

## The Upstream-Downstream Project:

### Prospects for Trust and Cooperation among Regions Sharing a Common Source of Water

**T**wenty years ago, with the goal of protecting New Mexico's water from export to other states, legislators passed an innovative law, authorizing citizen committees in locally-defined regions statewide (based on hydrologic and political interests "in common") to create plans for future use of the resource in their area. Those sixteen water plans are at last a reality. The challenge now is how to implement them, and how to resolve potentially fatal disparities between them.

Taking a grassroots approach to water planning all but ensured that, eventually, regions would have to cooperate to implement their independent strategies without hindering the plans of others that rely on the same water source. One example of the need for cooperation is in the state's central corridor, where rapid population growth, declining hydrologic health, and the uncertainties of climate change have prompted concern that Rio Grande Compact (RGC) delivery obligations may be increasingly difficult to meet in the years to come. The threat of an RGC default is emblematic of our inability thus far to adapt to these changes.

The 230-mile reach of the Rio Grande between Otowi Gage and Elephant Butte Reservoir (which project participants termed the Middle Rio Grande Basin) cuts through three water-planning regions—Jemez y Sangre, the Middle Rio Grande, and Socorro/Sierra. To

these adjoining constituencies, the real possibility of defaulting on RGC obligations presents a common dilemma, for its annual allocations, debits and credits apply equally to all three, and deficit in one segment affects each of the others.

Recognition of just such a basin overdraft arrived with the new century. A water budget drawn up by the Middle Rio Grande Water Assembly in 1999 was the first to point to a significant discrepancy between basin inflows and outflows. By 2004, the third phase of a water supply study by S.S. Papadopoulos & Associates (SSPA) for the Interstate Stream Commission, concluded, among other things, that, "On average, the historically available water supply is not adequate (including San Juan-Chama Project water and groundwater withdrawals) to meet present demands in the Middle Rio Grande." Moreover, "based on Year 2000 demand, a minimum of 71,000 acre-feet per year and perhaps as much as 110,600 acre-feet per year of additional supply or reduction in demand is required;" and given historic variability in supply, under Year 2000 conditions, a Rio Grande Compact debit could be "expected to occur 3 out of every 5 years."

The report also advised that even if—and it seemed a very unlikely 'if'—*all* of the management alternatives contained in the three adjoining water plans were implemented with haste, under the optimistic assumptions built into the plans themselves, the basin's water deficiency could not be expected to abate until possibly the year 2040.

#### Getting on the Same Page

In hopes of advancing cooperation between and among the three regions, encouraging congenial implementation of their separate water plans, and beginning to mend the gap between supply and demand (thereby aiding the state in meeting compact delivery obligations), New Mexico Water Dialogue members who also participate in water planning in the MRG basin designed the Upstream/Downstream Project in early 2006. Was the mutual deficit addressed with any consistency in the various water plans? What conflicts and "disconnects" among the plans' goals and strategies needed to be worked out? Could having a conversation about regional apprehensions and motivations move regional interests closer to 'thinking like a basin'?

With major financial support from the McCune Charitable Foundation, and technical assistance from the Interstate Stream Commission (which paid for SSPA's participation), and the Utton Transboundary Resources Center at the University of New Mexico, the Dialogue invited delegates from each region and a diverse gallery of water specialists to a series of summer workshops. As a commitment to multi-stakeholder participation, regional planning committees and relevant tribal governments were asked to select their own representatives (with encouragement to include elected decision makers and appointed water managers), while individuals from



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## From the Editor

By John R. Brown, Executive Director

This issue of *Dialogue* is dedicated to the memory of Chris Nunn Garcia, a founder of the New Mexico Water Dialogue and cherished friend to so many of us, who left us – much too soon – in July. The main themes in this issue, water markets and community values – and their relationship – were ones that Chris cared deeply about, and are explored in three articles in this issue.

Two of the articles report on results to date of projects we have been working on during the past two years. Neither has been completed, but participants have made real progress on both, and there are substantive outcomes to tell our readers about. We used to call the first the “Water Transfer Policies Project.” But in 2005 the ISC’s “State Water Plan – Regional Water Plans Ad Hoc Committee” was reconvened. When it decided to make water transfer criteria a part of its work plan, a few of us made an attempt to link our project with the committee’s work. This failed, and we decided it might be productive to focus on a more specific set of issues than the committee had chosen.

Adopting an approach long advocated by a handful of board members who know from long experience the value of dialogue in tackling intractable issues, representatives from the three middle Rio Grande basin regions recreated it as the “Upstream-Downstream Project” to examine regional water planning in the context of the basin’s shared supply. Funded by the McCune Charitable Foundation, this

project is ongoing.

A second report, on the Water Conservation Incentives Project, describes work whose focus also tightened, in this case in response to an opportunity to collaborate with ongoing research at the University of New Mexico, once Chris’s academic home. This work, partially funded by the Bureau of Reclamation, explores whether markets for leasing water can provide incentives for conservation that serve public as well as private purposes.

The third article is a “review” of sorts of a seminar on water markets held in May. In it I’ve tried to apply some of Chris’s critical insights to some of the presenters’ discussions of the uses and the limits of market allocations of water. I hope Chris would approve.

Full texts of each of these articles including notes and references are available on the Dialogue’s website (<http://nmwaterdialogue.org>)

Finally, three of Chris’s closest friends offer tributes to her life and work in *Remembering Chris* in the centerfold of this issue. She’d be amused by the placement, moved to tears by her friends’ words, and a bit annoyed by all the fuss!

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This is the last issue of *Dialogue* I will edit, and I want to express my gratitude for the privilege of working with our wonderful Board and many of you over the past four years. You have given me an education and enriched my life. Thank you!

**UP DOWN—Continued from page 1**

various water management agencies and interests were solicited as observers, to provide an information bank for the discussion. (See the Box.)

At the first workshop, held in June in Albuquerque, regional representatives summarized their water plans, and their concerns. Both the processes employed and the strategies created by each region differed broadly, and so did the extent to which the groups had remained active after completion of the initial work. All, however, believed that significant data was missing, and all faced the difficulty of implementation without continued state funding or the authority to enforce their preferred policies.

Beyond those general areas of agreement, incompatibilities were soon apparent between plan elements adopted by each group and the course set by its neighbors. By far the most troublesome of these conflicts involved water transfers. To help bring supply more in line with demand, two of the three regions proposed to import water from beyond their borders. “There was an assumption,” explained one upstream participant, “that there would be water rights available, and that transfers could happen...Our gap can’t be met by transferring water from *within* the region. We have to increase supply.” “Then there’s the possibility of double accounting,” responded a resident from the basin’s midsection, “if one region didn’t consider that the others might oppose exportation.” But it was word from far downstream that brought the matter into sharpest focus: Socorro/Sierra delegates reported that that region, too, is faced with a shortfall and cannot afford to lose any water to transfers. Rather quickly, the same dilemma that first gave rise to regional water planning—the tendency for a hard-pressed locale to alleviate its supply problems at the expense of another—had doggedly resurfaced, much closer to home.

Clearly, if they were ever to begin ‘thinking like a basin,’ the regions would have to move beyond their independent

planning perspectives. “The reality is that transfers are being done without consideration of water plans,” warned one attendee. “Criteria are needed to change this. Unless regional plans have more support, and tools to demonstrate success or failure, management gaps will increase until the basin loses control to the state or federal government.”

One practical way to cultivate common ground, many thought, was to adopt consistent terminology and units of measure when reporting data from the regions, and to come to some basic agreement on what those concepts and numbers signify. Consultants from S.S. Papadopoulos & Associates, and representatives from the Interstate Stream Commission and the Office of the State Engineer, helped nudge the process forward by outlining the myriad constraints the regions faced as a whole:

- The middle basin’s deficit of 71,000 to 110,000 acre-feet per year (af/y) is a result of depletions from groundwater by all users, the effects of which are felt in two places: surface flows and aquifer storage. Groundwater depletion is affecting the river today, and there are also storage declines. Depletion was 80,000 af/y in the year 2000, and the curve continues to rise.

- The Rio Grande Compact allows the middle basin to deplete a maximum of 405,000 acre-feet of the natural river flow that passes the Otowi gage each year. Anything else has to come from within the middle basin. Current depletion in the entire basin by various use sectors indicates a total river depletion of 680,000 af/y being felt on the river right now, including the depletion from groundwater.

- Uncertainties exist in the numbers for agricultural acreage, agricultural consumptive use, riparian consumptive use, ungauged inflows to the basin, and precipitation. Errors in these categories mean evaporation estimates could be off by 5-10%, or 40,000 af/y or more.

- Factoring in both new demands and enactment of all of the alternatives proposed in the three regional water plans, the middle basin will still have an average annual deficit of 7,000 acre-feet

in the year 2040, *with 40,000 af/y of groundwater effects still to hit the river.*

- None of the three regional plans incorporated flow requirements for endangered species, yet according to the ISC, that federal obligation will necessitate taking water from some 22,000 acres.

- Indian water right claims (including prior and paramount and reclaimed lands in the MRGCD, and practicable irrigated acreage claims in northern New Mexico), as well as other claims associated with historic irrigated acreage in the basin, have yet to be settled. By state law, these rights have priority in the river system.

- The consequences of allowing post-compact water rights to be used as offsets for groundwater pumping have not been addressed. In the past, permits were issued to municipalities and mutual domestics without requiring immediate offsets, and those ‘pump now pay later’ policies have immense bearing on the basin’s supply equation, since the cumulative effect of all outstanding water claims has never been calculated. Upstream/Downstream participants left that first gathering with the burdensome knowledge—if not the unconditional acknowledgement—that there were fiscal, physical, ecological, legal and ethical constraints on water usage in their shared basin, and that they would all have to rise above provincial agendas in order to endure.

**Groping Toward ‘Solutions’**

In many ways, the second workshop corresponded to an anxious step back from the precipice. Weeks had passed since the initial meeting, and caterpillars of denial and prevarication had been at work. For the better part of a day, people offered up ‘low-hanging fruit’ tactics for meeting the basin’s unbridled water demand, and clung insistently to the hope of ‘new’ supplies from cloud seeding, saltcedar eradication, desalinization, and deep-well production. Succeeding lists of possible actions and policies decorated pages of the facilitator’s flip chart, until at last, one

exasperated participant pointed out that an inventory of proposals already existed—in far greater detail—in the alternatives section of the three water plans.

In due time, the spotlight did circle back to the overwhelming problem at hand. “Other than a few comments on water conservation, it seems we aren’t talking about addressing the deficit,” one Dialogue veteran pressed, “yet it’s the deficit that brought us together. Updating the regional plans needs to happen, and as we work to address the gaps, it should be applied basin-wide.” “We don’t have to reinvent the wheel,” agreed another. “Rather, we need to look at the *basin* problem, and communicate better to reduce the debt.”

In that spirit, the group ultimately distilled from the wallpaper of notes a short list of items worthy of further discussion and evaluation. These included injection of intra basin gains (from runoff or effluent) to trim evaporation; reducing water demand through conservation; reviewing or renegotiating the Rio Grande Compact to create opportunities for storage flexibility; adopting a basin-wide water budget; working to restore watershed health; exploring innovative ways to enhance supply; stimulating implementation of regional and state water plans; and evaluating current and potential water transfer policies and processes. It was agreed that assistance would be needed (from the ISC, consultants, etc.) to resolve the consistency-in-reporting issue; to provide funding for plan updates, resource management, monitoring, and data collection; to create the desired basin-wide water budget; and to generate a matrix of all the solutions put forth in the three regional plans.

### **Final meeting or the start of something bigger?**

Prior to workshop number three, members of the Upstream/Downstream Project’s steering committee met to pare down the previous suggestions to a few

major ideas requiring a basin-wide approach. Consistency in measurement and vocabulary was felt to be the most critical need, and most thought it should be accomplished through update of the regional plans. It was noted that water demand has continued to grow since the plans were completed, and that activities occurring outside of the planning arena have the potential to affect sustainability in the basin.

In addition to the steering committee’s recommendations, the SSPA consultants proposed that a uniform method of accounting be developed; that overarching questions about hydrology and water use in the basin, (i.e., how many acre-feet the MRGCD uses, etc.) should be cleared up; and that metadata (data about data) be developed and well-documented. Regions were cautioned, “Keep in mind you have to reduce, not just diversions, but depletions. You’ve got to reduce consumptive use or there are no net gains.”

Given the foregoing, workshop participants determined that a small group of regional representatives, with help from the Utton Center, should generate a proposed scope of work for approaching the Interstate Stream Commission. Five areas for possible collaboration include: achieving consistency in reporting numbers; developing a basin-wide water budget; creating a template for regional water plan implementation; evaluating current and potential water transfer policies; and working out a method for resolving conflicts among regions.

On the question of whether to continue the Upstream/Downstream gatherings, enthusiasm was mixed. “The concern is how to frame the issues so we don’t box ourselves into some solutions and out of others,” one region said. “There’s some unwillingness to continue in this forum,” admitted another. “We need to focus on real products and actionable outcomes, and not be so scattered. We did learn things but we need to continue on specifics. Right now [the format is] too agenda-driven, with no time to re-hash what’s

been said.” Tellingly, those downstream expressed the clearest interest in continuing the discussion, “with the caveat that we’ll protect agricultural water use in our region.”

### **Team Spirit**

It is probably fair to say that evidence of the unsustainability of water use and management practices in the Middle Rio Grande basin has not yet convinced all of the players. Some participants from each region are not ready to swallow the bitter pill that the basin deficit constitutes a physical/economic/environmental burden shared by all, and that legal challenges, unhappy limits posed by climate change, and perhaps even desiccation of the hydrologic system are storms on the horizon if local priorities are allowed to override basin-wide realities.

On the plus side, the Upstream/Downstream workshops did produce the first tendrils of confidence that ‘thinking like a basin’ is possible. One optimist noted, “Normatively, I think there is agreement that jurisdictions shouldn’t try to solve their own problems by exacerbating the situation for others.” That implied agreement appeared to be shared by most workshop participants, if demonstrated only by their willingness to stay at the table for all three workshop meetings. It may be a thin reed in the face of strong competitive pressures, but a fundamental understanding is emerging that a potential tragedy of the commons – “ruin for all” – is in the offing if stakeholders can’t find a collective solution to the basin-wide shortfall.

Perhaps the spirit of the project was most fittingly expressed in the final minutes of the final workshop: “Why did you come here?” an insightful observer wondered, “and why did you come back? Do you want to see this process continue? How can you make sure it does continue? What is the alternative? As a Pueblo spokesman recently said to me, ‘There is no substitute for dialogue, even with your enemies.’”

### Participants in U/D Workshops

*Convener:* New Mexico Water Dialogue, John Brown, Executive Director. *Facilitator/Recorder:* Lucy Moore. *Jemez y Sangre Region:* Conci Bokum, Chair, JyS Regional Water Planning Council; Walt Chapman, self-employed developer; David Coss, Mayor, City of Santa Fe; Doug Sayre, Deputy Director, Water Resources Department, Santa Fe County; Karen Torres, Hydrologist, Santa Fe County; Sigmund Silber, self-employed. *Middle Rio Grande Region:* Elaine Hebard, Treasurer, MRG Water Assembly; Michelle Henrie, Attorney, Brownstein Hyatt Farber; Janet Jarratt, Dairy farmer; MRG ESA Collaborative Program; NM Farm Bureau; John Kolessar, Public Infrastructure Director, City of Rio Rancho; Mark Sanchez, Executive Director, Albuquerque-Bernalillo County Water Utility Authority; Gilbert Sandoval (*Rio Jemez-Rio Puerco subregion*), Chairman, Jemez River Basin Coalition. *Socorro/Sierra Counties Region:* Peggy Johnson, Senior Hydrologist, NM Bureau of Mines and Mineral Resources; Michael Gurnsey, Water/Wastewater Program, City of Truth or Consequences; Jim McCord, Rio Grande Agricultural Land Trust, Hydrologist, Hydrosphere Res. Consultants, Inc.; Gary Perry, Chairman, Middle Rio Grande Conservancy District; Adrienne Podlesny, Mayor Pro Tem, City of Elephant Butte; Rosalind Tripp, Socorro County Commissioner. *Pueblos:* Peter Pino, Tribal Administrator, Zia Pueblo. *Observers:* Myron Armijo, Tribal Liaison, NM Office of the State Engineer/Interstate Stream Commission; Brent Bullock, Pecos Valley Artesian Conservancy District (presenter); Nancy Cunningham, Water Resource Supervisor, NM Office of the State Engineer; Mary Helen Follingstad, Manager, Regional Water Planning Program, NM Interstate Stream Comm.; Alan Hamilton, NM Wildlife Federation, Consultant to the McCune Foundation; Kyle Harwood, Assistant City Attorney, City of Santa Fe; Debbie Hathaway, Hydrologist, SS Papadopoulos & Associates (SSPA) (presenter); Susan Kelly, Associate Director, Utton Transboundary Resources Center; Jai Lakshman, Director, Hanuman Foundation; Dagmar Llewellyn, Sr. Project Hydrologist, SSPA; Estevan Lopez, Director, NM Interstate Stream Commission; Karen MacClune, Project Hydrologist, SSPA; Charles Nylander, President, Watermatters LLC; Marilyn O'Leary, Director, Utton Transboundary Resources Center; Lisa Robert, farmer and writer; John Romero, Water Resources Director, OSE; Blane Sanchez, Member, NM Interstate Stream Commission; Rolf Schmidt-Petersen, Rio Grande Basin Manager, NM Interstate Stream Commission (presenter); Frank Titus, consulting hydrogeologist; Jess Ward, District 1 Supervisor, OSE; Bob Wessely, Consultant, past chairman, MRG Water Assembly.

## Marketing Water in New Mexico – Whose Business?

*Review by John Brown, NM Water Dialogue Executive Director*

On May 5, two highly respected professionals in New Mexico's water community, hydrologist John Shomaker and resource economist F. Lee Brown, staged a day-long "seminar" for a few hundred people interested in "New Mexico Water Markets." It was a well-planned event, and relatively comprehensive in its scope. The morning session explored basic surface and groundwater hydrological connections and how state water law attempts to take account of them in its water transfer policies. The afternoon session was more specific: speakers related the hydrological realities of particular basins in the State to the characteristics of water markets in those basins, and Lee provided a thoughtful "economic comment" on each basin's unique situation. Though the principals were clearly advocates for the use of market mechanisms to reallocate water to economically efficient uses, they approached their task as educators, not proselytizers. For them the day was about the "nuts and bolts of water markets, not about why such institutions and arrangements are important.

As the session began, I started to list some characteristics of the people who were in attendance or had registered for the conference:

- They were not the usual water conference participants – at \$395, most couldn't afford it.
- There were a lot of lawyers, real estate brokers, consulting hydrologists, and developers (a few listed as "ranch managers").
- Public and private water utilities were well represented.
- There was a contingent of appraisers.
- Several staff of the State Land Office were in attendance.

- Some big industrial interests were represented, including PNM, Intel, and Phelps Dodge.

- There was a delegation from the Jicarilla Apache Nation, and a few representatives of other tribes.

In short, the audience consisted largely of interested buyers, a few potential sellers, and quite a few "middle men." A handful of individuals lacking a financial interest in market outcomes – among them Steve Harris (Rio Grande Restoration) and Paula Garcia (New Mexico Acequia Association) – attended, politely critical, but not overtly challenging the session's underlying assumptions about the value of markets.

This led me to the thought, "Water marketing – whose business is it? Or in whose interest?" Is it just the province of the people who want to "do deals"? Do the presenters and the audience believe the public at-large has a legitimate interest in water transactions? Would anyone here acknowledge the possibility that third party impacts could outweigh the private benefits achieved by particular market transactions?

For the most part, the presentations (20 during the day) were straightforward and informative. Program co-convener John Shomaker set the stage with a thorough but very clear lecture providing the hydrological basis for understanding the implications of a water right transfer on the physical resource, including the interaction of surface and groundwater depletions.

Tessa Davidson, an attorney who brokers water deals, talked about how costly in time and money the water transfer application process can be, and how this distorts prices and can disadvantage sellers. But rather than criticize the State Engineer's regulations as being unnecessary she advocated negotiating an escalation clause in contracts. She

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also mentioned the burden posed by notification requirements – joking that it seemed the SE “wants to get as many protests as possible” – but offered no serious criticism. Only one speaker thought it obligatory to make a snide reference about the silvery minnow – to very little laughter.

Presentations by economists Lee Brown and David Brookshire stressed the importance of market-established prices as signals indicating a “measure of relative scarcity.” Interestingly, however, they staked out different normative positions. David discussed his experiments modeling the behavior of buyers and sellers in a variety of water scarcity situations in a stylized model of a reach of the middle Rio Grande. In those experiments subjects role-played different types of water right claimants (farmers – Native American and non-Indian, “environmental users,” a city) with vastly different “utility functions,” who nevertheless were presumably rationally motivated to make trades in a leasing market solely based on monetary rewards – voluntary transactions through which buyers and sellers could both be made better off. (In the simulation, participants were actually paid for making trades that resulted in “higher value” uses of water. (See “Saving Water for What?” on page 10.)

On the other hand, Lee Brown explicitly recognized limits to overall gains from market transactions where basin-specific factors militate against actors’ behaving “rationally,” and where the market is “thin.” Significantly, both Lee and David acknowledged what Lee termed a growing trend toward the development of markets (or water banks) for leasing “bulk” water for short periods rather than transferring water rights. At the end of the day Lee expanded on the implications of this trend, as discussed below.

Just before lunch, Eileen Grevey-Hillson, in a talk titled “A Political Perspective on Water Markets in New Mexico,” offered a much broader view of the complex and differing motivations

and perspectives on markets of several categories of water “stakeholders,” including acequias, non-acequia agriculture and ranching, growth management advocates, the business sector, environmentalists, governments, municipal and industrial water users, and Native American communities – in short, everyone in the state. Although her perspective was a personal one, and because of time constraints she was forced to rush and leave out portions of her presentation, she still managed to depict the interests and values of multiple users as sources of conflict and contestation. Her clear implication seemed to be that water allocation is of necessity a political issue. To my mind this would mean addressing the collective choices required to establish the rules for how markets should operate, to ensure that the efficiencies supposedly gained by the rationale choices of individuals are not achieved at the expense of non-market values such as community, equity and environmental sustainability.

Eileen’s presentation struck me as a surprising anomaly at the end of a morning in which no one had raised analytic challenges to the dominant assumptions about markets. It implicitly suggested that such an analysis should be more central to the discussion – that some collective thought and action ought to precede a rush to market “solutions” for moving water from existing to new uses. No one else during the day thus far had raised such issues. However, the luncheon speaker, Bill Turner, did so and took a diametrically opposite position. He views most attempts at governmental regulation of reallocation as wrongheaded, and Eileen’s stakeholder groups as aspiring “hydrohegemony ... fighting for absolute power,” attempting to seize control over and ultimately to prevent reallocation, or as he put it, having “a clear agenda of obstructing the efforts of entrepreneurs to satisfy demand for water and grow economies.” Bill exhorted government (in the person of the State Engineer) simply to administer by priority and to protect the rights of

individuals to sell their water rights in an unfettered free market. Bill is a very smart guy, but his enthusiasm for market allocation seems to rest on a belief that water markets are “perfect” – that all costs in market transactions are borne by those who get the benefits – and on an unsupported equation of “free markets” and democracy. (Inexplicably, however, he also calls market transactions “a zero-sum game,” by which he may mean that even the most efficient transactions create no social surplus, or that all transactions create winners and losers – either way, not a great advertisement for markets!) Regional and statewide water planning were put in place in our state precisely because of concerns by both stakeholders and policy makers that though our water resources *can* be treated as a mere commodity, to be moved by the automatic mechanisms of the market from “lower” to “higher value uses,” there are reasons to suggest that in many instances it might not be wise, or socially just, or environmentally sustainable to do so.

Bill takes as an article of faith the position that individuals acting autonomously in pursuit of their self interest in the marketplace will produce the most “efficient” results in allocating the resource and that the “collective wisdom of all the water planners and legislators” is insufficiently flexible and responsive to changing demands (reflected by prices, unless those prices are distorted by excessive regulatory meddling). Against this blanket assertion of faith in the beneficence of Adam Smith’s “invisible hand,” Bill – together with all the buyers, sellers and brokers of water and water rights – ought to be challenged to address Chris Nunn Garcia’s four caveats about “markets in some things” (paraphrased from “Active Water Management and Water Markets,” *Dialogue*, July 2004).

1. that market democracy is based on the dollar vote, and if the initial distribution of dollars (individual endowments) seems unjust, so will market-based allocation decisions.

2. that real world markets are imper-

fect in many ways – insufficient information, often not available to all, “thin” markets with few buyers and sellers, many externalities (costs to third parties, including social and environmental costs, not accounted for in the transaction) – which may produce inefficient outcomes.

3. that markets’ very effectiveness in making price-based decisions impersonally and automatically – their institutional efficiency and speed – can result in abrupt, deep and perhaps irreversible social changes which no one may have intended or desired.

4. that “some things should not be lost” or alienated – such as the “inalienable rights” of life, liberty and the pursuit of happiness asserted in our Declaration of Independence. But positive law – resulting from collective choices – recognizes and protects other such things. We don’t, anymore, in this country, allow people to be sold into slavery. But markets without institutions (rules) to define their scope and regulate the behavior of the players could make anything alienable – “everything for sale!”

In constructing a system for the marketing of water rights – or the transfer of physical water under those rights – it seems to me that the public welfare of the State demands that we pay careful attention to crafting the rules that provide incentives for how they will operate. The regional and state water plans should offer guidance in that regard, but may currently be too unspecific to do so. Once again, Chris helps us to gain a perspective based on a more complex understanding of human motivation. In a report published in 1991, shortly after New Mexico’s regional water planning legislation had been enacted, and after spelling out some public participation criteria necessary to make regional planning bodies “appropriate public-interest prioritizers,” she wrote that “[f]or the regional plan to be an adequate guide [for the State Engineer], it should relate public priorities to the local water resource.” She further cautioned that “[t]he priorities expressed in regional

water plans would not create property rights; they would, rather, identify specific impacts of changes in water use in the region that should be given weight in consideration of an application’s effect on the public welfare” (See Nunn et al. 1991, “Expediting changes in water uses: hydrological criteria and market transactions.” New Mexico WRI).

Presentations on specific basins and “economic comments” on each by Lee Brown in the afternoon session underscored differences in the hydrological realities as well as in the interests and values predominant in communities around the state. Lee acknowledged this in his wrap-up comments titled “Outlook: water as the limiting factor in New Mexico’s future.” One of his major points was that the distance between the “community” perspective and the “commodity” perspective on water markets has been exaggerated, that people have always made “tradeoffs” and that it is the “mechanisms employed for making those tradeoff decisions” that have changed. He stated that the “impersonality” of the marketplace is part of the problem, and that “personalization...seems to be part of the solution, though not a sufficient part.”

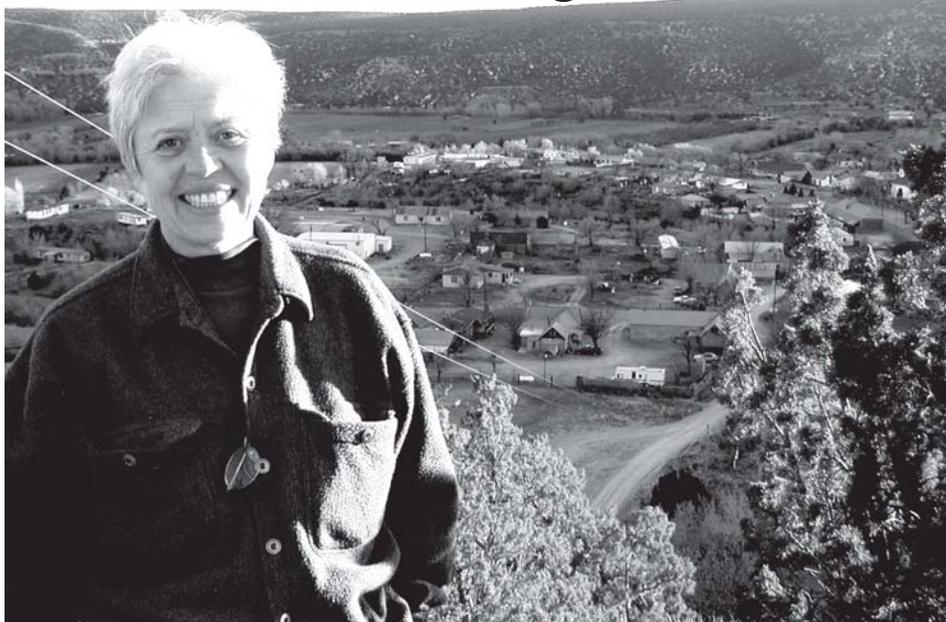
Compare this with Chris’s third caveat above. She also saw that impersonality in the market was a problem, but coupled this with its automaticity. When markets not only provide information, but make trades automatically between anonymous sellers and buyers, no one else may know what has happened, or be able to object that third parties may be harmed. For Lee, the relatively small population of New Mexico acts as a mitigating force; we have “the good fortune of still being small enough for all of the principal players to know one another,” and that means “the water community can still communicate readily within itself and that the broader interests of the various stakeholders...can usually be condensed into a relatively few folks who can get together and try to reach a consensus.” Very comforting, were it true, but we

ought to recognize that the existence of a water community, as opposed to communities of interest, is a fiction. Consensus may be possible, but negotiating consensus requires that all parties with interests in an outcome be at the table, and that they all have something close to “perfect information” about the implications of a transfer. Disparities in economic (Chris’s caveat #1 above) or political power do make a difference.

Finally, in his closing remarks, Lee discussed the evolution of water markets, noting that because transfers of rights from agriculture to M&I use would in effect end the opportunities for sellers to profit from their water rights (because those rights would never be in the market again), the trend toward farmers leasing “bulk water” for short periods while continuing to hold those rights would likely become the dominant form of market transaction. But here again, the speed and efficiency of markets (their “automaticity” as I have noted above) augur against such transactions. Why should farmers wish to sell (or cities to buy) temporarily available water for permanent uses? The Jicarilla Apache Nation entered a 40-year lease arrangement with Santa Fe, for which the city (which clearly can afford it) paid dearly. Other tribes, pueblos, and irrigation districts may also decide to negotiate long-term arrangements, whose public welfare impacts should be scrutinized carefully by the State Engineer. But individual farmers may well want to know who would like to buy their “bulk water,” and may choose to lease only for purposes they support. A functioning market in water in New Mexico may look very different from the classic economic model.

The Water Markets Seminar was refreshing in its “nuts and bolts” approach to these issues. I expect that it provided a good many answers for the “players.” At the same time, it certainly raised a lot of important questions for me. I greatly appreciate the sponsors’ willingness to invite me, and hope that dialogue begun there on the broader issues will continue in many forums.

## Remembering Chris



I can't remember first meeting Chris, but I owe it to the Ford Foundation. Both she, through UNM Natural Resources Department, and I, through the non-profit Western Network, had applied for grants in 1991. To maximize their grant-making impact, Ford suggested that the two applicants get together and create one project. When a foundation "suggests," the "suggestee" jumps. I remember resenting this forced marriage. "Who was this person I was going to have to share my brilliant idea with?" It turned out our brilliant ideas were very compatible, as were we. It was a perfect match.

That early grant brought regional water planners along the Pecos together in 1992 for ... well, we weren't exactly sure. We just had this hunch that those people who had been struggling to create water plans for their communities would benefit from talking to each other. It could have been a disaster. There were acequia members from up north around Mora, city folk from Roswell, big irrigators from Carlsbad, and plenty of variety in between. It was our first taste of something we both were immediately hooked on – gathering diverse voices together, providing a comfortable setting (with food), and sitting back and listening.

This was also the birth of the New Mexico Water Dialogue, which has provided many wonderful opportunities over the years for that kind of learning and exchange. Chris and I were such proud *co-*

*madres* of the Dialogue. She put enormous energy into those early years, as executive director, always ready to apply that formidable brainpower to the challenge. In the mid-1990s, after listening to Dialogue members generate ideas for the development of a state water plan, she created an entire state water planning process. At the next Dialogue meeting she unfurled it, on wall-size paper like a huge flag in honor of good process. There were boxes, lines, arrows, triangles, everywhere, and it made perfect sense. It was cyclical, full of loops to ensure the planning process was evolutionary, always being revised. It was open, with lots of public involvement inserted at critical points. It was reduced to 11" x 17" handouts, printed on salmon paper, and presented at an ISC Meeting as a gift from the Dialogue. It was so Chris.

Chris and I worked together on many subsequent projects, I as facilitator, she as recorder and archive-keeper. "I just take notes," she would say when introducing herself to a group. Anyone who knew her would hoot and holler, just to let her know that we all knew she was the ultimate in note-taking, report-writing, archive-keeping, and that we were damn lucky to have her perched behind her laptop. She took it seriously, which is why she was so good. Capturing all the points, hearing all the voices, honoring all sides and expressions – those were things that excited her, things she knew were important.

Our last job together was the ESA

Collaborative Program. In 1999 the two of us began working with an informal group of federal agencies and environmentalists concerned with water management and endangered species protection on the Rio Grande. This group exchanged and discussed "white papers" and "green papers," and by 2000 the effort had evolved into the ESA Collaborative Program. The group expanded to a large steering committee, with representatives from all relevant federal, state and local government, from the business, agriculture, environment and recreation communities. Eventually, some Pueblo interests joined the effort.

Chris and I looked forward to those meetings. They were always lively, often contentious, and sometimes surprisingly moving. Especially, we looked forward to lunch, when we would scuttle off to Taco Cabana. Making sure to look as if we were talking intently about the Collaborative Program, in case Steering Committee members came by, we would launch into topics of our lives. We were only months apart in age, and we were facing many of the same challenges – aging parents, adult children, questions about career, spirituality, diets, and clothes. We covered it all. Those were great lunches, and more often than not, they ended with both of us moved to tears. We shared a joy in crying. We cried easily, and over almost anything – a description of the tapestries sewn by the women of her beloved Villaneuva for the church, recalling a particularly powerful speech made by a tribal member at a Dialogue meeting, a flight to Chile to see my new grandson. And then, we would dry our eyes, polish off the taco salad, and head back to the meeting.

One year, the ESA Collaborative Program met on Halloween. We had urged all the members to come in costume. The meetings were tense, progress was slow, and it seemed to us that sitting around the table in costume would be just the answer. Chris and I decided to come as "river obstacles." I chose the San Marcial railroad bridge. Chris eagerly volunteered for a jetty jack.

I walked into the meeting that morning, pretty proud of the Styrofoam bridge jutting out from my shoulders, railroad trestle over my head, and black and yellow RR crossing sign on my nose. Chris looked up from her laptop. Her face was silvery-

black, and from a black helmet on her head stuck long black and brown structures that bobbed slightly as she typed. As I recall, there were strings of vegetable matter and straw clinging to her upper body. It was spectacular. We couldn't wait for the members to arrive, to see how they would be dressed, and how they would react.

One member came in a clown costume; another came in ethnic garb. That was it. The other 22 were dressed as the bureaucrats, environmentalists, and business people they were. And to top it off, no one said a word about our costumes! We were dumbfounded. I facilitated, wearing the bridge for a couple of hours, but found it hard to write on the flip chart. But Chris sat there, stone-faced, the whole day, dressed as a jetty jack, typing away. We were *so* disappointed. We griped about it as late as April 2006.

Remembering highlights with Chris makes me realize how much I miss her. We all know that she had a remarkable mind, an open and loving heart, and a deep sense of justice. I know that I have lost a dear and special friend, and that I will keep telling these stories about Chris... elaborating as I go. She would like that. —*Lucy Moore*

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In 1992, as I was collecting information on water planning in the Middle Rio Grande in preparation for the Dialogue's second regional roundtable, I became terribly frustrated that the people I was interviewing either didn't know about or hadn't been involved in the water plan that had just been completed. What I kept hearing was that counties, municipalities, villages and agencies were instead forging policies of their own, according to their specific needs. I called Chris, my boss at the time, and spilled my tale of woe. I soon realized she was taking a bath as we talked; you could hear the tidal movement of water to and fro. After a long and thoughtful pause, she said, "Well here's the story. Water problems are common to everybody, and if there is no information exchange, folks just tackle things on their own. Every entity you've mentioned has faced at least one difficulty and been motivated to adopt some course of action. Why don't you write those experiences up as profiles? It will put the whole scope of water issues in perspective. It will tell the players something about each other, and something about themselves."

I was with her the day she first laid eyes on Villanueva. Our friendship had ripened to the point where we could all-too-easily exploit each other's weaknesses, and we were doing just that in the confines of the little truck on our way to Las Vegas and another Dialogue meeting. Impulsively, we had taken a scenic shortcut, shaded gray on my ragged road map. What we were quarreling about that day has long since evaporated from memory, but everything else remains forever crisp. We dropped into the heart-melting valley of the Pecos, called a 'time out,' and drove through the gates of the little State Park. Seedpods nodded along the river. Chris took off her shoes. Wading into the frigid water sluicing over stones, she began to sob. "I envy you!" she howled. "I want to be part of a community! I want to know what it feels like to have roots!"

A few years later when her midlife Prince Charming turned up, it was no surprise to me that he was a native of that enchanted place, or that Chris would find her solace there, singing in the choir and serving on the ditch *Comisión*. After all, I was a witness to her petition.

When it was clear that goodbyes loomed in the near future, Chris called several of us together. The idea had been to make a road trip to Canyon de Chelly, scene of a number of previously important passages, but she was already too ill for the journey, and so we came to her in her beloved Villanueva. Ever a believer in telling one's story, what she longed for was an ultimate conversation, a concluding divestiture among this handful of colleagues who had so ardently loved the Dialogue.

That Chris and Lucy and Conci and Lisa could discover something new about each other after so many years is a testimony, first, to the endless mystery of being human, and second, to the classic elements of the Dialogue, which were all present those two splendid days in June: good food, empathy, and authenticity arising from the depths.

We walked and ate and talked, recollecting the milestones of our separate paths to personhood. We shocked one another—"Pobrecita! I didn't know that!"—but we confronted a few truths about ourselves, too. A crate of crumpled tissues later, Chris was so pleased with this definitive orchestration that she positively glowed. I believe she sat on some interior summit,

marveling at this one great secret of life: when you rally the courage to share who you are, then do you finally 'belong.' —

*Lisa Robert*

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Managing water is not easy, and I know that the quality of our decisions will have profound consequences for New Mexico's future, both in the next few years as well as for future generations. Chris Nunn Garcia didn't seek power or name recognition. But she did give New Mexico many gifts that, if we follow her lead, will help those of us still here make wiser decisions.

One gift was the New Mexico Water Dialogue, founded in the early 1990s with Lucy Moore. The Dialogue created a place for many of us New Mexicans to learn about water and each other, and to develop common ground and consensus on divisive water issues. From the Dialogue came an agreement from all over the state that there needed to be a template for water planning to create equity among the varied regions in the state and legislation to create a State Water Plan to involve all those impacted by changes in water policy. The Dialogue created an expectation for us that even people who thought they couldn't communicate with each other could find ways to resolve or lessen conflict. When our first executive director left to return to school, Chris became our "interim" executive director. It was wonderful to have her back. She was just so Chris and so Dialogue. What a celebration.

Her influence in many other decision-making groups also created important shifts in the ways decisions were made. She listened and heard what she once called "some amazing stuff in there about vision, leadership, knowing where we want to go." Her insights informed others and enabled people to move toward a resolution of very problematic "stuff." Chris was also an economist, a subject both not well understood and essential to our collective well-being. She was able to create clarity out of confusion and provide perspectives that allow for more informed choices.

Chris taught and led us with grace, warmth, humor and a profound capacity to bring together common threads. She gave many of us a valued and sorely missed friendship. —*Conci Bokum*

## Save Water For What? Considering Public Welfare In Designing Conservation Incentives

*Report from the Water Conservation Incentives Project Steering Committee<sup>1</sup>*

**W**ater conservation can be, New Mexico Interstate Stream Commission Director Estevan López has noted, a “two-edged sword.” From the perspective of a state or federal manager of an over-stretched resource, conserving it is a “good” only if it results in reducing net depletions, enabling required interstate compact or international treaty obligations to be met, facilitating compliance with other legal obligations (such as ESA requirements, protecting senior water rights, etc.), or more broadly relieving stresses on the physical system. Whether water use efficiencies achieve other private goals, such as increasing crop yields, irrigating more land, or moving saved water to other uses is, from a public perspective, irrelevant. If government investments fail to achieve public benefits, they can be justifiably seen as providing public subsidies to private interests.

Conservation of water means increasing the efficiency of its use, so that water that was “wasted” becomes available, either for a new use or to be applied to offset a deficit. Technically, conserving is relatively straightforward.<sup>2</sup> A variety of methods exists, some at low cost, for farmers and other users to be more efficient in their use of water. Economists predict that if gains from investing in conservation outweigh those costs, individuals will respond (as self-interested rational actors) to incentives to conserve, in order to reap gains from using the saved water for irrigating additional land, producing more crops, or from selling or leasing extra water to others.

Institutionally, the situation is more complex than the paragraph above suggests. In the unadjudicated Middle Rio Grande (MRG) basin, it is complicated by two aspects of what is widely regarded as the “property right” of

water right claimants. On the one hand, *beneficial use* being “the basis, the measure and the limit of the right to the use of water” (§72-1-2 NMSA 1978), any reduction in use carries with it the possibility of an eventual reduction in the amount of the right. “Use it or lose it” is the operative assumption of irrigators, and it has been reinforced (at least until very recently) by the water distribution practices of the Middle Rio Grande Conservancy District (MRGCD), the agency responsible for conveying and delivering water to most of the irrigators in the Basin. In addition to irrigating to grow crops, individuals may “use it” for several reasons, such as ensuring that they maintain the full extent of that right for their own use, or to pass down to their heirs, or to try to extract the maximum value of the right if they decide to sell it.

The other relevant aspect of a water right is the ability of its owner to convey that right to another party, through sale, inheritance or the like, as long as the recipient of the transfer intends to put the water to beneficial use. Water rights first put to use for irrigation are “appurtenant” to the land irrigated, and can only be “severed from the land” with the landowner’s consent. A transfer may change the point of diversion or purpose of use of the water, but any change must be “without detriment to existing water rights” (non-impairment), “not contrary to conservation of water,” and “not detrimental to the public welfare of the state” (§72-5-23 NMSA).

In both of these respects, a water right is a somewhat restricted property right, a license or permit from the state allowing the holder to use a certain amount of water (if it is available, and depending on priority in time that the right was established), for only as long as the holder is putting it to beneficial use. Physical water acquired under that

permit (or right) may be leased, but once it is permanently transferred (sold), the seller in theory foregoes all other opportunities to benefit from that right. The relative importance of these two aspects: tenure (holding and using a right), and alienation (selling it), can be altered by other incentives that structure the market for water and water rights. A recent example is the MRGCD’s practice of encouraging the sale of historic (pre-1907) water rights through its willingness to provide “banked” irrigation water to former owners who sell those rights to developers.<sup>3</sup>

### **The Water Conservation Incentives Project: A Search for Solutions**

The Water Conservation Incentives Project (WCIP) was designed to focus water users’ and policy makers’ attention on institutional motivations and barriers to conserving water – the legal, economic and social arrangements and incentives – the “working rules” – that shape individuals’ decisions about investing in conservation practices. The Bureau of Reclamation’s conservation field program in Albuquerque provided partial funding for this project in September 2004, with the long-term aim of producing measurable savings of water and reducing conflict among parties with strong and very different preferences about how water should be allocated and used.

The project’s organizers were a committee of Dialogue Board members representing diverse interests who began this work on the assumption that multi-stakeholder dialogue offers a promising approach to identifying cultural, socio-economic, and legal barriers to the implementation of conservation measures and, by building trust among individuals across stakeholder groups, learning whether “getting the incentives right” can increase the willingness of all

stakeholders to take concrete steps to improve the efficiency and productivity of their water use. Early meetings of this group in the spring and summer of 2005 focused on important definitional questions.

Scarcity – a structural imbalance between an uncertain and highly variable supply and increasing demand – was seen as the underlying issue. Despite growing understanding of the chronic deficit situation generated by regional and state water planning processes, the extent to which conservation can generate real savings and make water available for new uses is disputed. In its initial efforts, the WCIP committee found that resistance to serious consideration of conservation and efficient water management also reflects New Mexicans' reluctance to confront the physical limitations of the resource. However, the committee also identified changing societal values associated with allocation of a finite and essential resource to meet basic human and ecological needs as a major factor in raising awareness of the need to address the trade-offs involved.

As it studied possible solutions, the WCIP committee became increasingly aware of recent research in resource economics on these questions. Some of which has been done at New Mexico State University and the University of New Mexico. The committee sought to understand and explore the hypothesis that the development of markets in water rights could spur significant investments in conservation through treating water and water rights as tradable commodities, promoting transactions that achieve the most economically efficient water allocations.

Although market-oriented water policy reforms have been advocated since at least 1980 in many quarters, these issues had so far been avoided in New Mexico's regional and statewide water plans, except as vague generalities. Both the 2003 State Water Plan (SWP) and the MRG regional water plan call for measures to improve technical information about water supply and uses, about surface-groundwater interactions, and

related issues, and the state plan, for instance, says that the State should "consider providing...economic incentives, including low-interest loans, for agricultural users to implement best management practices to maximize conservation and efficient water use" (SWP: 26). But these plans fail to address specifically what kinds of economic or other incentives could achieve public objectives, as well as the social, cultural and political factors that complicate the implementation of market-based conservation incentives.

Following the direction of the Dialogue Board at its April 2005 meeting, the Executive Director discussed these questions with the ISC Director in June, and members of the Board's WCIP committee explored them in mid-July with a group of NMSU faculty who had been working on institutional barriers to conservation. In September a similar meeting was held with faculty of UNM's economics department.<sup>4</sup> The committee hoped these meetings would be a prelude to a series of workshops focused on the Middle Rio Grande basin to involve stakeholders, agency officials, and "experts" whose work and livelihoods would affect and/or be affected by rules that provide incentives. However, feedback from these conversations caused the committee to rethink the objectives of the project and its design.

The general thrust of the economists' comments at both the NMSU and UNM meetings was that our project's aims were too global and general. Some also thought that it failed to come to grips with what they believed is the underlying reason that senior water right claimants (in an unadjudicated basin) are uneasy about making any changes that would "save" water: lack of assurance about the security of their rights. The meeting with UNM provided an opportunity to refocus the project's efforts when Professor David Brookshire suggested that concrete issues could be raised by first having workshop attendees participate in a computer-based experiment then being developed, which he described as a "stylized simulation." He noted that microeconomic theory

posits that markets focus individuals' attention on scarcity, sending strong signals for people to conserve resources in their own interest, by providing opportunities for exchange that will leave both parties to a transaction better off.

Dr. Brookshire's research purpose was to "examine the feasibility of a lease/market based allocation of the middle Rio Grande water resources."<sup>5</sup> Based on a hydrological model providing information about surface water flows and diversions in six reaches of the MRG between Cochiti Dam and the inflow to Elephant Butte Reservoir, and simple assumptions about individuals' economic behavior, the simulation experiment was designed to test how a voluntary water leasing or water banking exchange process might operate. Dr. Brookshire had been developing and conducting the experiment with groups in a computer laboratory setting, where participants role-played different categories of water right holders (farmers, Native Americans, environmental users, and a city), voluntarily trading water for money (i.e., buying or selling bulk water) under various flow conditions. Participants in the research up to that time had consisted mostly of individuals whose lack of prior involvement in water and water rights issues had predisposed them to accept naively the behavioral assumptions of the model. Dr. Brookshire and the committee agreed that having a more "water-aware" group participate in the experiment could be helpful both to his research and to the Dialogue's WCIP objectives.

### **The experiment and first follow-up workshop**

The WCIP committee, and later the Dialogue Board, at its September 2005 meeting, considered Dr. Brookshire's proposal and agreed to participate in the experiment and a follow-up discussion. Although this process differed significantly from the initially proposed project design,<sup>6</sup> the Board saw the possibility that the model Dr. Brookshire and his

colleagues were developing for temporary water leasing might provide a way of testing the strength of a market incentive for a water right holder to “conserve” in order to reap an economic benefit from leasing the saved water. At the same time it would enable participants to consider what might be missing in a “pure” market-driven system. The Board agreed to assemble a group of fifteen individuals (the number needed for the computer experiment). Nine were Dialogue Board members, and the others were also well versed on water issues.<sup>7</sup>

The experiment was conducted on November 12, 2005. The first workshop discussion followed immediately. It was wide-ranging in its exploration of issues it raised: How realistic was the trading “environment”? How realistic were the assumptions of the behavioral model driving the simulation from the players’ point of view? What were potential “third party” implications of supposedly temporary leases of water? Was short-term leasing really a subterfuge to permit transfers to respond to permanent demands in a chronic condition of over appropriation? No conclusions emerged from the first conversation, but most participants in the experiment agreed that the discussion should continue, and that this forum should be the venue for further work on the WCIP. More discussion about this first session can be found in Molly McIntosh’s article in the Winter 2005-06 issue of *Dialogue*.

**The second follow-up workshop**

During the initial November 2005 “debriefing” workshop following the experiment, participants identified several problems involving the temporary leasing of water held by irrigators, but they didn’t come to any firm conclusions. The researchers had been careful to avoid the matter of historic water rights and the security of farmers’ tenure to their claims by focusing only on short-term leases and asking participants to assume that the basin had been adjudicated. Thus it seems fair

**Table 1.** Significant “third-party” issues constraining workshop members’ acceptance of or participation in a short-term water leasing market in the Middle Rio Grande Basin

<i>Potential problems identified<sup>a</sup></i>	<i>Suggested mitigating rules and incentives</i>
Lack of transparency – transfers may be unknown except to transacting parties (1, 8)	1. Provision for notice to potentially affected third parties in leasing transactions in proportion to likely impacts.
Buyer’s and/or seller’s lack of knowledge about bio-physical effects of a specific transfer or cumulative effects of many transfers on riparian environment (2, 3, 5-8)	2. Limits on what is transferable to recent historic use, with consideration of ecological impacts on “move from” and “move to” locations.
Absence of concern for or attention to cumulative effects on hydrologic deficit; e.g., reduction in aquifer recharge (market that increases transfers may exacerbate impacts, including degradation of water quality) (2, 4, 5-8)	3. Provision for “tithing” (in wet water) where some percentage of transferred water is dedicated to an ecosystem use.
Unforeseen cumulative impacts of changes from “climate-responsive” to non-responsive uses, accelerating impacts of drought conditions (2, 4, 5, 8)	4. Provision for seller to choose uses to which leased water may be put.
Increased cost of operation of irrigation delivery system (MRGCD) to remaining farmers, diminishing viability of agricultural economy (1, 8)	5. Clear geographic boundaries limiting market areas within which trades can occur.
Social and economic costs of loss of traditional cultures and associated values (2, 4)	6. Increased funding (from tithing?) for research on ecological functions of agricultural land.
Aesthetic impacts and economic losses associated with desiccated riparian corridor (1, 2, 3, 6, 7, 8)	7. Compensation to leasers of water to ecological uses; no tithing for ag-to-ag transactions that have no significant environmental impacts.
Potential for permanent loss of farmland and implications for food security (4, 5, 7, 8)	8. Clearing of trades to require appropriate level of approval dependent on potential impact and consideration of cumulative effects.

*a. Numbers in parentheses refer to relevant mitigating rules and incentives*

to assume that uncertainty about an individual’s water right – its priority and extent – was unlikely to be a significant intervening variable in irrigators’ trading decisions. What happens to the saved and traded water itself was more likely to be a factor. The discussion at the second follow-up workshop, held in July 2006, provided some qualitative evidence that validated this hypothesis.

The participants in this workshop included eight of the original experiment

group members and four new individuals recruited to substitute for some of those unable to attend. The workshop, which lasted four hours, began with a review of the purpose and modeling assumptions used in the simulation experiment, and of the results so far. The review documented the researchers’ contention that the “price paths” of trading in numerous runs trended toward greater market efficiency (following expected demand functions),

and that the experimental subjects made multiple trades, indicating that they were able to “handle the cognitive complexity” of the information the models provided. The researchers also asserted that their results showed that under experimental conditions subjects with different utility functions<sup>8</sup> sought to achieve their unique needs “motivated by monetary rewards and punishments” in the experiments. Some members of the group who had participated in the experiment questioned this characterization of the motives for their trading behavior, and this became a springboard for the ensuing discussion.

### Questions posed

The facilitator suggested that the workshop participants should focus on three questions or issues:

- Identifying third-party effects and how to deal with them;
- Design of the trading system, and rules needed to make it equitable;
- How to build appropriate incentives into the operation of a water-leasing market to meet public objectives.

Members of the group viewed these questions as overlapping, but also as relevant at two levels:

1. At the level of the experiment, how can the behavioral model and trading rules be refined and elaborated to make the decision situation more realistic for the actors?

2. At the “real world” level, what are the implications of these considerations for crafting institutions for water markets?

Although the discussion did not always distinguish between the two levels, this report focuses primarily on the “real world” level, bearing in mind that market-based price signals are generally understood to provide important information that individuals can use in deciding whether to invest in water conservation practices or technologies.

### Discussion summary

#### I: Third-party concerns

The workshop discussion of third-

party effects (“externalities” in economists’ language) dealt almost entirely with transfers of water from agricultural to urban (municipal and industrial) uses. “Third-party” refers to costs imposed upon (or incidental benefits to) parties or interests other than those engaging in a transaction that are not accounted for by the buyer or seller. Third parties can include individuals, communities, or society as a whole (as in transactions that result in ecological degradation). New Mexico water law recognizes impairment of an existing water right as an unacceptable externality. It prohibits the State Engineer from approving a transfer that would impair the exercise of that right, or requires him to place conditions on it to mitigate the harm. A body of case law defines situations that would create impairment. The other two criteria that the State Engineer must apply to his decisions are (as noted above) whether a proposed transfer would be “contrary to the *conservation of water* or detrimental to the *public welfare* of the state” (§72-5-23 NMSA).

These latter two criteria remain undefined, but would have to be invoked to provide a legal basis for defining the scope of market leases of water even under a short-term trading regime as suggested by the experiment. Participants in this workshop were less concerned with any individual transaction than with aggregate or cumulative effects of an active market in “agriculture-to-urban” exchanges. Externalities that affect the public welfare are likely to result from multiple transactions, particularly if supposedly short-term leases are used to satisfy long-term, ongoing consumptive-use demands.

Workshop participants listed a number of third-party concerns that they thought would be present in the “unmediated” trading environment of the leasing regime used in the experiment, a commodity trading system known as a “double oral auction,” in which no regulatory approval or oversight is needed for any given transaction. Both physical and socio-economic externalities were identified as imposing constraints on the willingness of potential

providers (irrigators) to participate in the leasing market (and thus to forbear using water or to seek water use efficiencies in order to be able to participate). The left-hand column of Figure 1 below lists several of the major concerns identified by the members of the workshop group.

#### II. Options for mitigating negative externalities and creating appropriate incentives

The consensus of workshop group concerns appears to be that institutions matter, and that they need to accommodate a variety of situations. Most members of the group agreed that all water movement transactions are not equal, even in the context of temporary leases of bulk water. They saw a need for evaluative criteria to be established and enforced, so that the clearing of a trade would be subject to some sort of review.

Of course, the Office of the State Engineer (OSE) does review applications for permanent water right transfers according to the statutory provisions noted above. However, OSE has viewed the current process as “time-consuming, limiting [its] effectiveness...in time-critical instances,” and stresses in the State Water Plan the need for an “expedited transfer process...balanced with protection of existing cultures, traditions, and water rights” (SWP: 44-5). The SWP identified “water banks” (substantially identical in function to the leasing mechanism described above), “allowing the temporary reallocation of water...without the need for a formal water right transfer,” as a means for providing “an efficient and timely alternative...to mitigate short-term shortages.” However, because the SWP also recognizes the OSE’s responsibility to protect “the customs, culture, environment and economic health and stability” of affected communities, “water banks and transfer processes must provide for full public notice and opportunity to protest” (SWP: 45). Thus there is an unresolved tension between the State’s concerns about timeliness and efficiency on one hand, and nega-

tive externalities on the other.

The right-hand column of Table 1 below lists several suggestions by the workshop participants to begin to address specific concerns and to specify rules for the operation of a leasing market that may provide incentives for farmers in the MRG to participate as leasers, and for potential lessees as well to have greater certainty about the terms of the agreements. These were only preliminary ideas and were not subjected to analysis of their benefits and costs. It is obvious that serious oversight of a leasing market by the OSE would raise transaction costs on some or all trades.

In the case of movement from irrigated agriculture to urban use the overriding concern of the workshop group was that a critical number of such “temporary” trades would result in a permanent loss to agriculture, and the

mitigating strategies proposed by participants reflected this concern. However costly, it seems that only if the affected parties – including third party interests – have a clear understanding of, and come to accept, the “rules of the game” is there likely to develop a robust market in temporary leasing.

### Further work proposed

A third workshop to continue the dialogue and to add additional substance to the suggestions explored here is contemplated, and discussions about the participation of the UNM-SAHRA researchers in that workshop have begun. There are sufficient funds left in the Dialogue’s grant from the Bureau of Reclamation to enable this work to take place before June 30, 2007, and for a final report to be prepared.

#### Participants in planning meetings with academics:

##### NMSU, July 15, 2005

Frank Ward, Professor, Agricultural Economics  
Rhonda Skaggs, Professor, Agricultural Economics  
Brian Hurd, Assistant Professor, Agricultural Economics  
Phil King, Associate Professor, Civil Engineering  
Leeann DeMouche, Specialist, Extension Plant Sciences.  
Dialogue WCIP Committee: Beth Bardwell, John Brown, Dick Kreiner, Elaine Hebard

##### UNM, September 8, 2005

David Brookshire, Professor, Economics  
Bob Berrens, Professor, Economics  
Janie Chermak, Associate Professor, Economics  
Susan Kelly, Associate Director, Utton Transboundary Resources Center,  
UNM School of Law.  
Dialogue WCIP committee: Beth Bardwell, John Brown

#### Experiment/Workshop 1 Participants, November 12, 2005:

Leanne Leith, Jean Witherspoon, Frank Robinson, Lisa Robert, Cyndie Abeyta, Conci Bokum, Dick Kreiner, Elaine Hebard, Kathy Grassel, John Brown, Janet Jarratt, Steve Harris, Adrian Oglesby, Brian Greene, Frank Titus. **UNM/SAHRA:** David Brookshire, Crain Broadbent, Molly McIntosh, Facilitator

#### Workshop 2 Participants, July 15, 2006:

Jean Witherspoon, Lisa Robert, Cyndie Abeyta, Dick Kreiner, Kathy Grassel, John Brown, Janet Jarratt, Frank Titus, Sara Rhoton, Deb Hibbard, Nejem Raheem, Naomi Engelman. **UNM/SAHRA:** David Brookshire, Craig Broadbent, Vince Tidwell, Molly McIntosh, Facilitator

### Footnotes

<sup>1</sup> Beth Bardwell, Conci Bokum, Elaine Hebard, Janet Jarratt, Dick Kreiner, Frank Titus, and Jean Witherspoon, together with (now former) executive director John Brown, comprise the WCIP steering committee.

<sup>2</sup> “Relatively” is an important qualifier, because some efforts at conservation may have adverse impacts that are not intuitively easy to grasp: lining irrigation ditches that reduces aquifer recharge, for instance; or indoor conservation that diminishes return flows to the river.

<sup>3</sup> This practice is documented and discussed in the August 2006 issue of *APA Watermark*, the newsletter of the Assessment Payers Association of the Middle Rio Grande Conservancy District.

<sup>4</sup> A list of participants in these meetings is in the Appendix.

<sup>5</sup> This project is part of a larger multi-university research consortium called SAHRA (for “Sustainability of Semi-Arid Hydrology and Riparian Areas”), a National Science Foundation science and technology center based at the University of Arizona.

<sup>6</sup> This change was discussed in the Dialogue’s October 10, 2005, annual program performance report to the Bureau of Reclamation.

<sup>7</sup> Participants in both the experiment and the follow-up workshops are listed in the Appendix.

<sup>8</sup> For instance, “farmers” require sufficient water to produce a crop, and under drought conditions where success is uncertain they may decide instead to lease their water as an alternative; “environmental users” seek a minimum stream flow necessary to protecting the silvery minnow, etc.

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Water Conservation Incentive Project  
Steering Committee  
Partial Completion Report  
Grant No. 04-FG-40-2257  
Submitted to United States Department of  
the Interior, Bureau of Reclamation,  
Albuquerque Area Office, November 2006**



**New Mexico Water Dialogue**  
**13th Annual Statewide Meeting**  
**January 12, 2007**  
**Indian Pueblo Cultural Center**  
**2401 Twelfth Street NW, Albuquerque**

**Water Planning – So What?**  
**DRAFT Agenda as of 11/14/06**

- 8:00 AM On-site registration
- 8:30 Welcome and introductions
- 8:45 **Planning in the Face of Uncertainty: Weather and Water** – David Gutzler, Professor of Earth and Planetary Sciences, UNM
- 9:30 **Panel: Where are the Regional Water Plans Now? – Implementation Successes and Failures; Lessons Learned**  
 Gary Esslinger, Lower Rio Grande  
 Peggy Johnson, Sierra/Socorro  
 Dutch Salmon, Southwest NM
- 10:30 Break
- 10:45 **Dialogue: The role of regional water planning in the state's future**
- 11:45 **Awards**  
 In Memoriam: Chris Nunn Garcia
- Noon Lunch
- 1:00 PM **How close we came to disaster in 2006** – Rolf Schmidt-Petersen, Rio Grande Basin Manager, Interstate Stream Commission
- 1:45 **Panel: Upstream/Downstream – Dead-end or Model for the Future?**  
 John Brown, former Director, NMWD  
 Susan Kelly, Associate Director, Utton Transboundary Resources Center  
 Peter Pino, Administrator, Pueblo of Zia (invited)  
 Peggy Johnson, Sr. Hydrologist, NMT, Sierra-Socorro Region  
 Elaine Hebard, Middle Rio Grande Water Assembly  
 Conci Bokum, 1000 Friends of NM Water Program, Jemez y Sangre Region
- 2:30 Break
- 2:45 **Panel: State Water Plan Update – What Next?**  
 Estevan Lopez, Director, Interstate Stream Commission  
 Angela Schackel Bordegaray, State Water Planner
- 3:15 **Dialogue: Updating the State Water Plan**
- 3:45 **Summation and Nominations for the Dialogue Board of Directors**
- 4:00 Close

**Continue to check the website <http://nmwaterdialogue.org> for agenda updates**

# NEW MEXICO WATER DIALOGUE | 3<sup>th</sup> Annual Statewide Meeting

## Water Planning – So What?

Friday, January 12, 2007

Indian Pueblo Cultural Center– Chaco I & II  
2401 12<sup>th</sup> Street NW, Albuquerque

### Early Registration Form

Registration includes lunch catered by the Indian Pueblo Cultural Center and morning and afternoon beverages and snacks. The early registration fee (pre-paid before January 9) is \$25. Registration at the door is \$30. The fee for panel members who prepay is \$20. Payment may be made by check or purchase order. Copy this form your computer, fill it out and send it to NMWD, 1300 Canyon Rd., Santa Fe, NM 87501. (Or paste it into an email to [bokatz@cybermesa.com](mailto:bokatz@cybermesa.com). You'll still have to mail in your payment, however, since we're not equipped to accept plastic.)

Name(s) \_\_\_\_\_

Organization (optional) \_\_\_\_\_

Title (optional) \_\_\_\_\_

Address (street or box) \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone \_\_\_\_\_ E-mail \_\_\_\_\_

Early registrations for \_\_\_ person(s): amount \$ \_\_\_\_\_.

I'd like a year's subscription (generally 2 or 3 issues) to *Dialogue* (see below. Subscriptions are \$15 for individuals; \$25 for non-profits, acequias, etc.; \$50 for government agencies, businesses) \$ \_\_\_\_\_.

I am making an additional tax-deductible contribution to the *Dialogue* of \$ \_\_\_\_\_.

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Our organization will pay. Invoice our P.O. # \_\_\_\_\_ for \$ \_\_\_\_\_.

Payment is being mailed separately.

I (we) will pay (\$30 per person) at the door.

By registering for the annual statewide meeting, your name will be added to our mailing list to receive a single issue of *Dialogue*. If you wish *Dialogue* to be sent to a different address, or to receive it electronically (by downloading from a Website) provide the following information:

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