Five Things to Consider When Developing and Adapting Water Policies and Programs in the West

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Summary

Water policies and programs in the western United States have not always achieved the results originally envisioned. The surrounding circumstances, from public opinion and involvement to hydrology and administrative capacity, significantly influence policy and program effectiveness. This Article identifies and provides examples of these key external characteristics, categorizing them under five overarching factors: social and political dynamics; physical landscape; economics; law; and administrative capacity. Considering these factors, and tailoring water policies and programs accordingly, offers the best chance of achieving the desired results.

Water policies and programs that are outstanding in theory do not always live up to their potential, and even those that work in one location do not always work elsewhere. Much effort can be spent scouring the globe for management solutions to water problems, or in developing completely new ideas. These are worthwhile and arguably critical endeavors, since the end result will only be as good as the strategy being implemented. But the fate of any policy or program rests as much or more in the circumstances in which it is applied.

Water policies and programs should be selected, adapted, and even designed from scratch to fit the circumstances of the intended locale. Incentives for implementation range from financial, to efficiency and process speed, to opportunities that would otherwise be prohibited by law. A policy or program should be built to capitalize on one or more of the incentives most influential in its intended locale. Perhaps even more important, it should avoid foreseeable pitfalls such as contradictory laws, inadequate staffing, and non-conducive hydrologic characteristics. If a water policy or program likely will need the assistance of those outside government to be effective, the presence of individuals and groups ready to provide that assistance is critical; in addition, they should be engaged in the process. If the policy or program is being adapted from another location, decisionmakers should understand the factors that led to success in the original location and determine whether the circumstances in the two places are sufficiently similar to adequately replicate the prior results.

Much rides on these policy and program decisions. Failure, especially of choices that showed great promise, can limit future opportunities. Proponents lose face; the problem gains an air of invincibility; and opponents of any subsequent reforms gain ammunition. Decisionmakers at the state and local levels should give a water policy or program every chance to succeed by selecting, adapting, and developing it wisely.

The first step is identifying the potential influences on a water policy or program's success. While each scenario is unique, this Article provides a checklist of influences prominent in the lengthy history of western water policy and program development. Framed as five factors (social and political dynamics, physical landscape, economics, law, and administrative capacity), the details of these influences and the examples of the ways in which each has determined the success or failure of programs and policies establish a foundation for more comprehensive issue-spotting and analysis. From this foundation, decisionmakers should be able to craft water policies and programs that better utilize incentives and overcome obstacles, and ultimately that are more successful. The objective should be more than just

good water policies and programs, but rather, good water policies and programs *that work*.

I. Social and Political Dynamics

The success of any water policy or program is first determined by the social and political dynamics. Often understood in terms of "softer" concepts such as trust, cooperation, engagement, and perception, this factor essentially boils down to people. Who is involved and how do they relate to each other and to the policy or program? This is especially important in the West, where many water programs are "voluntary." Key characteristics of social and political dynamics can take many forms, as outlined below, and the associated case studies illustrate these characteristics' role in the success of water policies and programs.

A. *Champions*

Rarely do policies or programs develop without the foresight and hard work of a person, group, agency, or corporation. Often, success requires multiple parties working together. These "champions" need not be involved in every phase, but serve as catalysts at the most challenging stages. A champion can be an engaged citizen conducting public outreach in support of a new program, a government official committed to passing a new policy, or a company dedicated to a program's implementation, among many other actors and actions.

For example, in 1995, Trout Unlimited (TU) partnered with the Montana Wildlife Federation, the Montana Farm Bureau, and others to convince Montana legislators to allow nongovernmental organizations to lease water for instream flow purposes. After the legislature enacted a 10-year pilot program, TU and its partners completed a number of full-season and split-season leases, and raised money to install water-saving irrigation systems for landowners in exchange for instream flow leases. This program, which is now permanent, has made tangible impacts on the water levels in tributaries across Montana, reconnecting important habitat for fish spawning and rearing.[1] While many factors affected the success of Montana's instream flow leasing program, TU's dedication to seeing the program through from concept to implementation was critical.

B. *The Perceptions of Those Affected*

Champions often will be affected, directly or indirectly, by the policies or programs they seek to advance, but the opinions of all potentially affected parties greatly influence success. Do stakeholders believe that there is a problem to be addressed? Do they think that the proposed policy or program will effectively address that problem, and do they consider it to be fair and in line with community values? Widespread support can simplify development and implementation of the policy or program; indifference can make the process challenging; and opposition may prevent it. The reality of the status quo and what the policy or program likely will do is only of secondary importance to what people *perceive* the current state and potential impact to be—and to what extent they act upon those views.

Yet, perceptions are not necessarily static. Supporters can be deterred, opponents can be convinced, and individuals without an opinion can fall either way. Opponents can have a prominent and unified message, turning an otherwise supportive environment into an unreceptive one.

A prime example of the power of opposition can be found in the history of potable reuse systems for wastewater. Efforts to develop potable reuse in San Diego have been derided as "toilet-to-tap" initiatives. The resulting cultural "yuck" factor has had a serious impact on these efforts' success, regardless of the scientifically demonstrated cleanliness of the resulting water and the fact that many sewage treatment plants already discharge effluent into the water San Diego withdraws for its drinking water supply. By comparison, Orange County, less than 100 miles north of San Diego, has the largest water purification system for potable reuse in the world (and it is about to undergo a further $150-million expansion).[2] It injects treated wastewater into the aquifer, rather than directly into water mains, and system administrators have been very careful to label the process "groundwater replenishment" and avoid "toilet-to-tap" references.[3]

But education and outreach have the potential to change entrenched perceptions, prevent the spread of misinformation, and ultimately generate support. For example, at the very early stages of development of the "Super Ditch," a corporation formed by irrigators in the Arkansas River Basin to coordinate rotational fallowing and lease water for the growing needs of Colorado, proponents arranged for a small group of leaders in these farming communities to visit the Palo Verde Irrigation District (PVID) in California, home of the model on which "Super Ditch" is built. The Arkansas Valley farmers were able to talk with the Palo Verde farmers about the latter's experience with their rotational fallowing agreement with the Metropolitan Water District (MWD) of southern California, including its effects on the community and farms. This trip eased farmer suspicions and paved the way for the "Super Ditch."[4]

Education efforts also may be more general. Like many other western cities, Santa Fe has used a widespread and varied education campaign to improve participation in and support for its water conservation efforts. This outreach includes weekly water conservation radio shows, an

1. Trout Unlimited, Water, People, Fish 6 (2008).

2. Christina Cocca & Vikki Vargas, *Orange County's Wastewater Purification System, World's Largest, Expands*, NBC Los Angeles, June 18, 2013, http://www.nbclosangeles.com/news/local/Orange-Countys-Wastewater-Purification-System-Worlds-Largest-Expands-211900901.html (last visited Apr. 24, 2014).

3. Tom Arrandale, *Flushing Away Fears*, Governing, Apr. 30, 2008, http://www.governing.com/topics/energy-env/Flushing-Away-Fears.html (last visited Apr. 24, 2014).

4. Press Release, Lower Arkansas Valley Water Conservation District, Arkansas Valley Irrigators Incorporate "Super Ditch Company" (Sept. 2011), http://www.lavwcd.com/news/superditch.html (last visited Apr. 24, 2014).

annual children's water fiesta, and an annual water conservation poster competition for local school children, with the winning poster being displayed on city buses.[5] Between 1995 and 2011, percapita water consumption in Santa Fe decreased by 37%.[6] More recently, the rapidly developing role of social media in information dissemination has made it increasingly influential on perception, and thus an important part of outreach efforts.

C. Civic Engagement

Examples of the influence of perceptions on policy and program success often highlight the significance of civic engagement. Involving potentially affected parties in all stages—planning, enactment, implementation, monitoring, and evaluation—can create educational opportunities and thereby affect perceptions. This transparency can build public trust, generate acceptance of the process, and proactively counter misinformation and public skepticism regarding the policy or program and the intentions behind it. Meaningful civic engagement also can mold policies and programs to more equitably, efficiently, and effectively address the issue at hand. In addition, it can create a sense of ownership and buy-in, giving participants a stake and thereby increasing the likelihood of success. When adapting a program or policy to new circumstances, the role of civic engagement may be as important to consider as its content and structure.

A valuable means of civic engagement in Colorado water management has been the "basin roundtables." The nine roundtables, one for each of Colorado's eight major river basins and one for the Denver metropolitan area, were established by the Colorado Water for the 21st Century Act to facilitate discussion of and local, collaborative solutions to water management challenges. Each table is composed of members appointed by the counties, municipalities, water conservation districts and state legislature, as well as at-large members representing agricultural, recreational, industrial and environmental interests, domestic water providers, and water right holders. Among other results, each roundtable has conducted a basinwide water needs assessment and is developing a basin implementation plan to meet future demands. In addition, the Act created the 27-member Interbasin Compact Committee (IBCC), composed of two representatives from each roundtable, seven gubernatorial appointees, and the chairs of the state House and Senate water committees. The IBCC is discussing the development of new Colorado River supplies to meet future needs on both sides of the Continental Divide for consideration by the Colorado Water Conservation Board, which is drafting the Colorado Water Plan.

Demonstrating the importance of involving all interests, the Yakima Water Transfer Working Group (WTWG) has drastically reduced the review period for temporary water transfers and changes in Washington's Yakima Basin, with no apparent ill effects. The Washington Department of Ecology and the U.S. Bureau of Reclamation established the Yakima Emergency Water Bank in 2001 to facilitate short-term water transfers and to relieve the effects of a 2001 drought, then established the WTWG to review the water transfers. Due to its success, the WTWG has become permanent. In addition to representatives from the two agencies, the WTWG consists of hydrologists, water users, and water rights experts from across the basin.[7] Members of the WTWG serve voluntarily and do not formally represent their respective organizations. Given the members' knowledge and the diversity of interests represented, unanimous approval is a positive indication that a transfer would not adversely affect streamflow or other users. Transfers receiving universal approval are sent to the Yakima County Superior Court for review, in accord with the Yakima Basin Adjudication, and the judicial approval rate of such transfers has been very high. The goal of the WTWG is for the entire process to be completed within 15 days in drought years, and 45 days in other years. The diverse representation and the dedication of the individuals participating in the WTWG are critical to making those short time lines possible.

D. Implementation Facilitators

1. First Movers

Any time a new water program or policy is implemented, there are growing pains. Both administrators and participants must invest time and energy to work through the kinks and practical realities of moving from concept to practice. An individual, organization, or other entity willing to bear the burden of being the "first mover" can pave the way for other users and participants. First moves can take a variety of forms, from leasing a water right through a new instream flow leasing program, to utilizing a new water conservation initiative, to capitalizing on a new tax incentive. First movers themselves also come in a variety of forms, including state agencies, municipal governments, farmers, private companies, and nonprofit organizations.

The Oregon Water Trust (OWT) and the Deschutes River Conservancy (DRC) were first movers for Oregon's Conserved Water Program, which allows water right holders to convert conserved water into a separate water right. The program was codified in the state's 1987 Instream Water Act and amended in 1993, but it was not until the mid-1990s that the program began to be truly utilized. This lack of initial success has been attributed to the lack of first movers.[8] The OWT and the DRC were not created

5. Save Water Santa Fe, *For Students and Teachers*, http://savewatersantafe.com/conservation-classroom (last visited Apr. 24, 2014).
6. Fernando Aranda, Presentation at the Central Texas Water Conservation Symposium (Feb. 26, 2013), http://www.slideshare.net/texasnetwork/fernando-aranda-conservation-measures (last visited Apr. 24, 2014).
7. State of Washington Department of Ecology, Yakima Water Transfer Working Group—Questions and Answers, http://www.ecy.wa.gov/programs/wr/ywtwg/ywtwg_qanda.html (last visited Apr. 24, 2014).
8. *See, e.g.*, Bruce Aylward, Restoring Water Conservation Savings to Oregon Rivers: A Review of Oregon's Conserved Water Statute, 10 (2008).

until 1993 and 1996, respectively. Among the first-mover challenges were the length of the application process and the costs of developing the project and coordinating participants (when multiple water users were involved). While these challenges have not been alleviated, their impact has been reduced since the program's early days, in large part due to the implementation experience made possible by the OWT and the DRC.

Another example of the value of first movers can be found in the history of Colorado's temporary review policy for augmentation plans, rotational crop management contracts, and changes to water rights. The policy, enacted into law in 2002, allows the state engineer to temporarily approve a plan, contract, or change if certain factors are met.[9] Soon after the bill's passage, the city of Aurora petitioned for temporary approval of its Highline project, a two-year pilot water leasing-fallowing agreement with 160 farmers. It took 18 months before the substitute water supply plan was approved by the state engineer, although other factors such as the very large amount of water to be transferred and the fact that it proposed an interbasin transfer contributed to the delay. Since then, petition writers and the state engineer have become more accustomed to the process: applicants now must file by December 31, and approvals are routinely granted by March 31.

2. Shepherds

Once a program or policy is ready for implementation, the role of "shepherds" can become very important to its success. Shepherds are individuals or organizations that aid implementation by providing information and technical assistance to those who may participate in the program or utilize what is offered by the policy.

The Clark Fork Coalition (CFC) has assisted with implementation of Montana irrigation efficiency, instream flow leasing, point of diversion and source changes, and water transfer programs in a variety of ways. First, they are participants in certain programs (e.g., by leasing rights for instream flow); and second, they assist other water right holders in evaluating which programs are right for them; writing grant applications; securing cost-share money from state, federal, and private programs; conducting water right reviews; and filing change applications with the Department of Natural Resources and Conservation.[10]

3. Enforcers

"Enforcers," as the name suggests, are people, organizations, and government entities that assist in assuring compliance with a program or policy. Enforcers of all types can be important to policy and program success. For example, Las Vegas' lawn-watering restrictions have been more effective as a result of citizen enforcement. Neighbors report violators, which helps to focus more formal enforcement efforts and ultimately reduce noncompliance efficiently. Enforcers also can be valuable even when the program or policy is voluntary. A Santa Fe newspaper annually publishes the names of the city's largest water users, in effect a public shaming to encourage reducing water usage.[11] Thus, carrots may not be the only impetus for participation in a program or compliance with a policy; one should consider the role of sticks, informal though they may be.

II. Physical Landscape

In the context of western water policies and programs, the "physical landscape" includes the hydrology, geography, and infrastructure of an area. How much water is available and when? Where is it relative to where it is needed? How easily can it be moved? How much is or will be lost in moving it? These natural and human-influenced characteristics can vary substantially from place to place and significantly affect program and policy success. Of the five factors described in this guide, the physical landscape may be the hardest to change, with the era of major dam-building seemingly in the past. Thus, a policy or program may have no choice but to adapt to the landscape rather than vice versa.

A. Infrastructure

Infrastructure is critical for many western water policies and programs, to store water until it is needed, to move water to where it is needed, and to maximize efficiencies in using water. In some cases, a program or policy can take advantage of existing infrastructure. In others, it will not succeed without new infrastructure. In either event, considering a program or policy's infrastructure needs relative to what is available is key to attaining the greatest likelihood of success.

In 1991, California implemented an Emergency Drought Water Bank with the goal of obtaining water for "critical needs" through voluntary transfers. The bank was successful, with 351 contracts providing over 820,000 acre-feet of water, and was reinstated with only a few changes the following year when drought conditions continued.[12] It capitalized on California's State Water Project, the largest state-built water and power development and conveyance system in the country, including 34 storage facilities, reservoirs, and lakes; 20 pumping plants; and over 700 miles of open canals and pipelines.[13] With the water sellers being in the northern part of the state and the buyers being in

9. Colo. Rev. Stat. §37-92-308.
10. Clark Fork Coalition, Working With Water: Tools for Landowners, *available at* http://www.clarkfork.org/images/stories/publications/vital-rivers/cfc_flow_2011-final.pdf.
11. Bob Shaw, *Santa Fe, N.M., Shows the Nation How to Conserve Water*, Pioneer Press, Mar. 18, 2013, http://www.twincities.com/old/home/ci_22819643/santa-fe-n-m-shows-nation-how-conserve (last visited Apr. 24, 2014).
12. Peggy Clifford et al., Wash. Dept. of Ecology, Analysis of Water Banks in the Western States, 40-42 (2004).
13. California Dept. of Water Resources, California State Water Project Overview, http://www.water.ca.gov/swp/ (last visited Apr. 24, 2014).

the southern part, large volumes of water had to be moved quickly and efficiently across great distances. Without this extensive preexisting infrastructure, the Emergency Water Bank would not have been possible.

Not every new program has access to the kind of infrastructure that was available to California's Emergency Drought Water Bank. In the 1930s, northeastern Colorado was suffering through a serious drought and sought to supplement its water supplies with water from the other side of the Continental Divide. Without existing infrastructure to facilitate this movement of water, the U.S. Congress authorized (and the Bureau of Reclamation began) construction of the Colorado-Big Thompson (C-BT) Project. This system now consists of 95 miles of canals, 35 miles of tunnels, and 12 reservoirs, spanning 65 miles from north to south and 150 miles from east to west. It delivers supplemental water to 30 towns and cities and is used to help irrigate roughly 640,000 acres of farmland.[14] The C-BT has enabled what has become a popular example of a highly functional water transactions program. The infrastructure, particularly the geographic coverage that it affords, is critical to the success of this program.

B. Hydrology

Hydrology is the science of water movement and its relationship to the land. Every water policy and program, regardless of its type, size, or goals, is affected by the hydrologic conditions of the implementation area. How connected are ground and surface waters? How quickly does water percolate through the soil? How accessible are the aquifers to which the water percolates? When does the snow melt and how quickly? What is the rate of evaporation? These questions and more are important when determining which efficiencies can be gained and how, what storage is best, how much water is needed to meet the desired ends, etc.

One example of the influence of hydrology on program success can be found in the Oregon Conserved Water Program (see *First Movers* above for more details). Since its inception, the program has been used primarily in the Deschutes River Basin, where a volcanic rock base causes significant seepage losses during water conveyance.[15] As a result, large piping projects can conserve substantial amounts of water, amounts impossible in other parts of the state, thus making the Conserved Water Program more practical to implement in the Deschutes Basin.

Hydrology also is part of the reason for the success of California's Kern Water Bank. The bank stores surface water from the State Water Project, the Central Valley Project, and the Kern River in an underground aquifer during high rainfall periods, and then recovers the water in times of need by pumping it out through wells.[16] The Southern San Joaquin Valley, in which the bank operates, is underlain by thick sedimentary deposits, consisting primarily of sand as well as some gravel, silt, and clay. This porous soil is very well-suited to quick recharge, a large volume of storage, and easy water recovery.[17] The bank can recharge up to 72,000 acre-feet of water per month through roughly 7,000 acres of recharge ponds, has approximately 10 million acre-feet of available storage capacity, and can recover about five cubic feet per second through each of its 85 recovery wells.[18] Through the middle of 2011, the Kern Water Bank had recharged over 1.7 million acre-feet of water and recovered nearly 0.9 million acre-feet of it.[19]

C. Geography

The relative locations of different water users, as well as natural and man-made water channels and storage, play a role in the success of many water policies and programs. These physical characteristics often dictate what transactions are possible, how they can be achieved, and how expensive they will be. The Yakima WTWG (see *Civic Engagement* above for more details) offers a prime example of the role of geography in program success. The major reservoirs of the Yakima River are located high in the basin, which allows greater flexibility in water management, including the water transfers being reviewed by the WTWG.

In addition to the location of infrastructure, the location of water users affects the success of policies and programs. The geographic proximity of sellers/lessors and buyers/lessees can influence the feasibility of transfers, and hence the practicality of a market and value of water in an area. Even with the infrastructure in place, how much water will be lost in transport; what borders and mountains need to be crossed; effectively, how much will it cost? Generally, the closer the parties are, the easier it is for a transfer to occur, and the more valuable the seller/lessor's water is. For example, water rights along the Front Range of Colorado generally are more valuable than they are in rural parts of Idaho due to their respective proximities to high-value uses like municipal supplies. Transfer programs like the "Super Ditch" (see *The Perception of Those Affected* above for more details) and that involving the C-BT Project (see *Infrastructure* above for more details) are possible in part because of the proximity of agricultural uses to higher value demands. The resulting increase in the value of water also makes more feasible some policies and programs, such as those concerning expensive water conservation measures.

III. Economics

Economics often play a critical role in the outcomes of water policies and programs. Is funding sufficient to sup-

14. Northern Colorado Water Conservancy District, C-BT History, *available at* http://www.northernwater.org/AboutUs/C-BTHistory.aspx.
15. Bruce Aylward, Restoring Water Conservation Savings to Oregon Rivers: A Review of Oregon's Conserved Water Statute 2 (2008).
16. Kern Water Bank Authority, Recharge and Recovery, *available at* http://www.kwb.org/index.cfm/fuseaction/pages.page/id/368.
17. Kern Water Bank Authority, Geology and Groundwater Quality, *available at* http://www.kwb.org/index.cfm/fuseaction/pages.page/id/371.
18. Kern Water Bank Authority, FAQs, *available at* http://www.kwb.org/index.cfm/fuseaction/Pages.Page/id/352.
19. Kern Water Bank Authority, Background and Key Dates, *available at* http://www.kwb.org/index.cfm/fuseaction/pages.page/id/360.

port the intended implementation? Are the right financial incentives in place to encourage voluntary compliance where and when intended? What economic costs will result from the policy or program, and will they generate opposition? Commenters frequently refer to water as "the life blood of the West"; it is vital to sustaining everything from crop production to industrial manufacturing, from basic domestic needs to unique recreational opportunities. In the West, decisions in water management affect the economy almost as much as the economy affects decisions in water management. It is these pressures that policy and program developers must navigate strategically.

A. Financial Support

Most water policies and programs require money for implementation and hence for success. Some programs, particularly those that charge fees, are financially self-sufficient; the challenge here is developing and maintaining self-sufficiency. Is the income vehicle able to prevent people from cheating (benefitting without paying)? Is the income high enough to cover administrative and programmatic costs, but not so high as to lose significant participation? Other programs and policies depend on external financial support. Here, the challenge is securing sufficient support to start implementation and reliable enough support to plan and operate over the long term. The availability of support, whether from program structure, government funds, or private sources, can vary tremendously and is a key consideration in adapting or developing a program or policy.

The water conservation and instream flow policies and programs of the Pacific Northwest are highly touted, and the amount and consistency of their funding matter as much as structure, popular support, and other circumstances. A prime example is funding from the Bonneville Power Administration (BPA), a federal agency that markets electricity from hydropower and other electric generation facilities in the Columbia River Basin.[20] It has invested a significant amount of money into development and maintenance of a wide variety of efforts to address the environmental impacts of dams.

In 2002, the BPA helped launch the Columbia Basin Water Transactions Program (CBWTP), which develops innovative voluntary water transactions to improve flows to tributary streams and rivers in Idaho, Montana, Oregon, and Washington. The Deschutes River Conservancy, Clark Fork Coalition, The Freshwater Trust, Washington Water Trust, TU, and several state agencies use CBWTP funding to implement flow restoration projects.[21] Other aspects of BPA's Fish and Wildlife Program restore and protect various habitat features, including flows. The BPA also provides substantial, long-term, flexible funding to the Bonneville Environmental Foundation's Model Watershed Program, which works with local partners to revitalize critical ecosystems through community-supported approaches.[22] Replicating the results of these programs and overarching policies elsewhere would be difficult without similar funding.

The history of water banks across the West also highlights the importance of financial support to program success. There are banks that trade water for water and those that trade water for dollars (providing water in one location or at one time for a fee that is used to buy water for mitigation or compensation). The costs and the sources of funding for each vary, but both types need money to function. In Washington, the Dungeness Water Exchange sells certificates to new water users in eastern Clallam County to offset their water usage, facilitating compliance with the Dungeness Water Resources Management Rule. The money from the certificate is used to purchase water from willing sellers and return it to the river, as well as to do shallow aquifer recharge projects that improve low-flow conditions.[23] Over time, the Exchange aspires to be self-sufficient, with the cost of the certificates covering the cost of the water needed to mitigate the new usage and cover administrative fees, but startup of the Exchange relied entirely on state grant funds.

In contrast, the Idaho State Water Supply Bank trades water for water. The water right holder deposits the right with the bank, and if the right is leased, the lessor receives 90% of the lease price while 10% goes to administrative fees.[24] In 2011, the Idaho Legislature approved a $250 lease application fee. In 2012, the bank rented over 15,000 acre-feet of water and received over $136,000 in fees, easily covering its roughly $90,000 of operating costs.[25] Also in Idaho, individual water districts run water banks for the rental of "storage water" (as opposed to natural flow water, which is the focus of the State Water Supply Bank). Price is determined by the individual water districts, but must include a 10% payment to the Idaho Water Resource Board and a certain sum paid to the water master of the water district for administrative fees in running the storage bank.

B. Cost Relative to Alternatives

A basic question when developing any water program or policy is how much it will cost as compared to alternatives. How much does procuring a gallon of water cost from one source rather than another? How much does a transaction cost through one means relative to another? How much does stream restoration cost via one method as compared

20. Bonneville Power Administration, About Us, *available at* http://www.bpa.gov/news/AboutUs/Pages/default.aspx.
21. Bonneville Power Administration, Fish & Wildlife: Columbia Basin Water Transactions Program, *available at* http://efw.bpa.gov/IntegratedFWP/Water%20Transactions.pdf.
22. Bonneville Environmental Foundation, Model Watershed Program: Our Partners, *available at* http://watersheds.b-e-f.org/our-partners/.
23. Washington Water Trust, Water Exchange, *available at* http://www.washingtonwatertrust.org/water-exchange.
24. Peggy Clifford et al., Wash. Dept. of Ecology, Analysis of Water Banks in the Western States 64 (2004).
25. Idaho Department of Water Resources, Annual Report 2012 (2013), *available at* http://www.idwr.idaho.gov/WaterManagement/WaterRights/waterSupply/pdfs/2012%20annual%20report.pdf.

to another? A program or policy has a greater chance of practical success if the actions it allows, promotes, or facilitates are the cheapest way to achieve a goal, or at least are close in price.

Good examples of the role of relative cost in program and policy success can be found in efforts to develop innovative water supplies. One way in which California supports desalination and water reclamation and reuse is by allowing the use of water from these sources in lieu of water from other sources under existing rights. Specifically, failure to use water under existing rights normally risks forfeiting the unused portion of the right, but California does not subject unused rights to forfeiture if the right holder instead is using desalinated or reclaimed water.[26] While this policy removes a concern about using desalinated or reclaimed water in lieu of water from another source, it has had little effect in practice. A significant reason why is cost. The treatment necessary for potable reuse and desalination, as well as for nonpotable reuse and the separate "purple pipe" distribution infrastructure needed, is expensive—commonly far more expensive than conveying and treating water from surface and groundwater sources under existing rights. However, if water reclamation or desalination would be used to *supplement* rather than *replace* existing water supplies, the comparable alternatives would be other sources of supply, such as reducing consumptive use or purchasing or leasing water from agricultural lands, not continuing existing withdrawals. In water-strapped areas such as southern California, desalination and reclamation and reuse can be cheaper than other sources of "new" supply, but generally not cheaper than supplies under existing rights.

C. Economic Effects

The success of a western water policy or program also can depend on its effect on the economy as a whole. As explained in the Western Governors' Association's 2012 "Water Transfers in the West" report, these effects can be "*direct*, regarding a change in on-farm income; *indirect*, such as effects to a tractor salesman whose customer base shrinks; or *induced*, such as effects to a waitress who receives fewer tips as the community's economy weakens."[27] All three types of economic effects are important to predict and consider, since any of them may be substantial enough to generate sufficient opposition to block a policy or program or make it ineffective.

Part of the success of the revered agricultural water leasing program between the PVID and the MWD in California stems from its ability to address negative economic externalities. Between 1992 and 1994, the two districts conducted a pilot project that transferred roughly 115,000 acre-feet of water per year from the PVID to the MWD. The MWD paid the farmers a total of 25 million dollars for the leases, but reportedly 52 full-time agricultural jobs were temporarily lost, and farm-related services lost approximately $4 million.[28] In 2004, the districts signed a 35-year agreement, providing water to the MWD through rotational fallowing of up to 29% of the agricultural acres in the Palo Verde Valley each year. Learning from the pilot project, the MWD established a $6 million Palo Verde Valley Community Improvement Fund in addition to the lease payments to farmers. The fund, managed by a volunteer local board, is intended to mitigate the economic and community impacts of the water transfer and has invested in workforce training, provided loans to businesses in the Valley, and developed community resources.[29]

In the market context of prior appropriation, a new policy or program can affect the economic underpinnings of existing policies and programs. For example, in 2007, Montana adopted a new groundwater use and storage policy, requiring replacement of pumped groundwater or mitigation of the hydrologic effects of that withdrawal when newly appropriating groundwater in a closed basin. To accommodate this new requirement, the legislature added "aquifer recharge or mitigation" as a legal beneficial use of surface water,[30] increasing the flexibility of water use and promoting responsible coordination of surface and groundwater. This additional use of surface water has the potential to raise the value of surface water rights by increasing the sources of demand on an already overtaxed supply. The higher value of water can mean greater financial incentives for improving water use efficiency, possibly making state policies and programs focused on water conservation function better. But the higher value also may hinder some policies and programs that rely on water leases, sales, and/or donations for success. There is some concern among the state's environmental community that adding aquifer recharge and mitigation to the list of approved uses of water will limit the effectiveness of instream flow programs.

IV. Law

State and federal statutes and regulations, as well as judicial decisions and local ordinances, can directly and indirectly influence the success of water policies and programs. Policies commonly are reflected in law, and programs can be authorized or otherwise made possible through laws. What are the noted objectives? Who has what authorities? Where and when does the policy or program apply? Equally important, the framework of other laws, including the remainder of the water code, environmental protections, and tax laws, can create incentives and disincentives, dictate flexibility in application, and even effectively block implementation. In law, subtle differences from one jurisdiction to another can drastically alter the basis for policy and program success,

26. Cal. Water Code §1010(a)(1).
27. Western Governors' Association & Western States Water Council, Water Transfers in the West 23 (2012).
28. M. Cubed, Regional Economic Impacts of the Palo Verde Test Land Fallowing Program 11, 19 (1994).
29. Western Governors' Association & Western States Water Council, Water Transfers in the West 53 (2012).
30. *See* Mont. Code Ann. §85-2-102(4).

and slight language variations within a given legal framework can determine eventual effectiveness.

A. *The Composition of the Enacting Laws*

The language, structure, and type of law chosen to reflect a policy or to establish the foundation of a program are key to its success. The crafting of incentives and mandates should consider the means by which the intended objectives will be achieved, particularly in light of social, economic, physical, and legal factors and the realities of enforcement. The better the law is tailored to foreseeable circumstances, the greater its chance of success. Likewise, when adapting policies and programs implemented elsewhere, one must analyze the language used, what it meant in the circumstances in which it was applied, and the similarities and differences of those circumstances to one's own. Just as new ideas need to be tailored, borrowed ones likely will need to be as well.

Texas has the policy of allowing "nonuse" of a water right without cancellation if, among other circumstances, "the permit, certified filing, or certificate of adjudication has been reserved to provide for instream flows or bay and estuary inflows."[31] But this statute has had limited practical effect. First, the statute does not guarantee that reservation for instream flows always will be a justified nonuse; instead, it merely requires that the Texas Natural Resource Conservation Commission give consideration to such a reservation when determining whether the nonuse is justified. Thus, the statute does not supply the assurance that right holders likely would want before taking such a step. Second, this statute applies only in the case of cancellation hearings, and cancellation is not often enforced in Texas. If this provision is intended to provide incentive for reserving rights for instream flows, it is not leveraging a particularly powerful force. In 2007, the Texas Legislature "determined that existing water rights that are amended to authorize use for environmental purposes should be enforced in a manner consistent with the enforcement of water rights for other purposes,"[32] potentially providing incentives and assurances that the cancellation statute alone does not.

B. *The Interaction of the Policy or Program With Other Laws*

How or whether to craft foundational laws for policies and programs is just the beginning; the rest of the statutory and regulatory codes and judicial decisions also influence success. When developing a new program or policy or adapting one from another jurisdiction, existing prohibitions, exemptions, permitted actions, etc., establish a framework of legal incentives and disincentives. Correctly predicting these influences, capitalizing on the incentives, and avoiding or amending the disincentives goes a long way to improving the likelihood of success.

The Idaho State Water Supply Bank (see *Financial Support* above for more details) offers a prime example of the support that law can provide. The bank has been very effective, particularly for short-term leases and rentals, in some cases with nearly seamless day-to-day transfers. This success has been widely attributed to a forfeiture exemption for deposited water rights. Codifying the existing understanding that a water right deposited in a water bank qualifies for the forfeiture exemption (whether it is rented or not), the Idaho Legislature amended the law in 2002.[33] As a result, right holders often use the bank to protect from forfeiture the portion of their natural flow rights that are in excess of what they need. Thus, the forfeiture exemption simultaneously reduces a barrier to using the bank, establishes an incentive for participating, and promotes saving water for dry periods and transferring it to the uses for which it is most needed.

But law also can hinder policy and program success. Unlike most western states, California still requires a physical diversion in order to appropriate water.[34] This requirement effectively prohibits the appropriation of new water rights for instream flow purposes. While it has little practical impact on fully allocated streams and rivers where no opportunities for additional allocations remain, the requirement removes a tool that has proven useful in other states to protect water bodies that are not fully allocated from further degradation. Consequently, all instream flow protection and restoration efforts must rely only on changing the use of existing rights, since those rights were perfected with a quantified diversion.

C. *The Clarity of the Laws and Water Rights*

Just as the amount of detail provided in enacting legislation can influence the effectiveness of a policy or program, the uncertainties in other laws and even water rights themselves can affect policy and program outcomes. The less certainty there is that a particular benefit will accrue or protection will be bestowed after a given action, the less incentive there is to undertake that action. The less that is known about a commodity, such as a water right, being sold or leased, the greater the expense of the transaction or the less valuable the commodity. While a lack of clarity can provide flexibility in implementing laws and hence can be a valuable trait in certain circumstances, it also creates risk, which in other circumstances can hinder a policy or program.

As demonstrated in several of the examples above, legal specificity can improve confidence and participation in what already had been common practice. Perhaps most to the point, the Colorado Water Conservation Board had entered into agreements allowing it to use all or part of a water right for instream use before 2008, and common interpretation of the law was that such a contract did not subject a water right to abandonment. Nonetheless, in that

31. Tex. Water Code Ann. §11.177(b).
32. Tex. Water Code Ann. §11.0235.
33. *See* Idaho Code §42-223(5).
34. *See* Cal. Water Code §1260.

year, the Colorado Legislature amended the definition of abandonment to explicitly exempt water rights subject to a contract with the Board.[35] The resulting legal clarity has eased the concerns of some water right holders contemplating this option, and thus aided the Board's instream flow program.

Water right transactions, particularly permanent ones, usually involve substantial process prior to approval, hence time and money. The primary reason is the "no injury" rule and the typical uncertainty surrounding the water right(s) at issue. Determining the historic consumptive use and ensuring that changing the place of use will not injure other water right holders is a scientifically intensive process. Transactions often are easier in basins that are adjudicated because a court has resolved who has a valid water right, how much water can be used, and who has priority during shortages. The fact that the Yakima River Basin is adjudicated has simplified the processing of transaction applications by the Yakima WTWG (see *Civic Engagement* above for more details).

V. Administrative Capacity

Last, but not least, is administrative capacity. The ability of government to execute its legal responsibilities and otherwise support the efforts of others often influences how successful a water policy or program will be. Do agencies have sufficient authority to carry out their mandate? If more than one division or agency is involved, can they collaborate effectively? Does government have enough staff with the skill, experience, and commitment to turn policy into practice and make programs function? Are the necessary data available and readily accessible? Ultimately, is government robust and flexible enough to adapt to changing conditions? The speed, accuracy, and manner in which the executive and legislative branches operate can dictate what is possible.

A. Authorities

Likely the most critical aspect of administrative capacity is the authority to do what needs to be done. Authority requires both breadth and depth, covering a sufficient geographic and topical range in a sufficient level of detail to effectively contribute to implementation of the policy or program at issue. Placing all of this authority in one institution often is simplest for implementation purposes. If that is not possible, the issue becomes whether all the relevant institutions together have sufficient authorities to create incentives, plan, permit, enforce, and undertake any other needed roles, and whether the institutions can work together to make those authorities effective in practice. Authorities can be developed and adjusted to best suit a policy or program, or vice versa. Regardless, authorities are an important consideration when developing a new program or policy, and even more so when adapting one, as the types and distribution of authorities may have had much to do with success in the original location.

For example, the C-BT Project's (see *Infrastructure* above for more details) water transactions program has benefitted greatly from the depth and geographic breadth of the Northern Colorado Water Conservancy District's authority. The fact that this district single-handedly allocates the end-use of C-BT water is a significant reason for the simplicity of the transactions: one entity sets and implements the transactions rules. In addition, the district includes both agricultural and urban users, often the sellers/lessors and buyers/lessees, respectively. These two circumstances allow the Northern Colorado Water Conservancy District to work relatively independently of extra-district water interests and to create an environment for highly efficient and adaptable decisionmaking focused on meeting the program's local goals. As a result, the water transactions program can operate with little process and thus at a relatively low cost.[36]

B. Staffing

The number and ability of staffers also plays an important role in an institution's capacity to perform tasks, and hence to contribute to policy and program success. Without enough people with the necessary skills and time to do what is expected, implementation of the policy or program will be slowed if not made completely ineffective. And while numbers certainly are a critical consideration, who those individuals are may be even more vital. Experience, connections, motivations, and personalities matter. A staff member may be a leader, innovator, or unique facilitator who is difficult to replace, or, in another institution, to find or imitate. Staff numbers and ability are connected to funding and hence to factor three, economics.

The importance of staff and the connection with funding are well-demonstrated by the history of Alaska's water reservation program. Under Alaska law, any person may reserve water for an instream flow purpose.[37] The Alaska Department of Natural Resources (DNR) is tasked with reviewing applications for water reservations, and the Alaska Department of Fish and Game (ADF&G) has been the primary applicant for such reservations across the program's history.[38] From 1992 to 2002, the DNR did not grant a single one of ADF&G's water reservation applications, despite dozens of applications during that period (and with dozens more from before that period not reviewed).[39] In 2002, the two agencies entered into a formal agreement that guided their collaborative activities. It included partial funding by the ADF&G of two positions, an adjudicator and a hydrologist, at the DNR.

35. *See* Colo. Rev. Stat. §37-92-103(2).

36. Janis M. Carey & David L. Sunding, *Emerging Markets in Water: A Comparative Institutional Analysis of the Central Valley and Colorado-Big Thompson Projects*, 41 Nat. Resources J. 283, 298 (2001).

37. Alaska Stat. §46.15.145.

38. *See, e.g.*, Joe Klein, Instream Flow Protection in Alaska, 1999-2009 28 (2011).

39. *See id.* at 24.

As a result, the DNR was able to grant 17 of ADF&G's pending applications between 2003 and 2009, a significant improvement.[40]

C. Data Collection and Management

Most water policies and programs need good information to succeed. Flow monitoring is important for instream flow protection and restoration programs; water banks rely on accurate accounting of deposits and withdrawals as well as estimated losses during storage; and leases and sales often require hydrologic data and historical use and weather information to determine historic consumptive use. In addition, some general management strategies, such as adaptive management, require data on the effects of the program itself. Not only must data collection be adequate, but so too its management: it should be compiled in a logical and useful format and available on an accessible yet secure system. When adapting an existing policy or program to a new location, it is important to consider the data resources available in the original location and the effect they had on success. Whether adapting or developing a program or policy, critical considerations include whether the necessary data and trained staff are available, and if not, what resources will be necessary to adequately collect and manage the necessary data.

The Washington Department of Ecology manages over 230,000 water right and claim records throughout the state, many of which originated in the late 1800s. In the past, obtaining detail about a water right required placing an official public records request or calling a Department staff member to look up the record. The Department's new "Water Rights Web Map" allows easy digital access to water rights records by location, record number, or the name of the person to whom the water right was issued.[41] This data management system has benefitted a number of water programs by simplifying one aspect of the process for consumers and saving the staff of the Department of Ecology considerable time and resources.

The Idaho State Water Supply Bank (see *Financial Support* above for more details) offers two examples of improved data management. Demands on the bank's recordkeeping and staffing resources have increased as use of the bank has risen. From 2011 to 2012, the volume of rented water nearly doubled and the number of rental agreements increased by 25%.[42] To address this administrative pressure, the bank implemented a geographic information system-based data management system in 2012 to store and share bank rental data. In addition, bank staff changed the way that data on rental payments are entered into their system. By assigning a separate code to each part of a rental fee, fiscal and bank staff can more easily analyze the data, ultimately resulting in more streamlined payments to lessors.[43]

D. Adaptability

The long-term success of any policy or program is a function of its ability to adapt to changing circumstances. The western water context certainly is no different, particularly in light of increasing water demands and greater uncertainty in supply. But in addition to physical changes, water policies and programs may need to adapt to political changes, such as a new governor or control of the legislature switching parties; administrative changes, such as the restructuring of an agency; technological changes, such as improvements in satellite monitoring; and legal changes, such as an influential court decision or the passage of a new city ordinance. Circumstances can change rapidly, and so the most successful programs tend to be those that are designed and implemented with adaptability in mind.

The highly regarded agricultural water leasing program between the PVID and the MWD in California (see *Economic Effects* above for more details) has succeeded over the years in large part because of its ability to easily adapt to year-to-year variation in water availability. In 2004, the two parties entered into a 35-year agreement that annually supplies the MWD with water resulting from land-fallowing and crop rotation on PVID farms.[44] The amount of water transferred to the MWD each year depends on MWD's demands, but within set limits. Under the agreement, the MWD agreed to pay farmers to fallow between 6,000 and 26,500 acres annually, depending upon southern California's water supply needs, a range of 7 to 29% of total PVID farmland acreage or roughly 29,500 to 118,000 acre-feet of water.[45] The agreement also sets a minimum and maximum percentage of land that may be fallowed per farm. In addition to regulated flexibility in volume, the amount the MWD pays annually to the PVID for its administrative costs varies, and annual payments to farmers per fallowed acre adjust for inflation.[46]

40. *See id.*; Christopher Estes, ADF&G Instream Flow and Lake Level (Reservation of Water) Protection Report 54 (2009).
41. Washington Department of Ecology, Water Resources Explorer, http://www.ecy.wa.gov/programs/wr/info/webmap.html (last visited Apr. 24, 2014).
42. Idaho Department of Water Resources, Annual Report 2012 1 (2013), *available at* http://www.idwr.idaho.gov/WaterManagement/WaterRights/waterSupply/pdfs/2012%20annual%20report.pdf.
43. *See id.* at 3.
44. Metropolitan Water District of Southern California, Palo Verde Land Management, Crop Rotation and Water Supply Program . . . at a Glance, *available at* http://www.mwdh2o.com/mwdh2o/pages/news/at_a_glance/Palo-Verde-fact-Sheet.pdf.
45. *Id.*; Western Governors' Association & Western States Water Council, Water Transfers in the West 52 (2012). In 2009 and 2010, the MWD and the PVID did negotiate a one-year (fiscal year) supplemental program to provide water to the MWD in addition to that contemplated in the agreement in light of the drought conditions.
46. Metropolitan Water District of Southern California, Palo Verde Land Management, Crop Rotation and Water Supply Program . . . at a Glance, *available at* http://www.mwdh2o.com/mwdh2o/pages/news/at_a_glance/Palo-Verde-fact-Sheet.pdf.

VI. Conclusion

Water management is challenging. Facilitating the distribution of a resource that is so vital to so many requires attention to a wide range of details. How will outside influences affect the outcome of a water policy or program? How will a policy or program affect outside influences? Predictions will never be perfect, but to have the best chance of achieving the ends sought, these factors must be considered, predictions made, and the policy or program selected and adapted or developed from scratch accordingly.