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Holly Kirsner

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Two Decades of Water Law and Policy Reform: A Retrospective and Agenda for the Future

CONFERENCE REPORT

TWO DECADES OF WATER LAW AND POLICY REFORM: A RETROSPECTIVE AND AGENDA FOR THE FUTURE

Boulder, Colorado, June 13-15, 2001

DAY ONE

OPENING ADDRESS—TWO DECADES OF REFORM PROPOSALS: AN OVERVIEW

LARRY MACDONNELL, LAWRENCE MACDONNELL, P.C.

(Due to time constraints, representatives of the *Water Law Review* were unable to attend the Opening Address).

SESSION ONE—USING WATER MORE EFFICIENTLY

BARTON H. “BUZZ” THOMPSON, JR., PROFESSOR OF NATURAL
RESOURCES LAW, STANFORD LAW SCHOOL

Barton “Buzz” Thompson, the Robert E. Paradise Professor of Natural Resources Law and Vice-Dean at Stanford Law School, opened the conference with a discussion on ways to encourage water users to conserve water and use it more efficiently. In particular, Mr. Thompson discussed the different forms of conservation programs, the advantages and disadvantages of each, the degree to which governments and agencies have used the approaches, and the successes they have had.

Mr. Thompson pointed out that traditional water policies in the western United States have actually encouraged increased water use. Historic pricing systems have not reflected the true cost of water; thus users were encouraged to consume more water even when the cost far outweighed the value to the consumer. Additionally, no monitoring system was in place to bring instances of water waste to the attention of courts or administrative agencies. Waste issues were only addressed in stream adjudications or when a water user complained of wasteful upstream diversions. In most cases, courts and administrative agencies have been reluctant to find water uses unreasonable, except where appropriators were using extreme methods, such as flood irrigation. Finally, the prior appropriation system encouraged cities and other water users to use as much water as possible so that another user could not appropriate it. Cities faced with expanding populations would not

encourage conservation, but instead used growth to justify additional appropriations.

Mr. Thompson explained that although most everyone agrees that historic water polices have led to "waste," it is difficult to determine the amount of that waste. Most estimates of "waste" are unreliable because it is not clear how the estimates were calculated, nor is it clear what definition of "waste" was used. Courts generally define "waste" narrowly, encompassing only the most flagrant use of water. Mr. Thompson suggested the following definition, which he used to evaluate various conservation measures in his discussion: "waste" is any consumption or irretrievable loss of water that could be eliminated or reduced at a cost that is lower than the value of the water in alternative uses. Waste does not focus on the amount of water diverted or efficiency of use, but on the total amount of water consumed or irretrievably lost. This definition recognizes that water can be wasted either in the amount that is used or in the purpose it is put to, and acknowledges that cost must be a factor. Determinations of waste and proposed conservation policies must take return flows into account; otherwise, current instream flows might decrease, and other appropriators may be hurt.

Next, Mr. Thompson discussed the various mechanisms for encouraging conservation. The approaches fall into four categories: appeals to conscious, new technological frontiers, revising price signals, and governmental mandate.

The least intrusive method is to appeal to the public's conscience and encourage voluntary changes in behavior. This approach has been particularly successful during periods of draught. Governments generally use a combination of education, marketing, information, self-evaluation, and direct communication to achieve this goal. Studies show that arousing altruistic and other nonegotistical motives engage the consumer's attention, and lead to a higher level of conservation than mere economic considerations. This approach does have problems, however. Agricultural and industrial water users are less likely to voluntarily conserve water, and the effort was less effective as income levels increased. Thus voluntary conservation can place a greater burden on poorer households. Additionally, voluntary campaigns do not appear effective in the long run because consumers tend to revert back to their pre-campaign level of use.

Technological approaches to conservation have been both popular and successful. For example, installing a low-flow showerhead decreases a household's water demand from 6.4 to 9.7 percent. A growing number of governments and water suppliers have adopted programs in which they provide water-saving devices to domestic consumers, or subsidize their purchase. These types of programs have proved to be very cost effective. It is interesting to note that conservation levels are lower than engineering models predicted; it appears that users typically respond to water-saving technology by using more water elsewhere, by taking longer showers, for example. Implementing new technologies in the farming sector is more

complicated. First, government programs must ensure that farmers are adequately trained to use complex technologies. Second, because crop yields are uncertain, farmers balk at significant up-front costs, especially where the changes are irreversible. Finally, increasing irrigation efficiency does not always lead to reductions in use. Some farmers view the water saved as a "new" supply, and thus grow higher water-using crops.

Revising pricing signals may encourage water conservation. In districts where users are charged a flat rate regardless of the amount used, reformers have suggested metering water and quantity-based rates. Metering water use can encourage conservation in at least two ways. First, many consumers are unaware of their level of use, and will voluntarily decrease their use when presented with the information. Second, when combined with a quantity-based rating system, consumers are provided with an economic incentive to conserve. Studies suggest that the combination of metering and quantity-based rates reduce water use by approximately a third. Although metering is more expensive than flat charges, the water saved makes up the cost. In districts where quantity-based rates are already used, reformers urge that prices should be increased to reflect the actual marginal costs. Otherwise, consumers will not appreciate the value of water, and will use more than justified. Finally, in districts where rates are the same regardless of the amount of water used, reformers have proposed tiered pricing, where the price of water increases as the level of use increases. Tiered systems give the greatest incentive to conserve to large water users, thus allocating conservation more fairly.

Water markets are another way to encourage conservation by giving consumers the option to sell the water they save. Markets have several advantages over pricing schemes. First, markets encourage conservation through positive means, rather than penalties such as higher prices. Second, markets provide the incentive and funding necessary to implement conservation techniques. Water markets automatically adjust since the price of water will depend upon its current value to others. Finally, markets have proven effective in increasing the amount of water returned to rivers and streams, because water can be purchased purely for conservation and environmental goals. There are numerous problems in implementing water markets, however. Markets face significant political opposition. They often benefit large water users who have been profligate in the past. Markets only work where a market exists, and often do not behave as economists predict.

Bounties and subsidy programs, such as paying consumers who are able to reduce their use by a specified percentage, are often more politically feasible than price increases. However these types of programs pose significant disadvantages. For example, subsidies appear to benefit large water users who were wasteful in the past, or are "wasted" on users who would have conserved without the subsidy. Often, the source of funding for subsidies is general tax revenue or surcharges on use.

Finally, governments can encourage water conservation by mandating it through regulations and enforcement mechanisms. This method appears to be effective; studies show that most people comply with the mandates. However, regulation can defeat altruistic motives and discourage users who would have conserved voluntarily.

LUNCHEON ADDRESS—THE ROAD TO WATER POLICY REFORM: WHERE WE'VE BEEN AND CAN WE AVOID GOING THERE AGAIN?

JOHN D. LESHY, FORMER INTERIOR DEPARTMENT SOLICITOR

John D. Leshy, former Interior Department Solicitor, Professor of Law at Arizona State University and Distinguished Visiting Professor of Law at the University of California, Hastings, gave a discussion on water policy reform that focused on water allocation issues. Many agree that water law and policy need to improve in several important areas. Some of these areas include curbing waste, promoting efficient use, effectively dealing with water transfers while aiming to promote water use from lower to higher valued uses, identifying, protecting, or restoring instream flows to promote environmental goals, and addressing groundwater issues.

Mr. Leshy discussed some of the major shifts in national policy during the last decade. The primary impetus for these changes has been the Endangered Species Act, especially in the west. The Act not only promotes, but demands water management for the benefit of endangered species. Mr. Leshy pointed out that most of the changes were not in the form of sweeping legislation, and thus may shift under the Bush administration.

Water policy reform at the state level has moved much slower, except in the area of groundwater storage and recovery. Most of the improvements were made at the suggestion of the federal government. While most states recognize instream flow rights, the flows are protected haphazardly.

Mr. Leshy suggested that one way to protect instream flows is to allow buyers to purchase and convert water rights perfected under state law for consumptive use to instream flows. Federal agencies and private parties alike have shown an interest in acquiring consumptive use rights for that purpose. While the transactions seem to be win-win, several problems arise. First, converting consumptive rights to instream flows may negatively affect other existing water users. State law may not recognize instream flows, or may not allow a government agency or private entity to hold the right. The transfer might impair other users, or be contrary to the "public interest." Finally, a special water district or other entity may claim veto power.

Mr. Leshy offered several possible cures for these problems. He argued that if the acquisition and restoration of instream flows promotes important federal goals, state law is preempted. A buyer could condition the acquisition on obtaining state approval, thereby protecting his investment, although doing little for instream flows.

Finally, states could amend their laws to provide for this situation. For example, the law could include a strong presumption in favor of environmentally protective transfers.

Mr. Leshy concluded his discussion by suggesting that the time has come for more radical action. He suggested that we seriously consider implementing a federal grant program to induce the state to adopt reforms. For a modest cost, the federal government could provide a financial "carrot" to underwrite the costs of improvements in state water law and administration. In addition to receiving money for agreeing to undertake improvements, the state would be assured that they would retain control over water management. Although Mr. Leshy acknowledged that there are many crucial details to determine, nothing else has seemed to work so far.

SESSION TWO—GETTING WATER FOR CHANGING FEDERAL WATER POLICY OBJECTIVES

DICK DANIEL, SENIOR PROJECT MANAGER, CH2MHILL

(Due to time constraints, representatives of the *Water Law Review* were unable to attend Session Two).

SESSION THREE—ACQUIRING WATER FOR THE TRIBES

SUSAN WILLIAMS, WILLIAMS, JANOV & COONEY

Ms. Williams reviewed a number of existing and pending Indian water right settlements regarding a myriad of issues. In reference to on-reservation water supplies, there are pending settlements for surface water, groundwater, Bureau of Reclamation Reservoir water, and retired state water rights. The Lummi Nation settlement negotiation is of particular interest. Off-site sources would provide approximately five million gallons per day ("mgpd") to achieve .5 mgpd non-tribal use, 2 mgpd tribal use, and 2.5 mgpd enabling instream fishery enhancement of the Nooksack Basin. In order for this settlement to work, the outside supply must be a reliable source of all five mgpd that will not diminish. When Congress enacts this settlement, on-reservation non-tribal groundwater users will substitute the off-site water for the current groundwater use, halting groundwater use completely with no future groundwater development prospects. Thus, the groundwater will be available for tribal use under the Tribe's reserved rights.

In reference to off-reservation water supplies, there are pending settlements for Bureau of Reclamation Reservoir water, City or Regional Water System water, Exchange Water, Purchased State Water Rights, State water rights, effluent, conserved water and new storage water. The Zuni is another pending settlement to watch. The Zuni tribe's settlement will be enforceable after the tribe purchases 3,600 acre-feet per year from willing upstream sellers in the Norviel Decree Area. Once purchased, the rights will carry a decree date of the

Norviel Decree. Further, state law will not apply to these rights once severed from the willing seller, thus not subject to forfeiture or abandonment. Finally, the tribe will have the right to utilize the water in any way it sees fit.

There are many legal issues surrounding water sources for tribal water rights. While there have been decisions reflecting an implied reserved right for maintaining a tribe's fishing right, the Nez Perce Instream flow decision rejected their claim to off-reservation water rights for instream flows to protect Nez Perce's fishing rights.

Considering groundwater, the *Gila River* case has had an important impact on Indian reserved rights. This decision details federal reserved rights to groundwater. Further, it affirms that the *Winters* Doctrine applies to ground water. Finally, the decision was rendered by a state court, thus being contrary to past historical treatment of reserved rights in state court.

The *Aamodt* case quantified the amount of water rights for the Pueblos in New Mexico. The United States District Court of New Mexico rejected the State of New Mexico's assertion that the Pueblo could only use the water for irrigation purposes. Instead, the court held that the Pueblo could use the water however they deemed fit, so long as they use only the amount of water quantified by the court.

In order to effect successful tribal rights settlements, all parties need a realistic sense of what their rights should be. Indian reserved rights present much risk to litigation due to the unique issues involved such as reserved water rights seniority due to early reservation date, tribal sovereignty, and complex jurisdictional elements. Indian water rights advocates need excellent negotiating skills because there are a number of parties that need to be considered.

Tribal rights settlement negotiations take a lot of time and money, thus presenting a large obstacle. Further, the Endangered Species Act ("ESA") and reserved rights early appropriation dates could present unique problems in the future when creating conservation plans in compliance with the ESA. Additionally, groundwater issues will continue to compound negotiation problems because each state has different laws regarding regulation of groundwater where it may or may not be conjunctive use. Lastly, religious and cultural tribal uses for water must be contemplated and accounted for during water rights negotiations.

In conclusion, the Zuni and the Lummi settlements contemplate interesting issues that will provide for a unique outcome. Each settlement tends to provide creative means to accomplish the important ends of water for Indian Reservations.

DAY TWO

SESSION FOUR—WATER FOR THE ENVIRONMENT: A CALIFORNIAN'S RETROSPECTIVE

THOMAS J. GRAFF, CALIFORNIA REGIONAL DIRECTOR, ENVIRONMENTAL DEFENSE

The National Water Commission's report provided a basis for water law and policy reform in the 1970s. One member, Charley Meyers, opined that the basis for reform rose out of a misallocation of federal subsidies, and the solution was more reliance on water markets. Another member, Joe Sax, believed the need for reform emanated from a total disregard of environmental issues throughout western water development, and a solution lay in focusing on the public trust doctrine as a mechanism to equalize environmental values with traditional consumptive uses.

The 1970s brought three opportunities for policy reform dominated by the Sax approach. The first two, New Melones Dam and Auburn Dam, dealt with the federal government requesting water rights through the State Water Resources Control Board of California. California required the Auburn Project to maintain instream flows, and restricted the New Melones project's ability to store water until the federal government had a better picture of the proposed stored water uses. These two projects resulted in the decisive case *United States v. California*, where the Supreme Court held that the Reclamation Act deferred to the states when dealing with water law issues, absent a clear preemption by Congress. Finally, Environmental Defense Fund's ("EDF") suit against the East Bay Municipal Utility District ("EBMUD") supplied the third opportunity for policy reform in the '70's. EDF challenged EBMUD's contract with the federal government for supplemental supply produced from the Auburn-Folsom Project based on waste, unreasonable use and unreasonable diversion. Here again, the Court deferred to state law, thus after twenty-nine years the case is still pending in county court. This case spurred an interesting relationship between federalists and environmentalists, usually on opposing sides, because both parties argued to maintain state power over intrastate activities.

In the wake of California's 1982 referendum defeat of the Peripheral canal, the Meyers policy reform approach surfaced in EDF's publication **TRADING CONSERVATION INVESTMENTS FOR WATER: A PROPOSAL FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA TO OBTAIN ADDITIONAL COLORADO RIVER WATER BY FINANCING WATER CONSERVATION INVESTMENTS FOR THE IMPERIAL IRRIGATION DISTRICT**. EDF proposed an end to public subsidies for water development through water markets where there were voluntary exchanges of water between willing sellers and buyers. However, the '80s were most characterized by President Reagan's lack of water project funding, thus forcing creativity in water users' approaches.

During Carter's 1980-campaign trail, Rosalyn Carter raised many funds in Fresno, and three days later, the Secretary of Interior offered a generous permanent contract to the Westlands Water District ("Westlands"). Remarkably, Westlands refused the offer in anticipation of a changing political atmosphere. Reagan's Secretary of Interior withdrew the offer on the table for a much less generous ultimatum. Westlands sued the United States and ultimately settled on terms exceedingly favorable to Westlands such that it committed inflated water deliveries ("Barcellos Settlement").

The Barcellos Settlement, compounded by a late '80s drought and subsequent aquatic habitat destruction laid the foundation for the most significant water policy reform in California: the Central Valley Project Improvement Act ("CVPIA") also known as the Miller-Bradley bill. CVPIA combined elements of both Sax's and Meyers' approaches through authorizing resale of federal development water, setting ground rules for federal water marketing, creating a habitat restoration fund, and rededicating water under federal control to refuges, fisheries and the Trinity River.

The '90s seemed to be a decade of multiple agreements such as the Bay-Delta Accord, authorization of many ecosystem restoration projects, and most recently the 2000 CALFED record of decision. The future of reformation is difficult to predict. There seems to be a rise of counter reformation as well as water takings on the rise. To balance the future, a solution may lie within new innovative approaches to water markets and less governmental subsidies.

**SESSION FIVE—STRATEGIES TO FACILITATE CHANGES IN WATER USE
BONNIE G. COLBY, DEPARTMENT OF AGRICULTURAL AND RESOURCE
ECONOMICS, UNIVERSITY OF ARIZONA**

In session five, Bonnie Colby addressed the various entities that commonly facilitate changes in water use, as well as the process through which these stakeholders accomplish such transactions. Colby noted that the three most prominent players are agricultural interests, tribal governments, and most recently, NGOs and government agencies with environmental stewardship agendas.

Of these interested parties, those in the agricultural field have traditionally been the most vocal in opposing changes in water use. This resistance, Colby says, is the result of the continuing movement of water away from local agricultural uses. Many farmers perceive this trend as a threat to local economies, business activities, and property values. According to Colby, this perception may have some merit. However, the negative impacts of these changes should not be considered without also taking notice of the positive impacts of moving water away from agriculture.

Colby offered six negative impacts of transferring water out of agricultural regions: (1) reduced profits for "backward-linked" businesses, which sell products and services to farmers; (2) reduced

profits for “forward-linked” businesses, which purchase crops from affected farmers, and must turn to more distant, costly supplies; (3) reduced profits for general businesses that sell goods and services to households (assuming water sellers exist in the area, reducing the number of households); (4) reduced jobs in all of the types of businesses referred to above; (5) reduced property values associated with a decline in business activity; and (6) reduced tax revenues collected by state and local governments on business sales and property values. These impacts, Colby asserted, assume that the revenues earned from water transfers are not reinvested in the economy of the affected area.

The positive impacts of water transfers out of agricultural regions include the following: (1) increased economic activity in the sectors acquiring water; (2) increased property values associated with new economic activities; (3) increased tax revenues collected by state and local governments or property values and sales; and (4) increased recreation benefits to local residents associated with improved streams, wetlands and wildlife habitat. Accompanying these beneficial impacts, Colby noted, is the fact that the economic impacts created by transfers out of agriculture are small relative to the amount of irrigated land affected. A number of economic studies support the assertion that this is true even when the water is moved away from the area of origin.

Local and state governments have implemented a number of strategies to prevent negative third party effects of water transfers. Agricultural bases have been preserved, Colby said, by making transfers contingent on drought conditions. With these restrictions in place, farming occurs as usual in normal years, and farmers are compensated in dry years. Other strategies include subsidizing water conservation practices on farms, rotating acreage followed among landowners, and partial buyouts of water used in farming.

Colby recognized that solving the economic disadvantages of water transfers does not necessarily resolve the concerns of all affected parties. Many feel that these transfers away from rural, agricultural communities represent “a change in society’s priorities and values for farms, cities, fish and wetlands.” Compensation schemes and restructuring transfers do not necessarily remedy these objections to changes in water use.

Colby next outlined the number of different ways to reallocate water. The most fundamental distinction that may be drawn is between voluntary and involuntary arrangements. Voluntary changes in use include: (1) negotiated purchases; (2) auctions; (3) standing offers; (4) water banks; and (5) contingent transfers for drought protection. Federal agencies, she said, often encourage the use of these mechanisms by offering technical assistance and cost sharing in order to induce improvement of management practices by farmers and ranchers. Resource pricing is another tool used to accomplish this goal. Some urban water providers penalize excessive use through incentive pricing in their water rate structures. However, agriculture generally enjoys very low water costs.

Compulsory changes in water use are primarily induced in one of three ways: (1) litigation; (2) administrative action; or (3) congressional mandate. While the Mono Lake decision in *National Audubon Society v. Superior Court* offers a good example of water reallocation brought about by litigation, the Secretary of Interior's order to modify the operations of Glen Canyon Dam 1991 demonstrates how such changes can be accomplished administratively. Finally, the Central Valley Improvement Act, passed by Congress in 1992, is a prime example of a congressionally-ordered compulsory change in water use.

While voluntary and compulsory mechanisms have proven effective – employed both individually, and in concert with each other – Colby believes some policy changes are necessary regarding water transfers by western states and by the federal government. She suggested ten specific improvements to the present water reallocation system: (1) restructuring municipal water rates paid by irrigated agriculture; (2) redefining the conditions under which western states define water as “conserved” and available for transfer; (3) revising policies so that those seeking water for instream flows as well as wetlands and species recovery can compete on the same bases as those seeking water for urban growth; (4) integrating water quality into the policies that govern changes in water use; (5) modernizing state and federal policies to recognize the interconnections between surface water and groundwater, accounting for these linkages in evaluating proposed water transfers; (6) establishing interstate mechanisms as a way to respond to basin-wide challenges such as drought, species restoration, and water quality; (7) the Corps of Engineers, Department of Agriculture, and Bureau of Reclamation using common sense economics as a “litmus test” for water-related activities; (8) creating inter-jurisdictional arrangements that would allow tribal governments to more fully participate in water transfer negotiations and regional water management; (9) utilizing the resources and experience of federal farm programs to accomplish on-farm water conservation, water quality improvements, and river and wetland restoration; and (10) designing innovative and cost-effective compensation schemes for area-of-origin interests affected by proposed transfers.

SESSION SIX—CLARIFYING STATE WATER RIGHTS AND ADJUDICATIONS
JOHN E. THORSON, ATTORNEY-AT-LAW & WATER POLICY CONSULTANT,
FORMERLY SPECIAL MASTER FOR THE ARIZONA GENERAL STREAM
ADJUDICATION

Mr. Thorson defined general stream adjudications as legal proceedings involving multiple users brought to determine ownership and characteristics of water rights to a river system or other common source of water.

Prior to general stream adjudications, Spanish and common law influenced water law. Spanish law developed extensive water

management in order to govern from a distance, and decentralized Spanish authority among the local authorities. The system honored legal title and prior use, however these factors did not defeat claims of the needy, needs of the crown, common good and 3rd party beneficiaries. Common Law established actions at law for damages or actions in equity for injunctive relief. Further, bills in equity allowed jurisdiction over all parties to solve disputes all at once. Conversely, quiet title actions adjudicated a single party's rights, but no others. Due to the nature of this process, there was no certainty or finality of water rights.

The western water law structure lent itself to adjudication of streams. The Colorado adjudicatory system exemplified this through pure adjudication, where all water rights claims must be heard in the water court. The Wyoming system established a complete administrative process where the state engineer and Board of Control managed all quantities and priorities. Finally, the hybrid approaches as illustrated through the Model State Irrigation Code and Oregon system combined the administrative and adjudicatory systems.

In the late 1800s, brokerage houses and banks required some adjudications before irrigation companies could issue stock or get loans. The progressive era spurred the scientific management movement, applying science to business, and the progressive conservation movement, applying multi-disciplinary science theory to natural resource management. The culmination of the progressive conservation era provided a context for improved water management for public benefit. The west manifested this movement through adjudications that resulted in the federal reclamation program and riparian and appropriative integration.

After World War II, western states became concerned about federal dominance over water rights as a result of the New Deal programs. In order to assuage such concerns, Congress adopted the McCarran Amendment, which waives federal sovereign immunity in certain situations. The Friat Dam and Santa Margarita conflict led to the adoption of this amendment. The amendment extended to federal reserved rights through the *Eagle County* case, the *Akins* case, and the *Arizona v. San Carlos Apache Tribe* case.

The McCarran Amendment applied when there was a suit dealing with a comprehensive adjudication of the river system where the federal government was a party via joinder. The comprehensive component suggested a meaningful opportunity to contest other rights that would affect a certain party's rights. There were three aspects to comprehensiveness. First, hydraulic comprehensiveness begged the question of how much water should be adjudicated and should the adjudication include groundwater as well as surface water. Second, use comprehensiveness begged the question of what types of uses should be included in the adjudication. Third, temporal comprehensiveness contemplated which priority dates must be joined in the adjudication.

The 1970s brought numerous stream adjudications throughout the

west in order to provide clarity, recognition of federal reserved rights, and better data records. There were increased state and federal tensions, as illustrated through *Arizona v. California* and *Cappaert*. The '70s saw a re-emergence of tribal self-government and advocacy as illustrated by the Native American Rights Fund and American Indian Lawyer Training Program. Rapid growth throughout the West resulted in need for additional water management, and created an atmosphere of increased competition for water.

The main reason to embark upon present-day general stream adjudication is to ascertain water usage data for a centralized inventory. In addition, there is a desire to confirm state water rights, while also striving to adjudicate tribal rights. Theoretically, one could say that general stream adjudications are close to halfway complete, however the more difficult issues have yet to be resolved such as groundwater, large senior claims, and federal rights. Adjudications sometimes deliberately avoid difficult issues such as the interrelationship of groundwater and surface water, water quality aspects and reasonable use and conservation. Adjudications have a tendency to be isolated and not comprehensive. The process is extremely costly and irrelevant in some instances. Further, the McCarran Amendment and other influences have complicated jurisdiction issues. Depending on the adjudication instigator, there is a great potential for disturbing community relations. Finally, the public has historically perceived exclusion from the water law process, and water is a public resource. Therefore, there are issues of public distrust for general stream adjudications.

Thorson proposed reform. First, the federal government should assess their water needs for the next forty years and create an administrative inventory of federal rights. Second, Congress should explicitly quantify water needs when reserving future lands. Third, the McCarran Amendment should be modified to eliminate the suit requirement. Finally, Indian reserved right adjudication should occur in a focused fashion in federal court.

Thorson set forth recommendations. There should be "hot-spot" adjudications instead of all encompassing adjudications. There should be better coordination between the state and federal government. There should be two steps in an adjudication: first, re-evaluate state law rights, and second examine the federal rights (reserved and non-reserved) against the state-law rights. Mediation and arbitration are good tools that can be introduced into the adjudication process. Finally, internet technologies need to be considered in reference to adjudications for its ease of communication.

SESSION SEVEN—TOWARD ECOLOGICALLY SUSTAINABLE WATER MANAGEMENT: THE ROLES OF SCIENCE AND TECHNOLOGY

BRIAN D. RICHTER, DIRECTOR, FRESHWATER INITIATIVE, THE NATURE CONSERVANCY

Noting the current trend of sustaining freshwater resources primarily for human uses, Richter focused on the correlative neglect of freshwater species and ecosystems this tendency creates. The needs of both humans and freshwater ecosystems must be simultaneously addressed he asserted. Failing this, “the trend in our quality of life will continue to slide toward impoverishment rather than sustainability.”

Richter expressed his belief that both needs could be met, alluding to a number of studies conducted throughout the world demonstrating that human needs can be met while sustaining the necessary volume and timing of water flows to support affected freshwater ecosystems. These needs are not mutually exclusive, however, as the value to society of freshwater ecosystems is estimated at \$9 trillion annually worldwide.

According to Richter, success may be achieved only through the concerted effort of policy makers and inter-disciplinary scientists. Richter is not optimistic that these scientists’ attempts to develop a harmonious balance between human and ecological needs will succeed initially. However, he believes that absent this opportunity, ecologically sustainable water management can never be achieved.

The Nature Conservancy has suggested six basic steps that need to be taken by the entities in charge of developing water management policy: (1) define ecosystem flow requirements; (2) determine influence of human activities; (3) identify areas of potential incompatibility; (4) foster collaborative dialogue; (5) conduct water management experiments to resolve uncertainty; and (6) design and implement an adaptive management plan. Decision makers should take these steps, Richter suggests, while making use of the best available technology to achieve a balance between natural and human water needs.

Richter opined that computer-aided tools such as simulation models and “decision support systems” are two such valuable technologies that can and should be utilized by those charged with establishing water management strategies. Simulation models are able to predict both the hydrological and ecological effects of proposed water management strategies. The use of these models, Richter believes, will help eliminate the uncertainties associated with complex hydrological systems.

Decision support systems are “software packages that facilitate the management and display of data and computer-based tools—a virtual ‘commons’ that provides access to information and ways of analyzing that information.” These tools are important, Richter said, because they allow for all stakeholders in a system to gain access to data that will ultimately support or foreclose water management decisions. They

also enable decisionmakers to rapidly evaluate alternative scenarios.

DAY THREE

SESSION EIGHT—CREATING BETTER GOVERNANCE

DENISE D. FORT, PROFESSOR, UNIVERSITY OF NEW MEXICO SCHOOL OF LAW

Denise Fort, Professor of Law at the University of New Mexico School of Law, discussed how the federal government functions in western rivers, and the effect of congressional politics. Western policy makers confront important issues regarding how to balance local interests with national interests, how river management purposes can be broadened to include environmental protection, how citizens can participate in decision-making, and how discordant federal policies can be reconciled. During the past two decades, policy changes have come about through the creation of consensus processes, rather than formal institutions. For example, the Interior Department and the Bureau of Reclamation policies were changed from within during Secretary Bruce Babbitt's tenure, despite opposition from a hostile Congress. However, the Corps of Engineers has stayed out of the fray, and only recently has it become clear that the Executive branch has little control over the Corps. In her discussion, Ms. Fort argues that the direct Congressional relationship to the Corps challenges the viability of many reform initiatives at the regional and local level.

The topic of governance continues to effect water policy because the physical dimension of improving water management is far less daunting than the questions presented by how society organizes itself to address our water challenges. There are examples of basins where water problems are being addressed constructively, where parties are communicating, restoration is occurring, and water management is improving. However experimentation with different mechanisms has not resulted in a consensus as to the best way of governance. Continued experimentation indicates a widespread belief that no one has gotten it right yet.

The initiation of *ad hoc* groups has forced the incorporation of certain goals of better governance. For example, although environmental concerns were not part of the western prior appropriation scheme, federal environmental laws have empowered environmentalist to successfully lobby changes in western river operations. Likewise, tribal governments are recognized and acknowledged in a way that was inconceivable a generation ago. While this type of greater participation has been the recent trend in the West, Ms. Fort discussed why it so difficult to change formal governance structures, and looked to the Corps of Engineers in particular for an answer.

Ms. Fort observed a great belief that agencies are redundant, but

there is little attention focused on how agency structure affects the agency's efficiency. The relationship between the Corps and the Bureau of Reclamation ("BOR") seems particularly redundant. Although the Corps operates across the nation and BOR is restricted to seventeen western states, the agencies often compete over the best dam sites. In the west, whether a particular basin is labeled as belonging the Corps or BOR is arbitrary in character. While debates rage over the appropriate role of the federal agencies, with Westerners united in their demand for state control over all water resources, there is no call for an end to the Corps' programs in the West. The federal funding for environmental controls rarely equals the perceived burden on the states, and the dependence on those funds tempers the demand that the federal government withdraw from the west.

So far, the Corps has managed to escape the scrutiny the Interior Department and the Environmental Protection Agency has undergone. While there is no strong movement to reform the Corps, members of both houses of Congress have introduced legislation aimed at its reform, and a coalition of environmental groups recently released a report calling for Corps reform. However, the Corps is different from other Executive agencies, where the President is responsible for the successes or failures of management, and thus a more fundamental cure for the Corps may be required. The use of federal dollars has a powerful effect on what is or is not built on western rivers, and the practical effect of subsidies is well understood. If cities and municipalities are forced to pay for the full cost of water, or the structures built by the Corps, different solutions would be sought. When nonstructural solutions make better sense, they would be used instead. After some experimentation, we can judge whether using federal funds to address Western needs would remedy distortion of public policy choices.

SESSION NINE—WATER POLICY REFORM: PROMISES, REALITIES, AND THE AGENDA FOR THE FUTURE

DAVID GETCHES, RAPHAEL J. MOSES PROFESSOR OF NATURAL RESOURCES LAW, UNIVERSITY OF COLORADO SCHOOL OF LAW

(Due to time constraints, representatives of the *Water Law Review* were unable to attend Session Nine).

Holly Kirsner, Makayla Shannon, and Jason S. Wells