

Rio Chama Flow Project Advisory Council Meeting

BLM offices, Santa Fe, 11-15-13

Purpose: Present Recommendations from March, 2013 “Flow Ecology Workshop”; Discuss Future Alternative Management of Releases from El Vado Reservoir

Attendees:

- Carolyn Donnelly, Reclamation
- Dagmar Llewellyn, Reclamation
- Mark Stone, UNM (Project Team)
- Mindy Benson, UNM (Project Team)
- David Gensler, MRGCD
- Todd Caplan, Geosystems Analysis (Project Team)
- Ryan Groenwald, Army Corps
- Andrew Lleuwen- ABCWUA
- Anders Lundahl, ISC
- Dale Lyons, The Nature Conservancy
- Mark Sundin, BLM-Taos Field Office
- Tim Scofield – Adobe Whitewater Club
- John Phillips, Forest Service Coyote Ranger District
- Ray Holland, UNM (student)
- Angela Gregory, UNM
- Richard Hansen, NM Game & Fish
- Mary Steuver, NM Forestry
- Mary Orr, Santa Fe NF
- Ryan Besser – BLM-Taos Field Office
- Gerald M – Los Alamos County
- Amelia Simmons, UNM
- Karen Dunning, MRGCD
- Fred Vigil – Rio Chama Acequia Association
- Mike Neas-Rio Chama Landowner
- Toner Mitchell, NM Trout Unlimited
- Steve Harris, Rio Grande Restoration
- Patricia Dominguez – Senator Heinrich’s office (“Senator is very interested in this project”)

Announcements (9:15 am):

1. Rio Chama Acequia Association and upstream junior acequias recently completed an agreement to share water shortages and avoid a contentious priority call dispute.
2. Governor Martinez has announced a \$1.5 million “River Stewards” fund, to be administered by NMED.
3. Environment Secretary-Designate Flynn has stated that NMED intends to budget \$7 million to Village of Chama to upgrade its wastewater treatment plant that has been out of compliance.

OVERVIEW OF CHAMA FLOW PROJECT BASELINE STUDIES

Project Hydrology and Geomorphology - Mark Stone

Describing what we have learned over past 18 months.

- Geomorphic mapping (Mike Harvey)
- Sediment characterization (particle size distribution to support incipient motion studies)
- Tie to specific processes on river
- Not a lot of infrastructure to worry about on the floodplain
- Evaluate influence of tributaries (important influence on geomorphology; provide lots of sediment so dynamics are different from typical below-dam systems).
 - Channel has narrowed because we don't have large events, and from vegetation encroachment (even have upland species on islands)
- IHA study (Ryan Morrison) – understand how natural flow regime has changed.
 - Based on La Puente (not totally unaltered) – we show influence of El Vado operations.
 - El Vado traps spring runoff peaks, can be seen in comparison of La Puente to Below El Vado gages.
 - Blips on weekends in summer for rafting.
 - SJC Project releases in fall (also P&P in late fall)
 - Chama Hydrology
 - Magnitude – median monthly flows up, peak flows down
 - Duration – minimum flows increase duration, maximum flows decrease duration
 - Timing – slightly later in year
 - Frequency – depends on flow rate ; shifted flood flows
 - Rate of change – increase rate of change on both limbs of hydrograph (more stair-step rather than gradual, but monsoonal events are very “peaky” so there is an analog in prior system)
- Geomorph-Performed inundation modeling based on expected flows (up to capacity of 6,000 cfs). In a lot of areas, terraces are too high to actually overbank at 6,000.
- Incipient motion – what does it take to mobilize particles; what size particles will we move. (Angela). It is possible to move a lot of sediment in this system with available flows, although the response is highly variable.
- Groundwater monitoring – shallow wells in floodplain, critical for vegetation response. Dataloggers.
 - Lag in groundwater response relative to river.
- Working hypotheses:
 - Infrequent high flows from El Vado will perform substantial geomorphic work and result in a more complex heterogeneous channel and floodplains
 - Intermediate mid-range flows will flush fine sediments and rework in-channel features (eg gravel bars)
 - Careful prescription of rise and fall rates can provide improved hyporheic and riparian groundwater interaction with respect to ecological needs.

Riparian Ecology - Todd Caplan

Riparian habitat characteristics and limiting factors.

- Vegetation mapping
 - Reach-wide, coarse level (from boat); draw polygons of basic vegetation types.
 - Detailed site-specific mapping
 - Archuleta ranch
 - Cebolla confluence
 - Dark canyon
 - Benson's Bar (Monastery)
 - Chavez Canyon
 - Big Bend (mile downstream of of gaging station rapid)
- Objectives:
 - Formulate hypotheses about riparian vegetation community composition and future potential
 - Integrate veg data with hydrogeomorphic information to generate hypotheses about how riparian habitats respond
 - Something else
- Methods:
 - Hink and Ohmart classification – considers height and canopy cover, over and understory -> 6 basic types.
 - More detailed characterization for detailed mapping
 - Upland Species (e.g. Juniper) are encroaching because of lack of high flows.
 - Encroachment mainly on higher (pre-dam) T2 surfaces.
 - Some sections have pretty wide floodplains seldom if ever inundated. Box elder is most common riparian trees in the lower alluvial sites.
 - In alluvial reach, see gallery forests, especially on alluvial fans. See dense NM olive
 - Don't have widespread encroachment of invasives (but concerned about Siberian elm – let Todd know if you see it).
 - Compare above and below the Gallina.
 - Very little forest or marsh, no real open water
 - Lots of shrub-dominated communities in both reaches
 - Sparse understory environment with some box elder in canyon
 - Encroaching rocky mountain juniper
 - Lack of native cottonwood and tree willow. Rio Grande Cottonwood is limited to downstream of Gallina. See some narrow-leaf cottonwood upstream.
 - Almost no cottonwood recruitment going on. There are limited safe sites for new cottonwood seedlings. Need some high flows to uproot existing vegetation (need bare, moist alluvium). What there is is limited to bank edge, very vulnerable to scouring flows.
 - T1 – inundate at 3,500 cfs. Could get some germination at those flows.

- 5 events from 1970 exceed 5,000 cfs. Would expect more cottonwood recruitment than we are seeing.
- Only place we see mature cottonwood in canyon segment is along abandoned channel at Dark Canyon.
- Normally, cottonwood germinates during descending limb of high flows (in most systems).
- Subject to heavy grazing pressure (cattle, but also elk and deer) keeping young cottonwoods from growing – they get browsed. In winter, the deer reportedly bed down in canyon reach; absence of predators.
- Hypotheses:
 - Densely vegetated floodplain surfaces limit safe sites for cottonwood seedling development.
 - Ungulate browsing is seriously inhibiting stand growth.
 - Channel is locked in, hasn't had opportunity to move around, as would be created by a flood disturbance regime.
 - Peak flow releases from El Vado have been insufficient to promote geomorphic disturbances sufficient to facilitate the creation of dynamic new marshes, oxbow wetlands, and moist-soil wetlands in the alluvial reach, potential germination areas for cottonwood seedlings and amphibian habitats.
 - Peak discharge of 6,000 cfs maintained for 2-3 days will promote disturbance of vegetated surfaces (and presumably seedling establishment).
 - Flow mediated geomorphic disturbance will promote creation of new off-channel wetlands and create new "safe sites" for cottonwood seedling establishment and amphib reproduction.

Questions:

- Box elder (in Maple family) ARE regenerating. They are reproducing in areas that don't inundate much.
- Juniper are allelopathic so crowd out other native /riparian species.
- Beaver – yes, there is activity, but not a driving factor on the limited numbers of cottonwoods.
- Siberian elm produce TONS of seeds, so we should get right on those if they start spreading in the reach. Can be controlled by girdling or herbicide application.

Aquatic Fauna - Ryan Besser – BLM-Taos (replacing Greg Gustina)

Langman and Anderholm 2004 – identified changes in flow from SJC Project.

Goal for this project: Establish baseline of aquatic community

- Fish (custom cataraft; electroshock, catch per unit effort; seining for smaller native fish)
- Amphibians (using dipnets)
- Invertebrates (standard BLM bug-lab protocol. Survey a square in a "server sample". In riffles)

Amphibians

- Nutrias – no amphibians
- Warm spring - none
- Ephemeral tributaries – none
- Woodhouse Toads at Aragon rapid
- Only bullfrogs below Abiquiu
- Northern leopard frog- indicator, but rare?

Benthic Invertebrates

- Species all decrease with increased flow perturbation (summer flow changes like rafting flows)
- Chiquito (archuleta) site had low richness but by far the highest abundance (just not very diverse).

Fisheries:

- 8 species of fish found in Rio Chama – 6 introduced and 2 native.
- Brown Trout is a focal species in Rio Chama Management Plan.
- Imported species spawn in winter, natives spawn in spring and summer.
- Brown trout abundance is highest in first few miles below El Vado (2.4 miles). Drops drastically as you move downstream.
- Highest richness (5 species) at mile 15.6.
- Carp supply a lot of the biomass throughout the river.

Hypotheses:

- Long duration of constant flows during summer decrease temperature, alter life cycle signals and reduce benthic productivity.
- Annual peak flows out of season disrupt reproduction of native fauna.
- Lack of hydrologic disturbance (ie 6,000 cfs flows; riparian H3) reduces available habitat for amphibian reproduction, juvenile fish growth and invertebrates.
- Dam releases that mimic the natural hydrograph will result in faster recovery of benthic community.
- A low flow recovery period in late summer and early fall will increase invertebrate richness and productivity.
- Maintenance of flows for brown trout from late fall through early winter will increase reproductive success.

Questions

- Is there room for needs of native species, in light of all of the other objectives?

- Cut-throat trout have been stocked in the river since the early 80s. We don't know how they do.

Aquatic Team Recommendations

- Flow management that maximizes spatial habitat complexity would benefit most aquatic species
- Seasonal regulation of flow could promote benthic diversity.
- Bank-full flows would facilitate movement of sediment that cause turbidity and result in higher diversity of fish habitat.
- Seasonal flows that mimic pre-impoundment conditions are necessary to maintain aquatic communities.
- Seasonal minimum instream flows are necessary to maintain aquatic communities (brown trout will not survive below 75 cfs; in winter flows should be 150 cfs or greater)

Mark Stone – Flow Recommendations from Flow-Ecology Workshop (3-10-13)

General Flow Recommendations

- Create off-channel habitat and provide floodplain connectivity. Hold for 2 days (high flows)
- Recession rates between 2 and 5 cm per day encourage riparian recruitment and nutrient recycling. Maintain for at least 2 days.
- Late season flows to flush fine sediment from gravel bars, hold for 3 to 5 days.
- Winter-steady spawning flows ~100 cfs.

Specific Flow Recommendations (mimumum amount that is realistic but will still accomplish something)

- 10-year recurrence 170 m³/s (6,000 cfs) – for geomorphic work
- 3 to 5 year recurrence – 127 m³/s (4,500 cfs) – for riparian recruitment
- 1-2 year recurrence – 71 m³/s (2,500 cfs) – to flush fine sediment from gravel bars and support aquatic habitat for fish and insects.

Note that the specific flows needed for geomorphic work and habitat is highly site-specific, but these numbers hold generally.

Need steady flows in the fall /winter to support brown trout spawning (timing is based on rainy season in Europe. The fish expect that when the flows come up they will stay up. If not, redds are left high and dry).

Contractors don't have to pay evaporation on their water as long as it sits in Heron, but they do once it is released. This is incentive to keep it in Heron until late in the year. Also, P&P water released in November.

6,000 cfs flow in 2009 – peak held for short time, then dropped to about 4,500 cfs for a while. If peak flow was extended a bit longer, it would have done more work. But it is important to at least reach that peak.

We need to create some notches in vegetated areas to allow river to do more work creating backwater for riparian regeneration.

If receding limb drops too fast, seedlings can't keep up. That's why the limit of 2 to 5 cm/day on recession.

Workshop report ties some specific flows to the study hypotheses. Hypotheses, objectives, and flow recommendations were developed.

Is it wise to keep managing for brown trout?

- This is a highly managed and constrained social-ecological system. We are not promoting radical changes. WE are embracing the fact that we have trans-basin water to give us more to work with. In this project, we are working within existing constraints. Don't let perceptions of constraints turn into realities of constraints – we don't have to do things a particular way because we always have in the past.
- Is borderline cut-throat trout habitat.
- BLM – we see the river as a valuable resource for the area. Brown Trout are the most adapted sport fish to this reach.
- This is a betterment project rather than a restoration system.

Recreational hydrograph (idealized hydrograph) – Steve Harris

Result of two workshops with anglers and boaters, assumes average snowpack

- Objectives: No net loss of weekend recreational opportunities (boating); match natural timing of hydrograph; smooth
- Gradual increase to peak in June of about 3,000 cfs; maintain 500 cfs in summer, with late summer boating increases above that (so more recreational opportunities during the mid-week; dampen changes, rather than going from very low up to 1,000 cfs on weekends).
- Peak moved from May to June to accommodate efficient storage of irrigation water.
- Winter minimum - 100 cfs

MRGCD Comment– requested that storage start earlier so that more water is available for minnow spawning peak. Started requesting that in 2003, which, in part, led to the 2009 flood flow. So now that has been moderated (except that we are always in Article VII restrictions these days).

Managers at El Vado have improved wintertime consistency, and have observed brown trout numbers increasing.

Los Alamos Comment – we can generate power from 200 to 1200 cfs. We can't use 6,000 cfs.

System Dynamics Model – Ryan Morrison (Presented by Mark Stone)

Multiple considerations for flows; need to incorporate in the system dynamics model

- Water storage and delivery
- Weekend boating
- Fishing
- Hydropower
- Ecological needs – geomorphic, riparian, aquatic
- Downstream water supply needs

There is a sophisticated operations model, Riverware, that provides detailed portrayal of system. WE aren't trying to replace that – this is hoped to be more nimble, useful to look at tradeoffs and feedbacks. This is a systems model meant to complement URGWOM Riverware model.

This is a Tool for exploring general impacts of flow alternatives and trade-offs. It is an exploration model, not an operation model.

Systems Dynamics Models:

- Allow incorporating of multiple types of water uses
- Incorporate feedback loops
- Used to screen options, impacts, and trade-offs of operational alternatives.
- Includes Rio Chama between El Vado and Abiquiu (inclusive of El Vado)
- Uses probability distribution to represent model variables, such as
 - precipitation,
 - evaporation,
 - Abiquiu releases,
 - San Juan-Chama Project inflows,
 - etc.
- Simulates thousands of random years in a daily timestep
- Keeps track of reservoir storage and release, boating days, hydropower production and revenue, and some flow-ecology characteristics.
- Useful for keeping track of broad impacts of flow alternatives
- Is in Phase 1 – in the process of incorporating environmental flows and their impacts
- Next step – use URGWOM or similar model to examine operation and accounting implications
- Model is run repeatedly through a bunch of hypothetical years in order to generate statistics (more robust than just running historic, but each of the years are based on a historic year).
- Based on historic patterns of how releases are run out of Abiquiu.
- David Gensler pointed out that recent operations are much different than in previous decades. It's very important to use current management paradigms.
- Mark replied – we have ability to specify particular portions of the historic record.

Adaptive Management - Mindy Benson

- We aren't actually managing anything yet, but this is a proposal to use adaptive management to meet our goals.

- One of first steps in Adaptive Management cycle – build conceptual model of system; decide what we know and need to know. Last several years have been toward that goal.
- Next step – design management objectives that allow you to test the hypotheses in Step 1.

Stakeholder responses to the general recommendations for operations

We are already working on baseflow recommendations, esp. in winter (brown trout spawning).

Reclamation (Carolyn Donnalay) – we don't anticipate being able to use stored water for higher flows. Only options are MRGCD or water authority move water for storage in Abiquiu. Two issues are the storage space and the evaporative losses.

Carolyn – we will typically have a spike in the winter due to the release of P&P water. We can't get away without releasing that before the end of the year. However, we can make changes (such as waiver to Santa Fe) to allow increased flows to extend past the end of the year.

MRGCD (David Gensler) – we have been doing the class 2 and 3 things here for years. The agencies have been getting together to try to make these kinds of management improvements. Anytime we can move water to benefit others with no harm to ourselves we have always done that. I think we have found the twos and threes already.

Carolyn – I think we are finding more... we have had to because of the drought.

Corps of Engineers (Ryan Groenwald) – We have recently been learning about slower ramp ups and ramp downs.

Carolyn – A slower ramp-up does cost time, money, and water.

Ryan – Something that is class IV or V is getting permission for native storage at Abiquiu. By law, you can store native water in Abiquiu in lieu of SJC Project storage space.

David – Would that be a Compact issue? Based on the current climate, I wouldn't be surprised to see objections to more native storage upstream.

Reclamation (Dagmar Llewellyn) – but it doesn't have to be more total storage, we are just talking about moving water between reservoirs.

Carolyn – we could potentially do something like on the Pecos, where the storage amount is capped for all of the reservoirs together.

Interstate Stream Commission (Anders Lundahl) – it is additional depletion above Otowi....

David – evaporative losses are different between the reservoirs. In the current hydrologic climate, every little bit is a big deal.

Rio Grande Restoration (Steve Harris)- In the 1980's, State Parks agreed to compensate Albuquerque \$2 million for evaporation losses due to Recreational releases.

Ryan – Abiquiu storage easements are for SJC project water only. Native can only be stored in Lieu of SJC Project water (if all of the SJC Project contractors say they don't need it). Some contractors have storage space they have leased from the city. Others don't.

ABCWUA (Andrew Lieuwen)– we have been able to convert some of our easements to leases (of lands in the Abiquiu reservoir pool). State engineer may be key constraint. We have applied for a permit to store native water in Abiquiu, and it was denied by the State Engineer. We are in litigation over this now.

Ryan – Space is available in flood control. Easements are only available for flood storage but authorization could be granted.

Andrew- City willing to help wherever it's feasible as long as their demands are met.

Dave – MRGCD happy to cooperate to the best of their ability.

Discussion of Wild Earth Guardians water storage rights at Abiquiu

Ryan – there is potential for moving native water at a good rate if it is to support spring flows for silvery minnow. WE could store this water temporarily at Abiquiu, but only under flood control authority. But it could only be released at 1600 to 1800 cfs rate.

Moderator (Mindy Benson) – if we could sync our peak flow needs with those needed downstream for minnow, that could help.

Anders – but Mother Nature needs to provide the water. It is water we are moving downstream for Compact delivery.

Ryan – we are not proposing any changes to Cochiti operations at this time, but we may do so in the future (but that's as much as I can say right now).

Anders – at every reservoir, there is a line of entities waiting for storage space. The Chama flows are 4th or 5th in line.

In 2014, there may be an opportunity to use the flood control operations to achieve your flow recommendations on the Chama. As soon as Abiquiu goes into flood ops, you should model when it would come out of flood ops. This is opportunity to stack water at Abiquiu. Then you release the stored water as a pulse, as long as timing of coming out of flood ops is matched. Compact is not affected.

Ryan – at that point, water would be stored at El Vado or at Abiquiu, so we wouldn't let it run down.

David – under current conditions, there are a lot of years we will need to manufacture a peak and will have to operate at bank-full in the Rio Chama below Abiquiu.

David –we are going to have recurrences of 2009 event because we are going to have more rapid runoffs, and are going to store as early as we can.

For 2014, we are hoping to store about 90,000 af in El Vado (for P&P mostly). After that is stored, we will try to store a bit more while Abiquiqui is in flood ops, and release it as a pulse at 6,000 (or whatever is possible that year) as soon as possible, before it is required to be released from Abiquiu. But it is only one day for water to flow between reservoirs, so we don't have to think that far ahead.

Steve – it seems to me that Reclamation has an opportunity to “re-color” water that has been released that is: change accounting of native and SJCP when that is useful.

Carolyn – it can't be a large volume of water or Nabil will be all over us for it.

Mindy – but if we are OK under a monthly timestep, small exchanges shouldn't show up.

Next Steps:

Steve – one remaining agenda item is to determine whether we can – or even want to – get our ideas into annual operating plan.

What might be more valuable is if the team looks at forecast and runs it through models to come up with management ideas for different conditions that might be encountered.

We might be able to specify a couple of water operations meetings/conference calls to discuss the options for the Chama.

Carolyn – we should institutionalize this, so you aren't just dealing with individuals at the various agencies.

Carolyn – maybe starting in January when we get forecasts, we could set up monthly calls between the team and the operations agencies.

David - there are advantages to keeping these things informal. This IS an experiment.

Anders – we might have a different focus each year (peak, baseflow...).

Todd Caplan – but we need to be able to monitor to test our hypotheses.

One example: La Cienega National Recreation Area – meets twice a year with science team. Science became integrated so that decision-makers came to expect it.

Steve – we should start formulating our plan based on March 1 forecast. Annual Operating Plan is created in mid-April. We hope to have an action plan before the AOP, so this information can inform the AOP.

Ryan – I'd prefer it was invisible to the AOP....

Steve – OK, you don't want to make commitment that you can't keep.

Mindy – we should look for trade-offs with recreation. Also, by March, we the Project Team should have an idea of what kind of (mostly volunteer) monitoring we can do.

Trout Unlimited (Toner Mitchell) - Can we use volunteers for monitoring? We can provide them.

Adobe Whitewater Club (Tim Scofield) – can private boating community help?

Steve – yes and yes.

Todd – let’s get together to talk about what we can utilize volunteer help for.

Public information is also important, and is another role for volunteers. Who can reach out and engage their communities.

State Forestry (Mary Steuver) – If this forest burns, you have a lot of problems. We are working on developing some forest treatments in the Chama watershed

Jan 15 in Dolce we will have meeting about the forest treatment ideas. At Wild Horse Casino.

Gerald – Are there issues with the dam and spillway so that you can’t store?

Carolyn – We won’t get THAT much water!

USFS/Coyote RD (John Phillips) – Cites repairs needed on private road (Sebastian Ranch) from the 2009 event which will probably recur in a future event. **Rio Chama Management Plan needs updating.**

Steve- There may be some issues at Cooper’s and the Monastery with structures getting flooded.

Skull Bridge was not an issue in 2009 event.

Are there plans to fix the El Vado Spillway?

Carolyn –yes, there are plans, but we don’t know when. It will be quite costly.

Future Actions:

1. Convene Project Team, Reclamation/Corps, MRGCD, recreationists after March 1 forecast-Decide what actions may be taken in coming season.

2. Create Monitoring Plan; engage volunteers from TU, AWC.

Adjournment 2:30 pm