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Current and Future Trends in Source Water Protection Planning

Presented by: Rob Annear, Ph.D., P.E.

ANNEAR WATER RESOURCES

AGENDA

01 What is Source Water Protection?

02 Why Protect Source Water?

03 Current Issues

04 Future Issues

05 Project Highlights

06 Future of Planning

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What is Source Water Protection?

- Source waters are the rivers, streams, lakes, reservoirs, springs, and groundwater that provide water to public drinking water supplies and private wells.

- Protection involves implementing programmatic and physical strategies to maintain and improve source water quantity and quality.

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Why Protect Source Water?

- Reduce risks by preventing exposures to contaminated water.
- Reduce treatment costs.
- May avoid or defer the need for complex treatment upgrades.
- Protect the availability and quantity of water supplies.
- Increase supply resiliency.

- Additional benefits: protect water quality for wildlife and recreational use.

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Current Issues

Not exhaustive.

- Pollutant loading from urban, rural and agricultural sources
- Water rights and environmental permitting
- Harmful algal blooms
- ESA listed species, flows for fish persistence, water temperature requirements
- Drought management

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Climate Change Impacts on Drinking Water Supply Sources

- Quantity
  - Floods
  - Droughts
  - Changes in snowpack
- Quality
  - Wildfires
  - Harmful algal blooms
  - Pollutant loading
  - Regulatory compliance


Source: Courier Journal, KY


Source: Oregonian

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Climate Change Impacts on Water Quantity

- Floods
  - Cause turbidity events – shut down the water treatment plant
  - Inundated infrastructure – lack of access or operations
  - Infrastructure damage and destruction
  - Longer term: Increase in water quality issues from changes in watershed upstream
- Drought
  - Timing and lack of precipitation
  - Transition of snowpack to rainfall
  - Increase in air temperature
    - Increased evaporation and transpiration
    - Increased chances for wildfires

Source: Characterizing Vulnerabilities for Flood and Drought (Vox, 2013)

Harmful Algal Blooms (HABs)

- Climate change impacts
  - Increased precipitation (and conversion of snowfall to rainfall); increased erosion and nutrients into water bodies
  - Longer and drier summers; more stagnant water bodies allow algal blooms and HABs to form and prosper
  - Blooms are no longer just a summer phenomenon
- Harmful algal blooms
  - Health hazard for humans, pets, and aquatic life
  - Water treatment issues

Source: WA Department of Ecology

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Future Issues

Not exhaustive.

- Water quality – new chemicals - PFAS
- Wildfires (again)
- Extreme (rain and flood) events
- Reduced snowpack – reduced groundwater and baseflows
- Drought management – longer term water availability – competing demands
- Thermal impacts of withdrawals

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Water Quality, Wildfires

- Fire retardants
  - Nitrogen, phosphorus, and iron oxide
  - Cyanide occasionally
  - PFAS
- Pipes
  - Toluene, ethylbenzene, and xylene
  - Benzene (known human carcinogen)
  - Volatile organic contaminants (VOCs)
  - Indicator for other contaminants
- Depressurization


Gates, OR


Gates, OR

Source: Andrew Whelton, Purdue University

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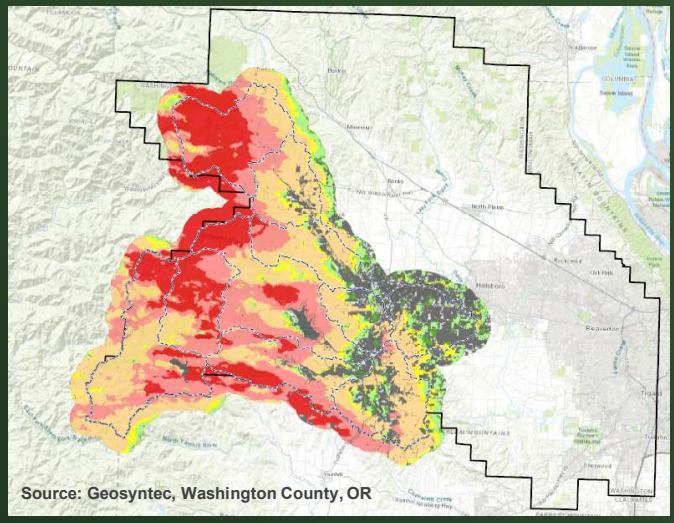
Water Quality, Wildfires

- Increase in suspended sediment and turbidity
- Increase in total organic carbon (TOC)
  - Disinfection byproducts
  - Increased use of coagulants during treatment
- Increase in pH, manganese, iron, nitrogen, and phosphorus species
  - Harmful algal blooms, cyanotoxin events
- Benzene, naphthalene, methylene chloride, styrene, toluene, and vinyl chloride
- Longer term: Water quality issues from watershed changes

Source: KBND News

Lionshead Fire



Source: Geosyntec, Washington County, OR

Burn Probability

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Water Withdrawal Thermal Impacts

- New and upgrades to Water withdrawal facilities in Oregon now trigger:
  - Permitting for local in-river work, as always AND
  - Thermal impacts analysis for the additional water withdrawn from the river.
    - Existing water temperature TMDLs, Oregon DEQ considers the withdrawal a nonpoint source polluter
    - Nexus is 401 Water Quality Certification, needs DEQ to weigh in before it can be approved.
- Rationale:
  - Waterbody is limited for temperature (too warm).
  - Withdrawal removes water while the water body still experiences the same seasonal warming.
  - In general results in warmer waterbody with the withdrawal
- Requires water withdrawal/user:
  - Calculate the thermal impacts to the waterbody
  - Develop a Thermal Trading Plan to mitigate thermal impacts
  - Implement mitigation strategies and report annually to DEQ on progress.

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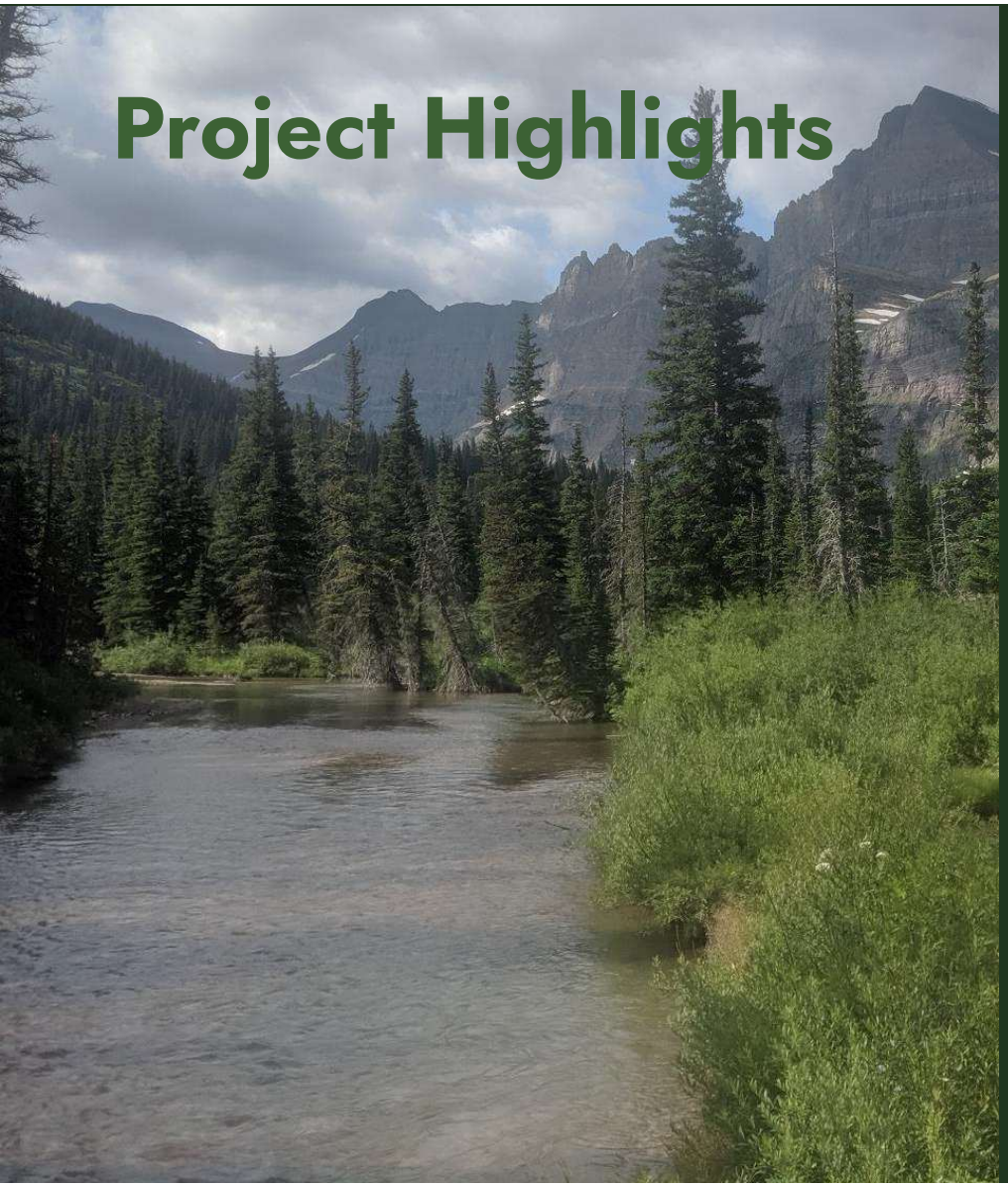

Project Highlights

- Source Water Assessment for Joint Water Commission
- Springfield Utility Board and Eugene Water & Electric Board new intake permitting
- Joint Water Commission harmful algal bloom impoundment analysis
- Clackamas River Water Providers, pollutant loading assessment

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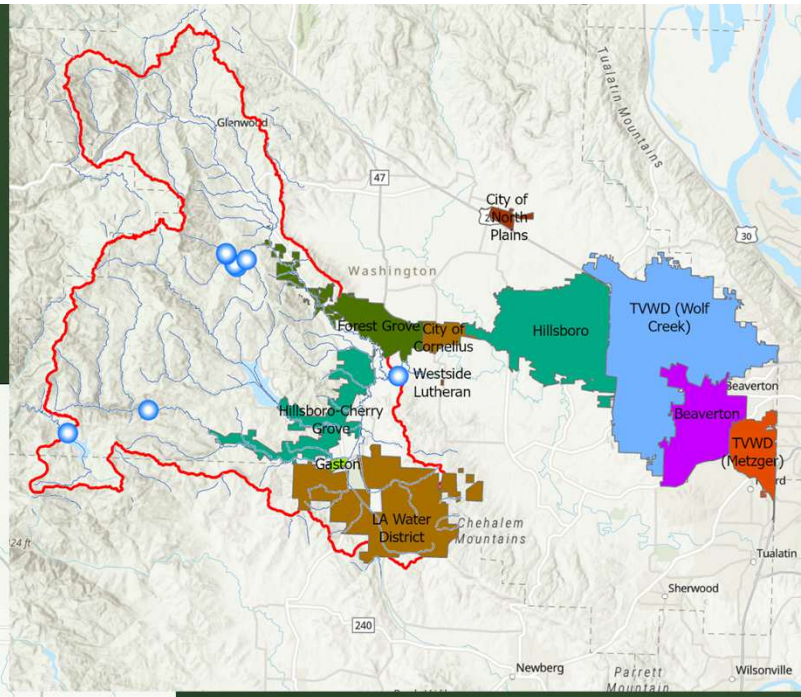
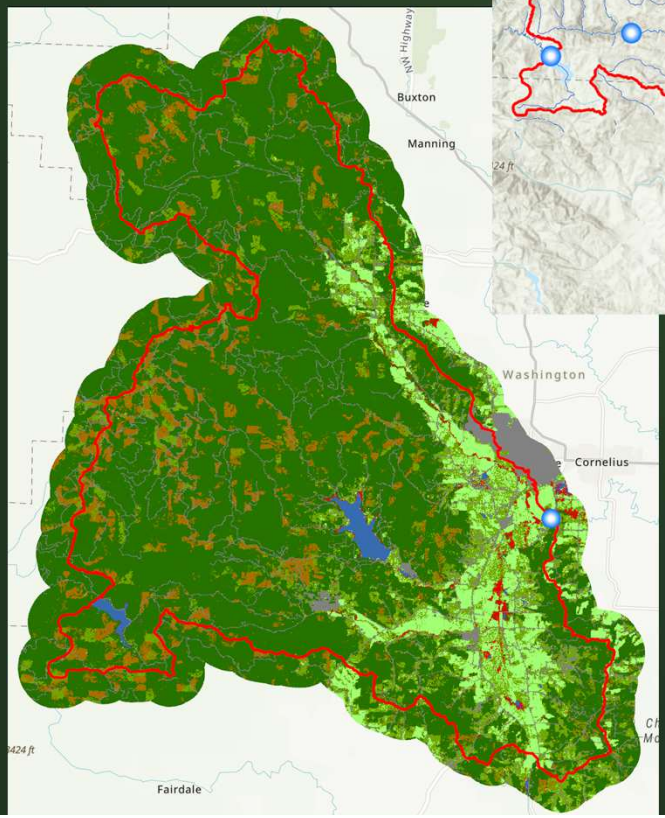
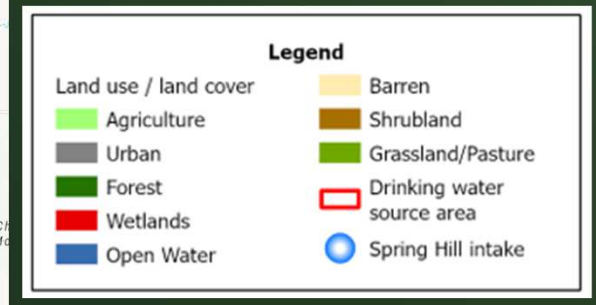
Source Water Assessment

Joint Water Commission

- JWC: Cities of Hillsboro, Forest Grove, Beaverton, and Tualatin Valley Water District
- National Water Quality Initiative grant from NRCS.
- Focused on risks from agricultural producers
- Builds off of 15+ years of previous work



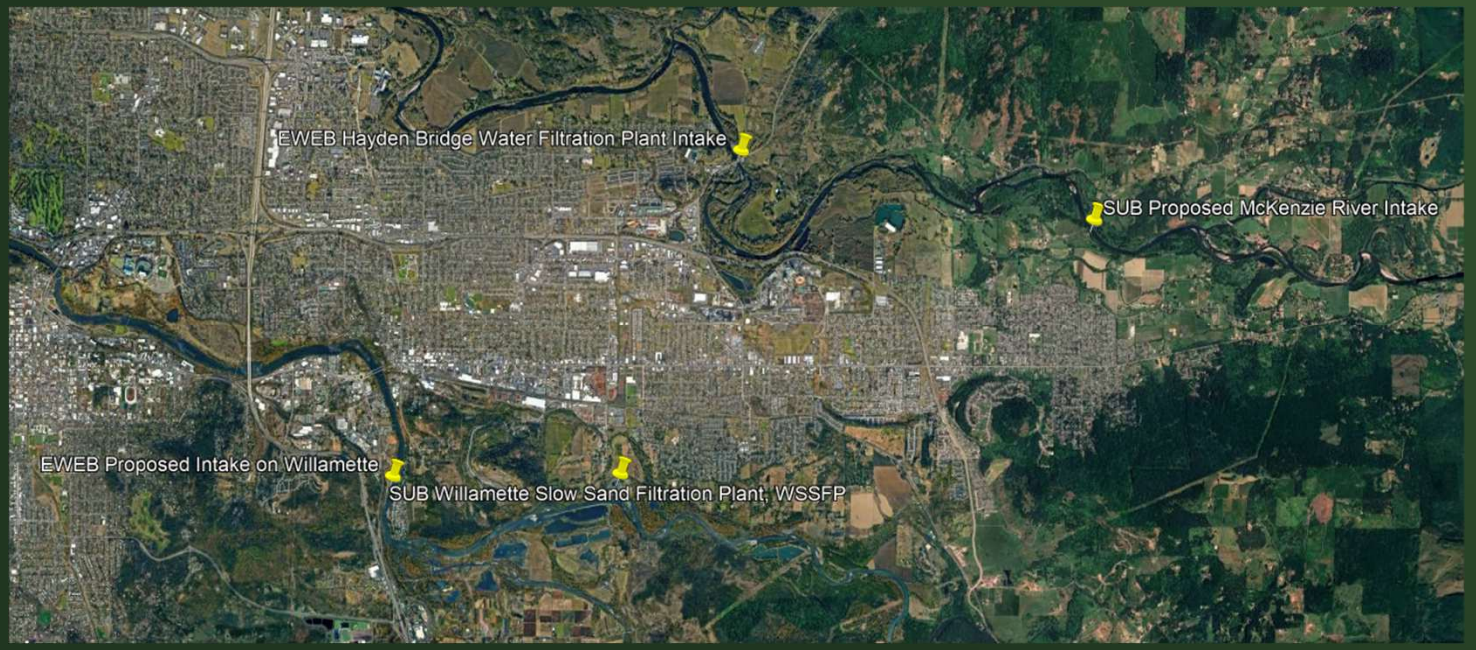




Drinking Water Intake Permitting, Thermal Impacts Analysis

Springfield Utility Board
Eugene Water & Electric Board

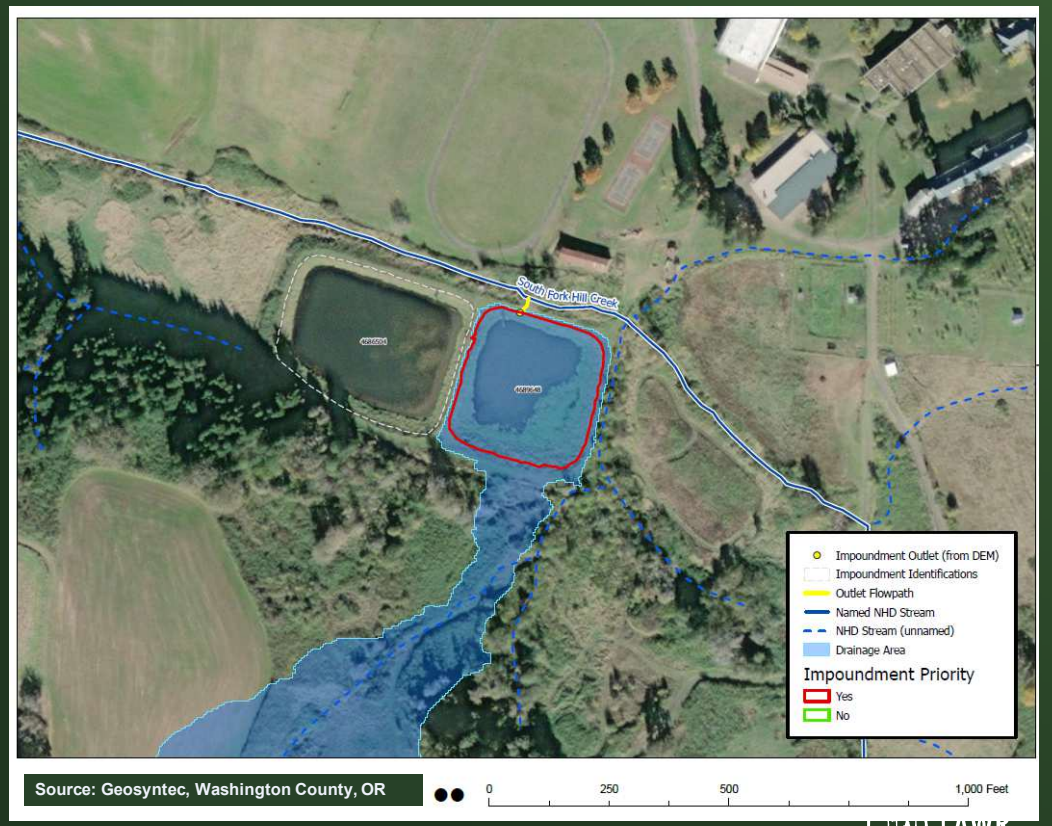
- Assess current water withdrawals
- Develop and setup future withdrawal scenarios
- Assess thermal impacts (maximum thermal load)
- Develop thermal trading plan



Harmful Algal Bloom Impoundment Analysis

Joint Water Commission

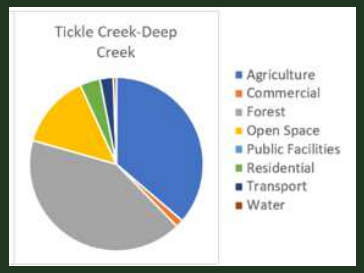
- Impoundment identification and prioritization
- GIS analysis
- Field confirmation
- Prioritization
- Outreach to owners
- Guidance document with BMPs

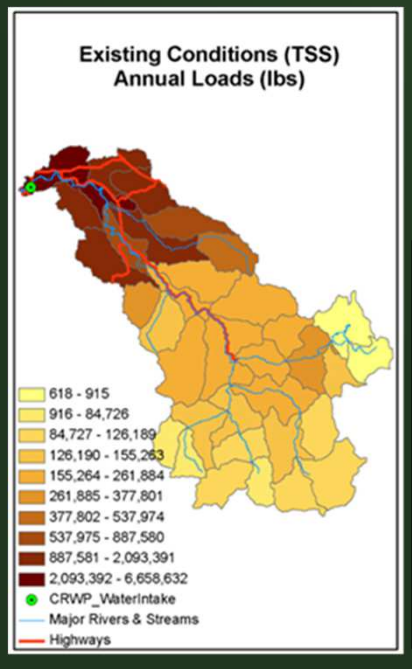


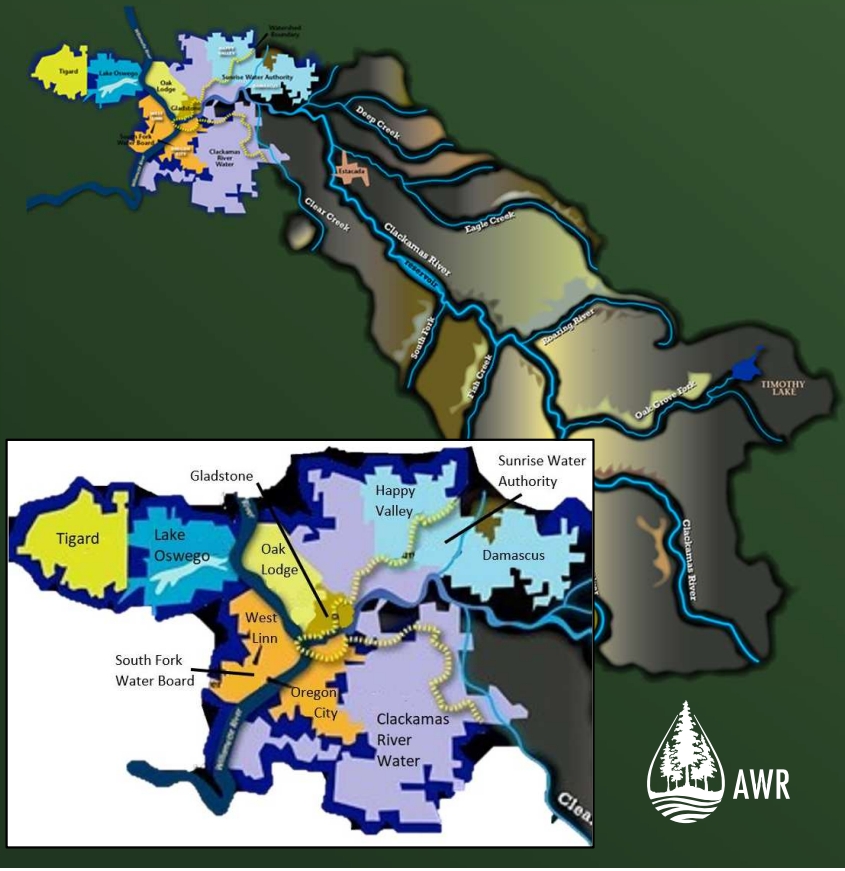
Watershed Pollutant Loading Assessment

Clackamas River Water Providers

- Pollutant load modeling
  - Watershed analysis planning level tool
- Source water assessment plan
  - Focused on agriculture







Future of Planning

A few pieces to the puzzle

- Potential monitoring and reporting
- Source Water Assessment
- Watershed Pollutant Loading
- Wildfire Protection Plan
- Emergency Response Plan/Spill Response Plan
- Wellhead Protection Plan
- Regulatory Compliance and Drivers
  - Clean Water Act, ESA, Safe Drinking Water Act and more
  - State Source Water Protection Programs
- HAB Prevention and Management Plan
- Climate change studies (floods, drought, reduction in baseflow and groundwater)

Future of Planning

Think CIPs

- Build a long-term source water protection strategy
  - What are your source(s)
  - What are your risks at a high level? Then prioritize them
  - What are your needs (sub-plans, assessments, and analyses) to help you?
  - What are funding mechanisms for each need?
  - What is required by your state's Source Water Protection Program?
- Implement the strategy in stages
  - Don't try to do it all at once
  - Tailor to your source water, needs, and community
  - How can one assessment or satisfied need feed into the next? How can you build one off another?

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Funding Ideas

- Rate payers - sometimes
- State Revolving Funds
- Natural Resource Conservation Service
  - National Water Quality Initiative
- FEMA
- Department of Homeland Security
- U.S. Forest Service
- Oregon Watershed Enhancement Board and similar agencies in WA and ID
- Water Infrastructure Finance and Innovation Act (WIFIA) – infrastructure related

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Key Takeaways

- Develop a long-term strategy
- Pick a systematic approach to plugging away at pieces
- Identify connections with other programs (FEMA, NRCS etc.) for
  - Possible funding
  - Completing pieces of your strategy
- State source water protection programs are growing
  - May have support
  - May add requirements

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Thank you.

Q & A

Rob

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Rob Annear, Ph.D., P.E.
rob@annearwaterresources.com
503.936.0115
www.annearwaterresources.com

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