

MODERNIZING THE LAW OF THE RIVER AND OTHER BASIN INSTITUTIONS

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SUSTAINABILITY INITIATIVES¹

This paper asks how well the guiding principles reflected in the laws and institutions which allocate and manage the waters of the Colorado River Basin serve the basin's many water users and interests. We conclude that, while these principles and their implementing institutions have worked in an era characterized by water supplies generally adequate to meet all demands, they are less well suited to today's conditions and have in fact already become an impediment to ensuring that uses of the river meet basin needs.

There is no unclaimed water remaining in the basin. Every new or additional use affects some valuable existing use. In this context, the basic division of interests set out in existing laws and institutions under which the states are concerned primarily with consumptive water uses while the federal government takes primary responsibility for managing its dams and other facilities to obtain other values of the water no longer makes sense. It is now time to integrate the governance of water in the basin in a manner that allows full and equal consideration of all of the values of the water and that provides for equal consideration of all those with interests in the uses of the basin's water resources.

Part I of the paper sets out the necessary background in three steps. Section A provides an overview of the Law of the River. Section B describes the governing

institutions that implement the Law of the River. Section C discusses the uses of river water established under this system of governance and some of the issues now presented by the choices that have been made.

Drawing on Part I, Part II takes a critical look at the existing system. In Section A we distill certain core features of the Law of the River and other institutions; in Section B we describe the behavior that these features appear to encourage, behavior which we believe is out of step with changing conditions and values. Part III provides our views respecting changes that are needed. Section A presents principles for modernization of the Law of the River. Finally, Section B offers three new institutions that should be considered to make a modernized Law of the River work: a trust to address public values; water banks to manage changing consumptive use needs; and a federal/interstate compact creating an integrated governance mechanism for the basin.

I. SETTING THE STAGE

Relatively few people live within the hydrologic boundaries of the mainstem of the Colorado River, but many more people rely either directly or indirectly on the uses of this source of water. Within the "hydrocommons"² of the Colorado River Basin live nearly 25 million people — located in such major metropolitan areas as Los Angeles, Phoenix, Las Vegas, Salt Lake City,

¹ 2260 Baseline Road, Suite 101, Boulder, Colorado 80302. (303) 417-1350. This paper benefitted greatly from the thorough and thoughtful review comments of Jo Clark, Jeff Fassett, David Getches, Jim Lochhead, Gary Weatherford, and Jerry Zimmerman. The authors remain responsible for the contents of the paper.

² Gary D. Weatherford, "From Basin to 'Hydrocommons': Integrated Water Management Without Regional Governance," *Natural Resources Law Center Western Water Policy Discussion Series*, 1990.

and Denver as well as numerous other smaller communities.³ The Colorado River and its tributaries provide an important part of the drinking water supply for many of the people who live within the hydrocommons. Water from this basin irrigates 3.5 million acres of productive farm land. The River also provides electricity to meet a portion of the needs of the millions of customers served by the region's municipal, rural cooperatives, and investor-owned utilities. Whitewater rafting and other recreational uses of the river and the surrounding area support an important commercial business and serve an important human need. And the river basin supports populations of dozens of fish species, most introduced, but some native and found nowhere else. According to one source:

It has been said that no river is asked to do so much with so little water as is the Colorado River. Every drop of the river's average annual flow has been apportioned, and the river is so intensely used that in most years, it completely dries up before reaching the Gulf of California.⁴

³ Water Education Foundation, *Layperson's Guide to the Colorado River, 1995 at 2*. The other statistics cited in this paragraph are from this same source.

⁴ *Id.*

⁵ For an overview of the major pieces of the LOR see Lawrence J. MacDonnell and David H. Getches, "Colorado River Basin," 7 *Waters and Water Rights* 5 - 55 (R. Beck, ed. 1994) (hereafter "Colorado River Basin"). Other recommended sources include: Charles J. Meyers, "The Colorado River," 19 *Stan. L. Rev.* 1 (1966); David H. Getches, "Competing Demands for the Colorado River," 56 *U. Colo. L. Rev.* 413 (1985); Norris J. Hundley, Jr., *Water and the West: The Colorado River Compact and the Politics of Water in the American West* (1975). The authors also drew from their previous work on the Colorado River and related issues: Lawrence J. MacDonnell, "The Law of the Colorado River: Coping With Severe Sustained Drought," 31 *Water Resources Bull.* 825 (1995); MacDonnell, "New Options for the Lower Colorado River," *Natural Resources Law Center Western Water Policy Paper* (1996); MacDonnell, "Managing Reclamation Facilities for Ecosystem Benefits," *U. Colo. L. Rev.* (forthcoming); MacDonnell, "Water Banks: Unlocking the Gordian Knot of Western Water," 41 *Rocky Mt. Minn. L. Inst.* 22-1 (1995).

⁶ The Compact divides the Colorado River Basin into an Upper and a Lower Basin. These areas are defined in terms of the drainage areas of the Colorado River System above and below Lee Ferry and areas served with water from these drainages. Art. II. (f) & (g). In addition, the Compact refers to the States of the Upper Division (Colorado, New Mexico, Utah, and Wyoming) and the Lower Division (Arizona, California, and Nevada). Art. II. (c) & (d). In this paper, we follow this usage established in the Compact by using "basin" when referring to the geographic area and "division" when referring to the states.

As the major source of water in largely arid portions of 7 western states and the Republic of Mexico, the Colorado River and its tributaries are the object of intense competition for their control and use.

A. OVERVIEW OF THE LAW OF THE RIVER

In an attempt to sort out competing claims to this coveted but limited supply of water, a legal framework referred to as the Law of the River ("LOR") has developed over the years.⁵ The foundation piece of the LOR is the *Colorado River Compact*, negotiated in 1922 among the seven states under the chairmanship of Herbert Hoover, representing the U.S. Article III of the Compact apportions the "exclusive beneficial consumptive use" of 7.5 million acre-feet annually to each of the Lower and Upper Basins.⁶ It also allocates an additional million acre-feet for consumptive use in the Lower Basin. It then provides that the allocation of water to Mexico under any subsequently negotiated agreement should come first from unallocated "surplus" water. Article III further obligates the states of the

Upper Division to deliver at least 75 million acre-feet to Lee Ferry in consecutive ten-year periods. Finally, Article III provides that Upper Division states may not withhold water, and the states of the Lower Division may not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses.

A driving force behind negotiation of the compact was the desire of water users in California, particularly in the Imperial Valley, to obtain federal funding support for the construction of an "All American Canal" to bring Colorado River water to the valley and construction of a dam on the mainstem that would enable regulation and control of the flows of the river. Congress passed the *Boulder Canyon Project Act* (BCPA) in 1928, authorizing construction of what became Hoover Dam as well as the All American Canal. The BCPA provided for allocating the Lower Basin's basic 7.5 million acre-foot apportionment in the following manner: 4.4 million acre-feet to California, 2.8 million acre-feet to Arizona, and 300,000 acre-feet to Nevada.⁷ It required California to specifically agree to limit its annual consumptive uses of this basic apportionment to 4.4 million acre-feet plus not more than one-half of any unapportioned surplus, which it did in 1929.⁸ In 1931 southern California water interests negotiated the *Seven-Party Agreement*, allocating the first 3.85 million acre-feet to agricultural users, the next 550,000 acre-feet to the Metropolitan Water District of Southern California (MWD), with additional water available beyond the basic 4.4 million acre-foot apportionment going partly to MWD and the City and County of San Diego and partly to agricultural users.

⁷ Section 4(a). In addition, California and Arizona were given the opportunity to consumptively use up to one-half of "any excess or surplus waters unapportioned by [the] compact...."

⁸ *California Limitation Act*, *Stats. Cal.* 1929, ch. 16.

⁹ Section 205(n)(2) provides for repayment of 25% of the costs of these projects from the *Upper Colorado River Basin Fund* and the *Lower Colorado River Development Fund*.

In 1944, the U.S. and Mexico entered a *treaty* settling their respective claims to both the Colorado and the Rio Grande. For the Colorado, the U.S. agreed to provide 1.5 million acre-feet of water to Mexico annually. In 1973 the U.S. and Mexico negotiated *Minute 242* of the International Boundary and Water Commission, under which the U.S. committed to provide water at the northerly international boundary with salinity concentrations no more than 115 (+/- 30) parts per million higher than those measured at Imperial Dam in the U.S. In 1974, Congress passed the *Colorado River Basin Salinity Control Act* under which federal funding would be provided for the construction of a desalter and other salinity control projects intended to control or reduce salinity loadings so that additional water development could occur while maintaining salinity levels in the river at or below the 1972 levels.⁹

In 1948, the states of Arizona, Colorado, New Mexico, Utah, and Wyoming negotiated the *Upper Colorado River Basin Compact*. The primary purpose of the compact was to allocate the Upper Basin's apportionment of 7.5 million acre-feet. Arizona, with only a small part of its Colorado River System watershed in the Upper Basin, obtained rights to the consumptive use of 50,000 acre-feet of water. The other four states share the remainder on a percentage basis: Colorado with 51.75%; New Mexico with 11.25 %; Utah with 23 %; and Wyoming with 14 %. Agreement on this compact cleared the way for passage of the *Colorado River Storage Project Act* of 1956. This law authorized the construction of Glen Canyon Dam as well as several other major projects in the Upper Basin.

In the 1963 decision, *Arizona v. California* and the 1964 decree,¹⁰ the U.S. Supreme Court determined that the BCPA had allocated the Lower Basin apportionment of mainstem water, despite the fact that no agreement among the states had ever been negotiated. The decision specifically recognized reserved water rights held by tribes living on reservations along the Colorado River, establishing the "practically irrigable acreage" standard as the basis for quantifying those rights. The Court upheld Arizona's right to use Gila River tributary waters in addition to its 2.8 million acre-foot basic apportionment. And the decision determined that the BCPA gave the Secretary of the Interior considerable discretion in allocating use of water apportioned to the Lower Basin through his contracting authority,¹¹ as well as in determining how shortages should be allocated.

Resolution of the Lower Basin allocation issue between Arizona and California opened the way for passage of the *Colorado River Basin Project Act* in 1968. This act authorized construction of the Central Arizona Project, with Arizona agreeing to subordinate its diversions of water for this project to California's basic apportionment of 4.4 million acre-feet under shortage conditions. In addition, smaller projects in the Upper Basin were authorized for construction.

Federal environmental laws, particularly the *Endangered Species Act*, the *National Environmental Policy Act*, and the *Clean Water Act*, now are part of the LOR. There are four species of fish native to the

Colorado River that are listed for protection under the ESA. Virtually the entire mainstem Colorado River as well as many of its tributaries have been designated as critical habitat important for the recovery of at least one of these species. A recovery implementation plan has been in place in the Upper Basin since 1988, and efforts are now underway to establish a multi-species conservation program in the Lower Basin.

In 1992, Congress passed the *Grand Canyon Protection Act (GCPA)*, elevating the recreational and environmental values of the Grand Canyon in relation to the operation of Glen Canyon Dam for hydroelectric power purposes. Essentially the codification of an environmental analysis process that had supported the need to change hydro operations, the GCPA directs that operation of the dam protect the values for which the Grand Canyon National Park and the Glen Canyon Recreational Area were reserved.

While the LOR has been quite successful in allocating river water to various uses, disputes remain. Thus, some in the Upper Basin have asserted that the apportionment of water between the two basins under the 1922 Compact was based on a fundamental "mistake of fact" regarding the native supply of water that ought now to be corrected in some equitable way.¹² In addition the Upper Division states question the amount of water they are obligated to provide to meet the Mexican Treaty commitment. The status of rights to develop the water of rivers tributary to the Colorado remains unsettled. There is ongoing uncertainty about

the availability of "surplus" water in the river and how shortages, should they occur, would be allocated for consumptive use. Tribal water rights, putatively left unaffected by the 1922 and 1948 compacts, have not been fully defined. And finally, there is confusion regarding the effect of federal environmental statutes, especially the ESA, on uses of the river.

B. BASIN GOVERNANCE

There is no single decision-making forum governing the allocation and use of the waters of the Colorado River. Rather these decisions are made in a number of different forums, sometimes involving distinctively different processes that are guided by different rules. This section lays out the primary governing mechanisms at the federal and state levels.

1. National-level Governance

In many important respects, governance of the Colorado River begins with the U.S. Congress. The Boulder Canyon Project Act, the Colorado River Storage Project Act, and the Colorado River Basin Project Act have profoundly shaped and directed uses of the Colorado River. In passing these laws Congress served as the mechanism by which the basin states reached common agreement on water use objectives for the Colorado River and mobilized federal support, primarily in the form of funding, to help achieve those objectives. At the same time Congress was, in effect, assuring that those basin objectives were consistent with broader national objectives.

There was some uncertainty in the early part of this century concerning the power of Congress to commit the federal government to the large-scale water development sought for the Colorado River.¹³ Water user

interests in the Lower Basin recognized that state and local financial resources were simply inadequate to pay for the unparalleled construction project that was regarded as necessary if the waters of the Colorado River were to be reliably turned to human use. Without question it has been the need for federal funding for water development in the Colorado River Basin that historically has given Congress a dominant position in decisionmaking respecting the Basin. In turn, Congress has designated the Secretary of the Interior to be the primary agent of carrying out its authorizations, providing considerable control over basin governance in the process.

The U.S. Supreme Court in its 1963 decision, *Arizona v. California*, provided this account of the context in which this case was being considered:

As we see this case, the question of each State's share of the waters of the Colorado and its tributaries turns on the meaning and scope of the Boulder Canyon Project Act passed by Congress in 1928. That meaning and scope can be better understood when the Act is set against its background—the gravity of the Southwest's water problems; the inability of local groups or individual States to deal with these enormous problems; the continued failure of the States to agree on how to conserve and divide the waters; and the ultimate action by Congress at the request of the States creating a great system of dams and public works nationally built, controlled, and operated for the purpose of conserving and distributing the water.¹⁴

Thus, as described, the Court determined that Congress had effected a division of the Lower Basin's basic apportionment by statute, despite the failure of

¹³ A good discussion is provided in *Water and the West*, *supra*.

¹⁴ 373 U.S. 546, 552.

¹⁰ 373 U.S. 546 (1963); 376 U.S. 340 (1964).

¹¹ "We are satisfied that the Secretary's power must be construed to permit him, within the boundaries set down in the Act, to allocate and distribute the waters of the mainstream of the Colorado River." 373 U.S. 546, 590 (1963).

¹² John U. Carlson & Alan E. Boles, "Contrary Views of the Law of the Colorado River: An Examination of Rivalries Between the Upper and Lower Basins," 32 *Rocky Mtn. Min. L. Inst.* 21-1 (1986). Records available to the negotiators in 1922 regarding native flows suggested reliable annual flows of at least 16 million acre-feet and probably considerably more. See discussion in notes __ and accompanying text, *infra*.

the states themselves to reach agreement. It found far-reaching authority in the Secretary of the Interior to directly allocate state shares of Colorado River water to users in the states. It held that the Secretary could determine how best to allocate shortages of water in the Lower Basin and that he need not follow state law, including prior appropriation, in so doing.¹⁵ In short, it concluded that the waters of the Colorado River mainstem in the Lower Basin had come under federal control and supervision.¹⁶

The Endangered Species Act also places substantial authority in the hands of the Secretary of the Interior, particularly concerning federal actions that might jeopardize the continued existence of protected species.¹⁷ As applied in the Colorado River Basin this statute has resulted in the development of special programs intended to protect listed species in the basin while allowing historical and new consumptive uses of water to occur.

The Clean Water Act requires that water quality standards be established for all waters of the U.S.¹⁸ For salinity in the Colorado River, EPA has approved the creation of standards at three locations in the Lower Basin — below Hoover Dam, below Parker Dam, and at Imperial Dam, rather than requiring the setting of standards for each segment of the river.¹⁹

Because it holds original jurisdiction in disputes between the states, the U.S. Supreme Court itself has been an important decision-making forum in the basin. The role of the Court is largely to act as arbiter in deciding what existing agreements (e.g., compacts) and laws (e.g., the BCPA) mean. In addition, since Supreme Court decisions now have become an important part of the Law of the River, amendments or additions to these decisions are likely to become another vehicle through which changes in the management and decision-making processes regarding the Colorado River can be made.²⁰

¹⁵ The Court's decision makes it clear that the BCPA was intended to fully displace state law in the allocation of water from Lake Mead: "But where the Secretary's contracts, as here, carry out a congressional plan for the complete distribution of water to users, state law has no place." 373 U.S. at 588.

¹⁶ This decision concerns only the Boulder Canyon Project Act. There is little to suggest that Congress held a different view of affairs when, 5 years later, it enacted the Colorado River Basin Project Act. It is true that in Section 602 the Secretary is specifically directed to consult with the governors of the 7 basin states respecting his development of criteria (and any subsequent modifications) for the "coordinated long-range operation of the reservoirs constructed and operated under the authority of the Colorado River Storage Project Act, the Boulder Canyon Project Act, and the Boulder Canyon Project Adjustment Act." Section 602 (b). The Secretary is not bound by comments he might receive, however.

¹⁷ Section 7. Given the pervasive presence of the U.S. through the Bureau of Reclamation in the construction and operation of facilities determined, at least in the Upper Basin, to have endangered the continued existence of several native fish species, the Secretary has a legal duty to recover these fish that he must balance with his other legal responsibilities in project operations. Should the Upper Basin recovery program be deemed inadequate for some reason, additional constraints may be required on the operation of facilities.

¹⁸ 33 U.S.C. Section 1313. States are to establish standards which are to be submitted to the Administrator of EPA for approval.

¹⁹ The Environmental Defense Fund brought suit against the EPA in the 1970s seeking to force it to set state-by-state standards for salinity on the Colorado River. The District of Columbia Circuit Court upheld approval by the Administrator of the existing approach. *Env't Defense Fund v. Costle*, 657 F.2d 275 (D.C. Cir. 1981).

²⁰ A contemporary example is the proposal to go to the Court to change language in its 1964 *Arizona v. California* decree to facilitate interstate trading of Colorado River water in the Lower Division. See "New Options," *supra*, at 40.

2. State Participation in Governance

The states are organized in relation to the Colorado River in a variety of ways. Perhaps the most formally constituted entity is the Upper Colorado River Commission, established under the Upper Basin Compact. It acts as a forum for the Upper Division states to collect information. Commission members from the four states meet on a regular basis and discuss issues. The Commission produces an annual report. Should there be a shortage of Colorado River water in the Upper Basin, the Commission is authorized to sort out allocation issues according to general guidelines. In some matters the Commission serves as a collective voice for the Upper Division states in Colorado River matters.

The Colorado River Basin Salinity Control Forum (Forum) is probably the single best example of interstate and state/federal cooperation in the basin.²¹ The Forum was established by the basin states to coordinate the interests of the states regarding federally funded salinity control projects.²² Its members also generally serve as the Colorado River Salinity Control Advisory Council, authorized under the Colorado River Basin Salinity Control Act.

Individually, the states have taken different approaches to organizing themselves to address Colorado River issues. California and Nevada have created special enti-

ties to represent state interests related to the Colorado River and in negotiation and communication with other states and the federal government. The other states tend to approach Colorado River issues through their departments of water or natural resources. The governors are actively involved in many issues, as are the major users of Colorado River water (those holding contracts for water in the Lower Basin and those with state-based appropriative water rights in the Upper Basin). The Secretary of the Interior, in connection with his responsibilities under Section 602 of the Colorado River Basin Project Act, has established a Colorado River Management Work Group to prepare an initial draft of the Annual Operating Plan for the Reclamation facilities. Representatives of each of the states are members of this work group.

Periodic efforts by the states to reach agreement on matters relating to the Colorado River have occurred over the years. A prominent recent example is the formation of the ad hoc 7 state forum that began in the early 1990s.²³ Now known as the 7/10 meetings since the inclusion of representatives from 10 of the Colorado River Basin tribes, these periodic sessions are perhaps the closest thing that has emerged to date attempting to convene the principals from the major sovereigns in the basin to discuss common issues.²⁴

²¹ "Competing Demands," *supra*, at 467.

²² The cost effectiveness of these salinity control programs has been the subject of continuing controversy over the years. The 1973 Salinity Control Act was amended in 1984 and 1995 to emphasize the importance of cost effectiveness in selecting projects. With shrinking federal funds generally it seems likely that there will be considerably less money for these projects in the future.

²³ These meetings emerged out of the Lower Basin's diversions less measured return flows of more than 7.5 million acre-feet in 1990 and the expectation that its uses would exceed this amount again in 1991. Colorado's Governor Roy Romer sent a letter to California Governor Pete Wilson urging that California determine how it would reduce its net diversions of Colorado River water. These events triggered a whole series of actions that are described in "Options for the Lower Basin," *supra*. Subsequent analysis suggests that when subsurface return flows are accounted for, total depletions in the Lower Basin of Colorado River water did not in fact exceed 7.5 million acre-feet in 1990.

²⁴ It was out of one of these meetings that the Lower Basin Technical Committee was formed in 1994 to attempt to develop options for a Lower Basin-focused approach to meeting water supply concerns among the three Lower Division states and five Indian tribes with reservations along the mainstream in the Lower Basin.

3. Basin governance: a summary

Fundamental decisionmaking respecting the Colorado River, since the Boulder Canyon Project Act, has resided with Congress and the Secretary of the Interior. In part, this federal dominance resulted from the scale of the effort required to "harness" the river and make it more usable for economic development in the basin's hydrocommons. No single state, or even combination of basin states, was capable of making the necessary investments to construct Hoover Dam. National financing was necessary. When the states in the basin proved incapable of reaching agreement on fundamental matters relating to the apportionment of water, federal authority filled the void to protect the increasingly substantial federal investment in the basin. Perhaps the high point of federal control of the river is marked by the U.S. Supreme Court's 1963 *Arizona v. California* decision.

For their part the states have focused largely on pursuing their own individual interests. As discussed below, they have viewed their interests almost wholly in terms of maximizing consumptive use of the basin's water. They have worked together when necessary to obtain federal funding to make possible additional consumptive uses. They have also worked together to avoid federal sanctions that might limit their consumptive uses. They have shown little inclination, however, to develop a common vision for the basin that might suggest ways for the basin's waters to provide enhanced benefits, preferring instead to expend their energies protecting their existing individual situations under the LOR. Long-term plan-

ning and management in the basin, such as it is, is done by the Bureau of Reclamation. Incorporation of emerging values in the recognized uses of the basin's water has been left largely to Congress and federal agencies.

Broader public involvement in Colorado River decisions was effectively nonexistent until the National Environmental Policy Act opened up federal decision-making. The public process associated with reviewing the operations of the Glen Canyon Dam represents the most extensive effort to date to open up the decision-making process in the Colorado River. With the Grand Canyon Protection Act, Congress has directed continued public involvement in this matter.

In sum, there is de facto federal management of the Colorado River, closely monitored and controlled as much as possible by the states. We return to this topic in Part II.

C. USES OF THE COLORADO RIVER

The uses of the waters of the Colorado River and many of its tributaries are determined by the LOR. For example, an analysis of the general effect of the LOR suggests a de facto priority system with the most senior priority belonging to the deliveries to Mexico, the next most senior belonging to "present perfected rights,"²⁵ third, the deliveries of water to the Lower Basin for consumptive uses (beyond present perfected rights), fourth, consumptive uses of water in the Upper Basin, fifth, other economic, non-consumptive uses, and last,

²⁵ The 1922 Compact provided that present perfected rights were to be "unimpaired" by the compact. Art. VIII. In its 1964 Decree in *Arizona v. California* the U.S. Supreme Court defined present perfected rights as "a water right acquired in accordance with State law, which right has been exercised by the actual diversion of a specific quantity of water that has been applied to a defined area of land, or to definite municipal or industrial works, and in addition shall include water rights created by the reservation of mainstream water for the use of Federal establishments under Federal law, whether or not the water has been applied to beneficial use...." 376 U.S. 340, 341 (1964). Water rights reserved for Indian reservations along the mainstream Colorado River are included in this latter category.

²⁶ This basic hierarchy of rights is described in "Colorado River Basin," *supra*, at 19-24.

noneconomic, non-consumptive uses.²⁶ Another way to look at the priorities established under the LOR is to say that consumptive uses hold the highest priority (essentially the first 4 priorities identified above), that economic, non-consumptive uses hold the second priority, and that noneconomic, non-consumptive uses are most junior.

In this section we divide the uses of Colorado River water into the latter three categories: (1) economic²⁷, consumptive uses; (2) economic, non-consumptive uses²⁸; and (3) "public good"²⁹ uses. Because of their distinct legal nature we treat tribal water rights separately.³⁰ We analyze these uses³¹ and present the major issues and problems presented by these uses in the foreseeable future. We also briefly discuss the relative economic values of uses of Colorado River water.

1. Economic, consumptive uses

The LOR emphasizes consumptive uses of the river's waters. This emphasis began with the 1922 Compact in

which the basic apportionment of water between the two basins is described in terms of "beneficial consumptive use." The Compact provides that the Upper Basin may not withhold water (nor may the Lower Basin demand water) that is not needed for (consumptive) domestic and agricultural uses. The Upper Basin Compact and the 1963 *Arizona v. California* decision focus on the apportionment of consumptive uses. The Salinity Control Act is predicated on the protection of consumptive uses. The RIP for endangered fish in the Upper Basin is intended to allow full development of (consumptive use) compact apportionments. It was the states that identified consumptive use as their highest priority in 1922, and today the states remain dedicated to this priority.

Table 1 shows the consumptive uses of the water of the Colorado River Basin between 1981 and 1985.³² Irrigated agriculture dominates water uses in all states.³³ The second major source of consumption is from reservoir evaporation.

²⁷ By "economic" we refer to uses on which it is at least theoretically possible to earn a return on investment. In part, the ability to earn a return depends on the feasibility of translating the value of the use into dollar terms. Agricultural and municipal/industrial uses fall into this category.

²⁸ The generation of electric power, flood control, certain kinds of recreation and navigation are examples of economic, non-consumptive water uses.

²⁹ By "public good," we refer to water uses on which it is difficult to earn a return on investment, in part, because it is difficult to translate the value of the use into dollar terms. The use of water for fish species protection and recovery, for aesthetics and for certain ecological values are examples of "public good" uses. Arguably, there are public good attributes of water that is used for consumptive uses, too, such as the community value of water used for agriculture.

³⁰ The tribes use and seek to use water for the first three uses. We treat tribal water rights separately because of the special legal context in which these rights must be seen.

³¹ Of course, the water flowing down the Colorado may be used for all of these uses in sequence. Thus, water for fish in the Upper Basin may be on its way to agricultural or M&I uses in the Lower Basin. Along the way it may be used for generating electric power. It may also be providing flat water recreation in reservoirs or whitewater rafting in the river. It is this "multi-attribute" nature of water that makes the analysis of its uses challenging.

³² Dep't of the Interior, Bureau of Reclamation, *Colorado River System Consumptive Uses and Losses Report 1981-1985*. The Bureau of Reclamation has not completed comparable reports for more recent periods.

³³ The greatest fraction of water identified as "transbasin exports" is water used ultimately in agriculture.

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Type of Use	Upper Basin(1,000af/yr)	Lower Basin(1,000af/yr)
Reservoir evaporation and channel losses	812	1,255
Agriculture (w/i basin)	2,312	5,101
M & I	203	841
Fish, wildlife and recreational	0	30
Transbasin exports	669	4,063
Totals	3,996	11,290

Source: Colorado River System Consumptive Uses and Losses Report

On its face the Law of the River provides for the annual consumption of up to 17.5 million acre-feet of Colorado River water.³⁴ In 1990 the three Lower Division states diverted considerably more than their basic 7.5 million acre-foot share of mainstream water, depleting about 7 million acre-feet.³⁵ California long has consumed more than its basic apportionment of 4.4 million acre-feet while Nevada is moving rapidly towards fully consuming its 300,000 acre-foot share. With completion of the Central Arizona Project, Arizona now has the physical ability to take its full 2.8 million acre-foot basic apportionment. At present it consumes about 2 million acre-feet of mainstream Colorado River water annually as well as water from tributaries to the river.

Development is proceeding more slowly in the Upper Basin, but ongoing construction of the Central Utah

Project will make possible much greater consumptive use of Colorado River water in that state. Using its assumption that the Upper Basin has only 6 million acre-feet of firm water supply available for total consumptive use, the Bureau of Reclamation expects Utah to go from 65% depletion of its Colorado River apportionment in 1990 to 89% depletion by 2010.³⁶ Colorado and New Mexico now consume about 75% of their apportionments, with New Mexico's remaining share projected to be fully consumed sometime after the year 2010 and Colorado's share fully consumed sometime after 2050.³⁷ Wyoming's consumption is projected to increase from 59% in 1990 to 81% by 2050.³⁸

It has long been acknowledged that the apportioned consumptive uses exceed the long-term average runoff available in the river.³⁹ While this long-term average

³⁴ The 1922 Colorado River Compact apportions the "beneficial consumptive use" of 15 million acre-feet equally between the Upper and Lower Basin. In addition, the Lower Basin is given the right to consume another one million acre-feet of water. By treaty, Mexico is guaranteed the delivery of 1.5 million acre-feet of Colorado River water annually.

³⁵ "Progress Report No. 17," *supra*, Table 3 at 23-24.

³⁶ *Id.* at 22.

³⁷ *Id.*

³⁸ *Id.* at 23.

³⁹ The negotiators of the Colorado River Compact in 1922 may have thought they were dividing as much as 21 million acre-feet annually. David H. Getches, "Competing Demands for the Colorado River," 656 U.Cola.L.Rev. 413, 419, n.13 (1985)(hereafter "Competing Demands").

amount of water is a matter of some debate, the Bureau of Reclamation sets the "average annual natural flow," measured at Lee Ferry, at 15 million acre-feet.⁴⁰ Tree ring studies reaching back three centuries suggest an annual average flow of something more like 13.5 million acre-feet.⁴¹ One recent analysis estimated a 20-year average flow of 10.95 million acre-feet occurred between 1579 and 1598.⁴² Moreover, it is a highly variable supply: flows have ranged from as little as 6 million acre-feet to as much as 20 million acre-feet (or more) in a year, based on historical records.⁴³

This fundamental disparity between the expectation of consuming up to 17.5 million acre-feet of water annually from a river system that does not provide this much water has not presented real problems until relatively recently. First, a massive system of storage facilities, capable of holding more than 60 million acre-feet of water, makes the delivery of water for consumptive uses almost immune from the short-term vagaries of the natural supply. Second, the Upper Basin remains some time away from fully consuming its apportionment. And, until recently, even the Lower Basin had not pushed up against its basic 7.5 million acre-foot apportionment. The emergence of concerns about the ecological needs for water now challenges the Upper Division states' expectations of developing its compact appor-

tionment for consumptive use. Moreover, ever increasing demands for consumptive use in the Lower Division states are forcing attention to the source of water for serving those demands. Finally, non-consumptive uses such as hydropower and recreation may in some cases be more economically valuable than certain consumptive uses. Yet because of their secondary status under the LOR, described next, they are not weighted evenly with consumptive uses in river basin decisionmaking.

2. Economic, non-consumptive uses

The LOR also provides for various economic, non-consumptive uses of Colorado River water. To justify federal involvement in the construction and operation of Hoover Dam, the Boulder Canyon Project Act proclaimed the purposes of the dam to be "controlling the floods" first, "improving navigation" second, and "regulating the flow" for delivery of water to irrigate public lands "and other beneficial uses" third. The last mentioned purpose was for the generation of electricity "as a means for making the project herein authorized a self-supporting and financially solvent undertaking...." Recreation first emerged as a purpose for the construction and operation of federal facilities with the 1956 Colorado River Storage Project Act. Water quality appeared as a purpose in the 1968 Colorado River Basin Project Act.

⁴⁰ U.S. Dep't of the Interior, *Quality of Water, Colorado River Basin, Progress Report No. 17, January 1995* (hereafter "Progress Report No. 17"). Of this amount, more than 5 million acre-feet are exported out of the natural drainage basin each year.

⁴¹ Weatherford & Jacoby, "Impact of Energy Development on the Law of the Colorado River," 13 Nat. Res. J. 171, 183-85 (1975); Stockton & Jacoby, *Long Term Surface Water Supply and Streamflow Levels in the Upper Colorado River Basin, Lake Powell Research Project, Bulletin No. 18, Inst. of Geophysics and Planetary Physics, University of California Los Angeles, 1976.*

⁴² Meko, Stockton, & Boggess, "The Tree Ring Records of Severe Sustained Drought," 31 Water Res. Bull. 789, 800 (1995). Whatever the long-term average annual runoff in the basin, it is small in comparison with rivers like the Mississippi (which produces 440 million acre-feet annually) or the Columbia (which produces 180 million acre-feet annually).

⁴³ "Progress Report No. 17," *supra*, at 7. The Upper Colorado River Commission reports virgin flows ranging from a low of 5.6 million acre-feet in 1934 to a high of 24.5 million acre-feet in 1984.

Flood control was a major concern of many of the promoters of the Boulder Canyon Project Act,⁴⁴ and U.S. Army Corps of Engineers flood control regulations govern the management of Hoover Dam and Lake Mead for this purpose. In addition there is flood control space in other Reclamation storage facilities which is managed by releasing carryover water as necessary to enable the impoundment of projected runoff.

The generation and sale of electric power from Reclamation facilities are responsibilities coordinated between the Bureau of Reclamation and the Western Area Power Administration (WAPA).⁴⁵ In the Boulder Canyon Project Act, Congress provided that the use of hydroelectric power facilities for Hoover Dam was "incidental" to other uses, but it was understood that revenues from hydropower would return much of the construction cost of the dam and all of the operation and maintenance cost. In the 1956 Colorado River Storage Project Act, Congress directed the Secretary to operate hydroelectric power plants constructed under that act to "produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates."⁴⁶

WAPA markets the energy generated from water running through federal hydroelectric plants with about

4425 megawatts of capacity on the River and its tributaries. The energy is sold pursuant to long-term contracts primarily to municipal and rural cooperative utilities for resale to their customers. Pursuant to section 114 of the Energy Policy Act of 1992, WAPA requires its customers to implement electric integrated resource planning so as to encourage the efficient use of the resource.

In an average year, sales of this energy raise over \$175,000,000. Even so, the average price of firm power from the dams (not including transmission and distribution costs) is less than 2 cents per kilowatt-hour, making this power one of the lowest cost firm power resources in the region.⁴⁷ This cost includes partial repayment of costs attributable to project agricultural water uses. In the Upper Basin, power rates include a contribution to the capital costs of irrigation projects that are authorized but are not yet built as well as a contribution to the costs of the Recovery Implementation Program for endangered fish.⁴⁸ In the Lower Basin revenues from power return the entire cost of the dams, the cost of salinity control projects, visitor facilities, and flood control.

In 1995 the Clinton Administration unveiled legislation to authorize the sale of federal power generation (and associated transmission) facilities located at federal

⁴⁴ Flooding of the Colorado River had washed away the original diversion structure taking Colorado River water to the Imperial Valley. Construction of a mainstem dam promised to control flood-related damage to valuable agricultural land along the river in Arizona and California. *Water and the West*, supra, at ***. Now, considerable other development exists along the river that demands flood control protection. These interests became quite vocal following the large releases from Hoover Dam in 1983 and 1984.

⁴⁵ Congress established WAPA (an agency of the U.S. Department of Energy) in 1977, giving it responsibility for the sale of electricity from Reclamation hydro facilities in the Colorado River Basin and other parts of the West. 42 U.S.C. Sections 7102 - 7152 (a).

⁴⁶ Section 7. The question whether power uses of power facilities located in the Aspinall Unit of the Colorado River Storage Project are incidental to certain in-state consumptive water uses is in litigation in Colorado. See *In Re Board of County Commissioners*, 891 P.2d 952 (Colo. 1995).

⁴⁷ Power from these dams will almost certainly increase in value when the region, now nearing the end of a 15-year surplus of power generating capacity, begins to construct new, higher cost capacity within five years.

⁴⁸ See "Background and Analysis of Apportioned Revenue, Colorado River Storage Project," Bureau of Reclamation, Upper Colorado Regional Office, 1994.

dams from which power is marketed by WAPA, including Colorado River Basin dams. The impetus for this legislation is purported savings to the federal Treasury. Ideological objectives—the feeling that the federal government need not be involved in power production and marketing—also play a role.

The Clinton bill prompted the introduction of other bills, primarily by various utility interests. All such legislation had been blocked at this writing, but is likely to resurface. Many believe that it is only a matter of time before at least some federal power facilities will be sold.

Navigation traditionally is regarded as a federal function but, while mentioned in the BCPA, is not significant in the Colorado River since there is very little commercial navigation along the river.⁴⁹

Water quality is not itself an economic use of water. It is regarded as important primarily because of the adverse effects that poor quality water has on many water uses.⁵⁰ Salinity is the dominant water quality concern in the Colorado River. It became an international concern in 1961 when the operation of an expansion of the Wellton-Mohawk Division of the Gila

Project in southwestern Arizona sharply increased the flow of highly saline water into the Colorado just above the border with Mexico, more than doubling the total dissolved solids in that water.⁵¹ Federal projects constructed with funds under the Colorado River Basin Salinity Control Act of 1974⁵² are reducing the loadings of salt in several locations in the Colorado River Basin.⁵³ The states (acting through the Forum) and the Bureau of Reclamation direct the salinity control program in the basin.⁵⁴

Recreational uses first gained legal recognition in the Colorado River Storage Project Act in 1956 in which Congress authorized the Secretary of the Interior to develop public recreational facilities in conjunction with new water storage projects as well as facilities to improve and protect fish and wildlife.⁵⁵ The 1965 Federal Water Project Recreation Act made outdoor recreation and fish and wildlife enhancement a planning purpose for all new federal water development.⁵⁶ In the 1968 Colorado River Basin Project Act, providing public outdoor recreation facilities and improving conditions for fish and wildlife were included as among the basic purposes for projects authorized to be constructed.⁵⁷ As discussed, above, in 1992 the Grand

⁴⁹ Article IV (a) of the 1922 Compact states that the Colorado River "has ceased to be navigable for commerce." Thus, it declares, "the use of its waters for purposes of navigation shall be subservient to the uses of such waters for domestic, agricultural, and power purposes." Nevertheless, as mentioned, the BCPA specifically states the improvement of navigation is one of the purposes of Hoover Dam.

⁵⁰ A 1988 study done for the Bureau of Reclamation estimated annual salinity damages in the basin between 1976 and 1985 to be \$311 million. Loretta C. Lohman et al., *Economic Impacts of Salinity of the Colorado River* (1988).

⁵¹ See Taylor O. Miller, Gary D. Weatherford, and John E. Thorson, *The Salty Colorado* (1986) at 24.

⁵² Public Law 93 - 320, as amended by Public Law 98 - 569 (1984) and Public Law 104-20 (1995).

⁵³ The Yuma Desalting Plant also was constructed under the authorization of this act.

⁵⁴ Since 1984 the Soil Conservation Service (now the Natural Resources Conservation Service) in the Department of Agriculture has been actively involved in on-farm programs intended to reduce salinity loadings to the river.

⁵⁵ Section 8, 43 U.S.C. Section 620 h.

⁵⁶ Public Law 89-72, 79 Stat. 213, Section 1, codified at 16 U.S.C. Section 4601-12.

⁵⁷ 43 U.S.C. Section 1501.

RAFTING
NOW

Canyon Protection. The required operation of Glen Canyon Dam to protect recreational, ecological, and cultural values in the Grand Canyon.

In general, recreational uses at Reclamation facilities and at other federally managed lands along the river are available without charge. Flat water boating and fishing on Lake Powell, Lake Mead, and the other federal reservoirs in the basin have become enormously popular. Rafting on the Colorado River is now the basis for a major commercial business.

Several clouds now dim the future of recreational uses in the basin. One is the very popularity of these uses. When a valuable good is provided free it is certain to be used. At some point this use can begin to diminish the quality of the good. This is the familiar tragedy of the commons. There is evidence of this problem in the basin: crowded reservoirs, jetski/boating accidents, congested whitewater rafting segments, riparian areas trampled by campers and anglers.

The issues raised by these economic, non-consumptive uses are many. They include competition among these uses, and competition with continually increasing demands for consumptive uses, some of which are of relatively low value. Finally, they include how all uses might be affected by defederalization of the power facilities. At present these uses are managed almost totally by the federal government. Annual reservoir operations are managed in large part to provide for these uses (or their benefits) within the constraints imposed by meeting

consumptive use commitments. As mentioned, the states are actively involved in developing the annual operating plan for the river, but they are concerned first and foremost with ensuring that consumptive use demands are met.

3. "Public good" uses

The ecological needs of the Colorado River have only recently gained legal protection within the Law of the River. Traditionally, instream management of the river focused on its value for sport fishing. Large numbers of nonnative fish species have been introduced to the basin. Efforts were made to eliminate native fish species regarded as undesirable. Changes in the hydrologic regime resulting from the construction and operation of dams along the river enhanced the river's habitat qualities for nonnatives and diminished the quality of the habitat for native fish species.

Fourteen native species have been identified in the basin. Four of these species are listed for protection under the Endangered Species Act, and 3 more are candidates for listing.⁵⁸ In 1987, a Recovery Implementation Plan (RIP) for the Upper Colorado River Basin was cooperatively developed by the Upper Division states of Colorado, Utah, and Wyoming, the FWS and the Bureau of Reclamation, and water users and environmentalists. As amplified in 1993 the RIP combines measures to protect and improve instream flows, to restore habitat areas, and to reduce adverse effects of nonnative fish species, among other things.⁵⁹ Activities under the RIP planned through 2003, when the plan expires, are estimated to require roughly \$100

million.⁶⁰ The objective of the RIP is to recover the listed species while allowing full development of the water apportioned to the Upper Basin for consumptive use.

In 1994, FWS promulgated regulations designating 1,980 miles of the Colorado River and its tributaries as critical habitat for the four native fish.⁶¹ Much of the mainstem Colorado River and some of the tributaries in the Lower and Upper Basins were included as critical habitat. At present, the only naturally reproducing listed species in the Lower Basin is a population of humpback chubs found in the Little Colorado River near its confluence with the mainstem.⁶² FWS and the Lower Division states are early in the process of developing a multi-species conservation program in the Lower Basin. There also are emerging concerns about fish and wildlife values in the Colorado River delta and the Gulf of California in Mexico.⁶³

The water-related needs of Colorado River endangered fish are not well understood. It is clear that the native fish species evolved in river conditions considerably different than those existing today:⁶⁴

The Colorado River has changed dramatically since the turn of the century. More than 20 dams have been constructed on the mainstem and tributaries since 1913. Declines of native fishes directly downstream from reservoirs are clearly related to colder water temperatures.... Other, more subtle factors include changes in stream nutrients, altered seasonal and daily discharge patterns, and lowered turbidity. Nutrients that once occurred in the rivers now are retained in the phytoplankton and zooplankton populations of reservoirs. Water from the hypolimnetic layer of deep reservoirs carries far less dissolved materials and fine particulates to fertilize

⁶⁰ Memorandum from John Hamill to Ad Hoc Committee on Funding Legislation, Dec. 2, 1994. It is not clear where money to support this program will come from. The U.S. Bureau of Reclamation, heretofore responsible for roughly 50% of RIP costs, has said it may cut its contribution by half after 1995. Other contributors have included the three states (roughly 25%) and FWS (roughly 25%). Water users also make a one-time payment, called a "depletion charge." Water users are not required to make water available to the RIP, but the RIP does attempt to work out voluntary arrangements with operators of new projects for release of water for fish recovery. One such arrangement is in place (on a temporary basis) for the Muddy Creek Project in Colorado. The following table, provided by the Wyoming State Engineer's Office based on information provided by FWS shows expected depletions from proposed new projects addressed through Section 7 consultation between 1988 and 1995.

State	Historic Depletions (acre-feet)	New (post88) Depletions (acre-feet)	Total Depletions (acre-feet)	Funds Contribute (dollars)
Colorado	12,803	41,984	54,787	210,232
Utah	18	140,614	140,631	336,149
Wyoming	3,316	5,082	8,398	30,141
Regional		3,000	3,000	
Totals	16,137	190,680	206,817	\$584,522

⁶¹ Fed. Reg., 13374-13400 (March 21, 1994).

⁶² Richard S. Wydoski & John Hamill, "Evolution of a Cooperative Recovery Program for Endangered Fish in the Upper Colorado River Basin," in *Battle Against Extinction, Native Fish Management in the American West* at 124 - 25 (1991).

⁶³ For a glimpse of one of these issues see Frank S. Wilson, "A Fish Out of Water: A Proposal for International Instream Flow Rights in the Lower Colorado River," 5 *Colo. J. Int'l L. & Pol'y* 249 (1994).

⁶⁴ Colorado River Fishes Recovery Team, *Colorado Squawfish Revised Recovery Plan*, August 6, 1991, pp. 14-17.

downstream reaches. Sediments are trapped by reservoirs so that downstream channel bottoms transform from sand to armored cobble and boulder. Channelization below dams has reduced the number and size of backwaters and sloughs that are sought after by Colorado squawfish and other native fishes for nursery and resting areas. The natural cycle of flood and drought is replaced by stable discharges and water levels; seasonal fluctuations are replaced by variable demands for irrigation water or hydroelectric power.⁶⁵

The U.S. Fish and Wildlife Service generally assumes that more efforts must be made to operate the river in a manner that attempts to mimic the pre-development system — that is, a river with high peak flows in the springtime and adequate flows in key habitat areas in the summer and fall.⁶⁶ In addition to water, recovery of native fish species depends on reducing predation and competition by nonnative fish species.

The ecological uses of the Colorado River are now recognized to be an important and valuable function of its water. Yet neither the RIP nor its funding is secured. Moreover, fish are not the only valuable ecological uses of the River. The cumulative effect of dams and consumptive water use on the basin's ecosystem is surely poorly understood. Yet there is

limited attention paid to these matters. The commitment of resources necessary to gain a better sense of the ecological needs of this river system is limited; even this amount of funding is resisted by some. The long-term commitment to restoration is even more problematic.

Another important public good value associated with Colorado River water is the expected value for future economic development and maintenance of quality of life inherent in the unused shares of state compact apportionments.⁶⁷ The states with unused apportionment water jealously guard their future right to use this water. In a very real sense the states are acting to preserve a public good value for their citizens represented by this as yet unused water. As mentioned, however, the states tend to understand this value only in terms of consumptive use of the water.

Still another public good use of water is the community and cultural values associated with water consumption, especially in irrigated agriculture. Viewed in this way, the full value to society of agricultural water use is not limited to its production of cash crops but includes the value of maintaining communities centered on irrigated agriculture.⁶⁸ There is some irony in the opposition of ranchers and farmers to use of water to meet growing public good, non-consumptive uses of river

water since the community value of water used for irrigation is, in type, the same as ecological uses of water — that is, neither is valued through the market. The difference between these two uses, however, is that the LOR has traditionally promoted agricultural water use (as a consumptive use), to which community values are attached, whereas the LOR places much less value on ecological uses of the river's water.

4. Tribal water uses

The 1922 and 1948 compacts deferred the question of the rights of tribes living on reservations in the Colorado River Basin to use the water of the Colorado River and its tributaries. Not until 1963 were the rights of the tribes living along the mainstream of the Lower Colorado River directly addressed. As mentioned, the U.S. Supreme Court explicitly held that water rights were impliedly reserved along with the reservation of lands as permanent homelands for tribes.⁶⁹ In its 1964 Decree the Court characterized these Indian reserved rights as "present perfected rights."⁷⁰ For the most part the reserved rights of the tribes with reservations along the mainstream have now been quantified and settlements have been reached with some of the other tribes residing within the basin.⁷¹ Tribal claims to main-

stream water in the Lower Basin are to be valued out of the apportionment of the state in which the reservation is located.⁷²

There are 32 Indian reservations either totally or partially located within the Colorado River Basin.⁷³ These reservations encompass approximately 30 million acres of land, with an Indian population of about 220,000.⁷⁴ The already quantified water rights associated with these reservations total about 2.4 million acre-feet of water.⁷⁵ Roughly a quarter of this amount is being diverted for use on reservations in the Lower Basin. There are additional claims outstanding, and some tribes have not yet sought quantification of their rights.

The principal issue associated with tribal water rights that have been established and quantified is the use of the water to which the tribes are entitled under the rights. In particular, the question is whether this water may only be used on-reservation or whether it may be leased for use off-reservation. Does off-reservation use only apply to water that has been historically diverted and used on-reservation; or does off-reservation use apply also to water to which tribes are entitled but which they have not yet diverted and used on-reservation?

⁶⁵ Water marketing is viewed by many as posing a threat to the continuing viability of irrigated agriculture in some places. We share this general concern but believe there are an increasing set of options for facilitating voluntary transfers of water in a manner that are protective of, and could even strengthen, viable irrigated agricultural communities. See Lawrence J. MacDonnell and Teresa A. Rice, "Moving Agricultural Water to Cities: The Search for Smarter Approaches," 2 *Hastings West-Northwest J. Env'tl L. and Policy* 27 (1994); Lawrence J. MacDonnell, "Water Banks: Unlocking the Gordian Knot of Western Water," 41 *Rocky Mt. Min. L. Inst.* 22-1 (1995).

⁶⁹ *Arizona v. California*, 373 U.S. 546, 599-600 (1963).

⁷⁰ See discussion accompanying notes — *supra*.

⁷¹ See "Colorado River Basin," *supra* at 30-36.

⁷² *Arizona v. California*, 373 U.S. 546, 601 (1963).

⁷³ "Colorado River Basin," *supra*, at Table 4, pp. 27 - 28.

⁷⁴ *Id.* at 24 - 25.

⁷⁵ *Id.*, tables 5, 6 & 7.

⁶⁵ *Id.* at 15.

⁶⁶ At Flaming Gorge Reservoir on the Green River, this objective has meant larger springtime releases than would have otherwise occurred. For the 15-Mile Reach in the Grand Valley of Colorado it has meant searching for sources of water that can be provided to this segment of the river during the summer months when local irrigation uses divert much of the Colorado's flow. In the Yampa River it has meant a concerted effort to limit the construction of additional water storage and diversion facilities to preserve this highly valuable and largely undisturbed fish habitat.

⁶⁷ From a state's perspective, there may even be a "public good" aspect to water that is already in beneficial consumptive use within a state. The economic and social benefits of this water are enjoyed within the state. Thus, for example, when proposals are made to allow out-of-state leases or sales of Colorado River water they are uniformly resisted by the state from which the water would come. The compact apportionment is a kind of patrimony, in this view, to be enjoyed only by the citizens to whom this patrimony is directly apportioned.

The ultimate answers to these questions have huge implications, both for tribes in the basin as well as for uses now benefiting from the availability of undiverted tribal water. For the tribes the legal recognition of reserved water rights is based on a determination that the availability of water is essential to the viability of permanent habitation of reservation lands. In *Arizona v. California* the U.S. Supreme Court measured the necessary quantity of water in terms of "practically irrigable acreage" — the amount of water that would be needed to irrigate all lands on the reservation suitable for irrigation.⁷⁶

There is little likelihood that the tribes will be able to use anything like this amount of water on their reservations. Few reservations were beneficiaries of the many Reclamation projects built in the basin to store and deliver water for irrigation uses. Now irrigated agriculture is stabilizing or declining in many parts of the West, with little indication of additional future demand for this use of water except on lands capable of growing high value crops.⁷⁷ Reservation lands rarely contain such areas.

At the same time tribal claims to an already overallocated resource are substantial. Any new consumptive uses of presently "unused" tribal water would come at some loss of other values. Yet it hardly seems fair to expect the tribes to forego the economic benefits potentially associated with controlling the use of this water.

No easy resolution of this problem is apparent. It is clear that the tribes hold legal rights entitling their use

on-reservation of far more water than they are presently diverting and using. It is also clear that this is a valuable asset that the tribes intend to benefit from. Recent discussions in the Lower Basin concerning interstate marketing of Colorado River water have included some consideration of tribal water.⁷⁸ There can be no long-term understanding of uses of the Colorado River without clarification or resolution of this issue.

5. Comparing the value of Colorado River water uses

Implicit in the LOR is the assumption that consumptive uses are the most valuable uses of Colorado River water. Water is specifically allocated for this purpose, and contract and property rights apply to protect these uses. Hydroelectric uses, by comparison, are treated primarily as a means of paying the costs of the facilities needed to make consumptive uses possible. Recreation and ecological values now figure into river operation decisions but are subordinate to providing water for consumptive uses. Indeed, ecological uses of the river's water are viewed largely in terms of constraining economic uses. At this point, it is hydroelectric uses that are most likely to be adjusted to accommodate other values.

Yet this view of the relative economic values of Colorado River water does not match well with available information providing actual or estimated values for different water uses. Perhaps the best existing source of information regarding the dollar value of different water uses is provided by a recent report from Resources for the Future entitled *Economic Value of Freshwater in the United States*.⁷⁹ This exhaustive

analysis examined nearly 500 water value estimates for four withdrawal uses (domestic, irrigation, industrial processing, and thermoelectric power generation) and four instream uses (hydropower, recreation/fish & wildlife habitat, navigation, and waste disposal) in all the major river basins in the country. Included are estimates obtained for these uses in the Upper Colorado River and the Lower Colorado River. The RFF researchers found average water values for all uses in the Upper Colorado to be \$32 per acre-foot, compared to \$122 per acre-foot in the Lower Colorado.⁸⁰ Average values for particular classifications of water use are shown for the two basins in the following table:

The authors of the report caution against placing too much confidence in the specific values found in their studies and point out the wide variance in approaches taken to obtaining the estimates. Nevertheless, this report contains the most complete effort to date to gather together the extensive work that has been done in placing dollar values on water uses in different locations. Moreover, the average values of the various uses are at least useful in providing a measure of relative worth and perhaps in providing some kind of sense of the magnitude of the respective values.

This report suggests that irrigation uses are the lowest value use of Colorado River water in the Upper Basin

(except for waste disposal). By comparison, it suggests that irrigation is a relatively high value use in the Lower Basin, higher in value per acre-foot, for example, than hydropower. Estimated values for recreation/fish and wildlife habitat in both basins are surprisingly high.

We turn next to a discussion of the central policy choices now reflected in the LOR.

II. CORE FEATURES OF EXISTING BASIN GOVERNANCE AND THE BEHAVIOR THEY ENCOURAGE

In this part of the paper, drawing on Part I, we describe what we believe to be the core features of existing Colorado River governance, in particular the LOR, as well as the behavior which they encourage.

A. CORE FEATURES OF LAW OF EXISTING BASIN GOVERNANCE

1. The Law of the River favors consumptive uses

Notwithstanding the overlay of environmental legislation and the importance of power generation at river facilities, in our view the LOR still favors consumptive uses of water over non-consumptive uses. First, the 1922 Compact establishes "beneficial consumptive use"

Water use classification	Upper Colorado (average value in \$/AF)	Lower Colorado (average value in \$/AF)
waste disposal	0	0
recreation/ fish & wildlife habitat	51	597
hydropower	21	35
irrigation	5	88

⁸⁰ *Id.* at table 3.3, p. 13.

⁷⁶ 373 U.S. 546, 600 (1963).

⁷⁷ National Research Council, *The Future of Irrigation* (forthcoming 1996).

⁷⁸ "New Options," *supra* at ***.

⁷⁹ Kenneth Frederick, Tim VandenBerg, & Jean Hanson, *Final Report*, October 1995.

as the only basis on which river water is apportioned to the states.⁴¹ Indeed, the Compact apportions to the states the consumptive use of more than the apparent average annual flow of the river to consumptive uses.

Second, the large projects on the river's mainstem were built primarily to store water for consumptive uses. The statutes authorizing the construction and use of these federal projects provide for additional purposes, but river operating plans are designed, first, to meet consumptive uses and, then, non-consumptive uses.⁴²

Third, power revenues subsidize the cost of water delivered from federal facilities for consumptive use. Fourth, measures to protect environmental values are designed primarily to protect existing and even future consumptive uses. Thus, the one-half billion dollar Yuma desalination plant was built to enable continued consumptive uses by irrigated agriculture. And state commitment to the Upper Basin Recovery Implementation Program is premised on allowing Upper Basin states to develop their compact apportionments for additional consumptive uses.

2. The evolution of the LOR makes federal agencies, particularly the Bureau of Reclamation, primarily responsible for non-consumptive uses and the states for consumptive uses.

At the time of the 1922 Compact, it is not surprising that the states saw their primary interest in maximizing withdrawals from the river for consumptive uses in support of irrigated agriculture and other activities

⁴¹ We note that a decision to apportion river water on the basis of consumptive use is perhaps not very surprising, given the time—1922—in which the choice was made. All of the states would have understood their economic well being to be directly tied to their ability to put this water to consumptive use, primarily for agriculture. Likely this explains the small quantity of water apportioned to Nevada. There simply was little arable land in that part of Nevada with access to the river.

⁴² In part, the management of the river to favor consumptive uses derives from the fact that consumptive uses of river water are protected and bolstered by property rights whereas certain non-consumptive uses often are not.

providing an economic base for state development. And for the next three to four decades, federal water policy was highly supportive of the states' desire to put river water to consumptive use: Most of the major federal reclamation projects were built during this time. The basic bargain struck between the states and the federal government was that the states got the consumptive use of the water and the federal government got the revenues from power generation at these projects. It was an arrangement that worked reasonably well for 30 years.

Beginning in the 1950s and 1960s, other uses of Colorado River basin water emerged in importance and began to be reflected in federal facility operations and plans. Recreational uses of reservoirs and the river itself drew increasing numbers of people around which local economies developed. The radical transformation of the river caused by the existence of the large dams proved disastrous to native fish species, prompting the listing of the Colorado squawfish as an endangered species in the late 1960s. Integration of these values into basin facility operation occurred through federal law such as the Federal Water Project Recreation Act and the Endangered Species Act.

The states generally supported the increased federal support of recreational uses of Reclamation since the associated costs were borne totally by federal government while many of the benefits accrued to local businesses and state residents. So long as deliveries of water for off-stream use were not affected, the states supported

federal efforts to maintain reservoir storage at levels suitable for recreation during the summer.

Protection of native fish was another matter. Initially, the states saw little benefit in preserving species with limited sport-fishing value, species that they had attempted to eradicate with rotenone not many years before. When the U.S. Fish and Wildlife Service began issuing "jeopardy" opinions under Section 7 of the Endangered Species Act blocking the issuance of federal permits needed for construction of water development projects in the Upper Basin in the 1970s the worst fears of the states were realized: protecting native fish apparently meant foregoing new consumptive uses of water.

In fact, the RIP in the Upper Basin has managed to avoid this result. As described, recovery activities are being cooperatively implemented in a manner that allows additional water development to occur. But the antagonism engendered between the states and a federal government now viewed as favoring management of water in the basin to protect fish rather than to meet consumptive uses remains today.

3. Ecological values are only beginning to be integrated into basin water management decisions.

Both those who live in the basin and those who visit its many unique attractions expect and want fishable, swimmable, and boatable rivers and reservoirs. And as the native values of these systems are better understood, many want those systems to function in a manner that supports their native plant and animal species. In this regard, rivers are viewed as resources in their own right and not just as sources of water to be applied to economic uses.

There are now programs and policies in place in the basin to protect these values. Yet they are incomplete and their sustained support is far from assured. For example, a program for protection of endangered species is only now under development in the Lower Basin. The Upper Basin RIP is narrowly focused on preventing the extinction of four species of fish. Virtually no attention is given to how additional listings of endangered species might be avoided. Nor does it investigate or provide the means to address the cumulative impact of the dams and consumptive water uses on the ecosystem in general. Moreover, the Recovery Implementation Program in the Upper Basin expires in eight years. The federal revenue contribution on which program operation depends in part is in doubt each year as Congress and the administration try to balance the federal budget.

Part of the problem we discuss here stems from the "public good" nature of ecological values. That is, these values are held by most people, but they are not purchasable by individuals. Their protection has been required by cumbersome regulatory mechanisms that widely criticized by consumptive water users in the basin and only grudgingly tolerated by the states.

4. Even while it subsidizes and supports other river uses, the production of hydroelectricity at basin facilities is viewed as the most easily adjustable use.

Revenues from hydropower production have been used for decades to subsidize irrigation and other water uses in the basins and, in recent years, to cover a portion of the expenses of the salinity control program and the Upper Basin Recovery Implementation plan. However, the production of hydropower at basin facilities is a kind of "swing" use, vulnerable to adjustment to enable additional consumptive and recreational uses.

Looking ahead, hydropower generation at basin facilities is also vulnerable to the proposal to "defederalize" the hydroelectric production and transmission facilities at federal dams. Issues raised by this proposal include: Would non-federal owners be responsible for the payment of project irrigation costs? How much control over the operation of the facilities might pass to new non-federal owners? Does defederalization present opportunities to improve facility operations or to raise revenues to meet "public good" or other needs? These issues are being debated as Congress contemplates defederalization, potentially a major step in the evolution of the LOR.

5. The basin relies largely on federal funding to meet its needs.

The basin has relied heavily on federal funding to meet its needs and continues to do so today. Thus, the federal government funded construction of the mainstem dams and facilities associated with them. Maintenance of these facilities is funded through annual appropriations by Congress. Most of the revenues available to help recover endangered fish in the Upper Basin is provided by Congress. Power revenues, by and large, are returned to the federal Treasury to cover power and irrigation costs. Even the revolving funds created in the basin under CRSP legislation may not be spent without congressional appropriation.⁸³ In short, the basin is without its own source of funding to meet needs.

6. Use of Colorado River water is subject to decades of laws that enunciate contrasting policies and do not resolve some significant issues.

The LOR is an amalgam of statutes, court decisions

and treaties that address different problems and enunciate contrasting policies. For example, on the one hand the 1922 Compact establishes "beneficial consumptive use" as the basis of state apportionments of what has turned out to be more than the average annual flow of the river. And project authorization legislation provided for the construction of more than 20 dams on the mainstem and its tributaries to facilitate consumption of river water and meet other needs. On the other hand, the Endangered Species Act seeks to protect fish species that appear to need water flowing in the river in a way that mimics pre-dam, natural conditions.

Other examples of contrasting policies occurring within the LOR include: tribal water rights and uses vs. non-tribal uses and recovery of fish species; the use of the dams for power production vs. various forms of recreation; and the use of dams to store water to protect against floods vs. consumptive uses. To a remarkable degree, so far there has been accommodation between the different policies and objectives of the LOR. However, as competition for the river's limited supply of water increases, accommodation may prove increasingly difficult.

Another aspect of the LOR is that it does not provide an answer to some significant issues, among them whether unquantified tribal water rights may be marketed off-reservation; how, if at all, water contained in one state's apportionment of river water might be marketed for use in another state; and how ecological uses might be integrated with other uses. These are major issues that are unresolved in many places in the West, not solely in the Colorado River. It is likely that, as competition for the river's water increases, however, the

value of trying to resolve these issues in the Colorado will also increase.

B. BEHAVIOR ENCOURAGED BY CORE FEATURES

In this section we characterize the behavior that is encouraged by the core features just described.

1. The management "divide".

The evolution of the LOR has encouraged the formation of a management and political "divide," on one side of which the states strive to protect state consumptive use apportionments while federal agencies take primary responsibility for power, environmental, flood control and other non-consumptive uses. For the most part these roles have been compatible and accommodation of interests has been achieved. In an era of increasing competition among all uses of the basin's water this separation of primary interests may not be tenable.

2. The focus on state consumptive use apportionments.

The primary focus of planning and management within the basin remains the ability of basin states to put the entirety of their compact apportionments to consumptive use and to otherwise meet consumptive uses whenever and wherever they arise. Yet, the value of non-consumptive flow uses of the river is increasing relative to many consumptive uses at the same time that continually increasing consumptive uses virtually assure that less and less water will be maintained in the stream as time passes.⁸⁴ The basin states and their citizens do in fact benefit substantially from the water in the stream that is used for power, recreational or ecological values. Basin governance, however, does not

now cause the states to give equal consideration to all values of the basin's water.

3. Avoiding the creation of internal basin funds.

Federal funding supported perhaps the most intensive development of water for economic uses anywhere in the U.S. The availability of this funding has made it possible for the basin to avoid developing its own source of funds. However, the era of substantial federal funding to meet water-related needs in the basin is over. Yet there are ongoing needs for funding. For example, money is needed to recover endangered species on a sustained basis, to learn about and protect other ecological values, to increase the energy output of power turbines without harming fish and recreational uses, to maintain the federal facilities in the river and, perhaps, to build more storage facilities. How will these needs be funded?

4. Absence of integrated planning and management.

The enunciation of contrasting policies and management roles throughout the development of the LOR has permitted the implementation of measures focused on one type of river use without addressing their effect on other uses. Thus, the impact of more consumptive uses on power production and revenues, on ecological values or recreation is not fully considered. The effect of state consumptive uses or steps that might be taken to protect endangered species in the Lower basin on tribal water rights is not addressed. Congress and the administration consider proposals to defederalize hydropower facilities in the basin with little regard yet for their effect on agricultural water use, fish protection

⁸³ These revolving funds are directed primarily towards providing assistance to agricultural water needs when other uses have needs, too. In any event, the revolving funds generate far less money than could be spent within the basin to meet the entire array of needs.

⁸⁴ The relative value of power production at the Glen Canyon Dam may be decreasing temporarily as the Dam is re-operated away from primarily meeting peak loads in order to provide stability to flows below the Dam. In addition, the cost of power in the region is generally at an all-time low due to the surplus of generating capacity to meet loads. However, as the region completes the absorption of this surplus, the value of all existing capacity in the region will increase.

or recreational uses. In short, the basin's planning and management is not internally integrated.

The fragmented structure of governance also has led to less attention to comprehensive planning in the basin than may likely be justified by the increasing competition of uses. For example, what steps might the states and federal government take together to prevent damage to non-consumptive uses in the event of a prolonged drought? We do not think the basin knows the answer to this question.

III. MODERNIZING COLORADO RIVER GOVERNANCE: PRINCIPLES AND NEW INSTITUTIONS FOR CONSIDERATION

The Law of the River has formed and evolved slowly but continuously since 1922. It has evolved largely in response to perceived opportunities, such as Delph Carpenter's shrewd insight that a negotiated compact would better serve the interests of the basin states than litigation, and recognition that federal funding and technical support could be used to make the economic benefits of the basin's water available to users. It has also responded to crisis, as when Arizona filed suit against California in the early 1950s because California users were about to exceed their 4.4 million acre-foot consumptive use apportionment.

The situation today is somewhere between crisis and opportunity. That is, the basin has many problems that could ripen into crises if nothing is done about them. Thus, users in southern Nevada press for an increased share of the Colorado River, consumptive uses in the Lower Basin push up against the 7.5 million acre-foot apportionment, recovery of endangered fish may place limits on additional consumptive uses, hydroelectric

facilities may be defederalized, and the basin has no secure internal source of funds to meet needs.

On the other hand, these problems are opportunities as much as they are potential crises. If the basin responds to them by embracing change where it is warranted, there is reason to think that increasing competition to meet diverse needs for water can be met without crisis. Indeed, careful policy changes can significantly improve the status quo.

In our view, to implement new policies and reap the opportunity inherent in today's problems will take new institutions, including a trust with funds dedicated to protecting and enhancing ecological values, a water bank to facilitate the trading of water, and a new governance mechanism established under the federal/interstate compact. We begin by outlining six principles that guide our thinking in the development of new institutions for basin governance.

A. PRINCIPLES TO MODERNIZE BASIN GOVERNANCE

1. *All beneficial uses of the waters of the Colorado River Basin, consumptive and non-consumptive, should be equitably considered in future allocation decisions.*

In a setting like the Colorado River Basin where so many interests vie for a fixed supply of water, the legal structure should not preclude or limit consideration of any possible valuable use of water. Human perceptions of the value of different water uses change over time. The potential uses of water should be able to keep pace with these changing values. The assumption in 1922 that the states would only be interested in the basin's water for consumptive use no longer holds true. The Law of the River should be changed to reflect this reality.

2. *The basin's undeveloped water should be recognized as already serving valuable water uses.*

There is no such thing as unused or surplus water in the Colorado River Basin. All of the water in the basin is used in some important manner, in fact serves multiple uses. Thus, unused compact apportionments support electric power, recreational and ecological values. Water to which the tribes may be legally entitled is already in use supporting consumptive and non-consumptive uses. In such a situation every allocation decision has implications for other existing valuable uses, whether or not these uses hold specific legal protection. Additional water within the basin can and will be developed. The fiction, however, that such water can be developed and used without impairing other valuable uses — or that there is unapportioned water in the basin — or that those with established legal rights to develop and use water are free to do so without regard for the effects of those uses — simply cannot continue.

3. *Economic uses of water in the basin, especially power use, should be chiefly responsible for protecting ecological public good uses of the basin's water.*

The remarkable structural development that has occurred in the Colorado River Basin and the valuable economic uses of this water that this development

makes possible impose substantial burdens on the ecological uses of the basin's water. By and large, private investment cannot be depended on to protect these uses because they are public goods on which it is difficult to earn a return. As a result, other sources of funding and protection must be found.

To date, the region has relied primarily on federal funding and river management to restore and protect these values. In our view, reliance on federal funding is now misplaced as federal budgets shrink. As a result, we believe that the region must shoulder the lion's share of the financial burden to protect these values. Doing so would be equitable. After all it is basin economic uses that impair ecological values, now widely supported in the basin even if their protection was first a result of national legislation. Put another way, economic water users share in the benefits of these facilities, and — we believe — equitably should share in the costs of making them compatible with the ecological needs of the river.⁸⁵

Small fees can be assessed on economic uses, especially power use, to defray the cost of mitigation and future protection of public good uses.⁸⁶ Changes can be made in the manner in which projects are operated, in which water is delivered, and in which water is used. What is needed is a commitment to search for such

⁸⁵ Some may view the protection of ecological values as incompatible with economic uses of the river. We reject this view. We believe that human activities are by no means incompatible with functioning ecological systems. We are bolstered in our view by the considerable progress that is being made in the context of Bureau of Reclamation facilities around the West in altering the operation of these facilities and modifying some of the water uses they provide in a manner that provides increased ecological benefits without taking away traditional economic benefits. See "Ecosystem Benefits," *supra*.

⁸⁶ At first glance, equity suggests that all economic uses of the river that depend on basin facilities or which deplete the river should contribute proportionately to the restoration and protection of ecological values. However, other considerations suggest that fees assessed to pay for ecological values might best be assessed primarily on power use. Assessing power would spread the cost of protecting these values to people who, while they live outside the basin, are among those who not only benefit from economic uses of river water but who also support ecological values. In addition, raising money for ecological values by an assessment on power, already in place to a limited degree in the Upper Basin, would spread the cost of protecting such values so that few electric customers would notice the difference in their electric bills. We note that transfer of ownership of basin hydropower facilities may open up opportunities to establish a fee on power.

opportunities and to obtain the funds necessary to take advantage of them.

4. More use of markets should be used to allocate uses of water.

As competition for river water increases, there is a larger role for markets. Markets would enable the voluntary reallocation of a portion of the basin's water resources in a way that can work not only for those involved in the market transaction but also for other interests, including non-consumptive uses. There are a number of important issues raised generally when market mechanisms are used to transfer water, but these issues are now much better understood than 10 years ago and creative approaches are emerging to address some of the more troublesome concerns.⁸⁷ In this regard, water banking has received attention in the Lower Basin and offers considerable promise as a mechanism by which to effectively manage transfers of Colorado River water.⁸⁸

Marketing of Colorado River water on an interstate basis, of course, does raise special concerns. For example, an argument can be made that an individual holding the right to use Colorado River water should be able to market his right, or some portion of it, to users in other states. For one thing, the water might be put to a "higher value" use, creating more value, releasing competitive pressures and, maybe, raising money for a state or local area as a result of fees on the market transaction. On the other hand, very likely the water marketed would be taken out of agricultural use. As discussed in Part I, agricultural water use carries with it its own set of community, public good values. In addition, like other consumptive uses, agricultural uses support

tax bases and secondary economic activity. It is not surprising that there is opposition to the interstate marketing of water already put to consumptive use. One place to begin agricultural water marketing generally is with water that can be conserved from existing consumptive uses, as is already well underway in southern California.

The marketing of unused state apportionments raises other issues. It can be argued that, if a state could make available, perhaps by lease, a portion of its "unused" compact apportionment for money for some period of time to another state or user in another state, it could generate money to meet other needs. As it is, under the LOR states with "unused" apportionments must watch the water be put to beneficial consumptive use in other states without making a penny from it. On the other hand, the notion of a state making money off of water that is not put to beneficial use within its borders is contrary to the 1922 Compact and western water law in general. In any event, is it reasonable to expect that someone having paid for water over a period of time will relinquish its use when development within the state that leased the water wants it back? In addition, since "unused" state apportionment water is already supporting valuable uses, as we point out above, how should the impact on these uses be accounted for in a market transaction?

We think that the marketing of both types of water—developed and "unused"—has significant potential to meet competitive pressures, raise revenues for the states to use within the basin and help meet non-consumptive use needs. Nonetheless, we respect the complexity of the issues raised. They deserve attention by all river basin stakeholders.

⁸⁷ See Lawrence J. MacDonnell & Teresa A. Rice, "Moving Agricultural Water to Cities: The Search for Smarter Approaches," 2 *Hastings West-Northwest J. Env'l L. & Pol'y* 27 (1994).

⁸⁸ See "New Options," *supra*.

5. River basin stakeholders—the states, tribes, federal agencies, irrigators, cities, industry, environmentalists and others—should plan for the gradual and orderly transfer of services provided by the federal government to the region.

Perhaps our most significant principle for consideration is that the region needs to prepare to manage the river, raise its own funds to meet incremental needs and resolve issues with decreasing support and involvement from Washington, D.C. In large part, the propriety of assuming greater responsibility stems from the almost certain reduction in funds to meet the basin's needs available from Washington.

But there are other benefits from carrying more of the load here. One is an opportunity to eliminate the "divide" between what federal agencies do and what states do in the basin, thereby encouraging integrated management and more coordination in facing and resolving future issues. Another is the benefit of face-to-face interchange among stakeholders within the basin, in lieu of each interest running to its favored state or federal agency or subcommittee of Congress to obtain benefits that too often harm interests that do not happen to be "in the room" when a deal is cut.

6. Transfer of federal functions to the region should depend on the willingness of all basin stakeholders to work together to meet incremental water use needs as well as to try to resolve problems before they become crises.

Having advocated an orderly transfer of river basin governance responsibilities to the region, we believe, however, that Congress and the federal government should not approve such transfers unless the region shows that it is up to the task. Such a showing would depend on the development of principles for basin gov-

ernance—no surprise, we favor our Principles 1-4—as well as institutions to implement these principles in a manner that is inclusive, allowing all stakeholders a voice in the development of policy. As discussed, below, we believe that the basis on which Congress should approve a transfer of authority is a federal interstate compact negotiated within the region and carried to Washington, D.C. for approval.

B. NEW BASIN INSTITUTIONS FOR CONSIDERATION

1. A trust or trusts with funding to restore and protect ecological values.

As discussed above, public good uses cannot depend on the federal government or private investors for their protection. Funding is needed so that these uses can provide for their own protection. We have argued above that all economic uses of the river should provide support for this purpose. In particular, we propose the imposition of a fee on such uses, especially power, that would be administered by a trust or trusts whose board would include representatives of all affected stakeholders. We say "trust or trusts" because we are not sure whether a basinwide trust or two trusts, once in each basin is best.

Among the activities that a trust or trusts might perform are:

1. The design of a fee that would be equitable and practicable and pursuit of the authority to implement the fee;
2. Development of a long-range plan to:
 - a. Recover listed endangered species;
 - b. Prevent the listing of additional species;
 - c. Develop information on other ecological values beyond threatened or endangered species;

d. Develop a plan to protect ecological values.

3. In developing the long-range plan:

- a. Collect and interpret scientific evidence;
- b. Take input from all affected stakeholders; and
- c. Make sure the plan is developed in the context of a larger plan or overall policy that treats all beneficial uses equitably.

4. Contract with the agencies implementing or, over time, absorb the Upper Basin Recovery Implementation Plan

5. Use monies raised through the fee as well as contributions, including federal contributions, if any, to:

- a. Acquire water for fish flow purposes;
- b. Provide for the construction and operation of facilities, like fish ladders and backwaters, important to recovery and protection of native fish species;
- c. Work with the operator of the dams on the river to provide for project operation that is sensitive to ecological values.

6. Figure out how to make more water available for ecological uses while being mindful of the fact that, especially in the Upper Basin, water for consumptive uses is used pursuant to water rights that are private property.

We like the institution of a trust with a carefully worded charter and a broadly representative board of

trustees as the vehicle to spend money raised from power and other basin economic uses for public good purposes. Trusts have proven effective in building confidence behind actions, for example land conservation easements, that are designed to protect amenities that are not provided in the marketplace.

2. Water Banks to Facilitate Marketing

One of the tasks before the basin is the ongoing need for reallocation of already developed and used water to new and changing uses. We have suggested that water markets are perhaps the most effective means by which such transfers of water between uses can occur. In particular, we support the use of water banks as a mechanism through which market transfers occur.⁸⁹

In our view, most new consumptive water uses in the Lower Basin as well as new consumptive uses in the Upper Basin can be met through transfers of water already diverted and used. Moreover, except perhaps for Nevada, these new consumptive uses can be met by transfers *within* the state. We recommend that each basin state establish a water bank for the purpose of managing reallocation of Colorado River System water within that state. Transfers through the bank could include Colorado River System water already diverted and used as well as unused entitlements to the consumptive use of Colorado River System water. Transfers could be permanent or they could be managed on a short-term basis. The states would each manage their bank under rules and procedures determined to be satisfactory to existing Colorado River System water users and other interests within that state.

Interstate transfers of Colorado River System water

raise more difficult problems. In the long term we believe that consumptive use shares of Colorado River System water will be widely transferable anywhere within the basin. We do not favor such a fully open market approach at this point. Instead we believe that there is a need for clarification of fundamental questions about apportionment of water and governance of water uses that must be addressed first. We take up these matters in the following section.

3. Towards a Federal/Interstate Compact

The declining capacity of the federal government to provide financial and technical resources for a broad variety of purposes, the desirability of integrating responsibilities for the management and balanced protection of all valuable uses of water, and the need to modernize the principles by which the river is governed argue strongly for new approaches in the basin. "Fine tuning" the system is not enough. This is the time for the basin states, the tribes within the basin, and the federal government to commit to the development of a federal/interstate compact to provide the structure for river management and planning in the years ahead.

Regarding the medium for discourse, we are aware of the 7/10 meetings that have occurred. If opened up to interests beyond the states and the tribes, these meetings could serve as the medium for the broad discussions which we believe are needed. However, the value of a forum that is all-inclusive from the start compels us to believe that it is preferable to create a new entity, a "Colorado River Forum," to fill this function. In any event it is imperative that *all* stakeholders be invited to participate in the discussions.

The case for a new governance structure arising from Forum discussions is compelling. First, the existing management structure—federal agencies primarily

responsible for managing for non-consumptive uses and the states for consumptive uses—is outmoded, encourages difficult-to-resolve disputes and, in any event, does not reflect the importance of non-consumptive uses to the inhabitants of the basin and greater hydrocommons. Second, the nearly certain reduction of the long-term capacity of the federal government to provide funding for everything from operations and maintenance of mainstem dams to new storage projects to fish recovery efforts suggests that the basin must carry an increasing financial burden. To do so, in our view, requires more management and control exercised within the basin. To integrate river management and planning while strengthening the basin's role in these functions requires a sorting out of roles between federal agencies and the states which can only be attained through negotiations aimed at developing a federal/interstate compact.

Certain caveats go along with our recommendations that discussions proceed towards the drafting of a new compact. One is that the compact assure that management and planning decisions made under a new compact-dominated process be *broadly representative*. Since Congress cannot legally delegate authority by compact to other than federal agencies and state government, the compact, itself, must bind federal agencies and state governments to procedures that will assure that all stakeholders will be invited to be meaningfully involved in all significant management and planning decisions under the compact.

Second, it will likely take several years for Forum discussions to develop a compact that is sufficiently broadly supported to obtain congressional approval. We are concerned that the discussions, themselves, could provide a basis for postponing the process of modernization of basin governance. If so, that would amount of an unintended effect of our recommenda-

⁸⁹ For a discussion of experience to date with water banks in the West together with a proposed framework for a bank based on an evaluation of this experience see "Water Banks," *supra*. A specific analysis of water banks in the context of the Lower Colorado River Basin is provided in "New Options," *supra*.

tion. To prevent this from occurring, we suggest that the Forum should early on discuss how principles of modern basin governance can begin to be effectively implemented while a compact is being developed.

In broad outline, we envision the creation of a Colorado River Commission composed of representatives of the 7 basin states, the federal government, tribes within the basin, and other interests. The Commission would have its own professional staff responsible for management of the river. The Commission would take over management of all federal facilities within the basin. It would be entirely self-supporting, primarily from the revenues earned from operation of hydropower facilities, charges for water deliveries, and fees for recreation usage.

The central matter of uses of the basin's waters should be addressed directly in the negotiations. Thus we believe that the limitation of the basin and state apportionments to consumptive uses should be eliminated. The existing basic apportionments to the two basins and to the 7 states should be ratified, and the additional apportionment of 1 million acre-feet to the Lower Basin should be regarded as applying to Arizona's use of Gila River water. There should be agreement that any additional development of Colorado River System water be counted directly against the state's basic apportionment. The Commission should take over responsibility for delivery of 1.5 million acre-feet annually to Mexico, and the negotiations should clarify the source of this water. The Commission also should take over responsibility for meeting the water quality obligations associated with this water. Special attention should be given to addressing the manner in which water from the Colorado River System legally

available to tribes with reservations within the basin may be used. The tribes have a clear legal claim to the use of a large amount of water not presently physically controlled by the tribes. In the various settlement acts passed by Congress, agreement has been reached regarding both the quantity of water to which certain tribes are entitled as well as the conditions under which that water may be leased for off-reservation use. The Colorado River negotiations should clarify a process for settling unresolved claims of other tribes in the basin. We believe the basis for this settlement turns on payments to the tribes for not developing and using some portion of their water.

The Commission also would become responsible for managing the river basin in a manner that meets the full range of interests in the basin's water. Thus, it would work closely with the trusts to ensure that the ecological values of the basin are protected and maintained. It would be responsible for flood control management. It would have responsibility for managing water to meet recreational interests.

IV. Conclusion

The changes in policy we outline and new institutions we propose in this paper are considerable. For them to be implemented, substantial shifts in thinking need to take place. We believe there is sound basis for our proposals. But we recognize that many may not share our view of the need for or the propriety of these suggestions. In any event this paper is still a DRAFT. We continue to look forward to the opportunity to explore our ideas with the many people who are knowledgeable about the river.