

# Using temperature credits to advance watershed health



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## Clean Water Services

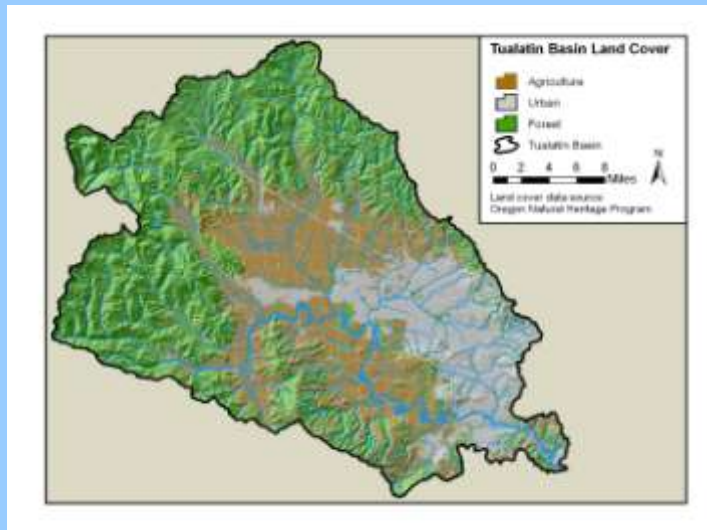
- **Public utility committed to protecting water resources**
  - **Serve 500,000 customers in Washington County**
  - **Coordinate with 12 member cities**
- **Core business functions**
  - **Four regional wastewater treatment plants**
  - **Storm water management**
  - **Surface Water Management (water quality, quantity and habitat)**



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# Tualatin Watershed



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## Tualatin River Watershed-Based Permit

- NPDES permits for four treatment facilities
- MS4 storm water permit
- TMDL for temperature
- 5 years: 2004-2008
- Water quality trading
  - 30 cfs/d stored water in July and August
  - Shade 35 miles of riparian area



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## CLEAN WATER ACT

### Watershed Management Strategic Drivers

- Regulatory
- Watershed Health
- Business Needs
- Sustainability
- Integrated Water Resource Management

## ENDANGERED SPECIES ACT

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## Action-Based Planning

- Gather sound science on water quality, quantity and habitat
- Conduct spatial analysis utilizing GIS and RESTORE
- Set priority and proportion to actions based on resource needs and recovery opportunities / benefits

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# Temperature Management Plan

- **Watershed-based NPDES permit**
- **Thermal load from 2 AWTF's**
  - **Rock Creek: 726 million kcal/d**
  - **Durham: 168 million kcal/d**
  - **Total: 894 million kcal/d**
- **TMP Approach**
  - **Flow Augmentation**
  - **Riparian Shade**



CUMULATIVE THERMAL BUDGET FOR CWS ACTIVITIES IN THE TUALATIN BASIN					
	Thermal Load after FA Credit		Thermal Credit for Shade		Net Thermal Input to Tualatin Basin
	Annual	Cumulative Average	Annual	Cumulative	
Year 1	312 million kcal/d	312 million kcal/d	-27 million kcal/d	-27 million kcal/d	285 million kcal/d
Year 2	200 million kcal/d	256 million kcal/d	-66 million kcal/d	-93 million kcal/d	163 million kcal/d
Year 3	219 million kcal/d	244 million kcal/d	-76 million kcal/d	-169 million kcal/d	75 million kcal/d
Year 4	297 million kcal/d	257 million kcal/d	-76 million kcal/d	-245 million kcal/d	12 million kcal/d
Year 5	203 million kcal/d	246 million kcal/d	-50 million kcal/d	-295 million kcal/d	0 million kcal/d

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## Flow augmentation

- **Main stem Tualatin River**
  - **July 1 – Aug 31**
  - **River flow: 200 cfs**
  - **Augmented flow: 36 cfs**
  - **RC: 726 - 523 m kcal/d = 203 excess**
  - **D: 168 - 394 m kcal/d = 0 excess**
- **Tributary Pilot Program**
  - **Agricultural areas with salmonid habitat**
  - **Monitoring: Small amount can make significant differences**
    - **Temperature**
    - **DO**
  - **McKay Creek**
  - **Gales Creek**

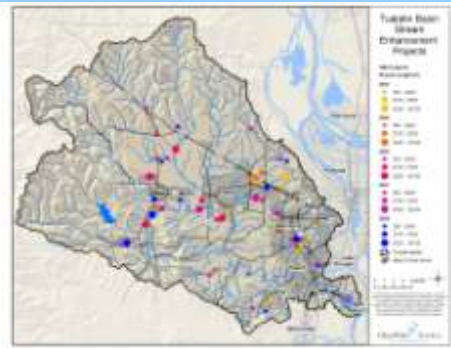


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## Generating shade credits

- **Riparian Planting**
  - urban & rural
  - 5 years to offset avg annual excess load after flow augmentation
- **Variety of implementation strategies = portfolio of shade credit sites**
- **Selected for TMP if**
  - Located on perennial stream
  - Pre-planting canopy is <75%
  - Public or private agreement is in place
  - Site boundaries and baseline conditions are documented and verified internally
  - Long-term maintenance and monitoring of site is ensured



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## Tracking the progress

- **GIS stores data and provides analysis platform for**
  - Ecological Priorities
  - Project Opportunities
  - Reveg Plans
  - Temperature Credits
  - "Shadalator"
    - Heat source temp model



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## Development of the Riparian Planting Program



*Forested Wetland*



*Oak Woodland / Savanna*

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## Riparian Planting Approach

- **Nursery contracts**
  - Long term
  - Seed collection
- **39 native plant species**
  - Bare root
  - Container
- **Centralized holding facility**
  - Cooler
  - Stream Operations Center



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# Riparian Planting Programs



## Community Tree-For All

- Community-based challenge to plant 1 million trees in 20 years

## Enhanced CREP/VEGBACC

- Rural landowner agreements with annual payments (1.1 acre to 36 acres)

## Capital Projects

- Urban area (<1 acre to >40 acres)

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# Community Tree-For-All

- Developed by 12 member cities with CWS
- Complies with land use regulations
- Build stewardship of resources within each community
- Expand local knowledge / expertise
- > 250,000 trees in 5 years



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## Capital Improvement Program

- **Stream & wetland enhancement**
  - **Urban stream re-meanders, large wood placement, floodplain wetlands**
  - **Focus on connectivity and investment protection**



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## Enhanced CREP Program

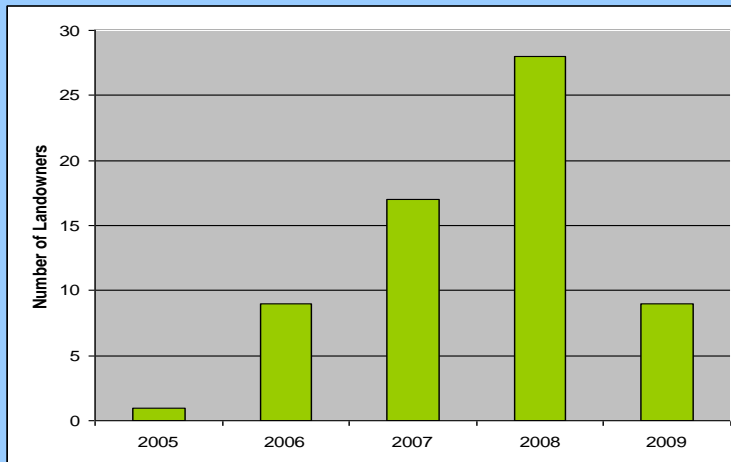
- **Targets rural agricultural areas**
- **Partnership with Conservation Reserve Enhancement Program (CREP)**
- **Pays farmers for lease agreement**
  - **\$171-\$394 per acre annually**
  - **20 year agreement**



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## ECREP Projects 2005 - 2009



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## Focus on Rural Revegetation

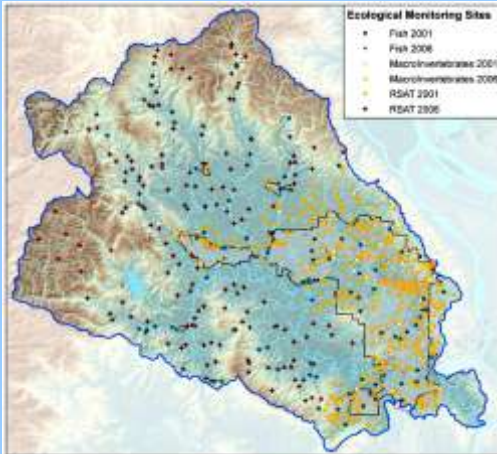
- Demand outpaced available resources
- Once established, focus on prioritization and cost control on sites offering the greatest ecological benefits
- Current cost share 80:20 with Federal partners
- Site maintenance required for 3-5 years after planting
- Expand program to include other benefits?



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## Long-term Performance Monitoring



- Monitor multiple parameters for understanding ecological health
  - Fish and macros
  - Vegetation
  - Stream dynamics
  - Water quality
  - Flow

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## Summary

- Since 2004 over 2,300,000 native trees and shrubs planted
- Cost for the program to date is 4.3 million dollars (Compared to 150 million for capital improvement cost)
- 100 % of needed shade credit generated
  - 30+ miles in 5 years
- Ten year average annual rate increase for CWS is 2.6 %

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## Ecological Benefits

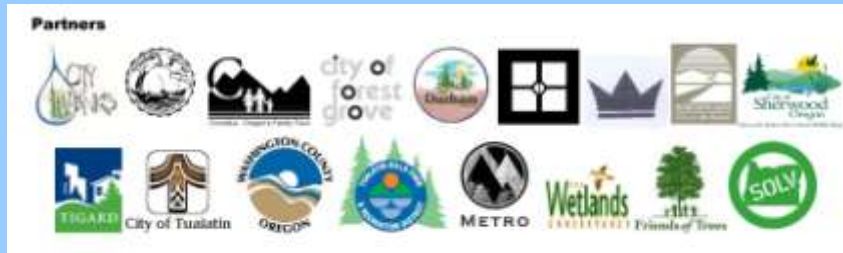
- Filtration and purification of water
- Attenuation of floods
- Reduction of stream temperature
- Groundwater recharge
- Habitat for fish and wildlife
- Erosion control

J. Kauffman et al. 1997, and US EPA 1996

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## Acknowledgements



Many talented staff, helpful interns and dedicated volunteers

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