DRAFT 9/26/97

SECTORAL CONFLICTS OVER WATER:

RESOLVING TENSIONS AMONG AGRICULTURAL, MUNICIPAL AND INDUSTRIAL, AND ECOLOGICAL DEMANDS

by

David H. Getches
Raphael J. Moses Professor of Natural Resources Law
University of Colorado School of Law
Campus Box 401
Boulder, Colorado 80309-0401
Telephone: 303-492-7377; fax: 303-492-1200
E-mail: getches@spot.colorado.edu

Rosenberg International Forum on Water Policy
September 29-30, 1997
San Francisco, California

SECTORAL CONFLICTS OVER WATER: RESOLVING TENSIONS AMONG AGRICULTURAL, MUNICIPAL AND INDUSTRIAL, AND ECOLOGICAL DEMANDS

by
David H. Getches

ABSTRACT

Competition among sectors for water use has intensified with global trends toward urbanization and increased environmental consciousness. Sectoral demands today can be grouped as: **1) agricultural, 2) municipal and industrial, and 3) ecological**. Resolving them calls for designing or reforming water institutions, including laws and the agencies that administer them, to respond better to multiple interests.

To be effective in avoiding or resolving modern sectoral conflicts, institutions should be guided by principles of **efficiency, equity, ecological sustainability, and balance**. These principles are supported by a growing consensus of experts and governments as reflected in a number of international consensus documents.

Experiences in the United States, both successful and unsuccessful, suggest the characteristics of a legal and institutional framework that comports with these principles. The institutional arrangements that tend to prevent or facilitate solving sectoral conflicts should meet the following criteria:

- **integrate functions** like managing groundwater and surface water and water quality and water quantity,
- have truly **comprehensive**, dynamic programs for **water planning**,

TYPES OF SECTORAL DEMANDS FOR WATER

Water uses by various sectors can be grouped according to common characteristics that have political, social, and economic significance. These groupings are therefore helpful identifying and resolving conflicting demands for water. The three types, or groups, of sectoral demands are agricultural, municipal and industrial, and ecological.[1] Agricultural demands fit the ordinary conception of a single "sector" while the other two categories of demand include several sectoral uses.

Agricultural Demands

Agricultural uses include all uses of water for food production. Food processing, however, is probably best considered as part of the industrial demand for water. Worldwide, and in all but the smallest countries, agriculture accounts for most of the water withdrawn and most of the water consumed. (World Resources Institute 1993)

Agricultural water demand is characterized by: 1) relatively high consumption, 2) historically gradual expansion, at a pace slower than population growth, 3) strong political support; and 4) low economic value.

Municipal and Industrial Demands

Included within this category of uses are all demands for domestic, manufacturing, and heating and cooling. A major sub-category or sector is energy use. Demands for hydroelectric power generation dominate many rivers and account for most of the major dam development in the world today. Municipal uses also encompass some incidental uses for irrigation of home

---

1. Navigation (other than recreational boating) is not here considered and it does not fit easily into any of the three categories.

gardens, for recreation (*e.g.*, pools), and for aesthetics (*e.g.*, fountains).

The overall consumption of water for municipal and industrial purposes is less than agricultural. Only a small part of domestic use is essentially consumptive -- the portion that humans need to survive and the evaporation or other unrecoverable system losses associated with domestic uses such as washing and gardens. Industrial uses also consume water by incorporating it in products (*e.g.*, beer) or through processing losses by evaporation or chemical alteration (contamination). The largest type of demand in this category is for hydropower and it is virtually non-consumptive.

The defining characteristics of this set of sectoral demands are that they generally: 1) are a function of population and economic expansion; 3) are politically influential based on economic power rather than popular sentiment; and 4) have high economic values.

Ecological Demands

Even more varied than municipal and industrial demands, ecological demands include a potpourri of uses. Notions of obligation to nature and to future generations underlie some demands. Beyond the demand for preservation of the natural environment for scientific and moral motives, sustaining natural flows and water in place satisfies recreational, aesthetic, and other basically human desires. Some of these can be translated into considerable economic value. Tourism and outdoor recreation are among the fastest growing sectors of some economies and these uses are often water-dependent (e.g., fishing, hunting, boating) .

Although the uses in this category are sought for varied motives, they share the characteristics of: 1) requiring almost no consumption but rather that water be kept in its natural course (though sometimes enhanced in flow or volume); 2) demanding relatively high volumes

with little possibility of substitutes; 3) enjoying strong popular support; and 4) being so diverse that it is difficult to organize the users to participate effectively in economic markets.

THE CAUSES OF SECTORAL CONFLICTS

Growth in Urban Demand

The world is becoming more urbanized. In 1920, approximately 100 million people lived in urban areas. In 1980, that number reached 1 billion and it is estimated that by the year 2025 it will have risen to 5 billion people, or 60% of the world's population. (World Commission on Environment and Development 1987) This concentration of population drives municipal and industrial demand and it brings inexorable pressures on water supplies, accentuating competition with the other sectors. Where established water users, primarily agricultural irrigators, control most of the available supplies, it is usually possible for municipalities or industries to buy out rights or to convince political decision makers to allow water to be shifted to urban uses. The shift of water resources away from arable land and to municipal and industrial uses for the sake of urban areas arouses concerns about whether agricultural production can keep up with the food-supply needs of an ever increasing global population. (McCaffrey 1997)

In the case of the Arkansas Valley in Colorado, vast areas of farm land were purchased by cities such as Colorado Springs. The cities wanted to the rights to use water that passed with the land. Today that farming region is being dried up, with major shifts occurring in its economy and culture. (Howe 1990) Some of China's richest farm land, and some 1,400 ancient rural communities occupied by populations of farmers, will be inundated to allow for the gigantic Three Gorges Project to develop hydroelectric power that is motivated primarily by the government's desire to satisfy municipal and industrial energy demand. (Zitch 1997)

Increased Ecological Consciousness

Although population growth has brought the most palpable pressures on existing and undeveloped water supplies, the "newest" group of sectoral demands is surely ecological. And while the competition between existing agricultural uses and new municipal and industrial uses is keen, tensions over *new* M&I supplies are primarily with ecological demands.

In recent years the public has gained a greater understanding of ecological science and the importance of biodiversity. This has increased the political influence of ecological interests. The ideal of sustainability has national and international importance as evidenced by the international adoption principles that express a high level of consensus. The flurry of activity leading up to and following the United Nations Conference on Environment and Development in Rio de Janiero in 1992 is evidence of the scope of concern and agreement. (Wirth 1993) The notion of sustainability facilitated political acceptance, even in developing countries, of the idea that nature deserved respect in development decisions. Sustainability imported the concept of development accountable to future generations rather than simply preservation for its own sake. (World Commission on the Environment and Development 1987)

In the US, the popularity and political acceptance of ecological values is evidenced in environmental laws passed beginning in the 1970s. Laws that affect water development and use include programs for species protection, wetlands preservation, assessment of environmental impacts, and water quality control. These laws now are more influential in limiting the extent and type of developing new water supplies in the United States than the norms styled as "water laws" which traditionally govern allocation of quantities of water.

The general public today has little tolerance for environmentally destructive projects.

Indeed, national polls regularly indicate a willingness to pay costs of stricter regulation. (Obmascik 1995) Citizens are willing to forgo projects in order to protect the environment In Denver, sentiment ran against the proposed Two Forks Project of the Denver Water Department, even among Denver citizens who would use the water, though the project was stopped not by a vote but a decision of the US Environmental Protection Agency. (National Research Council 1992) The veracity of responses to public opinion polls, if not all the conclusions that are sometimes extrapolated from them, is corroborated when decisions have been submitted to the voters. Californians passed a referendum in 1996 to tax themselves nearly one billion dollars for environmental projects. (Dow Jones 1996) The revenues are being used in part to remedy problems of the San Francisco Bay Delta caused by water development in the Sacramento and San Joaquin Rivers, an issue discussed in the final section of this paper.

Relation to Transboundary Conflicts

Conflicts among sectors tend to stop at state or national boundaries. Governments and often citizens generally assume that *any* use within their borders is superior in importance to any outside use, regardless of economic values or human concerns. This chauvinistic impulse is tempered by the application of legal doctrines such as the equitable apportionment principle applied by the Supreme Court in litigation over allocation of interstate waterways in the United States instead of applying strict priorities that would give absolute advantages to the earliest or upstream users. (Tarlock 1985) Thus, the Court takes account of the social and economic importance of water demands in the respective states, the availability of alternatives and conservation, and the nature of the watershed. Similarly, as Professor Lapidoth has explained, equity has become a source of law in international adjudication through the 1997 Convention on

Watercourses. That Convention, described in Professor Biswas's paper, includes many of the considerations applied by the US Supreme Court in interstate adjudications applying the doctrine of equitable apportionment. Faced with the application of equitable principles, parties may be more inclined to negotiate solutions that are rationally and fairly, based on multiple factors and with due respect for and participation by affected interests. The prospect of outcomes that do not reward a single party based on rigid legal rules or raw political power should force the negotiation of agreements. Thus, in the US we have twenty-two compacts allocating interstate waters.

RESOLVING AND AVOIDING SECTORAL CONFLICTS

Guiding Principles for Conflict Avoidance and Resolution

Some types of water allocation systems consciously attempt to be more conducive to forestalling conflict among sectors of water uses. Administrative systems generally consider more factors and interests in the course of approaching essentially discretionary decisions, while pure property systems (which are few) tend to be based on property rights and thus produce haves and have-nots, winners and losers. It is less important, however, what kind of allocation system–property rights or administrative–that is chosen than the values that may be expressed in the decision-making process. On the other hand, property-based systems can provide certainty that sometimes is fundamental to ensuring fairness without which there may be conflict. Ultimately, then, conflict may be lessened and a system most effective and efficient if it includes elements of different legal regimes for water allocation.

Certain value-based principles are essential to producing water allocation and management decisions that defuse or prevent conflict. The following principles emerge from

experience in the United States. They are also reflected as well in many documents representing international consensus on water management support the use of the following values or standards to evaluate legal frameworks. In particular, the Dublin Principles, the San Jose Declaration, and the Declaration of Buenos Aires all embodied the ideal of a balanced system that accounts for economics, fairness, and sustainable, integrated resource management. Similarly, the United Nations Conference on Environment and Development envisioned this type of approach to water issues in its Agenda 21.

Efficiency. Water allocation systems can ensure efficiency of use by a number of means. One is through the recognition of the economic value of water. Transferability of the right to use water–whether or not it is considered a "property right"–facilitates moving water out of wasteful, i.e., lower valued, uses. Old laws sometimes restrict transferability of water. Promoting efficiency demands changing these laws to allow water to be moved from less efficient to more efficient uses. (National Research Council 1992)

Similarly, market forces can help distribute water among consumers in accordance with its value to society. Low rates for water use promote wasteful uses and tend to deny water to other users and to deplete streams to the detriment of natural systems. A solution is to price water so that users are conscious that it has value and therefore they will be less inclined to waste it. Thus, water rates that escalate as consumption increases can discourage unnecessary use. In the long run, lower demand will, in turn, obviate or forestall the need to develop new sources, indirectly avoiding the conflicts that inhere in any major water development decision.

Most allocation decisions require some administrative judgments. They may involve choosing between competing uses or fixing conditions to be imposed on the water user. Both

types of judgment are opportunities for requiring efficient use. The necessity of an administrative role in ensuring efficiency is based on the unresponsiveness of water demand to changes in costs (inelasticity of demand). This is the result of two phenomena. First, the internal costs of producing water are chronically so low relative to the value produced by some uses, such as in the municipal and industrial sectors, that changes in price that result in water remaining relatively cheap do not send strong signals.

Further, the dominance of water development and supply by non-private entities lacking in accountability for the economic effects of their decisions has led to over-development of supplies and excessive use. In the western US, the federal government and special purpose districts have controlled most water development and much of its present use with little regard for cost, effectively providing massive subsidies for inefficient water use.

Uneconomic behavior by public water suppliers is typical. Even entities like cities, which are ostensibly responsive to the voters, often make economically inefficient decisions. In the Denver metropolitan area there are hundreds of water suppliers, virtually all of them cities or local districts with taxing powers. They are locked in keen competition with one another to control supplies of water far beyond any reasonable projections of demand, and no agency oversees the planning and overall pattern of water development. Furthermore, some of these entities have focused on expensive and less reliable sources of supply–transmountain diversions that remove water subject to junior rights from the western slope of the state and transport it over and through the Rocky Mountains–rather than cheaper alternatives such as purchases or leases of senior water rights from nearby agricultural users.

This phenomenon may be explained as consistent with a tradition of using structural

solutions rather than innovations based on negotiated arrangements. Another possible explanation is that public entities seek to avoid the political controversy connected with removing water from agriculture. The latter is a questionable explanation since some districts have appointed boards not accountable to political processes and cities have electorates that are not personally affected by the decision to retire water from agriculture. Furthermore, in a few notorious cases where cities have sought to acquire agricultural water rights they have seemed rather insensitive to political as well as economic consequences. For instance, when the City of Thornton sought supplies from established agriculture near suburban Denver a few years ago it proceeded, in a manner reminiscent of the City of Los Angeles's notorious raid on Owens Valley in the early twentieth century. Thornton anonymously purchased entire farms with the aim of simply drying them up, instead of pursuing more complicated but less controversial or expensive devices such as negotiating dry-year leases or conservation improvements and exchanges. This was followed by public outcry and legal action. (*Thornton, City of v. Bijou Irrigation Co.* 1996)

Market forces and pricing remain important tools in ensuring greater efficiency of water use. These approaches are especially useful where water can be transferred between and within sectors to more valuable uses. If prices can be increased sufficiently to reduce consumer demand, it can forestall new water development. Price adjustments may require government intervention, however. This is because past government actions and investments have created subsidies and other distortions that need to be corrected and because the institutions created by governments to be responsible for water decisions have proved to be unresponsive to market forces. In any event, unless the huge negative externalities caused by past water development and present water uses can be reflected in water prices, true efficiency will be impossible to

achieve. Today many public water suppliers are prohibited from charging rates that are based on any more than their direct, unrecovered costs. Past investments as well as social costs are simply ignored, hidden from the market.

Another approach to promoting efficient use is to include regulatory requirements in the rules (in statute, case law, custom, or administrative rulings) that govern water allocation and management. In agriculture, a "duty of water" requirement can limit the overall quantity of water used for irrigation. In municipal uses, plumbing codes can require low-flush toilets in all new construction.

Equity. The "right" to use water has, from earliest times, been conditioned on the fulfillment of certain reciprocal obligations to society. (Aristotle) Ultimately, what is "fair" depends on a community-wide notion of equity. Thus, decisions and allocation methods must provide a means for involving diverse interests.

Because many water allocation systems were dominated by particular uses or interests in the past, rights to use much water today are distributed inequitably. Reallocation may be necessary to respond to a wider range of interests and to correct past misallocation. But reallocation that is involuntary and sudden can also be disruptive and introduce its own kind of inequity by disappointing expectations that are reasonable even if not entirely justified. This occurs when a court announces new principles to correct for the past disregard of certain interests. For instance, the state of California long ago granted the City of Los Angeles a right to take water from streams that feed Mono Lake near Yosemite National Park, and take it hundreds of miles south to the city. When it was discovered that the ecosystem of Mono Lake was being destroyed, the state supreme court ruled that Los Angeles's rights were not enforceable because

when they the state had not considered environmental effects. Since all the state's water is effectively held in a "public trust," the court said that rights granted without a full consideration of all the public's interests were unlawful and could be reconsidered. (*National Audubon Society v. Superior Court of Alpine County* 1983)

Highly politicized systems tend to disregard minorities; highly marketized systems tend to disregard interests with low valued uses and groups of individuals who are not organized to participate. Typically, the diverse groups and individuals who advocate protection of instream flows are widely dispersed and it is difficult to organize them to engage in bargaining and cost-sharing. Consequently, it is the role of government to promote equity by representing and protecting evasive public interests in water.

Ecological Sustainability. Efficiency and equity focus on how to allocate water among fundamental human demands. Ecological values, however, are not limited to satisfying the needs and desires of people. A free-flowing stream can support a recreational boating business but water flows may be compelled at times and places and in quantities that do not provide for any human uses.

The best examples of the impact of relatively pure ecological motives driving water decisions arise under the United States Endangered Species Act (ESA). The Act demands that the federal government refrain from any action that would jeopardize the continued existence of any animal or plant species that has been identified and officially listed as "endangered." Because of the high level of development of most rivers in the arid western United States, the ESA, more than any law specifically addressed to water allocation, is the throttle on future water development.

In the Pacific Northwest, the Columbia and Snake River system has been heavily developed, mostly by the federal government, primarily for hydroelectric power but also for irrigation and, to a lesser extent, for navigation. The Columbia River has the distinction of being the most developed river in the world. Only one fifty-mile stretch of its twelve hundred miles remains "undeveloped", less than five percent of its length from the Bonneville Dam to the Canadian Border. The most notorious tragedy of development on the Columbia is that three-quarters of the historical salmon population no longer can survive in the River. (Wilkinson & Conner 1983)

Although the dams on the Columbia produce millions of dollars worth of energy annually, the Endangered Species Act demands that they be reoperated and in some cases retrofitted to reduce the impacts on endangered salmon. There is even discussion of removal of some of the dams for the benefit of several races of salmon which have become endangered.

Efforts are supported by more than a generalized ecological concern. The salmon fishing industry has produced rich financial returns and jobs that support many communities. (McGinnis 1995) In addition, the indigenous cultures of the Northwest are centered on salmon, much in the same way that the Plains Indians depended on the buffalo. (Getches 1996)

Even in the absence of complementary utilitarian motives the ESA has been applied to compel radical changes in water development and management. Thus, sustaining the habitat of fish that have no commercial or recreational value is now the single most influential factor in decisions to develop additional quantities of water from the upper Colorado River. Four states and the United States Fish and Wildlife Service have agreed to a plan that will allow limited development of the river but only with considerable investment in habitat improvements and

propagation efforts for species imperiled by the extensive past development of the river.

Balance. The goal of sustainability reflects the ideal of balance. Developing resources for present human needs but preserving sufficient resources for the use and enjoyment of future generations is an ethic that is widely accepted in international discussions of resource management. (United Nations 1992) Institutional structures, however, can make it difficult to realize balance in water decision making.

Present institutions in the US for allocating water were developed at a time when state officials were in the role of technical fact-finders and referees, charged simply with ensuring that sufficient water was available for a proposed use and that it would not conflict with the rights of a prior water user. Today, most of the agencies apply additional criteria, but virtually none has a system in place to make a balanced consideration of all factors. The challenge is to have an orderly, efficient system that fairly accounts for all legitimate interests. This requires more than giving an administrator (such as a state engineer) a longer checklist to consider before approving or disapproving an application for water rights. One way to achieve it is to introduce a dynamic water planning process that sets goals watershed by watershed, consistent with the social and economic direction of the region and state. Citizens and affected interests should be able to participate in designing and continually revising the plan in advance of actual proposals. The plan then guides administrative and judicial decisions. Systems like this work reasonably well in Kansas, Montana, and Oregon.

Markets are playing a larger role in water allocation, facilitating movement of water resources to higher value uses. But unbridled market forces can defeat the ideal of balance. Thus, changing laws to liberalize markets in water needs to be tempered with standards and

procedures that promote balance by allowing consideration of significant public values that are affected by a transfer, without making the process so cumbersome that transferability is defeated. (National Research Council 1992)

"Balance" does not suggest a mathematical formula for assigning values to various interests and reaching a quantitative result that drives a decision. Nor does it mean that all interests are to suffer equally. Instead, the ideal of balance should convey a careful consideration of the consequences in the decision making process. No interest should be excluded from consideration; none should have influence disproportionate to the value that society as a whole places on it. While it is difficult to evaluate social values precisely, it is possible to build checks into the system that prevent undue influence by interests that are politically or economically very powerful.

Almost any major water use requires trade-offs with other actual or potential uses. On-stream dams necessarily alter the natural environment; removing water from one area or sector of the economy will leave less available for others; forgoing a planned development will disappoint the economic expectations of the proponent. Those trade-offs should be considered rationally before a decision is made. This requires: 1) a mechanism to assess impacts - economic, social, and environmental; 2) full public participation; and 3) that no single interest can be able to trump others.

Elements of Legal Frameworks that Tend to Reduce Sectoral Conflict

Integrated Institutional Arrangements. Water laws often divide responsibilities for allocating and managing the use of water in ways that bear no reasonable relationship to either the nature of the physical resource or to its optimum use. Many states have different laws

governing the allocation of ground water and surface water, though the sources of water may be hydrologically connected. (Getches 1985) Although every use of water results in some contamination from the waters one agency typically has responsibility for water quality and another has responsibility for allocating water. Only two western states attempt to combine consideration of these two issues. (Getches, et. al. 1991)

The reasons that responsibilities are fragmented in water institutions are historical and political. The interconnection of groundwater and surface water that exists in the alluvia of most rivers was not always understood. The reaction of courts and legislatures was to treat them separately. So it was with the treatment of water quality and water quantity. In the United States, most state water allocation laws actually allowed a degree of pollution on the assumption that up to the point that another water user's use was impaired, there was no legal problem. Of course, at the point that cumulative effects precluded future uses there was a problem but no one was at fault. Later, it was necessary to create a separate regulatory program to deal with polluters. When the states did not act, the federal government took responsibility and passed the Clean Water Act. The Act restricts discharges of pollutants and mandates that states to pass implementing laws. Some states in the arid West passed these implementing statutes but, partly as an expression of their rivalry with the federal establishment, qualified them by saying that the laws could not affect the use of water under a water right. Not surprisingly, this hampered the effectiveness of water quality programs. In another context, the Supreme Court has recognized the quality-quantity connection and allowed a state's water quality standards established under the Clean Water Act framework to insist that minimum flows–a quantity of water–remain in a stream to ensure sufficient "quality" for fish. (*Washington PUD No. 1 of Jefferson County v.*

Washington Dept. of Ecology 1994)

In Idaho, after a court ruled that the priority system should be observed as between surface and groundwater users, the legislature acted to prevent the full implementation of the court's order. (*Idaho Dept. of Water Resources v. United States*) In that case, to integrate fully the administration of groundwater and surface water would have required cutting off efficient and economically productive new groundwater uses for the benefit of old, inefficient irrigators who take their water directly from the river. Failing to enforce priorities fully forces the inefficient seniors to drill wells to enable them to divert water no longer available from the river. That is precisely the result that a Colorado court said could be reached under administrative regulations. (*Alamosa-La Jara Water Users' Protection Association v. Gould*). A regulatory approach exposes the competing users market forces instead of giving absolute protection to the senior user and at the same time allows the agency to introduce a consideration of factors beyond the costs of drilling a well versus the benefits to reaped from use of the water in irrigation. Those factors range from the equities involved in requiring senior water users to drill wells to the environmental consequences of depleting a stream so completely that there is no usable surface flow.

Comprehensive Planning. Water planning has earned a poor reputation. In the past it has sometimes been a charade indulged to justify capital investments for major projects. The inadequacies of planning was addressed by some decision makers in the last two decades, mostly government financiers, insisting that the plans consider factors such as the impacts of proposed projects on the environment, costs and benefits, alternatives, and mitigation measures. For federally funded water projects in the US, this meant assessment of project proposals in an

environmental impact statement under the National Environmental Policy Act. In addition, the government adopted Principles and Guidelines that set certain minimum standards for projects. International funding agencies that historically paid little regard to the effects of water development on the environment, on local communities, or on indigenous people now are under pressure from non-governmental organizations and constituencies within and without the borrowing countries to account for these impacts before lending money.

Comprehensive planning for water includes all available sources of water and all reasonably foreseeable demands. Furthermore, it should include and be integrated with anticipated future requirements for recreation, land use, fish and wildlife, flood protection and other related issues. The danger of such a comprehensive approach is that an all-encompassing plan could become too rigid to accommodate changing conditions. To overcome this problem a process has to be developed in which there is dynamic, continual discussion and modification of the plan to keep it current with changing values and demands. It also has to have as substantial local component. River basins and sub-basins should be the units for considering plans in the first instance. Statewide and national interests can be factored into the process later as watershed plans become part of a larger state plan. (Getches 1988).

Open, Public Processes. Historically, in most of the western United States, only water users–people with water rights–were allowed to participate in hearings and other proceedings leading to decisions to allocate or change rights to use water. Today, almost all states include the public in some way in water decisions, often by the grace of the decision maker, sometimes by law. In Idaho the State Engineer makes major water allocation decisions and must consider the public interest. (Idaho Statutes, § 42-203A) Though not required to do so by statute, he

regularly invites representatives of the public to participate in hearings. The federal NEPA process also has provisions for public notice and participation concerning projects that require environmental impact assessment.

Of course, even the right to participate and be heard may be inefficacious unless there are groups or members of the public who can afford the necessary time and expertise. The costs may be prohibitive if there are large numbers of proceedings and in cases that are lengthy or technically complicated. There is no legal requirement in the US for funded participation by representatives of the public in water decisions. In the Province of Ontario, Canada, however, when major development projects (not specifically water) are proposed, a government agency can require the proponent (including another government agency) to fund public representatives, such a environmental groups, to participate in the process leading up to the decision. (Intervenor Funding Project Act 1988)

Demand-Side Management. Contests that result in denying a right to use water or which shifting the right to use a particular quantity of water from one sector to another at best leaves one party better off. But by increasing the efficiency of water use it is possible to develop solutions to water conflicts that produce better results for everyone concerned. For instance, municipal demand often can be satisfied with water now used in agriculture but without foreclosing future agricultural uses. The typically high level of inefficiency of agricultural uses offers an opportunity for municipal and industrial users to invest in efficiency improvements for existing agricultural users in return for the right to use the water saved. The often cited example of this approach is the Metropolitan Water District of Southern California's investment of $110 million to improve the facilities and practices of the Imperial Irrigation District in exchange for

the right to use about 100,000 acre-feet of water that would be conserved in the process. (Bates 1993)

Mechanism for Ensuring Balance among Sectors. Some sectors are inherently more powerful than others politically or economically. Even assured of input procedurally other sectors may be at a disadvantage. Thus, an endangered species may need to be protected under a strong statute while a water developer may have sufficient influence to protect its interests by virtue of its economic power. Likewise, a large city may have enough political power to protect its interests and influence a decision on the question of whether to export water from an agricultural part of the state, while the rural, agricultural region of the state with a small population may be at a political disadvantage without protective legislation.

Specific legal requirements concerning water use can help to correct for imbalances in political or economic power. One way to achieve this is to protect directly the interests of the public related to water. Many state laws ensure that streamflows (or lakes) do not fall below critical levels at certain times of the year. These laws address public interests from recreation to fish and wildlife to water quality. Few instream flow laws, however, have proved sufficient to protect the full range of public interests in flowing water. (Natural Resources Law Center 1993)

State instream flow laws vary, but rarely are effective in maintaining water levels in the driest time of the year when the protection of fish habitat is most critical. Most of these laws are of recent origin and state legislatures have been timid about passing laws that would interfere with existing uses, even when necessary to prevent serious harm to the natural environment. The rights that states obtain, then, are inferior to those of existing users. To obtain rights sufficient to protect the public interest in heavily used streams requires limiting diversions of water by

existing users who might dry up a stream and kill fish or do other environmental harm. Under the laws of almost every state, the government would have to *purchase* the right to do so from the private interests who now have rights to deplete streamflows.

Another problem with instream flow protection laws is that few states protect the full range of uses that depend on keeping water in natural waterways. Different states protect different types of uses but most protect only a few. The agency charged with administering Colorado's law has broad powers to hold rights to maintain streamflows to the extent "required to preserve the natural environment to a reasonable degree," but it applies the law to allow protection only for cold water (*e.g.*, trout) fisheries.

Environmental groups like the Nature Conservancy and the Trust for Public Land have invested in senior, enforceable water rights in order to maintain streamflows in connection with land purchases or to provide habitat for endangered species. Some landowners and entrepreneurs such as recreational boating companies, have also tried to invest in water rights for instream flow protection. These private entities have been frustrated by state laws that limit the ability of private parties to hold rights to instream flows, leaving the responsibility and privilege of stream flow protection with the state itself. Only Arizona and Alaska in the United States allow private ownership of rights to instream flows, severely curbing the potential for using private resources to invest in the protection of streamflows.

Procedural requirements or standards can enhance the balance in water decision making by forcing consideration of broad interests. Some states have laws that require administrators to identify the affected interests and to weigh them in specific decisions. Other laws mandate this consideration of interests in the planning process; the plans are supposed to set balanced goals

that will later guide administrators and courts in making individual decisions.

Most states in the western US have "public interest" or "public welfare" statutes. They have been of some value to interests who want to protect uses such as biological diversity, sport fishing, recreation, natural beauty, future economic growth or integrity of local communities. (Getches 1987) Idaho's law simply refers to the "local public interest" but the state supreme court has ruled that the term should be viewed expansively and that the state engineer in making decisions should weigh a wide range of factors in light of meanings given to references to the public interest in the laws of other states. Other states allow no such consideration. For instance, in Colorado where the key decisions about water allocation are made in special water courts, it is improper for the court even to consider evidence of factors affecting the public interest like the environmental consequences of a proposed water project. (*County of Arapahoe v. United States*) In Colorado, typically, the only forum for environmental and other public interest issues related to water allocation and development is a federal agency that has responsibility for administering a specific statutory program such as wetlands protection.

Large water development projects often require an environmental impact statement under NEPA because they involve a federal decision. This process also provides public input. The law does not, however, require that environmental harm be avoided or mitigated so long as information about the consequences is produced. Most countries and many states now have impact assessment processes. Some of those laws are stronger than NEPA in that they require mitigation or may be required of private projects, not only federal ones.

Effective Administration and Enforcement. When water law consisted of a simple system of priorities, enforcement was rather simple. If a farmer took water at a time or in an amount that

interfered with another's rights, the injured party took action by self-help or complained to an administrative official or the courts. Coping with the modern issues of multiple users from multiple sectors competing for scarce benefits from heavily appropriated streams commands a higher level of sophistication. It is not enough to have a system of allocative or management rules if they are not followed. It is particularly troubling, for example, to administer a statute that requires a certain quantity of water be left in stream if there is no means of monitoring actual depletions and flows and no way to cut off those who should not be diverting water.

Accessible Information and Data Systems. Avoiding and resolving conflict among water users can depend on the parties having reliable data available. Ideally, states will develop basin data on supplies, quality, demand, habitats, and demographics as part of their ongoing planning processes. Satellite technology is now available to monitor streams for dozens of parameters on a real time basis, year around. This can help not only with long-range planning and project specific allocation decisions, but with administration of existing rights, monitoring of quality for health protection, allocating responsibility for controlling quality, warning of impending floods, and many more purposes.

When regulation is based on inadequate data it can be imprecise and unfairly restrictive or inappropriately lax. The lack of baseline data on water quality is a chronic problem in the US. Controversies persist over the respective responsibilities of dischargers and whether the stream is being degraded or not.

As discussed in the final section, negotiated problem solving can assist in resolving many sectoral conflicts that are not easily addressed by established institutions. However, individual interests are unlikely to reach voluntary agreements with one another or with government

agencies to resolve conflicts among them, absent reasonably reliable information, including technical, scientific, demographic, or statistical data. Without it, parties will hesitate to make binding commitments. A solution could unravel causing dislocations if it was based poor or inaccurate data. Sound information and data undergird solutions to transboundary water problems as well. The states of Texas and New Mexico negotiated a contract to resolve their dispute over the Pecos River. They agreed to maintain river conditions as they existed the year before the compact. To evaluate what those conditions were, they engaged an engineering advisory committee. The Committees' formula later proved to be wrong, but it was built into the compact. Once the facts were known, Texas sued New Mexico, arguing that it had been denied over one million acre-feet of water. The Supreme Court ruled that a court-appointed special master should revise the formula and retroactively apply it. Both states objected to the Master's resolution but the Court accepted it. (*Texas v. New Mexico*, 1983).

Opportunities for Extraordinary Dispute Resolution Processes

For several reasons, it would be unrealistic to rely on institutional reforms to avoid or resolve all the problems of sectoral conflicts in water. Political, historical, and cultural barriers are bound to prevent institutions from achieving the ideal and so practice will invariably fall short of perfection. In any event, there is no perfect, all-purpose system; institutions "ideal" for preventing or finding solutions to agricultural-municipal conflicts may be inadequate to deal with a conflict between hydroelectric generation and fisheries. Further, the performance of institutions depends on the skills, commitment and temperament of people who are currently involved in administering the system and ultimately responsible for making and implementing solutions. Therefore personal factors can delay solutions, defeat processes for inclusion and

participation, and exacerbate conflict. Beyond the inherent imperfections in any institutional arrangements, a system designed to deal with "typical" conflicts among sectors is often inadequate to produce solutions to especially complex or controversial matters. That institutions are less than optimal in their structure or performance is inevitable and institutional inadequacies should not become an acceptable excuse for problems remaining unresolved.

Consequently, it is not surprising that solutions to the thorniest water conflicts often are developed outside the usual institutions and processes for decision making, usually through negtiation. This is the lesson of the most celebrated recent examples of water problem solving in the United States. The parties to some of the most contentious and significant water problems have made remarkable progress toward solving them by going "outside the system." This does not prove that present institutions must be scrapped because they are inadequate to solve every problems. Nor does it mean that institutional reform and improvement is unnecessary or superfluous. But it does illustrate the advantage of not confining parties to established institutions to address problems.

Recognizing a growing intensity and frequency of conflicts over water, top officials in the western United States came together in the early 1990s to struggle with how to improve their water laws and institutions. The Western Governors' Association and the Western States Water Council convened groups of water leaders and experts for workshops four times over a two-year period and developed what became known as the Park City Principles. These principles can be used to guide systemic improvements in water management by the states and the federal government. They comport closely with elements of the institutional framework for avoiding sectoral conflict discussed above. In particular, the principles counsel recognition of the diverse

interests in water, including relatively new resource values such as ecosystem integrity, a holistic approach to problems that cut across agency and disciplinary lines, flexibility and the ability to act in the face of uncertainty, more decentralized authority and accountability for decisions, emphasis on mediation and market-based solutions, and broad-based participation by and between federal and state governments in their respective policy development efforts. (Bell, et al. 1996). One of the most striking facts that emerged from the Park City workshops, however, was that the case studies of successful problem solving in water that were examined in depth were the largely the result of *ad hoc* negotiation efforts, outside established institutions. At least the methods used for reaching solutions in those cases suggested possible innovations that could be institutionalized and specific inadequacies in basic systems that could be remedied. It was from those experiences that many elements of the Park City Principles were generalized. But a further lesson may be that there are some problems that demand unique treatment and would probably escape solution even within a substantially improved institutional setting.

Truckee River-Pyramid Lake. An example of a set of water issues that could not be solved within the usual system is the Truckee River-Pyramid Lake conflict. Beginning early in this century the Pyramid Lake Paiute Tribe of Indians in Nevada sought to have the Department of the Interior as its trustee and representative claim adequate water rights to maintain a fishery in the lake that was surrounded by the tribe's reservation. The same department, however, also oversees the Bureau of Reclamation which has responsibility for a water project that takes most of its water from the Truckee River to irrigate non-Indian owned farms. As the lake level on the reservation dropped some seventy feet, the fishes that the tribe traditionally relied upon for a livelihood–the cui-ui and Lahontan cutthroat trout–were driven to the brink of extinction.

The tribe became embroiled in a saga of legal action that spanned seventy years. It eventually got a court to order the Department of the Interior to adopt new regulations to curtail the waste of huge quantities of water by the non-Indian irrigators. Ultimately the judicial process proved inadequate, however, to enforce the tribe's rights fully. Even after the tribe succeeded in proving that the United States had compromised its advocacy of the Indians' rights because of its reclamation responsibilities, the Supreme Court denied the tribe the ability to claim the full extent of its rights because too much time had passed and too many people had relied upon the water that the tribe could have claimed.

Not only did tribal water claims go unsatisfied, but the demise of the fishery conflicted with the federal Endangered Species Act, involving the US Fish and Wildlife Service. The tribe also had to pursue continuing legal action to force the irrigation district to obey the agency regulations prohibiting waste. To complicate matters further, the "waste" actually was supplying a large wetlands area of the Lahontan valley that had become a wildlife refuge. Meanwhile, cities, like Reno, upstream from the Indian reservation demanded more water for their rapidly growing populations, as did a power company that stored and released water along the Truckee River to produce electricity. Beyond this there were pollution problems caused by sewage return flows from the upstream cities. Furthermore, Nevada was contending with California over the respective rights of the two states to water from the Truckee, which originates in Lake Tahoe at the California-Nevada border.

By the late 1980s, five cities, one local and two national environmental groups, the two states, the power company, and several federal agencies as well as the tribe and the non-Indian irrigation district were involved in aspects of the Truckee River-Pyramid Lake conflict. Virtually

every sector of water demand was vying for the resources of the Truckee. Pressured by the tribe, the newly elected US Senator Harry Reid convened the parties for a mediated negotiation of the multi-faceted conflict. This led to agreement on the terms of a settlement that was embodied in legislation passed by Congress in 1990. The settlement resolved the interstate dispute, allocated water among the upstream users under an operating agreement that provided increased flows into the lake, provided federal funds, to buy out existing irrigators and to support acquisition of land and water rights needed for fish species recovery and for wetlands protection, and required more efficient operation of the irrigation project. While the legislation was a great accomplishment, there are still disputes over some matters that were not covered in it and over the settlement's implementation. But a framework for addressing the problems is in place, and negotiations continue.

San Francisco Bay - Sacramento -San Joaquin Delta. The Bay-Delta issue is another example of a highly complex water dispute that could only be resolved by creating a special process for that purpose, apart from existing institutions. The delta of the Sacramento and San Joaquin Rivers is in San Francisco Bay. An incredible fifty per cent of the state's surface water run-off passes through the delta. For this reason water developers long ago targeted it as a source of water to be used statewide. Both the State Water Project and the Central Valley Project pump huge amounts of water form the delta and transport it through canals hundreds of miles south where it is used by large, productive farms in the central valley and by residents of the Southern California megalopolis. The delta and its tributary rivers also supply water directly to northern California industries, cities, and farms. Depletion of the outflow of fresh water into San Francisco Bay causes a "reverse flow", admitting salt water upstream into wetlands and critical

fish habitat. It also degrades water to the point that it cannot be used for municipal and industrial purposes without treatment.

The intrusion of salt-contaminated water into the delta conflicts with the federal Clean Water Act. That Act, however, is implemented according to standards set by the state. The State Water Resources Control Board is charged with setting water quality standards but its attempts to do so were frustrated for ten years by legal and political maneuvers. Political tensions were caused by geographic as well as sectoral conflicts. Most of the water diverted from the delta serves users far away in the south. The question was how to allocate the burdens of complying with legal standards among users equitably. At one point the federal Bureau of Reclamation, as proprietor of the Central Valley Project challenged the legal authority of the state to modify the amount of water it could take in the exercise of its water rights. The US lost this argument. (*United States v. State Water Resources Control Board* 1986) Subsequent water quality plans were challenged by water users, disapproved by the EPA, or withdrawn under political pressure. In 1987, for instance, the EPA disapproved the Board's plan because it was not adequate to protect the striped bass.

By 1993 two species of fish in the delta had been listed as endangered and came under the protection of the Endangered Species Act. This gave the United State even more responsibility over water in California and compliance with the ESA would demand that more water be denied to agricultural and municipal users for the sake of fish. In 1993, California's governor caused a confrontation with the federal government when he ordered the Board to withdraw its current plan, which still had not yet been approved under the Clean Water Act. After a state agency fails to promulgate adequate water quality standards it becomes the job of the federal Environmental

Protection Agency (EPA) to take control. With the state's abrupt refusal to continue trying, EPA's forbearance ended. Federal officials, however, preferred for both philosophical and legal reasons that there be a state program for solving the problems rather than an assumption of federal control in water allocation, an area customarily left to the states.

Supported by pressure brought by urban water users and business leaders, the federal government led an effort to convene all the affected interests, not just the state officials who had either failed in their attempts or abdicated the state's responsibility. Complicated negotiations commenced, with scientific and technical experts assigned a variety of tasks, and policy experts and interest group representatives operating on related but parallel tracks. Environmental groups played a major role and have been cited as especially constructive in promoting a final settlement. Some of the "negotiation" included strategic use of the news media by the state and federal officials that was designed to get public awareness of the issues and support for positions.

The Bay-Delta Accord was reached in December, 1994. It set monthly limits on the amount of water that could be diverted out of the delta, prescribed water quality monitoring criteria, made a federal promise to buy any additional water needed for endangered fish if the plan proved inadequate to protect them, committed $10 million in funding by municipal water users for costly fish screens and other protective measures, and embodied several other important agreements. The final agreement was signed by the state, the federal agencies, agricultural water users from throughout the state, the major municipal user from Southern California, and environmentalists.

Watershed Organizations. Not only large, complex problems can benefit from unconventional approaches. A recent study chronicles nearly eighty examples of *ad hoc*

negotiated problem solving that occurred at the watershed and sub-watershed level. (Natural Resources Law Center 1996) Most were locally initiated. Typically watershed organizations involve relevant governments–federal, state, tribal, and local–but control is generally shared among non-governmental and governmental interests. Participants come together to reconcile the competing uses of resources that important to them for often divergent reasons, such as when a river is valued by different people as a fishery, as a symbol of the community it runs through, as a source of irrigation water, as a place to kayak, and as a receptacle for wastewater. Or participants may be motivated by centrally developed legal requirements or standards that will leave management of a resource in federal (or state) hands if they do not devise a plan of their own. Often, they have become disillusioned with the inadequacy of existing institutions. Unlike the example of overly complex problems that overpower existing institutions, at least some of these small watershed efforts might have been resolved within the system if it functioned better. The inadequacy of existing decision making institutions does not fully explain the parties' motives in most cases, however.

An interesting example of ad hoc watershed-level problem solving arose in the Henry's Fork watershed in eastern Idaho and western Wyoming at the southwest corner of Yellowstone National Park, near the Teton Mountains. Irrigated farmland produces potatoes, hay, and grains. The Henry's Fork River and its tributaries support several hydropower developments and a world-class trout fishery. By the 1980s, increased demands for irrigation water, hydropower development, and instream flows for recreation and fisheries created conflict. Residents were concerned about a general deterioration in water quality and fish habitat. They disagreed, however, about how the basin's water resources should be managed; over twenty-five federal,

state, and local agencies had management or regulatory jurisdiction. Two events convinced local interests that they should collaborate in finding solutions to water-related problems. First, a canal was breached during construction of the Marysville Hydroelectric Project, sending 17,000 tons of sediment into the river, severely degrading trout habitat. Three months later, another 50,000 - 100,000 tons of sediment spilled into the Henry's Fork after the Bureau of Reclamation drew down Island Park Reservoir attempting to kill unwanted fish.

An acrimonious debate erupted between irrigators and newer residents who were interested in fishing and preservation of natural amenities and the irrigation district and a local environmental group were locked in conflict. At a community meeting, however, they agreed to form the Henry's Fork Watershed Council. The purpose of the council was to create jointly a new, consensus-based approach to the resolution of watershed issues.

Today, all new projects proposed by government or private agencies that would affect the watershed are evaluated by the council to determine whether projects will benefit the watershed. The council then makes recommendations to the agency or party that proposed the project. Though the council has no official authority to enforce its recommendations, it has *de facto* power. Agencies and private parties, recognizing the credibility of council's process, usually will modify, accept, or reject projects based on the council's recommendations. The council's influence is enhanced because it was endorsed by the Idaho State Legislature in 1994. It is also respected because members and participants represent a broad range of interests and agencies. Monthly council meetings are well-attended and provide a comfortable forum. Besides reviewing proposed projects, the council has become a source of comprehensive watershed information, and there are plans to establish a watershed resource center to provide a central library and

database repository.

Both the Truckee River and the Bay-Delta compromises depended on the participants to appreciating the need to step outside the system, their willingness to participate in the efforts, and their acceptance of the results. Similarly the several small, *ad hoc* watershed efforts that are emerging throughout the US, like the Henry's Fork example, could not have succeeded if parties were confined to the rigors–and occasional inefficacy–of existing processes. For these efforts at collaborative, negotiated problem solving to realize their potential. there must be tolerance in the laws and institutions and among parties for non-system approaches.

CONCLUSION

Water allocation and management systems are most likely to provide orderly and successful mechanisms for avoiding and resolving conflict among the different sectors of water demand if they promote efficiency, equity, ecological sustainability and balance. These principles are supported by consensus among those who have studied water and natural resources issues around the world and they provide benchmarks for designing or improving water institutions and laws.

I have identified, based primarily on experience in the United States, several elements that characterize the kinds of institutions best equipped to find solutions to conflicts among sectors concerning water allocation and use. Yet, it must be recognized that achievement of these goals is neither necessary nor sufficient to deal with the most difficult problems of water allocation and management. Consequently, I have suggested that parties need to be able to "escape" from the system to seek *ad hoc* solutions through extraordinary processes in extraordinary circumstances.

REFERENCES

Aristotle, THE POLITICS 1330 A-B.

Bates, Sarah F., David H. Getches, Lawrence J. MacDonnell & Charles F. Wilkinson, SEARCHING OUT THE HEADWATERS (1993).

Dow Jones News Service, *Calif. Prop. 204 Gives Stability for Water Suppliers*, New York (Nov. 7, 1996).

Getches, David H., *Colorado River Governance: Sharing Federal Authority as an Incentive to Create a New Institution*, 68 UNIV. COLO. L. REV. 1 (Summer 1997).

Getches, David H., *Changing the River's Course: Western Water Policy Reform*, 26 ENVIRONMENTAL LAW 157, Northwestern School of Law of Lewis & Clark College (Spring 1996).

Getches, David H., *Water Planning: Untapped Opportunity for the Western States*, 9 J. ENERGY L. & POL'Y 12 (1988).

Getches, David H., *Controlling Groundwater Use and Quality: A Fragmented System*, 17 NATURAL RESOURCES LAWYER 4 (1985).

Getches, David H., Lawrence J. MacDonnell, and Teresa A. Rice, CONTROLLING WATER USE: THE UNFINISHED BUSINESS OF WATER QUALITY PROTECTION, Natural Resources Law Center (1991).

Getches, David H., WATER LAW IN A NUTSHELL, 3RD. ED. (1987).

Endangered Species Act, 16 U.S.C.A. § 1531-1544 (West 1985 & Supp. 1997).

Engelman, Robert & Pamela LeRoy, POPULATION ACTION INTERNATIONAL, CONSERVING

LAND POPULATION AND SUSTAINABLE FOOD PRODUCTION (1995).

Howe, Charles W., *The Economic Impacts of Agriculture-to-Urban Water Transfers on the Area of Origin: A Case Study of the Arkansas River Valley*, 72 AM. J. AGRIC. ECON. 1200-1204 (1990).

Idaho Statutes, § 42-203A.

Intervenor Funding Project Act, Ont.Stat.ch.71 (1988) .

McCaffrey, Stephen, *The Coming Fresh Water Crisis: International Legal and Institutional Responses*, 21 VT. L. REV. 803 (1997).

McGinnis, Michael V., *On the Verge of Collapse: The Columbia River System, Wild Salmon and the Northwest Power Planning Council*, 35 NAT. RESOURCES J. 63 (1995).

National Research Council, National Academy of Sciences, WATER TRANSFERS IN THE WEST (1992).

Natural Resources Law Center, University of Colorado, THE WATERSHED SOURCE BOOK (1996).

Natural Resources Law Center, University of Colorado School of Law, INSTREAM FLOW PROTECTION IN THE WEST (Rev'd Ed.1993).

National Environmental Policy Act, 42 U.S.C. §4332(2)(C) (1994).

Obmascik, Mark, *No weatherman needed to feel wind blowing*, THE DENVER POST (Dec. 2, 1995).

Pryor, *Environmental Safeguards in Jeopardy*, ST. LOUIS POST (Dec 14, 1994).

Richardson, *Water and Rice: Crisis Lies Ahead*, INTERNATIONAL HERALD TRIBUNE (Oct. 26, 1995).

Rieke, Elizabeth Ann, *The Bay-Delta Accord: A Stride Toward Sustainability*, 67 U. COLO. L. REV. 341 (1996).

Tarlock, A. Dan, *The Law of Equitable Apportionment Revisited, Updated and Restated*, 56 U. COLO. L. REV. 381 (1985).

United Nations Conference on Environment and Development, AGENDA 21, U.N. Doc. A/CONF.151/4 (1992).

Wilkinson, Charles F. & Daniel K. Conner, *The Law of the Pacific Salmon Fishery: Conservation and Allocation of a Transboundary Common Property Resource*, 32 KAN. L. REV. 17 (1983).

Wirth, Timothy E., *The Road from Rio–Defining a New World Order*, 4 COLO. J. INT'L. ENVTL. L. & POL'Y 37 (1993).

World Commission on Environment and Development, OUR COMMON FUTURE (1987).

World Resources Institute, THE 1993 INFORMATION PLEASE ENVIRONMENTAL ALMANAC (1993).

Zitch, *China's Three Gorges*, 192 NAT'L GEOGRAPHIC 2 (Sept. 1997).

Caselaw

Alamosa-La Jara Water Users' Protection Association v. Gould, 674 P.2d 914 (Colo. 1983).

County of Arapahoe v. United States, 891 P.2d 952 (Colo. 1995).

Idaho Dept. of Water Resources v. United States, 912 P.2d 614 (Idaho 1995).

National Audubon Society v. Superior Court of Alpine County, 33 Cal.3d 419. 659 P.2d

709, *cert. denied*, 464 U.S. 977 (1983).

Texas v. New Mexico, 482 U.S. 554 (1983).

Thornton, City of v. Bijou Irrigation Co., 926 P.2d 1 (Colo. 1996).

United States v. State Water Resources Control Board, 182 Cal.App.3d 82 (1986).

PUD No. 1 of Jefferson County v. Washington Department of Ecology 511 U.S. 700 (1994).