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WHAT TO DO WITH WATER LEFT OVER AFTER NEEDS ARE MET?

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This morning we're going to have a little conversation about New Mexico's water inventory and some of the issues associated with them. The theme, "What to Do with Water Left Over after Needs are Met," probably astonishes some and may perplex others who would argue that our state has no "left over" water. I'll try to lead you through several attributes of this critical resource that are or may become excess to imperative needs and what we can or should do with it.

A recent article in the Deming Headlight captures the essence of how modern irrigation practices can secure and save enormous volumes of water that are left over after needs are met. The headline reads,

"Farming Community Leans Heavily on Drip Irrigation." It describes how virtually all of Luna County's farms have, in the past ten years, transitioned from flood irrigation to drip irrigation, resulting in saving 35 to 50 percent of the water formerly used. The system relies on thin-walled, precisely perforated, and connected drip tapes placed in the ground in a very straight line within a quarter inch variance that waters the crop directly at its root. Water flow is computer controlled and much of the crop tending is managed by computers and GPS controlled tractors. The process relies on clean, filtered water derived from the Mimbres underground aquifer. The conversion is expensive, costing, with computers and global positioning system,

about \$360,000 to install on an irrigated 160 acre Luna County farm. But savings in management, labor, crop augmentation, and water have made the changes profitable. Is this or something like it a wave of the future for New Mexico crops and a model for creating water left over after needs are met?

Let me paraphrase what's currently on the minds of many New Mexicans when thinking of water. It's basically that: Maintaining contemporary patterns of water use in New Mexico has all the attributes of an inevitable train wreck. Escalating demands on limited supplies assure us that dramatic collisions with severe consequences are unavoidable sooner or later without

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changes. To illustrate, we need to look no further than recent events on the Pecos that came close to destroying the economy of some communities and almost decimated several irrigation projects. It was a genuine crisis that, without timely intervention

and expenditures of tens of millions of taxpayer dollars, almost became a catastrophe.

The difference between a crisis and a catastrophe is that if you're fortunate enough to perceive an approaching crisis, you have time to think and act your way out of it. A catastrophe is too late and is the certain result of an unattended crisis.

Are we approaching or in a water-related crisis? And, if so, are there ways to avoid catastrophe while preserving the integrity of our water supply?

To answer, we'll discuss components of our water systems that range from large volumes that are unaccounted for; through overused, underused, and unused water; address the subject of conserved water; and look at new sources of water that may be difficult to find or develop. By necessity, there will be some focus on irrigation water. Now, don't start heating the tar bucket, plucking the chicken, splitting the rail, and heading for the city limits with me yet. There's nothing in this talk that implies a threat to anyone's valid water right – if we successfully avoid catastrophe. And, no matter how intractable and alarming our water problems appear, I'd like to leave you with a sense that, with some solutions involving excess water, appropriate direction, and adequate funding, they are manageable.

That great philosopher, Yogi Berra, observed that, "The future ain't what it used to be." Certainly, the water future of relative abundance we contemplated several years ago is radically different from the predicted insufficiencies we encounter today. Also, since part of this discussion does have to do with water rights – any consideration of which is an anathema to some with older claims – I again turn to a foremost authority on addressing sensitive subjects. It's Will Rogers who profoundly stated that, "Sacred cows make the best hamburger meat."

After more than thirty years of examining and assessing New Mexico's water as a professional geologist, former legislator, past interstate stream commissioner, and involved citizen, I've concluded that with regard to our water issues we've been imprisoned for more than 100 years in a confining box where little or nothing changes. It's like trying to get out of a bucket you're standing in by pulling its handle. To achieve a sustainable water supply and continuing economic prosperity, we must do some creative thinking out of that bucket or box.

The timing couldn't be better. Several years of drought and shortages have prompted significant public awareness of deficiencies in the state's water supplies and some doubt of our ability to cope with them. The public is ready to move. Solutions, however, demand more innovative and original thinking, some legislation, and better application of available resources than those in Santa Fe have, so far, appeared willing to apply. Currently dealing with enormous financial windfalls, they have the means today to initiate and fund measures that can go a long way toward achieving water self-sufficiency.

They can start by adjudicating or otherwise validating our water rights. Once we know with certainty who owns the right to use what water and where their right appears in the pecking order of priority use, procedures to lease water from them to those wishing to use it will follow. Especially in the Middle Rio Grande valley, where almost half the state's population resides and its economic fulcrum is located, water rights confirmation followed by transparent, sanctioned water leasing markets would provide relief from concerns about our economic future related to water availability.

At a hearing before the U.S. Senate Committee on Energy and Natural Resources on New Mexico Water Supply in Las Cruces in 2001, then State Engineer Tom Turney stated, "Adjudications are key

to providing a viable water market... As challenges to New Mexico's water supply increase and more and more demand for new water sources arise from entities such as municipalities and commercial interests, only those rights that have been adjudicated will be marketable at low risk to the purchaser." In response to Senator Bingaman's question about the status of adjudications, Turney said, "In the past 100 years, the State of New Mexico has completed about 15 percent of its adjudications. At the rate we're going right now, that is about 600 years to complete the entire state. Clearly, that is not acceptable... And the cost is going to be very expensive. I think about \$170 million..."

Earlier this week State Engineer John D'Antonio, in response to a legislator's question, said that less than a quarter of the state's water rights have been adjudicated and that it would take about \$300 million and 55 years to settle the rest.

Last year, State Engineer D'Antonio suggested that a method to license water rights might be a viable alternative to the lengthy and very expensive adjudication process. In order to be a satisfactory and acceptable substitute in our water world, a number of critical conditions must be met. Paper trails with certainty as to priority dates and consumptive use are imperatives if effective and relatively inexpensive water markets are to be built. Current practices of extensive and expensive document research, preparation and examination, usually followed by lengthy and costly litigation in order to transfer a water right should no longer be acceptable. "Paper water rights" must be identified and removed. Lessors and lessees, buyers and sellers, must have the confidence in their transactions and the expedited closing time that those dealing in real property attain with title insurance in lieu of expensive abstracts. It will cost money – lots of money – to secure, examine, evaluate, and provide the necessary files and records. So, with water adjudications or acceptable alternatives so crucial to the economic future of our state, I leave it to you to judge whether recent legislative priorities for expenditure of extraordinary financial windfalls have adequately incorporated impending and impelling water urgencies.

Water and the right to use it in New Mexico begins with irrigated crops managed by Native Americans at their pueblos hundreds of years ago. Spanish settlers dramatically expanded these irrigation processes with

the development of acequias on the Rio Grande almost 500 years ago. New Mexico Territory's first water code was established in 1907. It "grandfathered" in pre-existing uses, virtually all of which were dedicated to irrigation, as "rights." But it didn't require registering or documenting them, so they are not adjudicated. The state's constitution, adopted in 1911, confirmed these rights.

Where's the water for new and expanding uses going to come from? Mostly, we'll have to create it. It may surprise some – and be heretical to others

– to know that the root cause of our water problems is not necessarily shortages, but distribution. Data on the State Engineer's website says that in the year 2000, New Mexicans diverted over 4.2 million acre feet of surface and groundwater for all purposes and depleted or consumed about 2.6 million acre feet of it. That's an enormous volume of water that, if otherwise managed and distributed, would meet the needs of all the state's users well into the foreseeable future.

Irrigated agriculture's share of this bounty is about 1.8 million acre feet. Reservoir evaporation accounted for another 431,000 acre feet. Since few of these reservoirs would exist except to store irrigation water, it is not unreasonable to suggest that the combined use of more than 2.2 million acre feet means that almost 85 percent of all the water we consume is used to irrigate crops. Municipal, urban, and public water supplies account for 8 percent of our water and all other uses are for the other 7 percent. Now, I'm fully aware that large volumes of the water charged to irrigation don't reach crops and are consumed elsewhere in the hydrologic cycle and that less than full reservoirs don't evaporate as much water. But, in the broader context, there's no escaping that irrigated crops are by any measure the primary beneficiaries of our water treasure.

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Crop production is a fundamental cornerstone of New Mexico's culture. It was here long before any of the rest of us. Its priority status in water use is well recognized in its ownership of most of New Mexico's senior water rights. When the Territorial legislature vested them one hundred years ago, the state's economy was virtually wholly based on agriculture: cattle and crops.

Our water laws have changed little since 1907, but our society and economy are vastly different. Statistics from the New Mexico Department of Agriculture at New Mexico State University tell us that in 2005 the total cash receipts from all of New Mexico's crops was \$621 million. That's certainly

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significant. But it's less than one percent of our state's 2005 Gross Domestic Product of \$69 billion as determined by the U.S. Department of Commerce. Might we conclude, then, that the direct monetary value of crops grown with 85 percent of our water is less than one percent of our economy? Including the indirect financial benefits contributed by our farming communities tied to irrigated agriculture would change this statistic some, but not much.

Like it or not, this illustrates the dramatic imbalance in the use of and benefits from New Mexico's water today. From it, might we also determine that many of our water woes are or will be as much a product of unchanged, long term, archaic, and – dare it be stated – obsolete management of available supplies as they are of shortages?

None of us here were around when the state's water laws were codified. Or when irrigation and conservancy districts were formed. Or had anything to do with enacting river compacts. So we can't take responsibility for initiating, developing, and approving them. Yet, these are the very elements that have absolute control over our lives today and, in some cases, threaten our economic future. But those leaders and decision makers in charge now and those coming along behind them are and will be responsible if they don't recognize that following many of the identical water paths of our ancestors may lead us to crisis if not catastrophe. Is it too provocative to suggest that it's time, perhaps, to question compacts or adjust ancient

water laws to present and future conditions? Forty years ago New Mexico's greatest water legend, former state engineer Steve Reynolds said, "Pigs will fly before we ever change those compacts!" Perhaps somewhere in all the great technical, medical, and scientific advances that have taken place since that statement, there's now a pig with wings!

It is clear that to meet future needs of our citizens and sustaining or improving the economic vitality of our state, providing new uses from New Mexico's fully appropriated water supplies will require easy and expedited transfers of water from irrigated crop agriculture. This doesn't necessarily mean sale of water rights. And it doesn't necessarily mean a dramatic change in the way a farmer does his business or grows his crops.

Under current water law it is relatively easy to transfer water use from one irrigated tract to another within an irrigation or conservancy district and acequias, but very difficult, costly, and time consuming to convey the same water right to a different use, place of use, or new point to divert it. The latter can be done, but it usually requires a sale of the right and a concurrent permanent loss of the water to the originating location and owner. In general, farmers who could conserve irrigation water that might be shifted to other uses are constrained by "use it or lose it" provisions, time and expense, loss of the right, lack of infrastructure and storage facilities dedicated to marketed water, and – perhaps most of all – the absence of sanctioned water markets.

If laws and rules are modified slightly, water that is surplus to irrigation needs that has been authenticated but perhaps not fully and expensively adjudicated can be leased, preserving ownership in the region of origination as well as the holder of the right. If properly sanctioned and accompanied by minimally restrictive institutional administration and regulation, active and transparent water leasing markets will be established that won't destroy the utility of the farm or dependent communities. And because these markets preserve the integrity of ownership in the right holder and its region of origination and the term of use or transfer is not permanent, institutional administration and regulation should be considerably less than those required of a sale.

We've all encountered farmers, some of whom are attending this meeting, who will admit that with adequate incentives, usually money and assurances against loss of water rights, they could conserve,

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salvage, or save a substantial part of their water and still grow their crop. This water will become a primary source of “water left over after needs are met” and will be of great benefit to all water users during good and bad water years, providing extra income and less work for the farmer and rapid and easier access to water by those needing it.

I promised earlier to describe some other sources of water that we can consider “left over after needs are met.” Let me digress to include some of these before I conclude.

- Recent years of drought leave the impression that sources of surplus or unused water are limited or non-existent in New Mexico. One has only to review the storage history of Elephant Butte reservoir in the ‘80s and ‘90s to learn that there were several years of overcapacity that resulted in actual or calculated “spills” over the dam. During “spill” years, not only are all Rio Grande Compact credits and debits accrued by compact states eliminated, the volumes of water overflowing are “free” of any compact requirements and accounting. Spill water volumes of more than one and a half million acre feet were lost during these periods. It will happen again, and the state should initiate procedures to “shortstop” this water, clean it up and add it to storage, preferably underground.
- Provisions of the Rio Grande Compact permit participating states to accumulate debits and credits based upon over or under annual deliveries of compact water. It would be prudent for the state to begin efforts to determine the conditions, tradeoffs, and negotiations that could lead to storage of its Rio Grande Compact credit water, currently 168,000 acre feet, in the Middle Rio Grande underground aquifer.
- There are geologically and hydrologically unexplored basins in New Mexico potentially capable of containing large volumes of potable water. A recent example is the Otero Mesa Salt Basin south of Alamogordo, described by the USGS as containing 45 million acre feet of freshwater. We should be actively searching for them.
- Some of us recall a very prosperous uranium industry in the southern San Juan Basin in the late 1970s. But how many remember that almost half of the electricity PNM generated then was

devoted to that industry to pump enormous volumes of water from their underground mines? That water is still there.

- Research must, of course, continue on efforts to make use of the state’s immense reserves of brackish water. Currently the main barrier appears to be the expense of the large amounts of energy required. Not all ideas are new. Would it surprise you that I have in my library a copy of a 400-page study for the Federal Energy Agency completed in 1977 by Los Alamos National Laboratory that describes the feasibility of a 2,480 megawatt nuclear generating plant in the Tularosa Basin, using brackish water as a cooling medium and 340 MW of its electricity to condense this water to provide 380,000 acre feet of water containing 5 ppm of dissolved solids annually?
- And, what could be called the “Las Vegas Solution?” That Nevada city, facing eminent critical water shortages, has floated the idea of constructing large desalination plants for coastal California cities in return for a portion of their Colorado River allocation. Ridiculous? Who knows?

Finally, validated or authenticated water rights and sanctioned water markets are only one part of solving the water puzzle. To think out of that box or bucket we’ve been in for a hundred years, the state needs to look beyond adjudication to eventual storage of leased water and assuring that it can be held over and is not subject to meeting compact or other requirements subsequent to its acquisition. If this is done, dramatic new paradigms have appeared in recent years that can go a long way toward accompanying and accomplishing long-term water planning and availability.

The most dramatic new dynamic is the completion of the Albuquerque Bernalillo County Water Utility Authority’s (ABCWUA) 400 million dollar municipal water supply system to remove water from the Rio Grande, clean it up, and distribute it to the community. Half of this cost was for the stand-alone treatment plant.

Second is the groundwater aquifer underlying the Middle Rio Grande Valley. Over the past 40 or 50 years it has been the source of water for the valley communities and during this time has been depleted of about 1,000,000 acre feet of its stored water. Much of

the space formerly occupied by aquifer water is now available for cleaned and injected river water that may be leased and left over after needs are met. Over time, with sufficient new water filling the aquifer, domestic requirements are more easily met and the Rio Grande could once again become a gaining stream that would more easily meet compact requirements.

Third might be the proposed Navajo-New Mexico settlement of San Juan River water rights. If and when accomplished, it gives the Navajos about 340,000 acre feet of the 611,000 acre feet of San Juan water allocated to New Mexico under the Colorado River Compact. They currently can't use this amount because their irrigation project is unfinished, and a large part of it still flows downstream to slake the thirst of California. Today, it's the greatest source of surplus water in the state.

Then we deal with some What Ifs that require out of box thinking and some legal maneuvering. And I acknowledge that the older I get the easier it becomes to make provocative statements and draw conclusions that in earlier years might have been considered impractical, irrational, unreasonable, or worse. Today, to me, in this context, they're bold and creative.

- If the Navajos agree and the State Engineer grants approval for Rio Grande water users to lease Navajo surplus water.
- If Congress approves transferring this water, in addition to our San Juan-Chama water, through the continental divide tunnels to the Rio Chama (The capacity is there. It is restricted to 110,000 acre feet by federal law).
- If the Corps of Engineers (CE) and Rio Grande Compact participants approve increasing Abiquiu reservoir's storage capacity to temporarily accommodate this water (it's currently restricted by CE and Compact to 183,000 acre feet). There would be tradeoffs for gaining approval (like sharing a portion of this leased water to southern New Mexico, Texas, and Colorado). But we'll never know if we don't indicate a willingness to negotiate.
- Then, the lessees of the stored leased Navajo water negotiate with ABCWUA for use of its treatment plant to clean and inject it into the underground

aquifer where, under certain conditions it is "on call" for drought or other contingencies.

- I mentioned earlier the very impressive water savings Luna County's farmers derived by their switch to drip irrigation. That isn't a directly feasible option for irrigators on the Rio Grande. Not only because of cost, but because this drip system relies on clean water obtained from the underground Mimbres basin aquifer. But, what if water users in the Middle Rio Grande valley cut a deal with irrigators to provide them with clean irrigation water and the infrastructure to distribute it in return for the water the process saves? It might be considerably less than constructing a water treatment plant or purchasing water rights at current prices in excess of \$12,000 an acre foot, assuming they're available.

Thanks for indulging me in defining water that is or could be "left over after needs are met" and what could be done with it. These are choices, some more viable than others, that in lieu of the return of a permanent El Niño might avoid an inevitable crisis. Doing nothing is not an option and in the midst of a crisis might invite the wrath of an outraged public that would demand and compel remedies much more dramatic than these. If you agree, I encourage you to express your thoughts to our decision makers. Thank you.