options related to each policy question. WTD refers to this cost information as Step 2. With this cost information, RWQC will have the opportunity to revisit any options it requested for analysis for inclusion in the DRAFT RWSP Update . All requested analysis and cost information for the policy questions is anticipated to be completed by Q3 2027.

After the DRAFT RWSP Update released. The Draft RWSP Update is scheduled for completion at the end of 2027. and RWQC will have another opportunity at this time to make comments to the Executive on the Draft RWSP Update The Executive will then develop the final Proposed Plan and transmit it to Council by the end of 2028 for Council adoption in 2029, at which time RWQC will have the opportunity to review and amend the plan.

MONTHLY MEETING SCHEDULE

January 7, 2026

- ✓ Regional Wastewater Services Plan Update: Update on RWSP Policy Analysis as Required by Proviso. This briefing will present the proposed schedule and grouping of policy questions.
- ✓ 2026 RWQC Work Program.

February 4, 2026

- ✓ An Overview of Water Quality in Puget Sound. Presentation by the Water and Land Resources Division, DNRP.
- ✓ Wastewater Treatment Division's Preliminary 2027 Sewer Rate and Capacity Charge, Including Rate Options.

March 4, 2026

- ✓ Proviso Response and Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 1: Separated System Conveyance (future conveyance capacity of the system, including Inflow and Infiltration and population growth.)
- ✓ WTD's 2027 Sewer Rate and Capacity Charge Recommendations and Options.
- ✓ WTD Initial Presentation Prior to Ordinance Transmittal on Proposed Capacity Charge Code Changes.

March 26, 2026 9-11 am. Optional Site Visit to South Plant to tour capital projects and compost pilot. This is not a RWQC meeting.

April 1, 2026

- ✓ Proviso Response and Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 2: Source Control and Legacy Pollution.
- ✓ WTD's 2027 Sewer Rate and Capacity Charge Recommendations and Options
- ✓ If transmitted and time available, Proposed Capacity Charge Code Changes.

May 6, 2026

- ✓ Executive's Proposed 2027 Sewer Rate and Capacity Charge.
- ✓ Proviso Response on RWSP Policy Questions.
- ✓ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 3: Asset Renewal and Replacement.
- ✓ Proposed Ordinance 2026-0066. Capacity Charge Code Changes.

June 3, 2026

- ✓ Proposed Ordinance 2026-0066 on Capacity Charge Code Changes.
- ✓ Regional Wastewater Services Plan Update: Policy Questions Initial Analysis Group 4: Climate Impact and Natural Disaster Resiliency.
- ✓ Executive's Proposed 2027 Sewer Rate and Capacity Charge.

June 25, 2026 Optional Visit to South Plant Treatment**July 1, 2026**

- ✓ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 5: Finance/Affordability.
- ✓ Capital Project Cost Update per proviso (Written).

August 5, 2026 (This is considered a special meeting due to Council Recess)

- ✓ Department of Ecology: Washington's Water Future Initiative. (20 minutes)
- ✓ Integrating Financial and System Sustainability. Briefing by Edward Cebon. (35 minutes)
- ✓ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 6: Combined System Management. (35 minutes).

September 2, 2026

- ✓ Vision for Clean Water 2100 (15 minutes)
- ✓ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 7: Level of Treatment (80 minutes).

October 7, 2026

- ☐ Puget Sound Institute Briefing on Low Oxygen Impacts in Puget Sound (30 minutes).
- ☐ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 8: Resource Recovery (60 minutes).
- ☐ Capital Project Cost Update per proviso (Written).

November 4, 2026

- ☐ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Group 9: Rate structure questions (70 minutes)
- ☐ RWSP 2027 Schedule (10 minutes)
- ☐ Briefing only on Proposed Ordinance (subject to transmittal) on Class A Biosolids (20 minutes)

December 2, 2026

- ☐ Class A Biosolids Proposed Ordinance (subject to transmittal) (30 minutes)
- ☐ Regional Wastewater Services Plan Update Policy Questions Initial Analysis Summary Groups 1-9 (25 minutes)
- ☐ Regional Wastewater Service Plan Update ESJ Approach (30 minutes)
- ☐ Capital Project Cost Update per proviso (Written).

Note for RWSP Update—Policy Analysis. Costing information for Policy Questions Groups #1-9 will be provided in 2027.

Monthly Written Report on Status Update for Motion 16900:

Committee requests monthly status report include status update on key tasks in Motion 16900, (WTD's sewer rate and capital work plan to improve engagement, transparency, and accountability) including:

- Develop and implement a process for MWPAAC and RWQC (as requested) to review a limited number of large capital projects selected by MWPAAC that substantively affect the rate.
- Develop public engagement strategy for rate payers in coordination with local contract agencies to explain why wholesale WTD rates are increasing and provide opportunities for public engagement.
- Independent consultant to review WTD's capital program.
- Evaluate regulatory requirements.
- Significant changes in capital project costs.
- Options for multi-year rate predictability.

DRAFT