



Policy Report

A NEW WESTERN WATER AGENDA

OPPORTUNITIES FOR ACTION IN AN ERA OF GROWTH AND CLIMATE CHANGE

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PREFACE

This policy paper grew from a roundtable discussion about western water policy convened by Western Progress in Boulder, Colorado, in October of 2007. We brought together a small group of experts to help us consider the driving forces for change in western water and to evaluate the opportunities for advocating sustainable solutions throughout the Rocky Mountain Region.

Denise Fort and Lawrence MacDonnell prepared a briefing paper in advance of the roundtable and presented their findings to the group to provide a starting point for discussions. In addition, Brad Udall of the Western Water Assessment provided the group with an overview of the current state of knowledge of climate change and its impacts on western water supplies.

From this starting point, participants engaged in a wide-ranging discussion of the major trends impacting water policy in the Rocky Mountain West. Their perspectives offered valuable insights into the potential areas for improving the laws, policies, and practices that influence how water is used in this region. We have attempted to incorporate their key ideas into this policy paper, which will provide the foundation for Western Progress' water policy research and advocacy program, but the ideas and conclusions here reflect the opinions of the authors, not those of other roundtable participants.

We offer our deepest gratitude to all the roundtable participants, listed below. Special thanks to Lawrence MacDonnell and Denise Fort for preparing a thoughtful and well-informed briefing paper to spark our discussions, and for doing the extra work to adapt that document into this more broadly applicable policy paper.

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INTRODUCTION

The Rocky Mountain West is a region of great contrasts—from alpine tundra to arid deserts, from red rock canyons to high plains prairies, from mountain forests to piñon-juniper woodlands. It contains the headwaters of many major rivers, including the Snake, the Green, the Colorado, the Arkansas and the Rio Grande. Yet it is largely semi-arid, with little rain; its moisture comes primarily as snow. Both stream flow and ground water recharge rely heavily on runoff from snowmelt. This constrained distribution of water and the variability of its supply give inordinate importance to decisions about its use.

Human habitation of this region has always been tied to water. The Hohokam civilization, located in what is now central Arizona, developed highly sophisticated water collection systems to support its growth more than a thousand years ago. Settlement of this region as part of the United States depended heavily on diversion of water for irrigated agriculture. Construction of large dams enabled storage and control of additional water. Conveyance systems involving large canals, pumps, tunnels and other structures allowed transport of water long distances, even between basins. Improved pumps made it possible to tap into ground water aquifers, sometimes at considerable depth.

People in the American West are heavily concentrated in urban areas, in part because such areas have developed extensive systems of water supply to support local populations and economies. Given a big boost by war-related activities during the 1940s, the West has continued to grow at rates faster than other regions of the U.S. Forecasts suggest a continuation of this trend. More people mean a need for more usable water.

Until relatively recently, it has been possible to identify sources of water not yet committed to some other, legally-protected use and develop these sources to meet new demands. We could store spring runoff and not interfere with summertime direct flow diversions. We could withdraw ground water without impairing surface water uses or other ground water uses.

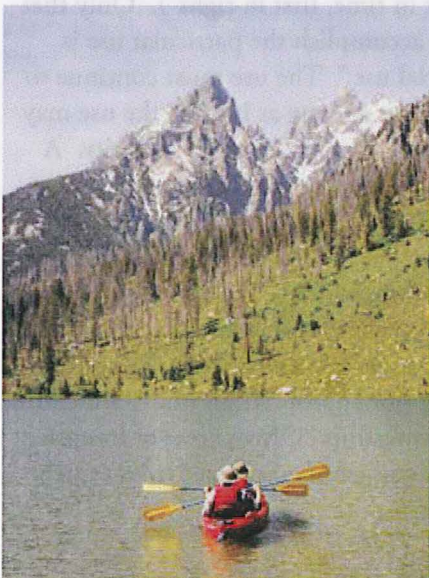
It is increasingly difficult to find water sources that are not already committed to another use. We have dammed most rivers to capture high flows and to recapture water for subsequent use. We have tapped ground water at rates well beyond the ability of aquifers to recharge, so water levels have dropped and associated surface water has declined.

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Alteration of aquatic systems for water development has caused extinction of species of fish, and others are in jeopardy. We are close to being in a zero-sum game in which the benefits of developing additional water are offset by the losses.

Further complicating this picture is a changing global climate that is bringing warmer temperatures and is predicted to measurably change historical hydrologic patterns in the Rocky Mountain West. One likely consequence of global warming for the Rocky Mountain West is a reduction in the mountain snowpack that has been such an important source of water supply in this region. Another likely consequence is increased evaporation from land and water surfaces. (See [IPCC, *Climate Change 2007—Impacts, Adaptation and Vulnerability*](#).) Almost certainly, the region needs to anticipate a net reduction in usable water supplies in the foreseeable future.

Without doubt, the biggest water-related challenge facing the Rocky Mountain West is how to meet increasing water demands associated with a growing population with a fully committed but less secure water supply. Responding to this challenge will require careful management and use of this water supply. It also calls for a reconsideration of existing laws and institutions that guide and direct human uses of water. This report sets out a brief overview of the existing water policy framework, explores the changing role of water in the West and identifies key issues for action.



THE LEGAL, INSTITUTIONAL AND POLICY FRAMEWORK

To help make the region's limited surface water supplies securely available for particular human uses, customary rules developed recognizing that the actions taken to capture (or "appropriate") water and apply it to beneficial uses established a legally protected right to continue that use. Newly formed states in the West often embedded these basic rules, known as the prior appropriation doctrine, into their constitutions.

Importantly, private rights to use water are not the same as ownership of the water itself. Every western state constitution includes a statement confirming that water is a public resource (similar to wildlife), and that the state is responsible for managing water on behalf of all citizens. When private water rights are established, they encompass the right to use water under particular conditions, most importantly the rule that one's use not harm other water right holders.

Led by Wyoming, states developed unique administrative and judicial systems to clarify rights to use water, to help sort out conflicts between users, and to enable consideration of broader interests. The earliest to put water from a particular source to use are given a priority over subsequent users (a doctrine referred to in shorthand as "first in time, first in right"). Only that amount of water reasonably necessary to accomplish the particular use is protected as a legally recognized "beneficial use." The use must continue to retain that protection ("use it or lose it") but, so long as it does, the use may continue indefinitely with full legal protection according to its priority. A use may be changed, but only after public review to ensure that other uses are not impaired.

Rules governing use of ground water developed independently of rules for surface water. In states such as Arizona, California, Nebraska and Texas, the right to pump ground water depends on one's land ownership. Most other states in the region follow some form of prior appropriation under which the right is established by use, not by land ownership. Often, areas of intensive ground water development are subject to special management rules to help manage conflicts between users.

Congressional and executive reservations of federal lands, such as for Indian reservations and national forests, are regarded as having an implied reservation of water necessary to accomplish the purposes of the reservation.

These reserved water rights date from the creation of the reservation and exist outside of state law. Once quantified and put to use, they are administered in the same manner as other water rights. Other water-related needs for the federal public lands are addressed under state water law or through land management decisions.

Thus, with the exception of reserved water rights for tribes and federal lands, allocation of water for particular uses is governed under state law. The primary objective of state law has been to encourage water development. It is the users and their representative organizations such as mutual ditch companies, conservancy districts, and city water utilities that have done the developing. Collectively, they hold millions of individual water rights that determine how much water is stored behind dams and when that water is released, how much water is diverted from streams and where, and how much water is withdrawn from aquifers and when.

The national role related to water in the American West historically concerned support for water development. Thus, under the Newlands Reclamation Act of 1902 the Bureau of Reclamation constructed large dams on many western rivers to store water to be used primarily for irrigated agriculture. Reclamation also installed hydropower facilities at many of these dams, using the revenues from the sale of electricity to help pay for the dams and other water delivery facilities. The U.S. Army Corps of Engineers also constructed dams in the region, primarily for flood control purposes.

The national role has shifted from construction of new facilities to management of existing facilities. It has expanded into the areas of water quality regulation, wetlands management, and endangered species protection under national programs established by Congress. Thus, the Clean Water Act established a national-level program that regulates the discharge of pollutants into water from point sources and requires specified levels of treatment before such discharges may occur. States generally implement the program. The regulatory program has been expanded to include stormwater discharges within urban areas. Pollution from more diffuse sources such as agriculture is addressed through voluntary programs. Section 404 of the Clean Water Act regulates the development (dredge and fill) of wetlands that are considered to be waters of the U.S. The Endangered Species Act prohibits federal actions that would jeopardize the continued existence of protected plant and animal species. Thus water-related activities with some kind of federal “nexus” affecting aquatic habitat used by protected species are regulated under this law.

Without doubt, the biggest water-related challenge facing the Rocky Mountain West is how to meet increasing water demands associated with a growing population with a fully committed but less secure water supply.

To summarize, state water policy encourages the development and use of available water resources by awarding water rights for the use that are administered and protected under state law. Traditionally, federal water policy also emphasized support for water development but has transitioned to management and implementation of more recent national priorities such as water quality protection.

A CHANGING CLIMATE FOR WATER POLICY IN THE ROCKY MOUNTAIN WEST

Political support for large-scale, federally supported development of western rivers peaked in the 1960s. Continued expansion of irrigated agriculture continued into the 1970s, based largely on development of ground water resources. While irrigation still accounts for about 80 percent of all water withdrawals from surface and ground water sources in this region, total withdrawals for this purpose have stabilized and even declined somewhat in recent years. Today, demands for new water supplies come primarily from population growth. In 1920 the population of the western states totaled 8 million. By 2000, the population had grown to 63 million. Additional water development remains an important component of meeting new demands, but that development has become greatly complicated by the reduction in federal funds, the increased attention to environmental concerns, the limited amount of undeveloped water still remaining, and the much more complex array of interests competing for use of this water. As discussed below, climate change adds still another enormous complication.

As the West continues its transition from a largely extraction-based economy with scattered small to medium sized population centers to a more diverse economy increasingly located in its growing urban areas, the role of its water resources is changing as well. Water once served as a tool to encourage settlement of western lands by making agricultural use of these lands possible. The result was the commitment of much of the region's water to irrigated agriculture. That remains true today. Irrigation is slowly but surely becoming more efficient as on-farm technology and management improve. Irrigated lands are being urbanized. Cities are purchasing irrigation water rights and changing the use of the water. Slowly but surely, water historically used to irrigate crops is shifting to supply urban growth and, in some cases, to restore depleted streamflows and wetlands.

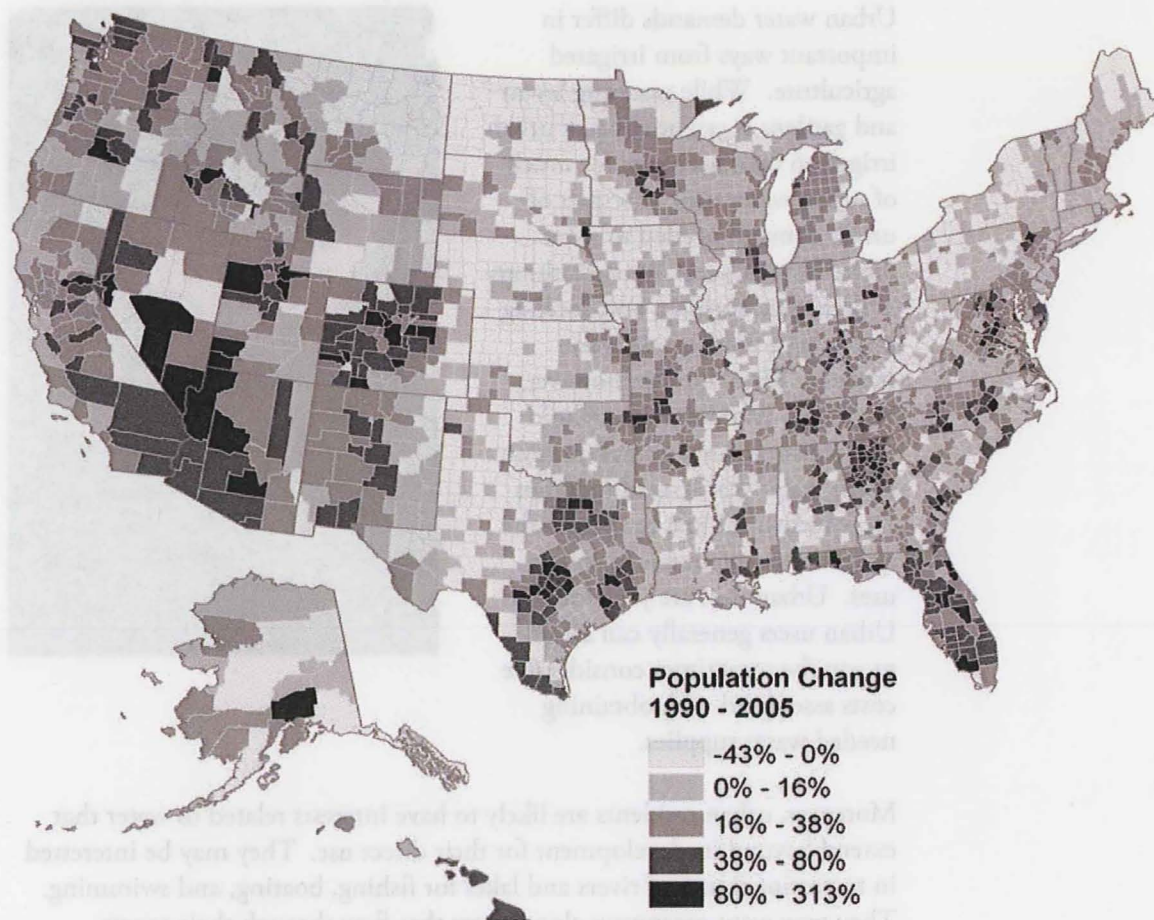


Fig. 1. Population change 1990 - 2005 Source: U.S. Census Bureau

Urban water demands differ in important ways from irrigated agriculture. While watering lawns and gardens is essentially just urban irrigation (and accounts for much of urban water use), that part of urban demand needed to meet direct human needs for such things as drinking, washing, and cooking (household uses) is relatively modest. Water quality, however, is critical. Moreover, household uses consume only a small portion of the water that is used (perhaps 10 percent); the rest returns to the system after treatment for other uses. Urban uses are year-round. Urban users generally can afford to pay the sometimes considerable costs associated with obtaining needed water supplies.



Moreover, urban residents are likely to have interests related to water that extend beyond its development for their direct use. They may be interested in recreational uses of rivers and lakes for fishing, boating, and swimming. They may want greenways along rivers that flow through their towns. They are likely to want water to stay in reservoirs during summer months for recreational uses. They may be concerned about restoring impaired waterways.

States have responded to these changing interests in a variety of ways. To address growing interest in maintaining flowing streams, most states have established some kind of "instream flow" protection program. Typically, a state agency is charged with identifying river segments in which remaining flows still support a valuable fishery or other important public values. Some portion of these flows is then reserved from future appropriation and development to retain this public value. These programs do not affect pre-existing appropriations and uses of water from these rivers, but they can limit future water development.

At the national level, Congress enacted the Wild and Scenic Rivers Act in 1968, enabling designation of river segments that should not be dammed so that they can maintain their wild, scenic and recreational values. The 1973 Endangered Species Act also has had the effect of requiring maintenance of aquatic habitat essential for the survival of protected species.

The process of allowing water to shift from agricultural to urban use involves the voluntary purchase of the water rights and then state review of the proposed new use of the water to ensure no existing water rights are harmed. While the quantity of water moving from irrigation to urban uses is gradually increasing, the process has been slower than might be expected based solely on the comparative economic value of water in the two types of uses. In part, this can be explained by the technical complexities and associated costs of demonstrating “no harm” to other water rights. Perhaps more important is the reluctance of many irrigators and other rural residents to see water leave agriculture, especially given the sometimes limited economic alternatives in a rural agricultural area.

Urban water suppliers, faced with interests in preserving instream flows and challenges to moving agricultural water, have turned to ground water development for new supplies and to water conservation as a means of reducing demand. Ground water in most parts of the West is not a renewable source of supply. Large-scale pumping lowers the water table, making pumping more expensive, affecting other uses, and sometimes causing land subsidence.

Conservation, on the other hand, has proven to be an important means to reduce the need for additional water. Cities have had considerable success with voluntary programs that encourage household and commercial water use efficiency. (See [Western Resource Advocates, *Smart Water*, 2003](#)). Programs range from providing low water using fixtures (e.g., showerheads and toilets), metering water use and using rate structures that encourage conservation, and encouraging landscaping using native vegetation.

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THE CHALLENGES AHEAD

Heading the list of challenges is a relative newcomer: the likelihood of a reduced water supply in at least some parts of the region caused by global warming. The international scientific community is now agreed that the average temperature of the earth's surface is increasing. The rate of increase appears to be accelerating. Observed temperature increases in parts of the West are greater than for other parts of the country. Regional climate models suggests average temperature increases in this region by 2100 of as little as 4° Fahrenheit or as much as 13° F.

At a minimum, such temperature increases will change some winter snows to rain, reducing the mountain snowpack. Temperature increases will cause snow to melt earlier in the spring. They will increase evaporation of water from land and water surfaces. Hydrologic patterns will change. Moisture may come more often in the form of intense storms that produce flooding than in winter snows. Regional climate models predict reduced water availability, perhaps substantial reductions of from 20 to 50 percent. (See, e.g., the [National Research Council](#) 2007 report on climate change impacts in the Colorado River Basin.)



Lake Mead and Hoover Dam Intake Towers. Lake Mead is currently at 46% capacity.

Water managers look to historic hydrological records to determine expected future water supplies. Tree ring analysis, however, demonstrates a much greater amount of variability in water availability than historic records. Climate models are warning us to prepare for at least this amount of variability, including prolonged periods of what we would term severe drought.

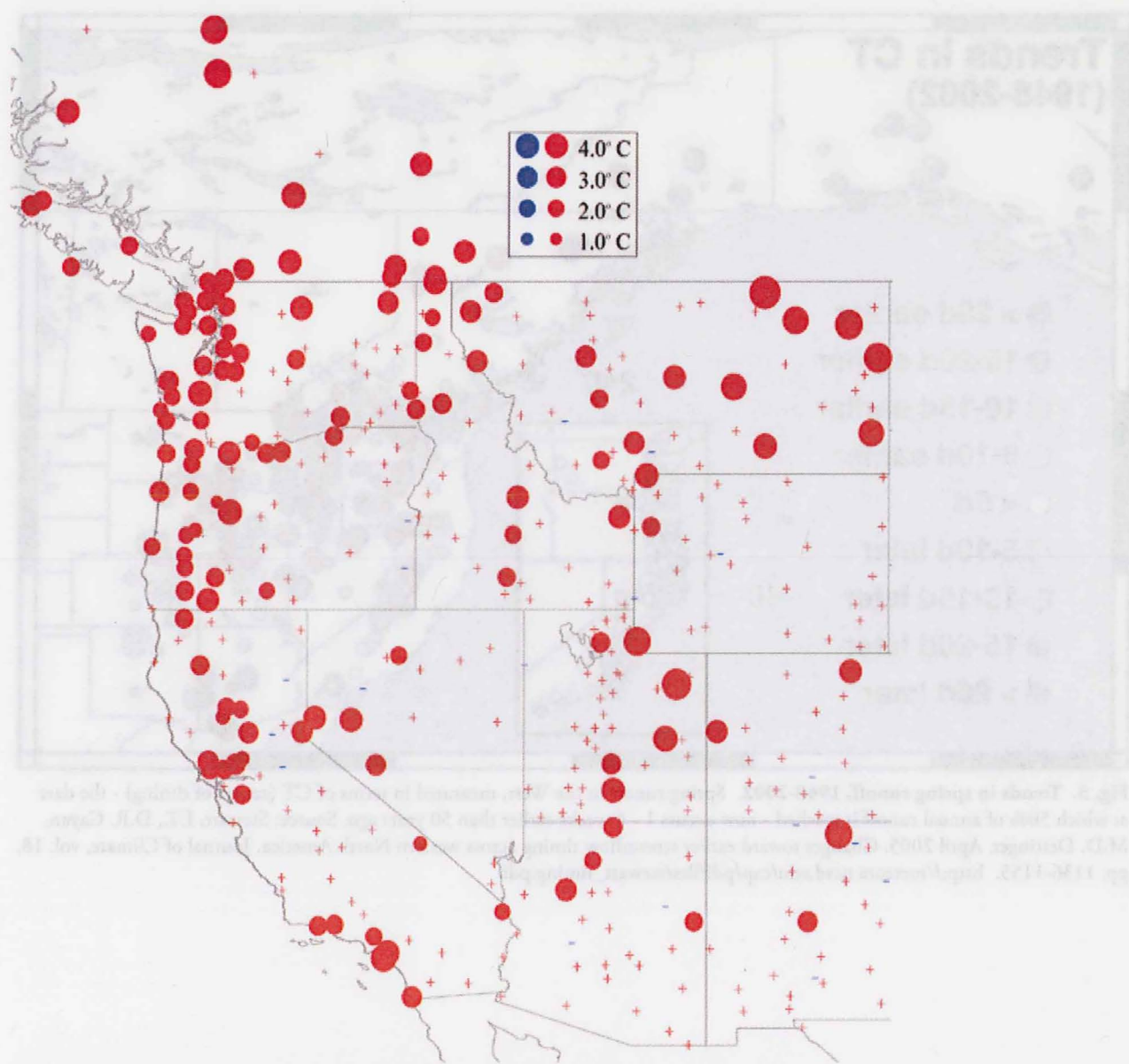


Fig. 2. Trends in November-March temperature, 1950-2000. Red circles indicate positive (warming) trends that are statistically significant, red "+" symbols indicate positive trends that are not statistically significant, and blue "-" symbols indicate negative (cooling) trends. Source: Mote, Philip W., Martyn Clark, Alan F. Hamlet, "Variability and Trends in Mountain Snowpack in Western North America," Climate Impacts Group, P.O. Box 354235, University Washington, Seattle, WA, 98195.

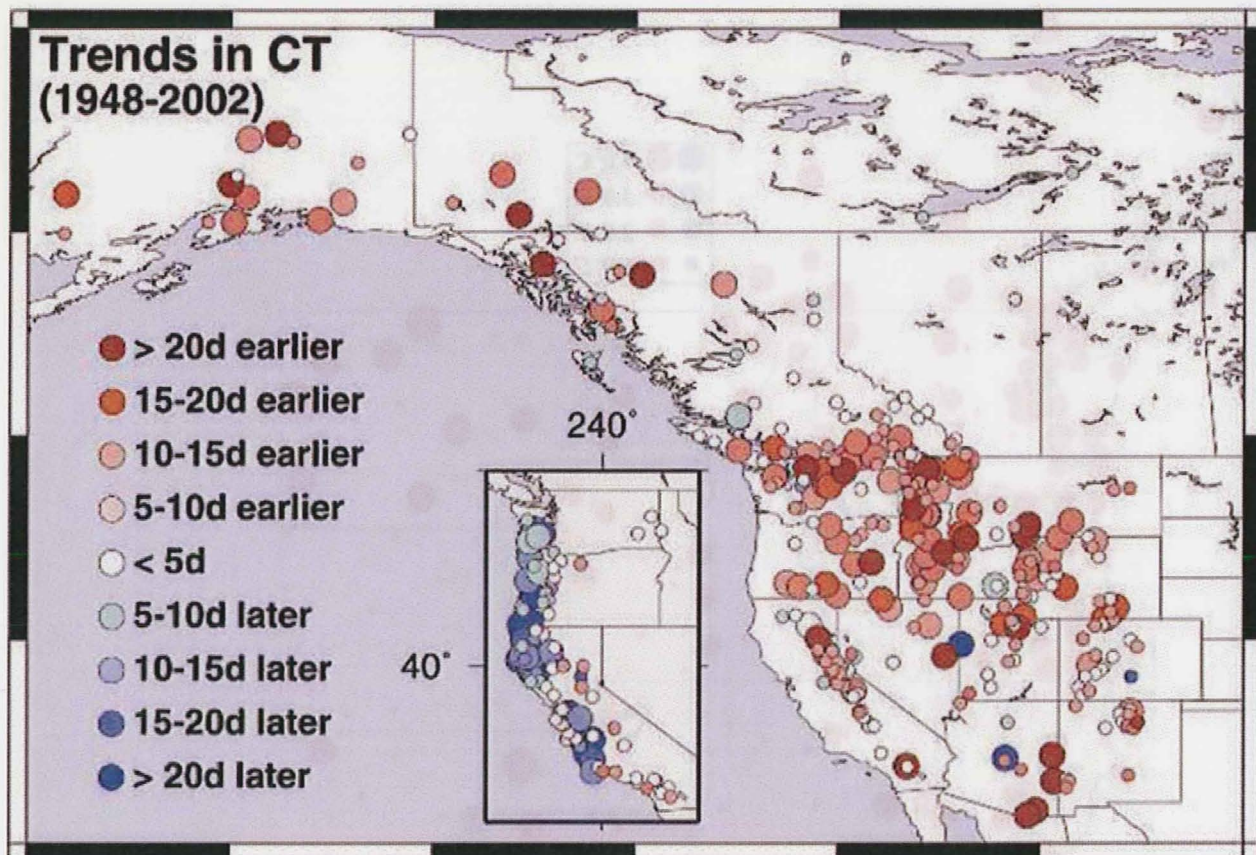


Fig. 3. Trends in spring runoff, 1948-2002. Spring runoff in the West, measured in terms of CT (center of timing) - the date at which 50% of annual runoff is reached - now occurs 1 - 4 weeks earlier than 50 years ago. Source: Stewart, I.T., D.R. Cayan, M.D. Dettinger. April 2005. Changes toward earlier streamflow timing across western North America. *Journal of Climate*, vol. 18, pp. 1136-1155. http://meteora.ucsd.edu/cap/pdf/stewart_timing.pdf

The implications of a reduced water supply in a region whose limited water resources already are overallocated are profound. We have been accustomed to meeting new demands by increasing supply. Water development has moved from source to source, taking control of previously unappropriated water to serve new uses. Public support of this development has often been necessary to keep the costs to users affordable. In a priority-based system, the newest appropriations are the first to be curtailed in the event of shortage. Thus, the prospect of declining or even highly variable water availability places the reliability of new water development at risk. Yet, population growth and its associated water demands are certain to continue.

Indeed, it is this heightened sense of scarcity during the past several decades that has elevated public attention of water policy and contributed to the splintering of the long-standing political consensus based on publicly supported water development to meet all demands. We are searching for a policy that better reflects the realities of a changing West with limited water development opportunities and growing water demands. We are concerned about the future of those areas heavily dependent on irrigated agriculture as water inevitably moves to meet new demands. We recognize the growing importance of economies drawing value from the scenic and recreational uses of rivers and their water.

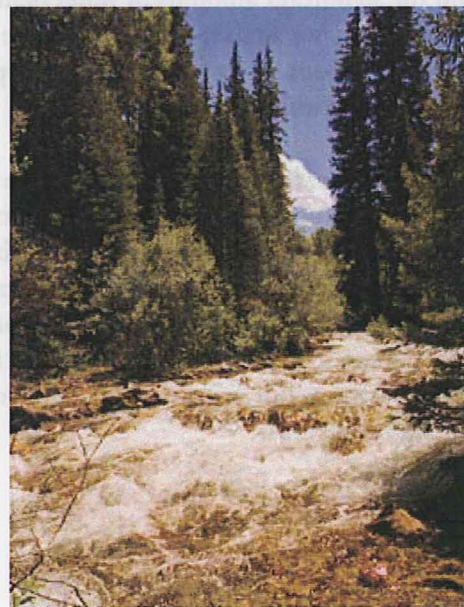
We are struggling with the water demands associated with the region's current and projected energy boom, including the production of large quantities of unwanted water associated with coalbed methane development and the significant amounts of water demanded for new coal-fired power plants. Now we are beginning to grapple with the implications of global warming for our water future. It's a complicated map, with no certain guideposts marking the path forward.

We can begin with a consideration of the resource itself. Western rivers and aquifers are important not only as a source from which to extract water for human use but for the many other valuable functions they serve. We need to remove large quantities of water to support human activities, but we also want healthy rivers that provide recreational benefits and support aquatic life. Thus a major thrust of water policy in recent decades has been to better integrate our water development activities with other hydrologic and ecologic functions.

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These efforts represent a critical testing ground for our experiments with achieving sustainable uses of our natural resources. In moving ahead, it is important to have the active engagement of those with water rights in the source because their uses have such a substantial influence on what can be accomplished. Further, the science of river restoration has made great strides in recent years. Some of these efforts are driven by meeting the requirements of the Endangered Species Act. We note that in those situations in which the water development community has been an active participant in developing measures to meet species needs, solutions have been found that have had little or no effect on existing water uses. Collaborative processes such as the [Upper Colorado Recovery Program](#) illustrate the potential for smarter river management to better accommodate our water use and river health interests.

Decisions respecting uses of water are made in the first instance by water users and suppliers. State involvement has generally concerned protection of existing water uses. Today government plays a more active role in water use decisions. With very limited amounts of unclaimed water still available, competing interests are greater. Public concerns beyond those represented by water rights holders are more likely to be involved, forcing broader consideration of proposed new or changed uses. In addition to the traditional state-level water allocation determination, water development may implicate local, state, and federal land use decisions as well as National Environmental Policy Act (NEPA) and other federal regulatory requirements.



RECOMMENDATIONS: WESTERN WATER POLICY FOR THE 21ST CENTURY

We can meet our future water needs and achieve the long-term goal of maintaining viable streams and rivers in the region. The following recommendations suggest a reform agenda for sustainable water management in the West.

Strengthen and expand water conservation and efficiency programs.

Water conservation is now widely accepted as a smart, cost-effective way of reducing the amount of water that would otherwise be needed to meet new demands. Many urban water providers are now leading the way forward in promoting conservation of water. As awareness of the region's water situation grows, users are demonstrating an increased willingness to be more careful in their own water uses. States have not yet evidenced much interest in getting involved in water conservation, aside from providing some limited funding support and encouraging water utilities to pursue conservation. It seems likely this will change as water supplies become increasingly scarce.

Water use efficiency should be promoted across the region, but especially in those areas of rapid growth and limited water supplies.

Integrate water planning with growth management and land use planning.

The 2006 Western Governors' Association report, [*Water Needs and Strategies for a Sustainable Future*](#), stated:

In the future, we may not be able to sustain unlimited growth and still maintain our current quality of life. Difficult political choices will be necessary regarding future economic and environmental uses of water and the best way to encourage the orderly transition to a new equilibrium. Among other things, these new realities require an evaluation of the relationship between water policies and growth.

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States have increasingly been using public water planning processes to address difficult questions of future water uses. A good example is the ten-year regional planning process used by Texas to develop a statewide water plan. Such processes can be used to develop better public information respecting existing water uses including instream flows and claims for future uses, the condition of water sources and the availability of water for additional development, and local, regional, and state interests respecting this water. Stakeholder involvement is used to educate the interested public and to search for areas of agreement. While cumbersome and time-consuming, such processes respond to contemporary demands for open public engagement in water matters.

States and political subdivisions should mandate growth management planning that includes adequate consideration of alternative sources of water to meet projected demands and the environmental and other impacts of obtaining this water.

Adopt integrated strategies at the federal level.

Although this report focuses most directly on state water policy, the federal Bureau of Reclamation will continue to be a key actor in the future of western water policy. While the Bureau of Reclamation has made considerable progress in making its projects more river friendly, either voluntarily in response to local interests or to bring project operations into compliance with the ESA, many opportunities for improvement still remain.

Congress and proponents of sustainable water policy should work to ensure that all U.S. Bureau of Reclamation projects in the region implement changes necessary to make their operations as compatible as practicable with river health while still meeting traditional project obligations.

We note that the U.S. Army Corps of Engineers has joined with The Nature Conservancy in a [“sustainable rivers” initiative](#) under which the Corps is reoperating many of its dams to achieve a more environmentally-oriented flow regime. Congress should give Reclamation the legal authority (and the funding) to participate in this initiative as well.

Improve the process for transferring water from agricultural to urban and environmental uses.

The influx of people into the Rocky Mountain West seems likely to continue. The region offers a quality of life unmatched in other parts of the country. The rates of growth have been greatest in the warmer, more arid parts of the region where water resources are more limited and where global warming appears most likely to further reduce water availability. These areas in particular face difficult challenges with maintaining their attractive qualities of life while accommodating increasing numbers of people.

It is instructive to consider developments in Colorado law relating to transfers of water from agriculture to new uses. The intent of these provisions has been to establish statewide requirements representing the conditions under which such transfers would be allowed. Thus approval of such transfers must include conditions requiring revegetation of the former cropland and control of noxious weeds. (Colo. Rev. Stat. §37-92-305 (4.5).) A “transition mitigation payment” to local governments may be required to offset losses of property tax revenues for up to 30 years. If the transfer would result in a change of water quality exceeding legal limits, requirements for offsetting this effect would be imposed. And, of course, the transfer may not impair other water rights.

Water transfers are common in Colorado but often controversial, especially if they involve large quantities of water. Through the legislative process, rules have been established that determine the conditions under which such transfers are to be permitted. Such clear guidance may also be useful for proposed new development involving large quantities of water. **The Colorado approach provides a model for other states to consider in addressing the impacts of water transfers from agricultural to other uses.**

With millions of acre-feet of the region’s water now used in irrigated agriculture, the trend towards transferring a portion of this water to new uses is certain to continue. Irrigated agriculture in the Rocky Mountain region remains important but, in many places, it is struggling to compete in an increasingly global agricultural economy. The water rights upon which this agriculture depends are very often the most valuable asset a farmer has. National farm policies, the aging of those in the business and changes in climate will make transitions away from farming the best alternative for some. However, alternatives to selling out and shutting down farming exist.

They include making water rights available to other users only in dry years, temporarily leasing water rights and rotating lands irrigated to make portions of water rights available. Again, Colorado has now established special statutory rules enabling such arrangements. (Colo. Rev. Stat. § 37-92-309; 37-92-305(3).)

We encourage use of agreements under which irrigators may retain ownership of their water rights but receive compensation for allowing their use by others to address temporary water shortages.

Expand and enhance state instream flow programs.

Most of the work to modernize our western water policy rests at the state level. For example, state instream flow programs have filled a critical gap in the prior appropriation system by providing a means of retaining some portion of the remaining unappropriated water instream. States vary widely in the extent to which they have used these programs to protect instream flows. Typically, a single rate of flow is protected—usually the minimum necessary to maintain a particular fishery. **It is now time for these programs to take the next step and expand into enhancement of rivers identified to be of state importance.** In this capacity, they would not only work to protect existing waters with high public values, they would also seek to enhance and restore lost values in other important waters. Again, such efforts can only succeed with the participation and support of water development community. Collaborative efforts would be essential. Rocky Mountain state governors and legislatures should redouble their efforts to develop expanded stream protection programs.

Promote local watershed efforts.

Local watershed restoration efforts have become increasingly important in recent years. Typically, these are ad hoc processes that emerge in response to some perceived local concern such as water quality impairment caused by abandoned mine wastes. While local, state and even federal agencies may be involved, these processes generally include a wide range of interested parties who often provide important leadership. Their emergence suggests there is a gap in existing institutions concerned with local watershed health. **States should authorize formation of appropriate local watershed districts or similar entities to fill this gap.**

Establish and strengthen statewide and local water trusts.

We also note the emergence of nonprofit “water trusts” and the development of programs by existing entities such as Trout Unlimited aimed at acquiring existing water rights and retiring these rights to allow the associated water to remain in the stream. A few states have authorized a state agency to acquire water rights for this purpose as well. **We support voluntary efforts to restore aquatic ecosystems and encourage other states to establish such programs.** While it may be possible to obtain water rights in some instances by donation if tax incentives are made available in a manner akin to those available for the donation of a conservation easement, funding for acquisition will ordinarily be required. States should encourage such efforts by nonprofits as well by allowing them to directly hold the donated or acquired water rights, rather than requiring these rights to be given to the state.

If indeed the future brings less water to this region, the pressure to forgo water for the environment will grow. In the past we made water development decisions without consideration of effects on physical and ecological values of rivers and aquifers. Now we better understand these effects and make conscious efforts to mitigate adverse effects. In some cases we have even reversed or reduced some of these effects to regain desired improvements.

Improve ground water management strategies.

Especially with the uncertainties caused by global warming, multiple approaches clearly are necessary to meet new water demands. Ground water seems best suited to play a role where this source can be used primarily to supplement surface supplies in drought years or where withdrawals can be adequately replaced by recharge. States have struggled with administration of this critical resource, stymied in part by inadequate information about aquifer function including recharge and discharge and effects of pumping. Basing substantial new development on ground water alone is not sustainable. Used wisely in conjunction with renewable surface water supplies, however, ground water can provide an important part of the water supply mix.

We encourage states to implement effective and comprehensive regulatory programs to manage surface and ground water conjunctively, minimize depletion of finite aquifers and encourage recharge of ground water resources.

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SUMMARY AND CONCLUDING THOUGHTS

We are entering into the ongoing discussions of water matters in the Rocky Mountain region at a time in which rapid growth and a diversifying economy are redefining the region's needs and interests. The region's aridity has always been a defining characteristic. Slowly, the region is shifting its views about its water resources from one committed to maximum development to meet all demands to one supporting sustainable development that provides for changing human uses while maintaining functioning hydrologic systems wherever manageable. A marked conservation ethic is emerging. Urban water needs now dominate new demands for water supplies. Urban water providers increasingly have demonstrated their ability to meet these demands in a manner that is responsive to local economic concerns in the areas from which water is taken and to environmental concerns. The uncertainties about the effects of global warming on regional water resources add a whole new dimension to these changes.

We recommend water supply and management strategies that emphasize the following key elements:

Sustainability: Support and promote ongoing efforts to make water development for direct human benefits more compatible with river health to help achieve the goal of sustainable water use.

Efficiency: Encourage more efficient uses of water to help reduce the burden on our limited water sources.

Flexibility: Support the gradual voluntary reallocation of agricultural water to new urban and environmental uses in a manner that benefits the landscapes and communities from which the water is moved.

Collaboration: Encourage use of public processes at the watershed level that develop better information about present and desired future uses of water resources and that help inform decisions about water uses.

Change does not come easily or quickly in water. The literature is filled with proposals for reform (a summary of selected proposals is provided in the appendix following this report). While in some form many of these proposals have gradually worked their way into federal and state policies, others have not. It is probably fair to say that none have found instant acclaim or quick adoption.

We have found that the best means to achieve objectives in water vary from state to state, according to differences in law and institutions, the relative availability of water in relation to demands and local politics.

There is an inherent conservatism in western water policy that reflects a preference for what exists despite enormous social and economic changes. The system works well for those who are its major beneficiaries—the owners of senior water rights. Understandably, they resist changes with unknown outcomes. Moreover the region's water resources are already committed to particular uses, and these use patterns are firmly established. Complicated relationships among users from the same source exist based on these uses. Even if we reach agreement on new policies, on-the-ground change is necessarily slow as these policies work their way into this complex web established under millions of individual water rights.

Nevertheless, policies must adapt to conditions or risk becoming obsolete. The West is a place undergoing dramatic change. Societal needs and interests related to water are markedly different than they were when the region was being settled. The West is the country's fastest growing region, contains most of the country's fastest growing cities, and now hosts more than 22 percent of the country's population. It faces the prospect of having less water when its resources are already fully allocated and demands are increasing. The status quo simply won't work.



APPENDIX: SELECTED WATER POLICY REFORM PROPOSALS

National Water Commission, *New Directions in U.S. Water Policy* (1973)

This major report contains over 200 recommendations covering a breadth of issues that extended well beyond western water matters. The Commission identified these “recurring themes”:

- First, the report emphasizes that the level of future demands for water is not inevitable but derives in large part from policy decisions within the control of society.
- The second recurring theme of the Commission’s report is that it sees a shift in national priorities from development of water resources to restoration and enhancement of water quality.
- Third, the Commission believes that water resources planning must be tied more closely to land use planning.
- Fourth, the Commission recommends policies which will lead to the conservation of water—policies which will motivate better use of water and reduce water losses by improved efficiency.
- Fifth, the Commission believes that sound economic principles should be applied to decisions on whether to build water projects.
- Sixth, the Commission believes that laws and legal institutions should be reexamined in the light of contemporary water problems.
- Seventh, the Commission believes that development, management, and protection of water resources should be controlled by that level of government nearest the problem and most capable of effectively representing the vital interests involved.

Bruce Driver, *Western Water: Tuning the System*, Report to the Western Governors' Association (1986)

This report was produced in conjunction with a Water Efficiency Task Force established by the Western Governors' Association. It offered nine recommendations to the western states:

1. States can take a significant step towards the encouragement of water use efficiency by adopting a policy statement establishing efficiency as a goal of water policy.
2. States can facilitate voluntary transfers of water rights or portions thereof by implementing a comprehensive transfer program that builds on existing western state law permitting transfers.
3. States can energize cost-effective salvage and conservation of water by implementing a statewide policy to encourage the reform of water rate structures to reflect the pattern of marginal costs of water supply.
4. The states should also consider implementing a comprehensive program, going beyond water pricing reform, to encourage conservation and salvage of water through markets.
5. Regarding conjunctive use, states should review their policies regarding regulation of surface and groundwater supplies that are physically related in light of the dual objectives of minimizing interference with vested rights and encouraging all users of these supplies to meet their collective needs at the least cost.
6. States can enable more development and use of water on or near fully allocated waterways by developing a program whereby junior users may provide alternative supplies to seniors.
7. States need to offer more comprehensive protection for public environmental and community values in water.
8. With the assistance of the federal government, western states need to improve the quality of data needed to be more efficiency-conscious water managers.
9. Finally, states can have a powerful effect on marketing, and simultaneously save their taxpayers some money, by refraining from subsidizing new water resource development within their boundaries unless the applicant for assistance can show that use of the money compares favorably, from a state perspective, with other uses of that money.

Marc Reisner and Sarah Bates, *Overtapped Oasis: Reform or Revolution for Western Water* (Island Press 1990)

The recommendations in this book are divided into those directed at the federal level and those at the western states.

Federal

1. The Department of the Interior should issue a set of rules establishing common terms, procedures, and conditions for voluntary transfer of project water rights. These rules should not, however, impose more restrictive conditions on water right transfers than already exist under state water codes.
2. Congress should expressly authorize transfers of federal water rights and clarify reclamation law in this regard.
3. Subsidies for federal water should be phased down, surplus crops should be discouraged, and "double-dipping" should be disallowed.
- ✓ 4. The Department of the Interior should pursue nonstructural solutions to drainage and salinity problems.
- ✓ 5. The administration must address special environmental problems caused by water diversions.

State

1. Water transfer laws and policies should be streamlined.
2. "Painless" water transfers should be encouraged.
3. Administrative structures and policies should be adapted to achieve a state's water efficiency goals.
4. "Area of origin" protections should be reviewed and modified to meet the anticipated needs of exporting communities.
5. Instream flow measures should be strengthened.
6. The public trust doctrine must be accommodated by state water transfer laws and policies.
7. Water conservation and salvage should be promoted.
8. Unilateral interstate transfer restrictions must be removed.

Western Governors' Association and Western States Water Council, *Park City Principles* (1992)

The Park City Principles emerged out of discussions at three workshops held over two years in Park City, Utah.

1. There should be meaningful legal and administrative recognition of diverse interests in water resource values.
2. Problems should be approached in a holistic or systemic way that recognizes cross-cutting issues, cross-border impacts and concerns, and the multiple needs within the broader "problemshed"- the area that encompasses the problem and all the affected interests. The capacity to exercise governmental authority at problemshed, especially basin-wide, levels must be provided to enable and facilitate direct interactions and accommodate interests among affected parties.
3. The policy framework should be responsive to economic, social, and environmental considerations. Policies must be flexible and yet provide some level of predictability. In addition, they must be able to adapt to changing conditions, needs, and values; accommodate complexity; and allow managers to act in the face of uncertainty.
4. Authority and accountability should be decentralized within policy parameters. This includes a general federal policy of recognizing and supporting the pivotal role of states in water management as well as delegation to states and tribes of specific water-related federal programs patterned after the model of water quality enforcement.
5. Negotiation and market-like approaches, as well as performance standards, are preferred over command and control patterns.
6. Broad-based state and basin participation in federal program policy development and administration is encouraged, as is comparable federal participation in state forums and processes.

Longs Peak Working Group, *America's Waters: A New Era of Sustainability* (1992)

This report (reprinted in *Environmental Law* vol. 24, pp. 125-144 (1994)) was the product of a group of western water policy experts, convened in December, 1992 to chart a course for the incoming Clinton Administration. It postulated four imperatives for a national water policy based on sustainability:

1. water use efficiency and conservation
2. ecological integrity and restoration,
3. clean water, and
4. equity and participation in decisionmaking

Four principles were directed to the institutional structure for federal policy making and implementation:

1. Institutional design for water resources management should be directed at making the most effective use of all levels of government, and strengthening opportunities and incentives for private action.
2. Federal systems should be designed to promote integration of decisions and actions of government closest to the levels at which problems are posed and impacts felt.
3. The federal government should promote integrated resource planning and management to meet water needs. "Integrated resource planning or management" attempts to find ways to meet water needs at the least cost—including economic costs and environmental and other costs and values, whether quantifiable or not—through consideration of all demand-reducing and supply-enhancing measures in a process that provides full opportunity for participation by members of the public.
4. Federal agency organization for the implementation of federal water management policies should promote decisionmaking efficiency, consistent administration, and public understanding of how such federal responsibilities are exercised.

The report concluded with 47 specific action items directed to the new Administration.

Western Water Policy Review Advisory Commission, *Water in the West: Challenge for the Next Century* (1998)

This comprehensive report focuses primarily on the federal role in western water and offers recommendations under the general headings of *new governance of watersheds and river basins, tribal water rights, restoration of aquatic ecosystems, water quality, management of water and water facilities, flood plain management, maintaining the water infrastructure, protecting productive agricultural communities, improving decisionmaking, and reducing conflict*. The report proposes a set of water management principles for federal water programs:

- Ensure sustainable use of resources
- Maintain national goals and standards
- Emphasize local implementation, innovation, and responsibility
- Provide incentives
- Respect existing rights
- Promote social equity
- Organize around hydrologic systems
- Ensure measurable objectives, sound science, adaptive management
- Employ participatory decisionmaking
- Provide innovative funding

Western Governors' Association, *Water Needs and Strategies for a Sustainable Future* (2006)

This report represents the most recent comprehensive consideration of western water by the WGA and contains numerous recommendations that are set out here in full under their organizational headings:

1. Water Policy and Growth

Recommendations:

- To foster sustainable growth policies, states should identify water requirements needed for future growth, and develop integrated growth and water supply impact scenarios that can be presented to local decision makers.
- States should facilitate collaborative watershed-focused planning that balances desirable growth and protection of the natural environment that depends on surface and ground water quantity and quality.

- In reviewing applications for new water uses, transfers and changes in use, including in-stream flows, states should consider local, tribal and watershed plans and decisions regarding growth management.
- States and local governments should consider the impacts of continued growth that relies on transfers from agriculture and rural areas, and identify feasible alternatives to those transfers.

2. State Needs and Strategies to Meet Future Demands

Recommendations:

- Federal and state agencies should increase support and funding for state and federal basic water data gathering activities that can serve as the basis for sound decision making. Gaps in data should be identified. Remote sensing capabilities, including Landsat thermal data, and developing technologies, such as the use of Doppler radar to measure streamflows, are important tools that need to be retained and fostered. Further, state and federal agencies must find ways to reduce costs related to gathering and disseminating real-time water data/information, including the acceptance of more in-kind contributions from cooperators. Moreover, new and stable sources of funding are needed. User-pay opportunities or voluntary non-governmental organization contributions should be explored, while recognizing the general benefits provided by basic data gathering efforts, which make it an appropriate governmental activity.
- Use the research programs at western state universities to focus research on practical applications of promising new technologies, and identify areas where the increased use of technology (e.g. remote sensing, Supervisory Control and Data Acquisition, new water and wastewater treatment technologies, energy and water efficiency) should be promoted to enable more efficient and cost effective operations.

- The WGA and WSWC strongly support enactment of the National Integrated Drought Information System Act of 2006 (H.R. 5136 and S. 2751) to make permanent a National Integrated Drought Information System (NIDIS), as well as broader national drought preparedness legislation. State and federal agencies should consider steps to pursue creation of a broader integrated water resources information system, which would serve as a basis for water-related planning, preparedness and response activities.
- The WSWC should encourage states to develop and implement strong state water plans and compile a state-by-state and West-wide summary of existing water uses, water plans and planning efforts, current ground and surface water supplies, and anticipated future demands, then identify and evaluate trends and common themes. The summaries should address both consumptive and non-consumptive uses and demands. This summary should include both existing water supply and demand-management policies and programs, as well as planned or potential activities. The focus should be on a grassroots, watershed approach to identifying water problems and potential solutions from the ground up, integrating these efforts into individual state plans. Similarly, regional or multi-state and multiple river basin strategic plans should be comprised of these building blocks.
- The WSWC should explore the relative merits and obstacles related to various programs and technologies and legal and institutional means to augment existing water supplies, including water conservation and water use efficiency, demand management (including pricing structures), water and water rights transfers, water banking, water reuse, revolving fallowing of agricultural lands, watershed protection and management, surface and ground water storage alternatives, desalination, and weather modification. Based on the findings, the WSWC should initiate discussions on an interstate level to optimize appropriate opportunities to ensure that adequate supplies of suitable quality are available to sustain the growth and prosperity of western states.

- The WSWC should hold a workshop in collaboration with relevant federal agencies and other stakeholders to evaluate federal and state watershed programs and strategies, and examine in particular the commitment of resources to the watershed approach and the level of coordination among federal agencies and between federal and state agencies, Tribes, conservation districts, municipalities, NGOs, etc.

3. Water Infrastructure Needs and Promising Strategies for Meeting Them

Recommendations:

- The WGA should support continuing stable federal State Revolving Fund appropriations at a level of \$1.35 billion for the Clean Water SRF and \$850 million for the Drinking Water SRF, increased annually by a construction inflation index. Further, states need flexibility and fewer restrictions in addressing their priorities.
- The WGA should urge Congress to increase appropriations from annual receipts (now over \$1 billion) accruing to the Reclamation Fund, for authorized Bureau of Reclamation projects and purposes, to help meet western water supply needs, especially for rural communities, to maintain and replace past projects, and to build new capacity necessary to meet demands related to growth and environmental protection.
- The WGA should ask Congress to enact S. 895 ("The Rural Water Supply Act of 2005") to assess rural water supply needs and authorize federal loan guarantees under Title II to better enable non-federal project sponsors to obtain private financing for reimbursable extraordinary operation and maintenance, rehabilitation and replacement costs.
- Congress needs to enact new authority for the U.S. Army Corps of Engineers, the Water Resources Development Act (WRDA), which includes many projects important to the West, and carefully consider planning and prioritization changes to encourage achievement of the maximum regional and national benefits.

- The WGA should encourage all levels of government to maximize opportunities for a coordinated regional and/or watershed approach under state and federal water pollution control laws to source water protection, stormwater management and non-point source pollution.
- The WSWC should identify the beneficiaries of our existing water infrastructure and opportunities to expand the range of interests to build a coalition to support necessary funding, as well as evaluate any opportunities to consolidate delivery of water-related services.
- The WSWC should identify successful water resources-related infrastructure and natural resources management partnerships and evaluate organizational opportunities for public/private, federal/state/local, agency/ agency, agricultural/urban and other effective partnerships.
- The states should develop coordinated public education and other outreach programs to help survey and communicate the need for adequate public infrastructure investments at all levels of government, highlight the consequences of a failure to address our present problems, and stress the need to price water-related goods and services so as to allow for necessary capital budgeting for project rehabilitation and replacement.
- The WSWC should organize a series of ongoing biennial symposia designed to: (a) bring stakeholders together to try and find ways to meet our growing western water, wastewater, watershed protection and restoration, and public safety-related infrastructure funding needs; (b) find ways to quantify, evaluate and prioritize funding those needs; and (c) highlight the benefits of integrated watershed, river basin, regional and interstate planning and management.

4. Resolution of Indian Water Rights

Recommendations:

- Reaffirm the resolution of the Western Governors' Association on settlement of Indian water right claims.
- Building on the successes of the past two decades, the WGA should engage Congress in an important discussion of what federal policy should be and how these settlements can be funded.

- The WGA should appeal directly to the new Secretary of Interior to begin a meaningful dialog on the Departments' trust and programmatic responsibilities related to Indian water right settlements.

5. Preparations for Climate Change Impacts

Recommendations:

While recognizing the uncertainties inherent in climate prediction, efforts should be made to focus on vulnerabilities and building increased resiliency to climatic extremes.

- **Data Collection**
The federal agencies must continue and expand funding for data collection networks and activities necessary for monitoring, assessing, and predicting future water supplies as addressed earlier herein by the Water Needs and Strategies group recommendation.
- **Improved Prediction, Modeling, and Impact Assessment**
The Western Governors should urge Congress and the Administration through the Climate Change Science Program (CCSP) to fund research for improving the predictive capabilities for climate change, and assessment and mitigation of its impacts. Additionally, given the complex climatology in the West, it is important that climate change modeling be conducted at a much finer resolution, e.g. watersheds and subwatersheds. It is also important that the federal government implement research funding recommendations associated with Goals 4 and 5 of the 2003 CCSP Strategic Plan, including the area of increased partnerships with existing user support institutions, such as state climatologists, regional climate centers, agricultural extension services, resource management agencies, and state and local governments.

- State Planning

1) The Governor of each state should direct their state climatologist, relevant water and environmental agencies, and universities to assess historical, current, and projected climate trends for their particular state and relate these to potential changes in water supply and water quality, in order to prepare for and mitigate the impacts from climate change and climate variability. Such assessments should include an inventory of data sources available for each state, with analysis appropriate to watershed-level management. The Governors should seek necessary funding to support these activities.

2) States should maintain various water-related plans, including state water plans, watershed plans, state drought plans, reservoir management plans, flood plans, etc. These plans should be expanded or enhanced accordingly to include climate change scenarios. Particular emphasis should be placed on climate change within the context of watershed planning. States, similarly, should expand or enhance other state plans that include water-related concerns—such as forest management, energy, and economic development plans—to include the impact of climate-change scenarios.

3) States should coordinate with and include local governments in their climate change planning efforts. Local governments are an ever-increasing player in water issues, for example, through land use policies, as the developer of new water supplies, water transfers, and in implementing water restrictions and water use efficiency programs.

4) States should evaluate and revise as necessary the legal framework for water management to the extent allowable to ensure sufficient flexibility exists to anticipate and respond to climate change.

- Ongoing Coordination & Information Sharing Between Scientists, Policy-Makers, and Water Users

The Governors should convene ongoing, broad stakeholder meetings between state water managers, local water supply managers, scientists, federal agencies, universities, and others to make sure water managers understand what the science is saying about climate change and what new tools exist, and, conversely so that scientists understand the data and research needs of water managers and users.

6. Coordination and Cooperation in Protecting Aquatic Species under the Endangered Species Act

Recommendations:

- Working with representatives of the federal implementing agencies, and soliciting input from other federal agencies and stakeholders, western state representatives under the auspices of the WSWC should establish a protocol outlining objectives and principles for implementing ESA Section 2(c)(2). Its objective should be to minimize conflicts arising between the use of water for the needs of listed species and other water uses and to foster cooperation and consultation between Federal and State governmental entities to enhance species protection and recovery, while protecting rights to water use.
- Identify tools under western state water law that can be used to provide water for threatened and endangered species protection.

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