

2010 Idaho Water Reuse Conference
Boise, ID

Water Reuse in Corvallis: Designing a Program the Public Will Support

Dan Hanthorn, City of Corvallis
Karen DuBose, Water & Environment Solutions
May 19, 2010

Presentation Overview

- ▼ Drivers for water reuse in Corvallis & Benton Co.
- ▼ Review of the City of Corvallis-Greenberry Irrigation District Project
- ▼ The power of the people
- ▼ Reuse Alternatives
- ▼ Citizen Survey
- ▼ Taking water reuse to the next level

Drivers for Water Reuse

- ▼ The City of Corvallis is concerned about meeting the new Willamette River Total Maximum Daily Load (TMDL) for temperature
- ▼ The Greenberry Irrigation District (GID) seeks to expand its irrigation supply for increased crop production and the ability to pursue emerging agricultural markets
- ▼ The Finley National Wildlife Refuge (FNWR) is located adjacent to GID lands and seeks additional water to expand and enhance wetlands habitat.

City of Corvallis Drivers

- ▼ Located in Oregon's mid-Willamette Valley
- ▼ Compact community of 55,000
- ▼ The economy is dominated by Oregon State University and high tech industry
- ▼ Government and commercial hub of Benton County
- ▼ Produces 4 billion gallons of treated wastewater per year
- ▼ Effluent temperature TMDL limit of 127,000,000 kilocalories per day

City of Corvallis Drivers

	2028 (20-year) Lifecycle Costs ⁽¹⁾	2058 (50-year) Lifecycle Costs ⁽¹⁾
Effluent Cooling ⁽²⁾	\$20.2 M	\$35.1 M
Ammonia Removal ⁽³⁾	\$59.7 M	\$64.9 M
Tertiary Filtration	\$28.7 M	\$31.7 M
Reverse Osmosis ⁽⁴⁾	\$149.0 M	\$248.0 M
Total	\$257.6 M	\$379.7 M

⁽¹⁾ Lifecycle costs include initial capital cost and annual Operations, Maintenance and Replacement Costs

⁽²⁾ Effluent cooling costs based on mechanical cooling with chillers

⁽³⁾ Ammonia Removal costs based on Nov. 1998 Corvallis Wastewater Utility Master Plan, with inflation factor.

⁽⁴⁾ Reverse Osmosis provides Excellent removal (>90%) for the majority of Emerging Contaminants

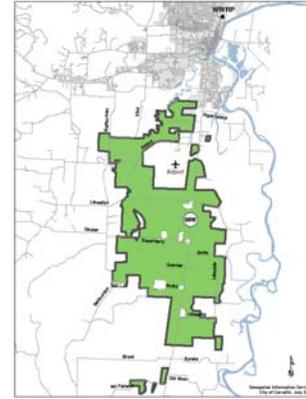
Greenberry Irrigation District Drivers

- ▼ The GID has 50 members, farming 11,000 acres in the mid-Willamette Valley, south of Corvallis
- ▼ Predominantly dry-land agriculture due to limited water for irrigation
- ▼ Largest crop is grass seed
- ▼ Must diversify crops and improve ag practices through irrigation to remain competitive
- ▼ Challenges securing additional water
- ▼ Very innovative, resourceful and determined leadership

Finley National Wildlife Refuge Drivers

- ▼ Created in 1964 to provide vital wintering habitat for dusky Canada geese
- ▼ More than 5,000 acres of varied habitat
- ▼ Hosts more than 200,000 waterfowl per year
- ▼ Needs water to "flood up" impoundments and wetland features during dry years
- ▼ Could increase moist soils wetland habitat by 5X
- ▼ Irrigated grass seed crops would provide additional forage to hold geese on the Refuge

Greenberry Irrigation District

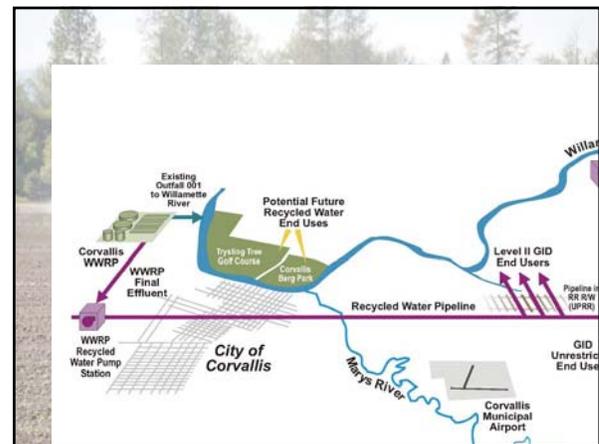
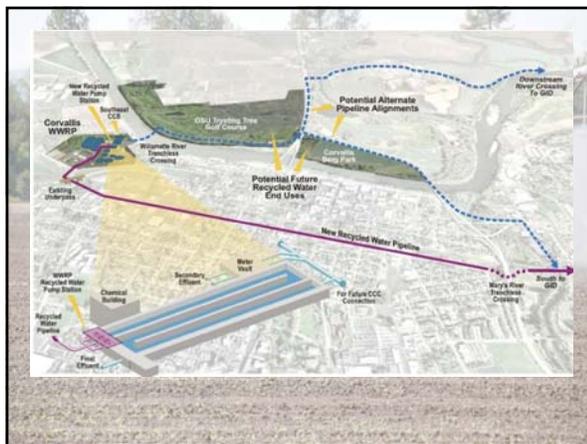


Infrastructure

- ▼ Pump station at Corvallis Treatment Plant
- ▼ Pipeline from Corvallis south to GID
- ▼ Remove 9 cfs of treated effluent from Willamette River
- ▼ Provides water to 2,000 acres of irrigated crops
- ▼ Approximately 200 acres of treatment and storage wetlands
- ▼ GID prefers secondarily treated wastewater
- ▼ Conceptual level cost estimate - \$13M

Unique Feature

- ▼ Ag wants water, water, water without the headaches
- ▼ The G.I.D. is well aware of the "World View" on recycled water, they are global competitors
- ▼ Water without the headaches is available at the end of our mixing zone, so.....
- ▼ Reverse mixing zone concept



Project Supporters

- ▼ Local boards & commissions; State and Federal elected delegations
- ▼ League of Oregon Cities
- ▼ Cascade Resource Conservation & Development
- ▼ Ducks Unlimited
- ▼ Marys River Watershed Council
- ▼ Oregon Farm Bureau
- ▼ Oregon Watershed Enhancement Board
- ▼ Oregon Economic and Community Development
- ▼ Oregon Department of Water Resources
- ▼ Willamette American Heritage Rivers Initiative

The Power of the People

- ▼ Recycling reduces the incentive to conserve!
- ▼ If somebody else wants this water, maybe we should keep it for ourselves!
- ▼ Flowers to showers!
- ▼ City Council direction to develop alternatives
- ▼ City Council direction for broader public involvement
- ▼ Wastewater Recycling Survey

Factors that have been found to influence public opinion of water reuse



- ▼ Degree of contact (the 'yuck factor')
- ▼ Age
- ▼ Gender
- ▼ Education
- ▼ Income
- ▼ Occupation
- ▼ Length of residence
- ▼ Presence of children

Factors that have been found to influence public opinion of water reuse



- Culture of the community
- Trust in local public utility
- Health effects
- Environmental effects
- Cost of project
- Prior knowledge of water reuse
- Awareness of water problems

What makes the public accept a decision?

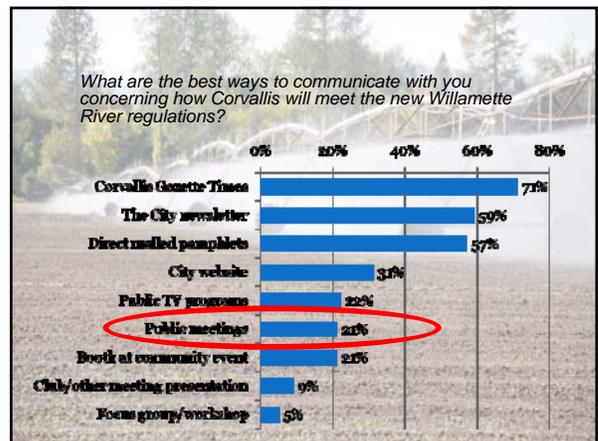
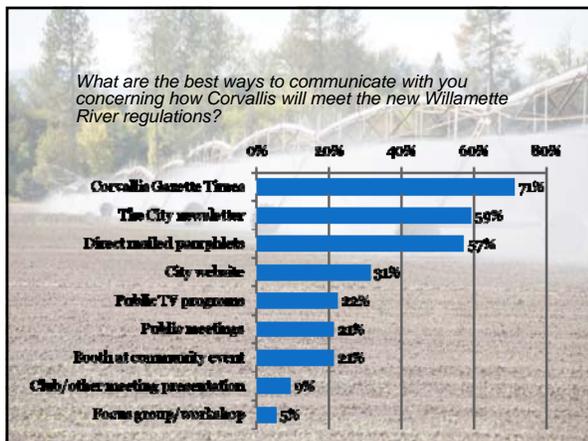
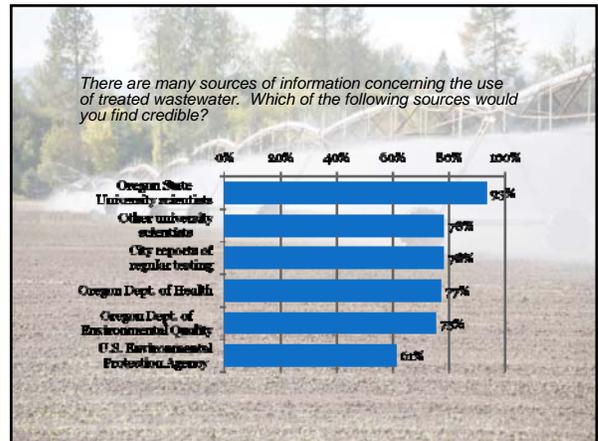
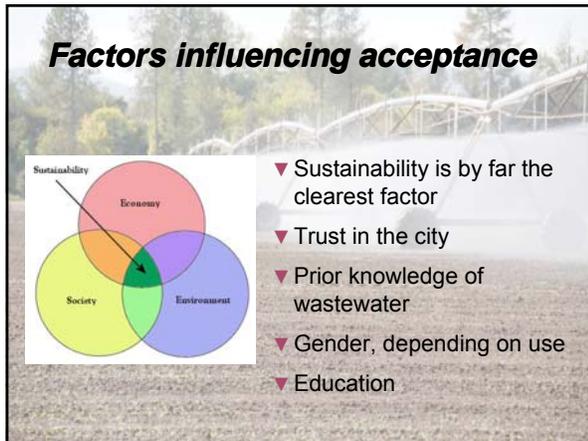
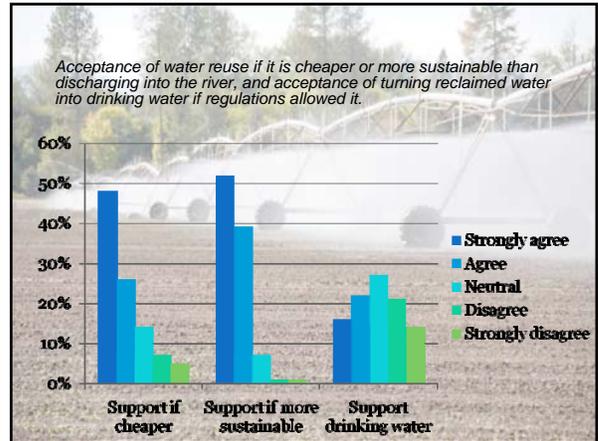
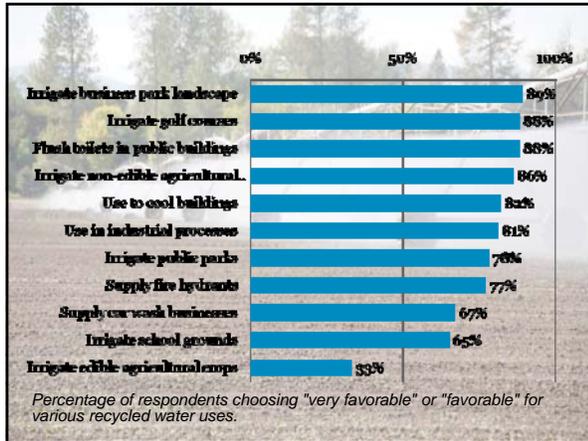


- ▼ Fairness & competence in the process ^a
- ▼ Trinity of Voice ^b
 - ┆ Access
 - ┆ Standing
 - ┆ Influence
- ▼ Is it the result one that participants desired? ^c

Goals of public survey



- ▼ Discover what factors influence the public acceptance of water reuse in Corvallis
- ▼ Make recommendations about next steps and how to conduct public outreach
- ▼ Used a mailed survey to 1,116 registered voters, 46% response





- ### Recommendations for Corvallis
- ▼ Develop a set of feasible options, either with or without public input
 - ▼ Communicate the options available through newspaper, city newsletter and direct-mailed pamphlets
 - ▼ Assess public opinion again to determine preferred options and education needs
 - ▼ Have information available from a wide variety of sources
 - ▼ Consider hiring OSU scientists to do research

- ### Most Common Survey Mistakes
- ▼ Biased or leading questions
 - ▼ Ambiguous questions
 - ▼ Double barreled questions
 - ▼ Loaded questions

- ### Recommendations from other water reuse programs
- 
- ▼ Educate, educate, educate!
 - | Direct-mail brochures
 - | Newspapers/newsletters
 - | Public gatherings/club meetings
 - | Tours
 - ▼ Clearly define the public role in decision making



- ### Urban Alternatives
- ▼ Uses available inside the urban growth boundary:
 - | City parks & open space
 - | Golf course irrigation
 - | Car washing facilities
 - | Industrial process water
 - ▼ Maximum estimated demand: 2.7 million gallons/day
 - ▼ Demand needed to be feasible: 7-20 mgd

East Alternative

- ▼ Irrigate Trysting Tree Golf Course
- ▼ Constructed polishing wetlands (Berg Park)
- ▼ Restricted impoundment discharge (Knife River Pond)
- ▼ Subsurface discharge into Willamette River
- ▼ Estimated capital cost: \$13.2 million
- ▼ Estimated 20-year lifecycle cost: \$14.9 million
- ▼ Est. Carbon Footprint: 130 Metric Tons CO₂/Year

South Alternative

- ▼ Agriculture (Greenberry Irrigation District)
- ▼ Construct polishing wetlands next to Finley
- ▼ Muddy Creek flow augmentation
- ▼ Estimated capital cost: \$40.1 million
- ▼ 20-year lifecycle cost: \$45.6 million
- ▼ Est. Carbon Footprint: 580 Metric Tons CO₂/Year

North Alternative

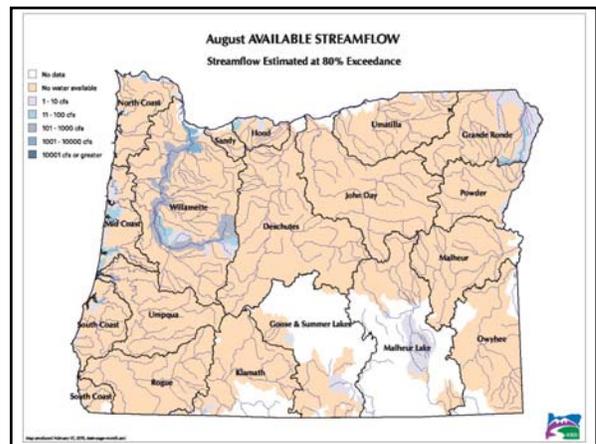
- ▼ Agricultural irrigation on grass seed and other crops
- ▼ Constructed polishing wetlands adjacent to river
- ▼ Willamette River subsurface discharge
- ▼ Estimated capital cost: \$24.1 million
- ▼ 20-year lifecycle cost: \$25.9 million
- ▼ Est. Carbon Footprint: 130 Metric Tons CO₂/Year

Riparian Alternative

- ▼ Temperature only
- ▼ 20-Year Tree Height of 65 ft. (20 meters) with 75% density in canopy
- ▼ Estimated development cost: \$5 million
- ▼ 20-year lifecycle cost: \$2 million

Taking Water Reuse to the Next Level

- ▼ Current regulations reflect our attitude towards water
- ▼ Water is abundant enough and affordable enough – for now
- ▼ Widespread reuse of water will happen in the U.S.
- ▼ Typical path to reuse – water crisis
- ▼ Alternate path to reuse – TMDLs
- ▼ Either path must pass through the same keyhole



The Oregon Garden, Silverton, Oregon



Ladd Marsh, La Grande, OR

