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The Colorado River Drought Contingency Plan: An Opportunity for Exploring Demand Management Through Integrated and Collaborative Water Planning

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THE COLORADO RIVER DROUGHT CONTINGENCY PLAN: AN OPPORTUNITY FOR EXPLORING DEMAND MANAGEMENT THROUGH INTEGRATED AND COLLABORATIVE WATER PLANNING

ABSTRACT

The Upper Basin Colorado River Drought Contingency Plan ("DCP"), signed May 2019, was created to maintain sufficient Lake Powell storage levels for consumptive water demand and for hydropower generation. One of the most important requirements of the DCP is the obligation for Upper Basin states to explore the feasibility of demand management programs for their respective states. This exploratory process is ongoing for Upper Basin states. The DCP exploratory process, as well as the potential implementation of demand management programs, offer unique opportunities for water professionals to increase the role of public engagement in the implementation of a particular type of demand management known as water-smart growth planning. These opportunities create an improved relationship between what some have referred to as an historical divide between urban and rural water users. Public engagement is crucial for implementing the integration of water-smart growth planning with large scale, multisectoral needs. Water-smart growth planning represents a strategy of conserving water for urban areas which can consequently improve the urban-rural relationship by encouraging cities to shoulder a proportionate responsibility for conserving water, limiting unsustainable growth, and, consequently, diverting less water from agricultural areas.

This article proposes three mechanisms meant to enhance the integration between a public engagement which links water-smart growth planning with multiregional water needs in order to cultivate better relationships between urban and rural water

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users. These include: (1) water-smart growth updates to San Juan Basin municipal development codes, their integration with the next Regional Water Plan update, and its public outreach process; (2) the interrelated mechanism of expanding water market transactions in order to integrate greater engagement between regional municipalities who have adopted water-smart growth planning and San Juan River users such as the Navajo Nation; and (3) the development of Colorado State University's collaborative framework, "Atlas of Collaborative Conservation in Colorado," in order to generate information on water use, including associated pricing, and assign implementation capabilities to environmental organizations within Colorado's eight major river basins.

I. INTRODUCTION: THE COLORADO RIVER DROUGHT CONTINGENCY PLAN IS AN OPPORTUNITY FOR ENHANCED PUBLIC ENGAGEMENT IN WATER-SMART GROWTH PLANNING

It is increasingly apparent that water scarcity no longer has the easy solutions that large-scale federal projects of the 20th century might offer. Climate change and population growth are impacting water quality and quantity at a quickening pace.[1] Consequently, it is important to concentrate new efforts on what has been termed the soft water path, the path of increasing the overall productivity of water, rather than primarily seeking new sources of supply.[2] This path includes refining the fields of water resources management, policy, law, and planning to include demand management strategies. These strategies have increasingly relied on coupling water supply planning with the regulation of urban land use development. This combination is here referred to as water-smart growth planning.[3] Combining the implementation of these strategies with mechanisms for enhancing multiregional relationships between water users is imperative for maintaining sustainable water supplies for future generations.

This article argues that the Upper Basin Colorado River Drought Contingency Plan ("DCP") offers a unique opportunity for water professionals to increase the role of public engagement in water-smart growth planning, and, in doing so, creates vital relational ties between urban and rural water users.[4] The article proposes three mechanisms for integrating a public engagement that is necessary for linking water-smart growth planning and multiregional needs into state water planning.

1. Julie Beth Zimmerman et al., *Global Stressors on Water Quality and Quantity*, 42 ENVTL. SCI. & TECH., 4247 (2008).

2. Peter H. Gleick, *Soft Water Paths*, 418 NATURE 373 (2002) (noting Peter H. Gleick was one of the first people to develop and apply this term to water resources management).

3. *See* Enjie Li et al., *Water-Smart Growth Planning: Linking Water and Land in the Arid Urbanizing American West*, 60 J. OF ENVTL. PLAN. & MGMT. 1056 (2017).

4. Clare Lindahl, *Bridging the Divide: Uniting Rural and Urban Landscapes for Conservation*, 74 J. SOIL AND WATER CONSERVATION 47A (2019); Filippo Civitelli & Guillaume Gruère, *Policy Options for Promoting Urban-Rural Cooperation in Water Management: A Review*, 33 INT'L J. WATER RES. DEV. 852, 864 (2016).

First, water-smart growth updates should be included to San Juan Basin municipal development codes and then integrated with the next Regional Water Plan update and its public outreach process. Second, the interrelated mechanism of expanding water market transactions should be implemented to integrate greater engagement between regional municipalities who have adopted water-smart growth planning and San Juan River users, such as the Navajo Nation. Third, Colorado State University's collaborative framework, "Atlas of Collaborative Conservation in Colorado," should be developed to generate information on water use, including associated pricing, and assign implementation capabilities to environmental organizations within Colorado's eight major river basins. Public engagement is not only critical for integrating water-smart growth planning with multiregional water needs in a general sense, but it is also particularly critical in the semiarid Southwest due to a history of complicated social relationships between urban and rural water interests, and between minority voices and majority influence.

Public engagement is a keystone ingredient for the development and maintenance of an urban-rural interface. This kind of interface, the premise of this article, comes from the increasing call for a new "urban-rural social contract."[5] Currently, efforts towards water conservation have focused primarily on the agricultural sector for its predicted water savings. There is good reason for this approach. In Colorado, approximately 80% of statewide withdrawals are utilized by agriculture, with municipal and industrial uses coming in second with only a fraction of this demand at about 10%.[6] However, this might be something of a false dichotomy, as consumptive water use, which is typically either agricultural or municipal and industrial, is not totally dependent on endemic sources of supply. In other words, there is a strong correlation between rapid growth in population centers, typically seen in Colorado's front range cities, such as Denver or Boulder, and greater demand for additional water diversion projects from western slope agricultural areas. Conservation strategies need to integrate a more dynamic interplay between urban and rural water needs which are more interdependent than currently estimated.

The DCP is an ambitious plan for a complex problem. The Colorado River water supply gap is an estimated deficit between water supply and demand. The 2019 Technical Update to the Colorado Water Plan estimates this deficit using future available water supplies and gaps under different planning scenarios including climate change, population growth, and a number of other factors.[7] In public policy, these kinds of problems are termed "wicked problems," [8] problems without simple solutions. Specifically, problems where the process of working to create solutions is often as important as the outcomes. When thinking of these problems, it is important to remain focused on case dependent detail. It is equally important to balance scope and scale with planning that meets local, regional, and multisectoral needs, as well

5. *See* ERIC KUHN & JOHN FLECK, SCIENCE BE DAMMED: HOW IGNORING INCONVENIENT SCIENCE DRAINED THE COLORADO RIVER 217 (2019).

6. COLORADO WATER CONSERVATION BOARD, TECHNICAL UPDATE TO THE COLORADO WATER PLAN 41 (2019).

7. *Id.* at 32.

8. R. Quentin Grafton, *Responding to the 'Wicked Problem' of Water Insecurity,* 31 WATER RES. MGMT. 3023, 3024–25 (2017).

as environmental stewardship. Systems thinking studies the relationships and feedbacks between the parts of a system and the entire system, which is helpful for balancing scope and scale, and for giving policy and law the context for a vision and direction of future sustainability.[9] In policy, a "silo effect" is created when planning decisions are reached without collaboration across jurisdictions or sectors. [10] A silo effect can have unintentional regional repercussions such as increased urban sprawl and decreased net water savings.

This article uses the urban-rural interface as a focal point for demonstrating the interdependence between urban and rural water use and how a social contract, based on pragmatic planning mechanisms between the two, represents one of the best perspectives for conserving water. To this aim, there are four questions which inform this article. First, as cities continue to expand, how should policy makers, planners and managers balance competing water needs between agricultural needs and urban population growth? Second, what is the most effective, equitable, and proportionate amount of water that agricultural water users should be asked to conserve versus municipal water users? Third, in what ways is the agricultural market related to both inter- and intrastate urban demand? Lastly, how might illustrating the relationship between an agricultural market and inter/intrastate urban water demand enhance a solution which relies on creating public engagement between cities and rural communities?

Integrating land use and water planning has applicability in generating water savings for municipal jurisdictions, but these savings also mean savings for agricultural users. Generating positive relationships between urban and rural jurisdictions is crucial to generating a number of mutually beneficial scenarios. These relate primarily to water savings, but they can also decrease urban sprawl, decrease buy-and-dry scenarios, and contribute to enhanced environmental conservation. Water-smart growth planning represents a baseline strategy for enhancing urban and rural relationships primarily for these beneficial scenarios. However, it also serves as a powerful gesture from municipalities which demonstrates a shouldering of the conservation burden. It should also be emphasized that this article is not advocating panacea solutions to what is in effect a multifaceted problem.

This article is structured into nine main sections. Section I provides a brief introduction to the DCP and the thesis of this article. Section II covers the current exploratory planning process for DCP application in Upper Basin states, which include Colorado, Utah, Wyoming, and New Mexico. Section III provides insight from the literature on water planning and management. It emphasizes Colorado and New Mexico as two states with particularly applicable case studies involving water management and land use integration. Section IV discusses the benefits of public

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9. Robert Louis Flood, *The Relationship of 'Systems Thinking' to Action Research*, 23 SYSTEMIC PRAC. & ACTION RES. 269 (2010); *cf.* Aavudai Anandhi & Narayanan Kannan, *Vulnerability Assessment of Water Resources – Translating a Theoretical a Theoretical Concept to an Operational Framework Using Systems Thinking Approach in a Changing Climate: Case Study in Ogallala Aquifer*, 557 J. HYDROLOGY 461 (2018).

10. Alan D. Hecht et al., *Working Toward a Sustainable Future,* 10 SUSTAINABILITY: SCI., PRAC. & POL'Y 65 (2014).

engagement and provides context for water planning and tribal water use in the San Juan Basin.

Section V provides insights from case studies on the integration of water management and land use in the Southwest. Section VI is a novel case study, developed from the recent System Conservation Pilot Program for Upper Basin states. This study highlights the role of public engagement in working with the Navajo Nation in northwest New Mexico. Section VII discusses the ongoing DCP exploratory process in Colorado and New Mexico. Section VIII proposes three mechanisms to both facilitate the process of public engagement during the DCP exploratory process and implement a demand management program should consensus be achieved. The article concludes, in section IX, by restating the importance of finding collaborative solutions to water supply problems.

II. OVERVIEW OF THE CURRENT EXPLORATORY PLANNING PROCESS FOR DCP APPLICATION IN UPPER BASIN STATES

The Colorado River Interim Guidelines were drafted in 2007 in order to address the projected supply gap regarding the Colorado River's deteriorating storage levels. These interim guidelines became the source material for the current plan, the DCP, which is actually two plans made for Upper and Lower Basin state members. The Upper Basin Colorado River DCP was signed May 2019 in order to maintain sufficient Lake Powell storage levels for current and projected water demand, and for hydropower generation. Banking water is an insurance policy for the 40 million people who depend on Colorado River water reserves, which are increasingly overstressed due to climate change and increased population demand.[11] Conservation is also necessary in order to maintain 1922 Colorado River Compact obligations, which include minimum allocation amounts for the seven member states.[12]

There are three general commitments for Upper Basin members under the new DCP: (1) exploring a demand management program within each state; (2) the development of a new plan to move water from smaller Upper Basin reservoirs to Lake Powell; and (3) augmenting existing water supplies through cloud seeding and the removal of water intensive species. If a severe water shortage resulted in the Upper Basin not meeting its 1922 Compact obligations, water rights across upper basin states would be at risk of curtailment.[13] Lower Basin states have committed to reductions in water use in order to maintain specific water levels in Lake Mead.[14] The Upper Basin Plan includes provisions for a 500,000 acre foot ("AF") pool which Upper Basins can use to conserve water. The caveat is that all four Upper Basin states (Colorado, Utah, Wyoming, and New Mexico) must reach consensus agreement on the design of an applicable demand management program before they can access the

11. U.S. BUREAU OF RECLAMATION, COLORADO RIVER BASIN WATER SUPPLY AND DEMAND STUDY 4 (2012).

12. COLORADO RIVER COMPACT (1922).

13. U.S. BUREAU OF RECLAMATION, AGREEMENT CONCERNING COLORADO RIVER DROUGHT CONTINGENCY MANAGEMENT AND OPERATIONS (2019).

14. U.S. BUREAU OF RECLAMATION, LOWER BASIN DROUGHT CONTINGENCY AGREEMENT (2019) [hereinafter CONTINGENCY AGREEMENT].

storage waters. Any program decided upon will also have, at its core, the premise that water savings will be generated through voluntary, temporary, and compensated means.[15]

Beginning January 2018, Colorado initiated stakeholder outreach regarding DCP. They also created eight workgroups organized around subsets of issues such as law and policy, environmental considerations, economic considerations, funding, education and outreach, and agricultural impacts.[16] The Colorado Water Conservation Board ("CWCB") approved a policy titled "Support and Policy Statements Regarding Colorado River Drought Contingency Plans, Demand Management, and Compact Administration," which frames the CWCBs policy to:

Develop the state's position and approach on whether and how to develop any Upper Basin Demand Management Program that could potentially be implemented within Colorado consistent with state law to avoid or mitigate the risk of involuntary compact curtailment and to enhance certainty and security in the Colorado River water supply.[17]

Additionally, they created a 2019 Work Plan for Intrastate Demand Management Feasibility Investigations. The Work Plan provides a framework for the initial stages of investigation of a demand management program for the Upper Basin in Colorado, and it includes workgroups, regional workshops, and education and outreach.[18]

Wyoming, Utah, and New Mexico have all initiated stakeholder outreach. Wyoming's State Engineers Office ("SEO") has contracted with the University of Wyoming Extension for facilitation. Utah's Division of Wildlife Resources ("UDWR") created a water task force. New Mexico's Interstate Stream Commission ("ISC") has engaged in stakeholder meetings. Section VII of this article explains New Mexico's planning efforts, including three tools that have been proposed for demand management: (1) a strategic water Reserve, (2) Active Water Resource Management, and (3) Special Water User Districts.[19]

The success of the DCP depends on collaboration and public engagement. An Upper Basin demand management program will only be approved through consensus (member states will not access the 500,000 AF storage pool without it) and if water savings are generated voluntarily from users, collaboration and engagement between junior and senior water rights holders will also be necessary. Finally, the DCP is only in effect through 2026, at which time the federal government, with consultation of all Colorado River Basin states, will reconsider if the program has been successful at fulfilling its intended purposes.[20] Consequently,

15. *See* CONTINGENCY AGREEMENT, *supra* note 15.

16. BRENT NEWMAN & KAREN KWON, WORK PLAN FOR INTRASTATE DEMAND MANAGEMENT FEASIBILITY INVESTIGATIONS (2019).

17. COLORADO WATER CONSERVATION BOARD, SUPPORT AND POLICY STATEMENTS REGARDING COLORADO RIVER DROUGHT CONTINGENCY PLANS, DEMAND MANAGEMENT AND COMPACT ADMINISTRATIONS (2018).

18. NEWMAN & KWON, *supra* note 17.

19. *See* DOMINIQUE WORK, DEMAND MANAGEMENT ACTIVITIES IN THE UPPER BASIN, NEW MEXICO INTERSTATE STREAM COMMISSION (2020).

20. U.S. BUREAU OF RECLAMATION, AGREEMENT REGARDING STORAGE AT COLORADO RIVER STORAGE PROJECT ACT RESERVOIRS UNDER AN UPPER BASIN DEMAND MANAGEMENT PROGRAM (2019).

any agreed upon program will depend on collaboration and engagement with states, private water users, and public water users for its continued success.

Land use and water planning have long been disparate planning processes. Water planners were historically asked to provide given quantities in order to meet the needed amounts for development. However, a sustainable future will require a "smart growth" approach that consists of development which is conscious of the carrying capacity of endemic water sources.[21] The following sections illustrate relevant water planning and management practices which inform the discussion around collaboration and the linkage of water planning with land use in the Southwest.

III. WATER PLANNING AND MANAGEMENT: POTENTIALS AND PITFALLS

Water planning and management in the semiarid west have received limited policy guidance from Upper Basin states, especially in Colorado where there is a dearth of guidance for drafting policy which links land use and water in required plans.[22] There has also been historical periods of neglect regarding state water planning and its associated consequences. Poor surface water quality, groundwater contamination, expensive projects which misdeliver water in the wrong amount and at the wrong time, disproportionate water rights in relation to where they are most needed: these are all descriptions of some of the outcomes associated with poor planning and management.[23] The multitude of proposed solutions involving water planning and management are context dependent. While the literature is rife with different approaches, seven are relevant to this article. These seven include requirements-based planning, benefit-cost planning, water pricing and tradable water rights, adaptive management, watershed planning, demand management as a whole, and water-smart growth planning.

Requirements-based planning is the traditional way of first defining the functional requirements of a system and then planning and building to meet these requirements. This kind of planning has historically been associated with reservoir sizing and is adequate for smaller scales where water quantity can more easily be tracked. However, this approach to planning can be ineffective for much larger scales where water accounting might be more difficult.[24]

Benefit-cost based planning is good for projects where each alternative can be quantified in monetary benefits and costs. It has been applied with success to flood control, water supply, and hydropower projects.[25] This approach is relevant to most projects where cost is a major factor in outcome. The limitations of this approach

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21. *See* Li et al., *supra* note 4; *Smart Growth and Water*, U.S. ENVTL. PROTECTION AGENCY, (last updated October 27, 2020), https://www.epa.gov/smartgrowth/smart-growth-and-water.

22. *See* MARIO CURGUS, GROWING WATER SMART: THE WATER-LAND USE NEXUS 10 (2018).

23. *See* David H. Getches, *Water Planning: Untapped Opportunity for the Western States*, 9 J. ENERGY L. & POL. 1–2 (1988).

24. Jay R. Lund, Approaches to Planning Water Resources 3–4 (Mar. 31, 2008) (unpublished manuscript) (on file with the University of California, Davis).

25. *Id.* at 4.

include the complex process of monetizing alternatives, incorporating social equity, and representing discount rates.[26]

Water pricing and tradable water rights is an approach which is becoming increasingly studied. This approach requires the development of clear price signals which can be done through administrative water pricing and is facilitated by a central authority or by water-quota trading. This approach can encourage equitable water conservation programs.[27]

A fourth type of planning, adaptive management, is a form of planning for environmental uncertainties by altering management strategies as novel information is generated by, and learned about, a system's behavior. This approach is useful for dealing with uncertainties such as climate change. In some cases, it offers collaborative potential, using a combination of water modeling and stakeholder input to adjust management strategies.[28] This method often requires adapting to new information over long-range scales of time, which may not always align well with the varying time scales of policy, legal, economic, and environmental processes.[29]

Watershed planning has been more recently advocated as a way of decentralized decision-making, as opposed to historical models of centralized planning stemming from more hierarchical forms of authority. Typical characteristics of the current watershed planning approach include emphasis on all watershed specific stakeholders being involved in discussions regarding the comprehensive management questions of quantity and quality, as well as all involved parties being afforded flexibility in achieving consensus decisions. The primary purpose of this approach is in developing consensus-based water plans, which involve all of the major stakeholders and associated agencies. This method is vital for group buy-in and implementation, but can require time and resources, especially if there are historical conflicts between stakeholder interests.[30]

Water demand management is often cited as the optimal alternative approach to increased water supply under scarce conditions. There are three primary methods which demand management uses to conserve water: technical, social, and economic. Technical methods emphasize pressure reduction, scheduled water usage, and valve closures. They utilize long term planning which involves metering, and/or plumbing devices to regulate domestic consumption. Social methods emphasize persuasion, educational campaigns, and appeals to reason or emotion. Legislation and consumer education function as the associated planning apparatuses. Economic methods include fines and punitive measures, and depend on differential tariffs, or trade and long-term planning designs involving supply-and-demand/marginal price economics.[31] However, while demand management is perhaps the most effective approach to conservation, some have cautioned that simply closing water basins, does not always ensure the conservation of the water, especially where the water will

26. *Id.* at 4.
27. Civitelli & Gruère, *supra* note 5, at 855.
28. *See* Lund, *supra* note 25.
29. *Id.* at 5.
30. *Id.* at 4.
31. Benedykt Dziegielewski, *Strategies for Managing Water Demand*, 126 WATER RES. UPDATE: UCOWR 29, 36–37 (2003).

simply be filtered back into a watershed which might be then consumed by other users downstream.[32]

This article adopts a more recently proposed term for the linkage between land use and water supply planning: water-smart growth planning. Water-smart growth planning represents a form of demand management that has been developed in response to rapid population growth, urban sprawl, and increasingly limited water resources. The conceptual underpinning of water-smart growth planning stems from ideas such as water-conscious land-use planning, integrated water resources management ("IWRM"), and 'wet-growth.' Smart growth has traditionally referred to compact development with efficient infill rates, decreased land conversions involving the development of open space to urban development, and less impervious ground coverage.[33] It stems from prevailing forms of management, notably IWRM, which advocate for holistic coordination between the hydrologic cycle and social-ecological systems more generally.[34] The addition of "water" to the more traditional "smart growth" provides added consonance to the necessity of preserving the sustainable quantity and quality of water, consistent with more sophisticated development practices.[35]

The more recently proposed concept of water-smart growth planning is exemplified in past examples from New Mexico and Colorado. These case studies are outlined in section V of this article, and insights are brought to bear on recent developments in the ongoing exploratory planning process in Colorado and New Mexico, as well as the proposed mechanisms in section VIII. Insights from the prior seven water planning and management approaches inform the proposed mechanisms in section VIII.

IV. THE BENEFITS OF PUBLIC ENGAGEMENT: CONTEXT FOR WATER PLANNING IN NORTHWESTERN NEW MEXICO

The benefits of public engagement are well known. An engaged public is associated with increased stakeholder buy-in, superior implementation results, and well-designed policies and plans.[36] When discussing the general theme of public engagement there are a number of factors to consider. It is vital to define the effectiveness of engagement, including the processes, outcomes, and impacts of

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32. Francois Molle, *Water Demand Management: Potential and Pitfalls*, INST. RES. FOR DEV. 2, 7-8 (2010).

33. Li et al., *supra* note 4. *See generally* J. Ivy Harvey Thomson, Evaluation of Best Practices for Urban Water Conservation and Water-Smart Growth Implementation in Utah (Aug. 2020) (unpublished M.S. Thesis, Utah State University) (on file with the Digital Commons, Utah State University).

34. Asit K. Biswas, *Integrated Water Resources Management: A Reassessment,* 29 WATER INT'L 248 (2004); *see also What is Integrated Water Management?*, AMERICAN RIVERS: RIVERS CONNECT US (Jan. 22. 2021), https://www.americanrivers.org/conservation-resources/integrated-water-management/what-is-integrated-water-management/; Li et al., *supra* note 4.

35. Li et al., *supra* note 4, at 1057.

36. Jeanne Cole et al., *Collaborative, Risk-Informed, Triple Bottom Line, Multi-Criteria Decision Analysis Planning Framework For Integrated Urban Water Management*, 10 WATER 1722 (2018); *see also* Kate K. Mulvaney et al., *Designing Solutions For Clean Water on Cape Cod: Engaging Communities to Improve Decision Making*, 183 OCEAN & COASTAL MGMT. 104,998 (2020); Matthew B. Anderson et al., *Beyond "Buy-in": Designing Citizen Participation in Water Planning as Research,* 133 J. CLEANER PRODUCTION 725 (2016).

engagement. Processes are the different ways that an initiative was implemented. They might include the extent to which a stakeholder group was able to direct an engagement process, or they might include measuring the number of workshops which were held for a particular intervention. Outcomes represent the particular issues which the initiative attempted to effect, and how successful the attempt was in producing the desired effect(s). Impacts are the long-term goals of a program or intervention. These might include water quality enhancements, the long-term observed increase in sustainable water conservation, or water policies which enhance environmental stewardship and communal health.[37]

It is also important that engagement be a two-way exchange of information. The engagement should involve built-in processes which provide input to and from involved communities. This allows for knowledge co-creation, enhanced learning, greater awareness, and a sense of responsibility and concern to be cultivated.[38] There is also an obligation to build involved communities, to ensure that people are aware of the implications of ineffective water management and planning. The effectiveness of engaged publics has been measured with promising results. A number of studies have demonstrated effectiveness in increasing water conservation in response to water demand management programs. Public awareness campaigns can reduce water use by about 2-5%.[39] Information campaigns can promote voluntary domestic water conservation savings of between 10-25%.[40]

The Department of Industry, Innovation and Science, a branch of the Australian Government responsible for encouraging economic growth, and productivity—as well as the joint insights from energy, resources, and science—lists eight principles for effective participation in community engagement in the water sector. These include the following: being transparent over the scope of participation; providing quality information and process to support decision making; aligning with existing community activities and practices; considering cultural issues; respecting and promoting local knowledge and existing skills; ensuring sufficient time and resources; considering the use of neutral facilitators; and building in flexibility. The report lists an additional four principles considered to be invariant factors relevant across different types of stakeholder groups. These four principles are processes which are designed to reach out to all stakeholders; information which is shared transparently and readily; people being engaged in meaningful ways, as opposed to empty engagement gestures; and engagement attempting to satisfy the diverse interests of different positions.[41]

37. ANGELA DEAN ET AL., AUSTL. GOV'T. DEP'T. OF INDUS. INNOVATION & SCI., COMMUNITY ENGAGEMENT IN THE WATER SECTOR: AN OUTCOME-FOCUSED REVIEW OF DIFFERENT ENGAGEMENT APPROACHES (2016).

38. Jan Adamowski et al., *Building a Foundation for Knowledge Co-creation in Collaborative Water Governance: Dimensions of Stakeholders Networks Facilitated Through Bridging Organizations*, 9 WATER 60 (2017).

39. David Inman & Paul Jeffrey, *A Review of Residential Demand-Side Management Tool Performance and Influences on Implementation Effectiveness*, 3 URB. WATER J. 127 (2006).

40. Geoffrey J. Syme et al., *The Evaluation of Information Campaigns to Promote Voluntary Household Water Conservation,* 24 EVALUATION REV. 539 (2000); *see also* Eric A. Coleman, *A Comparison of Demand-Side Water Management Strategies Using Disaggregate Data*, 13 PUB. WORKS MGMT. & POL'Y J. 215 (2009).

41. DEAN ET AL., *supra* note 38.

The following example demonstrates how New Mexico worked with the Navajo Nation to create agreements and better working relationships between sometimes conflicting positions. It demonstrates strategies for broadening inclusion in the planning process to include marginalized peoples and tribal governments who, in the context of a DCP program, have a great role to play as important regional stakeholders in New Mexico. Public engagement is here defined as both working relationships between government and its citizens, *and* multisectoral relationships between municipal and agricultural water users. One caveat is made to this definition concerning the role of tribal consultation as a common requirement in the policy process. Tribal governments represent themselves as autonomous governing entities, and so are hereafter included as historically disenfranchised populations which for all intents and purposes might be considered as members of the public, excluding specific privileges and powers.

A. Water Planning and Tribal Water Use in the San Juan Basin

The role of public engagement comes into particular salience when considering New Mexico's initial participation in a pilot program exploring the feasibility of a regional demand management program in the San Juan Basin. This project was named the System Conservation Pilot Program ("SCPP") and is now serving as inspiration for the current exploration of feasibility for a regional demand management program in the state.[42] Section VI of this article provides more detail regarding the encouraging outcomes of this program and how the Interstate Stream Commission worked with the Navajo Agricultural Products Industry ("NAPI") to successfully implement the program. The following details here provide some geographic and social context for this program.

The San Juan Basin water supply includes the San Juan River and its tributaries.[43] The San Juan River and its tributary, the Animus River, originate in the San Juan mountains in Colorado. The river extends through northwest New Mexico into Utah. Figure 1 depicts the San Juan River watershed. The most senior rights holders for water in the San Juan Basin are most often members of the Navajo Nation and the Jicarilla Apache Nation in New Mexico.[44] Currently, there is a positive working relationship between these Nations and the State of New Mexico. Tribal water use is an important part of the context for exploring demand management programs for interrelated reasons. First, tribal participation for the SCPP accounted for the largest water savings for the state and was second most in savings in 2017 for the entire SCPP program. [45] However, for smaller and larger tribes alike, this is also an opportunity to incorporate more traditionally marginalized voices into a planning process that could be used to increase secondary benefits, such as increased small-scale agriculture, which is associated with traditional livelihoods, while still reducing net water use.

42. *See System Conservation Pilot Program*, UPPER COLO. RIVER COMMISSION, http://www.ucrcommission.com/system-conservation-pilot-program/ (last visited Jan. 13, 2021).

43. N.M. OFFICE OF STATE ENG'R, SAN JUAN BASIN, REGIONAL WATER PLAN §5.2 (2016).

44. *See* DARCEY BUSHNELL, AMERICAN INDIAN WATER RIGHTS SETTLEMENTS (2012).

45. *See* Herrick K. Lidstone, Jr., *Regionalism or Parochialism: The Land Use Planner's Dilemma--Boulder, Colorado's Danish Plan*, 48 U. COLO. L. REV. 575 (1977).

There are twenty-two federally recognized tribes which are located in the Colorado River Basin. These tribes have quantified water diversion rights, confirmed by either court decree or final settlement. Collectively, these tribes possess rights to 2.9 million acre-feet ("MAF") of Colorado River Water. In 2015, these tribes had only used about half of their quantified water rights. Generally speaking, increased use of tribal water rights, once ratified, are counted toward state specific allocations, located in the respective tribes' home state. As of 2018, it is estimated that there is an overall diversion rate of approximately 1.5 MAF of 2.8 MAF total water rights which have been utilized by ten of the twenty-two tribes. These are significant volumes which may impact state allocation amounts if their use is increased or decreased.[46] More importantly, they speak to water rights which could be beneficially applied to different demand management programs in Upper Basin states, and they highlight the importance of working with diverse communities in order to realize mutually supportive goals. Tangentially, they also speak to smaller tribes within the Colorado River Basin, such as the Hopi Tribe, who are increasingly water stressed and could well use additional quantities.[47]

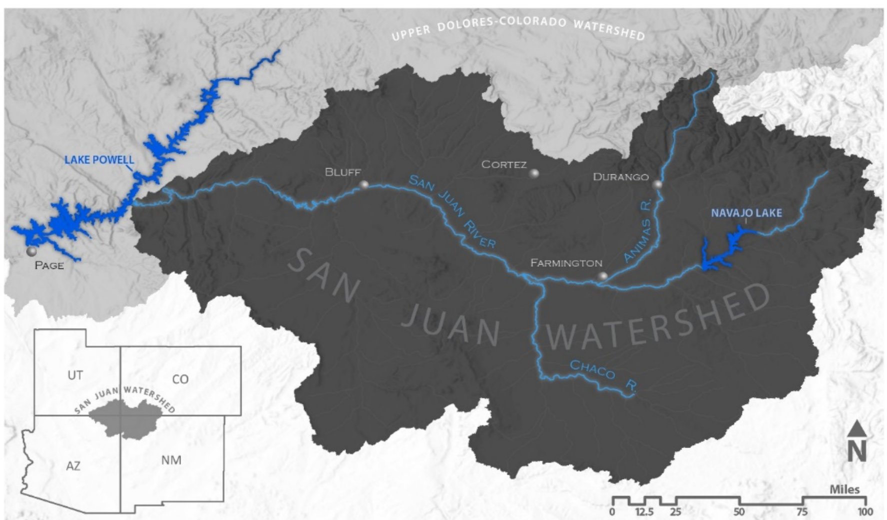

Figure 1: Depiction of the San Juan River Watershed including Navajo Reservoir and Lake Powell.
Source: National Hydrology Dataset, United States Geological Survey, Geographic Names Information System, and Census TIGER datasets. Map created by Alex G. Krebs.

Native American water rights law is beyond the scope of this article. However, as key stakeholders in a potential demand management program for the state, the unique history of indigenous engagement in water planning in New Mexico bears particular relevance not only for the region but also for other states as they

46. CHARLES V. STERN & PERVAZE A SHEIKH, CONG. RESEARCH SERV., R45546, MANAGEMENT OF THE COLORADO RIVER: WATER ALLOCATIONS, DROUGHT, AND THE FEDERAL ROLE (2019).

47. Karen L. Smith, *Arizona at the Crossroads: Water Scarcity or Water Sustainability*, GRAND CANYON INSTITUTE (2011), https://grandcanyoninstitute.org/wp-content/uploads/2015/06/GCI_Background_Report_Water_Policy_Sept 2011.doc.pdf.

consider the importance of required consultation with tribal governments, as well as engagement with members of the public who are both senior rights holders and historically marginalized peoples. Sufficient context specific information is thus relevant for understanding and tailoring regional public engagement. Increased focus has been paid to the evolving status of an historic over-reliance on formal dispute resolution mechanisms used for facilitating tribal-state engagement on water resources. Today, a more sophisticated approach has evolved wherein states have begun engaging tribal governments in more collaborative planning efforts. [48] These efforts begin with the initial exploratory stages of planning. [49]

Historically, water planning in the Southwest was focused on developing plans and policies without considering tribal input and with even less concern over the impacts on tribal lands, resources, and legal rights. This exclusion has led to conflicts between tribal and state interests, and it has arguably led to lost efficiency in the management of natural resources. Navigating the complexity of water and tribal-state relationships is confounded by a morass of colonial legacy, constitutional and environmental law, development, federalism, private property, and economic interests. Today, legally enforceable tribal water rights are still contentious at times, in part, due to a dynamic between tribal reserved rights and state rights and authority.[50]

Some have advocated for the adaptation of water planning boundary conditions to better integrate tribal voices. For instance, Stephen Greetham argues that water planners are the missing keystone for modern water planning and that they should use the tools at their disposal to "actively seek the integration of tribal voices into the collaborative fact finding and assessment, issue spotting, and strategic policy formation processes that make up modern water planning."[51] Greetham uses an example from northwest New Mexico, the Navajo Indian Irrigation Project ("NIIP"), to contextualize how water planning can both better integrate the tribal voice, thus transcending exclusionary boundaries, and in doing so, improve regional water planning outcomes.[52]

The NIIP was a Federal project which authorized the Navajo Nation an annual reserved water right of 787,000 AF. Political opposition from non-tribal interests resulted in the Navajo Nation being pressured to accept a reduced annual amount of 508,000 AF.[53] A further reduction in allocation and subsequent deferred funding investments in favor of other projects left a lack of infrastructure that has only recently seen more oversight. Recent authorship details the physical infrastructure investments which have begun to occur in the San Juan Basin from the

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48. *See* Stephen H. Greetham, *Water Planning, Tribal Voices, and Creative Approaches: Seeking New Paths Through Tribal-State Water Conflict by Collaboration on State Water Planning Efforts,* 58 NAT. RES. J. 1 (2018).

49. *Id.*

50. *Id.*

51. *Id.* at 3.

52. *Id.* at 10.

53. *Id.*

New Mexico Navajo Nation Water Settlement.[54] A recent article argues that these investments are important, but they will fail unless "soft" infrastructure components are also integrated into their design. The authors recommend seven steps necessary to encourage new Navajo (Diné) farmers to return to sustainable, small-scale agricultural forms of livelihood in the San Juan Basin of New Mexico. These include:

1. The stakeholder group forms a master plan task force and prepares a vision document.
2. The task force creates a work plan and a work plan budget and obtains funding.
3. The task force undertakes research, compiles findings, and reports back to the stakeholder group.
4. The stakeholders create a memorandum of understanding to implement organizational changes in the irrigation system, including OM&R, LUP management, and research and education infrastructure.
5. An implementation team is then selected.
6. A budget is prepared.
7. Implementation begins. [55]

These steps are complemented by recommendations for greater use of technology, such as enhanced monitoring, record keeping, and spatial databases. Importantly, these steps might be replicated or enhanced in other regions and planning processes. They are designed for a context involving small-scale agricultural investment which would see greater returns for individual families. [56] They would also increase local investment in planning processes which could be integrated in regional planning efforts such as the DCP.

More generally, the State of New Mexico has worked to incorporate engagement with tribal governments in regular water planning initiatives. The ISC includes a detailed provision in Section E of its first statewide water plan explicitly calling for the direct consultation with the governments of Indian nations, tribes, and pueblos. This provision formulates policy guidance for the integration of the water plans of Indian sovereignties in New Mexico with the state water plan, as well as final adjudication or settlement of all water rights claims of Indian sovereignties located within New Mexico.[57] The State has since created a significant number of effective strategies for engagement, including a State-Tribal Collaboration Act,[58] an executive order for statewide tribal consultation plans,[59] and a signatory joint

54. Tracy D. Raymond & Constance L. Falk, *Feeding the Tribe: The Role of Soft Infrastructure in Addressing the Root Problems of the Navajo Nation San Juan River Irrigation System*, 42 AM. INDIAN Q. 320 (2018).

55. *Id.* at 323.

56. *Id*.

57. INTERSTATE STREAM COMMISSION, NEW MEXICO STATE WATER PLAN (2003).

58. State Tribal Collaboration Act, 2009 N.M. Laws 1–5, (codified as amended at N.M. STAT. ANN. §§ 11-18-1–5 (2009).

59. NEW MEXICO DEPARTMENT OF HEALTH, STATE-TRIBAL CONSULTATION, COLLABORATION AND COMMUNICATION Policy (2009).

Statement of Policy and Process, [60] which was created to foster and promote enhanced working relationships between tribal and state governments. The State has also instantiated a progressive mechanism for the provision of tribe-specific engagement data for regional water planning. Importantly, while ISC provides guidance and assistance, it has left the extent and nature of public engagement in the water planning process to the prerogative of respective tribes.[61]

Developing robust mechanisms for public engagement are necessary for buy-in, successful implementation, and quality policy design. However, engagement and collaboration are necessary at multiple scales of planning. Insights from consensus building, in particular, at local scales, can be applied to interstate planning efforts as well. Recall that in order for the Upper Basin states to be able to access a 500,000 AF storage pool of surplus water, they will need to reach consensus around the feasibility of applicable demand management programs. Any program decided upon will also have, at its core, the premise that water savings will be generated through voluntary, temporary, and compensated means. Engaging with multiple states, as well as diverse sectors which include but are not limited to the agricultural or municipal sectors, will require the ability to navigate diverse interests and planning needs specific to different entities. These unique needs also underscore the role of integrating water management and land use in the semiarid Southwest.

V. THE BENEFITS AND CHALLENGES OF INTEGRATING WATER MANAGEMENT AND LAND USE IN THE SEMIARID SOUTHWEST

The following case studies serve as examples of both the challenges of planning for development, as well as the smart application of strategies for meeting the conflicting pressures of continued development and water limitations. These case studies propose a necessary link between the sustained longevity of a demand management program and its beneficial integration with public engagement which creates ties between urban and rural water users. They also serve to reinforce the argument that municipalities will need to work on limiting the self-fulfilling prophecy of population growth and its need for commensurate water supply. This argument in turn is tantamount to the interface between urban and rural water usage and the need for municipal and agricultural sectors to do their fair share to conserve water. Water management methods have slowly but increasingly been integrated with land use planning for the past forty years.[62] There are an increasing number of examples of this integration, but it is only recently that most have been instantiated. The DCP demand management exploration process presents itself as a novel opportunity for incorporating tested case studies with insights into how this might be best done.

The Center for Systems Integration prepared a 2010 report titled *Colorado Review: Water Management and Land Use Planning Integration* on behalf of the Colorado Water Conservation Board and the Colorado Department of Natural Resources. The report is comprehensive; it covers, but is not limited to, water

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60. *Id.* at 1.

61. N.M. OFFICE OF STATE ENG'R, UPDATES REGIONAL WATER PLANNING HANDBOOK: GUIDELINES TO PREPARING UPDATES TO NEW MEXICO REGIONAL WATER PLANS (2013).

62. CURGUS, *supra* note 23.

scarcity, demand management, policy research, stakeholder input, land use planning in Colorado and in New Mexico, and tools and strategies for integrating water and land use planning. It provides some of the most relevant case studies of the successful integration of demand management and land use planning. It uses a hierarchical schema, with land use practices, and conservation practices as two forms of demand management , and examples of these two forms which include denser developments, agricultural conservation, retrofits of existing structures, etc.[63] This schema is helpful for understanding the following overview of how water planning and governance are broadly organized in New Mexico and Colorado. It also serves as a primer for two case studies which exemplify different demand management strategies that are well integrated with land use planning, and a third which demonstrates historic challenges to growth regulation.

New Mexico and Colorado have some commonalities in how they regulate water use, but there are also differences in location, demographics, and economy. Both use a water law system based on the doctrine of prior appropriation. This affords junior and senior water rights holders primary or successive priority access to water dependent on when they obtained their right.[64] Municipal and industrial uses generally have more junior rights than agricultural rights users in New Mexico. The population of New Mexico is expected to grow to 3 million by 2040.[65] Most of this growth will likely occur in the middle Rio Grande which is a region that extends roughly from Elephant Butte Reservoir northwards to Cochiti Dam.[66] This region is water scarce and will face increasing pressure as new water users attempt to develop the area.

In its current form, there are still opportunities for a more comprehensive system of water governance. The State currently utilizes a state water plan for broad policy guidance. However, the document lacks any regulatory teeth. Water planning is currently administered under the purview of local government authority. In 2007, an attempt was made to formulate some comprehensive standards which would have integrated regulations for water authorities, water utilities, and quasi-governmental agencies into a proposed 40-year planning statute. A stakeholder group came together to discuss these issue areas but failed to formulate any standing directives due to a lack of funds. Consequently, planning authority continues to be divided between municipalities and counties which sometimes complicates regional planning efforts. In some cases, it has obfuscated the ability to accurately account for water supply, which has caused some speculation that development is not adequately regulated due to a preponderance of creative methods that have evolved in order to procure water in unsustainable areas. For instance, in Colorado and New Mexico, there is an increase of exempt domestic well-use because of adequacy laws. There is a correlation between increased exempt well-use and water scarce areas.[67]

63. LYN KATHLENE ET AL., COLORADO REVIEW: WATER MANAGEMENT AND LAND USE PLANNING INTEGRATION (2010).

64. *Id.*

65. *Id.*

66. *See* ROBERT K. DUDLEY & STEVEN P. PLATANIA, MONITORING OF THE RIO GRANDE SILVERY MINNOW REPRODUCTIVE EFFORT DURING 2014 IN THE RIO GRANDE AND SELECTED IRRIGATION CANALS (2014).

67. KATHLENE, *supra* note 64.

Santa Fe County, New Mexico is an apt case study for the integration of land use planning and water smart management because of its longevity. Efforts first began in 1980 with the development of the Santa Fe County General Plan. The administrative premise of the plan was straightforward. The development management approach was to apportion new development in locations with sufficient infrastructure and services, while limiting growth in locations constrained by natural hazards and poor-quality water. In locations that were reliant on groundwater, the County was separated into hydrologic quadrants which were assigned a minimum lot size in order to minimize the risk of groundwater depletions. Within these lots, also referred to as base zones, a 100-year water supply was mandated and demand was calculated based on an estimate of one-acre foot per lot. There were four minimum lot sizes for the quadrants: 160 acres, 80 acres, 40 acres, and 10 acres. The associated development code was then updated in order to include the stipulation that new developments conduct an analysis of water resources, existent infrastructure, and land suitability. Developers were allowed to increase development density contingent on the completion of a geo-hydrological study.[68]

The Santa Fe County General Plan has subsequently undergone a series of new updates—the first in 1999, and the second in 2001. The 1999 update only marginally changed the plan, but the plan still continued with the guiding premise of linking new growth with well-resourced locations. However, the 2001 update adopted a new approach which created new zoning districts and development standards which were intended to provide more rigorous protection of sensitive land, preserve open space, and to ensure improved infrastructure and services. The revision included an update to the code and three development tiers which included:

1. A priority growth area to accommodate new compact development served by surface water or community systems, and adequate public facilities and services.
2. A future development area for infill development likely to occur within the limits of groundwater availability.
3. And low-density agricultural land, environmentally sensitive land, and conservation areas. [69]

Water Supply, Wastewater and Water Conservation requirements were included in the code. These requirements provided definitions for how developers can meet the necessity of a sufficient water supply. Whether a development project is connected to a community water system, or whether instead it uses a well, is determined by the lot size, the location and scale of development, and the proximity to infrastructure. Developments must also undergo a development review, which summarizes how a development will meet the requirement of an adequate water supply, and they must also meet strict water conservation requirements. Examples of these conservation requirements include: low water landscaping/xeriscaping; drip irrigation and mulching; the prohibition of outdoor watering between May and

68. CURGUS, *supra* note 23, at 17.
69. *Id.*

November, between 11:00 am and 7:00 pm; and a domestic well metering program and sub-metering of landscape water use.[70]

The case of Santa Fe serves as a classic success story. The city was able to use demand management and land use integration to limit growth to sustainable areas, reduce water use, and conserve water. Santa Fe used only 95 gallons per capita per day ("GPCD") during the year of 2017, which is significantly lower than almost every southwestern city. As a rough comparison, Salt Lake City Utah used 242 GPCD during the same year which indicates just how much water a city can conserve per capita.[71] This is perhaps one of the greatest benefits to a rigorous municipal demand side management program. This water can be banked for use during dry years, and it prevents cities from needing to procure water elsewhere which increases self-reliance.

In Colorado, population projections are a cause for consideration. According to the Colorado State Demographers Office, the state's population is projected to roughly double between 2010 and 2050.[72] The population in certain water basins is projected to nearly triple by 2050.[73] In terms of governance, authority over land use has been trusted to local municipalities and counties. The authority for most local government programs is attributable to three sources: specific statutory authorizations, general home rule powers, and/or implied authority from general land use planning, zoning, and subdivision laws.[74] There are some unique variants in governance structure. For instance, special districts might be formed as governmental entities with particular functions. Intergovernmental agreements can also be formed when local governments form multijurisdictional agreements with other governments. Variations of governance influence the particular source of land use authority within a local government's jurisdiction. Typical classifications of government include home rule city or town, home rule county, statutory city or town, or statutory county.[75]

The following case study illustrates some important considerations which arise when a city institutes a growth limitation which lacks sufficient coordination between itself and neighboring counties. In 1959, the City of Boulder, Colorado created the "blue line," which was instituted as an effort to curb development on mountain sides located adjacent to the city. This was done to preserve open land and scenic views. The line was not an attempt to conserve water, but it utilized water supply as a way of constraining vertical population growth. The blue line restricted city water services to altitudes below a 5,750-foot elevation line which effectively obstructed any construction of large residential developments or denser subdivisions which were planned at the time. Homes were still able to drill their own domestic wells and utilize non-city water supplies. The city further limited growth through a

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70. *Id.* at 18.

71. CITY OF SANTA FE WATER CONSERVATION OFFICE, CITY OF SANTA FE WATER CONSERVATION AND MANAGEMENT PLAN 2015: ADDENDUM (2020).

72. COLO. DEPT. OF LOC. AFF., POPULATION TOTALS FOR COLORADO AND SUB-STATE REGIONS (2021).

73. KATHLENE, *supra* note 64, at 8.

74. *See generally*, COLORADO DIVISION OF WILDLIFE, MANAGING DEVELOPMENT FOR PEOPLE AND WILDLIFE: A HANDBOOK FOR HABITAT PROTECTION BY LOCAL GOVERNMENTS (1996).

75. COLORADO LAND PLANNING AND DEVELOPMENT LAW (Donald L. Elliot ed., 7th ed. 2006).

1967 dedicated sales tax on the "acquisition, management, and maintenance of open space to purchase land prior to its already having been developed."[76] A subsequent Boulder Valley Comprehensive Plan in 1970 delineated the city's growth boundaries. Finally, in 1976, the Danish Plan was drafted, which explicitly limited population growth to less than or equal to 2% per year (less than the historic annual 4%). This was done while failing to simultaneously limit commercial development.[77]

The failure to limit simultaneous commercial development, in addition to the combination of the previous initiatives, led to some adverse ripple effects. An opposing relationship between increased job growth and decreased housing due to constraints on development, resulted in unaffordable housing prices and an associated unsustainable boom in residential growth in the regions surrounding Boulder. A surplus of other indirect effects occurred as well: housing prices exceeded income growth rates; people in middle- and lower-income brackets were hard pressed to find available and affordable housing; the tax base became stressed from the rise in housing costs; increased traffic congestion from people having to commute from longer distances; and commercial businesses relocating to neighboring communities. These effects underscore the importance of integrating regional with local planning. Engaging adjacent communities in order to determine their needs, then creating more refined development regulations would have mitigated against these adverse effects.

Colorado counties have since begun incorporating past lessons into current practice by creating much needed guidance documents. The Western Resource Advocates, an organization dedicated to protecting the West's land, air, and water, recently published a report titled, *A Guide to Designing Conservation-Oriented Water System Development Charges*. The report itself serves to demonstrate an increase in precedent setting guidance, but it also includes one of the most successful case studies of a well-integrated combination of land use planning and water management. [78] This case study comes from the City of Westminster, a front range city which like most other front range locales will likely experience the projected exponential increase in population inflow. The City's Water Supply Plan is directly linked to its Land-Use Plan in their Comprehensive Plan. [79] The City of Westminster has been incentivizing water conservation since 1998, primarily through the use of irrigation water meters. The city requires individual meters on all non-single-family projects, and it focuses on large, landscaped areas. [80]

Westminster also implemented a three-tiered fee schedule to assign irrigation connection charges, which are determined by the area of landscaping and the projected annual water demand. The cost per square foot is greatest for turf areas and smallest for the most water efficient landscapes. After the tiered schedule was implemented, the average for irrigation taps fell from previous quantities, to only 25% more than projected. [81] Table 1 depicts the three types of landscapes for which

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76. KATHLENE, *supra* note 64, at 63.

77. *Id.*; *see also* Lidstone, *supra* note 46.

78. WESTERN RESOURCE ADVOCATES AND RAFTELIS, A GUIDE TO DESIGNING CONSERVATION–ORIENTED WATER SYSTEM DEVELOPMENT CHARGES (2018) [hereinafter WRAR].

79. CURGUS, *supra* note 23, at 13.

80. WRAR, *supra* note 79.

81. *See id*.

the city has priced irrigation. Irrigation connection charges for landscaping and the projected annual water demand are calculated based on vegetation water requirements. The cost per square foot is most for turf areas and least for low-water-use landscapes.[82]

Table 1 Westminster's Irrigation Water Tap Fees (2021).

Landscape Type	**Potable Water Cost (per sq. ft of irrigated area)**	**Reclaimed Water Cost (per sq. ft of irrigated area)**
High Water (>10 Gallons/sq. ft annual use)	$2.59	$2.06
Medium Water (4-10 Gallons/sq. ft annual use)	$1.30	$1.04
Low water (<3 Gallons/sq. ft annual use)	$0.65	$0.52

The Bessemer Ditch Project is included here as a final case study which illustrates an alternative transfer method ("ATM") between an agricultural community and a local municipality. In 2009, the Pueblo Board of Water Works ("PBWW"), the City of Pueblo water provider, purchased shares from the Bessemer Irrigating Company Ditch ("BIDC") and is temporarily leasing the water back to farmers through 2029. Simply fallowing PBWW-owned shares, known as a buy-and-dry scenario, would have created a number of adverse agricultural, environmental, and economic impacts. In order to mitigate these impacts, the Bessemer Project Association ("BPA") created an alternate fallowing plan for strategic fallowing opportunities that would improve water quality, retain high-quality production ground in agriculture, and help farmers increase their production potential, among other economic and environmental benefits. In order to enable water exchanges from potential fallowing areas to agricultural production areas, the study's authors recommend using a "Dry-Up Bank," which is a list of landowners interested in potentially partaking in exchanges or the selling of water. [83] Farmers who participate in this kind of a marketplace can increase their production potential because it allows them the potential to buy quality productive ground at below-market rates, which can then be strategically irrigated and rotationally fallowed in cooperation with other farmers to increase its value. [84]

The water savings that a municipality generates are also water savings for agricultural communities who, in addition to implementing their own demand

82. *See id*; *see also* CITY OF WESTMINSTER, COLORADO, WATER/SEWER TAP FEES (2021), https://www.cityofwestminster.us/Government/Departments/CommunityDevelopment/Building/WaterSewerTapFees.

83. SOURAV KUMAR BISWAS, NAVIGATING THE WAKE OF MUNICIPAL WATER SALES: ALTERNATIVES TO IMPROVE AGRICULTURE AND ECOLOGICAL OUTCOMES ON THE BESSEMER DITCH 18 (2017).

84. *Id.*

management strategies for conservation, will have extra savings from municipalities who will lessen their need for additional diversions. The following sections contain case studies which provide insight into land use planning and water smart management and how such planning can be combined with better public engagement strategies.

These case studies also serve interrelated functions. They provide some of the best long-term data available, and they illustrate the balance between the role of local and regional planning in water conscious development, as well as the integrated role of demand management strategies for maintaining this unique assemblage. Their benefits produce conserved water and sustainable growth patterns which have demonstrated the ability to reduce projected population growth where it cannot, and should not, create unsustainable demands for increased water supplies. They inform the discussion on how to better design development in order to incorporate local and regional concerns, and they consequently serve as foundational studies which can be developed to integrate with mechanisms designed for engaging the public.

Insights from these cases can be applied to ongoing DCP exploratory planning processes and the mechanisms discussed in the following sections. In particular, section VII, which documents the ongoing DCP exploratory planning process in its efforts at exploring the feasibility of a demand management program for both Colorado and New Mexico respectively, and section VIII, which utilizes the crosspollination of insights from both states, and contributions from the literature discussed throughout. Section IX concludes with discussion and future prospects.

VI. THE SYSTEM CONSERVATION PILOT PROGRAM IN THE SAN JUAN BASIN OF NEW MEXICO: A CASE STUDY

The Colorado River System Conservation Pilot Program ("SCPP") was a four-year pilot program which was first implemented in the Upper Colorado River Basin in 2015. The SCPP was a way of testing out conservation strategies for ensuring 1922 compact compliance, and it has consequently formed part of the inspiration for the current Drought Contingency Plan. The fundamental objectives of the SCPP, detailed in the SCPP Final Report, were to aid in exploring, learning from, and determining whether a voluntary, temporary, and compensated program would significantly reduce consumptive water use in the Upper Basin. [85] This reduction would be gauged according to the extent necessary to either mitigate the decline in water levels in Lake Powell, or to raise the same water levels. The success of the program was in part determined by the feasibility of system conservation to serve as a means of increasing storage at the reservoir. During the period of 2015-2018, the Upper Basin SCPP funded 64 projects. These projects resulted in a consumptive use reduction of approximately 47,213 AF. [86]

The program was pivotal in answering the basic questions of how to administer a program at such a large scale, how to solicit water user interest, and, namely, whether and how such a program might succeed in protecting reservoir

85. *See* UPPER COLORADO RIVER COMMISSION & WILSON WATER GROUP, FINAL REPORT: COLORADO RIVER SYSTEM CONSERVATION PILOT PROGRAM IN THE UPPER COLORADO RIVER BASIN (2018) [hereinafter WILSON REPORT].

86. *Id*. at 6.

levels during a drought. The program served to identify a number of key variables which were helpful in implementation. Two among them relate to stakeholder engagement and public engagement, and the third was presented as an open question for further study:

> 1. It is valuable to have key stakeholders and NGOs participate in program outreach.
> 2. Involvement by trusted local and state representatives is critical in attracting agricultural water user participation.
> 3. How do we preserve the widespread interest, support, and momentum that the SCPP has generated, and will a short-term break in implementation have long-term impacts in interest? [87]

The SCPP Final Report also identifies additional insights into community outreach and education. Understanding public perceptions and cultural attitudes about the SCPP, focused outreach, and local outreach were all crucial for increasing the number of applications and enhancing working relationships between the Upper Colorado River Commission, state agencies, and participants such as the Navajo Nation. In particular, it was found that areas with local, trusted water personnel, or places which had the presence of local organizations, such as The Nature Conservancy ("TNC") or Trout Unlimited ("TU"), had higher rates of participation. The report states, "Many of the TU and TNC staff members live and ranch in the areas where they work. This peer-to-peer networking helped to build trust and promote participation."[88] In 2018, sixty-eight percent of projects were associated with TU outreach efforts. [89]

In New Mexico, applicants began participating in SCPP in 2016. All of the projects in New Mexico were located in the San Juan Basin, in the northwestern region of the state. San Juan County is ranked second in the state for irrigated cropland. It has approximately 150,000 acres, or 10% of the state total.[90] Tribal project participation was exclusive to the Navajo Nation with their participation beginning in 2017 and continuing into 2018. Participation from the Navajo Nation was significant in that it accounted for approximately 14% of the estimated conserved consumptive use in the 2018 SCPP, and, in 2017, yielded an estimated conserved consumptive use amount of 2,895 AF, which was the second largest SCPP project in 2017.[91] The significant water savings from this project are due in large part to the fact that three-fourths of the irrigated acreage in the San Juan Basin is operated by the NAPI, which was created in order to administer the Navajo Indian Irrigation Project ("NIIP"). NIIP irrigates 110,630 acres of farmland with water from Navajo

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87. *Id*. at 5.

88. *Id*. at 29.

89. UPPER COLORADO RIVER COMMISSION, FINAL REPORT APPENDIX C: 2018 SYSTEM CONSERVATION PILOT PROGRAM UPDATE (2018).

90. *Agricultural Science Center at Farmington: Overview,* N. M. STATE UNIVERSITY (2017), https://farmingtonsc.nmsu.edu/overview.html.

91. WILSON REPORT, *supra* note 86.

Reservoir. It uses approximately 508,000 AF of annual allocated water to irrigate the NAPI farm.[92]

In 2017 and 2018, the Navajo Nation's participation in the SCPP yielded 1,286 and 1,656 acres respectively of fallowed farmland. The respective conserved consumptive use for both years was 2,901 AF in 2017 and 3,626 AF in 2018. [93] In 2017, the project consisted of an entire season of fully fallowed crops. These crops include alfalfa, corn, and pinto beans, which are typically grown in this area. The following year mimicked the first, only with greater acreage. Both projects were compensated with a U.S. dollar amount of $219 per acre foot.[94] Part of the success of this program was due to relationship building between staff at the New Mexico ISC and NAPI staff.[95] This kind of relationship building, exemplified by the role of local TNC or TU staff, is pivotal to greater understanding and ability to communicate between implementation agencies and the people they work with.

VII. PUBLIC ENGAGEMENT DURING THE ONGOING DCP EXPLORATORY PROCESS IN COLORADO AND NEW MEXICO

This article takes a broad approach to examining public engagement. Public engagement, as opposed to stakeholder engagement, typically refers to outreach efforts which are targeted at citizens who may be located within the planning area, but otherwise have little direct role or investment in the results of the exploratory planning process. Public engagement, as more broadly used here, refers both to engagement during the exploration, planning, and implementation processes of policies, plans, and programs. It widens the definition of stakeholders to include those with or without a direct stake in the outcome, but who, nevertheless need to be consulted in order for implementation to be successful, inclusive, and sustained.

Colorado's exploratory planning process has included eight workgroups organized around funding, environmental conditions, agricultural impacts, administration and accounting, economics, local government, monitoring and verification, education and outreach, and law and policy. The education and outreach workgroup was designed to serve the following role:

Develop public outreach strategies and materials regarding the topic of demand management within Colorado. In addition, this workgroup will coordinate with the PM Team to develop consistent and informative workshops and presentations that are intended to engage with water rights stakeholders and other interested stakeholders on the topic of demand management.[96]

Four Education and Outreach reports have been created for this workgroup. The key takeaways from them are summarized thematically in Table 2. The table is color coded in order to quickly identify prevalent themes from each report. These

92. *History,* NAVAJO AGRICULTURAL PRODUCTS INDUSTRY, https://napi.navajopride.com/history/ (last visited April 9, 2021).

93. *See* WILSON REPORT, *supra* note 86.

94. *Id*. at 15.

95. Telephonic Interview with Christina Noftsker, Interstate Stream Commission (June 25th, 2020); Interview with Amy Haas, Upper Colorado River Commission Staff (June 25th, 2020).

96. COLORADO WATER CONSERVATION BOARD, COLORADO'S DEMAND MANAGEMENT FEASIBILITY INVESTIGATION UPDATE 19-20 (2020).

themes are grouped under five categories coded as language, logistics, process, communication, and audience.

The themes that have been coded under language apply to a range of themes including semantics through narrative. For instance, establishing a common understanding of phrasing and intention is important to convey messages and engage with different groups accordingly. Language is important to this objective because meaning can vary considerably within majority populations, as well as within minority subcultures. Messaging consistency is important for making language and meaning more accessible to diverse audiences. Adopting a narrative which emphasizes demand management as an evolving process, as a tool for water resiliency, and an opportunity for net positive water management, is seen as an important way of being aware of the role of combining tailored semantics with positive messaging for diverse audiences. Process and communication are codes which identify interrelated themes. For instance, identifying a platform and methods for how water users communicate, and how they might communicate better, is seen as pivotal to creating processes for more equitable forms of engagement. Process is the mechanism(s) used to make program development more transparent, inclusive, and holistic. An example of this was a statement about ensuring that group discussions were recorded in a way as to capture all comments made. Logistics and audience are also similar in that they relate more to defining scope, time frame, and how to best identify audiences for whom education and outreach might be most relevant.

Table 2. Thematic of Key Takeaways from Education and Outreach Reports 1-4.

Report 1	Report 2	Report 3	Report 4
Messaging consistency	Communication platform	Frameworks for communication	Defining DM audience
Process transparency	Regional and local communities	Defining common terms across workgroups	Inclusive and holistic record of discussions
Languaging	Mapping communication networks	Scope and time frame	
	Concept communication and water educator communication methods	Demand management narrative	

Legend: Language Logistics Audience Process Communication

Due to its role as a headwater state, Colorado's planning efforts have been the most comprehensive of any upper division state. The Interstate, Federal, and Water Information Section of the CWCB compiled and submitted a report on the Demand Management planning process to Colorado Water Conservation Board Members, dated July 15-16, 2020. The report serves as an update of the work done pursuant to the 2019 Work Plan, which summarizes the key insights of the eight

workgroups to date. It also provides an update on all other Upper Division States' feasibility investigations, including New Mexico's state efforts.[97]

The CWCB has also hosted approximately eleven demand management events since the DCP was signed in January 2019. As of this writing, the most recent was a public Board Workshop on March 2, 2021. The Workshop provided a Demand Management Framework report and it discussed core framework concepts including but not limited to education and outreach, environmental considerations, and agricultural impacts. Importantly, the Workshop also provided a framework for the CWCB's model of public engagement, as well as information about a new Demand Management Resources Survey which asks respondents for their input on which resources would help them better understand the demand management feasibility investigation. The survey is located on a dedicated CWCB webpage for demand management resources.[98] The CWCB framework for engagement includes a three-tiered pyramid with public input at the bottom, representative stakeholder groups as the middle portion for synthesis and feedback of public input, and the CWCB Board at the top which uses the input, synthesis and feedback to shape policy and inform decisions.

The New Mexico ISC held an in-person meeting with stakeholders in January of 2020, as well as a second stakeholder meeting in April 2020. These meetings discussed demand management in the New Mexico San Juan Basin, which included identifying San Juan Basin water users and potential tools which could be used for a demand management program. Existing tools which have been proposed for further development consist of the strategic water reserve, active water resource management ("AWRM"), and special water user districts.

The first consists of the ability to first identify conserved water originating in Colorado which flows into New Mexico, and the subsequent action of storing it in Navajo Reservoir. The second consists of a methodology for shepherding water into Lake Powell during the irrigation season during low flows. The third simply refers to a more systematic way of communicating with stakeholders. AWRM is being considered as a potential DCP tool in the San Juan Basin of New Mexico. [99] AWRM regulations provide the framework for the promulgation of specific water master district rules and regulations. There are currently no district specific AWRM regulations that have been promulgated in the San Juan Basin region, but the ISC is currently exploring the feasibility of developing them. [100]

VIII. OPPORTUNITIES AND MECHANISMS FOR ENHANCED PUBLIC ENGAGEMENT IN THE DCP PLANNING PROCESS IN NEW MEXICO AND COLORADO

This article defines public engagement as both working relationships between government and its citizens, *and* multisectoral relationships between municipal and agricultural water users. This definition is purposefully broadened

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97. *Id.* at 1.

98. *See Demand Management Feasibility Investigation,* COLO. WATER CONS. BOARD, https://engagecwcb.org/dm (last visited Apr. 9, 2021).

99. WORK, *supra* note 20.

100. *Id.*

because the role of stakeholder can sometimes be used too narrowly to include only those with a direct stake, or a direct value in the planning process. This kind of view has at times excluded different groups of people who might otherwise have desired a voice at the planning table. Consequently, public engagement, as used here, more generally refers to engagement during the exploration, planning, and the implementation processes of policies, plans, and programs. It widens the definition of stakeholders to include those with or without a direct stake in the outcome, but who nevertheless need to be consulted for implementation to be successful and sustained.

This article notes the ongoing exploratory DCP as an opportunity for public engagement. It emphasizes the implementation of potential demand management programs as particularly fruitful opportunities for utilizing more sophisticated forms of public engagement in order to create enhanced relationships between urban and rural water users. It offers water-smart growth planning as a critical factor in bridging a perceived divide between these users, and as an opportunity in and of itself for integrating superior mechanisms for public engagement. The following subsection highlights the urban-rural divide as a unique opportunity for the exploratory DCP process to integrate enhanced public engagement with the exploration and implementation of a potential DCP program. Its primary function is to provide associated mechanisms for the enhanced integration between a public engagement which links water-smart growth planning with multiregional water use.

A. The Urban-Rural Divide in New Mexico and Colorado: Mechanisms for Engagement

The perceived urban-rural divide is apparent in places such as Colorado, particularly between western slope and front range cities, as well as in New Mexico. The San Juan River, a Colorado River tributary, supplies water to agricultural production in the San Juan Basin in Northwestern New Mexico. The San Juan River and its tributaries also supply water to the three regional municipalities of Farmington, Aztec, and Bloomfield and the river provides water to the cities of Albuquerque, Santa Fe, and the Middle Rio Grande Conservancy District.[101] The following primarily serve as mechanisms proposed for their possible usefulness in exploring and implementing potential demand management programs in the San Juan Basin and Colorado River Headwater Counties.

1. 2016 San Juan Regional Water Plan Update:

The cities of Farmington and Bloomfield are examples of two cities which could implement water-smart growth planning strategies. Both of these cities, as well as the Navajo Nation, divert water from the river and its tributaries. The 2016 San Juan Regional Water Plan ("SJRWP") identifies a regional water steering committee for this area. The SJRWP provides record of eight public meetings, some of which discuss the formation of the steering committee and which water users were thought to be the most relevant to include. It also discussed key projects, programs, and

101. Laura Paskus, *On the Colorado River, will New Mexico be left in the dust?*, THE N.M. POL. REPORT (Oct. 24, 2018), https://nmpoliticalreport.com/2018/10/24/on-the-colorado-river-will-new-mexico-be-left-in-the-dust-en/.

policies for regional collaboration. The 2016 Plan includes record of public comments on the then Draft Plan and a table in appendix 8-A listing regional projects, programs, and policies in the planning region. A regional consortium of San Juan Basin municipalities could begin updating their development codes to model Santa Fe's water-smart growth precedents. These updates could then be further developed on a regular basis, as well as during the subsequent planning process initiated for the next Regional Water Plan Update. These updates could also be integrated into local water supply and comprehensive plans as was done in the City of Westminster. While the previous SJRWP update involved eight public meetings used to identify relevant stakeholders, subsequent meetings could be used to provide education and outreach to local stakeholders which incorporates themes from the four Education and Outreach reports generated by the CWCB.[102]

The 2016 SJRWP also makes a number of project, program, and policy recommendations for inclusion in the State Water Plan, of which two are relevant here. The first recommends that the State Water Plan, "[e]xplore changes to subdivision regulations to support community water supply and return flows."[103] This could be expanded to include changes to development code regulations to support community water supply return flows, and the requirement of additional conservation regulations relating to landscape type and proximity to infrastructure. Further emphasis in the plan update could integrate additional meetings for discussing the implications of incorporating regional smart-growth regulations aimed at avoiding potential spillover effects from municipal growth limitations, such as the ones which happened in Boulder, Colorado. A dual objective of such meetings would expand the following recommendation from the 2016 SJRWP, increasing the use of water market transactions, in order to enhance collaboration between small-scale Navajo Nation farmers, NAPI (large-scale agricultural producers), and regional municipalities, such as Farmington or Bloomfield.

2. *Facilitated Support of Water Market Transactions*

The subsequent recommendation from the 2016 SJRWP suggests utilizing water market transactions in order to enable efficient and equitable transfers of water for environmental protection.[104] This recommendation could be expanded to integrate greater support for facilitation of transactions between members of the Navajo Nation who opt into a potential DCP and elect to fallow their fields in order to conserve water, municipalities who have integrated water-smart growth planning, and small-scale farmers from local tribes. NAPI utilizes water for large-scale agricultural operations and succeeded in conserving approximately 14% of the estimated consumptive use in the 2018 SCPP.[105] However, small-scale family farms, including members of the Navajo Nation or the Jicarilla Apache Nation, could benefit from water transfers between regional municipalities who have adopted smart growth regulation, and NAPI large-scale agriculture which has opted into demand

102. NEW MEXICO INTERSTATE STREAM COMMISSION, SAN JUAN BASIN REGIONAL WATER PLAN 4-13, 6 (2016).

103. *Id.* at 158.

104. *Id.* at 158.

105. *See generally* WILSON REPORT, s*upra* note 86.

management conservation programs. This could map well onto the seven steps listed by Tracy Raymond and Constance Falk, in their article, "Feeding the Tribe: The role of Soft Infrastructure in Addressing the Root Problems of the Navajo Nation San Juan River Irrigation System."[106] The authors claim that focusing on small-scale agricultural stakeholders from the Navajo Nation will encourage more traditional forms of livelihood to be reengaged with on the reservation. [107]

A local database on regional water users including, but not limited to, tribes such as the Navajo Nation or the Jicarilla Apache Nation, NAPI, and regional municipalities or industries, could help identify ways to analyze who was using water, how much, which seasons, and for what purpose. This information could be used to establish a water market better suited for providing regional net water savings in Lake Powell as fulfillment of a state DCP. This is also consistent with CWCB Report numbers two and three, which note a potential need for mapping communication networks and providing platforms for communication. A communicatory platform for facilitating transfers could result in net savings by trading water use privileges based on when and where they were most needed. Such a market could build in equitable pricing incentives for users to limit water use depending on time of year and need. This could influence how cities limit development in areas with seasonal imbalances of water.

3. Atlas of Collaborative Conservation in Colorado

There are sixteen existing transmountain water diversion projects in Colorado River headwater counties which divert water from rural to urban regions. In these counties, which include Eagle, Grand, Gunnison, Pitkin, Routt, and Summit, agriculture is the predominant private-sector land use and is vital to local economies. It covers an average of approximately 73% of all privately owned land. [108] Despite its importance in these counties, most of their water has been diverted by other states, another country, and neighboring municipalities. In Colorado, this water is diverted by major front range cities including Boulder and Denver, whose needs are growing as population increases. How to balance the needs of these cities while protecting local agricultural economies in headwater counties is not a new question. Different frameworks have been in the process of development for some time in anticipation of greater engagement and collaboration.

The Colorado Water for the 21st Century Act was established in 2005 in order to "facilitate discussions on water management issues and encourage locally driven collaborative solutions."[109] It divided the state into eight major river basins and the Denver metropolitan area, and it also created the Interbasin Compact Committee ("ICC") to explore cooperative actions among the basins. Each basin created a Basin Implementation Plan ("BIP") to study the individual needs of each

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106. Raymond and Falk, *supra* note 55, at 324.

107. *Id.*

108. COLEY/FORREST, INC., WATER AND ITS RELATIONSHIP TO THE ECONOMIES OF THE HEADWATERS COUNTIES 11 (2011); *see also* U.S. DEP'T OF AGRICULTURE, NRS-INF-31-15, WHO OWNS AMERICA'S TREES, WOODS, AND FORESTS? (2015).

109. *Basin Roundtables*, COLO. WATER CONS. BOARD, https://cwcb.colorado.gov/about-us/basin-roundtables (last visited Apr. 9, 2021).

basin [110] There have been other efforts at creating collaborative frameworks. Colorado State University created a project, "Atlas of Collaborative Conservation in Colorado," ("The Atlas") which spatially identifies and describes collaborative environmental initiatives around the state.[111] Collaborative groups were identified based on characteristics involving conservation of natural resource related goals, the sustained process of interacting or consensus building which lasted for at least two years, and representation consisting of people with a stake in the outcome or who have recognizable responsibilities within the initiative. [112]

The Atlas has not only mapped collaborative initiatives across the state but has produced a report which includes explanations for why collaboration is initiated and implemented at different scales and in different regions.[113] This kind of mapping and research provides a powerful tool for relationship building between diverse stakeholders. The tool was initially created as a more general mechanism for identifying statewide conservation collaborative initiatives, but it could be developed into a larger platform in further phases to both explore DCP feasibility, and then to help implement a potential demand management program. As a tool, this could be used by both the ICC and individual basins to better understand the spatial network of existing relationships, where they could be strengthened, and how the relevant organizations, or nodes, could rely on each other for specific implementation or information production functions.

This could be developed into a more robust platform which uses information from the second mechanism—a database for facilitated water market transactions. It could include built-in sensitivity for seasonal water use variance and need, as well as seasonal pricing. [114] These enhanced networks would create an engaged, dynamic relationship between urban municipalities and rural, agricultural water users and could bridge the gaps in space and knowledge between the two groups.[115] For instance, agricultural and municipal water users might be able to coordinate dynamic agreements which might mean alternating water use amounts between them during dry and wet years. A city with surplus water could divert less from agricultural water users during a wet season, and an agricultural user might enter into a rotational fallowing agreement with another user dependent on any number of variables including season, seniority of water right, region, or crop type. This approach is similar to an adaptive management approach where, dependent on water availability variance, supply would be regulated based on novel information from regional and seasonal hydrologic cycles. Water prices could be adjusted accordingly, and water users could trade water rights based on this kind of information.

The critical aspect of these propositions relies on a collaborative attitude and an interdependency on information based on relationships. This information

110. *Id*.

111. *Atlas of Collaborative Conservation in Colorado*, COLO. STATE U., https://collaborativeconservation.org/program/discover/atlas-of-collaborative-conservation/ (last visited Apr. 9, 2021).

112. *Id.*

113. *Id*.

114. CURGUS, *supra* note 23, at 31.

115. Jan Adamowski et al., *supra* note 39,at 2–3.

might be a database which establishes a market for water transactions, where surpluses from more efficient municipal use are sold or traded to agricultural users, and vice versa. Or it could be the combination of a water market and a network of water conservation organizations in collaboration with cities, agricultural users, and the eight basins in Colorado, who collaborate in order to increase the efficiency of implementation and the ability to engage wider swathes of the public. This latter proposition relies also on the abilities of conservation organizations in particular, to be able to prioritize both local, regional, and statewide concerns in a productive way, which would again rely on an engagement process. This approach is very similar to a platform for facilitated water market transaction which could be integrated with urban land use development planning.[116]

IX. CONCLUSION

Engagement can mean many things. An engaged public is one which is not simply consulted during an exploratory planning process. It involves the process of sustained, proactive coordination, information collection, trust, capacity building, implementation, and maintenance. These characteristics might occur to differing extents and with different mandates between groups, coalitions, and state or federal agencies, but the common denominator is for inclusive, meaningful action towards a common goal. The ongoing exploratory DCP process will eventuate in the determination of whether to implement a demand management program in Upper Basin states. The actual version of such programs will vary according to the unique particularities of each state, but the importance of bridging historical divides through multisectoral and multiregional engagement will be critical to sustained success.

The DCP exploratory process, as well as the potential implementation of demand management programs, offer unique opportunities for water professionals to increase the role of public engagement in water-smart growth planning. In doing so, it can create improved relationships between urban and rural water users. Public engagement is crucial for implementing the integration of water-smart growth planning with large scale, multisectoral water needs. Water-smart growth planning is a strategy of conserving water for urban areas which can improve the urban-rural relationship by allowing cities to shoulder the proportionate responsibility for conserving water, limiting unsustainable growth and, consequently, diverting less water from agricultural areas.

The three mechanisms proposed are meant to serve as dynamic methods for integrating public engagement with demand management strategies that emphasize urban, water-smart growth strategies and their combination with rural water needs. The three include: (1) smart-growth updates to San Juan Basin municipal development codes, their integration with the next Regional Water Plan update, and its public outreach process; (2) the interrelated mechanism of expanding water market transactions in order to integrate greater engagement between regional municipalities and other San Juan River users such as the Navajo Nation; and (3) the development of Colorado State University's collaborative framework, "Atlas of Collaborative Conservation in Colorado." These mechanisms are informed by the previous case studies and are contextualized by localized information.

116. *See supra* Section VIII.A.2.

Water scarcity is increasingly becoming a critical issue for society. Climate change and population growth are two of the principal reasons for an uncertain supply and an associated potential for diminishment in water quality. It is important that instead of letting these issues fester and eventuate in divisive or restrictive retrograde water planning and management strategies, that states and locales collaborate in order to plan for a less certain water supply future. Informed by sound science, the fields of water resources management, policy, law, and planning will be vital in facilitating this kind of planning. Creating a culture of mutual benefit and engaged collaboration is necessary for future water planning and management to maintain a sustainable water supply of sufficient quality for consumptive needs.