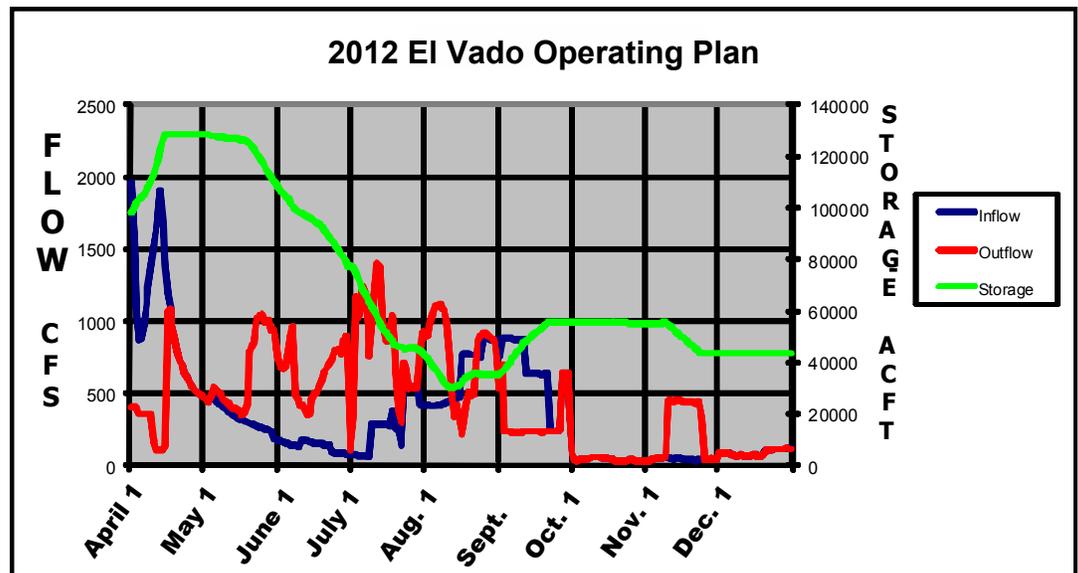


Water Operations Forecast for 2012

Each April, the Bureau of Reclamation produces an Annual Operating Plan which will guide how the agency will deliver water to its constituents. The 2012 Plan for El Vado announced recently by the Bureau will regulate a water supply that is well below the average.

On the average, the snowpack in the Rio Chama watershed peaks around April 7 with 70 inches of snow-water equivalent (SWE) – the amount of water in the snowpack. In 2012, the snowpack topped out one month early, and never reached 50 inches SWE.

Prediction of annual supplies are computed as the sum of native flow produced by winter snowpacks in the upper watershed, plus water carried over in storage reservoirs and San Juan-Chama Project (SJCP) water imported into the basin. From the calculated supply, the Plan seeks to satisfy numerous water demands: water rights of the Middle Rio Grande Conservancy District, the Albuquerque-Bernalillo Water Utility, other SJCP contractors, Pueblos, Rio Grande Compact-mandated deliveries



and flow requirements for the endangered Rio Grande silvery minnow. This is done by modeling releases from Heron, El Vado and Abiquiu reservoirs.

The Plan must be cognizant of Article VII in the Rio Grande Compact, which prohibits storage in El Vado when, as is the case this year, there is less than 400,000 acre-feet in Elephant Butte Reservoir. It also accounts for end-of-year releases of San Juan-Chama contract water in Heron Reservoir.

This year promises to be a shorter than normal irrigation season for Middle Rio

Grande Conservancy District farmers, who can anticipate that irrigation will end about a month early (late August or early September). The projected lower-than-average inflows to El Vado may well mean that, by season's end, the District will have exhausted the water supply it has in El Vado.

This "dry" season scenario also means that the Bureau will tap into previously leased water in storage to meet flow requirements for the endangered Rio Grande silvery minnow. The plan calls for these supplemental releases from El Vado and

through Abiquiu to begin in mid-June.

The Bureau also anticipates making weekend recreational releases for boating the Chama below El Vado. Such recreational releases have been conducted since the 1980s.

Impacts of a below-average snowpack can often be mitigated by a healthy monsoon season, but the 2012 Annual Operating Plan can only assume an average contribution from the Summer skies. Thus, the AOP can never precisely predict how water users will fare in 2012; much depends, as always, on nature.

The Chama Flow Report

*A quarterly newsletter of the
Rio Chama Flow Optimization
Project*

Vol. I, No. 4

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Dagmar Llewellyn, *Hydrology*

Laura Crossey, *Water Quality*

Andy Dennison, *Communications*

Projected "Advisory Council"

Albuquerque-Bernalillo Water Utilities Authority

Middle Rio Grande Conservancy District

New Mexico Interstate Stream Commission

U.S. Bureau of Reclamation

U.S. Army Corps of Engineers

U.S. Bureau of Land Management, Taos Field Office

U.S. Forest Service, Santa Fe National Forest

Los Alamos County Utilities

Pueblos of Ohkay Owingeh, Santa Clara, San Ildefonso

Rio Chama Acequia Association

Acequias Nortenos

New Mexico River Outfitters Association

Adobe Whitewater Club

New Mexico Trout Unlimited

City and County of Santa Fe

Jicarilla Apache Nation

University of New Mexico

Christ in the Desert Monastery

Ghost Ranch

El Vado Ranch

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Rio Grande Restoration

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The 2012 Snowmelt Runoff: A Moving Target

If you recall, over the Christmas holidays, New Mexico was offering some of the best skiing in the nation. This was largely because of record warmth and nonwinter-like conditions in much of the rest of the country. But still, the January snowmelt runoff forecasts for March-July for the Rio Grande at Otowi was 665,000 acre-feet, or 88 percent of average, and the El Vado inflow was 200,000 acre-feet, or 84 percent of average.

Sweet! Especially considering the drought conditions in the lower Rio Grande in 2011.

Unfortunately the forecasts took a dive from there. The May snowmelt runoff forecasts for March-July for the Rio Grande at Otowi is 315,000 acre-feet, or 42 percent of average, and the El Vado inflow is 115,000 acre-feet, or 49 percent of average.

What happened? Well, it warmed up, pretty much stopped snowing, and the spring winds sublimated some of the snowpack. It also appears that dust on our snowpack may be causing an earlier melt effect. The Rio Grande at Otowi peaked at the end of March at about 2,200 cfs.

The Upper Rio Grande Water Operations Model (URGWOM) users look at the 1975-2011 historic period for insight on runoff projections when they put together the Annual Operating Plan for water operations in the Middle Rio Grande. This year's runoff peak was way early and way below any of the other years in the historic period.

The story here is that the Bureau of Reclamation water operations folks have had to roll with the forecasts and revise their El Vado Reservoir operations as the conditions change. Article VII of the Rio Grande Compact is still in effect, because Elephant Butte Reservoir storage is so low. Normally, New Mexico would not be able to store native Rio Grande water in post compact reservoirs, like El Vado. Fortunately, an agreement is in place that allows storage in El Vado in exchange for previously relinquished Compact credit water. Under this agreement, Reclamation was able to store 30,000 acre-feet in El Vado. The storage volume of Prior and Paramount water for the six Middle Rio Grande pueblos has increased monthly as the forecasts fell.

Everything gets adjusted to reflect the changing conditions. As our modelers on the Rio Chama Flow Optimization Project begin to look at El Vado water operations for possible opportunities for enhancement, this year's runoff provides a great example of how things can change – and how quickly and unexpectedly it can happen.

– Dick Kreiner

Contribute to the Project

The Rio Chama Flow Project needs your help. Join the effort to rejuvenate the Rio Chama by donating to the Project. Send tax-deductible donations to:

The Rio Chama Flow Project

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Modelers Prepare to Put Project Data Through Its Paces

The 30-mile Wild and Scenic Rivers stretch of the Rio Chama offers its own set of complicated challenges for understanding Rio Chama flows, as Project modelers from the University of New Mexico work toward developing recommendations on El Vado Dam that would revitalize the river's ecology while satisfying the demands of water users.

In order to develop these hypotheses, UNM engineers Dr. Mark Stone and Ryan Morrison must coalesce data from geomorphic, riparian habitat and fisheries studies; add in the requirements of water users and hydropower; and, make room for the desires of anglers and boaters. They also must account for seasonal differences in snowmelt and monsoons, as well as the physical and institutional constraints at Heron, El Vado and Abiquiu impoundments.

What eventually comes out of the modeling effort will be flow recommendations for the Bureau of Reclamation water operations of El Vado. In turn, Reclamation will be asked to try out some of these recommendations testing ecological hypotheses predicted by the model.

"The overall goal is to pull together all the information into one tool to inform management decisions," says Stone. "And, we know that managers must be able to use the decision-support



Mark Stone, of the UNM Civil Engineering Department explains modeling process during recent press tour.

tool we create in a variety of scenarios."

The modelers are analyzing Indicators of Hydrologic Alteration (IHA) using streamflow data on the Chama – both upstream and downstream of El Vado Reservoir – and investigating how hydrologic conditions on the river (especially timing, seasonality and magnitude of flows) have changed due to management operations. Then, the modelers will use PowerSim system dynamics software platform to crunch multiple "layers" of collected data to produce a model that evaluates tradeoffs that impact stakeholders in any given scenario.

For example, the Project wants to link flow scenarios to ecological change. Ever since 1936 when El Vado Dam came on line, the river has had fewer natural high runoff flows that regularly inundated floodplains, moved sediments downstream, and nourished a diverse riparian habitat. Likewise, dam releases have interrupted provision of adequate lower flows that support spawning trout.

Stone and Morrison say that mimicking native high and low flows to the extent feasible will be crucial to the revitalization of the river's ecology. However, water managers must follow a schedule of storage and release. It is here, at this traditional loggerhead, where the success of the modeling phase of the Project will facilitate the give-and-take of

stakeholder-approved flow regime alterations.

This Project differs from others he has worked in that there are no endangered species targets or legislative mandates to drive the model, Stone says.

"Here, we have a grassroots effort by a group on individuals who recognize that the system can be improved without downstream heartburn," Stone says. "And we have a relatively small system that limits our scope and can allow us to take a holistic perspective. That's exciting."

Morrison, whose doctorate work is funded by the prestigious Hydro Research Foundation, agrees: "We aren't looking for a specific objective. We are bringing in the data and then deciding what the best environmental flows should be."



Photo Courtesy of Bureau of Reclamation
Scenarios developed by Project modelers will suggest changes to operations at El Vado Dam (above).

Project Notes

Inaugural Advisory Council Meets

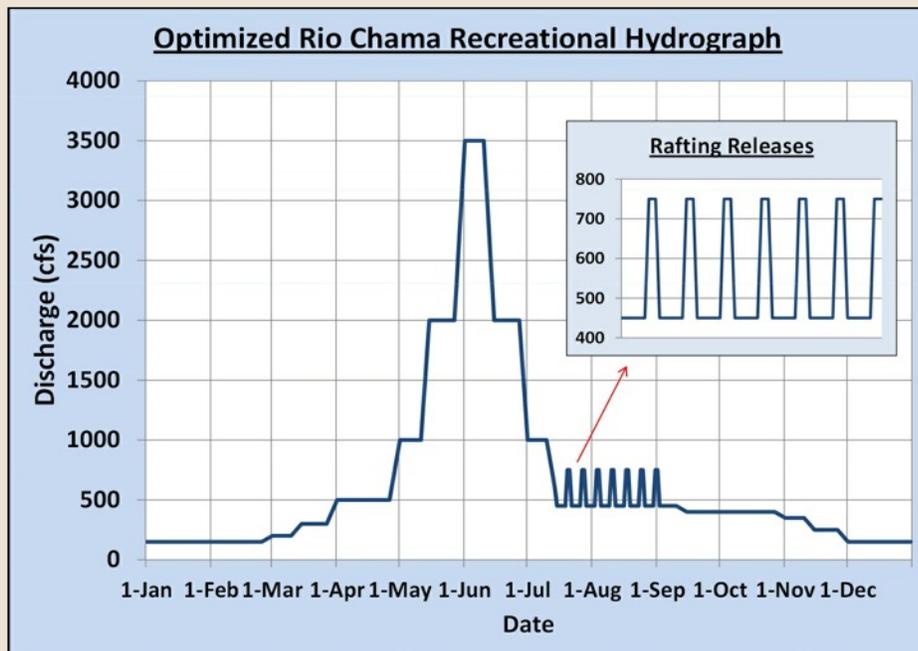
The Rio Chama Flow Project officially introduced itself to the project's Advisory Council on March 22 at the Santa Fe National Forest offices. Among the attendees were representatives of the Albuquerque-Bernalillo Water Authority, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, New Mexico Interstate Stream Commission, Los Alamos County Utilities and Ghost Ranch. Also in the room were officials of New Mexico Trout Unlimited, New Mexico River Outfitters Association, as well as private boaters and anglers. Core Team members summarized their activities over the last eight months.

Journal Features Project

The Rio Chama Flow Project got front-page coverage on the Sunday (April 22) edition of the of the *Albuquerque Journal North*. Staff writer Jackie Jadrnak accompanied Core Team members during a walking press tour of the river, hosted by Christ in the Desert Monastery on April 18. Jadrnak heard presentations from project manager Steve Harris, riparian ecologist Todd Caplan, modeler Mark Stone and hydrogeologist Laura Crossey. To read the story, go to <http://www.abqjournal.com/main/2012/04/22/news/project-examines-rio-chama-flow.html>.

Dye Test Shows Leak in El Vado Dam

On Feb. 24, the Bureau of Reclamation siphoned 14½ gallons of red-dyed water into a crack on the reservoir side of El Vado Dam. About 2½ hours later, the



This hydrograph reflects annual flow milestones most desired by Chama recreation groups, after August and February discussions among anglers, commercial and private boaters, and river managers. The key flow components are maintenance of boating releases and winter trout breeding flows. The Project will continue to refine this aspect, with further comments by recreationists welcome.

colored water appeared downstream at the pumphouse and the two-foot parshall flume. Bureau officials are evaluating the results and rehabilitation options.

Report Highlights Flow Alterations

The October 2011 EPA Report, "Evaluation of Hydrologic Alteration and Opportunities for Environmental Flow Management in New Mexico," concludes

that flow alterations have been linked to disappearance of sensitive riparian and wetland ecosystems, and native fish populations, due in large part to the loss of high flows during runoff. The Rio Chama near La Puente (upstream of El Vado Dam) was one of 32 sites in the survey. To read the report, go online to <http://uttoncenter.unm.edu/projects/e-flows.php>.

