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## Assessing the Value of Adjudications in a World of Uncertainty: An Economic Perspective

Bonnie G. Colby

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# ASSESSING THE VALUE OF ADJUDICATIONS IN A WORLD OF UNCERTAINTY: AN ECONOMIC PERSPECTIVE<sup>†</sup>

BONNIE G. COLBY<sup>‡</sup>

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## I. INTRODUCTION AND OVERVIEW

Water rights adjudications have been underway for several decades in the western U.S. to clarify the validity, scope, and priority date of water rights. In principle, adjudications allow public agencies and claimants to submit and scrutinize evidence supporting water rights in

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‡ Professor of Agricultural and Resource Economics, University of Arizona. The author appreciates and acknowledges the research assistance of Izetta Chambers and Lana Jones in preparing this article and comments from fellow ABA Water Law Conference panelists Peter Sly, Charles Dumars and Ramsey Kropf. The author acknowledges the financial and intellectual support provided by the Climate Assessment for the Southwest (CLIMAS) Project at the University of Arizona, with funding from the National Oceanic and Atmospheric Administration.

a neutral court venue, accessible to all parties with standing, and through a fair process. Comprehensive adjudications can lead to court decisions that improve certainty for water claimants, provide direction for future cases, and permanently ameliorate some water right ambiguities.<sup>1</sup>

Disadvantages of the adjudication process include: excessive opportunities for water right holders to present evidence, necessitating a burdensome number of hearings and costs for all parties; incentives to make spurious and exaggerated water claims; and the requirement that an entire basin be adjudicated even if a smaller section would suffice.<sup>2</sup> While water right changes and transfers generally can transpire during an adjudication process, the process raises uncertainties that are likely to have a dampening effect on such activities.

Many factors contribute to the need for the increased certainty that adjudications are intended to provide. These include looming federal reserved rights and the exercise of state authority over water rights based on the McCarran Amendment.<sup>3</sup> Rapid population growth in the West, coupled with the emerging federal reserved rights doctrine and the need to secure water for growing cities, contributed to the adjudications that started in the 1970s.<sup>4</sup> During this time the West was also becoming increasingly urban, concentrating in "urban archipelagos" like Denver, Las Vegas, and Phoenix.<sup>5</sup> Numerous environmental needs for water became evident, along with increased demand for water to maintain stream flows and lake levels for recreation.<sup>6</sup> The energy crisis

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1. For example, in one ruling in Washington State's Yakima Basin, *Acquavella*, the court held that the interests of individuals can be represented by a larger entity like an irrigation district or a ditch company. This ruling will reduce the time and cost of future adjudications by reducing the number of parties involved. See WASH. DEP'T OF ECOLOGY, ATTORNEY GEN. OF WASH., 2002 REPORT TO THE LEGISLATURE: STREAMLINING THE WATER RIGHTS GENERAL ADJUDICATION PROCEDURES 10 (2002), <http://www.ecy.wa.gov/pubs/0211019.pdf>.

2. *Id.*

3. See 43 U.S.C. § 666 (2000); see also *Arizona v. California*, 373 U.S. 546, 564-67 (1963).

4. See BUREAU OF THE CENSUS, U.S. DEP'T OF COMMERCE, HISTORICAL STATISTICS OF THE UNITED STATES: COLONIAL TIMES TO 1970 PART 1, 22 (1975), available at <http://www2.census.gov/prod2/statcomp/documents/CT1970p1-01.pdf>; see also PAMELA CASE & GREGORY ALWARD, REPORT TO THE WESTERN WATER POLICY REVIEW ADVISORY COMMISSION – PATTERNS OF DEMOGRAPHIC, ECONOMIC AND VALUE CHANGE IN THE WESTERN UNITED STATES: IMPLICATION FOR WATER USE AND MANAGEMENT 1 (1997), available at <https://repository.unm.edu/dspace/bitstream/1928/2793/1/PATTERNS.pdf>.

5. A. Dan Tarlock & Sarah B. Van de Wetering, *Growth Management and Western Water Law: From Urban Oases to Archipelagos*, 5 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 163, 163-65 (1999).

6. *Id.* at 168; see generally Office of Counsel, Corps of Engineers, Missouri River Division, Dep't of the Army, *The Role of Recreation in the Regulation of the Corps of Engineers Constructed and Operated Main Stem Reservoirs of the Missouri River*, 4 GREAT PLAINS NAT.

prompted by the oil embargo of 1973 led to increased water demand in the energy-producing sector.<sup>7</sup>

As federal support for new water development projects evaporated, improved water management emerged as a goal of states, many of which created new water management agencies. As population and energy needs continued to grow, so did interstate conflicts over water. States turned to adjudications as a way to demonstrate water use, helpful in securing water from interstate river negotiations. Federal involvement in western water became more evident, not only from post-World War II Supreme Court decisions that affirmed federal authority over water under specific circumstances,<sup>8</sup> but also from the Endangered Species Act,<sup>9</sup> and other pollution control and conservation acts.<sup>10</sup> The erosion of states' control over local water added to the impetus for adjudication of water rights.<sup>11</sup>

There is a substantial body of literature describing various forms of water rights adjudication processes and progress, or lack thereof, in specific proceedings.<sup>12</sup> This article takes a different perspective, laying out a framework for systematically considering the costs and benefits of adjudications and discussing economic aspects of a question that is being posed more frequently: are water rights adjudications a "worth-while" use of scarce resources?

Economic evaluation of public expenditures in the United States can be traced to the early 1800s when the Secretary of the Treasury

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RESOURCES J. 26, 43-44 (1999) (discussing the role of Corps of Engineers in establishing and regulating recreational facilities).

7. See e.g. *ETSI Pipeline Project v. Missouri*, 484 U.S. 495, 497-99 (1988).

8. See *First Iowa Hydro-Electric Coop. v. Fed. Power Comm'n*, 328 U.S. 152, 166-67, 181 (1946) (establishing federal authority over water diverted in navigable streams); *Fed. Power Comm'n v. Oregon (Pelton Dam)*, 349 U.S. 435, 437 (1955) (establishing federal authority over non-navigable streams with dams next to federal lands).

9. 16 U.S.C. §§ 1531-1544 (2000) (limiting actions that threaten to modify or destroy critical habitat for threatened and endangered species).

10. See *Federal Water Pollution Control Act (Clean Water Act)*, 33 U.S.C. §§ 1251-1387 (requiring federal permits for "dredge and fill" activities affecting navigable waters); *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, 42 U.S.C. §§ 9601-9675 (allowing the federal government to determine the relevant and appropriate environmental standards for the cleanup of hazardous waste sites); *Migratory Bird Conservation Act*, 16 U.S.C. § 715 (limiting actions which interfere with the migration of certain birds).

11. See D. Craig Bell & Norman K. Johnson, *State Water Laws and Federal Water Uses: The History of Conflict, the Prospects for Accommodation*, 21 ENVTL. L. 1, 3 (1991) (discussing federal assertion of management interests in western water resources).

12. See e.g., John E. Thorson et al., *Dividing Western Waters: A Century of Adjudicating Rivers and Streams, Part II*, 9 U. DENV. WATER L. REV. 355 (Spring 2006) (discussing specific comprehensive general stream adjudications); see also Christopher W. Moore, *Foreword to TAMRA PEARSON D'ESTRÉE & BONNIE G. COLBY, BRAVING THE CURRENTS: EVALUATING ENVIRONMENTAL CONFLICT RESOLUTION IN THE RIVER BASINS OF THE AMERICAN WEST ix-x* (Ariel Dinar & David Zilberman eds., 2004) (discussing the response to increasing and costly conflicts over water).

requested comparison of costs and benefits for water projects.<sup>13</sup> In the nearly two centuries since then, economic analysis has become commonplace for major federal projects and for new regulations, and is now mandatory for many types of federal actions.<sup>14</sup> Given the emphasis on evaluation of public expenditures in the United States, the time is ripe to consider how best to evaluate the financial and economic aspects of adjudications. Policymakers and the public seek accountability. Public agencies are often stakeholders in adjudications, addressing conflict expends public resources, and issues of public interest are at stake. Public officials and taxpayers understandably want to know how much money, time, and other resources are involved and whether positive results of the process justify incurred costs incurred.

Economic and financial evaluation can serve a number of purposes. First, it may help direct the use of public money and agency staff toward processes that will be the most effective in fulfilling adjudication objectives. Economic analysis of past efforts will also generate information to help courts, management agencies, and stakeholders learn what strategies are likely to be the most effective in resolving water right disputes. In addition, thoughtful evaluation may suggest changes in public policies and institutions to facilitate more efficient resolution of conflicts.

The article begins with a discussion of the economic functions of water rights adjudication in a setting in which decisions potentially affected by adjudication proceedings face multiple uncertainties. Next, the article presents a conceptual framework for evaluating the costs and benefits of adjudications, including practical matters such as evaluation criteria and collection of data to support future analyses. Finally, the article briefly summarizes the existing literature on adjudication costs and benefits, concluding with recommendations for evaluating adjudication processes and for enhancing the cost-benefit tradeoffs of these proceedings.

## II. ADJUDICATION IN THE CONTEXT OF ECONOMIC DECISIONS AND PERVASIVE UNCERTAINTY

Adjudications are intended to reduce uncertainties in the quantity and priority of water rights. In principle, this can facilitate economic development that requires reliable supplies; allow all parties and water administrators to plan better for the future; separate real water claims from "paper water"; and quantify federal, Indian and other reserved

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13. See NICK HANLEY & CLIVE SPASH, *COST-BENEFIT ANALYSIS AND THE ENVIRONMENT* 4 (Edward Elgar Publishing Ltd. 1993).

14. See Exec. Order No. 12,291, 46 Fed. Reg. 13,193, sec. 2 (Feb. 17, 1981).

rights, reducing this specific source of uncertainty for water right claimants.<sup>15</sup>

Although their objectives are well appreciated, adjudications are not without critics.<sup>16</sup> Even successful adjudications face limited ability to address risk, as courts only seek to define specific characteristics of rights, not the policies that guide future changes in use of rights.<sup>17</sup> Ambiguous and changing state, federal, and tribal policies are a key source of risk to right holders even when rights themselves are well-defined. A host of other uncertainties result from regional hydrology and climate, changing economic conditions, agency actions taken under the Endangered Species Act ("ESA") or Clean Water Act ("CWA"), and changing political administrations. Adjudications attempt to reduce one specific source of uncertainty in a context beset by multiple risks.

While improved certainty has been a central objective of adjudications, economic decisions routinely proceed in the face of uncertainty. The risks inherent in stock market and real estate investments are just a few of many potential examples. As always in the field of economics, the issue is tradeoffs. There are costs of achieving greater certainty and there are costs of proceeding with economic decisions in the face of uncertainty. Legitimate differences of opinion exist as to the proper role of government in reducing risk for the public and the private sectors. Various government agencies are involved in a diverse array of risk-related policies such as vehicle airbag regulations, airport security, drought assistance for farmers, limits on arsenic concentrations in drinking water, and truth-in-lending regulations. In this broad context, the debate over adjudications can be seen as part of a larger debate on the appropriate level of public investment in reducing risk.

In the case of water, the risks associated with ill-defined rights significantly affect both the public and private sectors. Economic decisions that adjudications are likely to affect include water acquisitions for various purposes such as implementing water settlements involving Native American tribes or multiple states, assuring flows for recreation and environmental needs, and securing reliable dry year supplies for cities and industry. Water rights ambiguities also affect decisions to

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15. See, e.g., NORMAN K. JOHNSON, WESTERN STATES WATER COUNCIL, INDIAN WATER RIGHTS IN THE WEST 93 (1983) (estimating a total potential reserved rights claim of about 46 million acre-feet of water per year by Indian tribes in the western states).

16. See A. Dan Tarlock, *The Illusion of Finality in General Water Rights Adjudications*, 25 IDAHO L. REV. 271, 272-73 (1989); Scott B. McElroy & Jeff J. Davis, *Revisiting Colorado River Water Conservation District v. United States - There Must Be a Better Way*, 27 ARIZ. ST. L. J. 597, 648 (Summer 1995); Frances Levine, *Dividing the Water: The Impact of Water Rights Adjudication on New Mexican Communities*, 32 J. SW. 268, 268-69 (Autumn 1990).

17. Adjudicators usually take a narrow view of their role. Setting the quantity, priority and other essential elements of a water right is the statutory burden adjudications carry. Any further involvement transgresses the separation of powers doctrine.

invest in water storage, treatment, and delivery infrastructure. These decisions are crucial to states, cities, counties, tribes, private firms, and non-profit organizations across the West. Moreover, water rights affect multiple public interests such as endangered species and municipal water supply reliability. Pervasive public agency involvement and expenditures substantially affect taxpayers.<sup>18</sup>

In recognition of the substantial public interests at stake, the federal government developed principles and standards for evaluating water projects.<sup>19</sup> The U.S. Department of Interior also created guidelines for Indian water settlements.<sup>20</sup> The Office of Management and Budget ("OMB") plays a critical role in reviewing proposed water projects and tribal settlements and OMB has consistently opposed settlements on fiscal grounds, recommending a presidential veto in the case of the majority of settlements.<sup>21</sup> The political power of states and their congressional delegations has driven administrative approval of settlements, overcoming OMB objections. Similarly, despite the existence of cost-benefit standards<sup>22</sup> to evaluate proposed water development projects, approval of these projects hinged heavily on political matters rather than objective economic analysis.<sup>23</sup> It is important to acknowledge that politics often trumps analytical findings when developing systematic economic analysis for the evaluation of adjudications.

### III. A CONCEPTUAL FRAMEWORK FOR ECONOMIC EVALUATION OF ADJUDICATIONS

Assessing the benefits and costs of water rights adjudications is not a simple undertaking, even though the science of benefit-cost analysis has advanced over several decades from its early application to examining infrastructure projects such as construction of highways and reservoirs. It is worth asking why one might take the trouble to conduct a

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18. For more information on the role of Cost-Benefit analyses in federal projects, see generally U.S. WATER RESOURCES COUNCIL, ECONOMIC AND ENVIRONMENTAL PRINCIPLES AND GUIDELINES FOR WATER AND RELATED LAND RESOURCES IMPLEMENTATION STUDIES iii (1983), [hereinafter PRINCIPLES AND GUIDELINES] (discussing the costs and benefits of water resources development alternatives and providing more information on the role of benefit-cost analyses in federal projects); Maynard M. Hufschmidt, *Benefit-Cost Analysis: 1933-1985*, WATER RESOURCES UPDATES: REFLECTIONS ON A CENTURY OF WATER SCIENCE AND POLICY: ISSUE NO. 166, Mar. 2000, at 42; Warren Viessman, Jr., *An Overview of President Carter's Water Policy (1978)*, 3 ENVIRON. MGT. 189 (1979).

19. See 42 U.S.C. § 1962a-2 (2000) (establishing principles, standards, and procedures for federal projects).

20. See Criteria and Procedures for Indian Water Rights Settlements, 55 Fed. Reg. 9223 (Mar. 12, 1990); see also BONNIE G. COLBY, JOHN E. THORSON & SARAH BRITTON, NEGOTIATING TRIBAL WATER RIGHTS: FULFILLING PROMISES IN THE ARID WEST 38 (2005).

21. COLBY, THORSON & BRITTON, *supra* note 20, at 38, 60-61.

22. See generally PRINCIPLES AND GUIDELINES, *supra* note 18, at iii.

23. See MESSAGE FROM THE PRESIDENT OF THE UNITED STATES, FEDERAL WATER POLICY INITIATIVES, H.R. Doc. No. 95-347, at 1 (1978).

systematic evaluation? After all, establishing an evaluation framework and collecting and analyzing data is not itself a costless process.

Perhaps the strongest rationale for establishing such a framework is to inform the creation of more effective processes for accomplishing adjudication objectives. Documentation can also help guide the appropriate level of public and private investment in these lengthy and expensive processes. At minimum, it would be useful to gauge how cumulative expenditures on water rights adjudications compare to the value of the water assets being adjudicated. In those regions where water rights have high financial value and adjudication costs represent a modest fraction of that value adjudications may be considered a reasonable "cost of doing business." Likewise, it would be useful to identify areas where adjudication costs are high and significantly out of proportion to the value of water rights.

"Effectiveness" refers to achieved results relative to the time, money and other expended resources.<sup>24</sup> The importance of assessing the effectiveness of adjudications has been intensifying. Those who bear the costs, particularly in the public sector, desire result based accountability that requires adjudication programs to provide evidence about what they aim to achieve and the results they have achieved.

#### A. COSTS

The adjudication costs that an informed analysis must consider are generally more straightforward than adjudication benefits. Costs include ongoing financial expenditures by all parties, including the value of staff and managerial time. These costs are borne by the taxpayers through multiple avenues of public agency involvement and the operation of the court system, as well as by all of the parties to the proceeding. Other costs include time delays and uncertainties that affect water management decisions, non-cooperative behavior among parties in withholding useful technical information and failing to address regional water problems, and the stress and acrimony that may accompany court proceeding. If an adjudication is successful, many of these costs will be reduced once the proceedings are well-established and progressing.

Comprehensive cost data is difficult to collect because costs incurred by private parties are not public information and public agencies often do not systematically compile their incurred costs. Cost information can be categorized as: (1) costs to parties participating in the process; (2) costs to the public including agencies, courts, and

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24. Andy Rowe, Bonnie Colby, Michael Niemeyer, and Will Hall, *Economic and Environmental Effects of Environmental Conflict Resolution*, Presented to the William and Flora Hewlett Foundation (Dec. 2005).



other costs paid through taxes; and (3) costs to others that are not participating in the process—and are not paying with tax dollars—such as water utility ratepayers. Cost-benefit analysis of adjudications must “count” expenditures of staff, time, money, resources, water, and other assets as costs. It is important to carefully distinguish between costs attributable to the adjudication and more general costs that would have occurred anyway. The analysis must only include those costs that are attributable to the adjudication process.

Transaction costs are a special consideration that, as contemplated by this paper, relates to the effect of adjudications on water transactions. Transaction costs are information, contracting, and enforcement costs, including verifying water rights and regulatory requirements, gathering data on compliance, assessing and collecting of penalties, and monitoring the condition of the water resources that are the subject of the transaction. Transaction costs may arise from public policies that require stakeholders to follow specific procedures, such as state agency review of proposed changes in water rights.<sup>25</sup> In principle, a successful adjudication will reduce future transaction costs of transferring water rights by providing increased certainty. However, during the period that the adjudication is active, transaction costs may well increase due to heightened levels of scrutiny of proposed water right changes by other claimants and by management agencies.<sup>26</sup> Eliminating transaction costs is neither feasible nor desirable. The goal is a balancing of the costs of improving certainty with the benefits of that certainty. Transaction costs are part of the “price” of having transferable private property rights in a resource with pervasive public interests and community implications.

The most compelling category of costs is particularly elusive to describe and quantify. An “opportunity cost” is not a direct expense paid out of someone’s pocket. Rather, it is an opportunity—or flow of expected benefits—that is given up in order to obtain something else. For instance, the use of state and federal agency staff time to support adjudication proceedings could have instead gone towards implementation of water conservation programs. Monies that irrigation districts expend on adjudication could instead go towards modernization of the district’s water conveyance infrastructure. Urban water suppliers could spend their adjudication budgets on acquiring water rights instead.

All expenditures of time and money have an opportunity cost—the sacrifice of alternative accomplishments that could have been secured. With respect to adjudications, opportunity cost considerations pose the

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25. See generally Bonnie G. Colby, *Transaction Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (Dec. 1990)

26. Charles T. DuMars, *Some Thoughts on the Future of Water Rights Adjudications in Western Water Law*, in ABA 25th Annual Water Law Conference Materials 7 (ABA 25th Annual Water Law Conference Feb. 23, 2007).

question: Is there some more effective process and/or goal that could be accomplished with the resources being expended on adjudications?

Table 1: Adjudication Costs

- Expenditures of money and time
- Delayed problem-solving, resource degradation
- Delayed investment, foregone returns
- Opportunity costs – what could we have done instead with \$ expended?

Table 2: Parties Who Bear Adjudication Costs

- Costs to parties (claimants)
- Costs to public agencies and taxpayers
- Costs to “others” (rate payers, instream flow beneficiaries)

## B. BENEFITS

The potential benefits of an adjudication are difficult to identify precisely, even harder to quantify, and are dependent upon the effectiveness of the adjudication in accomplishing its objectives. The economic benefits of reducing uncertainties in water rights depend on the extent to which uncertainty is reduced and the financial value of the rights. The literature on valuing water rights has evolved substantially in the last fifteen years.<sup>27</sup> Economic values, generally expressed in terms of per acre-foot, can be estimated, even in regions where there are no active market transactions. The higher the economic value of water, the greater the financial returns from reducing uncertainty over water rights.

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27. See e.g., James F. Booker & Bonnie G. Colby, *Competing Water Uses in the Southwestern U.S.: Valuing Drought Damages*, 31 WATER RESOURCES BULL. 877 (1995); David S. Brookshire et al, *Market Prices for Water in the Semi-Arid West of the United States*, 40 WATER RESOURCES RES. W09S04 (Sept. 2004); Bonnie G. Colby, *Applying Fair Market Value Concepts to Water Rights*, 18 REAL EST. ISSUES 8 (1993); Bonnie G. Colby, *Estimating the Value of Water in Alternative Uses*, in ECONOMICS OF WATER RESOURCES: INSTITUTIONS, INSTRUMENTS AND POLICIES FOR MANAGING SCARCITY 3 (K. William Easter & Mary E. Renwick eds., 2004); Bonnie G. Colby & Steve Wishart, *Quantifying the Influence of Desert Riparian Areas on Residential Property Values*, 70 APPRAISAL J. 304 (2002); Bonnie G. Colby, *Recent Trends in Southwestern Water Values*, 59 APPRAISAL J. 488 (1991) [hereinafter *Southwestern Water Values*]; Bonnie G. Colby et al., *Water Right Transactions: Market Values and Price Dispersion*, 29 WATER RESOURCES RES. 1565 (June 1993) [hereinafter *Water Right Transactions*]; Julie Leones et al., *Measuring Regional Economic Impacts of Streamflow Depletions*, 33 WATER RESOURCES RES. 831 (Apr. 1997); STEVEN J. HERZOG, GUIDELINES FOR THE APPRAISAL OF WATER RIGHTS IN CALIFORNIA, ES-3 to ES-12 (prepared for U.S. Fish and Wildlife Service, September 2006), available at <http://www.fws.gov/cno/fisheries/docs/Guidelines%20for%20Appraisal%20of%20Water%20Rights.pdf>.

An adjudication that successfully resolves uncertainty over water rights may lead to improved regional economic output and productivity, enhanced ability to plan for growth, endangered species recovery, improvements in water dependent habitat, and recreation opportunities. In addition, there may be better cooperation amongst jurisdictions and stakeholders, improved organizational morale and credibility, increased confidence in the system to solve problems, and decreased anxiety and tension.

One tangible benefit of a successful adjudication is to enable straightforward enforcement of water rights in times of shortage. As A. Dan Tarlock has noted, many areas of the West have little history of enforcing a priority system and cutting off junior users.<sup>28</sup> However, enforcement of priorities will become more commonplace and necessary as the effects of climate change unfold. Feller has noted extensive costs and delays endured by a prominent senior right holder in central Arizona attempting to curtail upstream juniors in the midst of a slow and cumbersome ongoing adjudication.<sup>29</sup>

Other benefits from an effective adjudication can be conceptualized in standard economic terms that consider adaptation to risk. For simplicity, assume that the water right characteristics of central interest to claimants are the mean yield of the right in “average” hydrologic years and the variance around this mean in dry years.

Suppose the adjudication succeeds in reducing the variance around the mean yield so that a claimant can know with more certainty the lowest yield of the right in foreseeable hydrologic circumstances. Economists have developed the concept of a “risk premium”—a willingness to pay to reduce risk—in this case to reduce the variance in the yield of a water right.<sup>30</sup> The risk premium is larger when the economic consequences of the variance in water right yield are higher. For instance, a farmer growing high-profit specialty crops would have a higher willingness to pay to reduce uncertainty than a farmer growing less profitable crops. Risk premiums increase as water rights become more financially valuable. Climate change is likely to increase water demand in agricultural and urban sectors due to the effect of higher temperatures on evapo-transpiration in crops and urban landscapes. Climate change is also likely to increase the variance around the his-

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28. See Dan Tarlock, *General Stream Adjudications: A Good Public Investment?*, 133 J. CONTEMP. WATER RES. & EDUC. 52, 56 (2006).

29. see also Joseph M. Feller, *The Adjudication That Ate Arizona Water Law*, 49 ARIZ. L. REV. 405 (2007).

30. See W. DOUGLASS SHAW, *WATER RESOURCE ECONOMICS AND POLICY: AN INTRODUCTION* 185 (2005).

toric mean water yield for water rights, due to increased temperature, reduced winter snowpack, and more erratic precipitation events.<sup>31</sup>

The value to the right holder of eliminating uncertainty in yield during dry years is the maximum they would pay to eliminate the variance and be assured of the average yield under all hydrologic conditions. Rationally, this dollar amount has an upper limit. There is a cost of achieving certainty for a specific water right at which the right holder would rather adapt to the existing uncertainty through acquiring additional, also uncertain, rights, investing in storage facilities, water banking, etc. In fact, the willingness to pay to reduce uncertainty in water supply portfolios has motivated many of the water transactions undertaken by cities, businesses, and agricultural districts.<sup>32</sup>

The clearest benefit that has emerged from actual adjudications is the incentive that the costly morass of the process creates for negotiated settlements. Thorson et al. cite these settlements as the single most evident accomplishment of adjudications.<sup>33</sup> However, one must inquire whether a less costly and cumbersome process could induce such settlements.

An analogy from the transportation sector is in order here. If roads become sufficiently congested in the central part of a city, then commuters, weighing the tradeoffs, will opt for more use of public transportation. Without the excessive delays of congested, this shift might never happen. However, significant cumulative costs accrue as congestion increases. The same incentives to switch to public transit could have been created instead by a tax on driving into the center of the city, with tax revenues used to provide a superb public transit system.

In the same way, it is conceivable that a carefully designed system of fees for claiming and holding water rights could reproduce the incentives to negotiate a settlement that slow, costly, and uncertain adjudications generate. Trivial and unsubstantiated claims will decline as these claimants will no longer find it worthwhile to maintain an active claim. However, urban traffic congestion reaches a costly stage before significant investments are made in public transit because no elected body is willing to levy a driving fee unless dire circumstances are evident. This same inertia applies to the water policy arena. The imposition of user fees per unit of water consumed (for agricultural and urban users), along with substantive fees for holding water rights and participating in

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31. WORKING GROUP II, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 742-43, 745 (2001), available at [http://www.grida.no/climate/ipcc\\_tar/wg2/index.htm](http://www.grida.no/climate/ipcc_tar/wg2/index.htm).

32. See *Water Right Transactions*, *supra* note 27, at 1565-72 (discussing market transactions involving a scarce resource); *Southwestern Water Values*, *supra* note 27, at 488-500 (discussing the development and trends of the water market in the southwest United States).

33. See Thorson et al., *supra* note 12, at 355.

adjudications could substantially reduce many water problems. Those parties with relatively low economic returns from their water use and their ownership of rights would release their water for other purposes.

Political antipathy to imposing new fees, legitimate equity considerations, and jurisdictional tangles make this approach difficult to implement. Moreover, prior court decisions limit the manner in which such fees can be imposed.<sup>34</sup> Nevertheless, even modest fees linked to the quantity claimed would be a beginning in creating appropriate incentives.<sup>35</sup>

### C. THE COUNTERFACTUAL – CONSTRUCTING “WITH AND WITHOUT” SCENARIOS

An important aspect of a benefit cost assessment is the counterfactual, constructing the baseline against which the adjudication will be assessed. This requires identifying a clear counterfactual—what would take place in the absence of the adjudication process? Evaluation of adjudications must explicitly consider alternative processes and compare the results achieved through adjudication to those that each alternative counterfactual—the likely process and outcome absent adjudication—would have achieved. Among the questions that an analysis must address are: Would the ambiguities in water rights have continued without any resolution? Would a different water rights clarification process have occurred? Case-by-case litigation of rights seems a natural baseline for a comprehensive adjudication. However, there are many difficulties with using litigation as a baseline.<sup>36</sup>

First, adjudication, piecemeal litigation, and other processes are not mutually exclusive options. All of these processes require collection and analysis of technical information, preparing positions and analyzing tradeoffs among different outcomes. Which costs should be assigned to which process? Litigation often provides the incentives necessary for negotiated agreements to be achieved. In addition, different processes generate different “products” such that comparison of costs alone would neglect potentially large differences in the benefits generated by negotiation versus litigation to the various parties. An administrative water rights hearing and ruling may constitute the most realistic baseline. Still, one must conjecture regarding the length, costliness, and outcome of such a hearing. There is a dearth of closely comparable cases that have been addressed by different processes and

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34. See *e.g.*, *U.S. v. Idaho*, 508 U.S. 1 (1993).

35. For fee purposes, the consumptive use quantity of the claim would be most relevant and instream flow claims would need to be assessed in a different manner.

36. See GAIL BINGHAM, *RESOLVING ENVIRONMENTAL DISPUTES: A DECADE OF EXPERIENCE* 128-32 (1986).

have been carefully documented such that rigorous comparisons can be made.

A systematic assessment of adjudications must clearly define the counterfactual in order to determine what difference the adjudication process made in comparison to the most likely outcome absent the adjudication. Results-based accountability requirements direct programs to assess this difference. Economists refer to this as the incremental contribution, or marginal net benefit when measured in dollars. This is a central question of program evaluation—what difference did the program make?

The analytical goal is to identify effects that the evaluated adjudication process specifically caused. Effects due to the adjudication are those that would *not* have occurred without it. This is the “with and without” principle—attributing to the adjudication only those effects that would not have occurred in absence of the adjudication.<sup>37</sup> It is essential to separate the economic effects of general regional changes in resource use and management from impacts which are properly attributable to the process being evaluated. Professional judgment calls are inevitable in attempting to isolate the impacts of adjudication from other events that affect water resources in the region.

In previous studies of similarly complex multi-party processes, researchers have asked parties to identify their preferred alternative to the process being evaluated. “Candidate counterfactuals” may consist of prior and/or concurrent processes used by parties, alternatives used elsewhere to address similar issues with a different process, and constructed alternatives—plausible and likely processes that could have been used but were not. The counterfactual must be credible to the parties and to professionals involved, as well as to agencies concerned with results-based accountability.<sup>38</sup>

Thorson et al. highlighted several likely alternatives to general stream adjudications. As one alternative, significant changes could be made in the role of the federal and state governments with respect to federal reserved rights.<sup>39</sup> The federal government could take action to: give deference to state law, inventory or quantify reserved rights, amend the McCarran Amendment, or adjudicate in federal court.<sup>40</sup> Early versions of the Western Water Rights Settlement Act, proposed in 1956<sup>41</sup> would have required the government to declare when it was reserving water, compensate states when federal rights affected state

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37. See JOHN B. LOOMIS, INTEGRATED PUBLIC LANDS MANAGEMENT: PRINCIPLES AND APPLICATIONS TO NATIONAL FORESTS, PARKS, WILDLIFE REFUGES, AND BLM LANDS 158-60 (2d ed. Columbia University Press 2002).

38. See D'ESTRÉE & COLBY, *supra* note 12, at x.

39. Thorson et al., *supra* note 12, at 464.

40. *Id.* at 464-70.

41. S. 863, 84th Cong. (1956).

rights, and guarantee reserved rights would not affect rights established before the creation of the reservations. A number of amendments have been proposed to McCarran. Michael White recommended changing general requirements to allow a "straight-forward determination of federal water rights," and charging the federal government for litigation.<sup>42</sup> Crapo introduced a bill that would have required the United States to abide by state laws and fees when appropriating water, to abide by the same laws as individuals in seeking water rights, and to waive sovereign immunity in certain cases.<sup>43</sup> Section 2(c) in the bill denied that the reservation of lands by the United States guaranteed water with the designation.<sup>44</sup>

McElroy and Davis recommend the adjudication of Indian rights in federal courts, citing the small number of Indian adjudications completed by state courts.<sup>45</sup> They believe that federal court would provide the speediest fair trial.<sup>46</sup> Federal courts were involved in the Klamath Tribe *Adair* litigation in Oregon.<sup>47</sup> The district court recognized reserved rights for fishing and other uses but let the state court quantify the rights.<sup>48</sup>

As another strategy, administrative inventories could be pursued instead of judicial proceedings. The Public Land Law Review Commission gave recommendations for handling federal and Indian reserve rights in the early 1970s. They proposed a plan where federal land agencies would "ascertain and give notice of their projected water requirements for the next 40 years for reserved areas . . . ."<sup>49</sup> Additional protections would also be in place to protect states against conflicting rights or rights created in the future.<sup>50</sup>

The National Water Commission advocated a different approach. Existing and future federal reserved rights would be established, recorded, and quantified in accordance with state laws. The Commission recommended an inventory and recording of Indian reserve rights in state records regardless of whether or not adjudications would be nec-

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42. Michael D. White, *McCarran Amendment Adjudications—Problems, Solutions, Alternatives*, 22 LAND & WATER L. REV. 619, 628-29 (1987).

43. S. 561, 108th Cong. §§ 3(a), 3(b)(2)(A), 5 (2003).

44. *Id.* § 2(c).

45. Scott B. McElroy & Jeff J. Davis, *Revisiting Colorado River Water Conservation District v. United States — There Must Be a Better Way*, 27 ARIZ. ST. L.J. 597, 648 (1995).

46. *Id.*

47. *United States v. Adair*, 723 F.2d 1394 (9th Cir. 1983).

48. *Id.* at 1397, 1399.

49. U.S. PUB. LAND LAW REVIEW COMM'N, ONE THIRD OF THE NATION'S LAND: A REPORT TO THE PRESIDENT AND TO THE CONGRESS 147 (1970). Interestingly, Senator McCarran proposed such an inventory as part of his bill in 1951. See S. Rep. No. 82-755 at 1-2 (1951). The inventory proposal did not pass the Senate.

50. *Id.* at 147-149.

essary as a means to inform other water users.<sup>51</sup> In the event that Indian rights displaced local water right holders, the commission recommended either the federal government lease up to the entire Indian water right, compensate displaced right holders, or supply the displaced water through alternative means.<sup>52</sup>

Various proposals would have required federal agencies prepare detailed inventories of all water rights in each state.<sup>53</sup> Carter's water policy statement in 1978 required administrative inventory of all non-Indian reserved rights based on actual needs "rather than theoretical or hypothetical needs based on full legal extension of all possible rights."<sup>54</sup> This plan was vague in respect to Indian rights.<sup>55</sup>

Legislative quantification has been considered as an alternative to adjudications. There have been repeated efforts to induce Congress to quantify Indian water rights. For example, in 1977, Carter's appointed Federal Reserved Water Rights Task Force recommended legislation, which was subsequently introduced in the House of Representatives that year, that would assign priority dates and quantify existing Indian reserve rights.<sup>56</sup> The determinations would be based on reservation date and past five years water use.<sup>57</sup> The bill did not address undeveloped Indian rights.

Regional settlements and negotiated agreements could become the primary process. Indian water right settlements in the West have been moving forward although states and tribes generally feel that the federal government is not contributing resources on the level it should.<sup>58</sup> Former Secretary of the Interior Bruce Babbitt advised tribes to coop-

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51. NAT'L WATER COMM'N, WATER POLICIES FOR THE FUTURE: FINAL REPORT TO THE PRESIDENT AND TO THE CONGRESS 477-78 (1973).

52. *Id.* at 481-83.

53. A similar proposal in 1974 recommended that the inventory and quantification should occur by a neutral federal agency independent of the Department of Interior and Department of Justice. This agency or commission would include some Indian representatives, water scholars, and resource planners. Susan Millington Campbell, Note, *A Proposal for the Quantification of Reserved Indian Water Rights*, 74 COLUM. L. REV. 1299, 1320 (1974); see also Walter Kiechel, Jr. & Kenneth J. Burke, *Federal-State Relations in Water Resources Adjudication and Administration: Integration of Reserved Rights With Appropriative Rights*, 18 ROCKY MTN. MIN. L. INST. 531, 538 (1973) (arguing that quantification of reserved rights by administrative process is a better approach).

54. U.S. GEN. ACCOUNTING OFFICE, RESERVED WATER RIGHTS FOR FEDERAL AND INDIAN RESERVATIONS: A GROWING CONTROVERSY IN NEED OF RESOLUTION app.II (1978) [hereinafter GAO REPORT].

55. *Id.*

56. H.R. 9951, 95th Cong. (1977).

57. H.R. 9951, 95th Cong. (1977).

58. See Bonnie G. Colby, *What Makes Water Settlements Successful?*, in TRIBAL WATER RIGHTS: ESSAYS IN CONTEMPORARY LAW, POLICY, AND ECONOMICS 171, 173 (John E. Thorson et al. eds., 2006) (noting that non-federal parties bear a significant portion of settlement costs); see also DANIEL MCCOOL, NATIVE WATERS: CONTEMPORARY INDIAN WATER SETTLEMENTS AND THE SECOND TREATY ERA 31, 48-49 (2002) (noting the time involved in the passage of various settlement acts).



erate in settling Indian water claims.<sup>59</sup> Others have proposed regional settlements. The Arizona Water Settlements Act of 2004, which involved the Gila River Indian Community's rights, the State of New Mexico's rights, and the Bureau of Reclamation's bill for the Central Arizona Project, is an example of a regional settlement.<sup>60</sup> The creation of an Indian Water Rights Commission appointed by the President has also been suggested to draft model water agreements.<sup>61</sup> The Commission would make guidelines for the different stages of adjudication.<sup>62</sup> A surcharge on reclamation projects could fund its operation and some of its settled agreements.<sup>63</sup>

One example of an alternative model is CALFED, created out of the Bay-Delta Accord of 1994.<sup>64</sup> This intergovernmental agency is a collaborative effort between the State of California, the Federal government, and numerous other signatories. Another example of an alternative model is the Comprehensive Everglades Restoration Plan (CERP), authorized under the Water Resources Development Act of 2000.<sup>65</sup> It is important to note that the threat of lengthy, uncertain, and expensive litigation motivates carefully crafted regional agreements, but that even established settlements are fraught with uncertainty. For instance, former Interior Secretary Babbitt worked hard under his administration to establish that "a deal is a deal."<sup>66</sup> This encouraged major efforts to complete habitat conservation plans under the Endangered Species Act.<sup>67</sup> However, the "no surprises" policy itself is under challenge in district court in Washington D.C.<sup>68</sup> Federal Energy Regulatory Commission ("FERC") has re-opener clauses in its li-

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59. Keith Bagwell, *Babbitt to Indians: Unity May Aid Water Fight*, ARIZ. DAILY STAR, Mar. 19, 1997, at 2B.

60. S. 437, 108th Cong., 118 Stat. 3478 (2004).

61. Lloyd Burton, *The American Indian Water Rights Dilemma: Historical Perspective and Dispute-Settling Policy Recommendations*, 7 UCLA J. ENVTL. L. & POL'Y 1, 47-49 (1987).

62. *Id.* at 50.

63. *Id.* at 54.

64. The Bay-Delta Accord, signed in 1994, set forth principles towards the implementation of a permanent Bay-Delta protection plan. Among its complex provisions, the agreement sets water quality standards, requires the state to conduct water rights proceedings, and specifies that compliance with the "take" provisions of the Endangered Species Act is not intended to result in any additional loss of water supply. To meet that goal, the Accord allows for operational flexibility, developed through a state and federal operations group. The parties also agreed to fund ecosystem restoration, including water and habitat purchases. See CALFED Delta-Bay Program, <http://www.calwater.ca.gov/AboutCalfed/> (last visited March 20, 2007).

65. Pub. L. No. 106-541, § 601, 114 Stat. 2572, 2680 (2000).

66. See Peter Sly, *Address at ABA 22nd Annual Water Law Conference: Environmental Water Settlements: Can We Make a Deal?* (Feb. 19, 2004).

67. See *Habitat Conservation Plan Assurances ("No Surprises") Rule*, 63 Fed. Reg. 8859 (February 23, 1998); see also Donald C. Baur & Karen L. Donovan, *The No Surprises Policy: Contracts 101 Meets the Endangered Species Act*, 27 ENVTL. L. 767, 767 (Fall 1997).

68. *Spirit of the Sage v. Babbitt*, No. 98-CV-01873-EGS (D. D.C. filed July 29, 1998)

censes for hydroelectric projects and this uncertainty impels FERC licensees and other stakeholders, such as conservation groups, to seek binding regulatory agreements.<sup>69</sup>

Other suggestions for simplifying adjudications include: limiting the number of necessary parties, allowing states to represent non-Indian users, and allowing class action procedures.<sup>70</sup> John Leshy, former Solicitor of the United States Department of the Interior, suggested a focus on improved relations between federal and state governments, including agreements for federal agencies and states to notify each other promptly in the case of proposed water right changes and to cooperate on research initiatives.<sup>71</sup>

Identifying appropriate counterfactuals to compare adjudications is challenging, but not impossible. A study conducted by Rowe et al. assumed that complex environmental disputes were highly unique, and this would prevent identification of a good counterfactual. However, Rowe et al. found that highly complex environmental disputes can have good naturally occurring counterfactuals.<sup>72</sup> This study suggested construction of a counterfactual for comparison when environmental disputes were unique in the sense that an observed alternative was not present. Rowe found that the use of observed and constructed alternatives together, when placed before an expert science panel to compare effects of the process under evaluation to both alternatives, maximized effectiveness.<sup>73</sup> This method greatly enhanced cross-case comparisons and may be an efficient approach to learning from complex processes.

#### D. STATE OF KNOWLEDGE ON ADJUDICATION COSTS, BENEFITS

Below, this article summarizes the existing anecdotal literature on costs associated with adjudications for each state in which information is readily available.

Adjudication of all Montana water rights issued prior to July 1, 1973 began in 1979.<sup>74</sup> As of 2004, six decrees have been finalized out

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69. See generally, Michael A. Swiger et al., *Paying for the Change: Can the FERC Force Dam Decommissioning at Relicensing?* 17 ENERGY L. J. 163 (1996) (reprinted in the ABA 18th Annual Water Law Conference materials) (discussing the impact of FERC hydroelectric dam decommissioning on the property interests of hydropower licensees).

70. See, e.g., *Miller v. Jennings*, 243 F.2d 157, 157, 159 (5th Cir. 1957) (noting the limited circumstances in which a court may join the United States as a party defendant in a water rights lawsuit and the importance of including all water claimants in a water rights adjudication, whether members of a class or parties thereto).

71. John D. Leshy, U.S. Department of Interior, Discussion Draft, Memorandum of Understanding, Nov. 21, 1994; see also Thorson et al., *supra* note 14, at 472-73.

72. Rowe et al., *supra* note 24.

73. *Id.*

74. Upper Clark Fork River Basin Steering Comm., White Paper on the Montana Water Rights Adjudication 3 (Mar. 2, 2004), [http://water.montana.edu/watersheds/pdfs/FinalAdjudication\\_WhitePaper\\_030204.pdf](http://water.montana.edu/watersheds/pdfs/FinalAdjudication_WhitePaper_030204.pdf).

of 219,413 water rights claims.<sup>75</sup> There is no indication of when the state will finish the adjudication. When the process began, the legislature estimated that one hundred full time positions would be necessary to complete it within ten years.<sup>76</sup> The funding that the legislature provided was inadequate so the process has been slow, even though the State of Montana has spent over \$37.5 million dollars.<sup>77</sup> This estimate does not include costs to individuals or economic losses due to uncertainty in land and water transactions.<sup>78</sup>

The Gila River water adjudication began in 1974,<sup>79</sup> and its end is nowhere in sight.<sup>80</sup> By the mid-1990s Arizona had spent an estimated \$100 million on adjudications including costs to the Department of Water Resources and lawyers' fees.<sup>81</sup> Idaho spent around \$68 million from 1980-2003.<sup>82</sup> Estimates place Wyoming's litigation expenses up to 1993 at \$20 million.<sup>83</sup> The state of Texas spent around \$10 million on

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75. *Id.* "While six decrees are issued which DRNC describes as 'final,' they will have to be re-opened, so, arguably, even those 'final' decrees are not truly final." *Id.* at 2, n. 2 (citing MONT. CODE ANN. § 85-2-237 (2005) (titled reopening and review of decrees)).

76. *Id.* at 4.

77. *Id.* at 1.

78. *Id.* The Steering Committee's 1991 statutory mandate included drafting a water management plan for the basin, which the Committee completed in December 1994. In 1995, the mandate was changed to include implementing and revising the initial plan. See MONT. CODE ANN. § 85-2-238 (2005); see also UPPER CLARK FORK RIVER BASIN STEERING COMM., UPPER CLARK FORK RIVER BASIN: WATER MANAGEMENT PLAN (December 2004), available at [http://dnrc.mt.gov/wrd/water\\_mgmt/montana\\_state\\_waterplan/pdfs/upper\\_clarkforkriverbasin\\_waterrgmt\\_plan.pdf](http://dnrc.mt.gov/wrd/water_mgmt/montana_state_waterplan/pdfs/upper_clarkforkriverbasin_waterrgmt_plan.pdf).

79. See *United States v. County of Maricopa (San Carlos Apache Tribe)*, 697 P.2d 658, 661-64 (1985); see also Feller, *supra* note 29. Petitioners filed the case before the Arizona State Land Department, which transferred it to the Maricopa County Superior Court in 1979, when Arizona amended applicable statutes to require that parties bring stream adjudications in the Superior Courts. *San Carlos Apache Tribe*, 697 P.2d at 663-64.

80. The Arizona Supreme Court observed in 1985, "The case has been pending more than ten years and may well take another twenty for decision." *San Carlos Apache Tribe*, 697 P.2d at 662. The court underestimated the time that the case would require, as did the Arizona Department of Water Resources in predicting that the required Comprehensive Report on the Adjudication would be completed in 1996 or 1997. See DONALD J. GROSS, STATUS REPORT: GENERAL ADJUDICATION OF THE GILA RIVER SYSTEM AND SOURCE 63, 70 (1988).

81. Thorson et al., *supra* note 12, at 432; see also OFFICE OF THE SPECIAL MASTER, ARIZONA GENERAL STREAM ADJUDICATION BULLETIN, October 1996, available at <http://supreme.state.az.us/waternews/issue/oct96.htm> (discussing Indian tribe claims for attorneys fees).

82. Memorandum from Krista Lee Evans to Envtl. Quality Council 2 (Feb. 23, 2004), available at [http://leg.state.mt.us/content/lepo/2003\\_2004/environmental\\_quality\\_council/staffmemos/adjudication\\_funding.pdf](http://leg.state.mt.us/content/lepo/2003_2004/environmental_quality_council/staffmemos/adjudication_funding.pdf).

83. Teno Roncalio, *The Big Horns of a Dilemma*, in INDIAN WATER IN THE NEW WEST 209, 211 (Thomas R. McGuire et al eds., 1993).

court costs and attorney fees to complete its surface water adjudication.<sup>84</sup>

Determining the total costs of adjudications to all parties is complicated and has led to speculation that a comprehensive cost-benefit analysis would reveal benefits insufficient to justify the costs. While studies conducted to date shed light on the magnitude and types of costs, there have not been any systematic comparisons of adjudication costs with the potential cost of likely alternative processes.

The high cost of extended adjudications has caused litigants to call on state legislators for reform. In Idaho and Arizona, efforts to reduce costs by changing adjudication statutes have not been successful due to legal challenges and costs brought on by the proposed changes.<sup>85</sup> High costs have had an additional side effect in Idaho. The federal government challenged Idaho's fee structure because of a \$10 million fee assessment.<sup>86</sup> The United States Supreme Court decided the case against Idaho.<sup>87</sup> As a result, the federal government—a large land owner and water user in Idaho—will not have to pay filing fees for the Snake River Basin Adjudication.<sup>88</sup>

Sources of funding to cover state court and agency adjudication costs differ across states. Some western states provide annual appropriations for agencies that bear the cost of adjudications, related hydrologic study, and notices. In Montana, funding also comes in the form of special revenue funds<sup>89</sup> coupled with water right fees.<sup>90</sup> Other states use filing fees to defray to costs of adjudication. South Dakota,<sup>91</sup> Washington,<sup>92</sup> and Nevada<sup>93</sup> all require claimants to pay filing fees ranging from \$25 to \$100.

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84. Doug Caroom & Paul Elliot, *Water Rights Adjudication - Texas Style*, 44 TEX. B. J. 1183, 1184 (1981).

85. Arizona's legislature amended its adjudication statute in 1995 with H.B. 2276, signed into law on March 17, 1995. The United States and several Indian tribes challenged the Arizona legislature's 1995 amendments to its adjudication statute in state court. See Press Release, United States Dep't of Justice Env't and Natural Res. Div., State Court Strikes Down Amendments to Arizona Water Adjudication Statute: Decision Insures Laws Governing Water Rights Applied Fairly (Sept. 9, 1996), available at <http://www.usdoj.gov/opa/pr/1996/Sept96/435enr.htm>. Idaho's legislature amended its adjudication statute one year earlier, with the Act of April 12, 1994, chs. 454-55, 1994 Idaho Sess. Laws 1443-91 (codified at IDAHO CODE ANN. §§ 42-1401-28 (2003)).

86. *United States v. Idaho*, 508 U.S. 1, 3 (1993).

87. *Id.* at 8-9.

88. *Id.*

89. See Legislative Fiscal Div., *Legislative Fiscal Report 2007 Biennium*, at F-29, available at [http://leg.mt.gov/content/publications/fiscal/fr\\_2007/fr\\_f/lfd\\_f.pdf](http://leg.mt.gov/content/publications/fiscal/fr_2007/fr_f/lfd_f.pdf).

90. MONT. CODE ANN. § 85-2-276 (2005).

91. S.D. CODIFIED LAWS § 46-2-13 (2004).

92. WASH. REV. CODE ANN. §§ 36.18.016(17), 90.03.180 (West 2006).

93. NEV. REV. STAT. ANN. § 533.135(2) (LexisNexis 2006).

The non-financial costs of adjudications are also substantial. The case can bring about conflicts that can undo local cooperative agreements.<sup>94</sup> Some have argued that the acequia system in New Mexico represents a cooperative effort that may be vulnerable to damage by state adjudications.<sup>95</sup> The adversarial process also impedes the sharing of technical information and cooperation in addressing regional water problems. Based on the available evidence, there is little basis for determining whether negotiated settlements are less costly than adjudication processes.

#### E. DATA NEEDS

Systematic collection of data related to costs and benefits can further our collective learning. Ideally, an adjudication process should specify reporting requirements for cost data as part of the process. Such a program could ask parties to make monthly reports on their expenses to a central repository, which could then compile and track such information. This systematic reporting of benefits will be more challenging—likely requiring a carefully designed survey and perhaps follow up interviews. Nevertheless, better cost data would be a valuable step forward. At minimum, it is valuable to be able to compare adjudication expenditures to the financial value of water rights and determine whether costs are reasonable when compared to the value of what is being adjudicated.<sup>96</sup>

Perhaps the effort most analogous to systematic benefit-cost analysis of adjudications is a series of studies evaluating resolution of environmental disputes in the western United States. A pilot study that began in 1998 instructed case researchers to rely only on publicly available sources to evaluate resolution of each case based on twenty-six

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94. See generally Charlotte Benson Crossland, *Acequia Rights in Law and Tradition*, 32 J. Sw. 278, 284-87 (1990) (discussing the effect of water rights adjudications on the traditional water allocation methods of acequias in New Mexico); Frances Levine, *Dividing the Water: The Impact of Water Rights Adjudication on New Mexican Communities*, 32 J. Sw. 268, 269-70 (1990) (discussing the impact of water rights adjudications on the traditional water sharing and reallocation practices of communities in New Mexico); Frances Leon Quintana, *Land, Water, and Pueblo-Hispanic Relations in Northern New Mexico*, 32 J. Sw. 288, 288, 292 (1990) (discussing the historical collaboration between the Puebloans and Hispanics to share water and the effects of current and future water projects on this historical system of water allocation).

95. See, e.g., STANLEY CRAWFORD, *MAYORDOMO: CHRONICLE OF AN ACEQUIA IN NORTHERN NEW MEXICO* 86 (1988).

96. Data on the financial value of water rights is available for most regions of the western U.S., based on either comparable market transactions or on analysis of the financial returns to water in alternative uses. See, e.g., Bonnie Colby, K. Crandall & D. Bush, *Water Right Transactions, Market Values and Price Dispersion*, 29 WATER RESOURCES RES. 1565-1572 (1993); Bonnie Colby, *Southwestern Water Values and Market Activity*, 59 APPRAISAL J. 488-500 (1991).

criteria.<sup>97</sup> The study intended the reliance on accessible sources to test whether it was possible to evaluate dispute resolution processes and outcomes in a low cost and non-intrusive manner, without the use of stakeholder interviews.<sup>98</sup>

Results indicate that economic aspects can be difficult to assess without obtaining additional information directly from stakeholders. However, for conflicts involving the National Environmental Policy Act (“NEPA”) processes, economic data are available from Environmental Assessments and Impact Statements. For conflicts involving expenditures of federal dollars, the Office of Management Budget, the General Accounting Office, the Department of Interior’s Office of Policy Analysis, and the Congressional Budget Office perform economic or financial assessments. Access to economic data varied substantially across the pilot cases. In principle, expenditures by public agencies are public information. However, agencies rarely compile cost data in a systematic manner on a case-by-case basis. Expenditures by corporations and non-profit organizations generally are not a matter of public record and are available at the discretion of the organization. Subsequent to the pilot study, several evaluations of environmental conflict resolution provided valuable indicators of how systematic evaluation of adjudications might be conducted.<sup>99</sup>

#### F. WELL-DEFINED ACCOUNTING STANCE

Careful definition of accounting stance is a crucial analytic step in evaluating adjudication. The accounting stance determines the width—across time, layers of parties, and geographically—of any cost, benefit, and other impact, analysis. In general, this definition should include the geographic area encompassed by the adjudication plus those parties that are substantially affected but are located outside the geographic scope.

Here is an example of an explicit statement regarding accounting stance for a hypothetical case: The adjudication on the Grand River has been ongoing since the early 1970s. In this evaluation, we examine the period 1985 to the present due to lack of reliable data from earlier periods. The primary claimants are farmers, cities, and a mining company. Stream flows for boaters and anglers may be affected by the adjudication, but these constituencies do not hold water rights and are direct participants in the adjudication. Consequently, we do not include boater and angler impacts in our detailed analysis. We count

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97. d’Estrée & Colby, *supra* note 12, at 64-65.

98. *Id.*

99. See, for instance, evaluation work sponsored by the U.S. Institute for Environmental Conflict Resolution, [www.ecr.gov](http://www.ecr.gov) (last visited May 15, 2007).

costs and benefits to federal and state taxpayers, attributable to agency participation. Inadequate data is available to consider costs to participating cities and counties.

As the example illustrates, an evaluation must state clearly the time period, the geographical area, and the range of parties that the analysis will consider. There may be legitimate reasons for excluding some time periods, regions, and parties—such as that they are not central to the case, or there is limited information available—and these need to be explained. The issue of whether to focus on local, regional, or national costs and benefits is one that researchers commonly encountered in benefit cost analysis. However, the selection of a time period to cover is uniquely complicated for adjudications where many processes continue in varying forms over decades.

#### G. BENEFITS AND COSTS OVER TIME

With respect to accounting for benefits and costs over time, economists have well-defined techniques for comparing benefits and costs occurring at different points in time using net present values and discounting procedures. However, one must estimate the longevity of benefits that arise from an adjudication successfully resolving issues. For instance, a successful adjudication may produce improved certainty and better working relationships and information sharing among parties. Are these benefits assumed to grow or decay over time, to remain robust or dissipate in the face of new conflicts?

### IV. POTENTIAL CRITERIA FOR EVALUATING ADJUDICATIONS

Any evaluation process requires a clear definition of the criteria against which a process is assessed. d'Estree and Colby offered a relatively comprehensive menu of criteria for evaluating dispute resolution processes and outcomes.<sup>100</sup> Rowe et al., 2006, focused upon economic and environmental aspects in evaluating dispute resolution processes and outcomes.<sup>101</sup> A few criteria most likely to be relevant to evaluating adjudications are summarized below.

The criterion “positive net benefits” examines whether the adjudication creates net benefits<sup>102</sup> for the parties that would not have been available otherwise.<sup>103</sup> Voluntary, negotiated agreements satisfy this

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100. See D'ESTRÉE & COLBY, *supra* note 12, at 30.

101. Rowe et al., *supra* note 24.

102. “Net benefits” are benefits minus costs.

103. D'ESTRÉE & COLBY, *supra* note 12, at 34 (calling this “perceived economic efficiency”). See also ROGER FISHER & WILLIAM URY, *GETTING TO YES: NEGOTIATING AGREEMENT WITHOUT GIVING IN* 56-61, 70-71 (Bruce Patton ed., 1991) (utilizing the concept of weighing benefits and costs in the “mutual gains” negotiation framework); LAWRENCE SUSSKIND, PAUL F. LEVY & JENNIFER THOMAS-LARMER, *NEGOTIATING ENVIRONMENTAL AGREEMENTS: HOW TO AVOID ESCALATING CONFRONTATION, NEEDLESS*

criterion for the signatory parties. If the agreement fails to provide incentive beyond their most likely alternative for those who sign on, they would decline to bind themselves to the agreement.<sup>104</sup> Adjudication outcomes, which do not require voluntary consent of the parties, are unlikely to satisfy this criterion. In adjudications, net benefits may arise from reducing or eliminating the costs associated with water right ambiguities, from improvements in water management, and from better cooperation such as the sharing of information, technology, and problem-solving capacities among the parties. As previously discussed, many analytic challenges arise in documenting and quantifying various adjudication costs and benefits.

The criterion “cost-effective implementation” considers costs of implementation decisions coming from an adjudication court. When a ruling sets specific requirements (e.g., a 10% increase in summer stream flows for fish), this criterion asks whether compliance is achieved in a cost-effective manner. Implementation costs are likely to be higher under court rulings. Courts are not required to consider costs in crafting their ruling, focusing instead on rights and consistency with the existing body of law.<sup>105</sup> Nevertheless, stake holders must carefully weigh costs, taking into consideration the financial burdens on adjudication participants, taxpayers, and property owners.<sup>106</sup>

Effective “incentive compatibility” means that the adjudication process and rulings generate signals that assist, rather than obstruct, successful implementation. Two specific elements of incentive compatibility in the adjudication context are incentives for compliance and incentives for more efficient water use and conservation.

Rulings that incorporate economic incentives for compliance will involve lower monitoring and enforcement costs than those that fail to consider incentives. Compliance incentives can be in the form of penalties, with specific consequences for violations—and adequate money and technical staff for monitoring and enforcement. High penalties are not effective in inducing compliance if there is little monitoring and therefore little probability of detection and imposition of fines.<sup>107</sup>

With respect to incentives for better resource management, adjudications may encourage water transactions. Market transactions create incentives by providing a known market price for the resource being traded—e.g., water rights. That established market price can signal

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COSTS, AND UNNECESSARY LITIGATION 236-38, 273-74 (2001) (applying mutual gains negotiation to disputes with a process called “creating value” or converting zero sum negotiations to positive sum negotiations).

104. A broader version of this criterion could inquire whether the outcome provides net gains to the larger community and society, beyond the immediate signatories.

105. See DONALD L. HOROWITZ, *THE COURTS AND SOCIAL POLICY* 34-35 (1977).

106. See *id.*

107. See SUSSKIND ET AL., *supra* note 103, at 212-13 (discussing economic sanctions in enforcing environmental laws).



resource users that water has value beyond their own immediate use of it. For example, irrigators will realize that on-farm water conservation may enable them to sell or lease the water no longer needed for irrigation and this opportunity provides an incentive for more efficient water use.<sup>108</sup>

Although judicial processes can send an incentive signal, courts generally do not have jurisdiction to set water prices. The compliance that the process encourages to the degree that violation will bring the violator before the court and expose them to the attendant costs and uncertainties, serve to improve the environment in which market transactions occur more readily.

Charles DuMars has addressed the potential effects of adjudications on market transactions.<sup>109</sup> This article will add a few points to his discussion. Market prices, negotiated between buyers and sellers, lie in a bargaining space defined by the other options available to the buyer, which determine the most the buyer could reasonably pay for a specific water right, and the least the seller could reasonably accept based on net financial returns they currently earn from owning the water rights and the expected increase in the value of the water right over time. Buyers' and sellers' negotiating skills and bargaining power determine where, within this range, the negotiated price will fall. Transaction costs resulting from ambiguity in water rights "chip away" at this bargaining space and make some transfers financially infeasible.<sup>110</sup>

Studies in the 1990s collected and analyzed primary data on costs to applicants and objectors for proposed water transfers in several states.<sup>111</sup> This article will briefly review the results to demonstrate that transactions occur even when burdened with a range of transaction costs. Costs include attorneys' fees, engineering studies and state agency fees. The relevant costs are only those to get change applications approved by the state, and do not including the purchase of water, conveyance costs, engineering for diversion works, and other costs of implementing the transfer and actually moving water to a new use. Across Colorado, New Mexico, Utah and Nevada, average applicants' costs were 6-12% of the price paid for the water right being trans-

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108. See TERRY L. ANDERSON & PAMELA SNYDER, *WATER MARKETS: PRIMING THE INVISIBLE PUMP* 8-12 (1997); see also Bonnie G. Colby, *Negotiated Transactions as Conflict Resolution Mechanisms: Water Bargaining in the U.S. West*, in *MARKETS FOR WATER: POTENTIAL AND PERFORMANCE* 77, 79, 87, 89-91 (K. William Easter, Mark W. Rosegrant & Ariel Dinar eds., 1998).

109. See DuMars, *supra* note 26.

110. See Bonnie G. Colby, *Regulation, Imperfect Markets and Transaction Costs: The Elusive Quest for Efficiency in Water Allocation*, in *HANDBOOK OF ENVIRONMENTAL ECONOMICS* 475, 483, 498-500 (Daniel W. Bromley ed., 1995).

111. See generally DR. LAWRENCE J. MACDONNELL, *THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS VOL. I*, 1, 2 (Natural Resources Law Center 1990) (discussing water transfer activities in six western states).

ferred.<sup>112</sup> The filing of an objection (protest) to a change in water right application raised applicant costs substantially.<sup>113</sup>

Colorado had much higher costs and much longer time delays to approve a water right change application.<sup>114</sup> These higher costs likely are due to the fact that the Colorado cases involved a higher proportion of transfers that moved water out of agriculture, the most controversial type of transfer, and a higher proportion of surface water change applications, which have more direct and immediate third party impacts than with groundwater.<sup>115</sup> Moreover, water right prices during the period of the study were much higher in Colorado than in New Mexico and Utah.<sup>116</sup> Where water is more valuable, it is worth spending more for a careful review of the transfer impacts.

There are multiple implications of the limited prior research on transaction costs for the present discussion of adjudications. First, market transactions occur in the presence of non-trivial costs and uncertainties. The state with the highest transaction costs also has the most active market. Second, it is economically rational to spend more on reducing water rights uncertainties in areas where water rights have a comparatively high economic value. Third, the incentives that the parties to an adjudication face are somewhat similar to those that applicants and objectors to water right changes face. Those parties with large financial interests at stake will rationally expend more asserting their rights and objecting to assertions by others. Those with a smaller economic interest at stake will reasonably expend less. In this way, the claimants themselves naturally balance the costs and benefits of participation in adjudication to some extent.

Another criterion with economic implications is "improved problem solving capacity." The stakeholders engaged in water conflicts often must address multiple problems over a period of years.<sup>117</sup> For instance, the dispute in the adjudication may involve the nature, quantity, and priority of water rights. However, the same parties may later find themselves engaged in conflict over providing water in-stream for endangered fish recovery or may confront a drought or a water quality problem. Consequently, the ability of the parties to work together effectively can be an important asset. Negotiated settlements provide some advantages over adjudications because they engage stakeholders in identifying strategies, debating their merits, allocating the cost bur-

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112. See Colby, *supra* note 25, at 1188.

113. See MACDONNELL, *supra* note 111, at 56.

114. See *id.* vol. I, at 47b, 57, vol. II, chapter 3, at 33.

115. See *id.* vol. II, chapter 3, at 18.

116. See BONNIE COLBY SALIBA & DAVID B. BUSH, WATER MARKETS IN THEORY AND PRACTICE: MARKET TRANSFERS, WATER VALUES, AND PUBLIC POLICY 172 (1987).

117. Bonnie G. Colby, *Negotiated Transactions as Conflict Resolution Mechanisms: Water Bargaining in the U.S. West*, in MARKETS FOR WATER: POTENTIAL AND PERFORMANCE 77 (K. William Easter, Mark W. Rosegrant & Ariel Dinar eds., 1998).

den, and building consensus for a particular approach.<sup>118</sup> The process gives the stakeholders experience in working together and may make it easier to solve the next regional water problem. Litigation encourages an adversarial approach among the parties rather than a problem-solving stance.<sup>119</sup> One would expect improved problem-solving capacity when stakeholders face a subsequent dispute after they have successfully resolved an earlier conflict through multi-party negotiations, as compared to having resolved the earlier conflict through litigation. However, there is little empirical evidence to either support or negate this hypothesis.

A broad criterion applicable to adjudications is “durability under uncertainty.” This criterion assesses the degree to which the adjudication process and rulings consider drought, environmental factors, and other natural contingencies that may create new uncertainties for water users in the future. While these considerations may not be the mandate of the court, to the extent that rulings are specific about adaptation to drought and other uncertainties that affect exercise of water rights, they can be helpful in planning for these contingencies. Climate change is one looming source of uncertainty facing the western water community. Careful evaluation of adjudications should inquire whether these processes will help address the future effects of climate change, and do so in a more cost effective manner than other possible alternatives.

One important factor that affects the durability of the positive results that adjudication can achieve is the degree to which various interests are represented in the process. Ramsey Kropf has pointed out that adjudications have a specific mandate and are not intended to resolve regional water challenges or to be “all things to all people.”<sup>120</sup> Nevertheless, to the degree possible, it is useful for adjudication proceedings to consider a diverse range of regional interests and claims. Environmental needs for water are a pressing water management challenge in nearly every western basin, but one not likely to be addressed where environmental interests and agencies do not hold water rights. One possible way to incorporate these interests into adjudications is for those unrepresented interests to become water right owners to a greater degree than through the environmental acquisitions that already have occurred. The facilitation of broader participation of envi-

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118. See WESTERN WATER POLICY REVIEW ADVISORY COMM'N, WATER IN THE WEST: CHALLENGE FOR THE NEXT CENTURY 3-41 (1998), available at <http://bioe.oregonstate.edu/Faulty/selker/Oregon%20Water%20Policy%20and%20Law%20Website/Report%20of%20the%20WWPRAC/WATER.PDF>.

119. See *id.*

120. Comments by Ramsey L. Kropf, panelist of *Forum for Changing Values: Do We Still Need Adjudications?* presentation at the American Bar Association Section of Environment, Energy, and Resources' 25th Annual Water Law Conference: *Changing Values, Changing Conflicts*, San Diego, California (February 22-23, 2007).

ronmental interests as right holders will require policies that provide funds for water right purchases or that provide a share of water for environmental purposes when a water right is transferred. This is possible through environmental trust funds, which could essentially take a "cut for the environment" from a transferred water right. Environmental advocates can participate directly in adjudication processes where they are right holders. Bringing them directly into the process may be necessary to help alleviate long running conflicts over water for environmental needs in many western river basins.

## VI. CLOSING THOUGHTS AND RECOMMENDATIONS

Analysis of the costs and benefits of adjudications and alternative proceedings may be a task well-suited to the Water Resource Research Institutes found in each U.S. state and territory, usually at the land grant university.<sup>121</sup> Such institutes typically have good communication with the water stakeholders in their state and may be effective at collecting the necessary data for systematic adjudication assessments.

The insurance industry has become quite sophisticated in assessing risk and establishing fees for policies that reduce the effects of risk on policyholders. Major ski resorts, for instance, often purchase policies that stabilize their revenues in the event of a poor snow year. In principle (and for a profit), private firms could offer insurance for the financial repercussions linked to uncertain water right yields by systematically and scientifically assessing risk and charging fees accordingly. The federal government absorbs some of the economic consequences of drought for farmers through its crop insurance programs and disaster relief payments.

One of the largest challenges water adjudications face is the uncertainty of a system dependent on climate, with precipitation and temperature being major determinants of water supply and demand.<sup>122</sup> Global warming will change the hydrologic cycles of the western United States in innumerable ways, many of which we can only roughly anticipate. Assessment of the likely yield of water rights under dry conditions will continue to become more crucial. Enforcement of priorities is likely to become the norm in the future, despite the fact that it is largely theoretical at the present time.<sup>123</sup> The financial value of improved water right certainty is likely to increase steadily in the face of climate change combined with population growth.

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121. See Water Resources Research, 42 U.S.C. § 10301(9) (2000).

122. Crammond, Dar. *Counting Raindrops: Prospects for Northwestern Water Rights Adjudications*, N.W. Water L. & Policy Project, 15 (Jan. 31, 2001), (available at <http://www.lclark.edu/dept/water>).

123. See Dan Tarlock, *General Stream Adjudications: A Good Public Investment?*, 133 J. CONTEMP. WATER RES. & EDUC. 52, 56 (2006).

The economically "optimal" balance of certainty in water rights differs across regions and over time. It is not worthwhile to create sophisticated property right regimes and to clarify all contingencies in advance of need when water is plentiful and cheap. However, in over-appropriated river basins there is sound economic rationale for investing in more certainty. The tradeoff in spending money to create more certainty is a delicate one. It is counterproductive if ambiguities burden the water acquisition process so heavily that socially desirable transfers fail to occur. However, it is unreasonable to expend so much money trying to reduce uncertainty that the costs of adjudication or an alternative process are out of proportion to the economic stakes, the value of water, and decisions that hinge on more certainty about water rights.

The fact that stakeholders receive different "products" for the money that they invest in different processes confounds comparisons of benefits and costs across alternative adjudicatory processes. In litigation, the ideal payoff for environmental advocates is a ruling that both favors their position in the particular case at hand and sets a favorable precedent for future disputes. In market transactions, the payoff is acquisition of water. Investment in alternative dispute resolution strategies provides differing types of results. An assessment strategy needs to consider the different mix of benefits that each alternative process produces given that, with existing data, we cannot conduct a systematic comparison of costs. The potential criteria for evaluating adjudications presented earlier in this article can provide a framework for comparing different kinds of end "products."

While a thorough economic assessment of adjudications will require several years of systematic data collection and analysis, practical steps can be adopted now. First, parties should be required to report costs of participating in adjudication processes in a regular and systematic manner, such as filing standardized quarterly reports.<sup>124</sup> Second, information that the parties use in the adjudication venue should become part of the public record and be available to others. Over time, this will create a valuable body of data, models and other information on hydrology, fish biology, wildlife needs, recreation use, etc. Finally, a cooperative effort amongst land grant universities, state water agencies, and federal agencies to initiate a research effort aimed at carefully identifying principal costs and benefits of these processes could help guide future adjudications.

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124. See U.S. Institute for Environmental Conflict Resolution, Program Evaluation System, available at [http://www.ecr.gov/multiagency/program\\_eval.htm](http://www.ecr.gov/multiagency/program_eval.htm) (discussing protocols for collecting data on the cost of multi-party dispute resolution processes from participants).

In closing, two words add pressing impetus to the need to resolve water right ambiguities: climate change. Climate change over the next several decades is likely to substantially alter temperature, water demand, and water supply conditions throughout the western U.S., compounding current water conflicts. The socio-economic stakes associated with water rights and water management will increase exponentially. The next generation of water attorneys, economists, engineers, planners, managers, and public officials will need to be much more innovative than those of us currently filling those roles. One positive legacy we can leave for the future is carefully structured and effective process for addressing water rights ambiguities. Systematic evaluation of current adjudication processes is an important first step.

