

FINAL PROJECT REPORT

Lane Council of Governments

Willamette Small City Water Conservation and Reuse Planning Study



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This FINAL REPORT describes services rendered for the Lane Council of Governments/Oregon Water Resources Department contract for the Willamette Small City Water Conservation and Reuse Planning Study. This report covers all quarters since the project's beginning in the fall of 2012. The following narrative describes the services and products provided for each of the project's budgeted tasks.

Background

The goal of the Willamette Small City Conservation and Reuse Planning Study was to reduce water demand in two pilot cities by examining, elaborating on, determining the feasibility of, and selecting water conservation/reuse policy strategies at the small city urban scale that can serve as models for other small cities to reduce water demand in the Willamette Basin. To meet the goal, the project: collected information about water demand; conducted an analysis of how to reduce demand through conservation and reuse; analyzed and selected tools for small cities to use which guide water conservation at the municipal, residential, industrial, and commercial level through policies and programs (incentives, regulatory and non-regulatory).

Lane Council of Governments (LCOG) coordinated the work in the headwater region of the Willamette River Basin (Coast Fork sub-basin) for the cities of Creswell and Cottage Grove. Like most small cities, both lack local knowledge, staff, and financial resources to formulate regulatory and incentive-based strategies to address the increasing demands for water. LCOG helped the cities sort through technical information and brought options forward in a way each city could digest and consider for implementation. Not only did the project directly assist these two cities in providing insight into and mechanisms for reducing water demands, it also built a partnership with the Willamette Water 2100 (WW 2100) Project and other stakeholders integrating conservation into future water use in the Willamette Basin. The project provided results that can be applied to the other 63 small cities (populations < 10,000) in the Willamette Basin and elsewhere in the State of Oregon.

Although products to submit are not clearly identified in the contract, products submitted include:

1. *Community Water Use Profiles for Creswell (Final Draft).*
2. *Community Water Use Profiles for Cottage Grove (Final Draft).*
3. *Policy Alternatives for Water Conservation In Small Cities– Report/Briefing Paper (Note: Similar reports were individualized for Creswell and Cottage Grove).*
4. *Creswell Water Conservation and Re-use Technical Report – Being completed - will be submitted with final billing.*

5. *Cottage Grove Water Conservation and Re-use Technical Report – Being completed – will be submitted with final billing.*

Project Highlights and Activities by Task:

Following is a description of the project highlights and activities by each of the three project tasks.

Task 1: Estimate current and projected population and water needs of Creswell and Cottage Grove.

Using a variety of data sources, the project explored water supply and demand for Creswell and Cottage Grove. Based on the current baseline per capita water usage a trajectory of future needs and supply to meet those needs was constructed. The two pilot cities are in very different circumstances in terms of level of supply to meet future needs. Within 20 years the City of Creswell, population about 5,000, could see water supply limitations, due to lack of water rights. The City of Cottage Grove has sufficient supply (in terms of water rights) to meet future needs however there is a projected need for a significant treatment facility upgrade within about 15 years. The differences in projected need and supply influence the motivation for selection and implementation of conservation policies.

Community water profile reports were prepared for each city's staff and public officials to help develop an understanding of water supply and demand issues within each city. The profiles include a supply demand trajectory along with data and analysis of water use integrating factors such as land use, geographic distribution, lot size, and age of housing stock. Existing demand and conservation policies were examined and a gaps analysis provided information to each city as to possible strategies to achieve future desired outcomes. Activities performed related to Task 1 include the following:

- Gathered data and source identification such as within Public Water System Reports, Billing Reports, interviews with Public Works staff to determine which data resided where; main contacts for requests; and data easily available for ongoing reporting/outcomes measurement.
- Reviewed existing documents such as Water Master Plans for information on current and projected water supply and use.
- Compiled specific 2011 and 2012 user water use data reports for Creswell and Cottage Grove and configured data to extract values pertinent to water conservation strategies.
- Compiled current and projected populations for Creswell and Cottage Grove to help determine water demand and to develop a water supply and demand trajectory for each city.

- Performed quantification and disaggregation of water demand; determining demand at varying times by type of account and by level of unaccounted for water production.
- Linked Creswell and Cottage Grove tabular water consumption data to Lane County's taxlot layer in GIS. This allowed for spatial analysis of water usage in Creswell. Mapped water data representing peak and low consumption/billing periods for 2011 and 2012.
- Performed spatial water usage analysis examining consumption among varying land uses and zones, building age, lot sizes, and through seasonal shifts identifying relationships with water usage.
- Spatially identified high water users and associated characteristics. Identified potential conservation factors within Cottage Grove and Creswell such as age of housing stock, top users, lot size in relationship to built area (amount of landscape).
- Generated maps and figures representing spatial analysis of water consumption, including the development of narrative to accompany the maps and figures within Creswell's and Cottage Grove's community water profile.
- Re-examination of Water Rights and Quantification of Demand, Supply and Population: conducted an analysis of water rights. Worked with City Engineer and Public Works Director to use this information in new characterization of supply for new population projection.
- Determined Top Commercial Water Users for Lane Community College (LCC) students to contact for free water audit.
- Developed draft and final draft community water profiles and associated "report/briefing paper" - documenting community demographic characteristics as well as water supply and demand, distribution and storage characteristics.

Task 2: Research and gather different policy options (opportunities for conservation and reuse) for the small city urban environment. Review selected methods and detail specific additional information about potential tools and measures to determine feasibility for small city implementation. Analyze and integrate local issues to build a customized city specific tool kit detailing city selected methods to affect demand over time.

The project developed the top dozen potential strategies which seemed to be the most realistic for the small city urban environment. LCOG prepared a report for each city of potential strategies for staff and public official use that analyzed strategies including: potential regulatory, incentives based, and educational strategy options. The pros and

cons of each strategy, cross program benefits, case studies of cities implementing the strategy and an estimate of costs and potential water savings for different policy alternatives were identified in the analysis. This information, along with evaluation criteria, helped staff and decision makers better evaluate policy alternatives for achieving multiple objectives.

The cities then selected a sub-set of realistic and appropriate policy tools to mitigate increasing water demand as a result of growing population and development. The policies selected as most appropriate per jurisdiction were then further dissected and analyzed in a Technical Report for inclusion in the Water Master Plans. The Technical Report includes the water use profiles of each city and the selected “top” strategies including an implementation plan. Categorization (i.e. high, medium, low) of these policy considerations and integration of information with the Willamette 2100 Envision model provides the region with actionable policy tools to shape the future of water conservation in small communities. These pilot cities have become empowered to better plan for the future with a set of water conservation techniques to meet their objectives while informing models for the broader Willamette Basin portraying the benefits of conservation and to other decision makers.

Activities performed related to Task 2 include the following:

- Researched case studies of other jurisdictions implementing water conservation measures. Developed parameters for selection of case studies; key components to be extrapolated from case studies; and developed case study summary. Researched and examined conservation strategies used by small cities in Oregon, other states, and internationally (in water stressed regions).
- Researched typical costs and amount of water savings of different water conservation strategies.
- Drafted and distributed survey on public perceptions of water and water use: determined need for better understanding of public perception and identified primary domains for questions.
- Developed evaluation criteria to help staff and decision makers evaluate water resource policy alternatives from a number of critical perspectives in general and specific to each city. Drafted criteria for multiple objective benefits to aid in development of decision making tools.
- Identified infrastructure needed to distribute treated wastewater, conducted cost analysis of infrastructure and maintenance costs, and performed flow and volume calculations for irrigation of proposed Creswell golf course.
- Worked with the Creswell Elementary School on developing a rain garden which can be a stormwater runoff and irrigation demands demonstration project for the community.

- Performed analysis of current block rate structure for both Creswell and Cottage Grove consumption data and recommended changes for better conservation effectiveness.
- Researched information and participated in LID training-on designing, building, reviewing and permitting for rain gardens and xeriscaping to minimize irrigation.
- Worked with LCC students in Regional Water Policy class to review and research various policy alternatives for Creswell and Cottage Grove to use in implementing water conservation programs. Developed presentations and class materials including weekly assignments for LCC students to use as guidance for reviewing and researching policy alternatives for water conservation programs.
- Structured LCC student time outside of class researching and developing policy strategies for water conservation in Creswell and Cottage Grove. LCC student activities included:
 - Developed maps to delineate source water protection zones for Creswell and Cottage Grove to understand opportunities and barriers to developing water conservation programs with cross program benefits in water quality
 - Researched and developed regulatory programs to suit conditions in Creswell and Cottage Grove
 - Researched and analyzed different non-regulatory policy options for Creswell and Cottage Grove
 - Investigated a variety of case studies with a focus on the small city environment in addition to other alternative approaches for water conservation that could be applied to Creswell and Cottage Grove
 - Investigated and provided information on a number of different funding sources that are available for implementing educational, regulatory and non-regulatory programs in Cottage Grove and Creswell
 - Presented findings on different options that Creswell and Cottage Grove could use to implement water conservation programs as part of their final class project
- Assembled draft and final *Policy Alternatives Summary* reports for Creswell and Cottage Grove. The final report reflects input from stakeholders and identifies potential policies best suited for small cities. Reports include potential regulatory, incentives bases, and education strategy options. Options identify the pros and cons, of each strategy, cross program benefits, case studies of cities implementing the strategy and an estimate of costs and potential water savings for different policy alternatives to help decision makers better evaluated policy alternatives.

- After selection of priority strategies (Task 3), conducted more detailed analysis and investigation into policy alternatives shortlist, utilizing Creswell and Cottage Grove feedback, as well as feedback from stakeholder work session. Followed up with contacts from that work session for more guidance and tools.
- Drafted and finalized Water Conservation Technical Report to include water use profiles for each city focused on selected “top” strategies. Report includes detailed characteristics of each strategy and strategies are expanded to include an implementation plan (phasing, roles, etc.). (To be finalized by June 30th)
- Developed a policy matrix highlighting and emphasizing key aspects of water conservation strategies to provide a concise resource for jurisdictions to use in considering potential water conservation programs for implementation.
- Considered implications of WIFIA (Water Infrastructure Financing Innovation Act) for water infrastructure needs related to goals.

Task 3: Work with City staff, technical advisory committees, and public officials and the WW 2100 Stakeholder Learning Action Network to develop and adopt policies and strategies that are appropriate and realistic.

As has been noted, the cities of Creswell and Cottage Grove while being 12 minutes apart have very different water profiles. Cottage Grove holds water rights which could provide potable water for well over their projected 20 year population where Creswell’s water rights are much more limited placing pressure on supply and providing impetus for conservation efforts. Given these somewhat divergent water profiles, both identified similar strategies felt to be appropriate and realistic.

City staff, school district staff, tree board members, watershed council members, and public officials provided input on cross-program benefits and on effective strategies for water conservation. Discussions were also held with transportation modelers working on greenhouse gas emission scenarios to discuss the potential of applying the GreenSteps model which includes unit water use by density group to understand water consumption on a more integrative scale and as a possible refinement to outputs generated by Willamette Water 2100’s ENVISION model.

Tools to be implemented were analyzed for and tailored to each city and vetted with stakeholders. The work session held for stakeholders throughout the region provided realistic input about what is possible in the small city environment. Together we developed a set of policy tools through a collaborative process. This process leveraged resources to begin a regional dialogue about water management in the Willamette Valley to best meet multiple objectives.

The planning and policy development process coordinated by LCOG delivered a practical and successful model for providing valuable tools to regional cities. The

partnership with WW 2100 provided an additional level of sophistication, information sharing, resources, and opportunities to help build a conversation about the choices we face regarding how to use water efficiently in an increasingly uncertain future.

Activities related to Task 3 included the following:

- Meetings and coordination with City of Creswell and Cottage Grove planning and public works staff of desired conservation goals, tools, and outcomes given one City has demonstrated water need and the other has sufficient supply for quite some time.
- Documented existing strategies included in Water Master Plans and other relevant document. Met with city staff to determine if implemented, any quantifiable success and identification of any barriers to implementation.
- Reviewed and discussed draft *Policy Alternatives Summary* reports with Creswell and Cottage Grove staff and/or public officials. The reports identify potential policies best suited for small cities and specifically applicable for Creswell and/or Cottage Grove. Helped staff and public officials evaluate potential strategies for each city.
- Held discussions with Public Works staff in Creswell on the nature of unaccounted for water production to determine how much of the unaccounted water production could actually be classified as demand rather than loss to provide accurate numbers and projections of water demand to determine what strategies would be effective for conservation.
- Held a water rate structure work session with Public Works, City Administrators, and City Council.
- Coordinated and scheduled water rate training by Oregon Association of Water Utilities (OAWU) for Creswell City Council.
- Met with the Willamette Water 2100 (WW 2100) research team to discuss the integration of municipal water provider conservation strategies and behavior into ENVISION model.
- Coordinated with Tree Board, School District and Earth Day Event organizers on 2013 Earth Day event and views on preferred policy options for water conservation. Selected preferred educational materials for xeriscaping and gardening tips for water conservation for posting on website and Tree Board training.
- Reviewed WW 2100 ENVISION model framework, and examined the WW 2100 Reference Case Scenario comprising the elements and assumptions of the "base

case" Examined the metrics for evaluating water scarcity in ENVISION to evaluate outcomes for the modeling scenarios that will include water conservation.

- Participated in the WW 2100 Learning Action Network (LAN) workshop/meeting to provide input on the ENVISION model scenarios and metrics used for evaluation. Provided input about the proposed approach and shared perspective on what kind of model results would be useful to cities and counties to illustrate the water scarcity issue and mechanisms that will help move forward with implementation of programs and/or policies.
- Participated in the WW 2100 Webinars:Development of Regional Climate Scenarios and Their Application to Willamette Water 2100 - Climate models and implications for analysis and impact and Land-use Models for Willamette Water 2100, highlighting the economic focus on model assumptions regarding land use which may or may not link with existing or future urban growth boundaries and population projections.
- Participated in Willamette Water 2100 Learning Action Network (LAN) workshop to provide input on development of modeling for valley wide water quantification and share municipal issues related to supply, demand, and quality.
- Coordinated with Watershed Council on potential integration of conservation goals into watershed council work program as part of their strategic planning.
- Coordinated small city information sharing regarding proposed Irrigation Code
- Participated in USACE-Water Reallocation Study regroup meeting where methodology was presented along with timeline and potential funding for this and next biennium.
- Worked with the Creswell Elementary School on developing a rain garden which can be a Stormwater runoff and irrigation demands demonstration project for the community on water reuse/recycling strategy.
- Coordination with Cottage Grove and Creswell Planning on City efforts: worked on developing a stormwater management plan which furthered options and incentives to minimize irrigation of private and public facilities.
- Participated in a multi-jurisdictional meeting (City of Creswell, ACOE, ODFW, Irrigation District, Water Control District, OWRD, Watershed Council plus more) *TMDL and Temperature Issues Summer Garden Lake Park*. Discussed low lake water levels- to address water flows (and over draws) in Hills Creek contributing to reduced water level and decreased water quality in Garden Lake which enters the Willamette. Further discussed issues with public officials along with links among water quantity and quality.

- Coordinated with EPA Region 10 Research Facility, Willamette Partnership, OR Depts. of Agriculture and Environmental Quality, NRCS, Benton and Lane Soil and Water Dist. and others to explore how irrigation watering conservation practices can reduce nutrient loading in surface and groundwater in the Valley.
- Water Legislation Symposium and Willamette Water Bill/Reallocation Study: attended Legislative Update sponsored by the Oregon Water Utilities Council to learn more about how State Agencies intend to implement the Integrated Water Resources Strategy; potential legislation regarding land use UGB expansion; and the reallocation Study. Creswell has identified need for additional water to serve projected population growth and is the pilot community in the Willamette Basin Reservoir Study
- Conducted a work session with Willamette 2100 Learning Action Network and other stakeholders to gain broader understanding and feedback about conservation and reuse issues in the Willamette Valley. Met with staff and/or public official representatives from the Willamette 2100 project, the Department of Environmental Quality, Eugene Water and Electric Board, Lane Community College and local jurisdictions (Westfir, Brownsville, Lane County, Dunes City, Creswell, Cottage Grove, Tangent, Yoncolla, Veneta, Coburg, Stayton, Mill City, Scio, and Harrisburg). Identified and discussed priority issues and potential strategies for water conservation and reuse and the associated opportunities and limitations-for example, debt service on infrastructure..
- Obtained feedback from stakeholders about the viability and barriers to water conservation within their jurisdictions based upon the identified strategies. Refined strategies and policy matrix to reflect jurisdictional realities.
- Maintained communication with Lane Community College's Water Conservation Technician program to develop opportunities to include and utilize expertise within the College to assist Creswell and Cottage Grove with implementing water conservation strategies.
- Discussed water consumption anomalies with Public Works staff in Creswell on the nature of unaccounted for water production to determine how much of the unaccounted water production could actually be classified as demand rather than loss to provide accurate numbers and projections of water. Identified major leak.
- Worked with Oregon Health Authority on messaging regarding conservation, quality and health.
- Investigated linkages with other regional modeling efforts such as with transportation modelers working on greenhouse gas emission scenarios to discuss the potential of applying the GreenSteps model.