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### River Management in the Twenty-First Century: The Vision Thing

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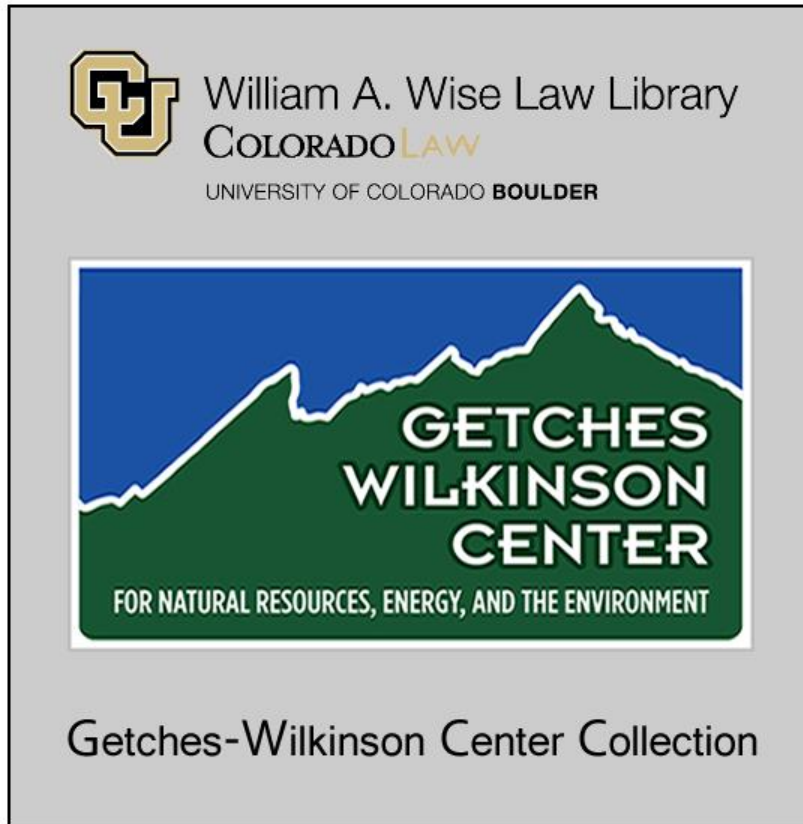
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**RIVER MANAGEMENT  
IN THE TWENTY-FIRST CENTURY:  
THE VISION THING**

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**DAMS: Water and Power in the New West**

June 2-4, 1997

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**The views expressed in this outline are solely those of the author and do not reflect the views of any organization with whom I have a consulting relationship.**

[P]eople around the world in the 1990s are perceiving the earth as more than a globe to be surveyed, or developed for the public good in the short term, or to be protected from threats to its well-being both human and natural. It is all of these to some degree, but has additional dimensions. People in many cultures accept its scientific description as a matter of belief. They recognize a commitment to care for it in perpetuity. They accept reluctantly the obligation to come to terms with problems posed by growth in numbers and appetites. This is not simply an analysis of economic and social consequences of political policies toward environmental matters. The roots are a growing solemn sense of the individual as part of one human family for whom the earth is its spiritual home.

[Gilbert F. White, *Reflections on Changing Perceptions of the Earth*, 1994 Annual Review of Energy and the Environment 19 (1994)]

**I. A Brief History of the Disenchantment with Large Dams and Reservoirs:** In the twentieth century, large multiple purpose projects were constructed on major Western rivers to provide carry-over storage for irrigation, to control floods, to generate power, to enhance navigation and to provide recreational opportunities. These projects are a product of the progressive conservation era and the New Deal. The prevailing ideology behind the construction of these projects was scientific conservation which taught that water should be put to its maximum potential human use through impoundment and management. Scientific conservation was based on theories of production efficiency and assumed that the entire river systems should be intensively developed and managed to maximize their immediate economic potential through large-scale, multiple-use projects. Non-consumption of water was waste. See Samuel P. Hays, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT 1890-1920* (1959). These projects provide the infra-structure that supports much of the West's economic growth, but they are also becoming increasingly controversial as we ponder the question of whether there are natural limits to the artificial and natural functions that rivers can provide. A full cost-benefit analysis of the choice to impound or not impound was never made when most projects were

initially constructed, but modern environmental laws, scientific research and a fundamental value shift create pressures for an accounting. The defeat of Echo Park reservoir in the 1950s signaled the beginning of the era of the Big Dam era and in the 1960s, a combination of fiscal and environmental objections has made it very difficult to construct new dams. Initially, the environmental movement successfully focused on preventing further dams. However, the West is now veined with large reservoirs and dams. The issue today is how existing rivers should be managed to accommodate the full range of consumptive uses and non-consumptive functions.

## **II. The Original Understanding and Evaluation of Downstream Impacts: Fish be Damned.**

Prior to the Tellico Dam litigation in the 1970s, *Tennessee Valley Authority v. Hill*, 437 U.S. 153 (1978), little attention was given by dam planners and managers to the downstream effects of dams. A recent U.S.G.S. paper observes that the "[downstream effects of dams were of little concern during the design and construction of most dams in the United States. Engineers knew that water releases would erode the channel immediately downstream from spillways and power plants; they attempted to calculate the amount of scour to protect the integrity of the dam and its structures. Changes in fish populations were often unanticipated or were not taken seriously . . ." Michael Collier, Robert H. Webb and John C. Schmidt, *DAMS AND RIVERS: PRIMER ON THE DOWNSTREAM EFFECTS OF DAMS 3* (U.S.G.S. Circular 1126 1996). Downstream fisheries impacts were "solved" either by technological add-ons such as fish ladders, hatchery releases or by subordinating fish to water supply.

## **III. Management or Post-Management Visions:**

The dominant river management paradigm of "optimum" development was formulated by the engineers and hydrologists who influenced the development of the West as a supplier of raw materials to the rest of the country and the world. Rivers were commodities. e.g., William Cronon, *NATURE'S METROPOLIS* (1991). This paradigm is now being reevaluated, See David L. Feldman, *WATER RESOURCES MANAGEMENT: IN SEARCH OF AN ENVIRONMENTAL ETHIC* (1991), but no clear alternative has emerged. The contenders include:

A. *A Return to the Wild*: The possibility of removing dams or draining reservoirs has been put on the political agenda by environmental groups and Indian tribes. The initial legal basis was the expiration of a large number of 50 year F.E.R.C. licenses which opens up the possibility of removing rather than relicensing a dam. The 1998 Clinton budget proposal includes 25 million dollars to buy back the Elwha Dam in the Olympic National Park in Washington state. The Sierra Club has endorsed David Brower's proposal redress the Club's original support for Glen Canyon Dam and Lake Powell by draining Lake Powell which would make the dam irrelevant. The Economist, March 29, 1997, pp. 27- 28. A citizen environmentalist has proposed that the federal government breach four dams on the Lower Snake River in Washington state by carving a new channel around them to allow salmon to swim free. The cost is estimated to be \$525 million which compares favorably to the \$425 million per year now being spent to barge salmon around the dams. The New York Times, Monday, April 21, 1997, p. A8, col. 1.

B. *Sustainable Management or Prudent Radicalism*: The more prudent approach proposes to reengineer and reoperate dams to simulate pre-dam flows to promote sustainable river use. Sustainable use recognizes that artificial systems are permanent landscape features, but seeks to use science-based adaptive management to achieve use patterns that start from the assumption that the river's historic hydrographic is the norm and inconsistent uses the exception for technical feasibility and economic reasons. After a decade of monitoring the Glen Canyon Environmental Studies, which provide the scientific basis for the re-operation of Glen Canyon Dam, a National Academy of Sciences/National Research Council Committee concluded:

A different kind of management principle, which might be called the principle of naturalness, applies to national parks. Management is minimized, and where it must occur, it is directed toward the maintenance of environmental regime that as nearly as possible resembles the natural or undisturbed condition of the environment. It seems unreasonable to consider the future operation of Glen Canyon Dam without also considering the principle of naturalness as it might apply to the Grand Canyon National Park.

While many aspects of the Grand Canyon are in fact natural or at least not subject to management or direct human perturbation, the river itself and the riparian corridor inevitably are a reflection of human action because of the existence of Glen Canyon Dam. The dam will continue to exist and will inevitably be a means by which the downstream environment is managed, either haphazardly or toward particular goals. The GCES has shown that operation of the dam can be modified in various ways to restore a greater degree of naturalness to the river and riparian environments through maintenance or restoration of physical characteristics of the environment such as beaches or biotic resources such as endangered species. Given the emphasis of national parks on naturalness, and the flexibility of operations to restore some aspects of naturalness, one obvious basis for future management of Glen Canyon Dam might be characterized as simulated naturalness, which could be defined as the use of operational flexibility to restore and maintain environmental conditions in the national park that resemble as nearly as possible the original condition of the river.

Many aspects of the river corridor in Grand Canyon National Park cannot feasibly resemble the original river corridor. As shown by the chapters to follow, however, there are many ways in which the environmental conditions along the river can be restored to a more natural state. These possibilities, some of which are in place or under construction, include adaptation of a more natural hydrologic regime, the introduction of controlled floods, restoration of seasonally warm water in the river, and maintenance of habitat and physical features such as beaches through manipulation of water and sediment. The adoption of simulated naturalness would give a unifying theme and purpose to operational changes with these objectives, and would provide a blueprint for the future.

[National Research Council, RIVER RESOURCE MANAGEMENT IN THE GRAND CANYON 47-48 (1996).]

**IV. The Constraints on Transforming Rivers from Working Rivers to Rivers that Work: Entitlements, Entitlements, Entitlements and Futile Calls.** Large multiple purpose projects were built for purposes that are still vitally important today, and large, powerful political



constituencies have grown up around these projects and the agencies that operate them to support the status quo. They assert entitlements inconsistent with the reoperation of dams and reservoirs as well as questions of technical feasibility. The major river basin management agencies have adopted new more "river-friendly" missions, but they are often constrained by four types of claimed entitlements: (1) vested state water and interstate rights, (2) international entitlements, (3) contractual entitlements and (4) alleged conflicts between the authorized project purpose and the reoperation of the reservoir.

*A. Vested Water State Water Rights.* Prior appropriation is the ultimate river and watershed engine of destruction because it allows the last possible amount of a stream to be released from storage, diverted and depleted to satisfy prior rights. There is no relationship between the source of water and the locus of use. Prior vested state water rights are often raised as defense to reoperation, although courts have held that interference with state water rights is not a defense to compliance with Endangered Species Act mandates. *United States v. Glenn-Colusa Irrigation Dist.*, 788 F. Supp. 1126 (E.D. Cal. 1992).

*B. International Law.* International law reenforces the operation of reservoirs for traditional multiple uses. The historic function of international water law has been to set the ground rules for comprehensive river basin development and to promote treaties among riparian states for the allocation and development of large rivers. See A. Dan Tarlock, *International Water Law and the Protection of River System Ecosystem Integrity*, 10 *BYU J. Public Law* 181 (1996). In recent years, draft water law rules have added important environmental protection mandates, but it is very difficult to promote the protection of the ecological integrity of river systems because such protection is not a conventional water use. For example, flood plain and wetland protection are largely excluded from these new rules which are focused on pollution prevention rather than the required hydrographic of the river. Further, international water law is channel not watershed or ecosystem-based legal regime, and this focus is inherently biased toward development and against ecosystem protection. International legal regimes maintain a persistent but artificial separation of rivers from the flood plains. See Reed E. Noss & Allen Y. Cooperider, *SAVING NATURES LEGACY: PROTECTING AND RESTORING BIODIVERSITY* 95 (1994). See generally

Schudder, *The Need and Justification for Maintaining Transboundary Flood Regimes: The Africa Case*, 31 *Natural Resources J.* 75 (1991) and Ludwick A. Teclaff, *Treaty Practices Relating to Transboundary Flooding*, 31 *Natural Resources J.* 109 (1991).

C. *Bureau of Reclamation Contractual Entitlements.* The Bureau of Reclamation has created many contractual entitlements to deliver project water. Contractual entitlements are legally protected entitlements, but the Bureau of Reclamation has more discretion reallocate them. For example, the Central Valley Project Improvement Act, Title 34 of the Reclamation Projects Authorization and Adjustment Act of 1992, Public Law 102-575, 106 Stat. 4600, (October 30, 1992), creates an 800,000 acre foot pool (600,000 acre feet in dry years) of CVP water which is dedicated to environmental uses such as instream flows. This represents a reallocation of CVP water from project beneficiaries that must be replaced by the Bureau of Reclamation from yet unspecified sources and conservation strategies. The scope of the pool is unclear and the effective use of the pool is yet to be tested. The law does not specify where it can be used, the conditions for use and whether it is available for export after its initial upstream use.

D. *Inconsistent Project Purposes.* This is the most frequent objection to new river management initiatives. For example, the operation of Snake River dams for hydroelectric power generation makes it very difficult to store and release water in a way that would decrease the rate of downstream erosion and prevent the recolonization of riparian corridors. Michael Collier, Robert H. Webb and John C. Schmidt, DAMS AND RIVERS: PRIMER ON THE DOWNSTREAM EFFECTS OF DAMS 3 (U.S.G.S. Circular 1126 1996).

E. *Futile Calls.* Many river systems are so altered that it is not clear that altered but artificial flow regimes will produce the desired environmental benefit. It is not clear, for example, that the adaptive management strategies to save salmon in the Columbia will actually prevent the extinction of many species and populations.

V. **Counter-Entitlements.** There are a variety of non-consumptive uses that can be asserted to require instream flows. Collectively, they do not add up to much more water left in the stream.

However, collectively, these counter-entitlements can support specific basin efforts to reoperate reservoir systems to provide a new more "natural" flow regime.

*A. Instream Flows.* Recent droughts in the western United States have exposed substantial fish population and riparian vegetation to extreme stresses from the prior appropriation doctrine. A number of states have tried to address this problem by recognizing various forms of in stream flow rights to sustain fish populations in designated rivers. Initially, the law of prior appropriation did not recognize rights unless there was a diversion, but most western states now have in stream flow protection programs. See Natural Resources Law Center, *INSTREAM FLOW PROTECTION IN THE WEST* (Revised ed. 1993 Lawrence J. MacDonnell and Terese A. Rice eds. 1993). The public trust doctrine also can promote integrated watershed management by requiring the preservation minimum flows necessary to sustain local fish populations, but it as an ad hoc doctrine limited to the redress of extreme cases of resource use above.

*B. Native American and Federal Public Land Rights.*

(1) *Native American Rights.* Native American tribes have a special class of water rights that adhere to treaty and executive order reservations, *Winters v. United States*, 207 U.S. 564 (1908), which could be the basis for sustainable river management. Native American water rights have characteristics of both appropriative and riparian rights and which are superior to most state created-rights. The distinguishing feature of all aboriginal peoples is that their identity is tied to a specific geographic location, and thus these rights could be a powerful form of basin and watershed protection on Native American homelands or reservations. Until the 1960s, tribal rights were asserted by the federal government under its trust responsibility. As a result, *Winters* rights were generally only claimed to supported existing or planned tribal irrigation needs, and were thus minimal since federal irrigation funding lagged far behind non-Indian subsidies. *Winters* rights are now asserted directly by the tribes and tribal-state tensions have risen. Tribes assert rights to large amounts of water long allocated by state law, to the use of water of irrigation and non-irrigation purposes and for the right to lease the water for non-reservation uses. Many tribes want to use water for non-consumptive, non-irrigation uses and these uses can be the foundation for reservation basin and watershed protection and restoration strategies. Courts have recognized

*Winters* rights for in stream flows and fisheries, but the idea has not been universally accepted. A major Wyoming State Supreme Court opinion has held that *Winters* neither applies to groundwater nor to the use of water for fisheries maintenance. *Winters* rights are also a source of off-reservation transfers and thus could frustrate basin and watershed river restoration efforts. However, the legal power of tribes to transfer water remains disputed. The power to lease to non-Indians is often asserted but has never been directly judicially sanctioned. The transfer to tribal land and probably water requires Congress consent under the Nonintercourse Act of 1790 and this may apply to leases as well as permanent title transfers. See Judith Royster, *A Primer on Indian Water Rights: More Questions Than Answers*, 30 Tulsa L. J. 61, 82- 83 (1994). Indian tribes may also protect their reservations against upstream pollution. Section 505 of the Clean Water Act allows tribes to adopt more stringent water quality for spiritual as well as for public health reasons standards than those required by the federal EPA or the state in which the reservation is located. A Rio Grande River Pueblo, located below the city of Albuquerque, adopted and EPA approved a more stringent sewage discharge standard for arsenic than New Mexico's and applied it against the upstream city. The 10th Circuit upheld EPA's and the Pueblo's power to do so. *City of Albuquerque v. Browner*, 97 F.3d 415 (10th Cir. 1996). See Denise Fort, *State and Tribal Water Quality Under the Clean Water Act: A Case Study*, 35 Natural Resources J. 771 (1995).

(2) Proprietary and Non-Proprietary Regulatory Federal Water Rights. The federal government may also assert reserved rights to carry out the water-related purposes of withdrawn public land units. Federal land management agencies have tried to use these rights to protect riverine stream corridors in national forests and grazing lands, but the Supreme Court has basically rejected the use of federal rights for this purpose except for national parks and monuments. Most non-Indian reserved rights claims are based on the implied rather than the express intent of Congress in withdrawing public land from entry. In a case denying reserved rights for national forests, the Court developed a high threshold test: (1) there must be strong evidence of implied intent, (2) the water must be for the primary not secondary purpose of the reservation and (3) the right is limited to the minimum amount of water necessary to carry out the purpose of the withdrawal. *United States v. New Mexico*, 438 U.S. 696 (1978). In addition to state laws that create in

stream flow rights, the federal government has the power to mandate conservation flows through the assertion of federal regulatory water rights. Regulatory water rights are de facto rather than de jure proprietary rights that arise because of federal and state regulatory programs. Regulatory property rights refer to the impact on state water rights from federal programs which require flow releases that may be inconsistent with state water law. The three most important federal programs that can supersede state water law are Sections 401 and 404 of the Clean Water Act and the Federal Endangered Species Act. Prior the 1970s, the federal government generally asserted only proprietary water rights. Programs such as the Clean Water Act, Federal Power Act of 1920 and the Endangered Species Act of 1973, have the potential to require that large quantities of water be released from federal reservoirs or left in streams to fulfill the federal program objectives. These decisions may preempt state water allocation law and thus often drive current watershed protection efforts. For example, the Endangered Species Act applies to both new and existing federal water projects and to federally licensed projects. Section 401 of the Clean Water Act is another source of new regulatory rights that give the states increased power to protect their watersheds and basins from the adverse water-quality related effects of federally licensed projects. The section requires state certification that a federal facility or licensed facility complies with state water quality standards. PUD No. 1 of Jefferson County v. Washington Department of Ecology, 114 S. Ct. 1900 (1994) holds that a state may refuse to certify a hydroelectric facility because the proposed minimum flow schedules were inadequate to meet the state's anti-degradation standard. The Court refused to confine state certification to chemical pollution, calling the distinction between water quantity and quality "artificial."

## **VII. CONCLUSION**

The future of river management will be characterized by three features that will try to move toward the sustainable vision articulated above: (1) all efforts to restore natural hydrographs or the best feasible approximation are experiments, (2) management institutions will practice adaptive management as new scientific information suggests new and revised strategies and (3) a primary function of modern river basin management regimes is to move toward risk allocation among the major stakeholders. The risk allocation model recognizes that a large

number of stakeholders have legitimate interests which can better be 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.