

9-1-2005

## Interstate Water Compacts: A Bibliography

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"Interstate Water Compacts: A Bibliography", by George William Sherk, D.Sc., J.D., September, 2005

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Western states do not appear willing to "go with the flow" and let the federal government control leasing of Colorado River water. Instead, the lower basin states of Arizona, California and Nevada are busy devising their own strategies to use unused portions of Colorado River allotments. A federal plan calls for interstate leasing of unused water allotments to be authorized by the secretary of interior. The Bureau has circulated a draft of its plan to the Colorado River Compact states for comment. Reaction to the plan has been less than favorable, mainly because the federal government would gain control of how states manage and eventually sell their allotments of Colorado River water.

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The Colorado River Basin covers a large and diverse area of the intermountain and southwestern United States. Its drainage covers seven states and water from the basin serves the needs of 15 million people in supplying water for cities, irrigated agriculture, energy production, industry and mining. The allocation system on the Colorado River operates on four levels: international, interregional, interstate and intrastate. The Mexican Water Treaty of 1944, the Colorado River Compact of 1922 and the Boulder Canyon Project of 1928 provide the basic framework for the first three of these relationships. The legal

problems of water use from the Colorado River are discussed as are the competing users of the river's water. The problems of water quality and energy development utilizing Colorado River water are examined. Energy may have significant impacts on local and regional water allocations and quality. Upon whom the impact falls will depend to a great extent on institutional and economic constraints and incentives imposed, either as a result of historical development or future policy directions. A strong objective look at the social, economic, and physical problems as they can be anticipated is recommended with less concern for the sensational elements of the planning process.

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— In the arid and semi-arid regions of the western United States, recent droughts have drawn attention

to interstate differences in water scarcity and the possibility of differences in the marginal economic values of water. In some cases, interstate differences in the marginal value of water may occur within a river basin where available streamflow is allocated by an interstate compact. The allocation rules embodied in the compacts determine the extent to which the relative marginal values fluctuate as streamflows fluctuate. In some cases, one party to a compact is exposed to greater risk of water shortage than another. Compounding this problem are the possible shifts in precipitation and runoff patterns due to climate change. This dissertation addresses these issues by examining the effects of interstate compacts in the western United States. Existing interstate river compacts are surveyed, summarized and categorized by type. Interstate compacts most frequently allocate streamflow using either a percentage formula or a fixed delivery requirement. The allocation formula embodied in the compact determines the distribution of risk stemming from variable streamflow. A model is used to compare the economic efficiency of interstate water allocation under the two alternative compact types. Findings from four case study river basins governed by interstate compact are presented. Actual deliveries are compared to required deliveries and cases of noncompliance identified. A theoretical model and some numerical examples show that levels of noncompliance will be higher under the fixed delivery requirement for most levels of streamflow. A tobit model is used to support the theoretical and numerical arguments. Finally, the potential effects of climatic changes on streamflow are examined. Climate models suggest the western United States may become warmer in the event atmospheric CO<sub>2</sub> doubles from pre-industrial levels. While changes in precipitation are uncertain, warming alone may result in large changes in the seasonal distribution of streamflow with possible reductions in availability during the growing season for many river basins. Potential effects of climate change on the South Platte River basin are outlined and various climate change scenarios resulting in a reduction in streamflow are imposed to determine the likely effects on upper basin compact deliveries.

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— Interstate river compacts are widely used to allocate water among riparian states. Twenty-one compacts are currently in force in the western United States, and these compacts are mostly of two types: those that allocate a fixed amount or flow of water to individual states; and those that allocate percentages of available water to the riparian states. This study compares the performance of the two resulting allocations with that resulting from basin-wide optimization without compact constraints. While widely varying hydrologic and economic characteristics of river basins create a large set of possible outcomes, a range of stylized case studies indicates that percentage compacts are likely to generate greater net benefits and to result in more equitable risk-sharing than fixed compacts under many circumstances. In light of recent compact negotiations in the southeastern United States, it is recommended that efficiency analyses under present and future conditions be made a part of all compact negotiations.

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— The Galloway Project has presented the states on the Colorado River with a proposal requiring a new definition of rights under the Colorado River Compact. These proposals have caused several agencies and states to reevaluate the Colorado River Compact, and to reconsider their present position on the meaning of the terms that have been defined. The Galloway Project proposal is causing a new consideration of water leasing, states rights, state politics, and interstate sales of water. These issues are discussed. It is concluded that, whether or not Galloway is successful, the issue of interstate sale of water rights to out-of-basin users will return. Some of the legal obstacles appear to be illusory, but are in fact subject to judicial interpretation. Questions relating to the amount of water actually available for appropriations are not significant next to political questions. The future will probably see more projects proposed similar to the Galloway Project.

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— With the recent withdrawal of the interstate compact between California and Nevada from the U.S. Senate there has arisen consideration of a suit for equitable apportionment in the U.S. Supreme Court to determine the rights to the waters of the Carson, Truckee, and Walker rivers. Disparate parties include the states of Nevada and California, the Pyramid Lake Paiute Indians, and farmers on the Bureau of

Reclamation Newlands Project. There is little or no agreement between these parties and the cities of Reno and Sparks concerning present and future needs for water. There are perils associated with such a suit and the parties involved should consider these before such a suit commences. History has shown that many surprises can result from the institution of a suit in the federal court system, court decisions are difficult to reverse. Two alternative methods exist to resolve interstate disputes over the allocation of water. One method is by congressional apportionment, and the other is by interstate compact. In cases of equitable apportionment, the court has upheld in prior cases that only reasonably efficient uses of water would be protected. States must prove serious injury due to the unequitable apportionment of water, or demonstrate future needs for water as occurred in the case of Colorado vs. New Mexico. If the economic benefits of one competing use outweighs another, the court may rule in favor of the user who can prove more economic benefits of the water use. The Paiute Indians have used desire to protect the fisheries in the Truckee River and maintenance of the lake elevation of Pyramid Lake as reasons for preserving their water rights. Nevada may not be willing to go to court to test the equitable apportionment that the court might apply when there are so many unknowns that the court can adopt to make the actual water apportionment of Nevada less than if it had not gone to court. As a result, Nevada is busy exploring every other possibility of settling the disposition of the water of the three rivers before going to court.

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— State and national boundaries are traversed by natural surface water and groundwater systems, but the flow of water in such systems is not influenced by these boundaries. Considerable history and experience have developed in the United States over the allocation and management of water in interstate and international streams. However, similar agreements between states or with other countries concerning the development and use of groundwater flowing under a state or international line are practically non-existent. This study was designed to be a first look at the physical and legal problems involved with interstate and international aquifers. Approximately 200 interstate and international aquifer situations were identified by state agency and university personnel responding to a questionnaire. The principal conclusion derived from the questionnaire results and related literature research was that many current and potential interstate and international groundwater problems exist which have received little joint attention by the states concerned. A case study was conducted on the Ogallala formation lying across the Colorado Kansas state line. The study points out the need for similar management to be imposed on both sides of the state line. Legal aspects were reviewed and discussed and a proposed interstate compact was developed.

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water exchange mechanisms governing use of off-stream reservoirs in the basin. Model calibration exercises conducted for the case study area confirm that MODSIMQ reasonably reproduces both historical flows and salinity levels for the calibration period. Results from various management scenarios indicate that appropriate conjunctive use of surface and groundwater can simultaneously satisfy water demands for users while enhancing control of salinization.

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This paper begins with a survey of the law of interstate compacts generally. It then compares the usual patterns of interstate water compacts in the west and east. It then proceeds to describe the provisions and working of the Delaware River Basin Compact. It continues with a brief survey of the Great Lakes legal system. Finally, it closes with a brief discussion of the efforts to craft a workable compact in the southeast of the U.S. to manage the waters of the rivers shared by Alabama, Florida, and Georgia.

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– The Columbia Interstate Compact represented an attempt to establish a regional institutional mechanism for river basin development. After seven Pacific Northwest states spent 18 years negotiating the compact, and five attempts were made to ratify the compact in the state legislatures, Oregon and Washington had not ratified. This study is a history of the compact negotiations, describing the efforts of the seven states in the context of the political environment in which the compact was negotiated. Several factors which contributed to the ultimate dissolution of the negotiating effort are analyzed in some depth. First, role perceptions (sense of negotiating objectives) of compact commissioners varied substantially from state to state and within states in a period of time when attitudes related to river basin development were typically strong and polarized. Second, the negotiating environment changed in such a way as to reduce the perceived need for a compact. Finally, financial crisis, after Washington, and Oregon discontinued financial support of the effort, forced the compact commission to close its office. The most devastating defeat of the compact attempt came in the Washington legislature. There the compact became embroiled in the existing conflict regarding power generation and marketing. Although the compact effort may be dead, most issues with which it dealt, including allocation of water, reservation of power for states in which a dam is constructed, and out-of-basin diversion, are very much alive.

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resources are allocated as market or quasi-market commodities. The third issue examined involves litigation over federal Indian reserved water rights. The principle is simply stated but complex in its application: The United States, as sovereign, is a trustee for the Native American tribes and has a duty to ensure the tribes have sufficient water resources to fulfill the purposes of the reservations on which they reside. Likewise, the tribes, as sovereigns, have a duty to their members to protect and preserve the natural resources of the tribes. Interstate compacts and litigation over federal Indian reserved water rights in some instances have served the purposes for which they were designed. However, their historical purposes are narrow. They are ill-suited to solving modern day regional water management problems. A better fit may be joint commissions, such as the New Mexico/Texas water commission, arising out of litigation. However, litigation is not the best method for beginning collaborative efforts. The Park City Principles appear to be best adapted to regional water planning processes that preempt conflict, rather than to conflicts that have already risen to the level of litigation or that have been resolved by a compact addressing only a few of the issues in the dispute.

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The United States Supreme Court is the forum for the judicial settlement of disputes between States over the apportionment of the waters of interstate streams and bodies of water. The law evolving from interstate controversies acts as a limit upon the internal water law of the States. A summary of the results of interstate water controversies is presented. Interstate compacts may have various effects upon private rights and State legislation relating to water. An interstate compact may operate as a restriction upon private rights held under State law that are inconsistent with the compact and in some cases may be held to be unconstitutional. Interstate compacts may adversely affect private or public water rights previously established by State law. Several statutes have been enacted in the Western States regarding the question of the appropriation of water in one State for use in another State. Some of the variations in such legislation include: (1) Colorado legislation which provides that it is unlawful to divert or transport the waters of streams or other sources of water in the State for use into any other State for use therein; and (2) Utah legislation which provides that water may be appropriated from interstate streams in Utah, to be conveyed into any border State for use therein, provided the sister State has reciprocal legislation.

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This dissertation evaluates federal-interstate compacts as an institutional model for coordination and management of water resources for interstate river basins in the United States. In a federal-interstate compact, the federal government is a signatory party with the states. Federal-interstate compacts represent one institutional approach for addressing a recurring problem of government—how to perform functions that transcend state boundaries, but do not require national action. The dissertation research is performed using the Delaware River Basin Commission (DRBC) as a case study. Program-evaluation methodology is utilized to determine whether the DRBC has been successful in reaching its predetermined objectives and by extension whether federal-interstate compacts are effective in coordinating and managing water resources. The research concludes that the DRBC has been effective in meeting most of its objectives as set forth in its enabling legislation, the Delaware River Basin Compact. The DRBC has been most successful in settling disputes over water allocation and addressing severe stream pollution problems. The DRBC has been the least effective in flood-loss reduction. The research derives conclusions concerning federal-interstate compacts based upon the experience of the DRBC. The effectiveness of federal-interstate compacts depends to a great degree on the extent to which the parties are willing to fully support and participate in them. Their success also requires that the parties believe that severe water resources problems exist that require regional solutions. As an instrument for cooperative planning, federal-interstate compacts have been most successful for securing interstate coordination for addressing regional problems. The DRBC case study indicates that federal-interstate compacts only have been partly successful in securing federal-state and federal-interagency coordination for resolving regional problems. Their future potential for such purposes largely will depend on the federal government's willingness to make commitments through the compact commissions.

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Within the American federal system, cooperative interactions between the states have embraced a

variety of mechanisms - informal cooperation, voluntary associations, optional enactment of similar laws, and differing degrees of formal legal accords, including interstate compacts and administrative agreements. The most binding of these instruments is the interstate compact, a legal document that combines the attributes of a state statute and a contract. Over the 205 years of the nation's constitutional history, the use of compacts, expectations for them, and evaluations of them have varied sharply.

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— Environmental policy formulation is a difficult business under the best of circumstances. In many cases, policy making is complicated by factual uncertainty about the likely outcomes of policy intervention & by persistent value conflicts over desired policy ends & goals. This is nowhere more true than in formulating policy to manage adverse impacts to a watershed caused by natural & human activities. In the case of the Illinois River watershed in eastern OK, controversy over whether & how economic activities in the watershed should be regulated has effectively stifled meaningful policy reforms for three decades. As part of a test of a novel watershed management policy-making protocol funded by the US Environmental Protection Agency, a Q methodological study of stakeholders' perspectives on impact concerns & impact management preferences was conducted to diagnose the conflicts that have pre-empted policy initiatives for so long. We found that the conflicts that exist are not bipolar, but orthogonal - opening the way to potential superoptimum solutions that can satisfy everyone. This study demonstrates the power of Q methodology to assess conflict & thereby suggest strategies for its resolution. 2 Tables, 1 Figure, 1 Appendix, 49 References. Adapted from the source document.

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— In early December 1948, representatives of New Mexico and Texas signed the Pecos River Compact, which apportioned the waters of the Pecos River between upstream New Mexico and downstream Texas pursuant to an empirical formula that embodied the results of extensive hydrologic study of the Pecos River Basin. The states could better induce Congress to appropriate large sums towards stream improvement projects by compacting. The water shortages experienced by the Carlsbad Irrigation District and Texas evidence the apparent failure of the salvaged water assumption, in that the salvaged water failed to offset the post-agreement base-flow depletion in the Roswell Basin. The salvaged water assumption involved the stretch of the Pecos River between Acme and Artesia, New Mexico. Negotiators believed that eradication of salt cedars would offset the entire post-agreement base flow depletion caused by groundwater pumping in the Roswell Basin. The result of this miscalculation was, and will likely continue to be, chronic water shortages on the Pecos. New Mexico will likely succeed in substantially reducing or eliminating such shortages only if it delivers to Texas a quantity of water comparable to that



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— This study examines the efforts of Virginia's largest city, Virginia Beach, to locate a new source of water sufficient for its growth requirements and as a protection against recurring droughts in Southeastern Virginia. On the advice of private consultants and the U.S. Army Corps of Engineers, Virginia Beach decided to construct an 84.5-mile pipeline to Lake Gaston on the Roanoke River and there withdraw up to 60 million gallons of water daily. The State of North Carolina, which shares the river with Virginia, sued in court to halt the pipeline project. It argued that the Corps of Engineers was 'arbitrary and capricious' in recommending and approving this use of the Roanoke without making a full environmental impact study of the plan, and further that adequate water sources for Virginia Beach exist within Virginia. A court decision is expected by summertime, 1987. It could approve the Lake Gaston project, or it could slow the project for years by ordering further environmental impact studies. Counter-lawsuits are possible and could delay the Virginia Beach plan for years, or forever. A detailed study of legal records, administrative files and testimony at public hearings, reenforced by interviews with many officials in both states, revealed the passionate feelings and the environmental, social and economic concerns raised by the proposed interbasin, interjurisdictional transfer of water. This examination of the Virginia Beach case highlights the inadequacies of existing water resource laws and regulations. It foresees trouble as other cities inevitably seek interbasin transfers to meet their needs. It then suggests a time-tested solution to resolve the North Carolina-Virginia controversy, and possibly conflicts elsewhere. An interstate compact, ratified by each state's legislature and approved by Congress, could establish a bi-state, professionally-operated, regulatory commission capable of fairly managing the use and distribution of Roanoke River waters. The study notes that such compacts are successful in many states. A compact-created commission could provide environmental wisdom and political insulation, replacing the hostility of the present litigation with the amity and cooperation which have characterized North Carolina-Virginia relations over the past two centuries.

Gindler, B. J. (1967). Interstate Compacts and Water Quality. *Waters and Water Rights*. R. E. Clark. **3**: 332-348.

— Rights to permit or to prohibit degradation of water quality may be involved directly or indirectly in interstate compacts. An interstate compact may expressly disclaim any attempt to deal with water quality or pollution problems. States have agreed upon, and Congress has consented to, ten interstate compacts that deal directly with administrative controls for water quality and pollution. All of these compacts provide for an interstate commission or agency, with representatives from the states and in some cases also from the United States, to administer their provisions. The jurisdiction of an interstate commission is limited to waters in the interstate drainage basin with which the particular compact is concerned. Most of the

compacts recognize expressly that no single standards of water quality could practicably be made applicable to all waters under the jurisdiction of their commissions. Most of the compacts provide that they are not intended to preclude any signatory state from imposing any additional conditions or restrictions to further lessen or prevent the pollution of waters within its jurisdiction.

Gingrich, N. (2001). Testimony of the Honorable Newt Gingrich at the Oversight Hearing on the Alabama-Coosa-Tallapoosa River Basin Compact and the Apalachicola-Chattahoochee-Flint River Basin Compact. Committee on the Judiciary, Subcommittee on Commercial and Administrative Law. Washington, DC.

Girardot, J. W., Note (1989). "Toward a Rational Scheme of Interstate Water Compact Adjudication." University of Michigan Journal of Law Reform **23**: 151-178.

Glass, C. F., Jr. (2003). "Enforcing Great Lakes Water Export Restrictions Under the Water Resources Development Act of 1986." Columbia Law Review **103**(6): 1503-1537.

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

Goetze, D. (1981). A Strategy for Empirical Evaluation of River Basin Institutions. Unified River Basin Management - Stage II. R. M. North, L. B. Dworsky and D. J. Allee. Minneapolis, MN, American Water Resources Association.

Gold, H. D. (2002). "Supreme Court Struggles with Damage Assessment in Water Dispute as Interstate Compact Breaks Down." Ecology Law Quarterly **29**: 427.

Goldfarb, W. (1993). The Trend Toward Judicial Integration of Water Management. Water Resources Administration in the United States. M. Reuss. East Lansing, MI, Michigan State University Press: 82-93.

Goldfarb, W. (1994). "Watershed Management: Slogan Or Solution?" Boston College Environmental Affairs Law Review **21**: 483-504.

Goslin, I. V. (1976). "Interstate River Compacts: Impact on Colorado." The Denver Journal of International Law and Policy **6**(Special Issue): 415-439.

Water compacts to which Colorado is a party influence the nature and direction of future state development, conservation, and utilization of water resources. Compacts are a mutually agreeable means of settling existing water disputes and preventing future controversies over the waters of interstate streams. To date, Colorado is a party to nine interstate water allocation compacts and to three interstate agreements that can be designated as subcompacts. Their terms have served as parameters for resource development processes. The Colorado River compact is regarded as the grandfather of water allocation compacts in the United States. The following is a listing of the remaining eight compacts to which Colorado is a party: La Plata River compact, South Platte River compact, Rio Grande compact, Republican River compact, upper Colorado River Basin compact, Arkansas River compact, Costilla Creek compact, and the Animas-La Plata Project compact. Compacts have been beneficial to Colorado in protecting the use of interstate waters against prior appropriation and use in other states. Other areas of significant impact include water quality, water supply and litigation.

Gottlieb, R. (1988). A Life of its Own: The Politics and Power of Water. New York, NY, Harcourt Brace Jovanovich.

Grad, F. P. (1963). "Federal-State Compact: A New Experiment in Cooperative Federalism." Columbia Law Review **63**: 825-855.

Graf, D. (1996). "Bringing the River Back. To the Future: Urban and Rural Watershed Management: A Summary of the 1996 South Platte Forum." Colorado Water(December): 16-18.

Graham, G. (1981). International Rivers and Lakes: The Canadian-American Regime. The Legal Regime of International Rivers and Lakes. R. Zacklin and L. Caflisch. The Hague and Boston, Nijhoff: 3-21.

Grant, D. L. (1983). "The Future of Interstate Allocation of Water." Rocky Mountain Mineral Law Institute **29**: 977-1026.

Grant, D. L. (1991). Apportionment by Congress. Waters and Water Rights. R. E. Beck. Charlottesville,

VA, The Michie Company. **4**: 575-588.

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— Grant, D. L. (1991). Water Apportionment Compacts Between States. Waters and Water Rights. R. E. Beck. Charlottesville, VA, The Michie Company. **4**: 549-574.

— Grant, D. L. (2003). "Interstate Water Allocation Compacts: When the Virtue of Permanence Becomes the Vice of Inflexibility." University of Colorado Law Review **74**: 105-180.

— Grant, D. L. (2003). "Limiting Liability for Long-Continued Breach of Interstate Water Allocation Compacts." Natural Resources Journal **43**(2): 373.

— Recent Supreme Court decisions in *Texas v. New Mexico* and *Kansas v. Colorado*, involving assessment of damages for long-term breaches of interstate water compacts, have raised the specter of huge liability for breaching states. Thus far the Supreme Court has not dealt with the possibility that time may bar some claims of long-continued breach. The ancient principle of *nullum tempus*-no time runs against the sovereign-might enable a sovereign plaintiff state to recover damages no matter how old. The *nullum tempus* principle should not apply in water compact enforcement suits, however, because it would produce little or no public benefit in that situation and because its application would violate the constitutional plan of equal footing for litigating states. With the removal of the principle of *nullum tempus*, the defenses of either laches or a borrowed statute of limitations may reduce a defendant state's liability for breach of an interstate water compact.

Graves, W. B. (1938). Reference List on Interstate Compacts and Interstate Cooperation. Philadelphia, PA, Department of Political Science, Temple University.

— Great Lakes Governors Task Force on Water Diversion and Great Lakes Institutions (1985). Final Report and Recommendations: Great Lakes Governors Task Force on Water Diversion and Great Lakes Institutions. Madison, WI, Council of Great Lakes Governors.

— Great Lakes Water Resources Management Committee (1987). Managing the Waters of the Great Lakes Basin - A report to the Governors and Premiers of the Great Lakes States and Provinces. Madison, WI, Council of Great Lakes Governors.

— Gregg, F. (1989). Irrelevance and Innovation in Water Policy: Lessons from the WRPA. Redefining National Water Policy: New Roles and Directions. S. M. Born. Bethesda, MD, American Water Resources Association: 11-18.

— Gregg, F., S. M. Born, et al., Eds. (1991). Institutional Response to a Changing Water Policy Environment. Tucson, AZ, University of Arizona, Water Resources Research Center.

— Greve, M. (2003). "Compacts, Cartels, and Congressional Consent." Missouri Law Review **68**: 285-387.

— Grigg, N. S. (1985). Voluntary Approaches to Basinwide Management. Colorado Water Issues and Options: The 90's and Beyond - Toward Maximum Beneficial Use of Colorado's Water Resources, Boulder, CO: Natural Resources Law Center, University of Colorado School of Law.

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— Grigg, N. S. (1998). "Coordination: The Key to Integrated Water Management." Water Resources Update **111**: 23-29.

— Hacker, J. J. and T. D. Martin (1986). "Future Great Lakes Management - Beginning Steps in the Evolution of a Regional Approach." The Great Lakes United **1**(1): 11.

— Hagen, E. R., J. E. Kiang, et al. (2004). Water Loss in the Potomac River Basin During Droughts. Critical Transitions in Water and Environmental Resources Management, Proceedings of the World Water and Environmental Resources Congress, June 27 - July 1, 2004, Salt Lake City, Utah, Reston, VA, American Society of Civil Engineers.

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Hall, G. E. (2002). High and Dry: The Texas-New Mexico Struggle for the Pecos River. Albuquerque, NM, University of New Mexico Press.

Haller, T. G. (1982). California-Nevada Interstate Water Compact - A Study in Controversy. Reno, NV, University of Nevada.

The subject of this case study was the legislative consideration of the California-Nevada Interstate Water Compact in the California and Nevada legislatures during 1969 to 1971. The Compact was introduced into the California and Nevada legislatures in 1969 after fourteen years of negotiations between California and Nevada. The intent of the agreement was to allocate the waters of the Truckee, Carson, and Walker Rivers to California and Nevada. Complicating the division of these waters between the two states was the question of what waters Pyramid Lake, a part of the Pyramid Lake Paiute Reservation, was legally entitled to. The Paiutes opposed the Compact on the grounds that it would discriminate against their water rights, leading to the further decline and ultimate destruction of Pyramid Lake. The plight of Pyramid Lake and the possible infringement on Indian water rights resulted in spirited legislative battles in the California and the Nevada legislatures. Group theory was used as the conceptual framework for the analysis of the case study. Seven hypotheses consistent with group theory and applicable to the study were presented and tested. The first hypothesis postulates that the primary actors making demands and seeking outputs from the legislatures are groups and their representatives. The second and third hypotheses deal with the legislators' roles: the leaders in bargaining and mediating the interest group conflict in the legislature are relatively disinterested parties on the policy issue being contested; and most legislators are disinterested in a particular policy area and the group conflict on that issue and will take some cues from cue-giving legislators. The last four hypotheses are concerned with the effect that changes in the scope of a political conflict have on the nature and outcome of that conflict; there is a general tendency by participants in the interest group conflict to enlarge the conflict, bringing in new participants and changing the bias of conflict; conditions encountered by interest groups will tend to enlarge or limit the scope of the conflict; interest groups will use the tactic of trying to enlarge or limit the scope of the conflict to their advantage; and as the scope of the interest group conflict changes to include different political arenas, interest groups will find different conditions and policy questions in a different context. The analysis of the data presented in the case study supported each of these hypotheses.

Hamilton, J. B., N. K. Whittlesey, et al. (1991). "Economic Impacts, Value Added and Benefits in Regional Project Analysis." American Journal of Agricultural Economics **73**(2): 334-344.

Hardy, P. T. (1982). Interstate Compacts: The Ties That Bind. Athens, GA, Carl Vinson Institute of Government, University of Georgia.

Harnsberger, R. S., J. R. Potuto, et al. (1991). "Interstate Transfers of Water: State Options After *Sporhase*." Nebraska Law Review **70**: 754.

Harris, M. E. (1983). "Missouri River - The New Compacting Game." Water Resources Bulletin **19**(6): 921-927.

Proposed interbasin water diversions of the Missouri River are related to energy development, agricultural, municipal, and industrial water use. Overall, an estimated 8.5 million acre-feet of water from the Missouri River could be diverted by the year 2000 if three major projects are allowed to take place or continue. Interstate issues in the river basin include interbasin water diversions, riverbed and shoreline degradation, loss of recreational and natural areas, reduction in navigation capacity, the status of the Pick-Sloan Missouri Basin Program in terms of general river development, and the elimination of river basin commissions. An attempt to develop a comprehensive interstate water compact failed in the 1950s. Much of the concern over general river development lies in differing individual state attitudes towards the Pick-Sloan Missouri Basin Program. But, there are other available mechanisms for the resolution of the current political and legal differences among the ten river basin states.

Harrison, D. C. (1981). Basinwide Perspective: An Approach to the Design and Analysis of Institutions for Unified River Basin Management - Stage II. R. M. North, L. B. Dworsky and D. J. Allee. Minneapolis, MN, American Water Resources Association.

Harrison, D. C. (1986). "Organization of the Water Policy Process From the Bottom-Up: The Red River Valley of the North Experiment." Water Resources Bulletin **22**(5): 731-743.

Hart, G. W. (1971). Institutions for Water Planning. Springfield, VA, National Technical Information Service, U.S. Department of Commerce.

Hasday, J. E. (1997). "Interstate Compacts in a Democratic Society: The Problem of Permanency." Florida Law Review **49**: 1-47.

Hatch, L. U. and T. R. Hanson (2001). "Change and Conflict in Land and Water Use: Resource Valuation in Conflict Resolution among Competing Users." Journal of Agricultural and Applied Economics **33**(2): 297-306.

Hatcher, K. J. and J. E. Kundell (1983). Institutional Arrangements for Integrated Water Management in the Southeast. Atlanta, GA, Environmental Resources Center, Georgia Institute of Technology.

Hathaway, P. L. (1991). Drought Planning and Response Strategies. Severe, Sustained Drought in the Southwestern United States: Phase 1 Report. F. Gregg and D. H. Getches. Tucson, AZ, University of Arizona, School of Renewable Natural Resources: 3:1-47.

Hawk, M. R., Note (1997). "Interstate Compacts: Allocate Surface Water Resources from the Alabama-Coosa-Tallapoosa River Basin Between Georgia and Alabama; Allocate Surface Water Resources from the Apalachicola-Chattahoochee-Flint River Basin Among Alabama, Florida and Georgia." Georgia State University Law Review **14**: 47-56.

Heagerty, D. D., K. R. O'Hara, et al. (2004). System Dynamics Modeling and Valuation of Ecosystem Services. Critical Transitions in Water and Environmental Resources Management, Proceedings of the World Water and Environmental Resources Congress, June 27 - July 1, 2004, Salt Lake City, UT, Reston, VA, American Society of Civil Engineers.

Heaney, J. P. (1993). "New Directions in Water Resources Planning and Management." Water Resources Update **93**: 3-8.

Heath, M. S., Jr. (1983). Interstate Water Law Issues: Unilateral State Legislation - Original Suits in the Supreme Court - Interstate Compacts. Chapel Hill, NC, Institute of Government, North Carolina University at Chapel Hill.

— The principal legal avenues for resolving interstate water disputes involve either legislation, litigation or interstate cooperation. This report addresses one option in each of these categories that may be available to state governments: unilateral state legislation designed to restrict outsiders from access to a state's water resources; original actions against a neighboring state in the U.S. Supreme Court; and interstate compacts. The opportunities for unilateral state legislation have been severely restricted by recent Supreme Court decisions, though several developing areas of constitutional law should be monitored closely for their possible future impact on this subject. Original actions in the Supreme Court may offer the possibility that the court will place some limitations on withdrawal of interstate waters by a state, and this possibility may provide some leverage for another state that wants to contest this withdrawal, but original actions are beset by a number of obstacles and uncertainties. The interstate compact has long been regarded as a preferred enforceable alternative for resolving a water resources dispute - if you can get it.

Heathcote, I. W. (1995). Conflict Resolution in Ontario Water Resources Policy. Water Quantity/Quality Management and Conflict Resolution: Institutions, Processes, and Economic Analyses. A. Dinar and E. T. Loehman. Westport, CT and London, Greenwood, Praeger: 81-92.

Henderson, J. L. and W. B. Lord (1995). "A Gaming Evaluation of Colorado River Drought Management Institutional Options." Water Resources Bulletin **31**(5): 907-924.

Hess (1950). "Interstate Action to Control Pollution." State Government **23**: 204.

Hill, J. P. (1989). "The Great Lakes Quasi Compact: An Emerging Paradigm for Regional Governance of U.S. Water Resources?" Detroit College of Law Review **1989**(1): 1-24.

Hill, J. P. (1992). Managing the Nation's Waters Without Washington: The Interstate Compact Experience. Michigan State University. Ann Arbor, MI, University Microfilms International.

— The growing regional imbalance in water supplies has raised political tensions between water 'surplus' states and water 'shortage' states over control of surface and groundwater supplies. The result has been a growing fear among water surplus regions like the Great Lakes that pressure on Congress from politically powerful water storage states may result in eventual federal preemption of this traditional state management function. In light of the regional character of most water resources and the collective

action problems this fact raises, numerous regional efforts have been attempted by states. The most powerful device available from a legal standpoint to ensure that water resources policy or policies reflect regional variation while avoiding wholesale federal preemption is the interstate compact. However, studies of interstate compact commissions are dated and largely descriptive. This new theoretical effectiveness model is then applied to the entire population of interstate water compact commissions, utilizing a nationwide survey of all interstate water compact commissions as well as objective data obtained from legal and historical documents associated with each compact. Seven general hypotheses of what constitutes an effective interstate compact commission, drawn from the compact literature, are tested to determine whether or not they conform with the findings of the new effectiveness model. The model's explanatory power is further tested by applying it to three comprehensive interstate water compact case studies. The dissertation concludes that the interstate compact commission can be an effective mechanism for regional water management and potentially for other regional resources as well.

Hill, R. A. (1968). Development of the Rio Grande Compact of 1938. San Francisco, CA.

Hill, R. A. (1974). "Development of the Rio Grande Compact of 1938." Natural Resources Journal **14**(2): 163-199.

Hill, R. W., C. E. Brockway, et al. (1989). Duty of Water Under the Bear River Compact: Field Verification of Empirical Methods for Estimating Depletion: Final Report, 1982-1988. Logan, UT, Utah Agricultural Experiment Station, Utah State University.

Hines, N. W. (1966). "Nor Any Drop to Drink: Public Regulation of Water, Part I: State Pollution Control Programs." Iowa Law Review **52**: 186-235.

Hines, N. W. (1966). "Nor Any Drop to Drink: Public Regulation of Water, Part II: Interstate Arrangements for Pollution Control." Iowa Law Review **52**: 432-457.

Hines, N. W. (1966). "Nor Any Drop to Drink: Public Regulation of Water, Part III: The Federal Effort." Iowa Law Review **52**: 799-862.

Hinkle, J. (2003). "Troubled Waters: Policy and Action in the Great Lakes: Symposium: "Environmental Injustice"." Thomas M. Cooley Law Review **20**(2): 281-322.

Hobbs, G. J. (1994). "Ecological Integrity, New Western Myth (A Critique of the Long's Peak Report)." Environmental Law **24**: 157-169.

Hoffmann, D. S. (1984). "Who Owns the Great Lakes? Posturing for Control of an International Resource." Case Western Reserve Journal of International Law **16**(1): 71-100.

From time to time proposals have been made to divert water from the Great Lakes to other points for interstate use. Few of these proposals have survived economic and political barriers. However, if large scale diversions become economically feasible, several institutional and political questions need to be answered. Regulations and use of the waters of the Great Lakes are governed by a complex array of state and federal court decisions, administrative agencies, local, state and federal statutes, and federal treaties. A brief review is offered of United States laws and regulations including state law, federal law, the commerce power, the treaty power, the compact consent power, and also Canadian regulations including provincial law, and federal law. Historical developments cited include the International Joint Commission and the Chicago Diversion. The Great Lakes Basin is an example of the struggle between regional and national interests concerning natural resources. While the region presently lacks an institution with broad representation and authority, the impending threats of a water resource crisis will require a viable solution. This solution must be based on cooperative efforts, not on declarations of federal preemption or state or provincial autonomy. A novel approach is needed for these problems. An interstate compact consisting of regional and national representation appears to be the most attractive institutional framework for the basin.

Hoffmann, D. S., Note (1983). "Who Owns the Great Lakes? Posturing for Control of an International Resource." Canada-U.S. Law Journal **7**: 81.

Howe, C. W. and D. J. Goodman (1995). Resolving Water Transfer Conflicts through Changes in the Water Market Process. Water Quantity/Quality Management and Conflict Resolution: Institutions, Processes, and Economic Analyses. A. Dinar and E. T. Loehman. Westport, CT and London, Greenwood, Praeger: 119-129.

Huffaker, R., A. Michelsen, et al. (2001). "The Uneasy Hierarchy of Federal and State Water Laws and Policies." Water Resources Update **118**: 3-10.

Hull, C. H. J. (1978). "Delaware River Basin Water Resources Management." Journal of the Water Resources Planning and Management **104**(WR1): 157-174.

— The Comprehensive Plan (CP) for multipurpose development and management of water resources in the Delaware River Basin, under the first Federal-Interstate compact, is explained. The CP is a codification of administrative laws adopted by the Delaware River Basin Commission, and serves as a general guide for planning, development, and operation of water-related projects and facilities, both public and private, for water supply, water quality control, flood control, hydroelectric power generation, and recreation. The CP serves also a regulatory document to prohibit developments that do not conform to the adopted plan. The CP grows in scope almost monthly as the Commission adds new projects, policies, criteria, and standards. The CP, together with the basic statutory law, the Delaware River Basin Compact, provide the legal basis for regulatory control of water resources in the four-state, 13,000 square mile region. The CP includes the controversial Tocks Island Lake project, a multipurpose impoundment sited on a 37-mile reach of the Delaware River just downstream of the New York-New Jersey state boundary, which has been halted by opposition from environmental groups.

Hull, J. W. (2000). Regional Resource: The War Over Water. Atlanta, GA, Council of State Governments.

Hundley, N., Jr. (1967). "The Politics of Water and Geography: California and the Mexican-American Treaty of 1944." Pacific Historical Review **36**(2): 209-26.

Hundley, N., Jr. (1972). "Clio Nods: Arizona v. California and the Boulder Canyon Act - A Reassessment." Western Historical Quarterly **3**: 17-51.

Hundley, N., Jr. (1975). Water and the West: The Colorado River Compact and the Politics of Water in the American West. Los Angeles, CA, University of California Press.

— The Colorado River, the sole dependable water supply for an area of 244,000 square miles including parts of Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona, California, and Mexico, has been the cause of the greatest conflict over water in the American West. At the heart of the conflict is the fact that the river carries enough water for only a handful of cities, industries and farms. The movement for the Colorado River Compact of 1922 is traced, the complex legal and political battles that spawned the conflict and which continue to influence the lives of westerners today are described. A major topic is federalism; the attempt of the Colorado basin states to work out their destiny in concert with the federal government as each side has sought to assert its supremacy in areas coveted by the other. Further evidence of the important role played by government - federal, state and local - in the development of the west is discussed. Evidence is presented that the Supreme Court in 1963 misread the historical record when formulating the landmark decision of Arizona v. California. The study confirms the important role traditionally assigned to Delph Carpenter of Colorado in promoting the compact, but it also reveals that Herbert Hoover played a key part in breaking the impasse that developed during the final negotiations at Santa Fe in November, 1922.

Hundley, N., Jr. (1986). The West Against Itself: The Colorado River - An Institutional History. New Courses for the Colorado River. G. D. Weatherford and F. L. Brown. Albuquerque, NM, University of New Mexico Press: 9-50.

Hutchins, W. A., H. H. Ellis, et al. (1971). Water Rights Laws in the Nineteen Western States. Washington, DC, U.S. Department of Agriculture.

Imperial, M. T. (2001). Collaboration as an Implementation Strategy: An Assessment of Six Watershed Management Programs. School of Public and Environmental Affairs, May. Bloomington, IN, Indiana University: 394.

— This study utilizes a networked perspective to examine the role that collaboration plays as an implementation strategy. The study utilizes an inductive approach to generate conceptual frameworks and testable propositions by analyzing implementation efforts in six watersheds: Inland Bays (DE); Lake Tahoe (CA, NV); Narragansett Bay (RI, MA); Salt Ponds (RI); Tampa Bay (FL); and Tillamook Bay (OR). The analysis examined four research questions: (1) What implementation activities were observed? (2) What role did collaboration play in the implementation process? (3) How did the institutional setting influence the collaborative process? (4) What public value was created? These questions were answered using a qualitative, comparative case study research design that developed theory grounded in the data. Collaboration emerged as an important implementation strategy in all six watersheds. At the operational



level, collaboration was used to deliver public services such as permitting, public education, training, environmental monitoring, and data collection. At the policy-making level participants were engaged in a wide range of activities oriented towards sharing information, pooling resources, and developing shared policies and norms. There were also attempts to institutionalize shared policies by developing formal agreements, creating new programs, and developing new institutions. A theoretical framework was developed with testable propositions that help explain the particular pattern of collaborative activities in each watershed. The framework postulates that the watershed's contextual conditions create an interorganizational system's collaborative capacity. Five sets of contextual factors had the largest influence: the physical environment; configuration of problems; institutional setting; situational histories; and, programmatic context. Once these opportunities exist, the actors must still reach collective agreement on the activities to be pursued jointly. This decision-making process was influenced by a different set of situational factors: the mix of actors; mix of problems and policy solutions; the nature of the decision-making process; and, the expected outcomes. The situational factors create incentives and constraints that influenced the participants' ability to reach agreement. The final section analyzes the different ways that collaboration generates public value at the individual, organizational, network, and societal level and discusses the implementation problems that occurred.

Imperial, M. T. and T. Hennessey (2000). *Environmental Governance in Watersheds: The Importance of Collaboration to Institutional Performance*. Washington, DC, National Academy of Public Administration.

Imperial, M. T. and T. Hennessey (2000). *Improving Watershed Governance: Collaboration, Public Value, and Accountability*. American Political Science Association 96th Annual Meeting, August 31 - September 3, 2000, Washington, DC.

Ingram, H. (1971). *The New England River Basin Commission*. Springfield, VA, National Technical Information Service, U.S. Department of Commerce.

Ingram, H. (1973). "The Political Economy of Regional Water Institutions." American Journal of Agricultural Economics **55**(1): 10-18.

Ingram, H. (1990). Water Politics: Continuity and Change. Albuquerque, NM, University of New Mexico Press.

Ingram, H., D. E. Mann, et al. (1984). "Guidelines for Improved Institutional Analysis in Water Resources Planning." Water Resources Research **20**(3): 323-334.

Ingram, H. and S. R. Smith (1998). "Institutions and Policies for Democracy: A Discussion Paper and Comments." Policy Currents: Newsletter of the Public Policy Section, American Political Science Association **8**(1): 1-13.

Ingram, H., A. D. Tarlock, et al. (1991). *The Law and Politics of the Operation of Glen Canyon Dam. Colorado River Ecology and Dam Management. Proceedings of a Symposium held 24-25 May 1990 at Santa Fe, New Mexico*. Washington, DC, National Academy Press: 10-27.

The Colorado River was dammed to reduce the risks of feast and famine, and minimization of risks of water shortages remains a continuing preoccupation of the river's federal managers and the basin states. As agricultural and urban uses began to outstrip available water supplies, the western states persuaded the federal government to secure new supplies through carryover storage and interbasin diversion projects. The certainty of water rights in the West has traditionally been left to state laws and interstate negotiations. Fearing that California and to a lesser extent Arizona would acquire eternal vested rights to Colorado River supplies under the law of prior appropriation, the more rural upper basin states used their representation in Congress to block all reclamation projects on the lower Colorado River. All affected states negotiated the Colorado River Compact of 1922 which modified the law of prior appropriation to allow development of the lower basin while protecting other geopolitical values. Under this compact the lower basin retained the right to use any water not immediately used in the upper basin through a provision which declares that the upper basin states cannot withhold the delivery of water which can not reasonably be applied to domestic and agricultural uses. Other beneficial uses such as power generation and navigation were also provided for in the compact, but at a lesser priority. Hydropower revenues from Boulder Dam supported water development in the upper basin. The Colorado River Storage Project Act, which included Glen Canyon Dam, was the culmination of distributive politics which subordinated efficiency to regional development. By a compact signed in 1948, the upper basin states divided their 7.5-million-acre-foot share among themselves by a percentage allocation while the lower basin states fought over the division of their allocation in Congress and in the courts. In 1963 the Supreme Court held in

Arizona vs. California that when Congress enacted the Boulder Canyon Project Act it exercised its constitutional power to allocate interstate waters and thus implicitly apportioned the lower basin's share of the river. Revisions have since been made to the original compact of 1922 to protect the water rights of Native Americans and Mexico.

Ingram, H. M., L. A. Scaff, et al. (1986). Replacing Confusion with Equity: Alternatives for Water Policy in the Colorado River Basin. New Courses for the Colorado River. G. D. Weatherford and F. L. Brown. Albuquerque, NM, University of New Mexico Press: 177-199.

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— Interstate Commission on the Potomac River Basin (2002). Interstate River Basin Organization Source Water Protection Survey. Rockville, MD, Interstate Commission on the Potomac River Basin.

— Interstate Commission on the Potomac River Basin (undated). ICPRB: Protecting a River, Advancing a Quality of Life. Rockville, MD, Interstate Commission on the Potomac River Basin.

— Izzo, D. (2004). "Reengineering the Mississippi." Civil Engineering **74**(7): 39-45, 119.

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— A history is presented of the California Nevada Interstate Compact Commission from its formation in 1955 through 1971. The Commission was responsible for drafting a compact dividing up the surplus water of one interstate lake, Lake Tahoe, and three interstate streams, the Truckee, Carson and Walker Rivers. However, largely because of opposition from the federal government, the compact has never taken effect. Federal agencies interested in Lake Tahoe, particularly the Department of the Interior, have blocked any chance for the two states to solve their mutual water problems by imposing a new set of negotiating conditions on the commissioners after a formal compact between the states was adopted. Much of the criticism levelled at the Compact Commission has been unjustified considering the statutory limitations imposed on the Commission's authority when negotiations began. Finally, this report illustrates the continuing conflict over water use priorities in the American west. Throughout negotiations the relative value of water use for recreation was tested against the needs of farmers, power companies and other interest groups. The agreements reached by negotiators reflect the difficulty water use planners have had in reconciling conflicting, and often inconsistent, demand on a limited resource.

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— The vast majority of large river systems in the United States cross (or comprise) one or more state lines, creating numerous administrative challenges. Addressing these multijurisdictional challenges in an efficient and equitable manner often requires the development of sophisticated institutional arrangements. Several types of 'regional organizations' have been created for this purpose, including compact commissions, interstate councils, basin interagency committees, interagency- interstate commissions, federal-interstate compact commissions, federal regional agencies, and the single federal administrator format. These organizations feature a wide variety of authorities and responsibilities; what they inevitably share in common is a hostile political environment, a consequence of political geography and bureaucratic entrenchment. In this study, the challenges associated with the governance, administration, and management of interstate water resources are examined, using the Colorado River Basin as a case study. The Colorado is the only major river in the United States utilizing the 'single federal administrator' format, an institutional arrangement that is often criticized for its subordination of the states and its concentration of policy-making authorities in the hands of administrators. When evaluated against carefully defined normative criteria, the Colorado is shown to feature many institutional deficiencies that are, in part, derivative of the Colorado's unique institutional arrangements. The primary objective of this study is to determine if the governance and management of the Colorado could be improved by the establishment of an alternative form of regional water organization. It is concluded that a type of federal-interstate compact commission, if carefully tailored to the political realities of the region, could improve many of the observed institutional deficiencies. This study also presents a widely-applicable methodology for the description and evaluation of institutional arrangements.

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— In many interstate river basins, the institutional arrangements for the governance and management of the shared water resource are not adequately designed to effectively address the many political, legal, social, and economic issues that arise when the demands on the resource exceed the available supplies. Even under normal hydrologic conditions, this problem is frequently seen in the Colorado River Basin. During severe sustained drought, it is likely that the deficiencies of the existing arrangements would present a formidable barrier to an effective drought response, interfering with efforts to quickly and efficiently conserve and reallocate available supplies to support a variety of critical needs. In the United States, several types of regional arrangements are seen for the administration of interstate water resources. These arrangements include compact commissions, interstate councils, basin interagency committees, interagency-interstate commissions, federal-interstate compact commissions, federal regional agencies, and the single federal administrator. Of these options, the federal-interstate compact commission is the most appropriate arrangement for correcting the current deficiencies of the Colorado River institution, under all hydrologic conditions.

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— In the last ten years, watershed planning has become a focal point of soil and water conservation policy in the United States (Naiman 1992; Euphrat and Warkentin 1994; Adler 1995). To proponents, the watershed and the movement of water across and through its landscape and into its streams and groundwater captures processes that results in soil loss, sedimentation of waterways, and deterioration of water quality. Consequently, conservationists argue that by changing management structures and practices across the landscape of a watershed, it is possible to advance a range of environmental goals. As a consequence of this position, there are watershed planning efforts across the country that are typically based on a partnership that is led by local citizens who rely on federal and state agency personnel for technical support. While much is currently written about such watershed based planning efforts, the development of a set of strategies for facilitating the planning process rests on lessons derived from ongoing planning efforts (U.S. Environmental Protection Agency 1997).

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— Two main goals are achieved in this review of the empirical literature on factors affecting conflict resolution in watershed partnerships. The first is an assessment of two public policy theories relevant to partnership structure and function. The second is a set of practical suggestions for designing successful partnerships. The 37 available studies collectively identified 210 "lessons learned," which were grouped into 28 thematic categories. The most frequently recurring themes are the necessity of adequate funding (62% of the studies), effective leadership and management (59%), interpersonal trust (43%), and committed participants (43%). Exploratory factor analysis was used to search for patterns in the lessons. Four factors were identified, which together explain 95% of the variance in the 28 themes. The first two

factors emphasize the importance of (1) balancing the partnership's resources with its scope of activities; and (2) employing a flexible and informal partnership structure. The third and fourth factors offer modest support for two theoretical perspectives on collaborative resource management—the alternate dispute resolution framework and the institutional analysis and development framework.

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\_ Settlement and precedent conflict because a settlement precludes a potential precedent. Precedent is the foundation of our common law system, but settlement is the usual outcome of any dispute. Even considering only cases actually docketed in court, approximately 90 percent settle; many additional disputes settle before docketing. Given the fact that the overwhelming majority of cases settle, and given the public value of precedent, one might seek to encourage trials, at least in cases that stand to resolve controversial issues. Instead, courts, commentators, and federal policy, seem to favor settlement, with little attention given to precedent that may be lost in the process.

\_The favoritism of settlement is consistent with the view that litigation serves as a dispute-resolution mechanism. Under this view, bringing peace to the parties is paramount, and precedent created through court decisions is a "mere byproduct" of the dispute-resolution process. The dispute-resolution model fits well with the perspective of litigants, who control most aspects of litigation, including whether and when they settle. Litigants, both actual and prospective, have strong incentives to settle because the costs of litigation so outweigh the costs of settlement. In addition, because of the justiciability constraints in Article III courts, cases in those courts fit the dispute-resolution model of litigation well. That is, in courts created under the authority of Article III of the Constitution, evolution of the law occurs only in actual disputes that arise between adverse parties. And in justiciability doctrine, as predicted by the dispute resolution model, third-party concerns about precedent play no role.

\_As this approach to precedent reveals, the dispute-resolution model of litigation focuses on the private costs and benefits of litigation or settlement. Owen Fiss, by contrast, views courts as institutions that help illuminate public values. He therefore purports to be "against" settlement. Of course, each of these views only explains a part of the litigation process, and both are right in the sense that all litigation includes both private and public aspects. An appropriate model of the litigation process should balance both private and public roles in litigation, to illuminate the roles of both precedent and settlement.

\_Part I of the article develops a basic model of the prototypical litigation, in which the parties are the ones who bargain over settlement, and non-parties are not involved. It explores how even in this simple scenario, private and public concerns over settlement and precedent conflict. It also examines how settlement nonrandomly affects the substantive content of precedent, as well as the path-dependence of precedent.

\_Part II complicates the model. It considers the question of the proper role of settlement and precedent in litigation influenced by third-party interest groups. This Part considers the effect of third-party maneuvering in both Article III cases, using the controversial settlement in Piscataway Township Board of Ed. v. Taxman, as an example, and in Article I cases, using as an example *Smith v. Commissioner*, a tax shelter case involving an unsuccessful third-party attempt to engineer a settlement. Part III of the article draws on the expanded model to gain insights into the public and private factors in litigation and settlement in Article I courts and in Article III courts. In part, Part III looks at judges' own incentives to encourage settlement as one source of the general favoritism of settlement, as well as the extent to which encouraging settlement is efficient. It also considers the consequences of settlements obtained through third-party "engineering" of a settlement to avoid unfavorable precedent, concluding that these settlements should not be treated differently from other settlements simply because a third party funded the settlement.

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— The struggle for water is one of the enduring legacies of the growth of the western United States. This struggle has occasionally pitted states against states, and it has even been the source of diplomatic confrontations between the United States and its neighbors. The first international water conflict began in the 1880s over the Rio Grande, but within a few years the international aspect had also taken on interstate characteristics involving Colorado, New Mexico, and Texas. Only after years of controversy were compromise solutions reached to apportion the river's waters equitably among all its users above Fort Quitman, Texas. The earliest of these compromises was reached at the 1904 National Irrigation Congress, and it provided a plan to divide the river's waters among users in New Mexico's Mesilla Valley and those in the El Paso Valley. The U.S. Reclamation Service was to build a dam at Elephant Butte, New Mexico, and distribute the waters according to the 1904 compromise through what became known as the Rio Grande Project. The 1904 agreement became law when Congress extended the 1902 Reclamation Act to the El Paso Valley in 1905. In so doing the legislators accepted the 1904 compromise as the basis for the first congressional apportionment of an interstate river--long before the 1928 Boulder Canyon Act, labeled by the U.S. Supreme Court in *Arizona v. California* (1963) as the first such legislative apportionment. The 1904 agreement was later incorporated into broader accords encompassing all Rio Grande water users in Colorado, New Mexico, and Texas (above Fort Quitman), including those upstream from Elephant Butte Dam. The first new agreement was the 1929 Rio Grande Compact, which was a temporary solution while studies were done for a permanent compact. The Rio Grande Compact of 1938, which replaced the 1929 agreement, was the outcome of these studies. The 1938 compact's negotiators incorporated the 1904 compromise into a larger apportionment of the Rio Grande among Colorado, New Mexico, and Texas.

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Scope and method of study. The goal of this study was to evaluate the twenty-two interstate compacts currently in place to allocate the interstate waters of western rivers in the United States in order to determine whether compacts remained a useful mechanism for resolution of transboundary conflicts



and, if so, to determine what elements of those compacts contribute to successful resolution of conflict and what elements have caused difficulties. The text and history of all twenty-two compacts were examined along with the physical geographic setting of the rivers. Where possible, state officials with responsibility for administering the compacts were interviewed. Findings and conclusions. Interstate compacts have generally been successful tools for allocating this particular transboundary resource, but there have been notable exceptions in which the Supreme Court has been called upon to resolve disputes. Compacts which were executed as part of a plan to develop a particular federal project have generally not been successful. The greatest threat to the continued utility of the compacts is the uncertainty posed by federal claims to water and federal regulations requiring more instream flow. The compacts are based on off-stream use, and as public preferences tend more toward instream uses, the pressure on the existing compacts will increase. Several recommendations for future compacts are made. These include the use of percentage formulas in allocating water; avoidance of strictly guaranteed delivery obligations; avoidance of hydrological models; inclusion of groundwater use in compact allocations; and quantification of federal claims.

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— Emergence of a toxic organism like pfiesteria in tributaries of the Chesapeake Bay has focused public attention on potential hazards in our water. More importantly, it has reminded us of the importance of the entire watershed to the health of any body of water and how political boundaries complicate watershed management. New Strategies for America's Watersheds provides a timely and comprehensive look at the rise of "watershed thinking" among scientists and policymakers and recommends ways to steer the nation toward improved watershed management.

— The volume defines important terms, identifies fundamental issues, and explores reasons why now is the time to bring watersheds to the forefront of ecosystem management. In a discussion of scale and scope, the committee examines how to expand the watershed from a topographic unit to a framework for

integrating natural, social, and economic perspectives as they share the same geographic space. The volume discusses:

- \_ - Regional variations in climate, topography, demographics, institutions, land use, culture, and law.
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— The water crisis of the last third of the 20th century includes a tripling of water supply needs by the year 2000, an inadequate water supply, and the need of between \$40 billion to \$100 billion to win the fight against water pollution. The article discusses the development of a federal-interstate compact organization as a mechanism for dealing more effectively with the water problems. The characteristics and importance of the Delaware River are presented along with a discussion of two previous compact plans. Four states, New York, Pennsylvania, New Jersey and Delaware, organized the Delaware river basin advisory committee. This committee developed a federal-interstate compact, developed the type of organizational approach for the Delaware basin, and drafted the terms of the compact and obtained support for its

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One of the most successful compacts designed to aid in solving problems of use regarding interstate waters has been the Pecos River Compact between Texas and New Mexico. The Compact was made in 1948; in 1975 Texas filed suit against New Mexico based on dissatisfaction with the activities of the commission entrusted with applying the provisions of the compact. Most of the land surrounding the river is semi-arid, with the demand for water exceeding the supply. Much of the watershed is used for livestock grazing, but where water is available irrigated farming predominates. Historically a law regulating the use of groundwater basins was passed in New Mexico, but no such law existed in Texas. The need for water storage was the immediate cause of the problem which was resolved with the passage of the compact. The crucial aspect of the compact was the clause that New Mexico shall not deplete the flow of the Pecos River at the New Mexico-Texas state line below an amount which will give to Texas a quantity of water equivalent to that available to Texas under the 1947 condition. The current dispute will turn on the definition given to the phrase 'the 1947 condition'.

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— Although groundwater is a water source which must be increasingly utilized in the future, no law has yet been developed for interstate groundwater rights and allocation. An examination of federal court decisions involving interstate surface waters is made here to determine their applicability to groundwater situations. The major problem is a jurisdictional one since a complaining state must meet a heavy burden of proof by showing that the threatened groundwater use poses serious danger. The cost of obtaining such evidence may well be prohibitive. A further requirement of showing real and substantial, rather than potential, harm could mean that litigation would be too late to prevent damage to groundwater basins. The development of a doctrine of equitable apportionment of groundwater must take into account the correlation between ground and surface water. The courts have not yet recognized such a correlation. Although the interstate compact may be the most desirable solution to problems of interstate groundwater allocation, the most probable response is interstate litigation.

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— It has long been recognized that the best way to manage large and complex, interconnected surface and groundwater systems is through integrated, conjunctive use. Most conjunctive use studies to date, however, are either too general or too detailed. The former usually oversimplify the hydrology of the system and emphasize only the management aspects. The latter usually emphasize detailed simulation of the hydrologic system but pay less attention to the management aspects. A generalized computer model is presented for providing management guidelines for the conjunctive use of surface and subsurface storages in an interconnected stream- aquifer system which attempts to provide the correct balance between these extremes. The model simultaneously simulates the hydrologic system and optimizes water allocation period by period using a network approach. The model allocates water to surface storage, artificial irrigation, recharge, and various demands, such as according to relative priorities associated with each network link. These priorities are based primarily on water rights, but can also include economic factors. In order to demonstrate the usefulness of the model, a case study of a section of the South Platte River basin from the North Sterling inlet canal to the Julesburg gaging station in eastern Colorado was selected. The calibration results of the return flows to the river from several sources were satisfactory for the dry to average years but were less satisfactory for the wet years. The priorities of various demands obtained from the calibration were the same as the relative ranking of water rights for those demands. Management experiments indicate that conjunctive use with artificial recharge would have greatly alleviated drought conditions during extreme dry historical periods, without mining the aquifer. An integrated, basin-wide management approach is needed to implement these policies, however. Experiments were also conducted to determine the sensitivity of water supply availability in Colorado with changes in interstate compact agreements.

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— The federal government has long wrestled with the conflicting priorities of state and federal jurisdiction. While federal authority over waterways has historically increased, states still maintain

considerable jurisdictional prerogatives over land use and non-interstate water projects. However, local waterways often flow into larger streams which gather water from portions of several states. In recent years, a 'partnership' policy between federal and nonfederal jurisdictions has grown as a preferred option necessitating increased interstate planning and cooperation: a difficult task to achieve when priorities conflict. Interstate compacts, which are essentially treaties between states, have been extensively utilized since the 1920's to allocate water in the Western States. In the East, compacts have been developed for pollution control and flood control, as well as for allocation. A limited flood control compact in the Connecticut River Basin and an extensive multipurpose federal-interstate compact in the Delaware River Basin are devices which could be used to mitigate interstate flooding problems. However, the Connecticut compact has never been effective beyond the narrow purpose of tax loss reimbursements. The Delaware compact could be more effective in the area of flood control. In both cases, only increased public awareness and perception of flood hazard are likely to effect greater utilization of existing compacts.

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— The purpose of this study was to analyze the legal position of the states of Mississippi and Alabama in a conflict concerning the use of water from an interstate stream in the City of Mobile 's municipal water supply. The report does not include an analysis of the legal positions of private individuals of Mobile except as they pertain to the legal positions of the states. Although the two states have legal systems that apply different rules to disputes over water rights the decisions of the United States Supreme Court do not indicate that either state 's law would be the deciding factor in a dispute over the use of the stream in question. The rule applied by the Supreme Court is called the Doctrine of Equitable Apportionment and in essence holds that states have equal rights in an interstate stream. However, this does not mean the water is equally divided, but that a solution fair and equitable to both is sought by balancing the harm and benefits to both states if particular actions are taken. The report discusses in detail the factors previously used in achieving balancing of equities. Concluding that the expense, complexity and uncertainty of results are prohibitive in a Supreme Court suit, the report recommends negotiation of an interstate compact between Alabama and Mississippi. Provisions necessary to the successful working of a compact are discussed.

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acrimonious water dispute among these different state governments. Modeling of such basin reservoir operations requires parallel understanding of several river system components: hydropower production, flood control, municipal and industrial water use, navigation, and reservoir fisheries requirements. The Delphi method, using repetitive surveying of experts, was applied to determine fisheries' water and lake-level requirements on 25 reservoirs in these interstate basins. The Delphi technique allowed the needs and requirements of fish populations to be brought into the modeling effort on equal footing with other water supply and demand components. When the subject matter is concisely defined and limited, this technique can rapidly assess expert opinion on any natural resource issue, and even move expert opinion toward greater agreement.

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