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INSTITUTIONAL OPTIONS FOR THE COLORADO RIVER[1]

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ABSTRACT: 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.
(KEY TERMS: river basin administration; Colorado River; institutional arrangements; water resources planning; water management; water policy/regulation/decision making.)

INTRODUCTION: THE INSTITUTIONAL CONTEXT OF DROUGHT

When searching for alternative institutional arrangements to improve the Colorado River Basin's ability to cope with drought, it is important to realize that drought raises and exacerbates a host of resource issues that are often already present during normal hydrologic conditions. Conflicts between consumptive water uses and nonconsumptive uses; between environmental and economic objectives; between cities and farmers; between states, basins, and even countries – these kinds of disputes already dot the public policy landscape in the study region. During drought, these conflicts are certain to be intensified, and some new conflicts will undoubtedly arise; but the true significance of drought is that it forces attention be paid to a host of issues that already exist and that will ultimately become critical – even in the absence of drought – as growth in water demands continue.

It is difficult and probably unwarranted, therefore, to try to design institutional arrangements solely for drought response. The kinds of response strategies that are needed – actions such as promoting water conservation and efficient use, reserving water for environmental resources, improving the efficiency of reservoir operations, reallocating water through markets, and improving multijurisdictional cooperation while fostering a "problemshed" orientation in resource management – should be actively pursued in the Colorado Basin even in the absence of drought. Drought may provide the necessary political stimulus for such innovations, but the need for innovation already exists.

In the following pages, a political science perspective is utilized to briefly assess the policy-making and administrative environment of the Colorado River institution, and the dominant mechanisms and patterns of interstate conflict resolution are reviewed. Purely intrastate issues and decision-making processes are beyond the scope of analysis. An investigation follows of the institutional requisites of effective drought coping and of the potential nature of interstate bargaining in the Colorado Basin during drought. The institutional arrangements of the Colorado River Basin are then compared with arrangements seen in other major river basins. (In this study, the terms "institution" and "institutional analysis"

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are defined broadly to include all those formal and informal agreements, processes, forums, and behavioral patterns that collectively describe how resource users, public officials, and other interests interact in the governance, administration, management, and use of the river system.) Given the linkage between drought coping and other facets of resource governance and administration, prescriptions are then offered that are not confined solely to the topic of drought coping, but which offer the potential to improve the ability of the region to respond to a wide range of resource issues under a variety of hydrologic conditions and growth scenarios.

THE CHANGING FACE OF COLORADO RIVER POLITICS

The institutional history of the Colorado River Basin is a colorful and complicated series of interstate conflicts and bargains, and it is the subject of a diverse body of scholarly and popular literature (Hundley Jr., 1986). For several decades, each of the basin states has competed to secure its share of the Colorado. These conflicts have generally taken two forms: apportionment battles, such as those surrounding the ratification of the Colorado River Compact in the Boulder Canyon Project Act of 1928 and the eventual interpretation of that legislation in the *Arizona v. California* (373 U.S. 546, 1963) litigation; and legislative battles for the authorization of water projects and the subsequent appropriation of construction funds. With the notable exception of the Supreme Court action in 1963, the major decisions in the Colorado's history have emerged from the familiar calculus of distributive water development politics. Only by crafting agreements in which all (or almost all) the states could benefit – inevitably at the expense of the federal taxpayer and the natural environment – have the states found the incentive and mechanism to resolve their conflicts. Even the Colorado River Compact, the most celebrated example of interstate cooperation in the basin, became law only when nested within a massive water development bill. Over time, this form of interstate bargaining resulted in the Colorado becoming one of the most heavily regulated and manipulated rivers in the world. It also resulted in the majority of rules collectively known as the "Law of the River."

The Colorado River institution, however, is in a period of transition. The availability of distributive water development legislation has been severely curtailed in recent decades, primarily due to the well-documented economic and environmental abuses of past initiatives (Ingram, 1990; Reisner, 1986). A new paradigm has taken root in the basin, challenging the equity and desirability of additional water development and the continued subordination of "non-market" values to commodity values (Udall *et al.*, 1990). Additionally, the river is fully allocated – in fact, it is overallocated – and most good dam sites have already been developed. As a consequence, few plausible opportunities exist for crafting interstate deals using the familiar legislative approach, for the ability and willingness of Congress to resolve interstate conflicts is limited by the lack of "positive-sum" (and Pareto optimal) solutions. (Positive-sum arrangements are those in which the total net benefits to all parties exceed the net costs. If arrangements allow and require potential "winners" to compensate potential "losers," then all positive-sum deals can be made Pareto optimal – a situation in which no party is made worse off, while some (or all) parties benefit.)

With the changing political climate came a void of interstate conflict resolution mechanisms in the basin. This void has largely been filled by the Secretary of the Interior, the actor most responsible for managing the flow and use of the river at the interstate scale. Many of the most difficult and value-laden choices regarding the use of the Colorado have been delegated to the Secretary in federal legislation, such as the Endangered Species Act and the Colorado River Basin Project Act, and by the Supreme Court in the *Arizona v. California* (1963) litigation. The Secretary holds broad discretionary powers in many areas, including water contracting, reservoir operations, Indian water rights administration, endangered species protection, public lands management, and the allocation of water shortages during droughts – a responsibility of particular importance in this study. Other federal administrators outside of the Interior Department also occupy important decision-making positions in the basin. The region's salinity control program, for example, is primarily overseen by the Environmental Protection Agency, while the Western Area Power Administration, in conjunction with the Federal Energy Regulatory Commission, regulates the distribution and pricing of federal hydropower. Several informal interstate bodies exist for providing input into various regional decisions, including the design of the salinity control program and the annual development of the reservoir operating regime. The ultimate authority to actually make decisions, however, is generally held solely by federal actors.

As the Colorado River institution moves into an era where the management of existing water supplies (rather than new development) is stressed, issues such as reservoir operations, endangered species management, and interstate water marketing have risen to the top of the regional agenda (Getches, 1985). Current efforts to better reconcile hydropower

generation with environmental and recreation values downstream of Glen Canyon Dam is an example (NRC, 1987). Conflicts of this nature would be greatly magnified during drought. Even at the intrastate scale, balancing the needs of traditional commodity interests, such as hydropower and irrigation constituencies, with the water needs associated with environmental protection, recreation, and urban water supply is an extremely difficult task. At the interstate scale these challenges are further magnified, placing a premium on the existence of good decision-making processes and forums.

Institutional arrangements for addressing interstate water conflicts should exhibit, at a minimum, six related characteristics (Kenney, 1993). First, the arrangements must recognize a wide range of values and interests, and provide ample opportunities for meaningful representation and participation of all affected parties. Second, the arrangements must encourage practices that protect the integrity of ecological systems, foster respect for natural environments, and recognize environmental limits to growth. Third, the arrangements must facilitate the consideration of a wide range of management options and strategies. Fourth, the arrangements must provide decision-makers and other interested parties with accurate and timely information. Fifth, the arrangements must feature decision-making mechanisms that provide incentives for participation and conflict resolution and that produce clear and enforceable outputs. And sixth, the arrangements must reflect the regional character of water resource problems, and should promote governance and management at the "problemshed" scale – i.e., a geographic region delineated to include the source and expression of specific water problems, rather than a physical construct defined solely by topography or political boundaries.

Historically, the institutional arrangements of the Colorado have done a poor job of satisfying these objectives. Policy has traditionally been formulated by a small network of narrowly-focused water development interests, while the concerns of environmentalists, recreationists, Indians, and other "nontraditional" groups have been systematically excluded (Ingram, 1990). This has resulted in policy initiatives lacking respect for natural environments, indigenous species, native cultures, and nonmarket values (Fradkin, 1981). The institution has also shown a tremendous reliance on structural solutions to water problems, even when better management or regulation of existing uses would produce more cost-effective results – the salinity control program being a recent example (Reisner and Bates, 1990). These biases in the content and process of policy-making have been largely perpetuated by the manipulation of information (NWC, 1973; Reisner, 1986). Information made available to the public and decision-makers is often limited in scope and of dubious quality; and while good information is often unavailable or inaccessible, inaccurate "propaganda" stressing the urgency of new developments often fills local editorial pages, talk shows, and political speeches. These institutional deficiencies have been perpetuated by a policy-making process in which costs and benefits of proposed initiatives have been inequitably disbursed, with excluded parties bearing a disproportionate share of costs (Ingram, 1990).

A diverse group of natural resource professionals are calling for western water policies and decision-making processes featuring greater accountability, creativity, efficiency, and attention to environmental limits and sound economic principles (Feldman, 1991; Long's Peak, 1992; WGA and WSWC, 1991). Many states in the basin are pursuing water management initiatives of this nature, using tools such as the public trust doctrine, public interest provisions in water transfer and appropriation procedures, area of origin statutes, instream flow programs, redefinitions of beneficial use, conjunctive management and groundwater regulation, and a host of related innovations which are collectively reshaping western water codes (MacDonnell *et al.*, 1989; Colby *et al.*, 1989). But at the interstate scale – the focus of this study – progress has been much slower. This lack of progress is often attributed to the region's over-reliance on the federal water development bureaucracy (GAO, 1981; NWC, 1973). Policy initiatives emerging from the Interior Department have historically reflected the construction and commodity-orientation biases of the Bureau of Reclamation, an agency which has been only marginally responsive to the paradigmatic revolution occurring in the West.

In recent years, endangered species concerns have forced the Interior Department to employ a more holistic and balanced perspective in Colorado River matters, especially in the Lower Basin where the U.S. Fish and Wildlife Service is charged with implementing federal endangered species legislation. Under the leadership of Interior Secretary Babbitt, the Fish and Wildlife Service and the Bureau of Reclamation, in conjunction with several other federal and state agencies and private interests, have intensified efforts to develop and implement a variety of management plans designed primarily to protect native fish species harmed by water development. Among the most notable of these efforts is the redesign of the operating regime at Glen Canyon Dam. Although these new initiatives are a welcome addition to the Colorado River institution, the very fact that such efforts are now needed is ample proof that existing arrangements inadequately value and protect the entire spectrum of the river's resources. In order to craft

regional policies that more effectively (and proactively) consider public values in water, the arena of decision-making must be modified to feature a broader agenda, better information, greater public accountability, and a more strict adherence to economic principles.

INSTITUTIONAL REQUISITES FOR EFFECTIVE DROUGHT COPING

Promoting Institutional Flexibility

If the potential for drought is factored into all facets of water resources planning, the ability of a region to effectively "drought proof" the collective water system is inevitably enhanced. This simple observation provides a compelling rationale for considering drought in a broad institutional context. Even in progressive institutions, however, major climatic anomalies will eventually necessitate the use of specific drought coping measures. In order to effectively respond to severe sustained drought or other crises, institutional arrangements should allow a wide range of public policies to be utilized. Petak and Atkisson (1982) identify ten general types of hazard-related policies, primarily utilizing strategies based on education, technological innovation, improved system management, and the prohibition of certain activities. These policy types are described in Table 1.

In addition to their divergent strategies, these policy types feature a variety of incentive structures. Public policy scholars generally conclude that policies providing positive incentives – i.e., that utilize the carrot rather than the stick – are preferable to regulatory approaches (Osborne and Gaebler, 1992). The most familiar and effective of the incentive-based approaches for drought coping involve forms of water marketing. Many market strategies can be used to reallocate water during drought, including dry-year options, lease-back arrangements, exchanges among water sources, exchanges of priorities, and water banking (NRC, 1992; MacDonnell *et al.*, 1994). However, in order to ensure that market-based strategies adequately respect environmental and other nonmarket values and are consistent with other water management objectives, it is necessary to nest markets within political frameworks where public policy decision-makers can exercise regulatory and oversight powers.

During drought crises, each of the basin state governors is empowered to exercise broad regulatory powers, including the reallocation of state resources (including water), the suspension of procedural state law, and the issuance of executive orders with the force of law (WGA, 1990). Using powers derivative of state disaster statutes, most western governors in past droughts have established centralized drought organizations or task forces, usually located either in the governor's office or the state agency with primary water resources responsibility (Hathaway, 1991). These bodies often serve as information clearinghouses and help the state fashion multifaceted drought coping programs based on strategies of demand management, supply augmentation, and reallocation. These bodies also coordinate state efforts with federal drought response and recovery programs. An aggressive and well-informed governor can be instrumental in minimizing the impacts of drought.

TABLE 1. Types of Hazard-Related Public Policies.

1. **Action-Forcing Policies.** Adopted by higher level jurisdictions and intended to force loss-reducing activities by lower units and jurisdictions of government.

2. **Attention-Focusing Policies.** Intended to stimulate citizen, group, and governmental interest in losses produced by natural hazards and to promote voluntary state, local, and private action to reduce such losses.

3. **Disaster Recovery Policies.** Intended to assist personal, familial, neighborhood, community, and state recovery from the damages sustained as a result of a natural hazard.

4. **Technology Development Policies.** Focused on development of new knowledge and technology to support hazard mitigating policies.

5. **Technology Transfer Policies.** Focused on transfer of knowledge to consumers, governments, and others, and the use of that knowledge in the long term (as in hazard analysis programs) and the short term (disaster warnings).

6. **Regulatory Policies.** Regulate the decisions and behaviors of private parties and governmental entities to reduce losses associated with exposure to natural hazards.

7. **Investment and Cost Allocation Policies.** Specify conditions governing acquisition and allocation of resources to sustain the activities described above and below. Such policies determine how much will be spent, when, for what purpose, where, and at whose expense.

8. **System Management Policies.** Intended to fix responsibilities, specify the means used, and define the restrictions to be met by hazard mitigation programs.

9. **System Optimization Policies.** Intended to ensure that other policies are effective, compatible with system goals, and internally consistent.

10. **Direct Action Policies.** Authorize direct governmental action to implement a policy, such as physical construction or removal of structures.

Source: Petak and Atkisson (1982).

Crafting an effective drought response becomes significantly more difficult, however, when the drought crisis extends across state lines and involves federally supplied water – conditions that describe the drought under investigation in this study. The interstate reallocation of water resources and the modification of reservoir operating regimes are likely to be central features of an effective regional drought response. At a minimum, these actions – under current institutional arrangements – require the consent and active cooperation of the Secretary of the Interior; and as a practical matter, they require arrangements that facilitate bargaining and coordinated action among the states and the federal government.

When considering the efficacy of different strategies for coping with severe sustained drought, it is important to appreciate that different types of policy responses require different institutional arrangements. For example, while attention-focusing and technology transfer policies can be utilized by administrative bodies lacking regulatory powers, more authoritative entities are necessary to implement regulatory, action-forcing, and system optimization policies. In a comprehensive drought coping program, both voluntary (e.g., market-based) and regulatory approaches are likely to have utility. Given that the majority of Colorado River water is currently allocated to relatively low-valued agricultural uses, it is likely that municipal and industrial demands could be efficiently satisfied by a voluntary water market (Wahl, 1989; Gardner, 1986). Reserving water for environmental purposes (and other public values) is considerably more difficult using market mechanisms and will probably remain a great challenge to policymakers during all hydrologic conditions.

The Untapped Potential of Interstate Water Reallocations

As discussed elsewhere in this volume, the Law of the River does not distribute the burden of water shortages uniformly across the Colorado River Basin. This creates both opportunities and incentives for temporary water reallocations – at both the intrastate and interstate scale – that could potentially be exploited under institutional arrangements that facilitate bargaining, cooperation, and creativity. These institutional objectives are at least partially satisfied by the interstate water bank proposal forwarded by the State of California (1991), which would allow willing rightsholders to temporarily lease water – including water from federal facilities – during crisis situations to other water users throughout the basin. Several other interstate water marketing proposals in the Colorado Basin, including those of the "Ten Tribes" and a recent water bank scheme forwarded by the Bureau of Reclamation, also seek to increase the economic efficiency of water allocations in the region (Colorado River Tribal Partnership, 1992). In theory, market-based reallocations have the potential to significantly increase the drought coping capacity of the basin, as well as having potential utility as a water management tool under normal hydrologic conditions.

Under existing institutional arrangements, interstate water marketing proposals often do not receive serious consideration by the basin states due to the widespread fear of permanently (and inadvertently) losing state water rights currently "guaranteed" in the Law of the River. This concern can be traced to several areas of legal and political uncertainty surrounding all of the interstate water marketing schemes. For example, is marketing even permitted under the Colorado River Compact, federal water contracts and repayment obligations, the Constitution (particularly the Commerce Clause), and other elements of the Law of the River? Should unused entitlements be available for marketing, or should bargains be confined to water supplies currently being consumed? How should pricing be determined, and how should the costs and benefits be allocated? How can the public interest in water resources be protected in a market setting? Perhaps the most critical question is this: how should the market be administered and regulated, if at all? The proposal offered by the state of California called for the states involved to oversee potential deals; the Bureau of Reclamation plan calls for federal oversight; and still other schemes, such as the Roan Creek proposal, are designed to operate in a largely private environment (Gavin and Bettelheim, 1994). (The Roan Creek proposal calls for Nevada to finance construction of a dam near Grand Junction, Colorado, to develop and store water rights held by Chevron Oil and Getty Oil, which would then lease the water to Nevada for consumption in Las Vegas.)

If the institutional barriers to interstate bargaining are removed, several types of market-based water reallocations become plausible in the basin as severe sustained drought progresses. Among the first water users to face cutbacks would be Southern California municipal interests, which rely on surplus flows in excess of the state's 4.4 MAF (million acre-foot) apportionment. In an active market, these high-value uses could potentially be satisfied by arrangements with agriculturists in the Imperial, Coachella, and Palo Verde Valleys, or possibly by bargains with Arizona farmers currently unable to afford Central Arizona Project water. These agricultural regions could also provide water for municipal users in Las Vegas, in both drought and non-drought periods. Several creative intrastate arrangements in California are already being implemented; bargaining at the

interstate scale, however, is still in its infancy due to institutional constraints (Wahl, 1989; NRC, 1992).

As a drought worsens, Upper Basin municipal water users might also wish to explore creative market arrangements with irrigators – potentially in both basins – since the Upper Basin would bear the brunt of regional shortages. Implementation of these water transfers, especially those at the interbasin scale, would probably require modifying the rules which coordinate the operation of Lakes Powell and Mead. Even in the absence of explicit marketing, reservoir operations is a likely subject for interstate bargaining during severe droughts since the annual release requirement of 8.23 MAF from Lake Powell can quickly empty the reservoir once inflows decline, causing tremendous hardships to both instream and offstream interests. When factors of salinity, hydropower production, recreation, and endangered species protection are considered jointly with water supply concerns, the potential benefits of more flexible institutional arrangements in the Colorado Basin become obvious – a subject addressed in greater detail by Lord *et al.* (1995) (this volume).

Institutional Options for Interstate Water Resources. Throughout American history, numerous attempts have been made to fashion institutional arrangements for the effective governance and management of multijurisdictional resources (Derthick, 1974; Donahue, 1987). River basins, especially those of an interstate nature, have been among the most active laboratories of intergovernmental experimentation, within which the limits of legal and political feasibility have been explored. One such experiment was the use of the interstate compact device to apportion the flow of a river, a frequently copied innovation pioneered in the Colorado Basin in 1922 (Hundley Jr., 1975).

Since the negotiation of the compact, however, the institutional arrangements of the Colorado have not been the subject of deliberate or progressive reform. The changes which have occurred are primarily derived from incremental and uncoordinated actions, including several awkward attempts to integrate emerging environmental values into an institution founded on the goal of water development. The federal endangered species program is a typical example. The program allows existing patterns of water use to continue until a species extinction is imminent, at which time sudden and potentially draconian measures are mandated. The program is an important addition to the Law of the River, but it is a poor surrogate for arrangements that provide for the consideration of environmental values under all conditions.

One of the most frequent recommendations for improving the content of interstate policy in the Colorado Basin is to formally establish a regional administrative framework which welcomes diverse interests and values in water, and from which more regionally integrated and compatible policy initiatives can emerge (Getches, 1989; GAO, 1981; Bloom, 1986). However, developing institutional arrangements which effectively concentrate authority, activity, and accountability at the problemshed level is a difficult challenge – both conceptually and in practice. The most formal and direct strategy for developing such a "regional institution" is to enlist the aid of a regional organization to order the relationships and activities of non-regional entities at the desired regional scale. These regional organizations are not institutions by themselves but serve as the seeds upon which regional institutions can crystallize and mature. Regional organizations come in many shapes and sizes, and are endowed with widely varying authorities and responsibilities (Donahue, 1987; WRC, 1967). What they inevitably share in common is a hostile political environment, a consequence of political geography and of bureaucratic entrenchment (Derthick, 1974; Ingram, 1973).

Several types of regional organizations exist for the administration of interstate river systems. The most formal of these organizations are generally labeled as "river basin commissions"; many other interstate arrangements, however, are considerably less formal and authoritative, and are not as easily described. In this study, a framework of descriptive terminology is introduced to differentiate among the major organizational forms. Several criteria can be used as a basis for a typology of regional water organizations. Donahue (1987), the Water Resources Council (WRC, 1967), Hart (1971), and Fox (1964) all offer typologies based on "structural" criteria, focusing primarily on differences in memberships and legal foundations. In contrast, Derthick (1974) and Teclaff (1967) offer typologies based on "functional" criteria, distinguishing between organizations with "soft" management functions (e.g., advocacy and coordination) and those with "hard" management roles (e.g., regulation and construction). While both approaches are adequate for descriptive purposes, the comparative analysis of these organizational forms requires a consideration of the interplay between structure and function.

For descriptive purposes, this study presents a structural typology based on two criteria: jurisdictional membership and legal foundation. The jurisdictional membership criterion is utilized to divide regional organizations into three categories: (1) interstate organizations; (2) federal-interstate organizations; and (3) federal organizations. By subdividing these categories based on the legal basis of the organization, a total of seven organizational forms are revealed: *compact commissions* and *interstate*

councils are interstate organizations; *basin interagency committees, interagency-interstate commissions,* and *federal-interstate compact commissions* make up the federal-interstate organizations; *federal regional agencies* and the *single federal administrator* comprise the federal organization category. The regional arrangements of most major American rivers – including the Colorado – can be grouped into these categories.

Compact Commissions

Interstate compacts are a popular mechanism for allocating rights and responsibilities regarding interstate water resources among the participating jurisdictions. Creating a compact commission to administer the terms of the agreement is traditional but not necessary – e.g., the Colorado River Compact does not utilize a commission, whereas the Upper Colorado River Basin Compact does. Most compact commissions are headed by governor appointees of the participating states and often feature non-voting federal members. (The Upper Colorado River Commission is highly unusual in that it provides for a voting federal member, something that is normally only seen in the federal-interstate compact commissions.) Unanimity (or a close approximation) is the typical decision rule; however, the compact vehicle is sufficiently flexible to support a variety of decision-making arrangements. Budgets and staffing levels are highly variable.

The roles and functions of the compact commission are largely determined by two factors: the nature of the compact, and the degree of authority and autonomy granted the commission. The National Water Commission (NWC, 1973) found that interstate water compacts generally are used in four subject areas: (1) water allocation, (2) pollution control, (3) flood control and planning, and (4) project development (Muys, 1971). Compacts for water allocation are, by far, the most common type in the western United States (McCormick, 1994). The roles and authorities of compact commissions are highly variable, even between compacts addressing similar subject matter. Political viability is the key determinant of a commission's authorities; in general, the more authoritative the proposed commission, the less likely the compact will be successfully ratified (Martin *et al.,* 1960; Derthick, 1974). Given that interstate compacts require unanimous agreement among the basin states and Congress in order to take effect – except in extreme cases such as the Colorado – it is unusual to find a politically viable compact which creates a commission with a high degree of authority. Consequently, most compact commissions have a "soft management" emphasis, concentrating mainly on the collection and dissemination of basinwide information among the affected parties, and acting as a regional advocate in dealings with the federal government (Muys, 1971).

The primary strengths of compact commissions lie in the strength of the compact mechanism itself. Compacts are well established and enforceable mechanisms for addressing interstate disputes, with or without the use of a commission, and can be used in a variety of subject areas. Compact commissions can potentially be vested with broad responsibilities and authorities since they are the joint creation of powerful political sovereigns – i.e., states. The major drawback to the compact commission approach concern the politics of formation – specifically, the requirement of unanimity which often results in "watered down" agreements and weak commissions (Donahue, 1987). Compacts can generally be successfully negotiated and ratified only when needs are pressing and basinwide. Even then, the process of negotiation and ratification can be laborious and time consuming. The Second Hoover Commission found that compacts take approximately nine years on average to successfully negotiate and ratify (Martin *et al.,* 1960). Nonetheless, dozens of compacts and compact commissions dot the institutional landscape, and the compact commission is well established as the most widely recognized form of regional organization for the control of interstate water resources.

Interstate Councils

The second type of interstate organization for the control of regional water resources is the interstate council. This organizational form technically encompasses the interstate compact commission, but it "is generally characteristic of less formal arrangements, established via federal legislation, consistent multistate legislation, multi-state resolution or informal consent" (Donahue, 1987:136). Council members are typically state officials vested with formal authorities and powers independent of the council – most often governors or their appointees. Decision-making usually requires unanimity.

As is true of most organizational forms, the specific roles and functions of interstate councils can only be described in a general manner due to the considerable variability observed in practice. The functions of most councils can be described as "soft" – e.g., coordination, research, and advocacy – with decisions being implemented, if at all, by more established bureaucracies (Donahue, 1987). This *modus operandi* is best illustrated by the typical governor's council, in which the participating governors negotiate and determine regional policies which are implemented by the

relevant state agencies. The Council of Great Lakes Governors and the New England Governors' Conference are typical examples (Donahue, 1987; Foster, 1984). The Colorado River Basin Salinity Control Forum could also potentially be classified as an interstate council.

Like compact commissions, interstate councils are a flexible and well established organizational form. Since most councils do not need the level of regional authority only available to the states collectively via the compact mechanism, interstate councils can be relatively easy to establish. If the council members are motivated state governors, a reasonably common situation, significant progress can be made in addressing many regional issues. However, these strengths can also be liabilities. Their generally modest degree of formal authority, combined with a lack of federal membership, prohibits interstate councils from taking aggressive and comprehensive action in many policy areas. Additionally, their dependence on the participation and political resources of the council members can be a liability if leadership is lacking or if the council members face opposition from their state legislatures.

The lines between the interstate compact commission and the interstate council have been blurred somewhat by the Northwest Power Planning Council (NWPPC), which is founded on a combination of federal legislation followed by an interstate compact (Volkman and Lee, 1988). The NWPPC is headed by governor appointees of the four basin states but primarily is charged with regulating the activities of those federal agencies that control the operation of the Columbia River system. This arrangement is New Federalism in the extreme and perhaps will pioneer a new trend in interstate water organizations.

Basin Interagency Committees

The origins of the basin interagency committee – a type of federal-interstate organization – can be traced to the 1940s and 1950s, when federal agencies concerned with river development first organized together with state representatives in a highly informal and ad hoc manner to coordinate their activities (NWC, 1973). The best examples of this organizational form are the so-called "firebrick" committees, formed pursuant to the Federal Interagency River Basin Committee (FIARBC) agreement of 1943. These committees included representatives of the Departments of Interior, Agriculture, and Army; the Federal Power Commission; and later, the Department of Commerce and the Public Health Service (NWC, 1973). Firebrick committees have overseen major developments in several river basins, including the Missouri and the Columbia; however, most of the basin interagency committees formed in the 1940s and 1950s have either been terminated, have "evolved" into different organizational forms, or have become insignificant institutional relicts.

Basin interagency committees are generally formed without any legislative involvement and are totally dependent on the participating agencies for resources and formal authorities. Consequently, they primarily serve as forums for coordination and communication. The committees are primarily federal creations, including state agencies more for coordination than actual decision-making. The rules of decision-making in most basin interagency committees are largely irrelevant, since the committees rarely have statutory authority to implement their decisions. Decisions reached at field-level among the involved agencies must generally be approved by agency directors, governors, the president, and ultimately Congress before major actions are authorized and resources allocated. As a practical matter, securing congressional approval of committee recommendations is best accomplished if decisions are unanimous (Maass, 1951; ACIR, 1972).

The informal and ad hoc nature of the basin interagency committee is the root of its primary strengths and weaknesses (Donahue, 1987). The flexible nature of these committees allows problems to be addressed promptly and in a flexible manner – in theory at least – while remaining relatively dormant and cost-free during calmer periods. The committees also benefit from placing field-level federal resource administrators in direct contact with each other and with state representatives, facilitating the transfer of information and ideas. The primary weakness of this organizational form is that decisions are not binding and generally cannot be implemented without outside approval. Consequently, there is no real incentive or mechanism for reaching agreement on difficult issues. When significant interagency conflicts arise, the basin interagency committee is often bypassed as a conflict resolution vehicle (Maass, 1951; NWC, 1973).

Interagency-Interstate Commissions

The interagency-interstate commissions are descendants of the basin interagency committees and share many of the same characteristics. However, the interagency-interstate commissions have three qualities which justify their inclusion in a separate category: (1) they have a formal legislative basis, (2) they maintain permanent and independent staffs, and (3) they more fully treat states as equals to their federal counterparts. This organizational form was exemplified by the "Title II commissions" established pursuant to Title II of the Water Resources Planning

Act of 1965 and subsequently terminated by presidential order in 1981 (ACIR, 1972; Hart, 1971; Gregg, 1989). These commissions, like basin interagency committees, featured a membership of federal agencies and state representatives, usually governors or their appointees. Funding for the commissions came from both federal and state sources. Each member had one vote, and most commissions made decisions by unanimity. Each commission had an independent chairman appointed by the president, and a vice-chairman selected by the basin states – innovations that helped these organizations to look beyond the narrow water development agendas held by many member agencies. The major functions of the Title II commissions were to coordinate and advocate improved water management policies within their jurisdictions, primarily through the preparation of comprehensive and basinwide water resources plans.

Most of the differences between the firebrick committees and the Title II commissions were overshadowed by the similar political environment in which both organizations were placed. Neither type of organization, in most cases, possessed a sufficiently high level of independent resources and clout to implement their decisions without the cooperation of the participating agencies, Congress, and the Executive. Consequently, both types of organizations generally utilized a decision rule of unanimity and gravitated toward the "soft management" functions of communication, coordination, planning, and information gathering (NWC, 1973; Gregg, 1989). These generalizations do not fit for all the organizations in all instances, but they are sufficiently accurate to consider the two organizational forms to be close relatives despite their different legal structures.

A review of the weaknesses of the interagency-interstate commission format is somewhat redundant at this point, and somewhat irrelevant given that no examples of this organizational form currently exist. Nonetheless, the organizational form does possess several admirable characteristics worth noting. By joining state and federal representatives in a relatively coequal decision-making environment, the interagency-interstate commission provides a conceptually and pragmatically attractive environment for interagency and intergovernmental coordination. The presence of an independent staff and chairman further strengthens this form, providing the promise of a technically competent administrative infrastructure for the collection and dissemination of regionally focused information. These attributes are both supported by the formal statutory basis of interagency-interstate commissions, which provides a degree of status and resources often lacking in basin interagency committees.

Federal-Interstate Compact Commissions

The third type of federal-interstate regional organization is the federal-interstate compact commission (Derthick, 1974; GAO, 1981). Unlike a typical interstate compact which requires congressional consent and ratification but does not require or provide for subsequent federal involvement, a federal-interstate compact includes the federal government on an equal footing with the states – an institutional arrangement which, in theory, resolves many of the constitutional issues of basin management while providing the full resources of the federal government to an organization primarily comprised of state members. The role of the federal government in the terms and administration of the compact is highly similar to that of the basin states in most cases, except that the federal government is exempt from some of the constitutional restrictions on the states and is generally not bound by decisions that the federal representative does not approve. In general, however, the federal-interstate compact commission provides a forum where the states and the federal government interact in a highly equal and cooperative manner, a quality lacking in many institutional arrangements. This factor, combined with the ability to concentrate broad authorities in the organization using the federal-interstate compact mechanism, largely explain the widespread scholarly praise of this organizational form (GAO, 1981; NWC, 1973; ACIR, 1972; WRC, 1967).

The federal-interstate compact commission was pioneered in the Delaware Basin in 1961 and subsequently copied in the Susquehanna Basin in 1970 (GAO, 1981). No other examples exist. Consequently, any generalizations about federal-interstate compact commissions are ultimately a description of these particular organizations. These organizations are governed by an executive committee of state governors (or their appointees) and a federal representative appointed by the president. The rules of decision-making are negotiated as part of the compact and can theoretically vary by subject matter and by the nature of the federal commitment. Forms of majority-rule decision-making are featured prominently in both commissions, although most major agreements are reached through unanimity. The commission's decisions and policies are synthesized into a comprehensive basinwide plan, which is jointly implemented by the administrative branch of the organization and by existing agencies.

Interstate compacts in general provide an extremely strong statutory basis for a commission, a quality which is further enhanced by the formal participation of the federal government. Consequently, federal-interstate compact commissions can potentially be

vested with an extremely wide range of authorities and responsibilities, something that is seen in the Delaware and Susquehanna commissions. However, this strong legislative foundation can prove to be a weakness, for "the federal-state compacting process is potentially several orders of magnitude more complex and divisive than that of the interstate compacting process" (Donahue, 1987:132). Failed efforts to enact federal-interstate compacts in the Missouri and New England Basins provide evidence of this challenge of political acceptance.

Federal Regional Agencies

Among the most unusual regional organizations are the two forms of federal organizations: federal regional agencies and the single federal administrator. The federal regional agency is an independent agency of the federal government, created by federal legislation and vested with broad and comprehensive management authority over a specific physical area (Donahue, 1987). Being a federal agency, it is headed by federal representatives appointed by the president and is at least partially supported by federal appropriations. Any further generalizations are impossible, since only one example of this form exists: the Tennessee Valley Authority (TVA).

The TVA, created in 1933, is probably the most famous and widely studied regional water organization in the United States (Selznick, 1966; Martin *et al.*, 1960; Derthick, 1974). It was the sole product of the "valley authority" movement, an ambitious Depression-era effort to minimize interagency and intergovernmental conflicts in water resources management. The TVA, as well as this organizational form in general, is appealing on at least three levels. First, the federal regional agency format allows activities to be focused at the river basin scale rather than at politically defined constructs, such as state boundaries, thereby facilitating an efficient and technically sound approach to water management and development. Second, the high level of formal authority available to the organization from its statutory basis and federal standing allows the federal regional agency to pursue a comprehensive mandate. And third, the integration of planning, development, and management activities within a single agency, combined with the broad mandate, largely eliminates the need for interagency cooperation and bargaining and allows a single organization to implement the programs which it develops.

Perhaps the primary weakness of this organizational form is its irreproducibility. Dozens of proposals to replicate the TVA have been pursued, but all have failed primarily due to strong opposition from existing agencies and to the feared expansion of governmental (especially federal) influence (Fox, 1964). The TVA was a "political accident," arising from a unique period of economic crisis and political chaos (Derthick, 1974:192). In addition to this practical weakness, the federal regional agency form is also troublesome in its subordination of the states and its relative immunity from a system of checks and balances. High authority, when combined with high autonomy, can support innovation equally as well as despotism. Elements of both have been seen in the Tennessee Basin.

Single Federal Administrator

The second type of federal organization for the control of interstate water resources is the single federal administrator, seen in only one major basin: the Colorado (WRC, 1967; Donahue, 1987). The single federal administrator is not a typical "organizational form" and is perhaps better described simply as an institutional arrangement. In any case, the single federal administrator is the "institutional vehicle" utilized in the study region and, as such, deserves close examination.

The single federal administrator label "pertains to any arrangement in which a single, federally appointed administrator is vested with decision-making authority over the use and management of a given resource or set of resources within a specified geographic area" (Donahue, 1987:161). This definition potentially includes court-appointed River Masters used to oversee and implement judicial apportionments but is generally reserved for the Colorado situation. In the Colorado's Lower Basin, the Secretary of the Interior – a presidential appointee – is the single federal administrator, a byproduct of federal legislation and the Supreme Court's decision in *Arizona v. California* (1963). As discussed elsewhere in this volume, the court's landmark decision expanded the already broad discretionary powers of the Secretary to include the authority to allocate shortages among states and individual parties during periods of scarcity, within the poorly defined limits provided in the Colorado River Compact and the Boulder Canyon Project Act. This is a tremendous delegation of authority, especially for a river that is overallocated and extensively utilized and that is apportioned by rules full of technical and legal uncertainties. This newly acquired power of the Secretary has not yet been put into practice in any major episodes, so it is somewhat difficult to decisively evaluate the merits of this institutional arrangement. The potential behavior of the Secretary during severe sustained drought in the Colorado is speculated upon throughout this volume.

The strengths and weaknesses of this organizational form are largely linked to the qualities of authoritative and "top-down" management strategies (Donahue, 1987). In theory, the single federal administrator has the potential to quickly, efficiently, and equitably address difficult and contentious issues in a creative and definitive manner. However, the past performance of the Interior Department in Colorado River politics does not inspire great confidence in the ability of the federal bureaucracy to lead the institution during this era of paradigmatic change and declining water development. Furthermore, this concentration of power in a federal actor is inconsistent with prevailing norms of self-governance and the reempowerment of the states. Given this element of uncertainty and dubious accountability, the single federal administrator approach has few advocates in the Colorado basin and elsewhere.

CONCLUSIONS AND RECOMMENDATIONS

A Regional Organization for the Colorado

It is not the intention of this study to prescribe substantive solutions to the many policy issues in the institution, but rather to prescribe institutional arrangements that create forums and processes in which these difficult issues can be equitably and efficiently addressed. Ideally, arrangements should be fashioned that promote decision-making based on cooperation and bargaining (as opposed to coercion) among existing rightsholders and other interests, nested within a policy-making framework where accountable decision-makers – preferably at the state or regional level – can ensure that outputs are consistent with long-term regional objectives and public interests. The tremendous economic inefficiencies associated with many water uses in the region provide numerous opportunities for pursuing positive-sum policy objectives through carefully structured markets if transaction costs can be minimized (Wahl, 1989; Gardner, 1986). A process that discourages litigation and does not unduly or authoritatively challenge the existing system of private property rights in water is consistent with these design criteria.

Creating an institutional framework of this nature is probably best accomplished by the formation of a regional water organization with broad responsibilities and authorities. Among the organization's many functions would be overseeing the generation and dissemination of regional information, performing (or sponsoring) research on potential innovations, and coordinating the actions of various state and federal agencies active in the region. The central role of the organization, however, would be to provide a forum where the basin states could establish (and oversee implementation of) regional water management goals and programs, and where interstate bargains could be pursued. In order to support creative resource management at the problemshed scale, the organization's executive body would need to be vested with regulatory authorities in a wide range of subject areas: e.g., the modification of reservoir operating criteria and project purposes, the interpretation of compact and treaty obligations, the consideration of interstate water marketing proposals, the distribution and marketing of hydropower, the pricing and transfer of federally supplied water, the facilitation of Indian water rights negotiations and settlements, the quantification of other federal reserved rights, the design of fish and wildlife protection efforts (including those for endangered species), the formulation of salinity control strategies, and the preparation of risk-avoidance and response plans for drought and flood emergencies. These subjects are currently addressed in a variety of different forums and processes of dubious quality. By unifying these subjects under a single decision-making umbrella founded on the principles of value-pluralism, creativity and flexibility, and a respect for environmental limits, it is likely that initiatives will feature greater integration and compatibility, especially if the organization is supported by an independent technical staff capable of providing accurate and broadly-focused information – a current deficiency of the institution. Purely intrastate issues would be beyond the scope of the organization. On those issues where the organization fails to act, existing rules and decision-making arrangements would remain in effect. Implementation of most programs and policy outputs could remain the jurisdiction of existing bureaucracies, thereby avoiding unnecessary organizational duplication or reorganization.

A primary objective of this proposed innovation would be to formally shift responsibility for the control of the river away from the federal government to a collective of the basin states. This requires that many of the policy-making responsibilities of federal administrators – primarily the Secretary of the Interior – be constrained or completely subsumed by the proposed organization. There are a few federal obligations, however, which should not be delegated to the collective will of the basin states. The protection of federal reserved water rights (including Indian rights), the enforcement of the Endangered Species Act, and the satisfaction of treaty obligations with Mexico are prime examples. The federal government does, after all, own 56 percent of the land area in the basin (73 percent when Indian lands are included), in addition to having financed the major water

developments in the region (Weatherford and Brown, 1986). Consequently, the proposed regional organization, while prominently featuring state actors, would need to formally provide for federal participation.

The normative design criteria identified herein, when considered with the functional and structural needs of the proposed regional organization, suggest that the Colorado River institution would benefit most from the creation of a federal-interstate compact commission. This is not a novel suggestion. The National Water Commission (NWC, 1973) and water attorney Paul Bloom (1986), among others, have made similar recommendations. This organizational form, if patterned after the Delaware and Susquehanna commissions, would create a regional policy-making body of basin state representatives (ideally governors) and a federal actor, the Secretary of Interior being an obvious candidate. This would instill a much-needed element of local accountability into many facets of Colorado River politics and would empower state leaders to steer the institution forward during this era of political and paradigmatic change. In those subject areas where there is a compelling need for federal policy-making primacy, the federal representative to the commission could not – as a matter of law – be barred from independently exercising congressionally delegated regulatory powers. This arrangement provides an equitable balancing of state and federal powers within a regional policy-making forum. It is also consistent with funding arrangements which call for contributions from both state and federal treasuries, as well as from water and power users.

The federal-interstate compact mechanism is also desirable due to its ability to concentrate large amounts of power in the proposed organization, including the power to regulate interstate deals – an activity that is normally beyond the independent authority of state governments due to Commerce Clause restrictions. Unlike organizations designed solely to fulfill "soft management" functions (such as advisory or coordinating bodies), the organization proposed for the Colorado would serve as the focal point for regional decision-making. In order to ensure implementation of decisions spanning numerous political and bureaucratic jurisdictions, the organization needs to be endowed with a strong legal foundation – a task for which the federal-interstate compact is ideally suited.

The proposed innovation would not pose a threat to the 1922 Compact or the other basic elements of the Law of the River. Quite the contrary, the organization's organic act would contain a strong affirmation of the basic elements of the interstate apportionment. Other elements of the Law of the River, including environmental statutes and treaty obligations, would also be affirmed. These provisions not only increase the political viability of the proposed organization but also help to establish a framework conducive to interstate bargaining. As market proponents correctly argue, bargaining is constrained whenever legal arrangements imprecisely define rights and responsibilities (Anderson, 1983). A decision rule of unanimity would ensure that no major departures from existing arrangements could occur without the consent of all the basin states and the federal government.

In order to be a fertile arena of decision-making, organizations which rely on a decision-rule of unanimity must be able to craft positive-sum bargains (Wandschneider, 1984). Crafting positive-sum bargains is best accomplished by technically sophisticated management initiatives that improve efficiency (thereby expanding the size of the "pie" to be allocated), or by increasing opportunities for bargaining by expanding the range of issues and options available to the participants. These strategies are most effective when introduced into institutions characterized by inflexible and inefficient patterns of resource use and allocation – qualities seen in the Colorado. Only the most authoritative regional organizations (such as the TVA) have the ability to craft zero-sum initiatives, a fact which makes their creation all but impossible. Initiatives of this nature are best achieved through litigation and some forms of administrative and congressional rule-making.

The Political Environment of Institutional Change

Institutional innovations of the type advocated herein inevitably require disrupting existing bureaucratic arrangements and shifting the distribution of power within an institution. This creates considerable political opposition. Two major strategies exist for overcoming this political hurdle, both of which are applicable to this proposal. First, the magnitude of the institutional disruption can be minimized. The proposed federal-interstate compact commission for the Colorado does not require any fundamental modifications to the interstate apportionment codified in the Law of the River, nor does it require the termination of existing bureaucracies – e.g., federal and state agencies could retain important information gathering and facility operating responsibilities. The proposed innovation would primarily entail a partial shift in policy-making responsibility away from federal administrators to elected state officials and would provide a framework for pursuing market-based and private sector innovations. This is consistent with current national and western norms.

The other major strategy for overcoming the political obstacles of regional organization formation is to

opportunistically exploit a crisis or other unusual event temporarily affecting the political climate. Numerous factors could help to quickly produce an environment susceptible to institutional change: a western energy boom could dramatically increase water demands; large Indian water rights quantifications could threaten existing rightsholders; a private – i.e., unregulated – interstate water market could emerge; implementation of the Endangered Species Act, or other environmental legislation, could threaten established water uses; major reclamation reform legislation could be passed by Congress; economic boom or bust could radically affect the agricultural demand for water; a major dam could break; and so on (Kneese and Bonem, 1986). The effects of drought could also serve as a powerful stimulus for change. The creation of the federal reclamation program, for example, was prompted in part by a major midwestern drought in the 1890s (Pisani, 1992). Similarly, drought in the 1920s was at least partially responsible for the passage of the Boulder Canyon Project Act of 1928 and the creation of the Metropolitan Water District of Southern California. As Vincent Ostrom (1953:235) explains, drought provides a valuable political opportunity which should be aggressively exploited:

> ...the sense of anxiety and fear of catastrophe produced by prolonged droughts can be channeled into constructive action by competent political, administrative, and engineering leadership that anticipates the recurrence of droughts and prepares constructive alternatives to meet the water problems that inevitable arise during these periods. Otherwise, these circumstances of fear and drought, accompanied with actual shortages of water, are apt to produce frustration, irresponsible conflict, and occasionally result in quests for magic and panaceas.

Hopefully, the hypothetical drought scenario presented in this study, when coupled with existing political and paradigmatic trends, will help to provide a sufficient stimulus for meaningful institutional reform in the region.

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