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# The Missouri River: The Paradox of Conflict Without Scarcity

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# THE MISSOURI RIVER: THE PARADOX OF CONFLICT WITHOUT SCARCITY

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"The [Lewis and Clark] expedition was to follow the Missouri to its source, look for easy water routes across the continent, continue to the Pacific, and return. Particularly on the high plains, Lewis and Clark camped at places where nothing important has happened since. On some of the bleaker reaches of the upper Missouri, they were the harbingers not of civilization but of future visits by Lewis and Clark buffs."<sup>1</sup>

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## I. CONFLICT IN THE MIDST OF ABUNDANCE

From a legal and administrative perspective, the Missouri River is a paradox: the amount of water available to support existing and future demands is inverse to the number of potential users, but the basin states have been unable to agree either on a permanent allocation among themselves or on a management plan. Instead, for the past fifty years, the basin states have persistently, if quietly, fought among themselves and with the federal agencies, primarily the U.S. Army Corps of Engineers (hereinafter Corps), that run the Pick-Sloan project reservoirs about the use and management of the river. There are many "stories" or explanations for the fifty-plus years of unsuccessful allocation and management of the Missouri, but they all have a common primary theme: the paradox of conflict over absolute

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† Professor of Law, Chicago-Kent College of Law. A.B. 1962, LL.B. 1965, Stanford University. I wish to disclose that from 1983-85, I was a consultant to the Montana Department of Natural Resources and Conservation in the preparation of a report, John Thorson et al., *MONTANA AND THE MISSOURI: MONTANA'S STRATEGY FOR MISSOURI RIVER APPORTIONMENT AND MANAGEMENT* (1988), and from 1987-90, I was a consultant to the state of South Dakota in the *South Dakota v. Kansas City Southern Industries* litigation, 880 F.2d 40 (8th Cir. 1989), *cert. denied*, 493 U.S.1023 (1990), growing out of the failed attempt by the state to sell Missouri River water for a coal slurry pipeline. These experiences provided me with an introduction to the long and fascinating history of the settlement of the upper Great Plains and to the role that the Missouri River has played in sustaining the region in the post-settlement era. However, the views reflected in this article are solely my own.

1. IAN FRAZIER, *THE GREAT PLAINS* 184 (1989).

abundance rather than scarcity. A secondary theme—the injustice done to the Native American Tribes by the federal government, and the Tribes' subsequent inability to obtain effective redress through either allocation or management/tribal relations—also runs through the long history of the region.

The upper Missouri is now a managed river with great carry-over storage capacity. Six Pick-Sloan mainstem reservoirs have a present storage capacity of about seventy-three million acre-feet, the largest amount of water stored on any United States river system. However, the basin states continue to squabble over the use of the river and the operation of the system in ways that seem strange to those schooled in the allocation of rivers in the more arid regions of the country. Despite many efforts, the states cannot find the formula or process to overcome reliance on their historic entitlement claims, although the circumstances on which the claims are based have long since changed. There are two primary explanations for the Missouri Basin states' failure to agree among themselves and with the federal government about the use and management of the system: (1) the basin's geography and (2) federalism tensions.

#### A. GEOGRAPHY

Geographically, the Missouri Basin is actually two separate regions with conflicting rather than common water-related interests. The lower basin interests are fundamentally different from the upper basin, which sees the river as the means to sustain a stronger regional economy. From its headwaters in Montana to the South Dakota-Nebraska border, the river flows through the semi-arid Great Plains. The vision of federally subsidized agriculture to sustain the most sparsely populated region of the United States has driven the politics of the upper basin states in this century. As the river forms the Nebraska and Kansas borders with Iowa and Missouri, it enters the humid midwest. Irrigated agriculture is a minor water use, although there are some consumptive municipal and industrial withdrawals. In general, the lower basin states view the Missouri as both a flood menace and as a navigable highway between the mouth of the Mississippi and Sioux City, Iowa. Other basins with a similar split among states have been able to agree on a permanent allocation,<sup>2</sup> but the differences between the upper and lower Missouri Basins have substantially contributed to the inability of the states to cooperate.

#### B. FEDERALISM TENSIONS

The Missouri River is a story of the triumph of the scientific conservation idea of national control of large rivers through multiple-use dams and

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2. The best example of semi-arid and humid state cooperation is the 1980 Red River Compact, 94 Stat. 3305 (1980). See Marguerite Ann Chapman, *Where East Meets West in Water Law: The Formulation of An Interstate Compact to Address the Diverse Problems of the Red River Basin*, 38 OKLA. L. REV. 1 (1985).

reservoirs<sup>3</sup> and their use to produce cheap hydroelectric power. It is also a story of the failure of the river basin development idea to be translated into institutions that can adapt to changing regional conditions. Thus, it is ultimately a story of the failure of the multiple-use ideal. Pick-Sloan has both failed to promote regional equity and efficiency and to develop the institutions to promote sustainable river use and development by adapting to changing perspectives of the river's function and value. In the late 1930s and 1940s, the Missouri, along with the Tennessee Valley Authority, were to be the model for the river basin commissions as a new major federal-state government entity. However, the familiar pattern of western water sectionalism has repeatedly killed efforts to induce the basin states to make a permanent allocation and to create a management entity to administer the allocation.

The standard institutional accounts of the Missouri River focus appropriately on the federal-state conflicts and the failure of the states to find a mutually acceptable allocation formula or even to find a successful cooperation process. The states have preferred bitter, but tried and true, traditional sectional water politics to cooperation.<sup>4</sup> The federal government has managed the river, primarily with the support of the lower basin states, but has provided little vision or leadership since the basin states forced the Truman Administration to abandon a Missouri River Authority. Due to the Great Depression, the basin states were given a series of multiple purpose mainstem reservoirs that were to be managed by the federal government for the benefit of basin water users and states. By default, the Corps became the river master to the exclusion of the states and the Bureau of Reclamation. The Missouri, as John Thorson observed in his recent masterful study of the series of failed attempts at intra-basin cooperation, is characterized by prefectorial federalism.<sup>5</sup> The states were ordered to conform to federal mandates with no financial incentives to induce cooperation. "The Missouri River Basin Commission, which was originally established to coordinate government activity, gradually became a federally driven planning agency with an agenda that was ultimately rendered obsolete by congressional failure to fund the completion of Pick-Sloan."<sup>6</sup>

## II. PICK-SLOAN REVISITED

Since the Depression, the conventional story of the development of the Missouri is one of a New Deal dynastic marriage of mutual advantage between two rival water agencies, the Bureau of Reclamation and the

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3. See SAMUEL P. HAYS, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT 1890-1920* 91-121 (1959).

4. For a lucid articulation of the role that sectional politics has played in water allocation policy see DONALD PISANI, *TO RECLAIM A DIVIDED WEST: WATER, LAW AND PUBLIC POLICY 1848-1902* (1992).

5. JOHN E. THORSON, *RIVER OF PROMISE, RIVER OF PERIL: THE POLITICS OF MANAGING THE MISSOURI RIVER* (1994).

6. *Id.* at 116.

United States Army Corps of Engineers, which failed to fulfill its original purpose in the Upper Basin. General Lewis Pick's plan to construct a series of mainstem flood control and navigation channel enhancement reservoirs was combined with the relatively more modest plans of G. W. Sloan, Director of the Bureau of Reclamation's regional office in Billings, Montana, to construct both mainstem and tributary dams. This story has been told several times,<sup>7</sup> and it has recently been told again by a U.S. Army Corps of Engineers scholar, John R. Ferrell in his book, *The Big Dam Era: A Legislative and Institutional History of the Pick-Sloan Missouri Basin Program*.<sup>8</sup> Ferrell's study of the construction and operation of the mainstem reservoirs is an accurate, detailed and valuable account of the federal and regional forces that control the Missouri and the recent upper/lower basin recreational/environmental versus navigational conflicts caused by the drought of the late 1980s. However, as is often the case with the Missouri, the interesting story is what Pick-Sloan did not address and whether the project has to be substantially reconceptualized in light of the failure of Congress to implement Pick-Sloan in the Upper Basin and of changed perceptions of the Missouri's value and function. *The Big Dam Era* is a useful addition to the history of the Missouri, but it stops short of a necessary reevaluation of the future of the region, the role that water is likely to play in its future and the possibility for new visions of the Missouri's function that transcend the current upper/lower basin conflicts.

*The Big Dam Era* recreates the moment in time that produced the Pick-Sloan plan and traces the subsequent failure of the basin states to agree on a common management plan through the early 1990s. In addition to navigation enhancement, Pick-Sloan expanded the Corps' flood control mission and combined it with the New Deal's use of public works projects to provide regional employment with a more ambitious, but ultimately flawed and unsound, plan to use the reclamation of arid and semi-arid lands to resettle World War II veterans and thus avoid a post-war depression. Like other countries, such as Australia, we have tried to use our vast unsettled lands for veterans resettlement, but we refused to make the planning investment to make the policy work. Bureau of Reclamation planners envisioned up to 3.8 million acres under irrigation<sup>9</sup> on the assumption that the region would sustain large-scale irrigated agriculture,<sup>10</sup> a hollow dream today.

The merging of the Corps and Bureau of Reclamation plans into the final Pick-Sloan plan is often portrayed as a shotgun marriage, but Ferrell's more judicious portrayal of the final compromise shows that it was more

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7. E.g., HENRY C. HART, *THE DARK MISSOURI* (1957); Northern Lights Institute, *BOUNDARIES CARVED IN WATER: AN ANALYSIS OF RIVER AND WATER MANAGEMENT IN THE UPPER MISSOURI RIVER BASIN* (undated).

8. JOHN R. FERRELL, *THE BIG DAM ERA: A LEGISLATIVE AND INSTITUTIONAL HISTORY OF THE PICK-SLOAN MISSOURI BASIN PROGRAM* (1993).

9. *Id.* at 32.

10. *Id.* at 40.

like two feudal dynasties haggling over the last bits of a marriage contract. Both agencies agreed that Pick-Sloan was a single project which consisted of a chain of multiple-purpose reservoirs and they agreed to storage allocations contemplated by the two plans. Two crucial legal compromises were reached to make the marriage work. The first allocated the responsibility for planning the reservoirs by function: the Corps would determine flood control and navigation capacity and the Bureau of Reclamation would determine capacity for irrigation. The second is the famous O'Mahoney-Millikan Amendment which the upper basin states claim subordinates flood control and navigation to irrigation.<sup>11</sup> The Amendment, however, has not impressed the Supreme Court, and is an insufficient basis for the upper basin's claims to control the use of the river. For example, in the energy boom of the 1970s and 1980s, the Court unanimously refused to treat O'Mahoney-Millikan as a division of operating responsibility between the two agencies and held that only the Corps of Engineers could sell surplus mainstem water because the Corps built the Oahe Dam and thus controlled it.<sup>12</sup>

### III. TWO OUTDATED MANAGEMENT MODELS

Today, the Missouri Basin states remain locked in a battle between two allocation and management models. The federal government initially envisioned a strong river basin authority, and the upper basin states have tried to allocate the river to ensure that beneficial consumptive use has priority over navigation and flood control. In various forms, subsequent cooperation methods seek to accomplish one of these two objectives. The problem is time has rendered both models largely irrelevant.

#### A. THE TVA MODEL

From 1944 to 1981, the basin states struggled to develop a management structure for the Missouri which, both in prospect and retrospect, was doomed to failure, as experts warned at the time. The core of the problem is that the consumptive use of Missouri River water has never been central to the development of the Great Plains. The largest consumptive use of water is the post-World War II mining of the Ogallala Aquifer in the southern Great Plains by deep wells.<sup>13</sup> Today, most states have used the cheap portion of their share of the aquifer, and large-scale ground water irrigation only appears sustainable in Nebraska.<sup>14</sup> In contrast, dry land farming, rather than irrigated agriculture, is the source of the upper Great Plains' major crop—winter wheat. The story of the successful introduction of hard

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11. See John P. Guhin, *The Law of the Missouri*, 30 S.D. L. REV. 350, 383-411 (1985).

12. *ETSI Pipeline Project v. Missouri et. al.*, 484 U.S. 495 (1988).

13. See *GROUNDWATER WATER EXPLOITATION IN THE HIGH PLAINS* (David E. Komm & Stephen E. White eds., 1992).

14. NATIONAL ACADEMY OF SCIENCES, NATIONAL RESEARCH COUNCIL, *A NEW ERA FOR IRRIGATION* 131-36 (1996).

wheat to the upper Missouri region and the disasters of the 1930s are a lesson in adaptation to this harsh area, but Missouri River water plays a limited role in this story. Russian-German Mennonites brought drought resistant Turkey Red wheat from the Crimea, where Catherine the Great induced them to settle in the 18th century. Later, a far-sighted Department of Agriculture employee imported a better strain from Russia and created new pasta markets for this hard variety.<sup>15</sup>

The damming of the Missouri for Depression and post-World War II relief removed all incentives for basin state cooperation and the development of basin management institutions that manage the total resource. In 1949, the states rejected a Missouri Valley Authority after a decade of widespread opposition. The passage of the 1965 Water Resources Planning Act<sup>16</sup> revived the idea of a basin commission and in 1971 the Missouri River Basin Commission was established.<sup>17</sup> However, during its ten years of existence, it performed only a fact-finding and coordinating mission because it lacked management authority.<sup>18</sup> President Reagan defunded all the river basin commissions in 1981 to the regret of very few in the water community.<sup>19</sup> As Ferrell notes, the Missouri River Basin Commission was doomed to irrelevance from the start because there was very little to plan and coordinate.<sup>20</sup> The federal money had already been allocated so planning and coordination did not mean the distribution of new federal monies, but would have meant hard management and allocation choices that the states feared or had no incentive to make.

## B. THE ALLOCATION MODEL

The Upper Basin States tried to allocate the River in the 1970s and 1980s. The Colorado River is the model for the allocation of all western rivers, but again, an allocation formula has yet to be applied to the Missouri, which remains unallocated. Through interstate compacts, congressional legislation and original jurisdiction litigation, the river has been allocated among basins, states and the major user constituencies including Indians and environmental interests. States generally cooperate to allocate waters when the financial stakes are high and the costs of non-cooperation are equally high or when the financial stakes are low but the political benefits of cooperation are high. The Colorado River Compact<sup>21</sup> illustrates the first principle. Without an allocation, regional rivalries would have prevented a unified raid on the treasury. The 1985 Great Lakes Charter,<sup>22</sup>

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15. FRAZIER, *supra* note 1, at 190-199.

16. Water Resources Planning Act of 1965, 42 U.S.C. § 1962 (1994).

17. FERRELL, *supra* note 8, at 114.

18. *Id.* at 114-16.

19. *Id.*

20. *Id.*

21. 42 Stat. 171 (1921).

22. The charter was adopted by the Great Lakes governors in 1985 in response to U.S. Army Corps of Engineer plans to divert Lake Superior water to the southern Great Plains. It is reprinted in Great Lakes Governors Task Force, Council of Great Lakes Governors, Final Report

which requires the prior consent of all Great Lakes governors before a transbasin diversion can be approved, illustrates the second. Neither are present on the Missouri. There are no costs of non-cooperation for the lower basin states.

In the 1980s, the Supreme Court refused to find that the O'Mahoney-Millikan Amendment constituted a Congressional apportionment of the river,<sup>23</sup> and a recent effort of the Northern Lights Institute to promote a consensus allocation failed. The *Big Dam Era* recounts how the basin states killed a regional commission after they got the dams. Another recent analysis of the Missouri, John Thorson's *River of Promise, River of Peril* tells the story of the failure of the most recent consensus building effort, the Missouri River Management Project and the Missouri River Assembly. The first, a privately initiated inclusive education process, produced the second, a federal, state and tribal organization. The Assembly produced a consensus management plan, but a lack of funding prevented the continuation of its work.<sup>24</sup>

#### IV. TOWARD A NEW VISION: THE FLOW IS THE RESOURCE

Ultimately, the Missouri Basin states must recognize that the primary "use" of the river will always be non-consumptive and that what must be shared is a managed flow resource. This vision of the Missouri reflects the current debate between two alternative visions of river systems which are competing for dominance within the water community. The traditional multiple-use vision of a river system as a commodity to be used to the maximum extent possible is still the dominant vision world-wide. It is alive and well in China and many other parts of the developing world, but it is slowly giving way to a newer ecological integrity vision. This vision is less clearly articulated because it rests on a more complex view of nature and man's role in the functioning of natural systems. Thus, it is not a simple river preservation concept, rather it starts from the premise that we try to integrate human use of a river system with the maintenance of its natural environmental sustainability on a landscape scale.<sup>25</sup> This newer vision seeks to identify a river's hydrograph and the natural functions sustained

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and Recommendations of Water Diversion and Great Lakes Institutions 40 app. III (1985). The charter is not a compact because it was never ratified by Congress, but in 1986 Congress prohibited Great Lakes diversions unless there was uniform consent by the littoral governors. 42 U.S.C. § 1926d-20. See generally Symposium, Great Lakes Legal Seminar: Diversion and Consumptive Use, 18 Case Western Reserve J. of Int. L., No. 1 (1986).

23. *South Dakota v. Nebraska*, 485 U.S. 902 (1988) (leave to file complaint in original jurisdiction denied).

24. THORSON, *supra* note 5, at 172.

25. Lawyers will find Judith L. Meyer, *Changing Concepts of System Management in PROCEEDINGS: SUSTAINING OUR WATER RESOURCES*, WATER SCIENCE AND TECHNOLOGY BOARD TENTH ANNIVERSARY SYMPOSIUM 78 (1992) and *The Dance of Nature: New Concepts in Ecology*, 69 CHI.-KENT L. REV. 875 (1994) a good introduction to modern ecology and its influence on environmental management. The changes build on the substitution of a non-equilibrium for an equilibrium paradigm in ecology. See A. Dan Tarlock, *The Nonequilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121 (1994).

by the flow over time.<sup>26</sup> These functions include the maintenance of both natural systems, such as wetlands, and human economies. The objective is to use these patterns as the basis for adaptive management of an altered system. The flow cycle of the pre-Aswan Dam Nile is the classic example of the ecological-social vision<sup>27</sup> as the post-dam river is a prime example of the commodity vision.

The flow maintenance vision has three primary advantages. First, it places the emphasis on the major post-construction valuable uses of the resource such as hydroelectric power generation, ecosystem maintenance and recreation as well as on navigation. For example, joint tribal-state purchase of the Pick-Sloan hydropower facilities, a distinct possibility as the federal government downsizes and the electric generation industry is deregulated, could be the basis for regional cooperation that integrates the major environmental and development values.<sup>28</sup>

Second, it recognizes that a primary function of modern river basin management regimes is risk allocation among the major stakeholders. Modern river management is a large scale bioregional experiment.<sup>29</sup> The risk allocation model recognizes that a large number of stakeholders have legitimate interests which can be better accommodated through shared risk assumption than through the insistence on adherence to rigid entitlements that constantly seek to give use priority over others. Risk assessment allows those exposed to above normal risks to be compensated both by water releases and by direct or indirect financial contributions.

Third, it recognizes that the regulatory missions of the federal agencies, if they survive in their present form, will not be simply to administer past allocations and entitlements but to restore the ecological integrity of systems and to do a better job at promoting regional equity. In the future, a major river management task will be the restoration of degraded rivers. Major river systems such as the Colorado, Columbia, Missouri and Nile are facing substantial environmental problems as a result of the construction of large dams. The operation of these dams must be modified to expand the objectives beyond flood control, water supply and hydroelectric power to include environmental protection and recreation.<sup>30</sup> Experiments are now

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26. See DANIEL BOTKIN, *DISCORDANT HARMONIES* (1991). For an exploration of the potential influence of the non-equilibrium paradigm on environmental law see *Symposium on Ecology and the Law*, 69 CHI.-KENT L. REV. 847 (1994).

27. Nile irrigation began to be modified in the 19th century and barrages and dams were constructed to regulate the River's flow, but historic patterns were relatively maintained until the construction of the High Aswan Dam. H.E. HURST, *THE NILE* (1952).

28. See THORSON, *supra* note 5, at 186-88.

29. The over-arching concept is the idea of bioregionalism which seeks to identify "whole systems comprised of sets of diverse, integrated, natural subsystems and run by ecological laws and principles." David Henke, *Bioregionalism: A Territorial Approach to Governance and Development of Northwest British Columbia* (Unpublished Master's Thesis), *quoted in* Keane Callahan, *Bioregionalism: Wiser Planning For The Environment*, 45 LAND USE LAW AND ZONING DIGEST 3, No. 8 (August 1993). Australia is a leader in bioregional planning and management. See, e.g., J. M. POWELL, *THE EMERGENCE OF BIOREGIONALISM IN THE MURRAY-DARLING BASIN* (Murray-Darling Basin Commission 1993).

30. The need to correct the river modifications produced by dams is now widely recognized,

underway on many river systems, large and small, to restore the system to a baseline that reverses the most harmful effects of human use and alteration of natural system functions.<sup>31</sup> The Florida Everglades are the most spectacular example of system restoration, but there many others.

Efforts to revise the operating regime for the Glen Canyon Dam on the Colorado River have important lessons for the Missouri because they illustrate the challenges and opportunities of overcoming the entitlements generated by multiple-purpose development. On both systems, the environmental impact statement process has been used to try to force new operating patterns.<sup>32</sup> The construction of Glen Canyon Dam on the Colorado and its operation for hydroelectric power generation have altered the downstream environment through the Grand Canyon. The net result of the construction of Glen Canyon and other carry-over storage and hydroelectric generating dams is that the river has permanently become an artificial one.<sup>33</sup> Ecosystems often require disturbance cycles to sustain them, but Glen Canyon Dam altered the natural hydrograph of the Colorado River. In the early 1980s, a number of consequences of the substitution of an artificial for a natural disturbance regime began to surface. Canyon beaches were eroding, endemic fish were jeopardized by the substitution of colder clear water for the warm, more turbid natural flow regime and rafting trips were subjected to pulsating flows from the daily power release cycle. In 1982, the Bureau of Reclamation and the Western Power Administration began to collect information about these changes<sup>34</sup> and, after initial resistance, agreed to prepare an environmental impact statement.<sup>35</sup>

Re-engineering possibilities exist to improve the canyon ecosystem through different patterns of reservoir releases from Glen Canyon Dam, but they have been resisted because they may frustrate the expectations generated by the entitlement regime. Historically, the idea that the flow of the river was a use to be protected had no basis in the law of the river.<sup>36</sup>

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but the institutional barriers to doing so are often formidable. See Michael Collier et. al., U.S. Geological Survey Circular, DAMS AND RIVERS: PRIMER ON THE DOWNSTREAM EFFECTS OF DAMS 1126 (1996).

31. See NATIONAL ACADEMY OF SCIENCES, THE RESTORATION OF AQUATIC ECOSYSTEMS (1992).

32. *E.g.*, *State of South Dakota v. Hazen*, 914 F.2d 147 (8th Cir. 1990).

33. See PHILLIP FRADKIN, *A RIVER NO MORE* (1981).

34. Two readable assessments of the scientific studies are two National Academy of Sciences assessments of the scientific studies. NATIONAL RESEARCH COUNCIL, RIVER AND DAM MANAGEMENT (1987) and COLORADO RIVER ECOLOGY AND DAM MANAGEMENT (1991). I served as member of the National Academy of Sciences-National Research Council Committee to Review the Glen Canyon Environmental Studies from 1986-1995.

35. The triggering even was the decision to upwind the dam's generators. U.S. DEPARTMENT OF THE INTERIOR, OPERATIONAL OF GLEN CANYON DAM, ENVIRONMENTAL IMPACT STATEMENT (1994).

36. A leading Colorado River expert, Edward R. Clyde of Salt Lake City, Utah, offered the following definition of the "law of the river" in 1987:

[The] Colorado River Compact negotiated in 1922, which divided the Colorado River between the Upper Basin and the Lower Basin states; a treaty between the United States and Mexico dated February 3, 1944; the Upper Colorado River Basin Company negotiated in October, 1948; the apportionment made by Congress in the enactment and imple-

The dam managers, the Bureau of Reclamation and the Western Area Power Administration, were able to run the dam as a cash register and ignore the potential external costs of this management decision. Initially, the Bureau of Reclamation and the Western Power Administration tried unsuccessfully to make the problem disappear by funding research which would demonstrate minimal modification of the riverine ecosystem, but the problems did not disappear. In 1992, Congress responded directly to the new river use and interested constituencies with the passage of the Grand Canyon Protection Act.<sup>37</sup>

The Grand Canyon Protection Act is a direct outcome of identification of the need for a different release pattern from the dam both to build beaches and to retard beach erosion. It establishes the legality of river corridor enhancement flows consistent with the "Law of the River" and is an important step toward the adoption of ecosystem protection as a management standard. Section 1802 of the Act requires that the Secretary of the Interior operate the dam in a manner consistent with the "Law of the River," including the Endangered Species Act, "to mitigate adverse impacts to, and improve the values for which the Grand Canyon National Park and the Glen Canyon National Recreation Area were established, including, but not limited to, natural and cultural resources and visitor use."<sup>38</sup> Section 1804 requires that the Secretary use the "findings, conclusions, and recommendations" of the Environmental Impact Statement to adopt management criteria and operating plans in addition to those specified in Section 602 of the Colorado Basin Project Act of 1968.<sup>39</sup> In 1996, the Bureau of Reclamation released a beach-building flood flow.<sup>40</sup>

Interestingly, research has indicated that ecosystem management does not necessarily require a fundamental change in reservoir operations and thus may not be inconsistent with equitable entitlements. For example, when the Glen Canyon Environmental Studies began, many scientists and others thought that the dam had trapped the sediment necessary to sustain the canyon's beaches. Sophisticated sediment transport research done by the United States Geological Service and other federal agencies demon-

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mentation of the Boulder Canyon Project Act of 1928, as declared by the United States Supreme Court in *Arizona v. California*; federal statutes dealing with salinity on the Colorado River and the management of the federally constructed reservoirs; the laws of the individual states, which control individual use; and the Indian reserved rights. Beyond this we will have the continuing role of Congress which has the constitutional authority to intervene in the river administration and water allocation.

E. Clyde, INSTITUTIONAL RESPONSES TO PROLONGED DROUGHT, REPORT TO CENTRAL UTAH WATER CONSERVATION DISTRICT (1987), quoted in A. Dan Tarlock, *International Water Law and the Protection of River System Ecosystem Integrity*, 10 B.Y.U. J. OF PUB. L. 181, 205 (1996).

37. Grand Canyon Protection Act, Pub L. No. 102-575, § 1801, 106 Stat. 4669 (1992).

38. *Id.* at § 1802.

39. *Id.* at § 1804.

40. The beach building flood flows represent one of the most significant water management experiments in the West. The immediate effects, however, may be short-lived because the subsequent large, steady release patterns reverse much of the sediment deposition produced by the flood flows. For a summary of flood monitoring research see William K. Stevens, *A Dam Open Grand Canyon Roars Again*, N.Y. TIMES Feb. 25, 1997, at B7.

strated that tributaries entering the mainstem below Glen Canyon Dam contain sufficient sand to maintain beaches and backwaters. The problem was not the mass balance of sand in the system but the way in which it moved down the Colorado post-dam. The alteration of the pre-dam hydrograph eliminated seasonable floods, except when the reservoir could not contain the run-off, and replaced them with a combination of steady and fluctuating flows, produced by the generation of peaking power, that eroded the beaches. The scientists recommended controlled floods (or beach-building flows, as the Bureau of Reclamation prefers to call them) and reduced ramping rates (the decline in the rate of discharge from the turbines) to reduce beach losses. In short, the Bureau is inching its way toward a more flexible, science-based operating regime.<sup>41</sup>

## V. CONCLUSION: THE VIRTUES OF FLUID ENTITLEMENTS

Historically, the flow of large river systems and their adjacent corridors have been perceived as natural resources which should be extensively developed or modified. Rivers have thus often been conceptually and functionally "detached" from their surrounding landscape, and river channels and corridors ceased to be considered valuable resources as rivers were viewed exclusively as commodities.<sup>42</sup> A new vision of urban and rural landscapes and the relationship between human settlement and natural systems is required to address the adverse impacts of river and watershed development. This is possible, although difficult, for the Missouri. Despite the posturing of the upper and lower basin states, happily, the "Law of the Missouri River" is not locked into a rigid entitlement regime that makes adaptation to changed circumstances and values extremely costly if not impossible. The river remains unapportioned by Supreme Court decree or interstate compact: the Pick-Sloan Act creates a series of expectations that seem to fall short of a permanent congressional apportionment. Thus, neither history nor supply are an insurmountable barrier to the development of a new vision for the Missouri.

The objective of future management should be the adoption of a simulated naturalness baseline. There is neither a simple, accepted definition of this concept, nor is it an absolute standard. In brief, it can best be understood as a progressive management standard that recognizes that ecosystems are constantly changing, including the introduction of exotic species,

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41. See NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCES, RIVER RESOURCE MANAGEMENT IN THE GRAND CANYON (1996).

42. The influence of western European law and economic theory on the perception of all land and related resources as commodities from the time of settlement has been brilliantly explored by the environmental historian William Cronon in two books, *CHANGES IN THE LAND: INDIANS, COLONISTS, AND THE ECOLOGY OF NEW ENGLAND* (1983) and *NATURE'S METROPOLIS: CHICAGO & THE GREAT WEST* (1991). The adverse consequences of the "commodification" of nature is, of course, the central theme of modern environmentalism. See Lester W. Milbrath, *The World is Relearning Its Story About How It Works*, in *ENVIRONMENTAL POLITICS IN THE INTERNATIONAL ARENA: MOVEMENTS, PARTIES, ORGANIZATIONS AND POLICY* 21 (Sheldon Kamienecki ed. 1993).

and thus static preservation is impossible. The objective to use natural processes, such as erosion, flow cycles and other ecological processes as standards against which man-made changes can be measured and, if appropriate, mitigated. This baseline approximates as best as we can, within the limits of science and the legal constraints posed by the modification of the river and protection of existing uses at a reasonable level, our understanding of pre-intervention or background conditions.