

# BRIDGING THE GOVERNANCE GAP



# STRATEGIES TO INTEGRATE WATER AND LAND USE PLANNING

Public Policy Research Institute  
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COLLABORATIVE GOVERNANCE REPORT 2



*"Serving Western Legislatures"*

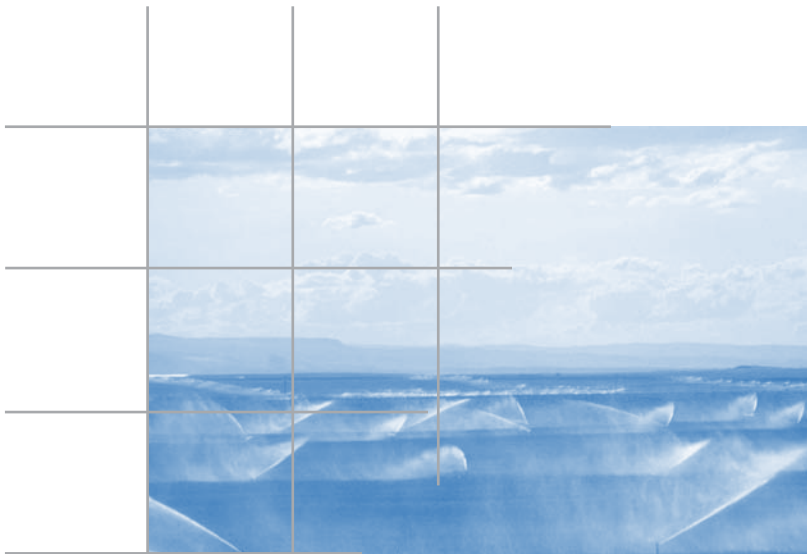


We applaud the Public Policy Research Institute's examination of the critical linkages between land use and water planning, particularly in the fast-growing American West. Increasingly, leaders in this challenging landscape must consider how to guide development to ensure sustainable use of our limited water resources. We urge readers to consider the issues described in this policy report and to work together to develop new policies and practices to more meaningfully integrate land use and water planning.

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*Bridging the Governance Gap: Strategies to  
Integrate Water and Land Use Planning*

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THE UNIVERSITY OF MONTANA

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## P R E F A C E

The mission of the Public Policy Research Institute is to promote sustainable communities and landscapes through collaborative governance. To help achieve this mission, the Institute produces Collaborative Governance Reports to build and share knowledge on alternative ways to prevent and resolve natural resources disputes. To ensure that the Reports are relevant, the Institute partners with appropriate organizations involved in formulating, administering, and otherwise influencing public policy.

This report, *Bridging the Governance Gap: Strategies to Integrate Water and Land Use Planning*, builds on work done in partnership with a number of organizations. Institute staff presented preliminary findings on this subject to the 2005 annual meeting of the American Planning Association, the Nevada Chapter of the American Planning Association, a senior executive seminar for land use and planning leaders in the West sponsored by the Lincoln Institute of Land Policy, the Council of State Governments-*WEST* (the association of western state legislators), the annual Public Land Law conference at the University of Montana, and a conference on growth and planning organized by the Ruckelshaus Institute of Environment and Natural Resources at the University of Wyoming.

The Institute has also discussed these issues with leaders of the Western Governors Association, the Western Planning Association, and the Western Interstate Region of the National Association of Counties.

While this report does not represent official policy of any of these organizations, the Institute's research has benefited a great deal from participating in the ongoing dialogue about this important topic, and it is hoped that this report will further enrich the discussion.

While much of the public attention to population growth and water supply issues focuses on the western United States, this report recognizes that the disconnect between land use and water planning affects communities throughout the country. We hope this report helps people better understand that disconnect so they can integrate land use and water planning in their communities.

Thanks to Douglas Kenney, Dan Tarlock, Lora Lucero, and Scott Coulson for their valuable help in developing the ideas described here and for reviewing earlier drafts of this report. A different and more detailed treatment of the subject appears in the 2006 issue of *Public Land & Resources Law Review*, included in the list of resources at the end of this report.

# INTRODUCTION: THE GOVERNANCE GAP

Historically, land use and water planning have occurred separately from one another in most parts of the United States. Water is allocated by state agencies, and land use planning is done by local officials. Water resource managers juggle many competing demands within a watershed, and they tend to focus on encouraging economic development. In turn, local land use authorities have safely assumed that water would be available to satisfy continued growth.

Increasingly, however, local land use decisions run headlong into water supply concerns.

In some cases, existing uses are depleting finite water supplies, raising questions about their future reliability. For example, in some fast-growing rural areas of Arizona, recently constructed houses draw their water from wells that the state engineer's office has certified as "not reliable" due to insufficient underground supplies. Some new homeowners did not realize the tenuous nature of their water supplies and have been forced to construct cisterns and pay for trucked-in water for their domestic use.

Elsewhere, officials are beginning to face the high social, environmental, and economic costs of obtaining water to meet rising urban demands. Hypothetically, the vast quantities of water already developed for irrigated agriculture could satisfy virtually all projected domestic needs.<sup>1</sup> Indeed, urban growth around Phoenix, Denver, and Boise has been fueled by voluntary, market-based reallocation of water from farms to cities, which will continue

in the future. But public outcry over Las Vegas' long reach into rural Nevada may indicate renewed concerns over the impacts of large-scale water transfers, both on the rural communities from which the water is taken and on the pocketbooks of the consumers receiving it.

**This report describes the problem as a "governance gap"—a lack of integration in decision making processes and a failure to examine and communicate the consequences of both land use and water decisions at various levels of government.**

Although water itself will not likely provide a hard barrier to growth except in isolated cases, the failure to connect land use and water planning may have far-reaching and increasingly unacceptable consequences throughout the country. This report describes the problem as a

"governance gap"—a lack of integration in decision making processes and a failure to examine and communicate the consequences of both land use and water decisions at various levels of government.

This report provides background on the governance gap between water and land use planning, summarizes emerging strategies to better integrate the two, and suggests options to improve land use and water governance to address the pressures of growth while ensuring sustainable water supplies for the future.

## A SHIFTING LANDSCAPE

Water and land use decisions take place within the context of a landscape that is dynamic in every sense. Dramatic changes in population growth patterns and lifestyle choices bring new and different demands for (and impacts on) land and water. Moreover, heightened public concerns about the consequences of land and water decisions have resulted in new laws that require additional

<sup>1</sup> See, e.g., Reisner & Bates, *Overtapped Oasis* at 112-115, in the Resources section at the end of this report.

disclosure and protective measures. Understanding these factors is an important first step in appreciating governance challenges and the need for more integrated land and water strategies in the future.

People are drawn to scenic, warm parts of the country. As demonstrated by information gathered in the U.S. Census, most of the fastest growing metropolitan areas are those with the most limited water supplies (see box below<sup>2</sup>). So far, lack of water has not prevented any urban areas from expanding, but cities such as Las Vegas face formidable physical and political obstacles in their continuing efforts to meet future demands. Moreover, despite high-profile urban conservation programs, the trend is toward higher per-capita water use, largely due to highly consumptive landscaping around suburban homes and office parks.

**Fastest-Growing Metropolitan Statistical Areas in U.S., 2000-2003**

Greeley, CO (16.8% change)  
St. George, UT (15.2%)  
Las Vegas-Paradise, NV (14.6%)  
Naples-Marco Island, FL (14%)  
Stockton, CA (12.3%)  
Bend, OR (12.2%)  
Gainesville, GA (12.1%)  
Riverside-San Bernardino-Ontario, CA (11.9%)  
Cape Coral-Ft. Myers, FL (11.6%)  
McAllen-Edinburg-Pharr, TX (11.6%)

At the same time, public attitudes toward water and the environment have shifted dramatically in recent decades. Historically, the federal government subsidized water supplies, especially in the West. Federal budget restraints have lessened the federal role, expanding both

**In general, water planning is subordinated to land use planning. That is, water planners seek to obtain water to meet the demands of expected population growth; local land use planners do not constrain development in response to limited water supplies.**

the responsibilities and costs borne by states and local governments. Increasingly, environmental costs are factored into water supply decisions as well, making it more difficult to rely on new infrastructure alone to solve water supply challenges.

Facing these dual challenges, cities are turning to the market to purchase water already developed for agricultural irrigation, or are investing in conservation and wastewater re-use technology. Some cities in coastal areas are exploring options for desalination of ocean water. The search for “new” water is no longer limited to looking upstream for a suitable dam site, or drilling a deeper well.

Complicating the water supply picture, global climate change offers a new set of challenges to water supply planners. For example, western states may see decreased snowpacks and earlier runoff, making it difficult to meet water demands in the dry summer and fall months. Legal frameworks currently in place to allocate resources in interstate river basins lack the flexibility necessary to deal with such large-scale changes in baseline environmental conditions.

## **WATER AND LAND USE PLANNING: THE HISTORICAL DISCONNECT**

The fundamental disconnect between water and land use planning arises from the separate legal bases for each area of governance. Water allocation is primarily the responsibility of state governments, while land use planning is within the authority of local officials. In general, water planning is subordinated to land use planning. That is, water planners seek to obtain water to meet the demands of

<sup>2</sup> See U.S. Census Bureau, Population Estimates (July 1, 2005), included in the Resources section.

expected population growth; local land use planners do not constrain development in response to limited water supplies. It is important to understand these distinct legal authorities before considering options to bring the two closer together.

## **WATER: MANAGED BY THE STATES, DISTRIBUTED LOCALLY**

Historically, states have taken the lead in water allocation and management. Distinct rules for water allocation in the eastern and western states reflect different precipitation levels, land use patterns, and geopolitical traditions. Eastern states adopted the riparian rights approach, a rule based on shared use of streamflows by owners of adjacent lands. In the drier western states, a rule based on the principle of “first come-first served” developed into what is now known as the prior appropriation doctrine. Importantly, the prior appropriation doctrine separates water rights from land ownership. A few states retain a combination of these two principles, sometimes called a hybrid system of water rights.<sup>3</sup>

State water administrators preside over complex systems of water rights, in some cases lacking full quantification of thousands of water claims. Federal agencies and tribal governments participate in the state administrative regimes through their assertion of reserved water rights—claims that date back to the establishment of national forests, national parks, and other federal withdrawals, as well as the creation of Indian reservations through treaty negotiations.

Groundwater remains a far less regulated resource than surface water, although again its use is under the authority of state water management agencies. In many cases, groundwater is available for use by overlying landowners, through what is basically a rule of capture. Some states have developed rules

that recognize the shared nature of groundwater, and impose limits on groundwater pumping aimed at limiting the impact on other users. Many states require that “tributary” groundwater (hydrologically connected to a stream or other surface water) be managed as part of the surface water rights system. But proving such a connection can be difficult, given the complex geology of most aquifers.

In most cases, private domestic wells are exempt from any state controls, other than a requirement that the state be notified when a well is drilled. This lack of regulation—and, frequently, lack of information about the extent of groundwater extraction—is becoming a problem in rapidly growing rural and exurban areas throughout the country. In some cases, counties approve low-density housing developments in areas with limited or declining water tables, leaving homeowners with the expensive proposition of deepening their wells or installing cisterns and paying for water delivery.

State agencies responsible for water resource allocation often engage in planning efforts to ensure long-term supplies for their residents. They have historically focused on maximizing their residents’ access to water supplies and fostering economic development. State water planning seldom considers the value choices raised by competing demands for water or allows for dialogue about the desired future conditions of public resources affected by water use.

Some states do not conduct statewide water planning at all. Maryland, for example, leaves long-term water supply planning to its river basin commissions, which cover only portions of the state.

Importantly, many critical water decisions occur at the local level, as municipal and regional water suppliers seek and hold water rights that enable them to ensure consistent deliveries into the future. While state agencies may be responsible for large-scale planning, the long-range plans of these local

<sup>3</sup> This summary provides only the barest introduction to the complex administration of water rights. For more information, see Bates, et al., *Searching Out the Headwaters: Change and Rediscovery in Western Water Policy*, in the Resources section.

water suppliers play a key role in determining where water will come from and where it will be used in the future.<sup>4</sup>

## LAND USE: A LOCAL CONCERN

In contrast with water rights administration, land use decisions occur at the local level, though often under the guidance of state law. A community's long-term vision is set out in its comprehensive (or general) plan, a policy document intended to guide specific land use decisions in the future. The comprehensive plan thus provides a blueprint for growth, defining the parameters within which development should be allowed and articulating priorities for community amenities. Unlike water law, land use planning explicitly embraces public values beyond a single resource use. Land use regulations significantly restrict the exercise of private property rights in favor of benefiting the public interests identified in a comprehensive plan and in other public documents.

Several aspects of a typical comprehensive plan relate closely to water planning. First, the plan typically assumes full build-out of available land in predicting population numbers, which are in turn used by water suppliers to forecast future demands. Second, the comprehensive plan includes a water infrastructure element, looking at the facilities necessary to serve projected development.

The comprehensive plan is implemented through land use decisions specific to particular areas and proposed developments. Typically a development permit is conditioned on a certification of water availability, which may be issued by the local

**Land use planning should be mindful of water supply constraints, and should prioritize development that is most consistent with maintaining water quality and ensuring sustainable supplies.**

utility or a state agency administering water rights. Such bare certification typically does not consider the source of new water or the impacts of moving it to a new use.

Moreover, in many places development is allowed even in the face of uncertain water supplies. For example, Arizona's biggest cities have highly regulated "Active Management Areas." But outside of these areas, many fast-growing communities allow development to continue even though groundwater supplies are documented as insufficient to serve their domestic wells.

## POLICY OPTIONS TO BUILD LINKAGES

Despite the obvious relationship between land use decisions and water supply planning, the separate institutions governing each have proven difficult to integrate. This section articulates a vision of integration and then describes some promising measures now emerging throughout the country to bridge this persistent governance gap.

## A VISION FOR LINKING LAND USE AND WATER

Ideally, every major land use decision would include consideration of where the necessary water would come from, and at what cost (economic, environmental, and social). Land use planning would be mindful of water supply constraints, and would prioritize development that is most consistent with maintaining water quality and ensuring sustainable supplies.

<sup>4</sup>See the comparative analysis of Maryland, Florida, New Jersey, and Oregon in Cohen, *Water Supply as a Factor in Local Growth Management Planning in the U.S.*, in the Resources section.



For their part, water planning and development decisions would acknowledge that infrastructure availability often sparks growth (“build it and they will come”), and thus would incorporate deliberative public dialogue about long-term land use priorities. Water suppliers would place a premium on making the best use of limited resources, minimizing demands, and ensuring that the impacts of water development on highly valued landscapes are acknowledged and taken into account before final decisions are made.

How close are we to realizing this vision? Consider some examples from around the country, most notably from the rapidly growing and water-stressed cities in the Southwest and in Florida. These may be viewed as a continuum of options, ranging from the most fully integrated approaches, in which land and water decisions are linked explicitly to one another, to improved institutions for making land use and water decisions in their separate realms of governance.

## **WATER-CONSCIOUS LAND-USE PLANNING**

### **•WATER AVAILABILITY REVIEW**

Before approving proposed development, some states and municipalities require an examination of whether projected water demands can be met by available supplies.

In California, for example, two laws enacted in 2001 require: (1) written verification of the availability of water before cities and counties may approve subdivisions of 500 or more units; and (2) assessment of water supply for large residential, commercial, and industrial developments, as part of the environmental impact reports prepared under the California Environmental Quality Act.<sup>5</sup>

Arizona<sup>6</sup> requires “assured water supply” evaluations, although this applies only in the designated Active Management Areas encompassing the state’s largest urban areas. New Jersey, like many states, simply requires that development

approval be conditioned on a determination of adequate water supply, but provides no definition of “adequacy.”<sup>7</sup>

Florida requires each municipality to adopt a 10-year Water Supply Facilities Work Plan, which must project the local government’s needs for at least a 10-year period, identify and prioritize the water supply facilities and source(s) of water that will be needed to meet those needs, and include capital improvements identified as needed for the first 5 years.<sup>8</sup> This “concurrency” review requirement effectively integrates land use and water supply planning, although it does not impose as strict an evaluation or balancing requirement as the California model.

State legislatures could facilitate integrated water and land use planning by strengthening the requirements for a water resources element in comprehensive plans. For example, they might require that such plans identify the known supplies of water for future development, quantify the demand that would result from projected population growth, and analyze how demand will be met by available supplies (or what additional water will have to be obtained). This level of analysis at the broader planning stage may prove more useful than asking for assurances that water is immediately available once a particular development is under consideration. It would be particularly useful if land use planners worked in close cooperation with water planners in this exercise in long-term thinking.

<sup>5</sup> Cal. Govt. Code Sec. 66473.7. The California Supreme Court recently articulated guidelines for water adequacy analysis in *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (Feb. 1, 2007). Importantly, the Court clarified that this is a disclosure requirement rather than a mandate that water definitely be available; CEQA is satisfied if the Environmental Impact Report fully explains the long-term supply uncertainties and analyzes the impacts of obtaining water and potential mitigation measures to address these impacts.

<sup>6</sup> See Ariz. Rev. Stat. § 45-401 et seq. (1980 Groundwater Management Act) and the implementing regulations at Ariz. Dep. of Water Resources, R. 12-15-703(b) (Feb. 7, 1995).

<sup>7</sup> New Jersey’s program is described in Cohen, “Water Supply as a Factor in Local Growth Management Planning,” included in the Resources section.

<sup>8</sup> Florida’s program is described in Cohen, “Water Supply as a Factor in Local Growth Management Planning,” in the Resources section.

Water adequacy issues also arise when municipal growth outruns available water supplies or the infrastructure to deliver water to new users. In some instances, local governments have taken measures to limit new development when faced with inadequate water supplies.

Pima County, Arizona, for example, has proposed a new approach for looking at development proposals in the fast-growing suburbs around Tucson. Presently, the county considers a proposed development's impacts on neighboring wells and the environment only after rezoning is approved—leaving little room to stop or limit the development. Under a new proposed policy, the county would examine these impacts at the earliest stage in the process, when considering a rezoning or comprehensive plan amendment proposal.<sup>9</sup>

Courts have upheld temporary growth moratoria when services (infrastructure) are not available to deliver water to meet projected demands.<sup>10</sup> Generally speaking, however, limited water availability seldom restricts urban growth.

#### •CONSISTENCY REVIEW

Integrated water and land use planning may require changes in state law to require a meaningful “consistency” review as part of the land-use decision process. In other words, when local decision makers consider a proposed development, they would not only take into account the reliability of available water, but would also look at whether the steps that would be necessary to obtain that water would be consistent with other land use and environmental laws and policies. Such a review would include laws and policies governing endangered species, water

quality, open space protection, and instream flow programs.<sup>11</sup>

New Mexico appears to be moving in this direction. In the spring of 2006, the State Engineer's Office proposed new rules for domestic well permits that would give the State Engineer the power to refuse to issue a permit or to approve a permit with conditions. Although the proposed rules don't use the word “consistency,” they provide that if a city or county enacts more stringent water regulations that impact domestic wells, the State Engineer's Office will defer to the more stringent local regulations.<sup>12</sup>

Consistency review places a single land use decision into its larger social and environmental context, to prevent surprises, and to ensure that overarching public priorities are not consigned to “death by a thousand cuts.”



<sup>9</sup> Erica Meltzer, “New Water Policy May Curb Homes on Fringes,” *Arizona Daily Star* (Dec. 13, 2006).

<sup>10</sup> For a detailed discussion of the legal issues raised by growth limits and moratoria, see Tarlock and Van de Wetering, “Western Growth and Sustainable Water Use,” in the Resources section.

<sup>11</sup> For a detailed description of the consistency doctrine, see Tarlock and Lucero, “Connecting Land, Water, and Growth,” in the Resources section.

<sup>12</sup> See [http://www.ose.state.nm.us/water\\_info\\_rights\\_rules\\_domestic\\_wells.html](http://www.ose.state.nm.us/water_info_rights_rules_domestic_wells.html)

## •WATERSHED-SENSITIVE PLANNING

Planners and local government officials are increasingly addressing the watershed-wide impacts of local land use decisions. Some examples include development setbacks to protect sensitive streams and riparian vegetation, aquifer recharge initiatives, and clustered development to minimize impervious surfaces (streets, parking lots, and other hard surfaces that prevent precipitation from flowing into the soil).

Watershed-sensitive planning means looking ahead at future land use decisions, providing guidelines, and expressing priorities to ensure that critical landscape and watershed features are not destroyed when growth occurs.

## •REALISTIC POPULATION PROJECTIONS

Local planners base their water demand projections on population forecasts. A recent study of water and land use planning in Colorado identified the population projection process as a critical intersection of land use and water planning. The researcher also noted this process as an unrealized opportunity to question the assumptions that often lead to aggressive pursuits of water with little or no consideration of the tradeoffs of growth, alternative future scenarios, or whether residents are willing to pay for the infrastructure to support projected growth.<sup>13</sup>

The process of developing growth projections could form the basis for a productive, coordinated regional dialogue, but this rarely happens.

<sup>13</sup> See Coulson, *Locally Integrated Management of Land Use and Water Supply*, in the Resources section

## COMMUNITY-CONSCIOUS WATER PLANNING

### •COLLABORATIVE APPROACHES

Prompted by recurring droughts, better information about historical hydrological conditions, and emerging knowledge of global climate change, water managers are beginning to explore flexible institutional arrangements to ensure water supplies in a less certain future. Interstate water banks, water leasing, drought contingency plans, and other initiatives suggest that more cooperative approaches—while not yet the norm—may provide part of the answer to regional water supply challenges and may offer new opportunities for deliberative dialogue about the tradeoffs inherent in each water management decision. Such collaboration is one way to bridge the often disparate disciplines of land use planning and water management.

In some places, diverse groups of stakeholders are inventing new forms of governance based on river basin and watershed coordination.<sup>14</sup> In many cases, these new partnerships are authorized by legislation and spelled out in formal agreements. The specifics of how to work together across state and other jurisdictional lines are constantly evolving.<sup>15</sup>

For example, in 2005 the Colorado Legislature established a creative approach to engage government officials, resource managers, stakeholders, and citizens in a statewide network of “Basin Roundtables,” aimed at facilitating discussion about local and regional water needs and community priorities. The legislation also established a process

<sup>14</sup> See, e.g., the Platte River Endangered Species Partnership ([www.platteriver.org/](http://www.platteriver.org/)) and the CALFED Bay-Delta Program (<http://calwater.ca.gov/AboutCalfed/CALFEDProgram.shtml>).

<sup>15</sup> See, for example, McKinney & Essington, “Learning to Think and Act Like a Region,” included in the Resources section.

to address statewide water conflicts through interbasin compacts, building upon the priorities expressed in the nine basin-specific Roundtables.<sup>16</sup> The structured involvement of local government officials, water officials, and the public offers an intriguing model for managing water in a more participatory, deliberative, and public context.

Although the Roundtable process is focused exclusively on planning for future water supplies, it offers a bridge to land use planning. Ideally, these forums will build greater awareness of the options for obtaining water for projected growth, the costs and impacts of obtaining new water supplies, and potential conflicts between long-term water supply forecasts and local land use priorities.

#### •ASSESSING PUBLIC INTERESTS

Increasingly, citizen groups and other stakeholders are actively engaging with public officials to ensure protection of diverse public interests in water.

Open, participatory decision processes could offer the opportunity for a meaningful deliberation about the long-term tradeoffs and value choices inherent in water management (and water-related land use) decisions, although this is far from the reality in most state water administrative programs.

In rare cases, courts have used the public interest principle to limit cities' reach for water, concluding that the projected urban demands do not justify the impacts of diverting water from streams and aquifers. The legal basis of the "public trust

doctrine" is beyond the scope of this report, but is described in several of the publications listed in the Resources section.<sup>17</sup> At the least, a timely public conversation about society's diverse interests and values as we move into the 21st century could help to clarify priorities for land use and water management decisions. Barring such a discussion, these priorities will likely be hammered out in the courts.

#### •REALISTIC COST FORECASTS AND PRICING

Urban consumers seldom pay the full cost of the water they use. Similarly, urban suppliers historically have enjoyed considerable subsidies in water delivery systems, but this era is drawing to a close as the federal government withdraws from its dominant role as water provider. Some consumers are already facing steep increases in water prices to reflect the costs of building new delivery pipelines and other infrastructure.

Local land and water planners could do a better job of forecasting the full cost of obtaining water to meet projected demands, and thus help citizens make more fully informed decisions about the costs of new development. In the future, water prices more likely will include the social and environmental costs that until now have been borne by society at large as externalities. Thus, through means such as impact fees, the full cost of water supplies may be reflected in assessments for new developments.<sup>18</sup>

<sup>16</sup> See Colorado Water for the 21st Century, <http://dnr.state.co.us/Home/ColoradoWaterforthe21stCentury/>.

<sup>17</sup> See, e.g., Bates, et al., *Searching Out the Headwaters*; Arnold, *Wet Growth*; and McKinney, "Linking Growth and Land Use to Water Supply," included in the Resources section.

<sup>18</sup> See, e.g., the discussion of impact fees and water supplies facing the 2007 Montana Legislature at [http://www.newwest.net/index.php/city/article/impact\\_fees\\_water\\_rights\\_top\\_development\\_issues\\_at\\_montana\\_legislature/C8/L8/](http://www.newwest.net/index.php/city/article/impact_fees_water_rights_top_development_issues_at_montana_legislature/C8/L8/).

## •SMART WATER MANAGEMENT

This report focuses on the governance structures—the institutions—within which public values are recognized and decisions are made about land use and water. It is also important to consider the physical realities of water demand and supply, and to acknowledge the many initiatives underway to better steward this limited resource. It is no longer possible to “build our way out” of complex water disputes, but we can reduce or avoid some conflicts by reducing demands and ensuring more sustainable long-term water supplies

State water policies are evolving to promote more efficient use of water resources and to allow voluntary transfers of water to more highly valued uses. Voluntary reallocation will be a major factor in meeting the demands of many growing urban areas. In some cases, urban water suppliers can pay irrigators to install more efficient water delivery systems, allowing the saved water to be diverted for domestic needs while preserving agricultural operations. More often, urban demands trump agricultural water uses in the marketplace, and farmland is rapidly being retired around fast-growing areas such as Colorado’s Front Range or Boise’s Treasure Valley.

While large-scale water transfers are already a fact of life in some parts of the country, they remain controversial. Many rural agricultural communities worry that placing a dollar value on water and allowing it to flow to those most willing to pay for it will result in unacceptable loss of farmland (thus valued open space) and detrimental impacts to rural economies. In some cases, these concerns are addressed by creative institutional arrangements for temporary transfers or lease arrangements, allowing irrigation to continue but ensuring safety margins for urban water users.<sup>19</sup>

**It is no longer possible to “build our way out” of complex water disputes, but we can reduce or avoid some conflicts by reducing demands and ensuring more sustainable long-term water supplies**

Technological advances allow more creative water management strategies, and will help meet growing and changing water demands. For example, when state laws support conjunctive management of surface and groundwater, water suppliers can capture excess surface water and store it underground, to draw upon during drier times. In some cases, this stored water can be exchanged for other water users’ surface water supplies, allowing needs to be met

without construction of new dams and pipelines.

Other technological advances have encouraged serious pursuit of desalination in coastal cities such as San Diego and wastewater reclamation and re-use in

cities such as Denver.

Water suppliers recognize that the least expensive source of “new” water is in more efficient use of existing water supplies. Consumers are encouraged to use less water for daily activities through water metering, tiered pricing (charging more per gallon for heavy water users), subsidies for conservation measures, and public education programs.

Residents of Las Vegas, for example, can claim monetary rewards for converting irrigated lawns for less water consumptive plantings. The City of Santa Fe, facing serious limitations in its water supplies, requires developers to install new efficient toilets in existing homes before obtaining permission to build new homes.



<sup>19</sup> For a good summary of marketing options, including temporary transfers, see Glennon, “Water Scarcity, Marketing, and Privatization,” in the Resources section.

While much has been accomplished through existing conservation programs, the full scope of potential savings remains unrealized.

Smart water management also includes caution in constructing new infrastructure to convey water from its source to areas in which increased demands are expected. For example, a study currently underway in Wyoming is examining the growth-inducing impacts of a new water pipeline, and considering whether alternative locations for the water supply line might induce more desirable settlement patterns. This kind of analysis is an encouraging step toward bridging the gap between water supply decisions and their impacts on land use.

## CONCLUSION

This report describes the historical disconnect between state-directed water supply planning and locally administered land use decision processes. Despite the obvious relationship between where and how people live and the water they need to do so, our institutions have not encouraged decision makers to think about land and water use together or to engage in a dialogue with affected publics about the consequences of these decisions. This default situation is less and less acceptable as we become increasingly aware of the high costs of obtaining “new” water to accommodate growth.

The initiatives profiled in this report offer ideas for how to integrate considerations of water resources into land use planning, as well as examples of state water and land use policy reforms that may encourage more integrated approaches in the future. The Public Policy Research Institute welcomes opportunities to explore these and other options for bridging the governance gap and working toward more sustainable land use and water management for the future.



## SELECTED RESOURCES

Craig Anthony Arnold, ed., *Wet Growth: Should Water Law Control Land Use?* (Environmental Law Institute, 2005).

Sarah Bates, David Getches, Lawrence MacDonnell, & Charles Wilkinson, *Searching Out the Headwaters: Change and Rediscovery in Western Water Policy* (Island Press, 1993).

James R. Cohen, *Water Supply as a Factor in Local Growth Management Planning in the U.S.: A Review of Current Practice, and Implications for Maryland* (University of Maryland, Urban Studies and Planning Program, 2004).

Scott E. Coulson, *Locally Integrated Management of Land-Use and Water Supply: Can Water Continue to Follow the Plow?* (thesis prepared for Master of Urban and Regional Planning, University of Colorado at Denver, 2005).

Robert Glennon, *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters* (Island Press, 2002).

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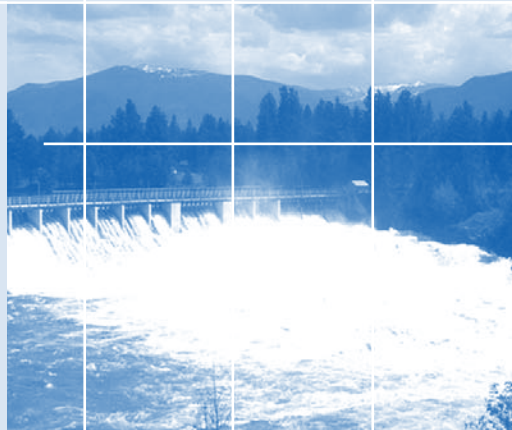
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