

Managing River Flows for Recreation and the Environment

Presented by

Steve Harris

Rio Grande Restoration, Embudo, NM

Introduction: Rivers occupy a unique position in the long-running national conversation about natural resource conservation and the question of who, exactly, has responsibility for the condition of ecosystems. Lands can and have been managed to reduce the outright damage from such extractive activities as timbering, mining and grazing. But rivers contain water, a commodity with particular importance to both the economic aspirations of the human species and the survival of every other living thing. Rivers present a paradox: can we both use and conserve rivers?

The underlying assumption in my presentation today is that our society possesses the means to extend our management of rivers to accommodate other than commodity values. I will talk about whitewater recreation as an example of such values, with the Rio Chama as a particular case in point.

The open question is whether sufficient will exists to expand our thinking about rivers and our management of them to include intangibles like biodiversity protection and ecological stewardship, alongside water consumption and water resources development. My bias is that we should be thinking a little more broadly about protecting rivers, but the main thrust of my remarks is about the practical-legal and engineering-issues to be resolved in meeting such objectives.

Economic Value of Rivers: Most everyone intuitively understands that rivers, in the guise of commodities, have real economic value: they supply water to cities, industries, and farms. A little less obvious may be the value of the environmental services they provide: transporting sediments and contaminants, cycling nutrients to nourish the agro-ecosystem, recharging our aquifers. Such services have tangible, instrumental benefits to society, determinable as the dollar-cost of replacing these river services.

Sometimes undervalued in modern society are some important intangible values. Rivers support biological diversity: frogs and fish, cranes and ducks and wild turkeys, otters and bobcats, and more. They are the spiritual bedrock of indigenous cultures, a miraculous treasure of water coursing across our landscapes, flowing through our interior lives. We find in rivers the peace and beauty of natural processes expressing themselves to our senses, a value we sometimes refer to as ‘quality of life’.

Here is where we encounter “recreation” and recreational stream flows- our topic of the hour.

Tourism Economy: Floating down rivers is quite a popular pastime, in fact is practiced by many in attendance at this “Law of the Rio Grande” conference. These conferees know how rafting, kayaking and canoeing through wild river canyons can be exhilarating, inspirational and how it may put them in touch with wild nature. Over the past 25 years river-running has become a mainstream activity. In fact, it is a cornerstone of the travel industry phenomenon known as “eco-tourism”.

Eco-tourism is an unusual industry. Its values are equal parts educational and economic. It intends to link travelers to the conservation of biological and cultural diversity and to include local and indigenous communities in its benefits. River outfitter businesses, such as my own, lend themselves to this model, as local guides and their guests tread lightly across local landscapes. Our appeal is closely linked to the vitality of the nature, culture and communities which we visit. Wild nature is, in essence, our capital.

River-running brings considerable economic benefit to Rio Grande Basin states. In New Mexico today, tourism is our second largest industry, providing about 80,000 jobs, paying a billion dollar annual payroll, and generating nearly \$700 million in tax revenues.

Eco-tourism/adventure travel is a robust component of tourism, overall. Nature, culture and history visitation generates about one-fifth of visits to New Mexico. Adventure travel, if one includes hunting and fishing, accounts for 10% of visits¹. Outfitting of whitewater adventure is at least a \$25 million industry.² Although the actual expenditures for such activities are relatively small, our region's natural, cultural, historical and adventure attributes are an engine which generates substantial added-value as sales of lodging, dining, retail and other, more traditional products.

Nationally, eco-tourism is the fastest-growing segment of the travel industry. As a proponent and beneficiary of the river travel industry, I can tell you that there is much unfulfilled potential in New Mexico, greater value to be gained if we can integrate river running into our water management processes. Valuable as drinking water and irrigation water may be, the same water we claim for these purposes can do "double duty" if released at times and places that also accommodate recreation.

All of this is by way of answering the question of why we should provide river flows. I'll now turn to the question of how we can provide these values.

Rio Chama Recreational Flows: Case Study

The Rio Chama rises in the southern San Juan Mountains, where it shares a watershed divide with the San Juan River Basin. It flows through the far southeastern corner of the Colorado Plateau geographic province, carving a canyon through the thick, colorful sedimentary strata. In 1988 Congress designated the Chama as a National Wild and Scenic River, in recognition of its outstandingly remarkable aesthetic and recreational values. It is jointly managed for these values by the Santa Fe National Forest and the Taos Field Office of the BLM, which provide access to about 4000 recreational river runners each year.

The Rio Chama is marvelous river resource. The 30 mile run between El Vado and Abiquiu Reservoirs offers entry level whitewater, abundant campsites in pine-fir forest and a number of natural attractions, including ancient pit house dwellings, fossil dinosaur footprints and sculpted sandstone side canyons. Although it is obviously a regulated environment, it retains distinct wilderness feel. Fortunate travelers may observe black bears, bald eagles, wild turkeys and mule deer. For a short distance downstream of El Vado, the Chama supports a tail-water trout fishery.

A major tributary to the Rio Grande, the Chama produces about 200,000 acre feet of snowmelt runoff on average which, since 1974 has been augmented with about 100,000 acre feet of water diverted across the Continental Divide into the Rio Grande. The native portion of its flows are claimed by the irrigators of the Middle Rio Grande Conservancy District (and the Rio Chama acequia associations). Under ideal conditions, MRGCD impounds up to 160,000 acre feet of native water in El Vado Reservoir, which it "co-manages" with the Bureau of Reclamation.

The yearly trans-basin flows of the San Juan Chama Project are released into the river for use by Reclamation contractors, largest of which is the City of Albuquerque (now the "Albuquerque-Bernalillo County Water Utility Authority"), which stores its 50,000 acre foot entitlement in a SJCP pool, leased from the Army Corps of Engineers, at Abiquiu Reservoir.

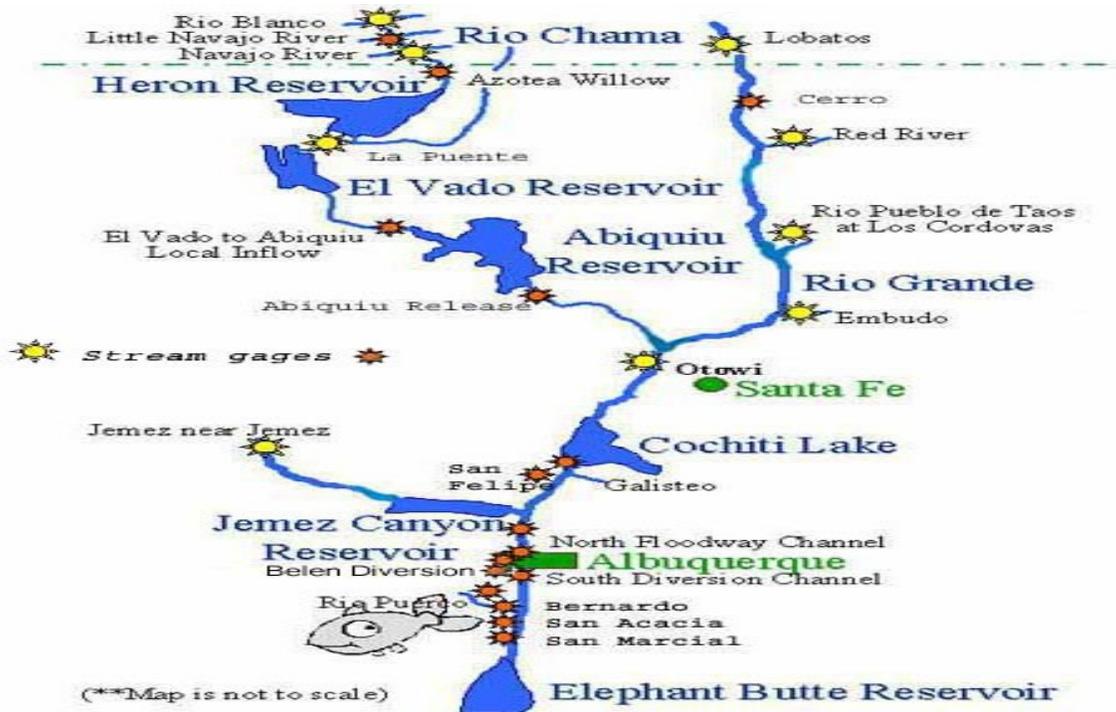
¹ NM Department of Tourism website. See URL: <http://www.newmexico.org/go/loc/research/page/dept-travelscope.html> (12-21-06).

² Colby, et al. "Economic Impacts of Streamflow on Whitewater Rafting on the Rio Grande", University of Arizona Dept. of Agricultural Economics (1992)

With nearly 700,000 acre feet of reservoir storage above the Wild and Scenic section and 180,000 acre feet of conservation storage below, one can see that water managers enjoy an extremely high degree of physical control over the (generously augmented) flows of the Rio Chama. The northwest portion of the map below illustrates these advantages.

Rio Grande/Rio Chama “PLUMBING” DIAGRAM

Courtesy of US Bureau of Reclamation



Weekend Releases Program: Prior to 1984, San Juan Chama water was often released in a block of water to satisfy the mandates of the SJCP authorizing legislation, which obligated contractors to take delivery of their annual entitlements in the calendar year in which it was diverted. Often this meant that, in November and December, the Chama would swell to a steady 2,000 cfs, describing a hydrograph quite contrary to its normal, pre-Project pattern.

Observing that the current managed hydrograph forfeited potential benefits to fish, wildlife and recreation, a BLM “fisheries hydrologist” convened a stakeholder process to consider alternative stream flow regimes that would accommodate more than consumptive uses.

An NMSU economic study, conducted in 1986, concluded that water regulated to enhance river recreation in the Rio Chama National Wild and Scenic River (float-boating and fishing) added substantial potential income to the tourism economy of Rio Arriba County. In fact, the study found that the recreational value of the water exceeded its value for irrigation by a substantial margin.³

³ Ward, *Economic Impacts of Rio Chama Instream Flow Releases on Recreational Boating*, 1987

The New Mexico Department of Natural Resources and City of Albuquerque executed a 25 year lease agreement (1984), under which the City would 6000 acre feet of its SJCP water annually to offset the evaporation losses from the minimum recreational pool in Elephant Butte Reservoir. This agreement will expire in 2010. Secondarily, the City also agreed to relocate water stored in Heron Reservoir to Abiquiu, on a schedule that would increase flows for weekend rafting. The agreement also specified that if the City was allowed to carry over their SJCP allocation past December 31, that it would provide Fall fish maintenance flows.

Department of Interior solicitors, at the joint request of local BLM and Reclamation managers, agreed that Reclamation could, on a case-by-case basis, extend waivers to allow SJCP water to remain in Heron until April 30 of the following year.

Following designation of the Rio Chama as a National Wild and Scenic River in 1988, BLM-Taos Field Office commissioned an “Instream Flow Incremental Method” analysis which, in addition to evaluating recreational flow needs, also determined a winter season minimum flow target of 185 cfs to sustain Bald Eagle and Rainbow Trout populations.⁴

Based in part on these events, the BLM was able to negotiate an informal arrangement that provided a series of six or more three-day weekend recreational releases in July and August each year. Target flows of 900-1000 cfs were provided by augmenting normal releases with water slated to meet MRGCD demand in the near term future. No more than 5,000 acre-feet/weekend need be transferred from El Vado to Abiquiu.

In addition to the BLM, principal parties to the weekend recreational release program included:

- City of Albuquerque (City), which provided a portion of its Abiquiu Reservoir storage to re-regulate the supplemental recreational flows.
- Middle Rio Grande Conservancy District (MRGCD), which provided water releases, in excess of its momentary demands, to supply the recreational flow targets.
- US Bureau of Reclamation (Reclamation) which administers releases from both Heron and El Vado Reservoirs and accounts for delivery of irrigation, Pueblo Prior and Paramount and silvery minnow supplemental water rights.

Other key parties were involved, including:

- US Army Corps of Engineers (Corps) which administers contracts for the storage of San Juan Chama water at Abiquiu Reservoir and flood control operations out of Abiquiu.
- NM Natural Resources Department (State Parks) whose contract with the City included water to offset any increased reservoir evaporation resulting from recreational operations.
- NM Interstate Stream Commission (ISC) which administers water depletions in the Rio Grande stream system and compliance with the Rio Grande Compact.
- Rio Chama Acequia Association (RCAA) the other irrigation water users who might be impacted by re-regulation of flows out of Abiquiu.

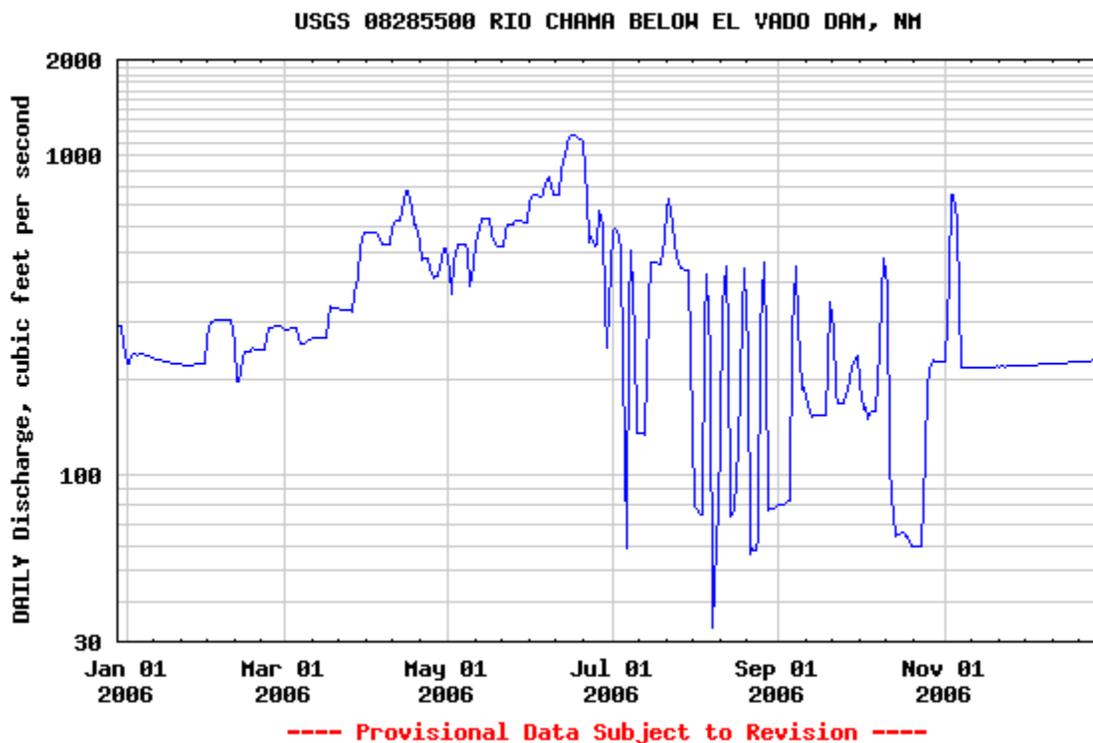
From 1986 to 2001, Reclamation was able to satisfactorily manage upstream reservoirs to comply with BLM’s recreational and wildlife objectives. From today’s vantage point, it is clear that the weekend recreation release program succeeded largely due to the BLM’s skills in

⁴BLM, *Rio Chama Instream Flow Assessment*, 1992

eliciting cooperation across the administrative landscape. It was immensely advantageous that SJCP water was abundant and the risks to irrigators were readily mitigated.

Current Recreational Flow Opportunities and Challenges: With the passage of time, the informal consensus which made weekend releases possible has begun to pull apart. As retirement and re-assignment of agency personnel have changed the playing board, “institutional memory” has faded.

Between 2001 and 2004, a succession of years of diminished runoff, water operations increasingly influenced by Endangered Species Act prescriptions, the impending operation of the Albuquerque-Bernalillo County Water Utility Authority’s SJCP Drinking Water Project, and recent prohibitions on upstream storage under Article VII of the Rio Grande Compact have made recreation flow management much more demanding. Though Reclamation has accepted primary responsibility for boating and wildlife releases, winter minimum flows have sometimes fallen short of the original targets and weekend recreational releases have become somewhat less reliable.



At the same time, the universe of objectives for flow releases has expanded and evolved.

- Commercial outfitters aspire to week long runnable flows to grow their operations and satisfy a potential client base.
- Sailing on Heron Reservoir has become problematic in view of declining lake levels.
- A history of spiky flows below El Vado have eroded river banks and impacted the trout fishery. (Notice the unpredictable, and undesirable, fluctuations in last season’s hydrograph, shown above.)

Likewise, institutional objectives have changed, in directions that tend to create a more adversarial set of relationships among stakeholders, upon whose cooperation the recreational flow program has relied. Today, a scarcity mentality raises vexing questions:

- In the context of the Rio Chama General Stream Adjudication, BLM is claiming an in-stream flow water right, confusing water rights administrators and raising anxiety among water users. Is BLM trying to persuade the court to impose stream flow conditions that might be more easily obtained by collaboration?
- Article VII storage restrictions have so constrained MRGCD's El Vado operations that whenever rain falls in the middle valley, reservoir releases are abruptly curtailed. Managers wonder: will water released in excess of demand be lost forever?
- Smaller SJCP contractors like Santa Fe are eyeing storage rights in Abiquiu. So are the downstream Pueblos and so is the silvery minnow recovery program. Which water users will get to conserve or carry over their entitlements at Abiquiu?
- In the wake of the storage provision of a settlement agreement between environmental groups and the Water Utility Authority, the City and Corps have begun wrangling over control of the leased storage pool. Is Abiquiu's conservation storage capacity to be a locally- or federally-controlled resource?

The Upper Rio Grande Water Operations Review and Environmental Impact Statement is in the process of analyzing the flexibilities and constraints inherent in Corps and Reclamation authorities. Two of these of these bear directly on the recreational flow program:

- Can the Corps allow storage of native water in Abiquiu? If not, can it re-regulate native water? What does re-regulation mean? A day? A month? Some longer portion of a season?
- Can Reclamation permit SJCP contractors to carry over storage in Heron longer than April 30, say until the end of the year following? If so, Albuquerque water could be managed to smooth radical fluctuations in flow during summer months and maintain fish flows in winter months.

The uncertainty surrounding these issues may be the reason we have not, as of this writing, the Record of Decision in the URGWOPS. Their importance to Compact and ESA compliance assures that they will, eventually, be decided.

Applying Lessons from the Rio Chama

On one level, the Rio Chama Recreational Flow program can be viewed as an encouraging success story: the agencies concerned found a practical way to integrate a new objective into an existing water management scheme. On another level, it is a work in progress offering new challenges for managers to adapt to. Significantly, it is also an object lesson in dealing with risk, uncertainty and competition, those time-honored hallmarks of society's attempts to equitably manage the gift of rivers. The Chama experience points out some of the prerequisites for achieving lasting success in improving flow management on other rivers and to satisfy other emerging needs, such as flows to protect and restore declining river ecosystems.

1. Identify Specific Objectives: This prerequisite may seem self-evident, but the full range of objectives had to be identified before the desired changes to water management regime could proceed. On the Chama, water managers were challenged to "provide 1000 cfs for three days on

six consecutive weekends”. This new objective was overlaid on other, more general goals such as “optimize conservation storage in El Vado” and “meet MRGCD delivery requirements” obliging managers to acknowledge a big picture of all they were trying to accomplish. Such a goal setting exercise will help re-define the range of what is possible in more complex settings.

2. Possess the Physical Ability to Regulate Flows: The ability to release water from El Vado for the in-stream purpose and recapture it at Abiquiu for the irrigation purpose was a unique advantage. But society’s astonishing physical control of rivers is exercised by other methods than impoundment. In another, less auspicious, logistical context, reducing the scale of diversions could also serve to manage increased stream flows, though applying this technique might involve maneuvering more complex trade-offs.

3. Uncover Institutional Flexibility to Manage the River Holistically: River management efforts confront a welter of federal and state water policies, laws and traditional practices, most of which were formulated when water development for irrigation was the prime directive in water management. Certainly fish, wildlife, recreation and ecological interests have continued to emerge as worthy considerations in the whole scheme of how society manages rivers.

When Reclamation began to embrace the challenge of providing recreational flows on the Chama, it discovered that it possessed the flexibility to allow carry-over storage in Heron Reservoir. Unfortunately, asserting the narrow constraints of existing mandates are commonly used tools for those who fear and resist change that would broaden the scope of water management. And while substantial opportunities appear when they are sought, true institutional constraints are also abundant. If consensus can be developed, authority can be broadened to embrace new considerations. For example, in 1974 Congress re-authorized Abiquiu Reservoir, to add a conservation storage purpose to the flood control purpose for which it was originally authorized.

While irrigation and municipal water supply continue to be the dominant purposes of Rio Chama water management, the goal of expanded recreational benefits has been at least partially realized through creative interpretations of the subtleties of agency prerogatives.

4. Set the Table for Cooperation: Inclusion and dialogue are the critical ingredients of success in any stream flow management program. Although the Rio Chama offered unusually advantageous “plumbing” for the recreational purpose, a substantial trust-building effort was required if the needs of all stakeholders were to be accommodated. Identifying and including each affected party was BLM’s essential innovation. Parties needed to be convinced that the recreational objective was a worthy one. The several-year-long process of convening all the essential players included field trips, one-on-one and more general meetings, essentially organizing a forum for considering ideas, evaluating options and, most importantly, for resolving conflicts.

5. Devise Ways to Minimize Risk: Risk, real and perceived, can scuttle innovative flow programs. Resistance to change almost inevitably comes from parties with the most to lose. On the Chama, assuring MRGCD that it would be compensated for any incidental evaporation losses, was the key to gaining its cooperation.

Not to be overlooked as a viable risk abatement strategy was the essentially informal nature of the Chama recreational flow agreement. Not reducing the several critical elements to writing offered cooperators the blanket assurance that if the program was working to a party's detriment, it could back off to a former position of greater certainty.

6. Have Leadership: Who, or what, will provide the impetus for change? As in any situation, leadership on the Chama required a healthy measure of vision and courage to get “outside the box”. Originally, it was one BLM manager who provided the leadership prerequisites. Today, that role has been ceded to Reclamation. In any case, the leader has to possess sufficient authority to leverage the process forward. Lacking authoritative leadership, the impetus for change may eventually reach the point of crisis, a most certain, but less desirable, catalyst for any management change.

Having been involved as a secondary stakeholder in, and beneficiary of, the Rio Chama Recreational Flow program, I'd like to close by offering a potentially useful innovation to be considered by any program that would extend the benefits of stream flow to accommodate both “new” and “old” water uses.

Design the Most Desirable Hydrograph: On the Rio Chama, this design hydrograph will integrate the low flows desired by fishermen and the intermediate flows desired by boaters, with the orderly water deliveries required by municipal and irrigation users and the minimum requirements determined by fishery managers. Water managers will design, apply and adapt scientific models of the system, consider variations in annual supply and hew more closely to the natural flow patterns with which the river ecosystems have evolved.

With the appropriate measures of cooperation, vision and will, all stakeholders may be able to reap a wider diversity of benefits that can be achieved from more intentional water management.

Additional References

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