



Colorado Water and Growth Dialogue

CWCB Final Report for Phase I Grant

May 21, 2015

I. Project Description

By 2030, Colorado is projected to experience a 65% increase in population¹ and with it a substantial increase in demand for water by municipalities. In a state with limited water, this increase in demand will result in a water supply gap. This impending supply gap is a well-known and pressing problem for the future of Colorado. Thus far, strategies to address the gap have generally taken three forms: develop new supply and water storage projects, implement reuse projects and finally encourage water conservation. The Colorado Water and Growth Dialogue intends to explore and demonstrate how a fourth solution—the integration of water and land use planning should be utilized to reduce water demand from the development and re-development associated with the projected population increase. This approach to planning aims to direct and incentivize smart, water-wise growth in lieu of allowing pure market conditions to guide how Colorado grows.

Thus, the purpose of the Colorado Water and Growth Dialogue is three-fold: first, to demonstrate how much water can be saved through the integration of water and land use planning for homes and neighborhoods that will be developed or redeveloped in the future; second, to develop a consensus-based set of recommended water-saving strategies for communities that can be incorporated into their planning that recognizes the uncertainties of how and where people in the future will want to live; and third, to develop and disseminate an implementation plan for these recommendations that includes a demonstration of real water savings that can be achieved through strategic land use planning decisions while still meeting the current and future needs of the community.

II. Project Update

The Colorado Water and Growth Dialogue is now well into Phase I: the development of a set of options for integrating land and water planning and reducing the demand from new and redevelopment in the Denver metro region. *Please see process flow chart in Appendix A.*

An early success was the formation of a diverse Work Group to oversee the project and develop the Action Plan. The Working Group is composed of approximately 30 water and land use planners, land and economic developers, and policy makers. The Group met in August, September and October 2014 to orient to the project, identify gaps in group composition, review and approve the Charter and introduce the research component. The Working Group also met via conference call in December to review the Action Plan and again in person in May to review and provide suggestions on land use patterns that will be further detailed and their water use quantified.

1. SWSI II: <http://cwcb.state.co.us/public-information/publications/Documents/ReportsStudies/TechnicalRoundtableReportFinalDraft.pdf>

A second early success was in overcoming initial barriers to collaboration between three significant stakeholders – Aurora Water, Denver Water and DRCOG. This required Keystone and the Steering Committee members to convene several meetings between Denver Water and DRCOG technical staff to assess the compatibility of DRCOG’s modeling tool, UrbanSim, and Denver Water’s water use data. This was necessary to assure all parties that the research component in Stage 3 was achievable.

In January, the Steering Committee met and decided to combine the research and modeling teams into one Technical Subcommittee. They also decided to postpone the monthly Working Group meetings until the Technical Subcommittee had developed a set of recommended land use patterns and a process strategy to determine the relative water savings potential of each pattern.

Clarion Associates conducted research that identified land use patterns and their potential for water savings and for implementation. This research has informed the Technical Subcommittee’s decision on which land use patterns will be presented to the Working Group as focus points.

The modeling subgroup is working to build a bridge water demand model that can interact with UrbanSim. DRCOG has provided an initial 2040 UrbanSim model run to Denver Water so that the Working Group can begin to understand the baseline water footprint of projected development in a no-change environment. Aurora Water has engaged in the Technical Subcommittee and their demand data will begin to feed into the process.

Most recently, the Working Group convened and confirmed the recommended geographic area, planning time horizon, and land use patterns for which the Denver Water modelers will quantify water demand. The WG further refined the definitions and generated examples of the recommended land use patterns, and the Denver Water modelers will now proceed with quantifying water demand for these land use patterns.

III. Progress toward Achieving Outcomes

A. Step 1. Select and convene the Working Group (WG).

Projected Outcome: A diverse Working Group formed to oversee the project and develop the Action Plan.

1. Approximately 30 individuals from the water, land use planning, land development, and economic development communities comprise the Working Group. Additionally, Ray Quay and two colleagues from the Desert City Decision Center at the University of Arizona have joined the Working Group and Steering Committee and bring a depth of expertise in modeling and exploratory scenario planning.
2. The Working Group met in August, September, October, and December 2014 and most recently in May 2015 to review and provide suggestions on land use patterns and strategies.

B. Step 2. Identify and explore potential policies, strategies and practices, and barriers to achieving the goal.

Projected Outcome: A better informed and engaged Working Group and a preliminary set of strategies, policies and best practices that will be explored, tested and refined throughout the project.

1. Clarion Associates conducted research that identified land use patterns and their potential for water savings and for implementation. This research informed the recommended land use strategies, or patterns, to test through modeling and scenario planning. The suggested land use patterns are:
 - Smaller residential lots (cluster development)
 - Cluster single family
 - Townhouses
 - Three-story walk-up apartments
 - Zero lot lines and patio homes
 - Changing from Single Family to Multi-Family development (infill)
 - Increasing Multi-Family (moving –up)
 - Turf/Irrigation Restrictions
2. The Technical Subcommittee set the geographic area as Aurora Water and Denver Water service areas and the planning horizon as 2040
3. The Working Group has convened and confirmed the recommended geographic area, planning time horizon, and land use patterns for which the Denver Water modelers will quantify water demand.

C. Step 3. Research land use/water demand data and lessons learned in other places, and collaborate with other research efforts.

Projected Outcome: A more in-depth and detailed understanding of the water use consequences of land uses and land use patterns, and the strategies, tools, policies and best practices that have been used in other places to reduce the water footprint from development and redevelopment and overcome barriers.

1. Clarion’s research has informed the Technical Subcommittee’s decision on the geographic area, time horizon, and land use patterns to use in scenario planning.
2. Keystone Policy Center staff attended Land Use Leadership Alliance training to further collaborate with other land use/water planning integration efforts.

D. Step 4. Engage regional stakeholders in a scenario planning process to demonstrate alternative land use approaches and their water use consequences under future uncertainties.

Projected Outcome: An informed multi-stakeholder planning committee that is ready to engage in the modeling and scenario planning processes within a relevant and well documented geographic area.

1. Desert City Decision Center is providing technical assistance to support Denver Water, Aurora Water, and Denver Regional Council of Governments (DRCOG) modeling teams as they work to bridge their data and create new decision support tools. DRCOG has provided an initial 2040 UrbanSim model run to Denver Water so that the Working Group can begin to understand the baseline

water footprint of projected development in a no-change environment. Denver Water will begin to quantify water demand data for the recommended land use patterns to feed into the model.

2. The modeling group presented their approach to the full Working Group in May to ensure buy-in and understanding of the steps of the process, as well as to get more specific recommendations of the neighborhoods and street corners within the larger geographic area (Denver Water and Aurora Water service areas).
3. In the original proposal, this step includes additional projected outcomes regarding development of a report and dissemination and implementation of the land use planning strategies. The Dialogue is on track to meet those outcomes, but they are part of Phase 2 and have not yet been addressed.

E. Step 5. Build consensus for best policies, strategies and practices for achieving the goal and develop a Roadmap for getting there.

Projected Outcome: Final recommendations for the State Water Plan – by December 1, 2014

1. The original proposal calls for consensus input into the State Water Plan by the Working Group by the end of 2014; however, this input will be delivered, but it will now be delivered as individual input and not from the group itself.
2. In our original proposal, this step includes outcomes related to changing how land use and water planning are approached and impacting the thinking among participants about future uncertainties and their capacity to anticipate, plan, and adapt to such uncertainties.. These outcomes are part of Phase 2 and have not yet been directly addressed, but we already see novel collaboration between the Denver Water, and DRCOG modeling teams and anticipate that further concrete understanding of the impact of land use planning on water savings will help the Dialogue achieve those outcomes.

IV. Major Obstacles Encountered

- A. The Desert City Decision Center is supporting the Denver Water and Denver Regional Council of Governments (DRCOG) modeling teams as they work to bridge their data and create new decision support tools. UrbanSim is a software-based simulation system for supporting planning and analysis of urban development, incorporating the interactions between land use, transportation, the economy, and the environment (www.urbansim.org). DRCOG is using UrbanSim for land use forecasting and describes it as “a parcel-based model that helps better reflect the dynamic interaction of households, firms, real estate markets and the regional transportation system.” The obstacle, however, is that the modeling tool is not currently compatible with water use data. DRCOG and Aurora Water and Denver Water do not currently have data and modeling capacities that can speak directly to each other; they, with the support of DCDC, are working to make these models compatible.
- B. Additionally, the Dialogue needs technical capacity to analyze a suite of future scenarios in order to identify patterns and robust strategies that are resilient against future uncertainties. Exploratory scenario planning will be instrumental in analyzing potentially 100’s of permutations of scenarios that will explore various land use patterns and management strategies. These management strategies will increase density and reduce

outdoor irrigation from development and redevelopment of lands on the Front Range. We have submitted a grant proposal to Lincoln Land Institute and the Sonoran Institutes' Western Lands and Communities program to receive additional financial and technical support the exploratory scenario planning component of this process.

V. Next Steps

- A.** The modelers will quantify water demand for the land use patterns established by the Working Group.
- B.** The Dialogue will utilize the Working Group to develop a set of plausible scenarios based on the land use patterns identified by our research. These land use patterns will be further defined by the Working Group into low, medium, and high states or a different delineation based on the group's discussions. We will then utilize the Western Lands and Communities technical expertise as well as the modeling capabilities of Denver Water and DRCOG to run the models and analyze the results. The Dialogue is committed to documenting, sharing and utilizing the results of the exploratory scenario planning process.

Appendix A. High-Level Process Overview

Colorado Water & Growth Dialogue – 2015 Process Chart

