

Colorado

2021 Ogallala Aquifer Virtual Summit White Paper

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Activities inspired by the 2018 Summit

Coloradans participating in the 2018 Ogallala Aquifer Summit in Garden City, Kansas, returned home and engaged in new conversations and networking efforts that have led to the formation of new partnerships within Colorado as well as across state lines. Examples include:

1. The development and launch of the Colorado Master Irrigator program in 2020, inspired by the 2018 Ogallala Summit presentation by Steve Walthour, General Manager of the North Plains Groundwater Conservation District in Texas, on their successful Master Irrigator program that launched in 2016. The first Colorado Master Irrigator program took place over four weeks from February 12 - March 4, 2020. The 22 participants in the first 2020 Colorado Master Irrigator program cohort are involved in managing more than 20,000 irrigated acres located across all eight counties in northeastern Colorado's Republican River Basin—this is more than 1/20th of the irrigated acres in the Basin. Colorado Master Irrigator in 2021 was postponed due to the ongoing pandemic, with participants preferring to wait for a fully in-person learning experience to be possible, rather than participating in the course online or through hybrid in-person/online learning. In the meantime, program coordinators are working to develop learning modules, videos featuring graduates explaining what they found useful or practical from the course, and sharing information and insights about which course materials, practices and tools graduates are considering or implementing as a result of taking the course with local, state, and federal partners located within and outside of Colorado.
2. Exploration of how to establish new Testing Agriculture Solutions Programs (TAPS) program in Colorado and Kansas, building on the examples of programs in Nebraska and Oklahoma supported with leadership from Ogallala Water CAP team members and others.



2020 Colorado Master Irrigator program graduates (photo by Hannah Moshay)

3. Rejuvenation of multi-district conversations focused on exploring different methods to encourage and support voluntary conservation efforts among producers. These conversations, among individuals, within groundwater management districts, by the Republican River Water Conservation District, via the Colorado Groundwater Commission, and with staff from the Colorado Water Conservation Board (CWCB) and South Platte Basin Roundtable have led to district-led requests to research the impacts of amending state water laws to remove policy-related roadblocks to on-farm increases in water conservation and water use efficiency, and CWCB partnering with the Ogallala Water CAP to support a regional listening session focused on gathering insights and data to support the inclusion of a High Plains-focused case study in the state's next water plan.
4. Communication between the Playa Lakes Joint Venture and Ogallala Water Coordinated Agriculture Project teams to connect with and to more regional stakeholders and publicize information related to both programs' publications and activities.

Other/new activities underway

Aquifer declines and sustainability needs are applying pressure to agricultural water users to change historic practices and have the potential to significantly alter agricultural production and water use and strategies for maintaining the economic base of local communities.

A Colorado State University food systems research team and the Denver's Office of Public Health and Environment have been working together to leverage urban market opportunities to support Colorado farmers and ranchers through a Foundation for Food and Agricultural Research (FFAR) funded project. The team is studying the City and County of Denver's integrated food policy plan called the **Denver Food Vision**, a program facilitated by the **Denver Sustainable Food Policy Council**, as a case study to evaluate the impacts of this food policy plan on rural social, political, cultural, physical, financial, natural, and human issues — with particular focus on evaluating the inevitable trade-offs that will occur. Meanwhile, little attention has been paid to how meeting these market opportunities with particular crops may further state and regional water resource management and rural economic development objectives. Thus, identifying and mapping these assets — as well as understanding their condition, capabilities, limitations, and untapped potential — before making recommendations is critical.

Another new project underway led by Colorado State University and supported by a Colorado Water Plan grant is creating a Colorado-specific food asset mapping tool, identifying market opportunities for San Luis Valley-grown products that reduce consumptive water use, and engaging state and local agencies to support agricultural economic development and rural job creation that concomitantly meet Colorado's Water Plan goals of maintaining Colorado's agricultural productivity and supporting rural economies. The activities and outcomes of this program, based in a separate, groundwater and agriculturally dependent part of the state, are instructive for the eastern

part of the state that overlies the Ogallala region. For more information, visit: foodsystems.colostate.edu/co-foodsystems-map.

Colorado Department of Agriculture's Soil Health Initiative is a state-wide program that will provide technical and financial support to agricultural producers interested in improving soil health for managing resiliency in light of drought and unpredictable weather events, including practices such as no-till and reduced till, cover cropping, crop rotation, continuous cropping, integration of managed livestock, and the addition of organic amendments. In partnership with USDA's Natural Resources Conservation Service (NRCS), many state agencies, Colorado State University and its agricultural experiment stations, funding will be leveraged to award new Health Soils Matching grants to producers. As farmers improve their soil health, they may become eligible for additional compensation through emerging ecosystem services markets, supporting ecological and economic resiliency in agricultural systems. The department's program will help connect interested producers to the ecosystem services platform. In addition, soil health specialists will help foster farmer-to-farmer learning, host workshops, and help producers connect with new market opportunities. For more information, visit: ag.colorado.gov/conservation/soil-health

Funding for Colorado Water Plan Implementation continues to grow, Governor Polis has included \$10 million for additional general fund support for Colorado Water Plan implementation in his annual budget request; in 2019, Colorado voters approved ballot measure Prop DD, which will put a tax on casino sport gambling proceeds to fund Colorado Water Plan grant implementation. This increase in state funding for Colorado Water Plan Grant implementation is helping to fund voluntary groundwater conservation efforts through the Colorado Water Conservation Board (CWCB), including Colorado Master

Irrigator and the San Luis Valley Food Asset Mapping Project described earlier in this white paper. The Colorado Water Conservation Board is eager to continue supporting locally-led, innovative efforts to assist communities to achieve groundwater management goals and enhance agricultural and community resilience in light of projected declines in groundwater and irrigated acreage.



Learning from examples within our state

San Luis Valley challenges and management approaches provide perspective useful to the eastern portion of the state that overlies the Ogallala aquifer. The Valley has long suffered from over-appropriation. Surface water systems in the Rio Grande Basin have largely been characterized as over-appropriated since 1900. The development of the groundwater systems accelerated in the 1950s and 1960s and again reached the same stage of over-appropriated by 1972 and 1982. The struggle to operate a surface water system and a groundwater system under the doctrine of prior appropriation has been a challenge for the State of Colorado and the water users in the San Luis Valley. Coupled with these issues is the problem of highly variable and generally declining water supplies in the basin, poor snowpack and run off over the last 20 years. Working collaboratively with the State of Colorado, the Rio Grande Water Conservation District and other water entities in the basin have shifted the paradigm and understanding in this basin. After significant investment in engineering and hydrology studies this region now has a much better understanding of its water system and the interaction between groundwater and surface water systems. Producers in the Valley have come together to form subdistricts of the Rio Grande Water Conservation District in an effort to develop groundwater management plans that mitigate the impacts their withdrawals have on senior surface water rights and at the same time work to create and maintain sustainable aquifer systems in the basin. This is a community-driven solution to a community regional problem and is an alternative to intrusive

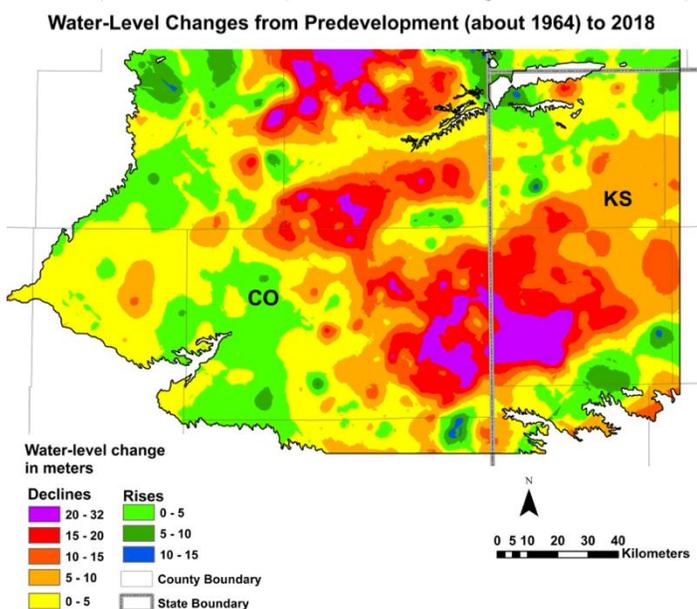
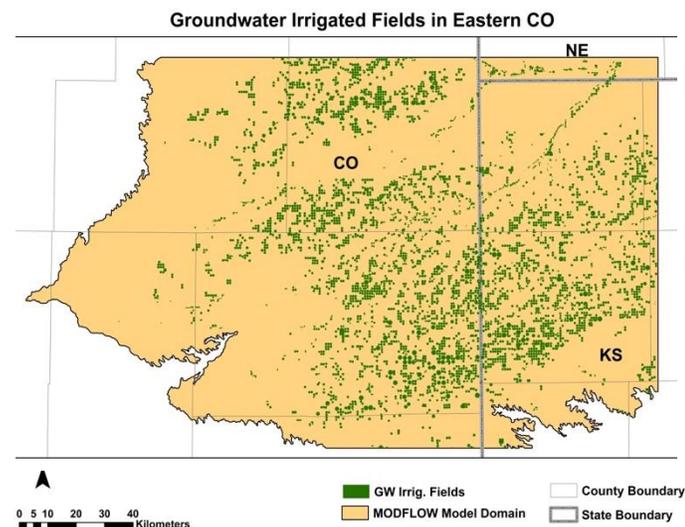
enforcement obligations by the State Engineer. The first subdistrict is in its 9th year of operation. In 2019, two more subdistricts were added to the operating group, and three more added in 2020. This means approximately 90% of the groundwater irrigated acres in the Valley are participating in these efforts, sponsored by the Rio Grande Water Conservation District. Producers in these subdistricts have agreed to assess themselves fees to raise the necessary funds to support their plans to mitigate injurious depletions and create/maintain sustainable aquifers.

Alternative Transfer Methods. Since 2007, the Colorado Water Conservation Board (CWCB) has promoted Alternative Transfer Methods (ATMs) as a framework for allowing water rights to be transferred to a new type of use without the permanent dry-up of agricultural lands. The ATM concept was prompted by examples of unique agricultural to municipal water transfers found in other western U.S. states. Colorado continues to financially support the development of alternative transfer methods to minimize permanent reductions in irrigated agricultural acreage due to increasing demands for water, but also to help explore voluntary, temporary, and compensated approaches to compact compliance. Over previous years, CWCB [ATM grant programs](#) have supported aspects of the [System Conservation Pilot Program](#) and [Colorado River Water Banking Working Group](#) to explore voluntary conservation measures that would help with compact compliance and maintaining reservoir levels. More recently, the Rio Grande Water Conservation District and Subdistrict 3 implemented an innovative ATM project involving conserving crop rotations that could be a model for additional projects that involve rotational fallowing or deficit irrigation as a tool to address groundwater impacts to senior water users. Similar approaches that avoid permanent reductions in irrigated acreage may be applicable in other basins facing compact or regulatory compliance concerns.

The CWCB has provided roughly \$5.3 million in grant funding to support a variety of ATM projects aimed at understanding, evaluating, promoting, and implementing non-traditional water transfers. These projects, as well as independent studies, have provided useful information and resulted in successful examples but they have not led to widespread interest and adoption of ATM solutions. Moving forward, the state plans to focus efforts on conducting outreach to the influencers of ATM adoption, identifying metrics to track progress, and ultimately to help CWCB promote ATMs in an effective manner.

Challenges and Questions

As a headwater state, many of the policy and political conversations surrounding water management have historically focused on negotiating and meeting state compact obligations. This is true with regards to conversations about the aquifer that have been dominated by meeting compact obligations with Kansas and Nebraska for the Republican River Basin where surface and groundwater are highly connected.



Figures by CSU PhD Candidate Soheil Nozari, from his study of two HUC8 watersheds (Arikaree River and South Fork of the Republican River) of the Republican River Basin. This study region was chosen due to the abundance of groundwater irrigated croplands (more than 500,000 acres) and significant groundwater level declines in recent decades.

Producers and decisionmakers across this basin have benefited from learning about promising programs and policies developed in other states. According to a recent survey of irrigators in the Republican River Basin, the three most common reasons irrigators cited for concerns related to future groundwater availability include concern for future generations (76% of respondents), future profitability (68%), and the community (48%). The vast majority (86%) of respondents were at least somewhat supportive of their groundwater management district working to develop and promote strategies and practices that conserve groundwater, with the same percentage supportive of coordination of conservation efforts across GWMDs in the Basin (Shepler et al 2019). Ongoing discussions regarding alternative transfer mechanisms, efforts to modify state water statutes, and ongoing evaluation of different locally-defined policy mechanisms will continue to reduce barriers toward groundwater conservation.

Shifts in on-farm management and awareness of consumptive water use in real-time represents an opportunity for improved conservation and efficiency efforts in the state. Currently, most producers check meters once a year to fulfill annual reporting, and many irrigation systems are not assessed regularly with audits to determine the efficiency and efficacy of pumps and irrigation hardware. Given that water is the most limiting resource in agricultural areas that overlie the aquifer, individual and group efforts to encourage conversations and action that focus on producing profit or bushels per acre-in of applied water, rather than boosting yield per acre, will involve increased targeting and timing of water applications to meet crop water needs, which in turn could help extend the use of the aquifer for irrigation and other uses.

References: Shepler, R., J. F. Suter, D.T. Manning, and C. Goemans (2019). [Private Actions and Preferences for Coordinated Groundwater Conservation in Colorado's Republican River Basin](#). *Journal of the American Water Resources Association*, 55(3) pp. 657-669.

Hrozencik, R.A., Manning, D.T., Suter, J.F., Goemans, C. and Bailey, R.T., 2017. [The heterogeneous impacts of groundwater management policies in the Republican River Basin of Colorado](#). *Water Resources Research*, 53(12), pp. 10757-10778.

Monger, R.G., Suter, J.F., Manning, D.T. and Schneekloth, J.P., 2018. [Retiring Land to Save Water: Participation in Colorado's Republican River Conservation Reserve Enhancement Program](#). *Land Economics*, 94(1), pp.36-51.