

The Benefits of Recycled Water: The Choose Your Own Adventure Tool

PNWS-AWWA

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Outline



- What is recycled water?
- What can it be used for?
- What are the drivers for use?
- Where is it currently being used?
- What should I consider?

Types of Water

- Drinking water
 - Fit for human consumption
- Greywater
 - Untreated non-toilet wastewater
- Rainwater harvesting
 - Captured stormwater for irrigation
- Industrial Reuse Water
 - Treated processing water
- Recycled (Reclaimed) water
 - Highly treated wastewater
 - Safe for many uses
 - Meets strict standards set by the State



Recycled Water Defined

OAR 340-055-0010 (13) “Recycled Water means treated effluent from a wastewater treatment system which as a result of treatment is suitable for a direct beneficial purpose.”

RCW 90.46.010 (15) “reclaimed water means water derived in any part from wastewater with a domestic wastewater component that has been adequately and reliably treated, so that it can be used for beneficial purposes.”

IAC 58.01.17 200 (33) “Water that has been treated by a wastewater treatment system and is used in accordance with these rules.”

(35) “(Reuse) The use of recycled water for irrigation, ground water recharge, landscape impoundments, toilet flushing in commercial buildings, dust control, and other uses.”

Recycled Water = Reclaimed Water = Reuse Water

Industrial Reuse Water Defined

OAR 340-045-0010 (20) "Process Wastewater" means wastewater **contaminated by industrial processes** but not including non-contact cooling water or storm runoff.

RCW 90.46.010 (9) "Industrial reuse water" means water that has been used for the purpose of **industrial processing and has been adequately and reliably treated** so that, as a result of that treatment, it is **suitable for other uses**.

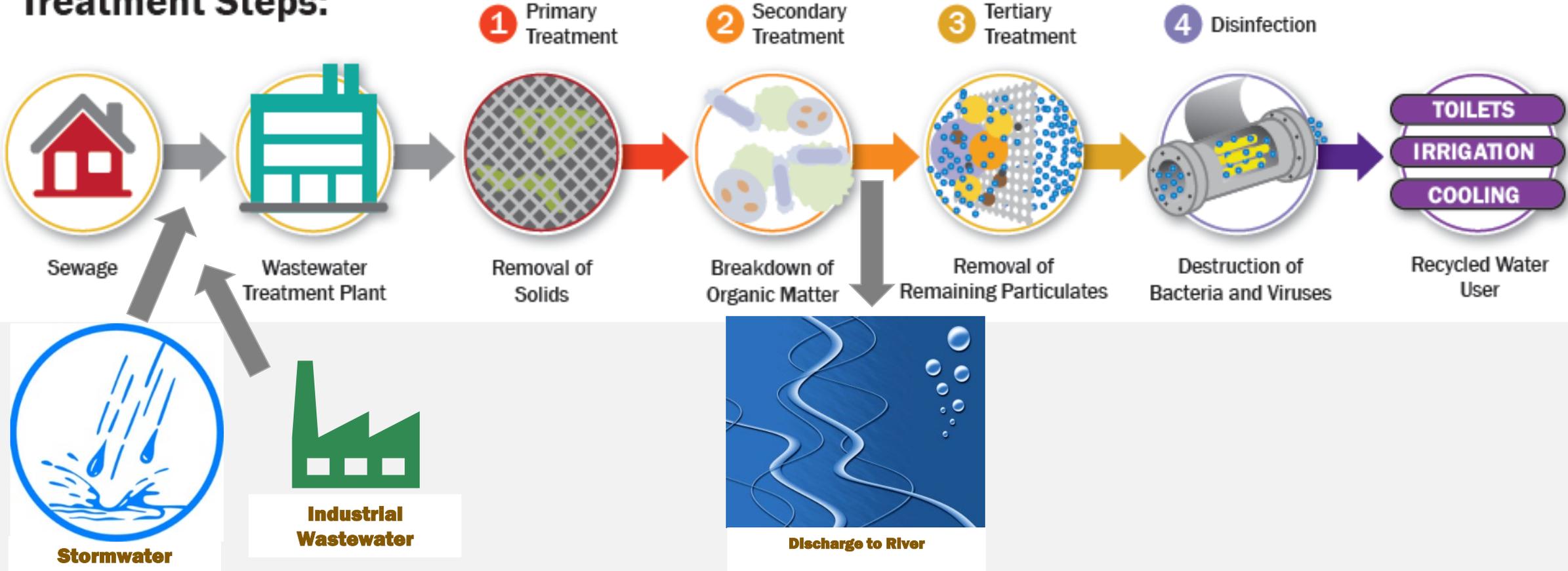
IAC 58.01.17 200 (10) "Wastewater that is the **by-product of any industrial processes** including, but not limited to, food processing or food washing wastewater."



Recycled Water

Recycled Water

Treatment Steps:



Classes of Reclaimed Water (WAC)

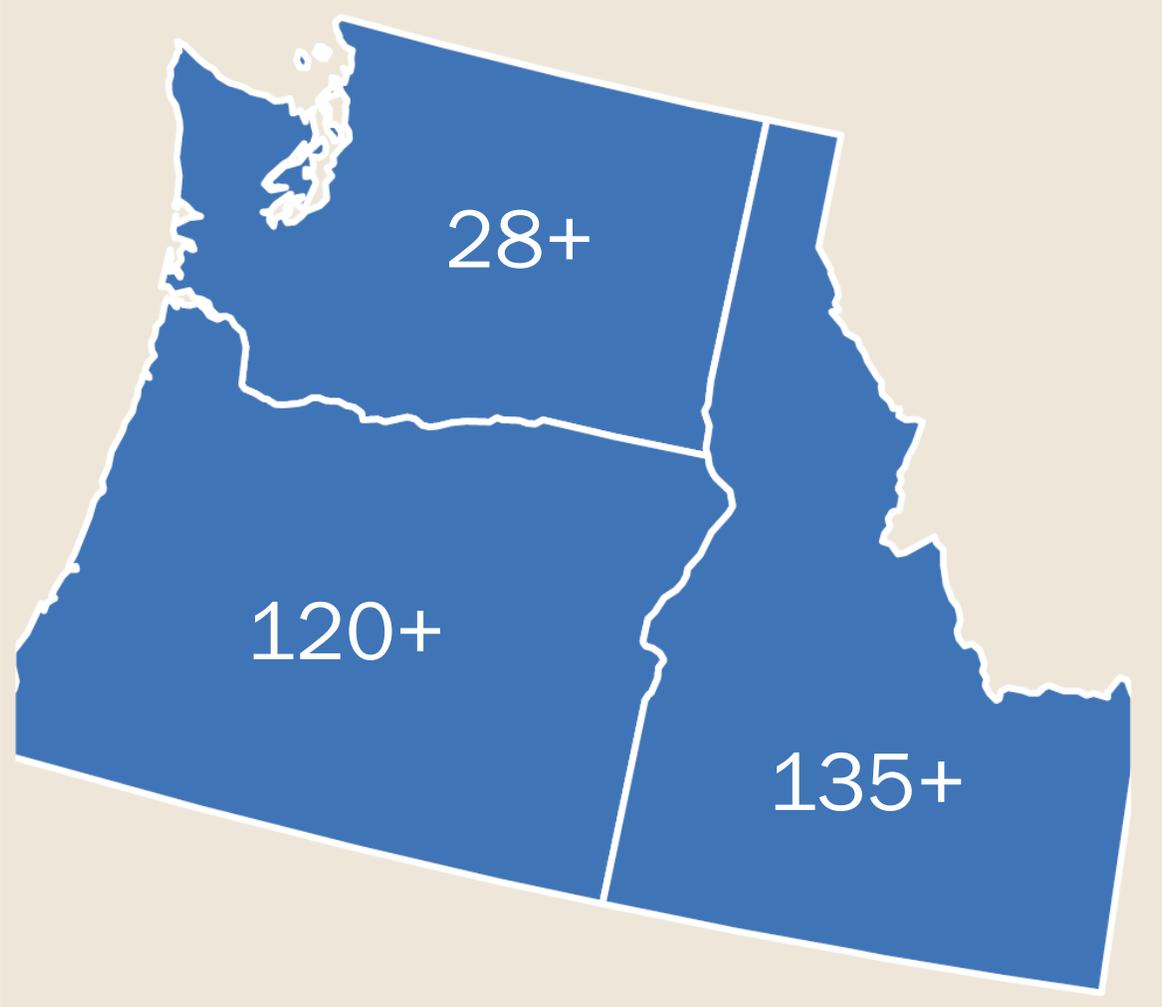
A₍₊₎

Oxidized, Coagulated, Filtered
Disinfected
<2 NTUs
2.2 per 100 mL TC

B

Oxidized, Disinfected
2.2 per 100 mL TC

Current Facilities and Permits



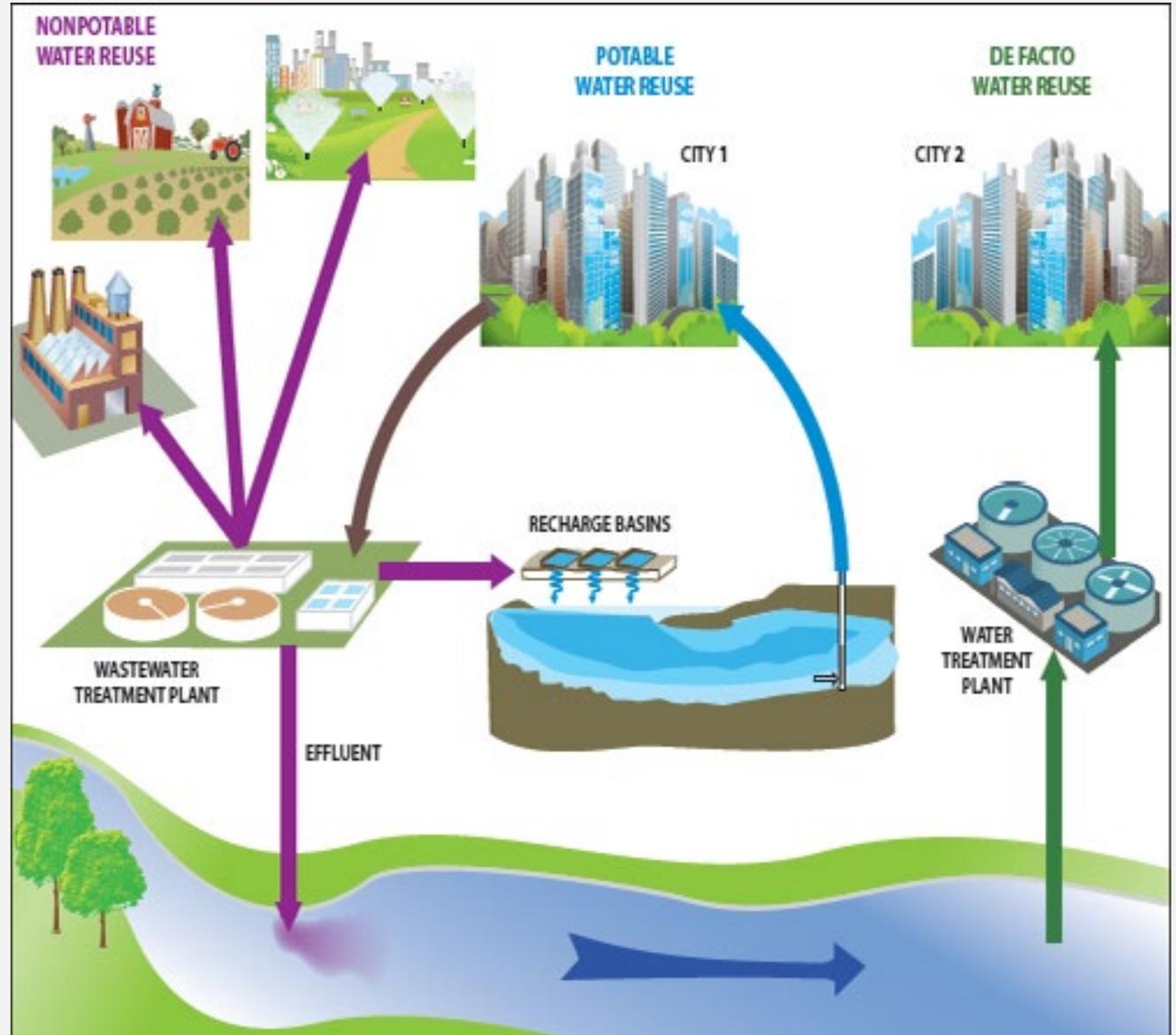
Nonpotable Reuse

- Irrigation
- Industrial
- Toilet Flushing
- Wetland Enhancement
- Stream Flow Augmentation



Indirect Potable Reuse

- De Facto Reuse
- Groundwater Recharge
- Reservoir Augmentation



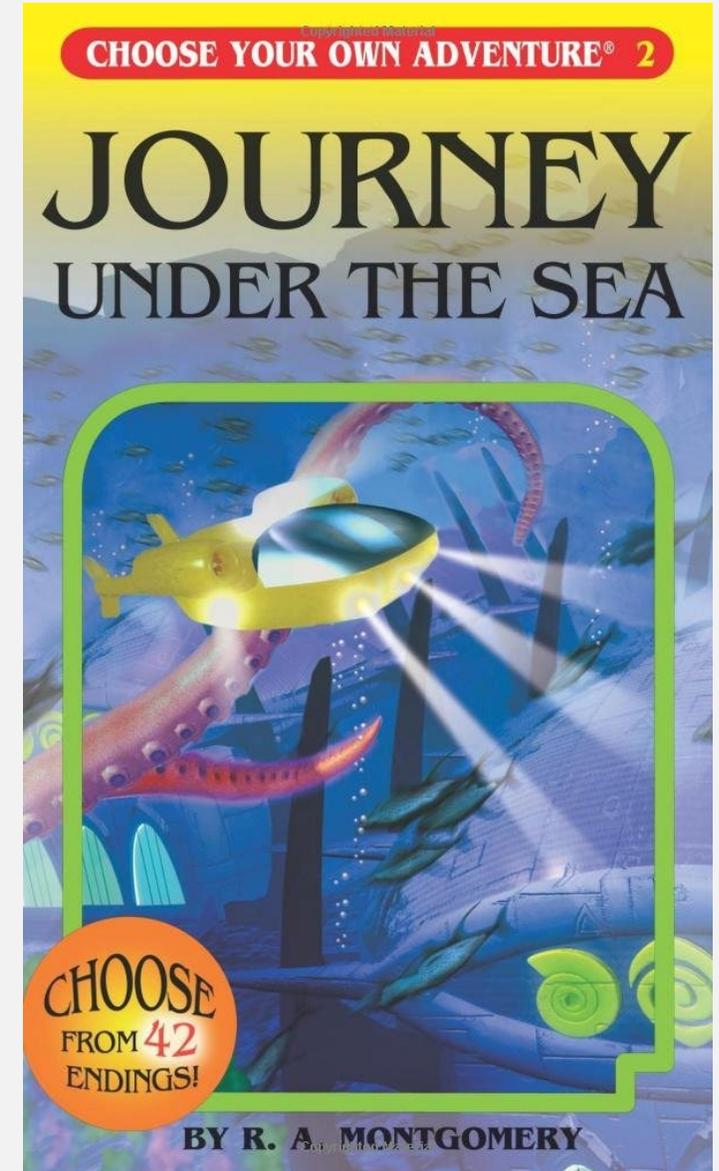
Direct Potable Reuse (A/A+)

- “Toilet to Tap”

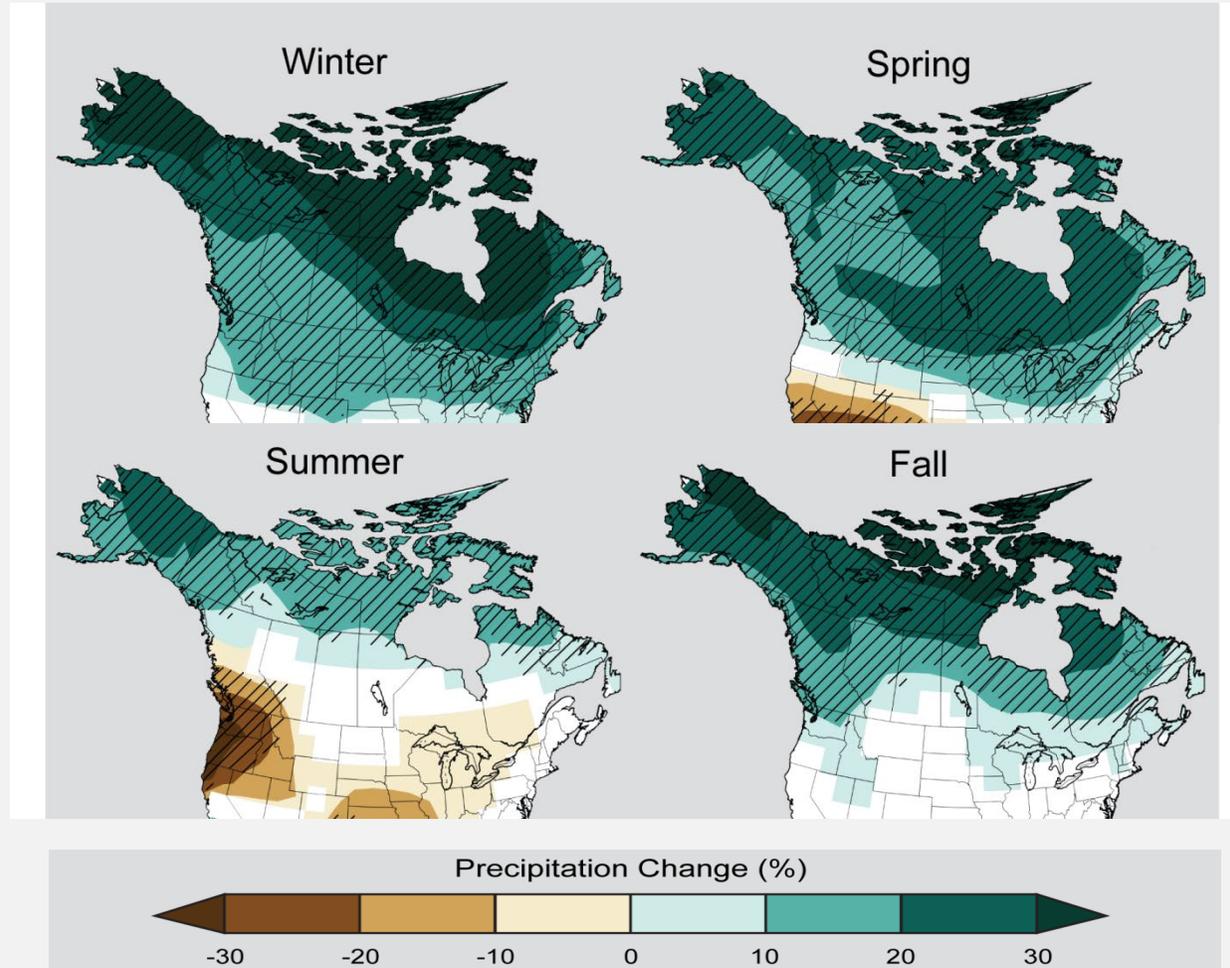


Benefits and Drivers of Recycled Water

- Reduced Reliance on Potable Water/Decrease Long-term Cost
- Regulatory Compliance
- Water Rights Mitigation
- Wetland Enhancement
- Sustainability Goals and Community Values

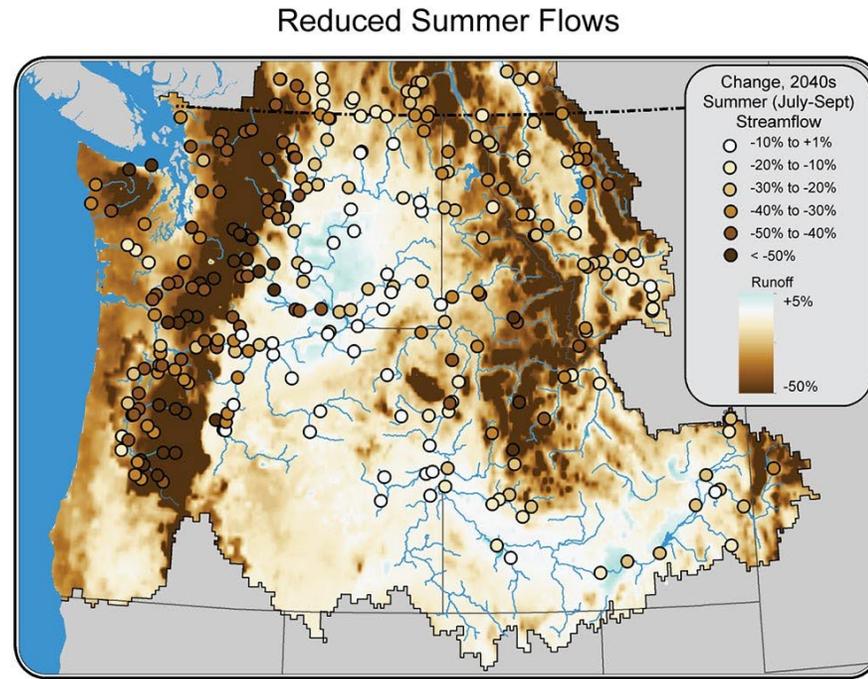
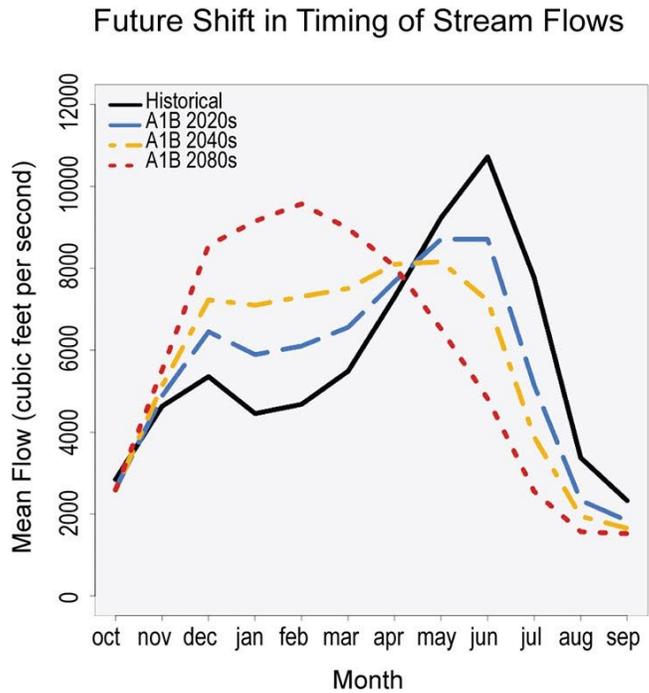


Climate Change Projections



(Walsh, et al. 2014)

Climate Change Projections



(Mote, et al. 2014)

Impacts to the PNW

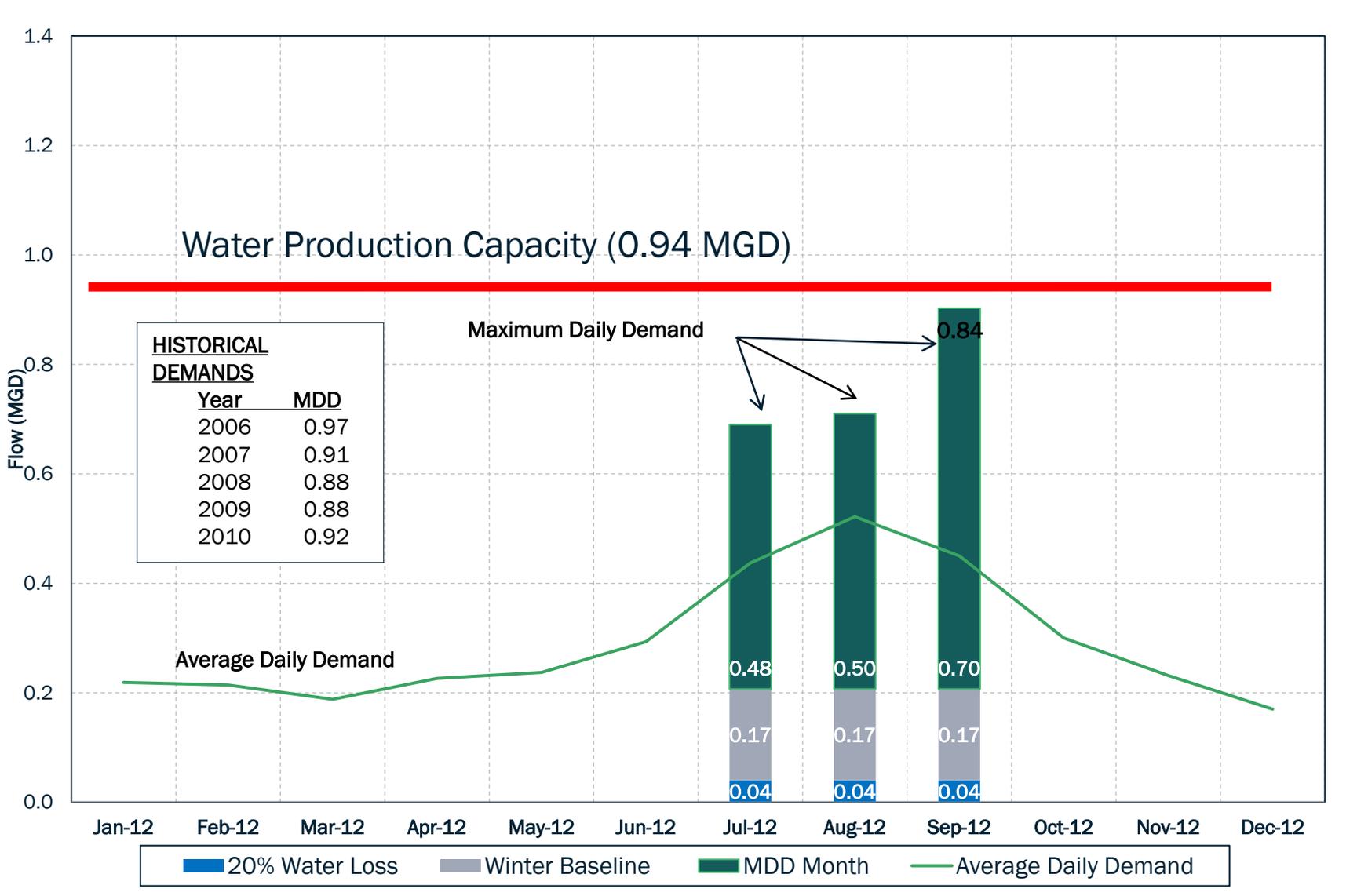
- **Agricultural Impacts**
 - Decreased surface water supply
 - Increased temperatures
 - Changing water quality
 - Production impacts
- **Streamflow**
 - Increased stream/reservoir temperature
 - Decreased groundwater
 - Decreased aquatic habitat
- **Utility Impacts**
 - Water supply reliability
 - Water quality changes
 - Demand on stormwater systems
 - Flooding
 - NPDES requirements
- **Industrial Impacts**
 - Increased utility costs
 - Social license to operate
 - Community pressure to reduce water footprint

Reduced Reliance on Potable Water/Decrease Long-term Cost

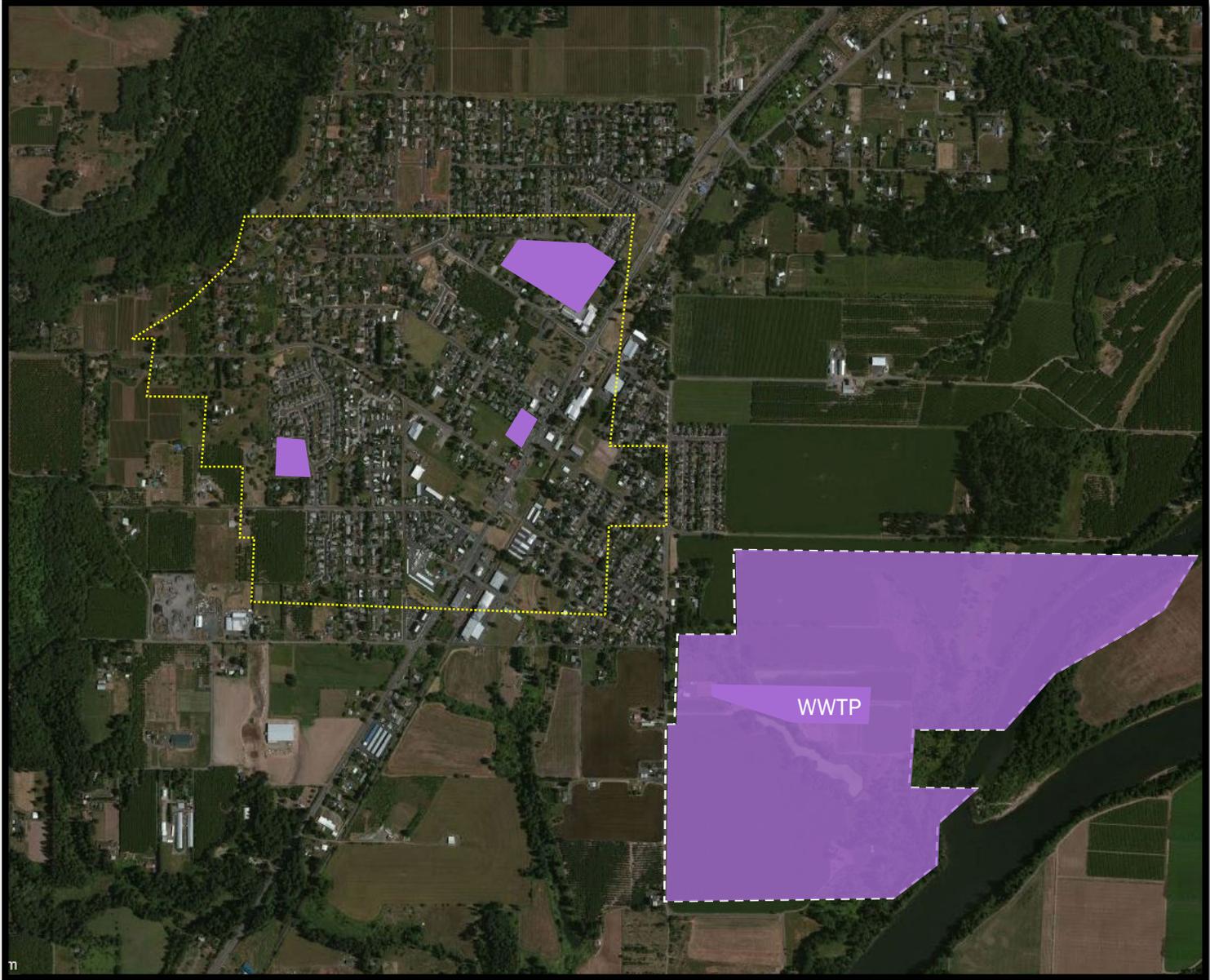
- Drivers:
 - Increased cost of potable water
 - Lack of supply of potable water
- Locations:
 - Dry, arid, water stressed areas
 - California, Arizona, Israel, Saudi Arabia, Australia
- Case Study:
 - Dundee, OR
 - Tehaleh, WA



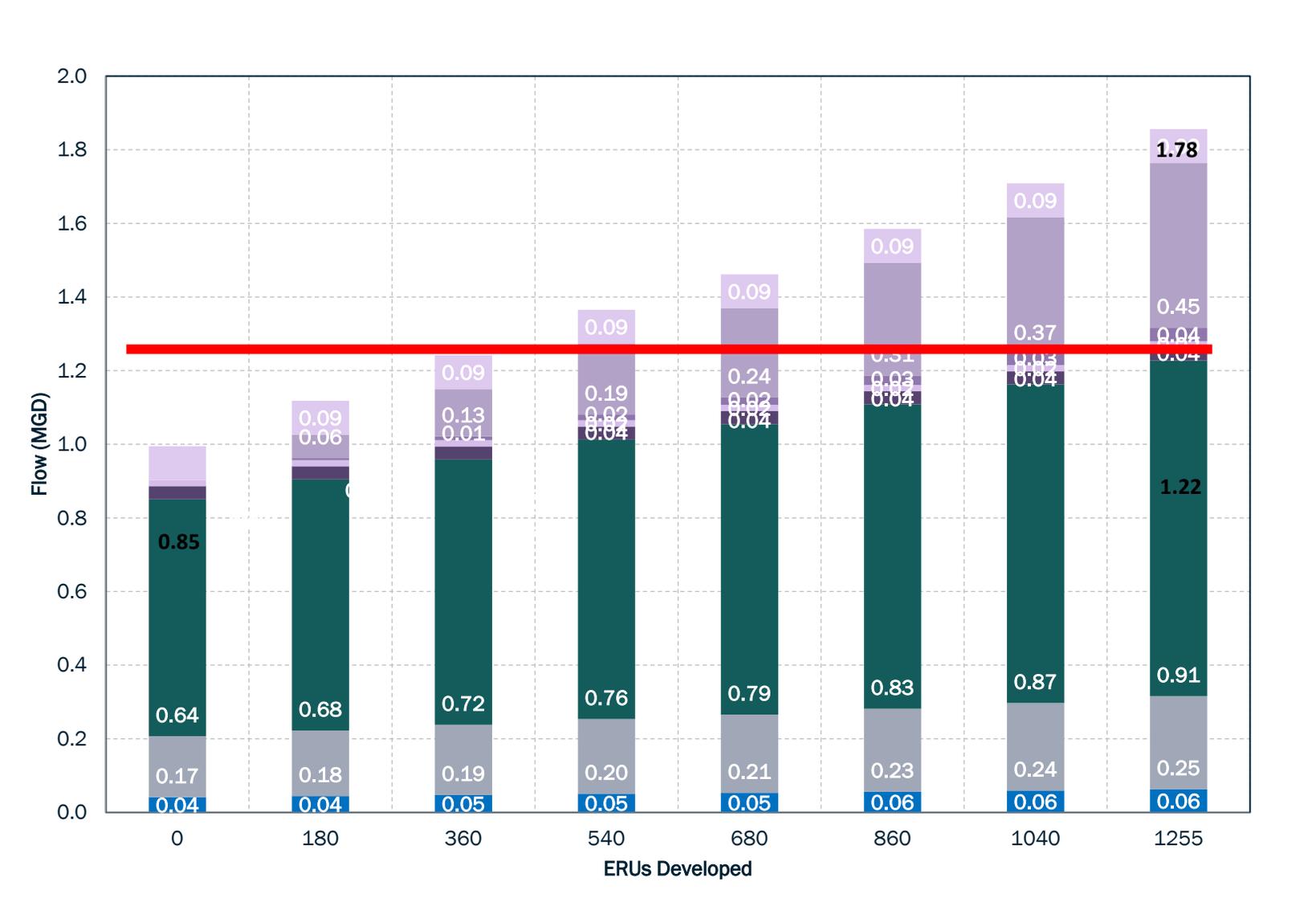
Dundee, OR – Existing Water Demand

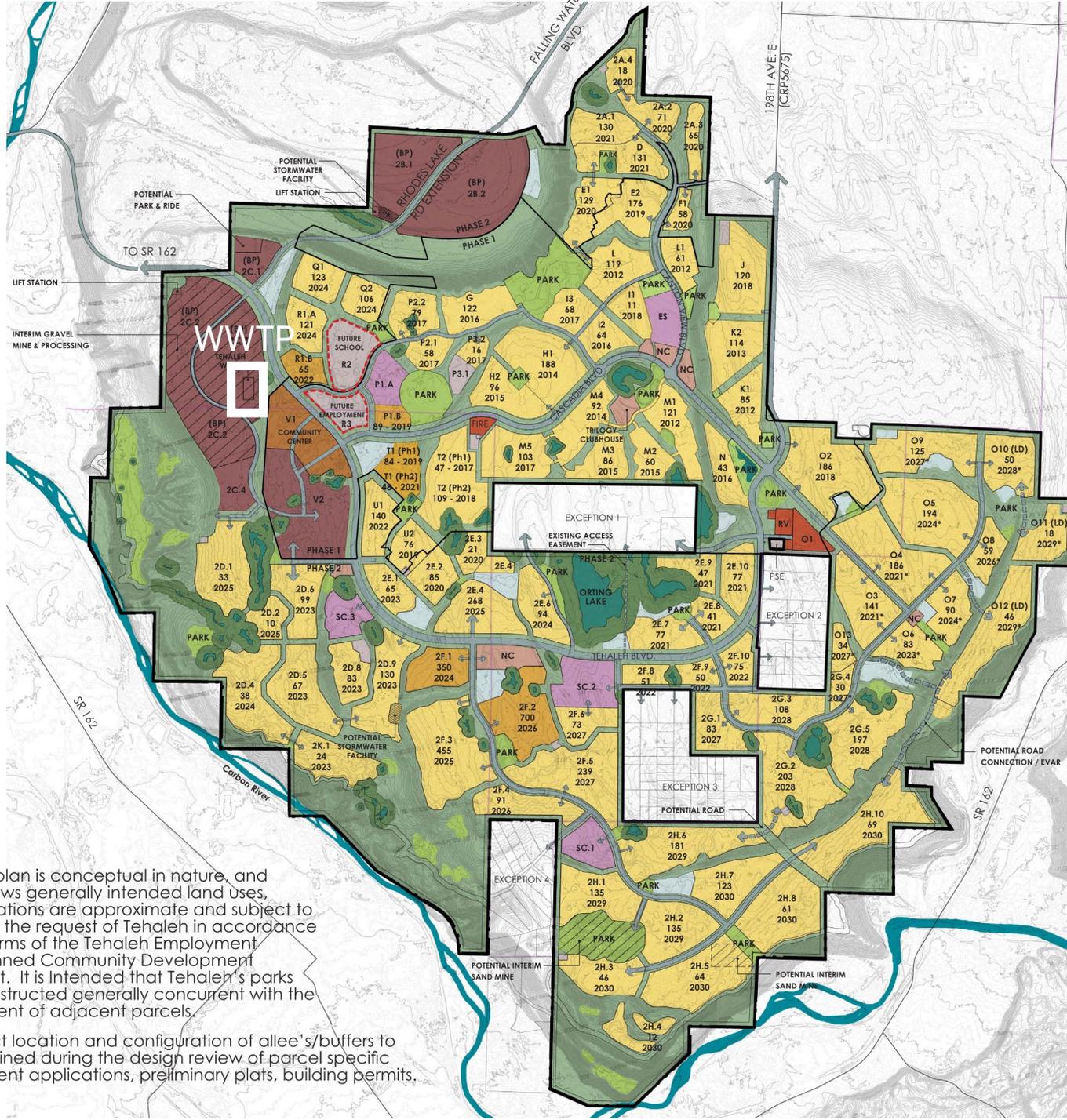


Dundee, OR – Recycled Water Service Areas



Dundee, OR – Projected Recycled Water Demand





Legend

- Cascadia EBPC Boundary
- Phase Boundaries
- School District Boundary

Residential

- Residential (Detached)
- Residential (Potential Multi-family)

Parcel Label

XX.XX Parcel #
 XX # of Units
 20XX Year of Delivery

* Lots to be Developed by Others

Employment

Note: Commercial parcels assumed as raw land sales

- Misc. Employment
- BP - Business Park
- CC - Community Center
- NC - Neighborhood Center
- Schools

Public Facilities

- Master Stormwater Drainage Facilities
- Public Facilities

Open Space

- Wetlands
- Buffers / Allees
- Natural Open Space
- Community Parks

Future Employment Parcels

These parcels may be designated as Business Park or School if the applicant proposes these parcels for employment use & Pierce County approves this use in the future.

Tehaleh

Note: This plan is conceptual in nature, and while it shows generally intended land uses, parcel locations are approximate and subject to change at the request of Tehaleh in accordance with the terms of the Tehaleh Employment Based Planned Community Development Agreement. It is intended that Tehaleh's parks will be constructed concurrent with the development of adjacent parcels.

Note: Exact location and configuration of allee's/buffers to be determined during the design review of parcel specific development applications, preliminary plats, building permits.





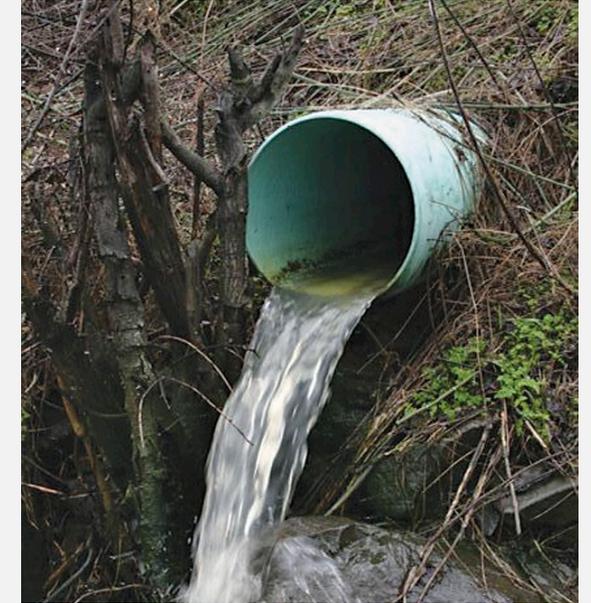
Tehaleh – Recycled Water Demand

- Summer of 2018 - \$300K for irrigation water
- Reduced long-term cost for homeowner’s association

Year	Stage	ADF (MGD)	RW Average (MGD)	RW Peak (MGD)
2016	Stage 2	0.72	0.5	1.0
2018	Stage 3	1.45	1.49	2.99
2022	Stage 4	2.17	1.59	3.18
2027	Stage 5	2.61	1.59	3.18

Regulatory Compliance

- Drivers:
 - NPDES TMDLs
 - Shellfish beds
- Locations:
 - Sensitive and impaired water bodies
 - Washington, Oregon, Idaho
- Case Study:
 - LOTT, WA
 - MWMC, OR
 - Sequim, WA

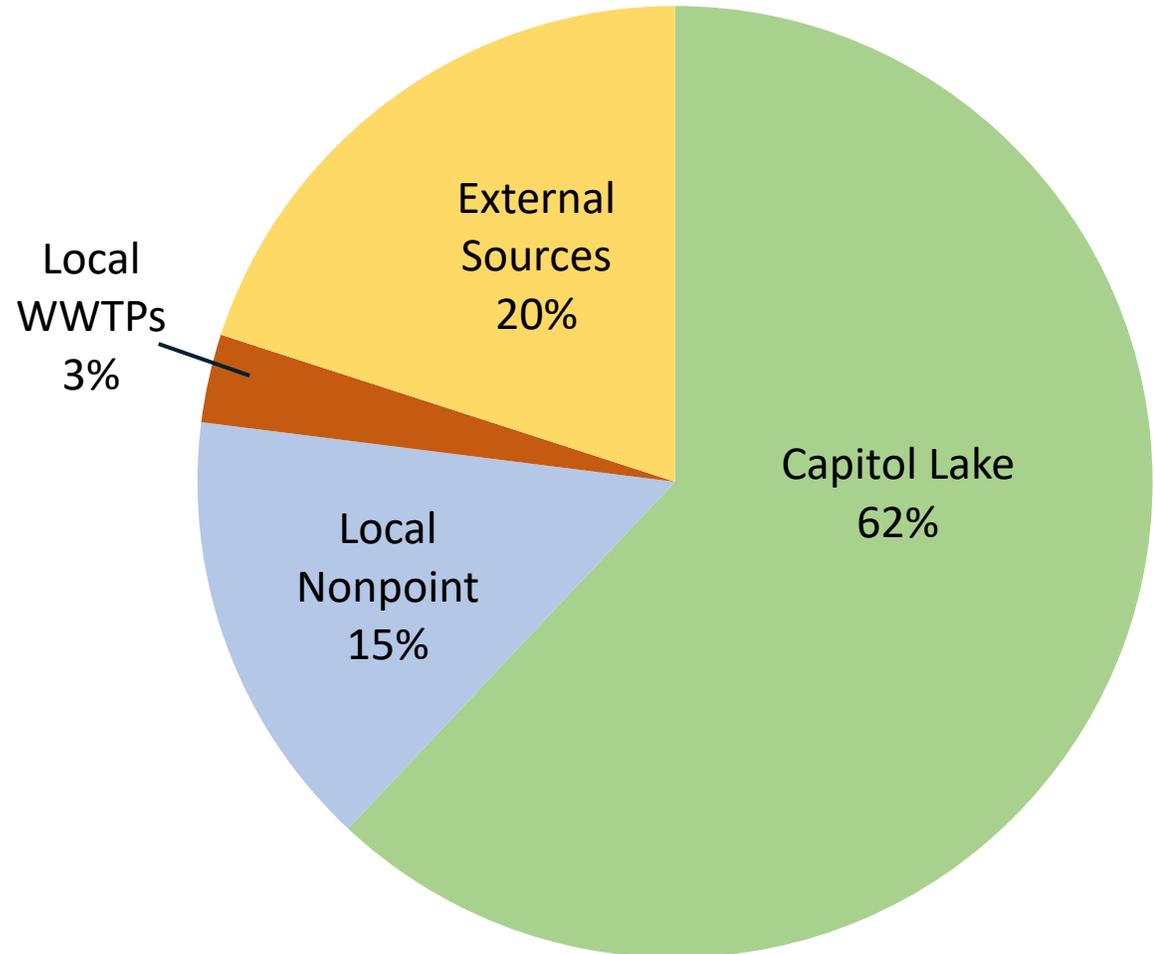




Budd Inlet and Capitol Lake TMDL

- Four main sources of nutrients
 - Local nonpoint: stormwater, septic, etc.
 - Local WWTPs: LOTT and other plants on Budd Inlet
 - External: WWTPs and nonpoint north of Budd Inlet
 - Capitol Lake
- Reductions are needed in all sources to meet the allowable depletion

Sources of Oxygen Depletion



LOTT's Wastewater Resource Management Plan



Public values:

- Meet future wastewater needs
- Treat wastewater as a valuable resource
- Maximize benefits to the environment
- Provide multiple community benefits

Long-term strategy:

- Continue discharge of treated effluent to Budd Inlet
- Expand production and use of reclaimed water
 - Multiple satellite plants in service area
 - Build capacity in increments, “just in time”
- Use reclaimed water to replenish groundwater

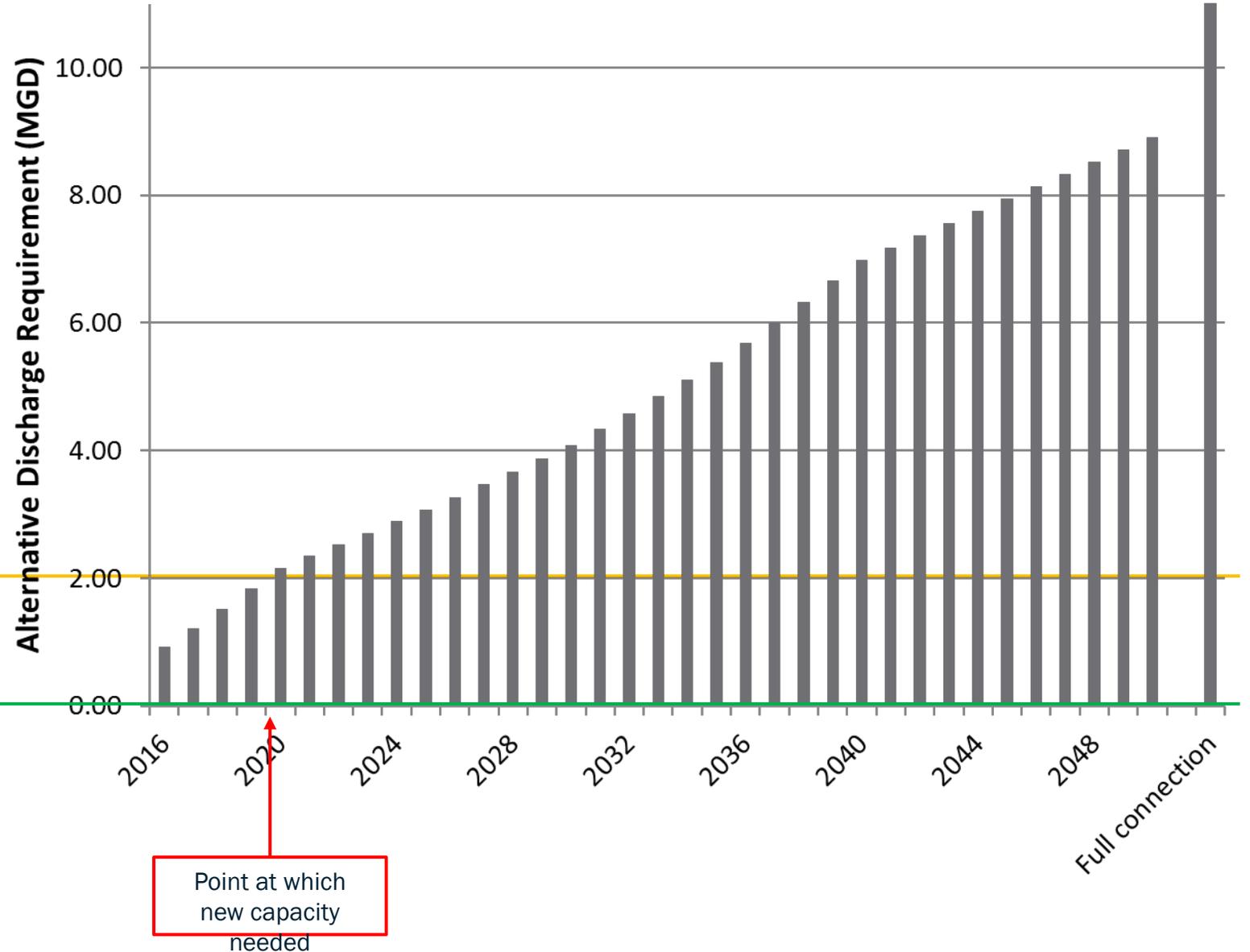
Existing Permit

Permit Limit TIN: 288 lbs/day

Performance Limit TIN: 3.0 mg/L

Discharge Capacity of
Martin Way/Hawks Prairie
Reclaimed Water System = **2 MGD**

Discharge Capacity of
Budd Inlet Treatment Plant = **11.5 MGD**



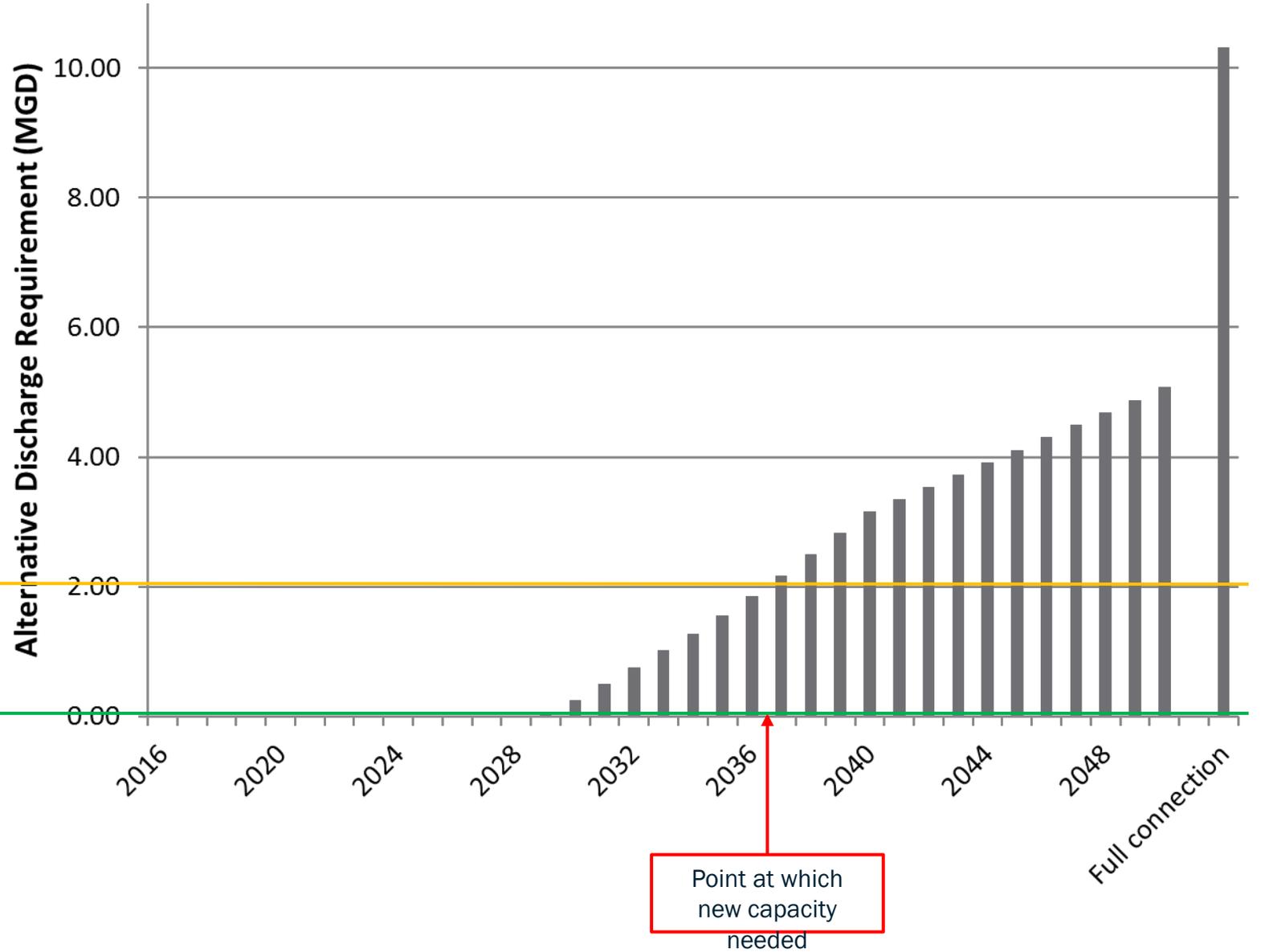
Current Performance

Permit Limit TIN: 288 lbs/day
Current Performance: 216 lbs/day

Performance Limit TIN: 3.0 mg/L
Current Performance: 2.25mg/L

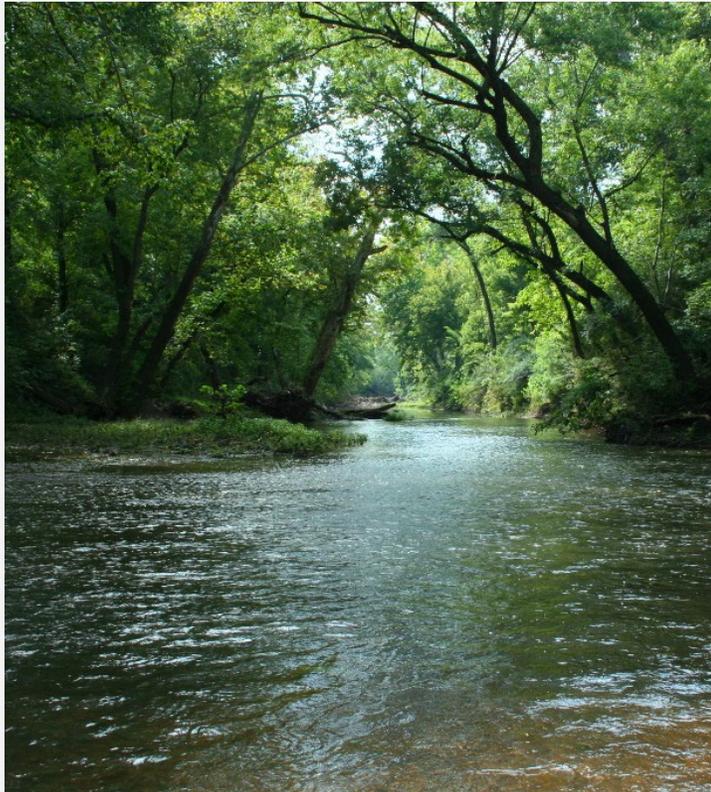
Discharge Capacity
of Martin Way/Hawks Prairie
Reclaimed Water System = **2 MGD**

Discharge Capacity of
Budd Inlet Treatment Plant = **15.3 MGD**



Metropolitan Wastewater Management Commission, OR – Thermal Load

- Eugene and Springfield, OR
- Faced with temperature TMDL on the Willamette River



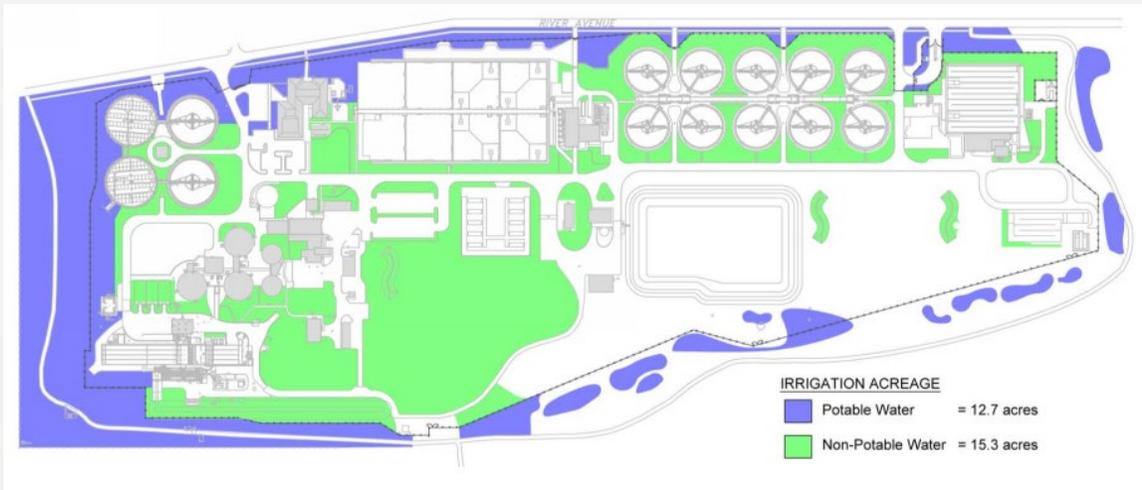
Metropolitan Wastewater Management Commission, OR - Compliance

- Biocycle Farm – 400 ac of poplar trees
- Irrigate with recycled water, fertilize with biosolids



Metropolitan Wastewater Management Commission, OR – Expansion

- Constructing Class A Facility
- Expanding demand:
 - On-site irrigation
 - Truck fill station
 - Street tree watering
 - Aggregate handling – wheel washing, vehicle washing



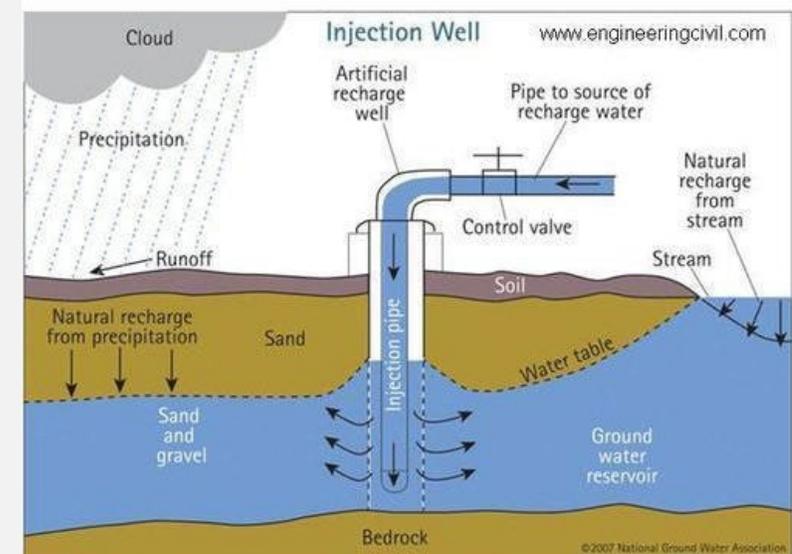
Sequim, WA – Reclamation System

- 1.7 MGD Water Reclamation Facility
- 2,800 ac of shellfish beds re-opened
- Stream flow augmentation
- Irrigation
- Groundwater Recharge



Water Rights Mitigation

- Drivers:
 - Sensitive hydrologic basins
 - Population growth
- Locations:
 - Sensitive hydrologic basins
 - Washington, others
- Case Study:
 - Yelm, WA



Yelm, WA – Drinking Water Wells



Yelm, WA - Infiltration

- Discharge 50,000 gpd
- Irrigate local parks in the summer



Wetland Enhancement

- Drivers:
 - Expanding urban areas
 - Destruction of natural habitat
- Locations:
 - Forested areas
 - Washington, others
- Case Study:
 - Carnation, WA



Carnation, WA – Sewer Need

- Needed sewer, under moratorium
- Partnered with King County
- Discharge to Chinook Bend Natural Area, up to 0.5 MGD



Carnation, WA – Wetland Benefit

- 59 ac wetland
- 18,000 trees
- Salmon/wildlife habitat expansion
- Reed canary grass control
- Recreation



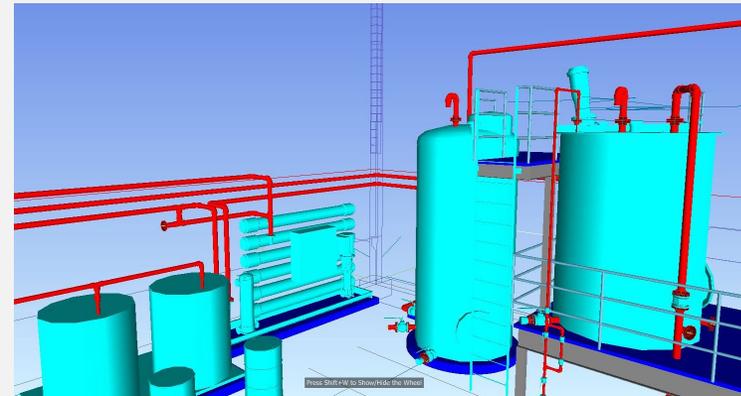
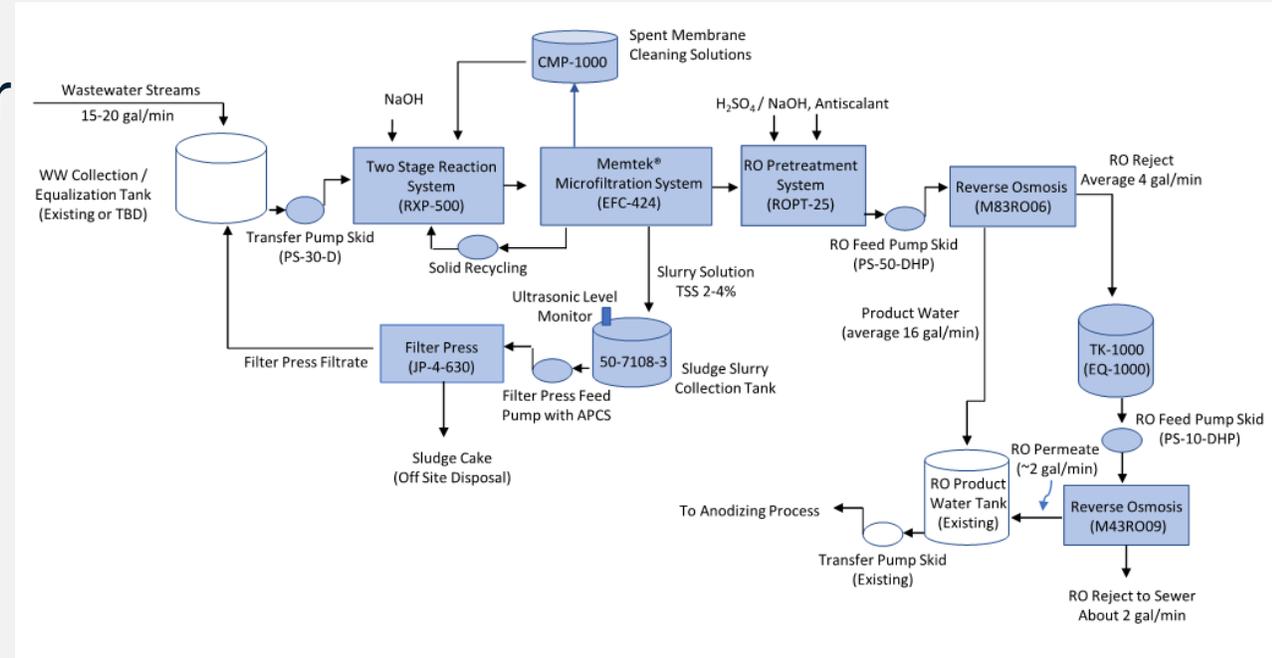
Sustainability Goals and Community Values

- Drivers:
 - Long-term operating cost certainty
 - Demonstrate responsibility to customers
- Locations:
 - Economically growing areas
 - Manufacturing facilities
 - All locations
- Case Study:
 - Aerospace Parts Manufacturer
 - Confidential Industrial Client



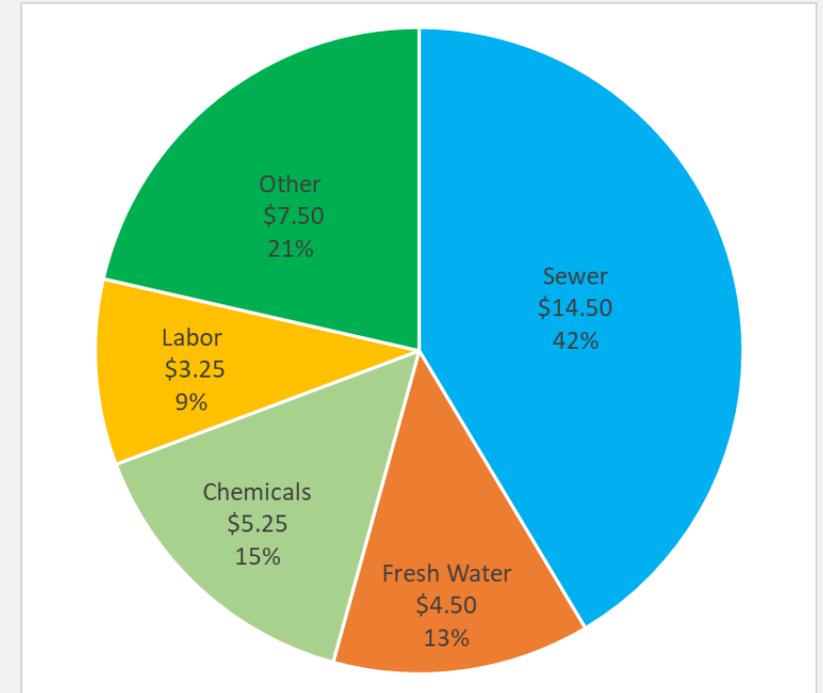
Aerospace Parts Manufacturer– Sustainability Goals

- 15 gpm Industrial Wastewater Treatment Plant
- \$80-90k/year in water and sewer expenses, Goal is 80% reduction in cost and water
- No wastewater treatment equipment currently exist
- Capital and Construction Costs ~\$2M (including demolition)
- From an economic standpoint payback is >20yrs



Confidential Industrial Client– Sustainability Goals

- 300 to 400 gpm Industrial Wastewater Treatment Plant
- True Cost of water = ~\$30-35/Kgal wastewater treated
- Recycle goal = 70% of wastewater treated
 - IWTP rate remains constant and major equipment already exists
 - Approximately \$2.3-2.5M/yr saved
 - Requires some capital investment
 - <3yr payback



Considerations for YOU!

- 2018 Reclaimed Water Rule – WAC 173 – 219
- Reclaimed Water Facilities Manual: The Purple Book
- Industrial Facilities – WAC 173-240
- Educate yourself and others
- Engage with stakeholders, build support
- Be creative and patient





Recycled Water is a Tool

Q&A

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