

Parched: The Future of the Glen Canyon Dam in a Drier West

by Bruce Clotworthy

Once fluctuating from a trickle to a torrent, the Colorado River has been subdued from its headwaters to its delta by water development. In just over one hundred years, we have turned her from one of the most uncontrollable rivers in the world into a tame workhorse. With all of the dams and diversions on the Colorado River, we have indeed harnessed the powers of the river for the growth of society in the West, but at what cost? Spectacular Glen Canyon was drowned, and, despite efforts to save them, the unique ecosystems of the Grand Canyon and the once vibrant wetlands of the Colorado River delta are in grave peril. Due to an unwillingness to take a comprehensive look at all of the available options, we are now faced with a water management crisis within the Colorado River basin. Any adequate analysis of these options must include some scrutiny of how the system would function without the storage created by the Glen Canyon Dam. The latest scientific information, considered in light of current conditions in the basin and the potential consequences of inaction, requires a new vision for a new century.

Climate Change and Drier Conditions

Despite the public perception that the current drier conditions are temporary, the United States Geological Survey is suggesting that the drought may actually be a return to normal, more arid conditions.¹ Tree ring records indicate that the flow of the Colorado River has historically averaged significantly less water than was divided up between the parties who share that water.² To exacerbate this shortfall, the amounts promised to each user did not originally include considerations that protected the environment³ and did not adequately consider Native American water rights.⁴ Currently the demand for this limited resource far exceeds the supply needed to satisfy all of the claims on the river and demands are only expected to increase. The current water management crisis should be seen as an opportunity to reassess the way we manage water in the West, and update our current outdated water delivery system. Meeting the growing water needs of the West with a finite and potentially shrinking resource, and restoring the health of the Colorado's fragile ecosystems is the daunting challenge

facing policymakers, water managers and everyone living within the river's influence. Changing conditions and social values call for a reevaluation of the management of the entire Colorado River basin in pursuit of a sustainable water delivery system. In this reevaluation, we must at least consider the evidence that the system could function more efficiently without the Lake Powell reservoir.

The Original Purposes of Glen Canyon Dam

The Glen Canyon Dam was born of the Colorado River Storage Project Act ("CRSP")⁵ which was passed primarily to regulate the flow of the river and to provide storage in the upper basin that would fulfill Compact obligations to the lower basin states.⁶ The Dam was built upriver from Lee's Ferry where releases from the upper basin storage are measured to see that they meet the allotted 82.3 million acre feet (maf) to be delivered to the lower basin and Mexico every ten years. Some analysts theorize that there would have been no need for the Glen Canyon Dam if they had merely changed the upper basin's delivery point from Lee's Ferry to the foot of the Hoover Dam and used Lake Mead to store the water.⁷ Today, there would be even less of a need for the extra storage provided by the Glen Canyon Dam since nearly 9 maf of storage has been added above the Hoover Dam.⁸ Considering the water wasted through evaporation and seepage on Lake Powell, the reservoir looks even less attractive as a storage facility under current drier conditions.⁹

The development of the Colorado River was based on a different set of conditions than currently exist. Western water law is based on a doctrine of prior appropriation¹⁰ which historically

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avored private over public water use, held water rights to endure through beneficial use¹¹, and considered it reasonable to divert the entire flow of a stream.¹² Under prior appropriation, unused water was wasted water.¹³ Fortunately, we now live in a society that places increasing value on public uses of water, has a definition of beneficial use that is increasingly concerned with waste¹⁴ and developing laws that require some flow be left in rivers to comply with the Endangered Species Act (“ESA”).¹⁵ Despite these advances, management of western water under the pressures of current demands has not been kind to many species in the Colorado River Basin and in large part, still subscribes to the outdated policies instituted forty years ago.

ESA and the Colorado River Delta

Today, five of the eight fish species native to the Glen and Grand Canyons are endangered or extinct.¹⁶ Some of the causes of these declines are changes in water temperatures, the introduction of exotic species, and the physical obstructions that the large western dams pose to spawning. All of these causes are the result of man’s manipulation of the Colorado’s flows. Programs such as the Lower Colorado River Multi-species Conservation Program (“LCR MSCP”) are having some modicum of success in restoring endangered habitat, but critics of the LCR MSCP say that the program doesn’t consider the health of the Colorado River delta in its programs.¹⁷ With six major species recovery programs ongoing in the Colorado River basin, a systemic approach will be the only way to mitigate the ongoing degradation of species and ecosystems and a cooperative effort is crucial. Restoring the Colorado River to a more natural condition by eliminating Lake Powell should be considered as an alternative. The ESA indeed has the power to challenge the validity of a giant dam project as it did in the landmark case,

Tennessee Valley Authority v. Hill.¹⁸ In that case, the presence of the endangered snaildarter was enough to halt the construction of the mighty Tellico Dam. Today, the ESA may still be the strongest tool in challenging the Bureau of Reclamation to deauthorize Glen Canyon Dam or finding a better way to manage it to protect dwindling habitat.

A free flowing Colorado River in the Glen Canyon may do more than just restore the riparian ecosystems in the Glen and Grand Canyons. It may also provide more water for the decimated Colorado River delta. The delta wetlands have been reduced to only five percent of their original size due to a reduction of freshwater flows by as much as 75%. When the Hoover and Glen Canyon Dams were being filled, virtually no water reached the delta.¹⁹ Deliveries of water to Mexico are guaranteed by treaty²⁰ but most of that water is allocated for agricultural use leaving little water for one of the most fragile and important ecosystems in the world. Both the United States and Mexico have recognized the delta area as a unique ecosystem that requires specific management.²¹ One proposal for protecting this distinctive environment is to add a new minute (amendment) to the U.S./Mexico treaty that would require both countries to manage the River to maintain the health of the delta.²² If this happens, shutting off the flow into the delta to refill Powell and Mead will be more difficult. Eliminating Powell as a storage facility may be one way to ensure some increase in flow to the delta. But even this may not ensure flows in the face of increased demands on the river.

Native American Issues

The future also holds potential legal challenges for Native American groups impacted by the problems facing management of the

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Colorado's waters. Native American reserved water rights²³ have only recently begun to be addressed. There are ten tribes with vested water rights on the Colorado River. Demands by these tribes to honor reserved water rights will pressure the parties to the Compact to provide water for current uses and Native American rights. Furthermore, with many Native American cultural sites reemerging with dropping lake levels, new legal challenges similar to the fight over Rainbow Bridge²⁴ will also resurface. In that case, the court held that the reservoir could be filled despite the encroachment on Rainbow Bridge, a sacred Native American site. However, this ruling was based upon the assumption that "a full Lake Powell was required to provide basic storage necessary to fulfill the delivery requirements to the downstream states and Mexico." With new evidence that Lake Powell may not be necessary to fulfill delivery requirements, the door may be open to new legal challenges to protect places like Rainbow Bridge.²⁵

Issues Surrounding the Refilling of Lake Powell Reservoir

There are many other legal challenges on the Colorado River basin that may test the validity of refilling Lake Powell. Issues dealing with the Clean Water Act, the Grand Canyon Protection Act, and the Endangered Species Act could potentially stall efforts to refill the reservoir above current levels (currently 38% of capacity).

When Lake Powell was originally filled there was far less demand on the system than there is today. Lake Mead was at capacity, the Central Arizona Project was not on line, and there was little demand from the upper basin. Despite the lower demands on the river, it took 17 years to fill Lake Powell. It will be much more difficult to curtail enough demand to see it full again anytime soon, if ever. The question should be carefully asked whether refilling Lake Powell would constitute a major state action that would trigger NEPA analysis and a systemwide environmental impact study.

Furthermore, with the cost of water rising in the West, the market could push the value of the water being wasted to evaporation to a level that far exceeds any economic benefit from maintaining Lake Powell as a tenuous water storage facility. Rising water costs could push the idea of interbasin water marketing from the upper basin to the lower basin (prohibited by the Law of the River) into the courts.²⁶ With these changing conditions, it is time to reexamine the value and management of the most precious resource in the West. Any reexamination should consider all of the viable alternatives to the current management of the basin, including some study of the system without storage at Glen Canyon. However, there is a conscious and consistent resistance to such an examination.

The Appropriations Rider

Every year a rider latches onto the Interior Appropriations bill which reads, "No funds appropriated for the Department of the

Interior by this Act or any other Act shall be used to study or implement any plan to drain Lake Powell or to reduce the water level of the lake below the range of water levels required for the operation of the Glen Canyon Dam."²⁷ This unfortunate language is but a small example of the unwillingness of lawmakers to adequately assess all of the alternatives to the current management of the Colorado River despite the obvious shortcomings of that management.

When it is full, the water level in Lake Powell reservoir is at 3700' above sea level. The water level currently sits at 3570' and continues to fall. Minimum power operating level, where the Glen Canyon Dam loses its capacity to generate electricity, is at 3490 feet. At 3371', the water would reach the bottom of the river outlets and the dam would not be able to release any water. At that level, Lake Powell would sit in a stagnant state known as deadpool. At deadpool, the riverbed of the Colorado could be dry through the Grand Canyon. Currently, the Bureau of Reclamation does not even have a contingency plan for the reservoir reaching this level despite the fact that under a continuation of the current drought conditions, it could reach that level in the near future.²⁸ This is largely a result of the appropriations rider's prohibitions on dam studies.

Conclusion

In light of the current conditions, some western water managers are calling for reforms of western water policy. Pat Mulroy, general manager of the Southern Nevada Water Authority, has been pushing Las Vegas to conserve water in creative ways from paying people to remove their lawns to pushing for a reduction in the amount of water release from the upper basin from 8.23 maf to 7.8 maf during times of drought.²⁹ Janine Jones of the California Department of Water Resources addresses the issue: "They divided up a very large pie, and we have a smaller pie."³⁰ Dennis Underwood places the current water management crisis in perspective by pointing out that, "The worst thing that could happen now is if this drought goes away and we don't do anything."³¹ The current dry conditions in the West allow us as a society to reevaluate the efficiency of our current Colorado River management policies, and to take steps to ensure their sustainability.

Any analysis of the Colorado River basin should explore a broad range of management alternatives including the feasibility of deauthorizing the Glen Canyon Dam. This should consider new analysis of historical flows on the Colorado as well as future climate models. It should also take into account an economic analysis that looks at all of the costs and benefits of maintaining the dam in the long term including the following: the cost to endangered species, the cost of water wasted through evaporation and transpiration at rising rates being paid in western cities, the

inevitable costs of losing power generation during periods of extended drought, and the mounting sediment cleanup costs imposed by continued dam operation. Any comprehensive analysis of the management of western water must also consider new and better technology for storing water in arid climates and the implementation of better conservation measures.

The current conditions call for a reassessment of the entire system, including an environmental impact study for the operation of the Glen Canyon Dam that includes deauthorization as an option. A free flowing Colorado River will mitigate waste, benefit endangered species, and be a catalyst for long-overdue reform of western water policy. The situation at Glen Canyon provides us with an opportunity to evaluate change and develop a cooperative approach to future management of water in the West. It builds on the strengths of the past, while utilizing improved information and abilities. Liken it to the changes that have been made in industry – as new information becomes available, we improve and evolve; we don't stay locked into the historic way of doing business. This perspective should be applied to the Colorado River.

1. U.S. DEPARTMENT OF THE INTERIOR, CLIMATIC FLUCTUATIONS, DROUGHT, AND FLOW IN THE COLORADO RIVER, USGS Fact Sheet 3062-04, June 2004 (*hereinafter* USGS Fact Sheet). This study indicates that the flow levels used to calculate the allocations under the Colorado River Compacts were made during one of the wettest periods in the last 450 years. The allocations of water under the Colorado river compacts are based on an estimated flow of over 16 million acre feet per year (maf) of water when a more realistic long term analysis puts the flow at around 13maf.
2. The Colorado River water is divided up among seven states and Mexico according to a series of acts of Congress, treaties, Supreme Court decisions, and state laws that have become collectively referred to as "the Law of the River." A brief summary can be found at the Bureau of Reclamation website at <http://www.usbr.gov/lc/region/g1000/lawofrvr.html> (last visited Oct. 6, 2004). Other laws such as the Endangered Species Act ("ESA"), 16 U.S.C. 1531-1544 (1994); the Clean Water Act ("CWA"), 33 U.S.C. §§ 1251-1387 (1994 & Supp. III 1997); and the National Environmental Policy Act ("NEPA"), 42 U.S.C. 4321-4370d (1994 & Supp. III 1997); as well as Native American water rights are becoming increasingly important parts of the Law of the River and in the management of western water.
3. Most of the major environmental laws were not in place as the "Law of the River" was developing. If laws like the ESA, NEPA, or CWA had been in place when the compacts allocated water to various states, the Colorado would probably look vastly different today.
4. Both the Colorado River Compact (CRC) and the Upper Colorado River Basin Compact (UCRBC) limited language in the compact to Article VII which stated that "nothing in this compact shall be construed as affecting the obligations of the United States to Indian Tribes." CRC, 70 Cong. Rec. 324 (1928). UCRBC, Act of Apr. 6, 1949, Pub. L. No. 81-37, 63 Stat. 31 (1949).
5. Colorado River Storage Project Act of 1956, Pub. L. No. 84-485, 70 Stat. 105 (codified as amended at 43 U.S.C. §§ 620-620o (1994)).
6. The generation of hydroelectric power and recreation were secondary benefits. *Id.*
7. Scott K. Miller, *Undamming Glen Canyon: Lunacy, Rationality, or Prophecy?*, 19 STAN. ENVTL. L.J. 121, at 183.
8. *Id.* At 178.
9. *Id.* at 176. Draining Lake Powell would eliminate the loss of approximately 1maf per year.
10. See, Dan Tarlock, *The Future of Prior Appropriation in the West*, 41 NAT. RESOURCES J. 769. Under the doctrine of prior appropriation, water users with the oldest priority dates have senior rights and will get their entire allotments in times of shortage. Some critics say that these "use it or lose it rights" encourage inefficient uses such as marginal agriculture and these inefficient uses often have an adverse effect on aquatic ecosystems.
11. For a discussion on the expanding definitions of beneficial use and waste, see Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENTL. 919. "Beneficial use, without waste, is the basis, measure, and limit of a water right."
12. Adrian N. Hansen, *The Endangered Species Act and Extinction of Reserved Indian Water Rights*, 37 ARIZ. L. REV. 1305, at 1314
13. Chris Bromley, *A Political and Legal Analysis of the Rise and Fall of Western Dams and Reclamation Policy*, 5 U. DEN. WATER L. REV. 204, 220;
14. Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. REV. 257. "Only as more demand is placed on the river is there a need to constrain uses in order to meet the purposes of an anti-waste policy. Thus the very essence of a law of beneficial use implies revisions over time as needs and circumstances change."
15. *Rio Grande Silvery Minnow v. Keys*, 333 F.3d 1109 (10th Cir. June 12, 2003). Holding that the Bureau of Reclamation had the discretion to reduce previously contracted water deliveries to comply with the ESA and that the diversion of water for species protection was "beneficial use".
16. Miller, *supra* note 8, at 196.
17. Ethan Shaner, *Balancing Current and Future Demands for Colorado River Water With the Requirements of the Endangered Species Act*, 28 WM. & MARY ENVTL. L. & POL'Y REV. 951.
18. 437 US 153 (1978).
19. 14 Colo. J. Int'l. L. & Pol'y 241.
20. Treaty Respecting the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Feb. 3 & Nov. 14, 1944, U.S.-Mex., 59 Stat. 1219 [1944 Water Treaty].
21. International Boundary and Water Commission, *Conceptual Framework For United States – Mexico Studies for Future Recommendations Concerning The Riparian and Estuarine Ecology of the Limitrophe Section of the Colorado River and its Associated Delta* (Dec. 12, 2000), available at http://www.ibwc.state.gov/html/body_minutes.HTM (last visited Oct. 9, 2004).
22. *Id.*
23. In *Winters v. United States*, 207 U.S. 564 (1908), the court held that the reservation of land for tribes also implied the reservation of water rights necessary to make that land Productive. See Adrian Hansen, *The Endangered Species Act and the Extinction of Reserved Indian Water Rights on the San Juan River*, 37 ARIZ. L. REV. 1305.
24. *Badoni v. Higginson*, 638 F.2d 172 (10th Cir. 1980).
25. Miller, *supra* note 7, at 153.
26. Hansen, *supra* note 23, at 1337.
27. Pub. L. No. 106-113, § 1000(a)(3) (1999) (incorporating by reference H.T. 3423, 106th Cong. § 135 (1999)).
28. I have been told that the Bureau of Reclamation is developing such a plan, but I have not seen a draft.
29. *Colorado River States Talking About Stemming Drop In Lake Powell*, LAS VEGAS SUN, Aug. 20, 2004.
30. *As Reservoirs Recede, Fears of a Water Shortage Rise*, LOS ANGELES TIMES, Oct. 3, 2004.
31. *Id.*