

Director's Statement

This year's Annual Water Conference, our 48th, was held at the picturesque Tamaya Resort and Spa at the Santa Ana Pueblo. Nearly 300 participants gathered to talk with their colleagues from around the state and to learn more about the State Water Plan.

Early in 2003, Governor Bill Richardson asked that a statewide water plan be written by the end of the year. The draft plan was ready to be announced to the public at our annual conference. State Engineer John D'Antonio spoke to participants on the process used to develop the water plan. Interstate Stream Commission Director Estevan Lopez described how the interstate stream compacts and issues affect New Mexico's planning and how the State Water Plan takes into account those planning activities.

We were very pleased to have Mexico Ambassador Albert Székely give the Albert E. Utton Memorial Water Lecture at our luncheon. The gracious and thoughtful Ambassador proposed that the seven governors of the Mexican states bordering the U.S. and the four U.S. governors take a leading role in dealing with the water conflicts along the U.S./Mexico border.

Frank Titus provided his thoughts and memories of W.K. "Kelly" Summers, a preeminent groundwater scientist who influenced water management in New Mexico for nearly 40 years. Kelly was a practitioner of sound science, something we would do well to reflect upon and emulate.

The success of the conference is due in large part to the input received from the Water Conference Advisory Committee. We look forward to planning next year's conference and the opportunity to once again meet with our friends and colleagues from around this great state of ours.

M. Karl Wood
Director

Funds for the proceedings publication were provided by registration fees, the U.S. Department of the Interior, and state appropriations to the New Mexico Water Resources Research Institute.

Photos by Stephens Photo Service.



W.K. "Kelly" Summers
1930 – 2003

New Mexico has lost one of its preeminent groundwater scientists. Kelly Summers profoundly influenced water management in the Middle Rio Grande Valley as well as the lives of his many colleagues and friends. In 1966, Kelly moved to the Southwest to work for the New Mexico Bureau of Mines in Socorro as research hydrologist. From 1972 until 1986, Kelly studied groundwater systems throughout the state as a consultant, increasingly incorporating land use and climatological data into his investigations. In 1986, Kelly was hired by the City of Albuquerque to re-evaluate the City's groundwater supply. It was during his six years with the City that Kelly's relentless insistence on good science and visionary water resources planning led the Middle Rio Grande Valley to better understand the hydrologic reality of the aquifer system. That understanding has become the basis for contemporary water management dialogues and decisions. He will be missed.

Water Conference Advisory Committee and Representatives

Lynn Brandvold, New Mexico Bureau of Geology and Mineral Resources
Wayne Cunningham, Arch Hurley Conservancy District
John D'Antonio, Office of the State Engineer
Jim Davis, New Mexico Environment Department
Tom Davis, Carlsbad Irrigation District
Doug Earp, City of Albuquerque
Gary Esslinger, Elephant Butte Irrigation District
Susan Fry Martin, Los Alamos National Laboratory
Chris Gorbach, U.S. Bureau of Reclamation
Michael Hatch, New Mexico Department of Game and Fish
Matt Holmes, Rural Water Users Association
Lt. Col. Dana R. Hurst, U.S. Army Corps of Engineers
Susan Kelly, City of Albuquerque
Fidel Lorenzo, Pueblo of Acoma
Julie Maitland, New Mexico Department of Agriculture
William McIlhaney, New Mexico Farm and Livestock Bureau
Nathan Myers, U.S. Geological Survey
Ken Needham, consultant, Las Cruces
Bill Rinne, U.S. Bureau of Reclamation
Craig Runyan, Extension Plant Sciences, New Mexico State University
Blane Sanchez, Interstate Stream Commission
Daniel Sanchez, Pueblo of Acoma
Marc Sidlow, U.S. Army Corps of Engineers
John Tysseling, Energy, Economic and Environmental Consultants
Linda Weiss, U.S. Geological Survey

New Mexico Water Planning 2003

48th Annual New Mexico Water Conference

Program

Wednesday Morning, November 5, 2003

- 8:15 a.m. Welcome
Karl Wood, WRRRI Director
E. J. Lujan, Santa Ana Pueblo traditional officer
- 8:30 Overview of How Water Planning is Being Formulated in New Mexico
State Engineer John D'Antonio
- 9:30 In Memory of Kelly Summers, 1930 - 2003
Frank Titus
- 10:00 BREAK
- 10:20 How a State Water Plan Extends Beyond Our Borders
Interstate Stream Commission Director Estevan López
- 11:00 Legislative Perspective on State Water Planning
New Mexico State Representative Mimi Stewart
- 11:30 How Water Quality Affects Planning
New Mexico Environment Department Secretary Ron Curry
- Noon Luncheon - Albert E. Utton Memorial Lecture presents
Ambassador Alberto Székely,
Border Water Affairs, Mexico City

Wednesday Afternoon, November 5, 2003

- 1:45 p.m. In the Spirit of Collaboration: Developing Solutions to
New Mexico's Water Problems
John Keys, Commissioner, U.S. Bureau of Reclamation
- 2:15 Acoma Pueblo Takes a Unique Approach to Water Planning
Fidel Lorenzo, Director/Liaison, Haaku Water Office and
Laura Watchempino, Water Quality Specialist/Attorney
- 2:45 Navajo Nation Plans for Their Water Future
John Leeper, Water Manager, Navajo Nation Department of Water Resources
- 3:15 BREAK
Hosted by the American Water Resources Association - New Mexico Section
- 3:35 Panel Discussion:
*Challenges, Opportunities, and Concerns When Planning for
New Mexico's Water Future*
moderated by **Bill Hume**, Office of the Governor
Letty Belin, Belin and Sugarman
Oscar Butler, Doña Ana Mutual Domestic Water Association
Tom Davis, Carlsbad Irrigation District
Charles DuMars, Law & Resource Planning Associates, P.C.
Paula Garcia, New Mexico Acequia Association
Randy Kirkpatrick, San Juan Water Commission
Jennifer Wellman, Santa Ana Pueblo

Thursday, November 6, 2003

- 8:00 a.m. Planning for Drought
Anne Watkins, Special Assistant to the State Engineer
- 8:30 Water Transfers: Key to Water Planning
Jim Brockmann, Stein and Brockmann, P.A.
- 9:00 *Regional Water Planning Examples: Rural and Urban*
- San Miguel/Mora - **Tracy Seidman Hephner**, San Miguel/Mora planning region
and **Joanne Hilton**, Daniel B. Stephens and Associates
- Middle Rio Grande - **Bob Wessely**, Middle Rio Grande Water Assembly
- 10:00 BREAK
- 10:20 *Science and Technology Needs for Water Planning*
- Introduction: **Karl Wood**, WRRRI Director
- Future Desalination Research and Development: **Mike Hightower**, Sandia
National Laboratories and **Tom Jennings**, U.S. Bureau of Reclamation, Denver
- Groundwater and Surface Water Modeling for Water Planning: **J. Phillip King**,
New Mexico State University, Department of Civil and Geological Engineering
- Planning and Development of Impaired Waters at El Paso Water Utilities:
Ed Archuleta, El Paso Water Utilities
- 11:20 The Next Step: Implementation
Jim Dunlap, Interstate Stream Commission Chair
Carlos Rey Romero, New Mexico Finance Authority

John D'Antonio was appointed as the New Mexico State Engineer by Governor Bill Richardson in January 2003. He also serves as Secretary of the Interstate Stream Commission. John is a registered professional engineer in New Mexico and Colorado. He has experience in hydraulic design, acequia rehabilitation, water resource management, and water policy development. John was Cabinet Secretary of the New Mexico Environment Department in 2002. Before that, he was the Director of the Water Resource Allocation Program for the Office of the State Engineer from 2001 to 2002, and served as the District 1 Supervisor in Albuquerque from 1998 to 2001. John also worked for the U.S. Army Corps of Engineers for 15 years as a hydraulic design engineer; as the Chief of the Hydrology, Hydraulics, Sedimentation, and Floodplain Management Program; and was the project manager for the Acequia Rehabilitation Program. A native New Mexican, John received a bachelor's degree in civil engineering from the University of New Mexico in 1979 and pursued graduate coursework in water resources engineering, hydraulic structures, and water resource administration. John was a member of the Governor's Blue Ribbon Task Force on Water Issues from 1998-2002. He is chairman of the Water Trust Board for the State of New Mexico, New Mexico Commissioner to the Rio Grande Compact, and the New Mexico Commissioner to the Costilla River Compact.



OVERVIEW OF HOW WATER PLANNING IS BEING FORMULATED IN NEW MEXICO

John R. D'Antonio, Jr.
State Engineer
P.O. Box 25102
Santa Fe, NM 87504-5102

New Mexico's Water Future: There is a Plan

As most of you know, the governor mandated that we do a statewide water plan by the end of this calendar year. The focus in Santa Fe, and especially this legislative session, has been on water issues. A state legislative bill passed, which the governor signed on April 4 of this year, requiring a State Water Plan by the end of 2003.

As far as regional water planning goes in New Mexico, currently we only have six plans that have been accepted by the Interstate Stream Commission (ISC) (Fig. 1). We anticipate having another two or three plans to go in front of the ISC for approval at the December 17 meeting. We might have as many as nine plans that have been approved by the end of this year.

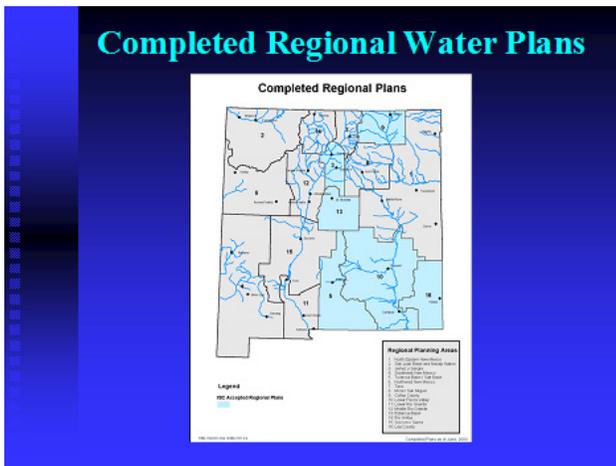


Figure 1. Regional plans accepted by the ISC

The process for developing New Mexico's first State Water Plan is already well underway. Our first public meeting was July 9 and the last of 29 public meetings was held on September 11. Then, a New Mexico First Town Hall meeting was scheduled September 23-25, which gave us a lot of input from people in this room for the consensus document. The timeline (Fig. 2) shows we have to provide certain deliverables and we must meet certain milestones.

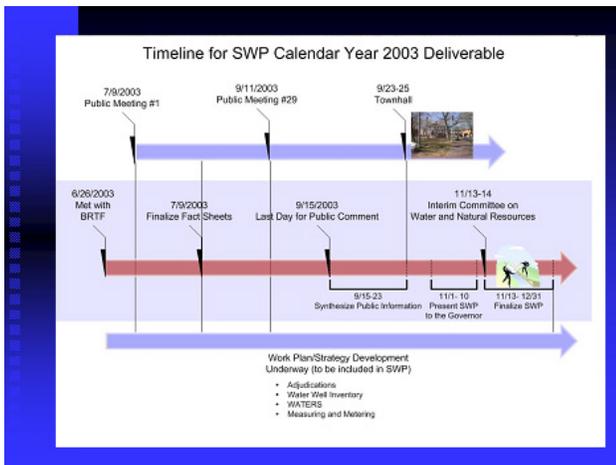


Figure 2. Timeline for Statewide Water Plan

We plan to present the statewide water plan to the governor sometime this month, within the next week or two, depending on his schedule and my schedule. The plan should go before the ISC by the end of December.

We received a lot of public input from every corner of the state as we held our public meetings. Locations were well dispersed around the state (Fig. 3), so we could listen to everybody's needs in every area. Our first meeting was held in Clayton. The Las Cruces public meeting drew the most people, about 200.

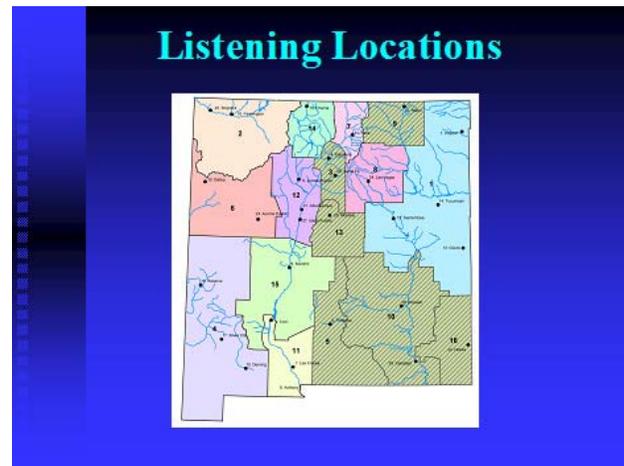


Figure 3. Public meeting locations throughout the state

We also met at several Native American venues during this process including: the Pueblo of Isleta, the Pueblo of Acoma, the Pueblo of Jemez, and we also held a meeting in Shiprock. Their input was important to include in the State Water Plan.

In all, more than 225 communities participated and over 1,400 people attended the meetings (Fig. 4).

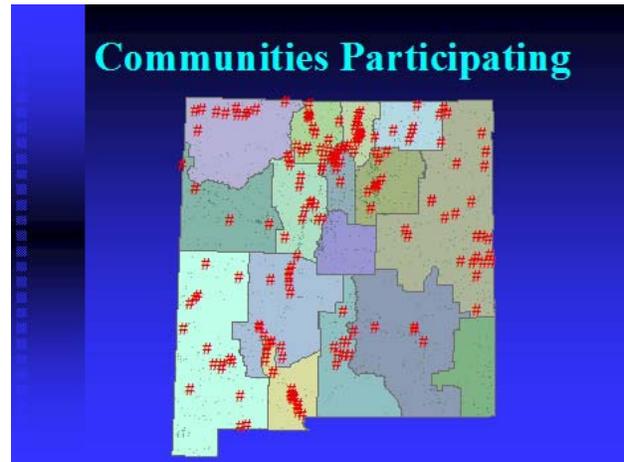


Figure 4. Over 225 communities participated in the public meetings on statewide water planning.

In advance of the public meetings, ISC Director Estevan López, our Public Information Officer, and I traveled the state visiting with local news media (Fig. 5). We made a total of ten visits to different communities, which would be hosting the public meetings. We visited newspaper editors, television assignments editors, and radio news directors as well as reporters covering water issues to promote the statewide planning process in an effort to get as much

public participation as possible at the meetings. As a result, we got a tremendous amount of coverage for the public meetings as well as having good attendance. My Public Information Officer, Karin Stangl, who is here today, has been a great addition to our staff. She carefully tracked the earned media attention for our efforts, which resulted in \$145,000 in earned media attention, which is what it would have cost the agency had we purchased paid advertisement for these efforts. Our news media coverage exceeded our expectations as a result of these targeted media visits.



Figure 5. State officials visited news media prior to the public meetings

Figure 6 shows our statewide planning team standing by the state plane after arriving for the Las Cruces public meeting. I call this slide, “*Planners Gone Wild.*” These guys were instrumental in the success of those 29 public meetings held across the state.



Figure 6. The statewide water planning team

The New Mexico First Town Hall meeting also provided great input into the State Water Plan. Figure 7 illustrates that process.



Figure 7. New Mexico First Town Hall meeting focusing on water planning was held on September 23-25.

The State Water Plan will be a broad-brush framework for a future policy within our state office. However, it is going to be an ongoing process. This plan is not by any means in final form. It is a draft that will become a strategic plan for our agency. We are not going to throw it on a shelf and forget it. The work will continue.

We need to plan for public input, continual public input. We need to be able to communicate better to the legislature about our funding needs. As a state agency, we need to communicate better just what resources we require to do our jobs more effectively. We need state legislative support. The State Water Plan will be a good document for this purpose.

There must be sound science behind the decisions we make. With the drought expected to continue for the next few years, we need sound science to help us make our decisions. Helping decision makers to better understand the complexity and the breadth of the issues we face within our state is immensely important.

Now, I’d like to talk about the Act itself. There is information within the Act that we had to follow for creating the plan. The State Water Plan is going to cover four areas in the first phase. The plan format will include discussion and background information relating to specific sections of the Act, and relevant Town Hall and public participation statements. It will also include specific policy statements to assist in developing a broad-brush framework as well as list some implementation strategies to support the policy statements.

Sections A and B of the Act describe the elements of vision and stewardship. We had a lot of discussion on Stewardship and how immensely important it is to us in terms of how we look at the importance of water to everyone in the state.

Section C of the Act has 13 elements. I'm going to quickly go through them in bullet form. These are the items that we are addressing:

- Common priority, goals, and objectives
- Active water resource management
- Inventories and water budgets
- Water conservation
- Drought management
- Water availability and land use decisions
- Watershed restoration and ESA mandates
- Water rights transfer policies
- Governmental coordination
- Integration of regional water plans
- Water supply purveyors planning
- Water infrastructure and investment
- Technological approaches to water supply and management

We are looking at these components in terms of background paragraphs that relate to each and every key item. We will then include relevant comments from Town Hall meetings and public participation. We will list the actual policies that we come up with and their implementation strategies for each and every item.

Sections D, E, and F elements of the Act refer to adjudications and databases. I will be spending a lot of time talking about adjudications and our databases this morning. Coordination with Indian Tribes and Pueblos is included in Section E. Public and stakeholder input is included in Section F.

Implementation will be key. I have some project management background from my work with the Corps of Engineers, which I think will be important to impart to the Water Plan. There must be accountability in state government. It must be laid out in terms of being able to explain to the general public and to our legislative body how we schedule things and what our issues are. The schedules typically used for water project management are Gantt charts with timelines. We also want to identify key milestones, deliverables, and assign resources effectively – both in-house and contractual resources. This requires accountability and setting priorities. Most people would be surprised to see our day-to-day activities and how we spread our

resources so thin to cover what we have to do as an agency. John Romero, who is my director of the Water Resources Allocation Program, will be coordinating activities and schedules with the rest of my division directors.

Proper implementation will require project management and more active water resource management than ever before. The continued drought will force us to manage times of shortage effectively. We must be able to go in and establish rules and regulations, put in measuring and metering devices, and hire water masters for priority basins that have been identified around the state. We are putting together timelines to try and accomplish this. We hope to have this accomplished in several areas of the state before the start of the next irrigation season.

Adjudication of water rights is a key issue. We have accountability schedules set up for all the adjudications in which we are involved. These are going to be a part of the appendix of the State Water Plan.

The population of the WATERS database is a critical component in doing everything that we need to do within our agency. Database population, being able to access that data, and understanding what and who owns what water, and expediting the processing of applications are all important.

Active water resource management is another initiative that I want to mention today. It is really a key component of planning efforts for the future of priority administration. Here is a quick recap of the drought situation we are in now. We have gone through the meteorological drought and have been there for at least four years in the state of New Mexico. Most of our agricultural communities and irrigation districts are only getting a percentage of what they are allotted. We are actually in the hydrologic phase and may have passed that stage essentially because our surface water supplies are so low. We cannot augment those needs for everyone around the state because our current water resources are so low. We are in a phase, which I consider the socioeconomic phase of the drought, which translates into an administrative drought for our office because our guys are out there everyday dealing with dry holes and with people who are potentially and illegally diverting water. There are also shortages everywhere, and our office is the first line of defense. I really have to take my hat off to those who are dealing with this daily out in the field. You who live in the city and can turn on the tap and get water are doing really great. A lot of people cannot do

that and we are dealing with this situation on a priority administration basis.

I have mentioned priority administration. We are inadequate in this state in our preparation for priority administration. We do not have the tools in place. We do not have the rules and regulations. We do not have the water masters in critical areas. We will get there with proactive steps toward active water resource management. We are going to try and share shortages to extend supplies. These are steps down the road to enforcing priorities, when we are actively measuring and metering, when we have rules and regulations in place, and when the adjudication process is further along.

This will require regulation development. We are going to use existing statutes to come up with these regulations. We already have a statutory scheme in place. The regulations are going to provide for the creation of water districts and appointment of water masters. We can do this in two different ways. If there is a request from the majority of the water users within a district, we can set up a water district. Or, by order of the Office of the State Engineer, in an emergency situation, we can create a water district.

The rules and regulations will provide for the publication of a water master manual drafted to benefit the water users by providing water management to extend supply to avoid a “priority call.” Yet, if there is a priority call in some areas, we will want to make sure that the junior water right users are restored as soon as possible.

The water master manual will provide water masters with instructions for the sharing of water through a structured informal “water banking” system. We will be talking a lot about “water banking” this year. In the near future, I think water master manuals in several areas will be developed.

A “one-size-fits-all” manual will not work in terms of the differences we have in the state. Really, the ultimate goal is to protect the senior water right holders and to make sure due process is followed in terms of transfers of water rights.

This manual will provide enforcement mechanisms to prevent illegal use and/or waste, and the regulations will provide for where hydrologic models exist to support some decisions that we make and make sure current issues are addressed. Then again, it will allow for expedited transfers, appeals of decisions of the water master to the State Engineer, and modification of the manual and regulations.

Again, due to the drought, the goal is to promulgate rules by the next irrigation season. We have legal and water rights staff committed as a priority. If we do not get additional help in terms of funding and resources, I may have to ask our water rights administration staff in our districts to put a hold on some of the application processes. We may actually have to go out into the field and administer water and we will sign contracts with former employees to do this. Water rights are very complicated and we can’t pull just anybody off the street to manage these issues.

Adjudication of water rights – this is a big issue. The simple definition of adjudication is “*who owns what water . . . and in what amount.*” It sounds very simple, but it is not. It involves doing hydrographic surveys and field verifications of points of diversion and places of use. Our office must be more user-friendly by talking to people in the field who are involved in doing these adjudications.

If we look at the state overall, less than 20 percent is fully adjudicated. But, if you look at the entire state in terms of areas where adjudications are in progress, the amount is about 60 percent of the state.

We have been working with an ad hoc committee of the Supreme Court to look at the New Mexico concept of water courts. The Colorado concept of water courts is different from ours and will likely not work in New Mexico. Colorado adjudicated water rights as time went along during the last century. We didn’t do it that way.

The Supreme Court has approved the way we plan to approach water courts. What makes a lot of sense is having one judge in each judicial district that would be designated as a “water judge.”

Water courts provide several benefits. There is “water rights” expertise and continuity with one judge. The water cases are heard in a timely manner and negotiations promoted over litigation. The judge and court personnel would be familiar with New Mexico water law and state water rights in particular areas of the state, which would also serve to expedite the process.

House Bill 744 was introduced last year during the legislative session, and it falls right into the development of this water courts concept. There was about \$2.1 million in funding associated with this bill. The bill made it all the way through the process, but did not get funded. Yet, we still want to concentrate on that procedure. There were three components of this bill. One was a web-based information system so that everybody in the state could have access to the

water rights cases from their particular area. Of the \$2.1 million, roughly \$300,000 to \$400,000 was going to that component. We were planning to hire more technical staff and more hydrographic survey people within the Office of the State Engineer. That would have taken \$1.3 million and was essential to our office. Right now we have hydrographic survey staff who are pretty smart, but they are distributed to every corner of the state in terms of supporting adjudication efforts. We do not have the flexibility within our office to send personnel to northern New Mexico, or to help finish the Lower Rio Grande, or to go to other places in the state where they are needed.

The balance of that \$2.1 million included another \$300,000 to \$400,000 for funding of public education initiatives and mediation to make landowners more comfortable with the process. We need to make a better effort to communicate with people and to educate them on how the process works, so that they will be more likely to come in and work with our office. If that is done, we will not have cases that end up going the full term of litigation, and more cases could be settled out of court.

I want to mention some of the State Water Plan highlights. Obviously, we still oppose the federal "taking" of water. We have been successful in dealing with our federal counterpart within the state. They have obtained state permits for federal actions, and when I say "dealing with federal government," it is always in terms of dealing with the Bureau of Reclamation and the U.S. Fish and Wildlife Service providing water for the endangered species. We are going to work with research institutes and universities on desalination, conservation, watershed restoration, water reuse, and weather modification projects and any other area in which we can use the expertise we have at our universities and our national labs—Los Alamos National Laboratory and Sandia National Laboratories provide a very good resource for us.

We are going to continue to resolve our Native American water-rights claims through negotiation, and initiating government-to-government contacts with the tribes and pueblos. We are really putting forth an effort to continue that communication. We have had six or seven meetings with the pueblos and tribes. We do have issues because of the sovereignty of the pueblos and tribes. They want to be treated on a sovereign-to-sovereign basis, and we do need to try and understand what they are doing with their water and what their plans are. The adjudications that have been pending for decades will be a priority. We are negotiating in

several areas of the state. Of course, the cultural significance of water will be respected and senior water rights will be protected.

I have not mentioned the acequia community yet. The acequias are very important in the state of New Mexico. They have important cultural uses of water. We recognize that those cultural traditions must be respected. There were some laws passed this last legislative session that will help in that area. Again, it is not just acequias, it is all senior water right holders, irrigation districts, and farmers that have been here for a long time. We need to continue to protect the senior water right status.

As I mentioned earlier, our agency attorneys and the hydrographic survey technical staff need to work more collaboratively to complete adjudications around the state. We need a commitment from staff to provide the technical hydrographic survey component and come up with a workable product in a shorter period of time. The data management component is critical. We also need to be able to schedule our resources and plan for use of our resources, so that we do not have any down time. For example, when technical staff has to wait for a three-day period while attorneys are working out a particular aspect of the process, we need flexibility in scheduling to allow them to keep working on data management and collection in other parts of the state. We need to have resources to allow for that situation.

Efficiency will involve each adjudication bureau. Currently, we have a northern New Mexico Bureau, a Lower Rio Grande Bureau, and a Pecos Bureau. We have three different adjudication bureaus in operation because of the active adjudications in those areas. The bureaus will develop stream system plans to be adopted by the court as well as four-year strategic plans.

We have a Hydrographic Survey Bureau that will develop a hydrographic survey plan as well as a four-year strategic plan for initiating and completing surveys for both pending and future adjudications. Adopted measures should reflect performance by the completion of specific milestones. Adjudication plans will provide an estimated completion date based upon existing resources. We need to communicate better with our legislators where we are in the process and what resources we need to be more effective. The integration and coordination of the bureaus with workable plans will maximize agency resources.

We can work on data collection and get up to 75 percent of the data needs in different areas of the

Overview of How Water Planning is Being Formulated in New Mexico

state without our data going stale. When you do a hydrographic survey too soon and complete it, that data can go stale before other personnel have time to act on it. With effective data management plans, we can collect up to 75 percent of our needs in certain areas, completing the last 25 percent when personnel is available to finish the job.

Another thing we need to do is to get to an EGIS framework to link all data within our agency. We are working on it as I speak. We have the water rights administration database (WATERS) that links all the paper files that we have in the district office with files in the databases for imaging and abstracting. As the adjudication process goes on, we have the WRATS database that the hydrosurvey group uses, as they input data. We are trying to get these two databases to match, so information is input just once for both databases. That is key in terms of getting the EGIS component and its framework in place.

The EGIS framework will provide easily accessible data inside and outside the agency. Yet we want the public to be able to access it through a web interface to obtain any data they want and in terms of technical data. We also want to create a queryable database on a GIS platform. We want to do this as soon as possible. We want to get rid of corresponding files, so that we have just one file where data are entered one time only. This will greatly improve efficiency within our staff.

In the future, there is going to be an electronic data exchange instead of a paper file exchange. Single tasking will be shared among the groups without any duplicated efforts. Then we get into the steps toward approval.

Back to the State Water Plan – here's where things stand now. We will present a draft plan to a joint meeting the Water Trust Board and the ISC. The draft will be presented to the State Legislative Interim Committee on Water and Natural Resources Committee on December 13 and 14. There will be an extensive public comment period on the draft plan. Then it goes before the ISC meeting for final approval, which is scheduled for December 17.

I encourage you to stay involved and stay informed on this process. We need your input on these critical water issues affecting our state.

I have time for just a few questions. I have to be in Santa Fe for a meeting in Governor Richardson's office by 10:30 a.m. with Mexican President Vicente Fox. I'm not sure what water issues that meeting will involve, but I'll share with him this saying we have in

New Mexico: *"mi casa su casa, pero mi agua es mi agua."*

Question: Would you discuss the relationship between the regional plans and the State Water Plan?

Response: The regional planning process is very important in my eyes as well as the public welfare issues that the regional plans address. Some of the regional plans have been much better funded than our State Water Plan. What we may do is cull out the best information we can from the regional plans and see how those plans fit in our overall framework. Certainly, if it is within the regional plan, it is going to be important to consider, and we will see how it is accountable with what we are trying to do. Regional plans may be more detailed on water issues that are important to specific regions. We are going to incorporate as much as we can and continue to support regional planning efforts while our statewide planning efforts are ongoing.

Question: Will there be any difference in interpretation on "use or lose it?"

Response: The "use it or lose it" issue tends to get overplayed. Within the State of New Mexico, the Office of the State Engineer has not really forfeited water rights that I can think of. After 1965, there was a new law passed that said the Office of the State Engineer had to provide a one-year notice if somebody had not put water to beneficial use before it could be forfeited. Over time, we have made progress on our adjudication processes. We look at historical use, current use, continuous use, and where water was put to beneficial use. We are certainly not out to forfeit people's water rights. We give them the opportunity to put that water to beneficial use. I think there are some issues— conservation issues—where people feel like they have to go out and use the water so they don't lose it. With respect to conservation in agriculture, if you put in a drip system and spend half a million to a million dollars, you ought to get some tax advantages or other benefit. There is a water savings to the system since you don't have to divert so much water, but you are out a significant amount of money. What we need to do is create some incentive for agricultural conservation. "Use it or lose it" seems to be brought up a lot, but I don't see it as a major issue, because we are not actively going out seeking to limit people's water rights through forfeiture.

Question: I want to address the issue about tribes. As you know the tribes are sovereign governments and have rights to water resources in the area of their jurisdiction. Regarding the State and the Native American water rights issues, will water rights and tribes be addressed in the State Water Plan? Will the solutions in the plan be mutually beneficial to both governments?

Response: It is a difficult problem, and we want to make sure that we are listening and that we understand what the public issues are. In terms of quantification, the tribal and pueblo water rights involve use of future water and as such is a different process than the state based prior appropriation system, which is based on historical use. Typically, there has to be a negotiated agreement. We negotiate with the tribal entity and the federal government, which provides funding for infrastructure improvement in exchange for limiting tribal claims. We are actively looking at these negotiation processes with the Navajos in northwest New Mexico. We have to modify claims to those rights and determine available water supplies based on New Mexico compact apportionment and existing uses. I really need to have a better understanding of what those future plans are to help us evaluate boundary situations. That is, if water rights applications are filed next to a pueblo or tribe, we need to look at the effects to the tribal water rights. In the absence of an adjudication, pueblos and tribes don't have to file an application for a new water use, so there could be impairment based on their water use with existing non-Indian water users. It really should go both ways in terms of protection. We need to be able to go out and obtain master plans in these areas so that we can take into consideration the pueblos' and tribes' needs, and what the government's plans are, so we can look at how we authorize water use and development especially within those boundary areas. We also have to consider water quality issues of Native Americans and their use of water. Governor Richardson signed a GPA with nineteen pueblos, and he has mandated that all cabinet secretaries will have an open-door policy. Water settlements with tribal and pueblo entities are a priority for our agency. And, we will continue to meet. At this juncture, we have met with one large pueblo/tribal group. After the first of the year, when we have some time, we will start meeting with those pueblos and tribes individually to make sure that we consider their needs and future plans. I think that the process of sovereign-to-sovereign governments will continue, and we choose to recognize those sovereignty issues.

Estevan R. López was appointed as the Director of the Interstate Stream Commission by Governor Bill Richardson in January 2003. He is a registered professional engineer in New Mexico and also serves as Deputy State Engineer. Estevan served as County Manager for Santa Fe County from 2001 to 2002. Before that, he was the Land Use and Utility Director for Santa Fe County from 1997-2000. Estevan is a native of Peñasco. In 2003, he was appointed by Governor Richardson to the New Mexico/Chihuahua Border Commission. He has B.S. degrees in chemistry and petroleum engineering from New Mexico Tech.



HOW A STATE WATER PLAN EXTENDS BEYOND OUR BORDERS

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Good morning. I would like to begin first by thanking the Water Resources Research Institute and New Mexico State University for this opportunity to speak to you today. I also want to comment on how beautiful it is here – the location where we are holding this conference is incredible. We are blessed to be able to spend some time here. I am going to try something I do not normally do. It might work, maybe it will bomb. I am going to tell a joke. All the people who are outside are going to wonder what the heck is going on when I try to tie this in at the end of my presentation.

A gentleman buys an exotic parrot. His friend comes in and sees the parrot and says, “Wow! That’s a beautiful bird.” “Well, you be careful with that bird, that’s a really expensive bird, I paid two thousand bucks for that bird.” “Two thousand bucks! What’s wrong with you!” says his friend. “Well, it’s a good investment, this is a bilingual parrot.” His friend says, “Yeah, yeah, yeah, right.” “No, no, try it. Pull his right leg.” says the gentleman. So his friend pulls the bird’s right leg, and the parrot says, “Good morning sir, how are you?” “Wow, okay, so he speaks English” acknowledges his friend. “Well, pull his left leg.” says the gentleman. So the friend pulls the bird’s left leg,

and the bird says, “Buenos días señor, como está?” “Whoa! That’s pretty impressive!” exclaims the friend. So the friend stands there looking at the parrot, and the parrot just stares back at him. Finally, the friend says, “I wonder what would happen if I pull both your legs at once?” The parrot glares at him and replies, “Pues qué crees...I’ll fall on my butt pendejo!” Loosely translated, “Well duh! What do you expect; I’m going to fall on my butt if you pull on both my legs, you idiot?!”

You have already heard today from John D’Antonio about our efforts to develop a State Water Plan and about the fact that our focus has been to develop a policy framework that will guide our state’s efforts in managing our water resources. As you heard from my introduction, the topic of my presentation is how the State Water Plan extends beyond our borders. In general, most of what we do with respect to water is done within our state for the benefit and with the state’s interest in mind. Nevertheless, those interests are often defined in large part by our agreements with other states or actions that happen beyond our boundaries. Various interstate stream compacts between New Mexico and its neighboring states dictate that New Mexico must deliver certain quantities of water to downstream states. There are also other non-compact related actions by other states or in some instances perhaps with nations beyond our borders that can set in motion specific plans within New Mexico.

I am going to discuss several examples of how our interstate stream compacts and issues beyond our borders are affecting New Mexico’s planning and how the State Water Plan takes into account those planning activities. Keep in mind that the examples I give are by no means exhaustive; there are other examples we could come up with if we think about this longer.

First I will talk about something close to home here: the Middle Rio Grande Endangered Species Act Collaborative Program. The State of New Mexico, through a number of its agencies, is heavily involved in this collaborative program. When the Rio Grande silvery minnow and southwest willow fly-catcher were listed as endangered species in this area back in the 90s, we quickly recognized that the efforts to preserve and improve the status of these species were going to require significant amounts of water and would probably change the way we operate the river to a great extent, and this in a river we generally consider to be fully appropriated. According to the Rio Grande Compact, New Mexico’s water delivery obligations to the Rio Grande Project and Texas are largely

determined by the amount of water flowing across the Otowi Gage just north of Cochiti Reservoir and these deliveries must be made into Elephant Butte Reservoir. This just happens to coincide with most, or all, of the critical habitat for the Rio Grande silvery minnow. In order for New Mexico to protect its ability to maintain administrative control over its waters to ensure that existing and future uses of water are able to continue, and that people will be able to continue to rely on Rio Grande flows for their water supplies, and to ensure the continued ability of the State to meet our compact obligations, we must be involved in generating the solutions that will help maintain and recover the endangered species.

Having just articulated those goals, if you go through and read the first draft of our State Water Plan, you will see that those goals pretty much correspond to what we have laid out as common priorities and objectives for the state as a whole. That is, we have articulated that the common priorities, goals, and objectives of the state’s water plan should be to protect senior water rights, specifically including those of pueblos and acequias, which are of the most senior water rights in the New Mexico stream systems; preservation of the state’s administrative authority over its waters; river restoration; and fish and wildlife habitat maintenance, reflecting the strong environmental policies that exist in New Mexico law. We have gone from our current efforts in the collaborative program to articulating some of the policy objectives for the state as a whole. And, in fact, they are derived directly from the activities that we have been participating in on the Middle Rio Grande.

Additionally, we realize if we are going to accomplish any of these goals, we are going to have to conserve water, use it efficiently; and actively manage our water resources. In the plan, we have stated that this will entail measurement, management, and markets. All three are going to be critical to the success of a collaborative program for the survival of endangered species.

A few other objectives are stated in our draft State Water Plan that are embodied in the activities of the collaborative program. First of all, there is collaboration and coordination with the various governmental entities at the local, state, federal, and pueblo levels. Collaboration and coordination with water users and water interests also includes government and non-government entities such as the Middle Rio Grande Conservancy District, the City of Albuquerque, environmental groups, and business organizations. And

although perhaps not completely effective, under the leadership of Governor Richardson we have, as mentioned by State Engineer D'Antonio a little bit earlier, done a considerable amount of outreach to the pueblos to try and coordinate our efforts with them better. We have specifically been reaching out to the pueblos in the Middle Rio Grande to participate in this collaborative effort. I think there is a substantial interest and we will continue to work with the pueblos as appropriate, and will make ourselves available to them for consultation on these and other issues. This is one example of how our need to meet our interstate compact requirements is playing out within the State Water Plan right here in our backyard.

The next example concerns the Lower Pecos River Consensus Solution and Settlement. I will give you a bit of a history first. New Mexico and Texas entered into a compact back in 1947 that said New Mexico would not deplete by mans' activities the flows of the river beyond the conditions that existed in 1947, or something roughly to that effect. I don't want the folks from down in the Lower Pecos Valley to have to come up here and correct me, so I'm just paraphrasing. Almost immediately there was disagreement as to exactly what that meant in terms of how much water New Mexico had to deliver to Texas. The disagreement continued for years until Texas took us to court; and ultimately the Supreme Court found that, in fact, we had been underdelivering to Texas. Under the Supreme Court Decree we are now obligated to deliver water on an annual basis. We can not carry accrued debits but we can carry accrued credits. Every year we must either meet the delivery requirements or, in a very short time frame after we have determined that we have not made the deliveries, make those up or risk losing control of that water. Since then, there have been extraordinary efforts through the leasing of water rights and purchasing of water rights to meet our compact obligations. But every year we are working under a crisis situation to try to make sure we meet our obligations. Last year, an ad hoc committee of water users from the Lower Pecos Valley was formed. They got together and formulated a plan that would allow us to meet our obligations in the short-term and also laid out a plan by which we could meet our state-line delivery obligations over the long-term. This plan will help get us out of crisis management mode. The committee was able to develop the plan while facing huge obstacles including a half-century history of disagreement and fighting.

Meanwhile, the state legislature, in order to support this consensus plan appropriated \$30 million to implement the plan provided that the parties also find a way to resolve the *Lewis* Adjudication, which has been going on for approximately 50 years. The ad hoc committee was able to accomplish that. This spring a settlement agreement was signed by the Carlsbad Irrigation District, the Pecos Valley Artesian Conservancy District, the State of New Mexico and the Bureau of Reclamation. The settlement calls for New Mexico to purchase 18,000 acres of land and the associated water rights. It calls for the state to develop a well-field capable of producing 20,000 acre-feet per year and putting that water into the river to make sure that we can make state-line deliveries in real-time. The idea is that by purchasing that amount of water and retiring those water rights, over time we will bring that whole system into balance. Over time, we should be able to use the augmenting well-field less and less. However, in the early years, it is expected that we are going to have to use it to make our state-line obligations.

We have certain implementation criteria that must be achieved by the end of next year: we must purchase 12,000 of those acres with the water rights, and we must develop a well-field capable of producing 15,750 acre-feet. We are well on our way to doing that and getting the settlement implemented. We have many bids well in excess of those minimum acreages. The potential sellers' offered price is higher than what we had anticipated. We are now facing the unexpected problem of coming up with some additional money to implement this settlement. Nevertheless, I think we are well on our way, if funding can be found. If we are successful in implementing this effort, it will have settled a long running adjudication issue. As I mentioned, it will provide a mechanism by which to meet our state-line delivery obligations, both in the near-term by using the augmentation wells if we need to, and in the long-term by bringing the system into balance. The emphasis is on making certain that we have a mechanism for meeting our compact compliance obligations. It represents a negotiated shortage sharing agreement that is not strictly based on priority administration. It is being driven by the reality of looming priority administration and our need to protect senior water users.

Endangered species issues are just now beginning to come into focus on the Pecos as they relate to how we implement that settlement. Here again, we are emphasizing that any water that is acquired for those

purposes be acquired via willing buyer/willing seller transactions. Those transactions must comply with state law and permitting and our activities to protect the endangered species must not prejudice the state's ability to meet its compact obligations.

In terms of how this fits within our water plan, most of the things I just mentioned are policies articulated in our State Water Plan. Initially, the plan focuses on collaboration and coordination with other government agencies at state, local, and federal levels as well as coordination among users. In sum, the successful implementation of this settlement is hugely important to the state of New Mexico. We must deal with it once and for all so we can focus our efforts on some of the other important issues facing our state. We have been putting bandaids on this problem for the past 15 years, since the Supreme Court Decree. We had been spending our money on solutions that basically met our needs a year at a time. We must get this behind us so that we can focus on some of the other important issues.

A third example: on the Colorado River, New Mexico is participating in the Colorado River Salinity Control Forum to protect our uses of the San Juan River. Although this Salinity Control Forum is not explicitly a requirement of the Colorado River Compact, Mexico and downstream states expect to get water that is of a useable quality. In other words, we can not just send water downstream that is no longer of a quality that can be used. The various states involved in this compact have recognized that this could become a problem if we do not deal with it proactively and collaboratively. Thus the states have set up the Salinity Control Forum to manage the increases in salinity that naturally occur as we use water. The forum provides a mechanism to determine jointly what projects will be most effective in controlling salinity along the Colorado River and its tributaries, and how to fund those projects. This effort promotes environmental quality. It is likely to defuse potential conflict with other states or Mexico, and it protects the water users — all aspects of the policy that we, as a state, want to pursue.

Fourth example: we are in a series of interstate negotiations with Arizona regarding our rights on the Gila River. Arizona is attempting to put forth a massive water rights settlement that includes the Gila River Indian community and several other users. Initially when we got wind of what Arizona was trying to do, we realized that they had kind of left us out. They cut New Mexico out of 18,000 acre-feet of water that

New Mexico was supposed to have a right to. We have become active in the negotiations and have been focusing on making sure that the 18,000 acre-feet that was due New Mexico is protected for New Mexico's uses in the southwest portion of the state. Additionally, we are trying to make sure that if there is a settlement that goes forward that funds a number of projects in Arizona, that funding is similarly provided for projects in New Mexico so that we can utilize that water.

An interesting kind of sideline to this particular discussion is that the Navajos have raised an issue about getting an allocation in terms of Arizona's settlement that might ultimately help facilitate New Mexico's settlement of Navajo water rights claims in this state. New Mexico and the Navajos have been talking about, in terms of water rights settlements, the possibility of building a pipeline between the San Juan River and Gallup. The Navajo Nation straddles the state-line and some of their end users are on the Arizona side. While we want to facilitate the efficient use of a pipeline, we do not want the water for Arizona users to come out of New Mexico's apportionment. So the Navajos have asked Arizona to consider making some of the water that is part of this massive water rights settlement, 6,500 acre-feet, available for transport through such a New Mexico pipeline for Navajo users within Arizona. Some of our policy focus in this regard is making sure that there is a sustainable supply for communities in the southwest corner of the state, and by extension, in the northwest corner of the state if we are able to get a Navajo settlement. We recognize that any water development will have to address environmental issues adequately, but at this point, our focus is to make sure we actually have something to manage. We want to make sure we have a right to use that 18,000 acre-feet.

The last example I have concerns the eastern New Mexico pipeline project on the Canadian River. Communities in eastern New Mexico are pretty much dependent on groundwater from the massive Ogallala Aquifer. This aquifer extends under several neighboring states and New Mexico sits over the outer fringe of the aquifer. Texas users right across the state-line are able to use as much water as they can capture, basically. The situation is causing a depletion of the water in the aquifer, and the depletion is going to occur first within New Mexico. Several studies indicate that some communities in New Mexico may be running dry as soon as 15 years from now. About 24,000 acre-feet of water is available from the Canadian River in the Ute Reservoir. As a result of the threat to the

groundwater supplies, and the eminent threat to the various communities dependent on those supplies, folks having access to or located relatively close to Ute Reservoir have come together to propose a pipeline that can deliver water from Ute Reservoir to the various communities. I am not going to mention all the communities but they include Tucumcari, Clovis, and Portales, and several of the smaller communities and counties also have an interest in this. Here again, actions beyond our state boundaries are driving some of what we are trying to do, as it relates to our objectives in the State Water Plan.

The State Water Plan vision statement mentions that sustainability must be a hallmark. We must create a sustainable water supply for these communities. Somebody earlier today asked about the relationship between the state plan and regional water plans. Our State Water Plan states that on issues of regional importance we should, to the extent we can, give deference to the projects afforded by the regional water plan. Although the regional water plan for eastern New Mexico has not yet been accepted, a pipeline project from Ute Reservoir is a centerpiece for that plan. Here again, we want to focus on conserving and beneficially using New Mexico's water within New Mexico. We do not want it to simply evaporate or go downstream to Texas. Finally, this particular project also supports regionalization, creating projects that benefit a number of different entities within a given region and cooperation amongst those various entities.

I have tried to give five specific examples of how either our compact obligations or actions beyond our borders are driving implementation of New Mexico's water plan. I have tried to describe how our actions relate to the policy objectives we have articulated in the State Water Plan. So how does this all relate to the bird joke? Well, hopefully the State Water Plan policy framework will provide us a uniform basis for translating our various reactions all over the state – our reactions to our compact obligations such that we react consistently from place to place and hopefully this will result in New Mexico's not falling on its butt when we get pulled on all the various stream systems, that are like our legs that hold us up.

This concludes my talk. I have plenty of time for questions.

Question: I am Valda Terauds with the Bureau of Reclamation. and have a question regarding the development of groundwater compacts across borders

where we have states that have unlimited capture rules. Any thoughts on that?

Response: Yes, in listening to the communities, particularly those on the eastern side of the state, there is substantial interest among the people in those communities that we try to establish some groundwater compacts. I think it is in New Mexico's interest to try and begin those discussions and it can not be a one-sided discussion – we must engage Texas effectively in dealing with this issue. I do think there is definitely a need for that. I believe that it is actually mentioned in the first draft of the State Water Plan. We ought to be pursuing this and I think Senator Bingaman has introduced some legislation to at least study and understand some of the physical realities that we face with respect to those shared aquifers. Hopefully that will lead to a discussion of what makes sense, not only for us, but also for Texas.

Question: I work with the State Geologist, New Mexico Bureau of Geology. In the Pecos Valley, a very careful analysis using the best available data has concluded that in order to maintain our concept of priority system on the Pecos, we have to retire 18,000 acres of irrigated cropland. This acreage has been intercepting groundwater, which originally fed the Pecos River. This is the first serious attempt the state has made to balance the priority system against the divergent ways between groundwater and surface water. Has an estimate been made on how much acreage we might have to take out of agriculture production on the Middle Rio Grande and Lower Rio Grande in order to meet our compact requirements in the Rio Grande?

Response: I am unaware of any such estimate and I think that the situation in the Rio Grande is probably not quite as dire as what we have in the Pecos, but hopefully we will learn something from the Pecos. We do not want to get into a situation where we have to try and do some sort of buyout of the sort that we are talking about on the Pecos.

Follow-up: Let me follow-up on that. That is a good answer. But, you know, I have published several things in the recent past that points out that we should have used the Pecos as a wake-up call. We should have been concentrating on the fact that we failed to make our deliveries on the Pecos and therefore the Supreme Court stepped in and insisted on telling us how we are

going to manage our own water resources. We should have used that as a wake-up call on the Rio Grande. The second point of my question, in your dealings with the state of Texas, on compact water rights on the Rio Grande, are you optimistic that we might be able to reach some win-win negotiated settlement in devising a compact so that Texas gains some benefit and New Mexico gains some more flexibility in using its waters from the Rio Grande?

Response: I am optimistic about the possibility of talking to Texas and negotiating a solution that is mutually beneficial. I don't know if that will mean amending the compact. I do hope that it does not get to that level. I think that we can do a considerable amount by defining how we are going to operate the system in a way that both of us can understand, and that is mutually beneficial. I am optimistic we will be able to do that and hopefully avoid some litigation on the Rio Grande.

Question: I have a question about the word "sustainability." You mentioned it in the planning process. Sustainability has to do with our state's population growth and I am wondering what kind of posture you are taking in this planning effort to look at growth control in the state.

Response: We have not addressed that at all directly in the first draft of the State Water Plan and I do not anticipate that we will address that between now and December. We do, however, recognize that we must make more serious evaluations whenever we allow a new development to go forward. We must take seriously the evaluation of available water rights and not only water rights, but actual wet water. We must make sure the Office of the State Engineer's analysis is actually heeded. The state as a whole generally just requires that we look at a 40-year window to the future. Why? It does not seem to be adequate, at least to me, in terms of defining the sustainability of a supply for what in essence is going to be a permanent community. I think we need to carefully think about longer planning horizons. We also mention in the State Water Plan that to the extent that a basin is fully appropriated, or closed, we should not allow additional appropriations unless some water uses retire and that water is transferred. We do not address directly the question of population growth in the water plan, but we do think that the impacts of population growth on our water supply need to be addressed.

Question: My name is Danny Hernandez. Just to follow-up on what are you going to do about actually retiring water. In other words, agricultural land is retired but then that land is developed and you use the same land all over again. Someone buys the water and uses it somewhere else, but then whoever moves onto the retired land, uses the water again. How can we fix that problem?

Response: I am assuming that at least in part, you are talking about the issue of domestic wells. As you heard from our State Engineer a little bit earlier, that is one of the primary areas in which we must perhaps bolster the State Engineer's authority to deny such things, particularly in areas where we know there is a critical supply shortage. I do not think that we want a blanket policy, but we do have to understand our supply and understand where there are critical areas that we have to manage better, and we have to give authority to the State Engineer to be able to manage those resources better. But this is not something we can do in a policy document. Ultimately those sorts of issues must be dealt with by the legislature.

Question: Before we got into compacts and their impact on planning in New Mexico, I would like to ask the question in the reverse way, that is, how planning in New Mexico is impacting the compacts to which we are a party. I think on the Colorado, both Arizona and Nevada have proven that the terms of the compacts can be re-interpreted; in Arizona's case, the introduction of using water, storing it, putting it to beneficial use, and increasingly building up their entitlement. Nevada worked with Arizona in the lower basin to get water banking, which I think 20 years ago people would have said was not acceptable under the compact. I am wondering how much you and John are thinking about the interpretations of the compacts that New Mexico is party to that might be beneficial to our being able to meet compact requirements. For example, in the Rio Grande the Silvery Minnow's historic habitat stretched all the way to the Gulf and yet the critical habitat designation is putting the burden of water consumption in the Middle Rio Grande. Is there any possibility that the compact could be interpreted such that that obligation is not just the Middle Rio Grande's, but extends throughout the basin?

Response: Yes, there is a possibility. I guess the best way for me to answer that, and particularly focusing on the Rio Grande, is to say that we are evaluating

that and a number of other issues. There were a lot of issues that were not contemplated back when the compacts were negotiated. We are exploring as many issues of that sort as we can. All of them are possibilities, but before we actually get out there and try to push something, we want to have the issue evaluated internally as well as we possibly can so that we understand the strengths and weaknesses of any such argument. We have an excellent technical staff, they eat, live, and dream about this stuff I'm sure, and they are constantly generating ideas of this sort. Every time one of these issues comes up, we try to focus some discussion on those issues and ultimately determine their technical merit. I do not want to speak to any specifics but we do discuss these possibilities as a matter of course.

Mimi Stewart was raised in the Southwest, educated in Massachusetts, and has been active in New Mexico politics since moving to the state in 1978. A State Representative since 1994, she is a Resource Teacher at Teaching & Learning Systems with the Albuquerque Public Schools. Mimi has sponsored bills to create an extended school year for disadvantaged youth called Kindergarten Plus, a statewide water plan, gray-water system regulations, summer youth gang intervention programs, domestic violence interventions, a school board campaign reporting act, emergency contraception for rape victims, and rights for mobile home park tenants. She was chosen by the Center for Policy Alternatives to be trained at the 1997 Flemming Fellow Institute in Washington, DC, to enhance her skills as a progressive legislator. Mimi was voted Legislator of the Year by the New Mexico Wildlife Federation for her work to decrease poaching of wildlife in New Mexico. She has gained national recognition for her innovative work on prohibiting insurance companies from discriminating against victims of domestic abuse by passing legislation that has become a model for other states. Mimi has two children, a thirty-year-old stepson working in the computer industry in Boston, and a twenty-year-old daughter attending Wellesley College. In what spare time she can find, she enjoys gardening, running, painting, and calling traditional contra and square dances.



LEGISLATIVE PERSPECTIVE ON WATER CONSERVATION

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Good morning. Thank you for the opportunity to talk about the legislative history and perspective on water conservation. The legislature has considered dozens of ideas for water conservation over the past ten years. I will use a few to illustrate the dilemmas we face in conserving our water.

One of the first bills introduced was in 1997, from former Representative Pauline Gubbels, House Bill 928, that would have defined “beneficial use” to include

conservation. That bill was defeated because we could not agree on the real definition of beneficial use. Our Constitution says that beneficial use is: “The basis, the measure, and the limit of the right to the use of water in New Mexico.” But beneficial use is not defined at all in the Constitution or in the statutes, but rather is defined in case law essentially to mean “use,” not conservation. So Representative Gubbels and some of her supporters thought that just including the word

“conservation” in a statutory definition of beneficial use would help. That bill got nowhere because there was no consensus on the definition of “conservation.”

For example, does conservation include lining ditches to minimize depletions? What about the cottonwoods growing along the ditches? If they die from lack of water, what about the conservation of habitat and the ecosystem? Defining conservation in statute may confuse existing case law, and perhaps create more lawsuits. We continue to be faced with this dilemma.

Representative Gubbels and Senator Sue Wilson-Beffort introduced the Water Banking Bill about five or six years in a row before it was passed as a pilot project in 2002 along the Pecos. It was generally well received and we broadened the application of water banking last year. Water banking was opposed year after year because it was perceived to be a threat to local irrigators who did not want the state to pre-empt their existing “water banking” practices. They did not trust the Office of the State Engineer to be fair in the administration of a centralized bank. They were suspicious of the State Engineer who they perceived to be taking away their own water rights.

There also was confusion over exactly what water was eligible to be banked, that is paper water rights or so-called “wet” water—water that had been adjudicated and had some real value relative to seniority in time.

It seems like we have gotten past the banking issue. We have tried it on the Pecos, and now the acequias can do water-banking; but all you have to do is look at Elephant Butte at 15 percent of capacity to know that water banking goes only so far when you do not have water to put in the bank.

Next, we have had several versions of bills that would have provided tax credits for installation of water conservation technologies. Former Representative G.X. McSherry from Deming introduced the first one in 1996, House Bill 124. That bill did not go anywhere, again, because of difficulties in defining “conservation” and conservation technologies, and also because of an unfavorable fiscal impact report. In other words, it would have cost the state a lot of tax revenue. If only the fiscal analysts understood and accounted for the costs to the state of NOT conserving water.

Last year, Representative Stell introduced House Bill 481. It would have provided an exemption from the gross receipts tax for the purchase of water conserving irrigation systems. House Bill 481 got through the House but was tabled in the Senate

Finance Committee. I am not sure what the opposition was, but the bigger question is: why can't the various interest groups in New Mexico get together and develop water conservation policies that are good for us all? As they say, “whiskey's for drinking and water's for fighting,” but I'm afraid when it comes to water issues, we are getting in the habit of fighting instead of trying to move forward on these issues.

Look at the Pecos River, where you have farmer against farmer, irrigation district against irrigation district, community against community. We have different viewpoints over water law, we have different priority dates, and we have different economic interests, different cultures, different hydrologic conditions, different diversions, uses, and goals.

They say water is a complex issue. That may be, but even if it were simple, we would still disagree on PRINCIPLE and never conserve it, because the constitution requires us to “beneficially use” it. I believe that water is not so complex that we can not come to some rational agreements if we exercise our collective political will.

That brings me to the legislation that I will be introducing this year, instituting a water resource fee, and I know it is going to have a hard time from many of you. But let me discuss some implications.

The New Mexico Finance Authority and the Office of the State Engineer prepared cost estimates of needed water projects for the next twenty years. Most of you are already aware of this, but we need almost \$4 billion dollars and that estimate will probably go higher. This is not money for golf courses and ballparks—this is billions so people have water to drink and to bathe in. Projects like the Navajo-Gallup Project to keep the city of Gallup from going dry; for Albuquerque to use its San Juan-Chama water to stop our rapid depletion of groundwater; for Clovis to replace the groundwater that Texas is stealing from us; for Las Cruces and Rio Rancho and Santa Fe and Española and for literally hundreds of thousands of people in small and large communities all over the state TO LIVE, not newcomers from California, but US.

And yes, it is also for the silvery minnow and the cottonwoods and the willow fly catcher AND the river rafters, the fishermen, the boaters in Elephant Butte, AND for Texas. Ah, yes, Texas. You know that if we do not spend some money now on conserving water and augmenting what flows we can, that sure enough, the great state of Texas will haul us back into the Supreme Court. How much will we spend on “water” then?

So I am going to propose a water user fee to pay for some water conservation measures to avoid disaster. Joe Stell got a bill through a few years ago to create a water project finance act, and he made sure that everyone could get a little something through that institution. Unfortunately, Gary Johnson vetoed the money to fund it; we had a \$400 million surplus then, by the way, that we do not have now. We put in a little money last year, so we are making progress, but we are a long way from \$4 billion dollars.

And I know the politics of a water user fee/tax/surcharge, call it whatever you want. But what is YOUR alternative? We're going to have to come up with more money for water somewhere, sometime, and I think it is time we start telling the public, our constituents, that water has to be paid for because it costs a lot to deliver it. I am going to propose that everybody puts something in and everybody gets something back.

My legislation will create a recurring dedicated funding source for water conservation projects and for a state program for voluntary acquisition of water rights for public use and benefit. It will:

1. Authorize the Tax and Revenue Department to collect fees from irrigation and conservancy districts, public water suppliers, self-supplied commercial, industrial, mining, power, and agricultural water users, domestic wells, and utilities for groundwater pumpers;
2. Assess fees on a variable rate depending upon class of water user, based on the amount of permitted water right, unless the user is metered with an approved meter, at \$2.00 per acre-foot for agriculture users, \$20.00 per acre-foot for public water system suppliers, \$20.00 per acre-foot for self-supplied commercial, industrial, mining and power, and a fixed annual fee of \$20.00 per well for domestic users;
3. Deposit the revenues into the Water Project Fund and the irrigation Construction Works Fund; and
4. Finance water conservation projects (giving priority to grants or loans for metering of withdrawals and divisions), state acquisition of water rights from willing sellers or lessors for public use and benefit including interstate compact deliveries, recreation, conservation, and enhancement of fish and wildlife and their habitats.

Let me conclude by summarizing some issues about water conservation and paying for the true costs of water.

Demands for our limited water supply are increasing. Demands for our water are increasing as a result of our growing population, diminishing groundwater reserves, and the decline of our river dependent species. Improved water management and water conservation are essential to ensure that New Mexico has water available for New Mexicans, economic development, and the rivers that are critical to our quality of life and economy.

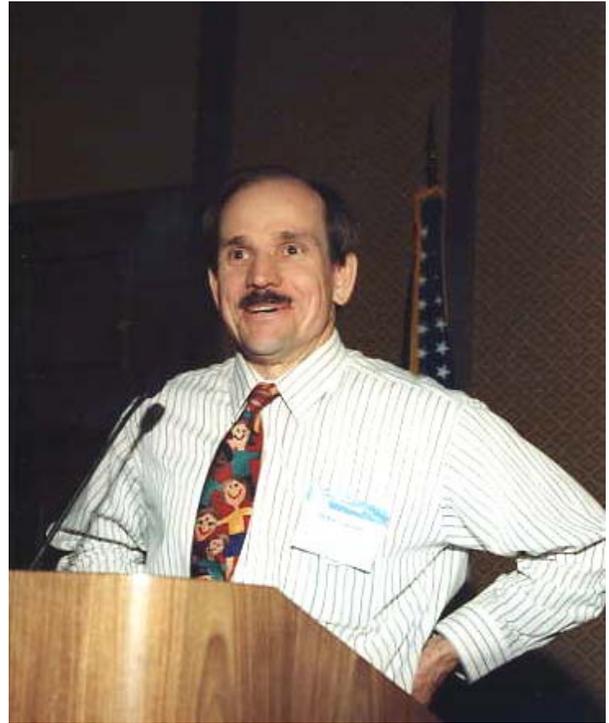
Water conservation measures are a good investment because they are less expensive than developing new water supplies and they are the environmentally most benign way of providing adequate water to all users. Water conservation is a vital part of the solution to meeting increased demands for water.

Until this year, New Mexico did not have a recurring dedicated funding source for water projects including conservation. Trust funds for statewide water conservation programs have been significantly depleted. Independent experts on New Mexico water policy have recommended user fees as a potential revenue stream. We need money to secure our future water supply.

New Mexico's current policy of "no charge" for water ignores the cost to the state of effectively managing its water and watersheds, and discourages water conservation. I believe that charging a minimal fee for water would encourage conservation. We tend to devalue what we receive for free. This proposal would directly benefit both farmers and urban residents because they would be the beneficiaries of the water resource fee. The revenues could be used to address leaking water systems, make farm conservation improvements, pay for metering, protect the ecology of streams and rivers, expedite priority administration of water, adjudicate water rights, and support efficient transfers of water rights.

I am sure many of you do not like this, but what is your idea for funding our water needs? How do you propose that we institute conservation methods to better use this precious resource? If you show me that your idea is better, I will help you, but come on folks, let us stop fighting and criticizing and whining and do our jobs. I want us to sit down and roll up our sleeves and negotiate a plan for conservation that will hold water.

John W. Leeper received a B.S. in civil engineering from the University of California at Davis, M.S. in civil engineering from California State University at Los Angeles, and Ph.D. from Colorado State University in Fort Collins. John worked for the Peace Corps for three years in rural Nepal building suspension bridges and domestic water systems. Later he worked on Peace Corps agroforestry training for trainees assigned to Rwanda, Mali, Senegal and Lesotho. He spent five years working for Stetson Engineers in San Rafael, California, where he worked on technical water rights studies for the Campo Bands in Southern California; the Flathead and Fort Belknap Indian Reservations in Montana; the Nez Perce Reservation in Idaho; the Warm Springs Reservation in Oregon; and the Hopi, Zuni, and Navajo Reservations in Arizona and New Mexico. John spent another five years working for Natural Resources Consulting Engineers in Fort Collins, Colorado providing technical support to the Office of the Tribal Water Engineer of the Shoshone and Arapaho Tribes in Fort Washakie, Wyoming, technical studies in support of the Little Colorado River general stream adjudication, and water development projects for the Government of Eritrea. For the last eight years, John has been a civil engineer with the Navajo Department of Water Resources in Fort Defiance, Arizona. He is the branch manager of the Water Management Branch, which is responsible for providing technical support to the Navajo Nation's water rights efforts in five ongoing general stream adjudications in Utah, Arizona, and New Mexico. The Branch also provides technical support for the Navajo Nation's drought response, flood plain management, regional water planning, and watershed restoration.



NAVAJO NATION PLANS FOR THEIR WATER FUTURE

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This paper describes a Navajo Nation water development strategy. According to the dictionary, a strategy is the science and art of conducting a campaign on a broad scale, or the technique for achieving an end. Meeting the water development needs on the Navajo Nation requires a campaign. The development strategy is not a Navajo Nation regional water plan,

and it does not follow the New Mexico template for preparing regional water planning. However, regional and chapter water plans that follow the template are a component of the development strategy. The Navajo Nation is working closely with the Interstate Stream Commission to complete these plans (Figures 1 and 2).

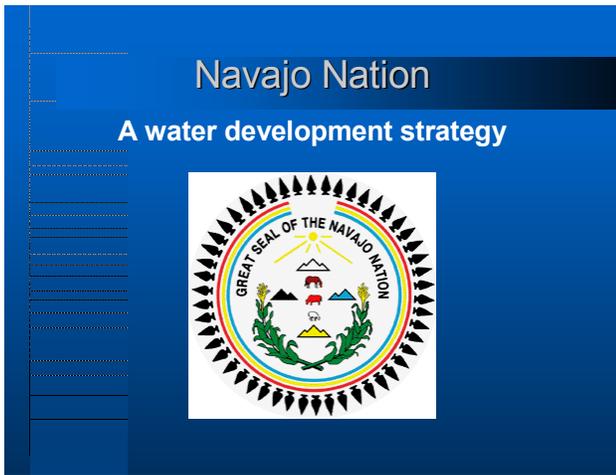


Figure 1.



Figure 2.

The Navajo Nation is a complicated piece of real estate. It encompasses approximately 27,000 square miles within three states. For perspective, when New Mexico water planners look at the Navajo Nation they tend to see a landmass somewhere off to the west. But, when Navajo Nation water planners look at the Navajo Nation, New Mexico is a landmass somewhere off to the east. The perspectives are very different.

The Navajo Nation is bounded by the San Juan River on the north, the Little Colorado River on the south, and the mainstem of the Colorado River on the west. It lies largely within the Upper Colorado River, Lower Colorado River, and Rio Grande basins in Arizona, Utah, and New Mexico (Figure 3). The Navajo Nation, however, did not participate in the formulation of the compacts that allocated the use of water among these basins and states. Not only was the Navajo Nation not at the table, back in 1922 Navajos could not even vote. Consequently, the Navajo Nation

raises complicated unresolved problems. For instance, if you are at the Copper Mine Chapter, which is in Arizona, you cannot see the physical divide between the Upper and Lower Basins. And when you drive from NAPI, which is near Farmington, New Mexico, to Church Rock you can cross the continental divide three times. Yet, when the Navajo Nation tries to address these communities' long-term water supplies, the water management issues telescope into very, complicated dilemmas. That situation is partly the nature of the Four Corners Area, but water planners in the Pecos River Basin and other basins share some aspects of these same problems. The point is that from a water resources standpoint, the Navajo Nation encompasses a tremendously complicated piece of real estate.



Figure 3. Navajo Basins Map

Water Development Problem Statement

The water development strategy begins by describing some basic problems confronting the Navajo Nation. Unemployment on the Reservation is between 40-50 percent compared to 4 percent for the region (Figure 4). Per capita income on the Reservation is approximately \$5,000 per year, which is less than one fourth of the per capita income for the region (Figure 5). About half of the Navajo families on the Reservation live below the federal poverty levels compared to 13 percent of families for the United States (Figures 6-8). And, between 30-40 percent of households do not have direct access to public water systems.

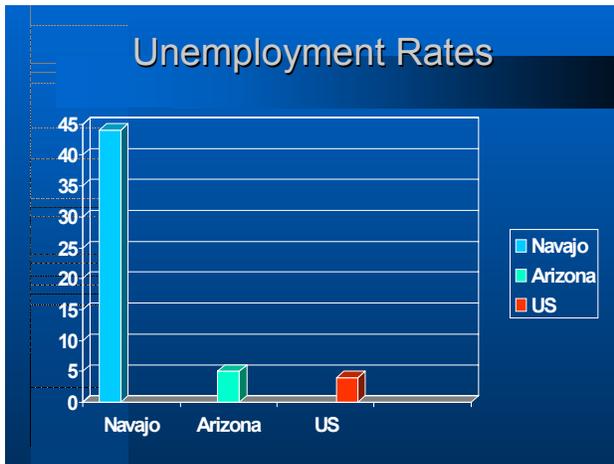


Figure 4. Unemployment Rates

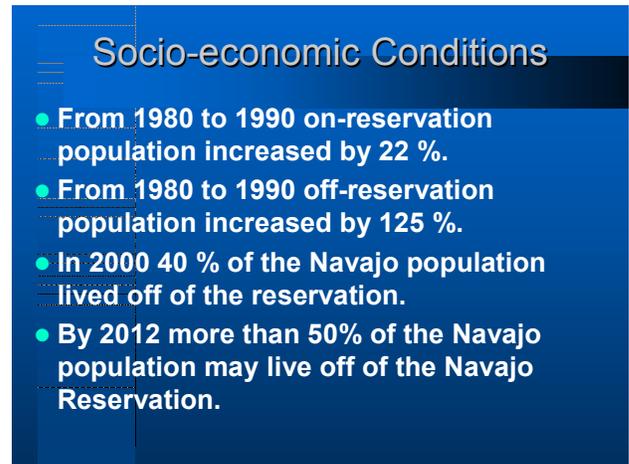


Figure 7. Socio-economic Conditions

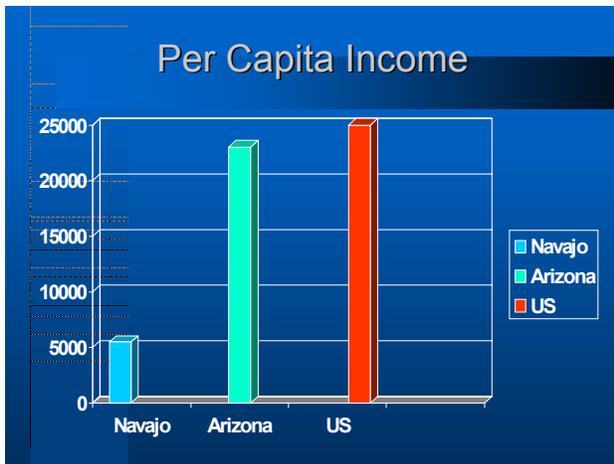


Figure 5. Per Capita Income

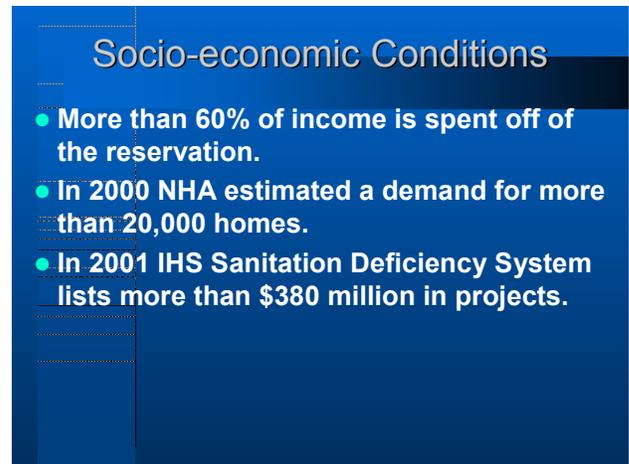


Figure 8. Socio-economic Conditions

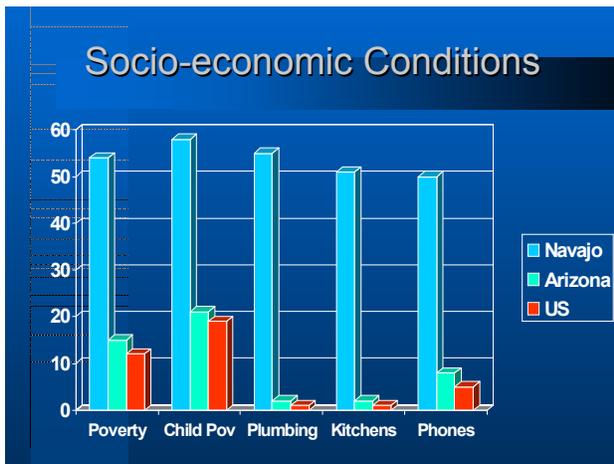


Figure 6. Socio-economic Conditions

The Navajo Housing Authority (NHA) estimated in the year 2000 an immediate demand for 20,000 additional homes on the Navajo Nation. The Indian Health Service (IHS) Sanitation System Deficiency List included \$380 million of projects. At current IHS funding levels, which are between \$15 and 20 million per year, there are decades of deficiencies with which to deal.

There is stress associated with these conditions. One result of this stress is out migration. According to the U.S. census, in the year 2000 the on-reservation population exceeded 180,000, but an additional 100,000, or approximately 40 percent of the Navajo people, live off of the reservation. From 1980 through 1990, the on-reservation population increased by about 22

percent, while the off-reservation population increased by 125 percent. The Navajo Nation Division of Economic Development projected that by 2012 more than half of the Navajo people will be living off the reservation. Out-migration is not unique to the Navajo Nation. Many Native American communities face this same challenge. But the fact remains that after more than 100 years of trusteeship, it is extremely difficult for the majority of the Navajo people to find a livelihood on the Navajo Nation, which is supposed to be a permanent homeland for the Navajo people. And, part of the reason for this failure is water.

The Navajo population is expected to increase by the year 2040 to nearly 500,000. The lack of infrastructure, the lack of economic development, the low per capita water use rates, and the sustained poverty are closely related. Implementing this strategy may not immediately create a sustainable economy for the Navajo Nation. But adequate water is a necessary, if not sufficient, condition for prosperity. And, if the proposed water projects can close these gaps by even a small percentage, the benefits that can be attributed to those projects are monumental.

Even when Navajos do have incomes on the Reservation, the dollars don't circulate on the Reservation. Instead, the dollars flee to the border towns, the Farmingtons, the Gallups, and the Albuquerque. The dollars go where the Costco's and Home Depot's are. For example, the Navajo Nation economy captures less than 8 percent of the \$660 million annual tourism revenue in the Four Corners area. If enhanced tourist infrastructure increases that percentage to 12 percent, the Navajo economy could generate tens of millions of dollars annually.

It is not correct to portray the Navajo Nation as a hapless victim. A lot is going on to improve these conditions. The Navajo Nation is investing its own resources and is working with other agencies to invest further resources (Figure 9). For instance, the Navajo Housing Authority is investing \$90 million a year in housing. The BIA Roads Program is investing \$60 million per year in roads. The Department of Energy Rural Electrification Program has authority to construct \$15 million in power lines. The Navajo Nation Department of Economic Development has 60 economic development projects with a total cost of \$312 million. These are all ambitious programs (Figure 10). But, every single project requires more water.



Figure 9. Navajo Economic Development

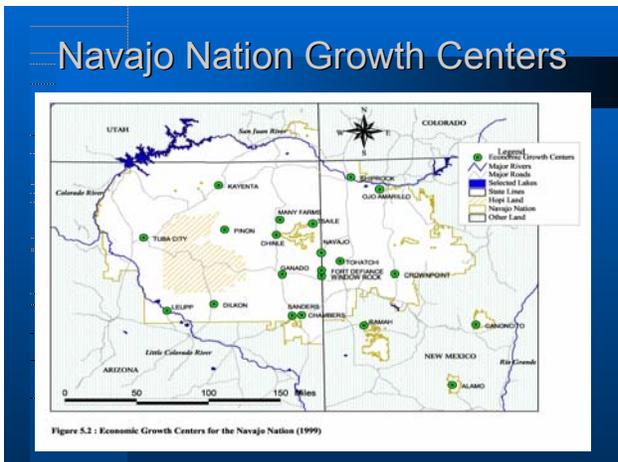


Figure 10. Navajo Nation Growth Centers

Time and time again, new infrastructure gets constructed, and the water infrastructure fails to keep up. For instance, four years ago in Navajo Mountain, Arizona, a high school was constructed with state funding and the public water system still does not have adequate capacity. In Pueblo Pintado, New Mexico, a high school is under construction and the NTUA public water system does not have enough capacity for it. And that is when the water department is forced to approach the States and others due to water supply emergencies.

The Navajo Department of Water Resources has developed a strategy to attempt to address this problem. The major components of this strategy are: 1) regional water projects, 2) improve small public water systems, 3) improve service to water haulers, 4) rehabilitation of small irrigation projects, 5) complete NIIP, 6) watershed restoration, and 7) drought mitigation and response (Figure 11).

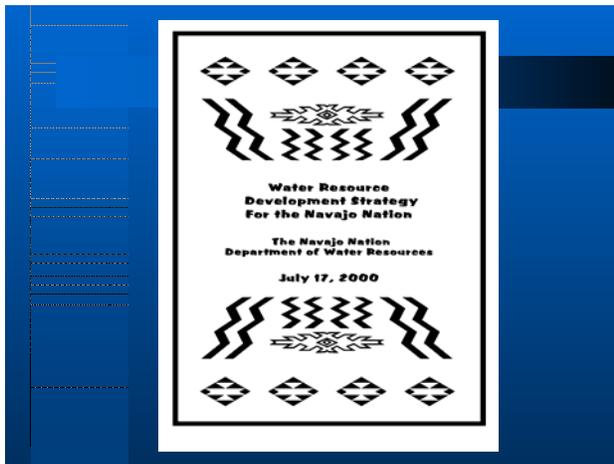


Figure 11. Water Development Strategy

Additional efforts are being made in a number of other areas including, among others, improving the reliability of stock water, improving unsafe dams, and improving flood plain management.

Regional Water Supply Projects

The water development strategy component includes proposals for several large regional water supply projects: 1) the Western Navajo Pipeline, 2) an alternate water source to the Peabody Mine, 3) the Three Canyon Project, 4) the Ganado Regional Project, 5) the Central Navajo Utah Project, 6) the Farmington to Shiprock Pipeline, and 7) the Navajo-Gallup Water Supply Project. These regional water projects make up different pieces of the Navajo Nation's water supply puzzle (Figure 12). Of particular interest to New Mexico are the Farmington to Shiprock Pipeline and the Navajo-Gallup Water Supply Project.

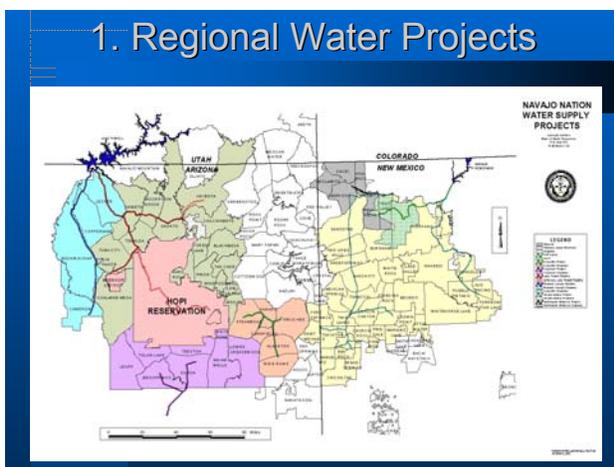


Figure 12. Regional Water Projects

The Farmington to Shiprock Project was authorized as a component of the Animas La Plata Project. It will convey more than 4,600 acre-feet of municipal water to the Shiprock area. Along with conveying water to Shiprock, this project has the potential of enhancing the water supply infrastructure on the western side of the City of Farmington.

The Navajo Gallup Water Supply Project (Figure 13) will convey 37,000 acre-feet of water to 40 Navajo chapters in New Mexico and Arizona, the City of Gallup, and the southern part of the Jicarilla Apache Nation. It will include the largest water treatment in New Mexico, which will be located just outside Kirtland, New Mexico. The Navajo-Gallup Water Supply Project will cross the Farmington to Shiprock Pipeline creating the opportunity for regional conjunctive operation.

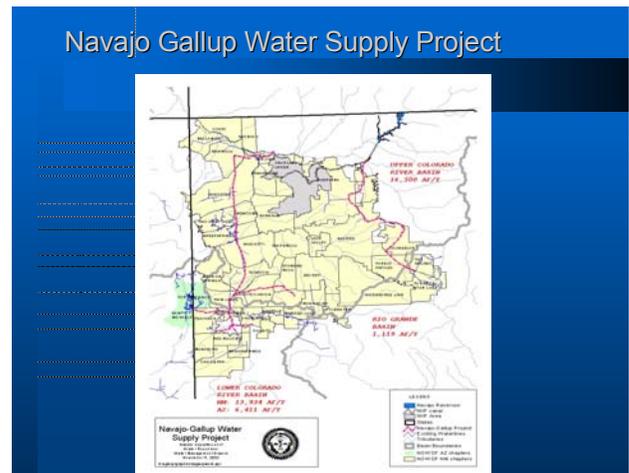


Figure 13. Navajo Gallup Water Supply Project

The Navajo-Gallup Water Supply Project includes two separate laterals. The Cutter Lateral begins at the Cutter Reservoir and conveys water south along Highway 371 toward Pueblo Pintado. The Cutter Lateral will serve the southern part of the Jicarilla Apache Nation, and possibly could include service to communities like Lindrieth. The main Navajo-Gallup Project lateral will divert water from the San Juan River at the existing Public Service Company of New Mexico San Juan Generating Station Diversion and convey water along Highway 491 south toward Window Rock and Gallup. There are trade-offs associated with the point of diversion. For instance, the further upstream the point of diversion is located, the better the water quality. However, the further

upstream the diversion, the impacts on the endangered Colorado Pike Minnow increase. This point of diversion minimizes the impacts to endangered species. And the releases made from Navajo Reservoir for this diversion can contribute to the river flows passing Bloomfield and Farmington.

The Navajo-Gallup Project includes sustainable conjunctive groundwater development. Some Navajo communities will not initially be served by surface water, but their demands will be included in the Project laterals. Even with the Navajo-Gallup Project, the Navajo Nation's municipal groundwater use will double in the Navajo-Gallup Project service area.

The Navajo-Gallup Water Supply Project will serve Window Rock, Arizona, which is the capitol of the Navajo Nation, and one of the larger Navajo communities. Many people question why the Navajo Gallup Project needs to serve communities within Arizona. They suggest that Window Rock can be served with local groundwater instead. The first response is that the Navajo-Gallup Project includes conjunctive groundwater development, and it will develop municipal groundwater to sustainable levels. But, to meet additional demands, Window Rock would need to develop groundwater 40 miles west from the Coconino Aquifer near Ganado. But the Navajo Nation already has projected water demands in the Ganado Area. So, if the Window Rock water demand is shifted to the Ganado Regional System, there is the risk of an inadequate water supply for Ganado Area. Then the Navajo Nation would need to shift Ganado's water demands over to the Three Canyon Project, which will serve the southern part of the Navajo Nation including Leupp and Dilcon. And, if the Three Canyon Project has inadequate water to serve those additional shifted Ganado demands, then the Navajo Nation may have to go all the way to Lake Powell to make up the difference.

The Western Navajo Pipeline begins at Lake Powell and conveys water to Cameron. In some respects, it is a mirror image of the Navajo-Gallup. And, like the Navajo-Gallup Project, it could convey water to non-Navajo communities, in this case the Flagstaff area. The Navajo-Gallup Project, the Ganado Project, the Western Navajo Pipeline, and the Three Canyon Project, all fit together like pieces of a gigantic puzzle.

One cannot say whether the Western Navajo Pipeline is a higher or lower priority than the Navajo-Gallup Water Supply Project. The Navajo Nation

needs both. And, the Navajo Nation must address the water supply needs of all its communities. The water development strategy is intended to do just that. There is a similar vision evolving for the State of New Mexico. One of the objectives of the State Water Plan is to find ways to fit together the pieces of the New Mexico puzzle.

Improve Small Public Water Systems

Another component of the water development strategy is improving the smaller public water systems (Figure 14). The Navajo Nation includes approximately 230 public water systems. Many of these public water systems, like many of the systems throughout the rest of the State of New Mexico, need lots of work.

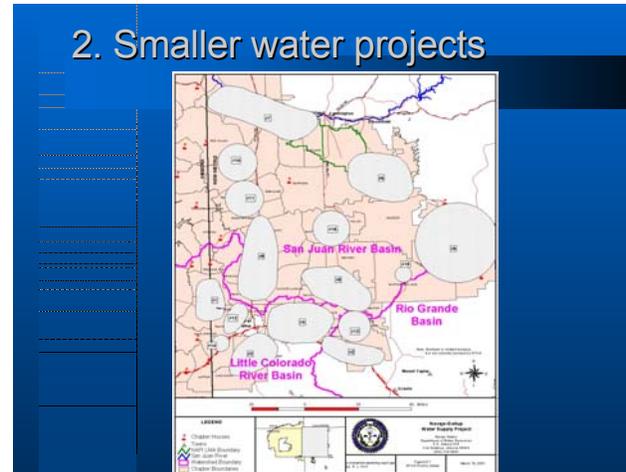


Figure 14. Smaller Public Water Projects

The Navajo Tribal Utility Authority (NTUA) operates more than 90 of the public water systems on the Navajo Reservation. NTUA has ranked its systems based on capacity, infrastructure, and water source. There are several examples of these smaller municipal water development projects. The Page to Le Chee Project, the Albuquerque to Tohajiilee Pipeline, and the Gallup Regional System, which will serve Manuelito, Church Rock, Bird Springs and other communities surrounding Gallup, are examples of these smaller municipal projects. These projects are smaller than the regional projects, and they have shorter planning horizons. But, these projects include greater per capita demand than the Indian Health Service projects because they are intended to include commercial uses. And, many of these projects involve partnerships with local communities. So, instead of adversarial relationships with the border towns, it may

be possible to work collaboratively with these communities.

Improve Services to Water Haulers

Another component of the water development strategy is to improve services to water haulers (Figure 15). On the Navajo Nation, more than 30 percent of the households haul water for their domestic needs. Urban water users in the region pay approximately \$600 per acre-foot for domestic water. On the Navajo Nation, hauling water costs about \$18,000 per acre-foot. One could assume that Navajos must be the richest people in New Mexico if they can afford to pay that much for water. But the reality is that the folks that can least afford it are paying the highest costs. Hauling water in 50-gallon drums over dirt roads is very expensive. And, as water becomes more and more expensive, people use less and less of it. Consequently, per capita water use is very low.



Figure 15. Improve Service to Water Haulers

The big regional projects might serve 60 percent of the chapters. The Indian Health Service assumes that above a certain expense, homes become infeasible to serve from a public water system, and the Navajo Tribal Utility Authority will not accept operation of a system with fewer than three meters per mile. So, many families on the Navajo Nation will be hauling water for a long, long time. The Navajo Environmental Protection Agency is looking more closely at the number and location of households that haul water. They are trying to develop approaches to improve services to water haulers. This effort may result in

additional watering points, or possibly in-household micro-water treatment systems.

Rehabilitate the Small Irrigation Projects

Another component of the water development strategy is rehabilitating the small irrigation projects (Figure 16). During the late 1980s, the Natural Resources Conservation Service conducted an inventory of more than 80 small Navajo irrigation projects and observed that more than half of the project acreage was no longer irrigated. These systems are caught in a cycle of irrigation system deterioration. It is happening on the Navajo Nation, and throughout Indian country. Many irrigation projects suffer from deferred maintenance, which results in a loss of water control. With reduced water control, the water users are less inclined to pay water assessments for operation and maintenance. With fewer resources for operation and maintenance, maintenance is furthered deferred, which leads to further reductions in water control. For a few years, the operators can get away with deferring maintenance. But after a few years the systems deteriorate. The main part of this problem is institutional.

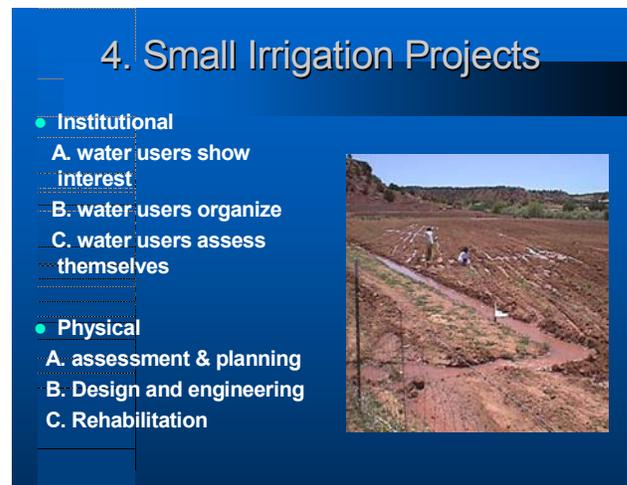


Figure 16. Small Irrigation Projects

The water users were disenfranchised from their own systems. The original systems were operated by their Navajo water users. Then, in the early part of the last century, the systems were subjugated by the federal bureaucracy. And, over time the federal bureaucracy was replaced by Tribal programs. But, the water users were still disenfranchised. It is an institutional problem (Figure 17).

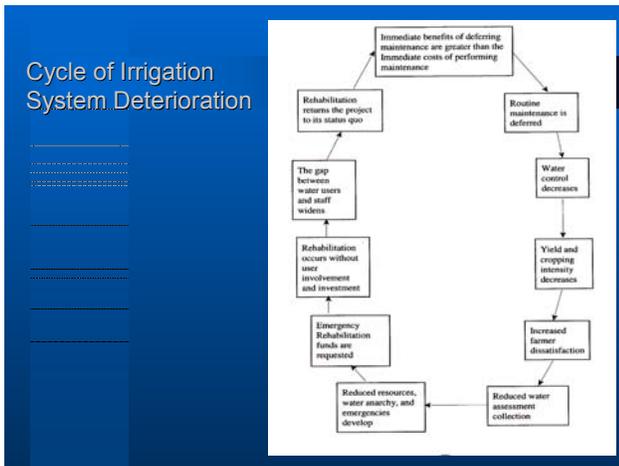


Figure 17. Cycle of Irrigation System Deterioration

One approach to rehabilitation would be a prioritized list of the 80 Navajo irrigation projects. But, that is not how this strategy works. Part of this strategy is not to force federal programs to re-order their current criteria. Instead, it is to coordinate better the resources on irrigation projects where more than one federal agency is working on a specific project. If they are all working together, can they coordinate their activities to do the irrigation project?

Another part of the approach is to create incentives for institutional development and for empowering the water users. Assessment and planning for irrigation projects target those irrigation systems where the water users are interested in organizing and taking some responsibility for irrigation. Design and engineering for irrigation projects specifically target those irrigation systems where the water users have organized. And finally, rehabilitation specifically targets those irrigation systems where the water users are assessing themselves for the operation and maintenance. If the water users are interested in assessing themselves and investing in their own systems, then the water managers should do everything in their power to complete the assessments and planning, the design and engineering, and the actual rehabilitation. There's a long history on the Navajo Nation, and elsewhere, of lining canals and other improvements without changing this cycle of deterioration.

Complete the Navajo Indian Irrigation Project

Another component of the water development strategy is completing the Navajo Indian Irrigation Project (NIIP) (Figure 18). NIIP was authorized in

1962 along with the San Juan Chama Project. The San Juan Chama Project, which diverts water from the San Juan River system to the Rio Grande Basin, was completed in a few years. NIIP, however, is only about 60 percent complete. Even though it faces difficult challenges, completing NIIP is still very important to the Navajo Nation. According to the original authorization, at full build-out NIIP will be more than 110,000 acres, making it the largest irrigation project in New Mexico.



Figure 18. Complete NIIP

The current operation and maintenance of the NIIP canal system is \$4 - \$6 million a year. When it is completed, its operation and maintenance may be \$8 - \$12 million a year. This expense is a huge burden. However, the Navajo Nation has made tremendous strides toward improving the management of NIIP. The farm can work. During the last few years many recommendations to improve its management have been implemented. With vertical integration, NIIP can create the jobs and livelihoods that were part of the project's original purpose.

Watershed Restoration

Another component of the water development strategy is watershed restoration (Figure 19). The Navajo Department of Water Resources has worked with various agencies on comprehensive watershed restoration approaches with mixed success. Many of the proposed treatments are controversial. And as the number of land users increase, the potential conflicts increase in a compounded fashion. Consequently, many of the comprehensive watershed efforts have collapsed under their own weight.



Figure 19. Water Restoration

It is always difficult finding land users who are interested in cooperating with watershed restoration, and who will follow through on the commitments needed to make restoration treatments work. On the Navajo Nation there are additional problems including among others, permitting and clearance problems, fencing problems, grazing disputes, and Chapter disputes. So instead of pushing watershed wide efforts, the Department is proposing 100 demonstration projects over the next five years. Because it is so difficult on the Navajo Nation to get land users, the Navajo staff will work with one land user at a time. The energy needs to go into identifying land users who are willing, and able, to participate in these programs.

The BLM has provided excellent support in the Rio Puerco Watershed. And the Navajo Nation has also worked on demonstrations in the Zuni Watershed in New Mexico, and in Tsaile, Asaayi, and Canyon De Chelly watersheds through the Arizona Water Protection Fund.

Drought Mitigation and Response

Another component of the water development strategy is drought mitigation and response (Figure 20). The entire region is confronting a prolonged drought. In 2002 the Navajo Nation Emergency Management Commission adopted a drought response plan that follows the outline provided by the Nation Drought Mitigation Center. For instance, the Navajo Nation has ranked the public water systems based on drought risk. The Navajo Nation drought declaration process is very similar to the process used by the State of New Mexico. The levels of drought emergency are based on the six-month Standard Precipitation Index (Figure 21).

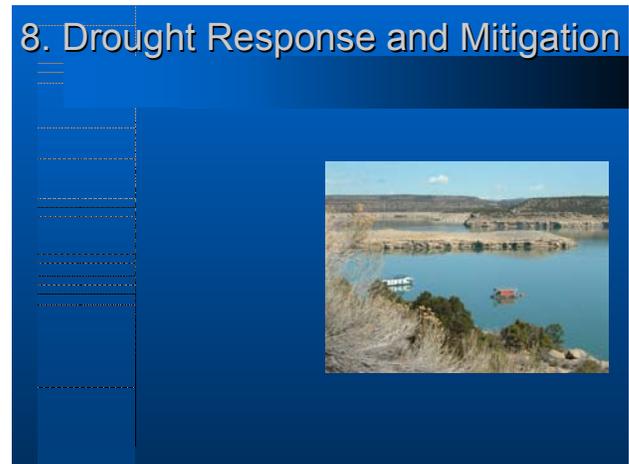


Figure 20. Drought Response and Mitigation

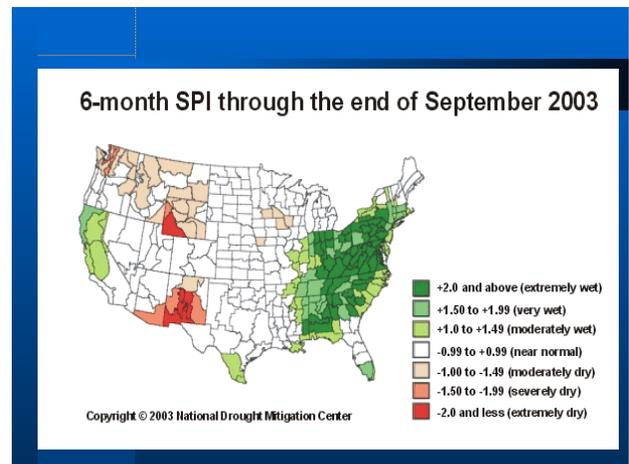


Figure 21. Six-month SPI through September 2003

During the winter of 2004, Navajo Reservoir was nearly as low as it was when the reservoir was first filled (Figure 22). Figure 23 provides the drought forecast for the U.S. In response to this prolonged drought, and for the second year in a row, the Navajo Nation worked with the other water users in the basin to develop a shortage sharing agreement. The effort has been successful. Through this agreement tens of thousands of acre-feet of water have been conserved. And, unlike the Klamath River, in the San Juan Basin there have been no fish kills. And, unlike the Rio Grande Basin, in the San Juan Basin there has not been a protracted legal battle. It has been a very, very, painful process. It is very tough to convince many Navajo Nation leaders that sharing the shortages is the way to go. But every other signatory to this agreement has had that same problem. Somehow sharing shortages during periods of extreme drought has been a very, very tough sell. But it was done in 2003 and I am hoping it will be done in 2004.

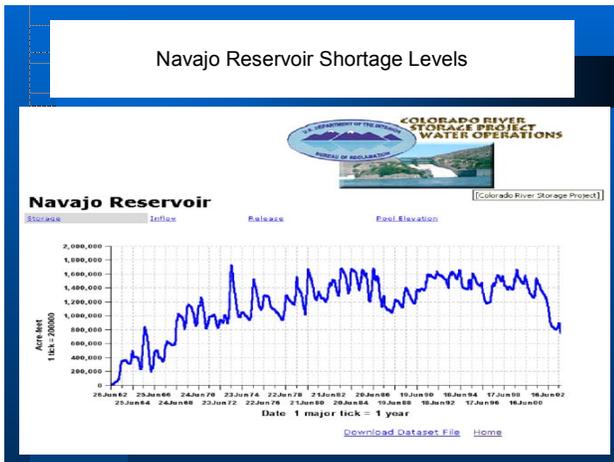


Figure 22. Navajo Reservoir Shortage Levels

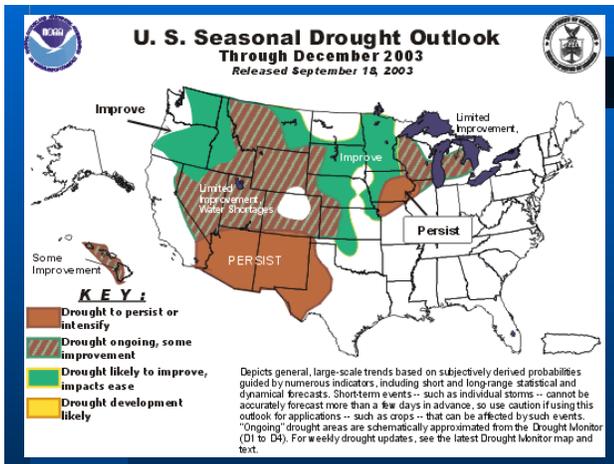


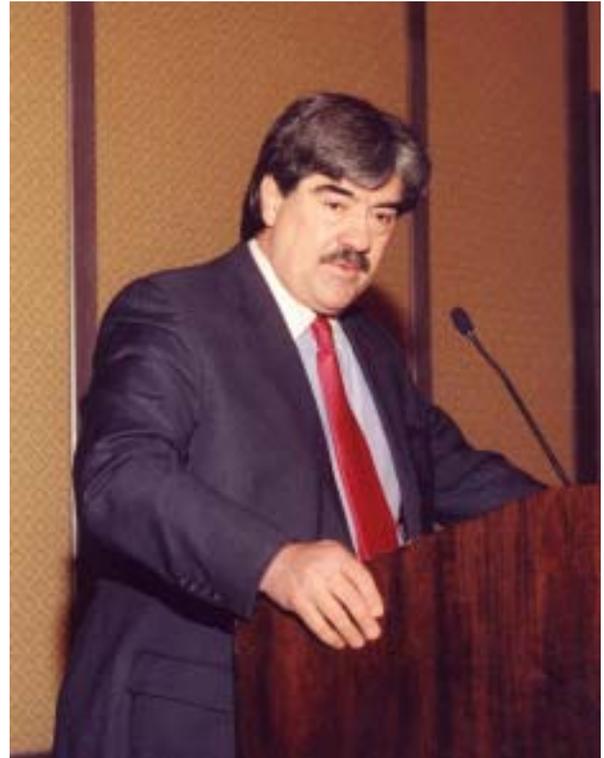
Figure 23. U.S. Seasonal Drought Outlook

Conclusions

The Navajo Nation is committed to improving the standard of living on the reservation. The Navajo Nation has made the development of reliable water supplies one of its highest priorities.

A proposed Navajo Nation settlement was presented to the public on December 5, 2003. This settlement is good for the San Juan River Basin, it is good for the State of New Mexico, and it is good for the Navajo Nation. One of the first impressions many people have is that it is too expensive. But, the cost of the settlement needs to be compared with the alternatives. And, if that settlement results in the implementation of significant portions of this strategy, then those benefits make it a bargain for all sides.

Ambassador Alberto Székely is a Career Ambassador, since 1986, with the Mexican Foreign Service. He served as Advisor to the Mexican Foreign Minister (1976-1979), was Alternate Representative of Mexico to the OAS in Washington (1979-1980), Legal Advisor to the Mexican Delegation to the Third U.N. Conference on the Law of the Sea (1973-1982), Alternate Representative of Mexico to the U.N. in Geneva (1982-1983), The Legal Adviser to Mexican Foreign Ministry (1983-1991), Representative to the Sixth Committee of the U.N. General Assembly (1983-1990), a Member of the Permanent Court of International Arbitration at The Hague (1986 to date), and Member of the U.N. International Law Commission (1992-1996). The Ambassador has recently been appointed Judge for the International Tribunal for the Law of the Sea. He continues to be a guest/visiting lecturer on International Law at a number of U.S. Law Schools (Arizona State, University of New Mexico, Johns Hopkins) while conducting a private international legal consulting business from Mexico City specializing in International Environmental Law, the Law of the Sea, and Transboundary Resources issues including environmental zoning and land use planning, sustainable coastal development, environmental defense, water law, forestry law, protected areas, and human rights. In 1998, he coordinated the Citizens Workshop for Legislative Proposals (The Rule of Law and Administration of Justice). Ambassador Alberto Székely has an LL.B. from the National Autonomous University of Mexico School of Law (1968); M.A. and M.A.L.D. from the Fletcher School of Law and Diplomacy, Tufts and Harvard Universities (1969-1970); and Ph.D. from the University of London, College of Laws (1975). He has published extensively in English and Spanish in Mexican, American and international journals.



Introduction by Chuck DuMars

We have certainly had a wonderful lunch, we appreciate it. It's also been a great conference so far and I'm sure it will be this afternoon.

I have been given the honor to introduce our luncheon speaker today, a man who I have known for 20 years, and who was if not the best friend, then close to being the best friend of Al Utton – Alberto Székely. Alberto is a tocoyo of Al, both being called Albert or Alberto. Tocayos are people who not only have the same name, but in some ways, have the same personality. Alberto certainly shares the same zest for life that Al Utton manifested throughout the time that

I knew Al, and he was a very close friend.

When I was told I would get a chance to introduce the luncheon speaker, I turned it down, until I found out that it was Alberto. When he heard I was introducing him, he said, "What are you going to say Chuck?" I said, "Don't worry, I won't tell the truth."

Alberto is an amazing person. He has many degrees: from the National Autonomous University of Mexico School of Law, an LL.B and an M.A.; a M.A.L.D. from the Fletcher School of Law and Diplomacy at Tufts and Harvard universities; and a Ph.D. from the London College of Law. He has

published numerous articles in English and Spanish.

He is the author of what can only be called the leading treatise on the law of the sea. He has co-published numerous articles in the *Natural Resources Journal*, some of which I have also contributed. He is a career ambassador since the mid-1980s with the Mexican Foreign Service. He has written at the Hague. He has been a leader in developing international water policy and transboundary issues. In the past 10 years, I can safely say, he has become one of the most famous individual authors of policy papers that are the constructs for controlling transboundary environmental pollution.

Alberto is a person who has talents that not everyone knows. In addition to being fluent in English and Spanish, he speaks two or three other languages. He is an incredibly good honky-tonk piano player, and I have played duets with him. He plays other instruments as well. He's got a great singing voice, a very deep baritone - drowns you out every time. And he knows all the words to H.M.S. Pinafore's songs. Alberto is an incredible scholar, and also, on a more serious note, has had the opportunity to, because of his tremendous academic credentials, to hide in academia.

Al Utton was very fond of a very famous play called *La Vida Es Sueño*. *La Vida Es Sueño* is the story of Segismundo, a leader of a country who was locked up in a tower for basically his entire life. He was finally able to free himself and he came down

and took a look at the world and he said "La vida sueño, los sueños de sueños son."— meaning that life is but a dream but dreams themselves are dreams and we have to live with those dreams and build on them. Segismundo went back into the tower.

Don Alberto has never gone into the tower. He has been out in the forefront in negotiations at every level for Mexico and for developing countries throughout the world. He represents an "Albert" vision, an advocate not for government so much but for the principal of excellence in the form of what he calls "preventative diplomacy." Preventative diplomacy refers to excellence in knowledge used in advance of a problem that will result in the resolution of that problem. He and Al Utton both articulated those principles, practiced them, and have been instrumental in setting up constructs for transboundary groundwater management regimes, for example, which are being adopted throughout the world.

It is that commitment to excellence in academics, excellence in principles, and the implementation through the institutions that Alberto Székely brings to this group.

I do not have a clue as to what he is going to speak about. He could speak on many topics, everything from Mexican music to classical music to Hungarian food to the most fascinating topics, what it means to plan for, predict, and dream for problem solving resolutions and implementation.

It is my great pleasure to introduce Alberto Székely.

ALBERT E. UTTON MEMORIAL WATER LECTURE 2003

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Good afternoon. I do not know how I can appear here after such an introduction. I told you that Chuck DuMars wouldn't tell the truth, and he didn't, he exaggerated on every account. But a most generous introduction. Chuck, thank you very, very much.

I have always been very proud of my association with New Mexico. There have been for the last 25

years so many things in my life that are associated with this state that I don't need to tell you how happy and honored I am that I have been invited to this forum to talk to you. In the last two years or so I have been making similar presentations in this state. I only recently went to Taos to talk to the Rotarians and I gave a presentation there that was not a very positive one

because what was happening then on the water issues between our two countries did not lend itself to give happy accounts. Knowing that I was going to come here, I said to myself, I have to do better. I have to try to create something a little more positive than the last time I was in Taos. Believe me, I am going to exert myself to that end.

This is a lecture in the memory of Al Utton, and I think that to be consistent with that, I should rely mostly on his words. Al Utton did have time to leave us a legacy, a testament, a vision that is very pertinent to bring forth today at his memorial lecture. I remember that in Taos I named my presentation “Chronicle of Man’s Disaster.” I will try to get away from that as much as possible but it’s not easy. Twenty-five years ago, back in the 1970s, Al and I had the idea of creating the transboundary resources center. At that time, Al started turning on some warning lights about the future in this area of the world. He started telling us what we should be thinking about and what kind of measures we should be taking. Perhaps he was thinking already about his grandson who is here today with us, little Daniel Albert. He was not thinking so much of our generation, but of the generations to come. I am sure that he wanted, with all the questions he started posing at that time, a brighter future to be available to future generations.

There was a very important piece of research that was published in 1982 that Al and others undertook during the 1970s called “Anticipating Transboundary Resource Needs and Issues in the U.S./Mexico Border Region.” In that article, Al asked a few questions that I am going to take the liberty of reproducing now. He was talking obviously about the situation with water resources in this part of the world and particularly as they pertain to the border between our two countries, the U.S. and Mexico. We were beginning to experience some difficulty at that time. We had gone for almost a hundred years with a happy situation of great bilateral cooperation between the two countries. We had adopted several treaties, we had created an international mechanism that was a part of history, the International Boundary and Water Commission, and we had built dams all along the two main basins on the border, which is the Colorado River Basin and the Rio Grande/Rio Bravo Basin. However, the honeymoon was almost at an end. Al asked the following questions in the 1982 article. He asked, “How do we get from here to the year 2000? How do we cope with the fact that every drop of water in the major drainage basins is already appropriated, yet the

population is projected to double by the year 2000?” I am quoting his words. He asked, “What is the institutional situation for managing water resources in the U.S./Mexico border area? How well have the institutions performed in the past? Given projections for dramatic population increases in the future, what problems should be anticipated? How should we handle them?” And finally, “What anticipatory actions should be taken?” It was precisely on the idea of taking anticipatory action that he created the transboundary resources center that now is named for him – precisely around the concept of preventing problems. Al put those questions at the end of what he called a century of achievement. The International Boundary and Water Commission was created in 1889. So it was almost a complete century of experience that he was recapitulating on. Al asked those questions because he already saw that there were some ingredients that were beginning to change and he could see that we could not count on continuing on such a bonanza.

Ever since that time, Al’s words, his questions, were the object of great analysis and they instigated the preparation of publications of great pieces of research, mostly published in the *Natural Resources Journal* here in New Mexico. Almost 20 years passed before he gave us his final words. Before he passed away, he published an article in 1999 called “Coping with Drought on an International River Under Stress: The Case of the Rio Grande/Rio Bravo.” Twenty years later he was not talking about the century of achievement, he was then talking, in his words, of “The Century of the Pinching Shoe.” Those of you who know that article remember those words. He said concerning the periods of drought that we had already been undergoing throughout the 1990s, “The shoe will contract, crinkle, and crack and the foot within will be subjected to sharp discomfort and perhaps traumatic dislocation.” Those are the words Al used to describe the beginning of a new century.

Al dared to look into a crystal ball as to what may result from the pressures of population and economic growth. He then left us this series of questions and warnings that I am going to relay to you because it describes how wise he was, what a visionary he was in his predictions. I took those words as a testament as to the way I should conduct my work in the years ahead. He said, “...there will be much greater conservation of existing supplies because water supplies will have to be stretched by much more careful usage. Competition between users will greatly increase. Water will increasingly be switched from

agriculture to municipal and industrial uses because many more jobs can be produced by industry with an acre-foot of water than can be produced by agriculture.” Then he said, “...limits on growth will confront the region; concepts of and the means for sustainable economic development will become imperative; international and interstate apportionments, hard earned in the twentieth century, will be increasingly challenged in the twenty-first century.” He had seen that scenario from the beginning of the drought that started in the 1990s and I do not think that anybody could have put it better, because the way things have been happening since have only confirmed his vision.

Al inspired us at the end of the 1970s, and after twenty years of additional work, with the words that he left us with at the end of the 1990s, he was still inspiring us for the future. I had the opportunity during the past 2½ years, ending in June, to be in charge of water negotiations with the United States. These were very difficult negotiations because reserves have dwindled to such small amounts that we have now encountered the problem of not being in the position, at least on the part of Mexico, to make the kind of compliance with the water treaties that we did historically. That has irritated the relationship tremendously. It has brought to the bilateral agenda an element of discomfort, the “pinching shoe.” The two countries have unfortunately not known how to deal with it; they have been bogged down in fighting about immediate water deliveries and have not been willing to look to the future.

The drought problem that started in 1992 resulted in, at least on the Mexican side of the Rio Grande/Rio Bravo Basin, a decrease of water availability by about 80 percent. That meant we did not have enough water to comply with our obligations under the treaty. But it was not enough to wake us up to the fact that we had to change the way that we use water. We continued with abusive practices. Had we stopped those abusive practices, we would have saved some water and been able to comply with our obligations under the treaty.

The same is happening in the two basins. The shadow of drought has appeared already in the Colorado Basin and the question is, how are we going to deal with it? It is the same question asked by Al Utton at the end of the 1970s and again at the end of the 1990s. We unfortunately do not know yet how to respond to those questions. For 2½ years, I participated in bilateral negotiations, and inspired by some of the words that Al Utton left us, I made

proposals, in the name of Mexico, that were reluctantly accepted in principle by the two governments.

The first proposal that was made and is waiting to be carried out, was something Al Utton reiterated in almost every article he wrote on the subject: the need to define when we are in an “extraordinary drought” situation so that we can say that the normal system of water delivery should be changed. Anybody who knows the literature produced by Al Utton will agree with me that he had sort of an obsession with the technical question of, or the need of, defining extraordinary drought. When a conflict eventually developed as a result of the drought, the one thing that triggered the conflict was that each of the two countries had its own version as to whether we were in an extraordinary drought situation or not.

Finally through these negotiations, at the beginning of this year, there was a proposal put on the bilateral table that we should finally do as Al Utton had advised so many times: sit down and negotiate an exquisite definition of extraordinary drought. I can only report that an agreement has been reached in which a body of experts will sit down and create that definition. Now the question is whether they are really going to sit down and do it. But at least we have advanced that far. There is a little bright light in the future.

Another proposal was made and at the time, we were thinking very much of the words of Al Utton when he said, “...concepts of, and the means for sustainable economic development will become imperative.” We proposed at the negotiation table that these two countries start negotiations for a bilateral plan for the sustainable management of the two basins. That is a tremendous challenge for the two governments because preparing a plan for the sustainable water resources of the two regions, of the two basins, on both sides of the borders, means putting to question a lot of things. It means that we need to start thinking about what Al mentioned regarding limits on growth. We are doing this at a time when nobody wants to talk about limits to growth – at a time when there is wild competition to create wealth to exploit natural resources in order to participate in the market. Therefore the idea of starting to look at limiting growth does not come at the most propitious moment.

However, a proposal was made to prepare such a plan. It will require a review how we implement NAFTA on both sides of the border. NAFTA is based on the idea that we should industrialize the Gulf of Mexico as that will bring about not only the creation of trade exchanges and investment opportunities

between the two countries, but it will also reduce the need for migration from Mexico to the United States.

We are working with a treaty that has as its foundation, a call for much greater growth in the region where water availability has been dwindling constantly to very alarming levels. We will have to question that foundation and, as you can imagine, the federal governments are not prone to get engaged in such questions. We must look at how industry is planning to develop on both sides of the border. We must look at the urban development of all the counties and all the municipios along the border. We have seven Mexican states along the border and four U.S. states. We have 39 municipios on the Mexican side, 25 counties on the U.S. side, and 14 pairs of twin cities. We must look at how we are planning future development, urban development as well as industrial development, because so far we have been developing without any consideration to water availability. Now, as Al said, it will be imperative.

In all this, we have a very big challenge because the attitudes of several of the actors in this story are not, as I said, very prone to engage in these activities. First of all, the institutional bilateral mechanism that we were so very proud of – the International Boundary and Water Commission (IBWC) – has been undergoing a terrible, traumatic period. We just witnessed the coming and going of the Commissioner on the U.S. side that resulted in putting the U.S. Section of the IBWC in a severe crisis to say the least. The Mexican Section is frozen in total stagnation and there is absolutely no will on the part of either of the two governments to do anything about it. So the IBWC is one of the actors we should not rely on. The IBWC will not change things. Many of those of us who are working on these issues keep harping on the idea that we should change the IBWC. I do not think that any change in the IBWC is coming and I do not think that even changing the IBWC a little is going to make a difference.

The IBWC is one actor, the institutional mechanism. Other actors include the two federal governments. However, they are too preoccupied with other things. First of all, their bilateral agenda was lost to 9/11. The Mexican Government has been making great efforts to revise some of the bilateral issues that Presidents Bush and Fox had agreed to undertake when they both came to power but 9/11 has killed that agenda and we have not been able to set it up again.

In the Mexican Government vision, migration to the United States and everything that that entails is Issue Number One; not the future of the border area, not the situation with water resources. The migration issue has its merits but I do not think that the water issue of the future of this area should be put in any place other than first place, perhaps along with the migration issue, but certainly at the top of the list. The two federal governments have not shown any interest in moving in that direction on these issues. We have been told ever since the end of the 1970s that aside from occasional droughts like the one that has been afflicting us for the past three years, we will be hit by something much worse than that, and that is the impact of global warming on these two basins. We have been told that as a result of global warming the Colorado River will lose 40 percent of its flow and the Rio Bravo will lose 76 percent of its flow by the middle of this century. We do not want to wake up. The U.S. resists the idea that they should enter into any international engagements or obligations to address the problem of global warming. Mexico resists the idea of engaging in its own obligations hiding under the umbrella of it being supposedly a developing country that can not afford to do anything about these environmental issues.

We have been told that things are going to get a lot worse, yet we do not wake up. We certainly can not rely on the federal governments to wake up and do something about it. I have counted out the IBWC. Who else should we look to?

We must look to the states. The words that Al Utton was giving us since the 1970s and all the warnings since point in only one direction given the dramatic reduction in water availability. We are going to start having conflicts and possibly even wars between the upper riparians and the lower riparians. We have to realize who those actors are. Who are the upper riparians and who are those lower riparians? In the international context, we are both upper riparians because we have water in the Conchos system that we gave to the United States under the 1944 treaty. But Mexico is lower riparian in the Colorado system while the United States is upper riparian in the Colorado but lower riparian in the Rio Bravo. That is only in the international context. So many of you know that there are upper riparians and lower riparians between states on the American side of the border – New Mexico, Texas, what else should I say? Worse than that, and we do not want to admit it, there are upper riparians in each of the states. Half the users of Rio Grande water

in the state of New Mexico is upper riparian and the other half is lower riparian, all inside your own state.

Who is likely to really worry about these conflicts? The governments of the two countries have not shown any interest, and as usual, they will get there late. I think we should start looking at the states and particularly the role of the states' governors. There is an increasing role for governors in both our countries. In my own country, governors are beginning to show up as a major political force simply because they have been liberated by central control from the presidency. Thanks to the transition that Mexico has been able to make to democracy, suddenly the states of the union are sovereign states not under the control of the president as we were for the last 70 years under the previous regime. Suddenly we are hearing the voices of the governors.

On the Mexican side, we have already constituted the national governors conference. We now have a new kind of actor that was not foreseen in any part of our legislation; an actor with great political force simply because they have regained their sovereignty. They are becoming major actors on most of the top national issues. Governors in Mexico have bonded together on many issues and they meet and talk about these issues. We need a very specific effort on the part of the 11 governors. We also need an effort on the part of the seven governors of the Mexican states bordering the United States along with the four U.S. governors. The governors are going to suffer the consequences of the conflicts between upper riparians and lower riparians not only in the state vs. state conflicts and in the international conflicts, but they also are going to suffer at home when confronting conflicts between their upper riparians and lower riparians. As it so happens, anything that takes place in any part of the basin will send shockwaves to the rest of the basin.

I think it is in the interest of the governors to take a role in this issue. I do not see any other alternative. I repeat: we must discount the IBWC and I do not see the federal governments wanting to take any responsibility on this issue.

I should have finished this talk a long time ago, I think. I have a lot more to say so, if you have a couple more hours, I will go ahead. I do not want to be negative in this presentation, particularly when we are talking in memory of Al Utton, who was always so positive and such an optimist, as you all know. So where do I see hope? Where do I see the possibility of answering these questions that were posed in the positive? I am afraid that if we do not have the states moving and

becoming active on this, I do not know who else will provide us with the answers.

If this Memorial Lecture should be good for something, I hope that it is as the first call on the governors of the 11 states to start acting to ensure a better future for Daniel Utton and for the other kids like him – for those of future generations. That way I will not have to come with gloomy chronicles of man's disasters – maybe we can avert those disasters. I hope this appeal to the states and their governors to move ahead on water resources issues is heard and is repeated by others. I invite you to repeat this appeal.

Thank you very much for listening to me.

John W. Keys, III was sworn in as the 16th Commissioner of the Bureau of Reclamation in 2001. He oversees the operation and maintenance of Reclamation's water storage, water distribution, and electric power generation facilities in the 17 Western States, where Reclamation is the nation's largest wholesale water supplier and the fifth largest electric utility. John has spent his entire 34-year professional career working with Reclamation throughout the western U.S. From 1964 to 1979, he worked as a civil and hydraulic engineer on issues related to the Great Basin, the Missouri River Basin, the Colorado River Basin, and the Columbia River Basin. In 1998, he retired from federal service, having served as Pacific Northwest Regional Director for 12 years. In 1995, John was awarded the U.S. Department of the Interior's highest honor – The Distinguished Service Award – for maintaining open lines of communication and keeping interest groups focused on solutions. A commercial airplane pilot, Keys owns a Cessna 182 and previously averaged about 300 flight hours a year; many of them for Angel Flight, Air LifeLine, and County Search and Rescue, based out of Moab, Utah. In addition, he has been a college football referee since 1970 and a high school referee since 1962. His wife, Dell, is a family practice physician and Airman Medical Examiner, and flies a Cessna 172. A native of Sheffield, Alabama, John received a bachelor's degree in civil engineering from the Georgia Institute of Technology and a master's degree from Brigham Young University. John is a registered professional engineer in Colorado, Wyoming, Montana, and North Dakota.



IN THE SPIRIT OF COLLABORATION - DEVELOPING SOLUTIONS TO NEW MEXICO'S WATER PROBLEMS

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Good afternoon. It is my absolute pleasure to be here this afternoon. I will tell you that since I have been Commissioner, I have traveled to a lot of places and every time I come to New Mexico I see why people love to live here. It is truly one of the great places in the West. And like I told somebody this morning, they don't call it "Land of Enchantment" for nothing. It is truly a great place.

The one thing that impresses me, though, as we meet this year, is how dry it is. If you look at a map of the western United States (posted on the Internet every week, as an update on the drought index) for this entire year, there has only been one of our 17 western states that has had normal or above precipitation and runoff. That state is California.

The drought that we are suffering through is centered over New Mexico, Arizona, Utah, part of Colorado, Wyoming, and Montana and we are certainly seeing the results of that drought. Of course, those of you who live here know how challenging it has been for us this year to manage our limited water supplies, especially for our traditional water users, new uses of water, and then planning for the future.

Before I go ahead, let me tell you about some changes that are happening around Reclamation. Most of you know that we have an area office here in Albuquerque; Ken Maxey has been the area manager for almost two years. He has taken a job in Denver with Reclamation and will be moving there this month. Also this month, the new area manager for Albuquerque will be Jack Garner. Jack has worked on my personal staff back in Washington for the last two years and has been heavily involved in our work here in the basin. He is a native New Mexican and certainly brings a lot of positive assets to the basin, and to the state of New Mexico in his new job. We look forward to him being here and being our representative in the state of New Mexico and the Middle Rio Grande, Pecos, and the other areas that we work with.

If you consider the problems that we are dealing with in New Mexico, it will give you a good idea of the challenges that Reclamation and water districts face on a daily basis. The challenge of meeting ever increasing water demand is real. Limited supplies and multiple responsibilities for water that we have in dry years emphasize the importance of water to those districts that we have contracts with for water supply, the water rights and interstate compacts that go along with supplying that water, and the obligations that we have to Tribes and Pueblos. Even with the legal requirements that we have to endangered species, Reclamation is committed to deliver that water and to generate power in an environmentally and economically sound way. When we're out of water though, it gets tough.

We are fortunate to have Secretary Norton and President Bush working with us. I will tell you that we have briefed our Secretary every week this summer on what is going on in the Rio Grande. We have also briefed the President and the Vice President on the water supply situation throughout the West. Mr. Bush is committed to addressing western water issues in a balanced and practical way. I will talk later about *Water 2025*. And certainly their support is there for that program. In his requests for Reclamation

appropriations for fiscal years 2004 and 2005, Mr. Bush has shown that commitment.

First I would like to focus on the particular situation that we are working with here on the Rio Grande. Reclamation operates the San Juan-Chama Project and the Middle Rio Grande Project to provide water for irrigators, for cities, for pueblos, and for other water users in New Mexico. On top of that, New Mexico is home to two endangered species, the silvery minnow and the willow flycatcher. I'm going to concentrate on the silvery minnow because of the water requirements that go along with it. The situation here has given us many opportunities to work hard and put our heads together to try to find solutions that involve all of our water users. A lot of the aspects of that collective effort have worked well this year and we should all be proud of how we got through this year with the water supplies to our irrigators, to the cities, to the minnow, and to meet the delivery requirements to the pueblos. That being said, there is always room for improvement. And certainly some of the things we're putting together this winter, we look forward to trying next year.

Let me talk about good news and bad news. First, the good news. I would like to start out by recognizing the Endangered Species Collaborative Program. This program is one that Senator Domenici has been personally involved with. It brings together representatives from all sectors of the water community. The Collaborative Program has received bipartisan support. Senator Bingaman has been there along with Mr. Domenici in the funding from Congress. As a result of that effort, real progress has been made in water management, habitat restoration, population management, and fish passage improvements. Certainly there is more to be done, but we worked this year with a good collaborative effort from all of the users. One of the most successful actions was flow that we were able to do early. It triggered the spawning of the minnow and helped us keep the population alive.

The Collaborative Program is truly a collaborative effort involving Reclamation, Fish and Wildlife Service, Bureau of Indian Affairs, Middle Rio Grande Conservancy District (MRGCD), New Mexico Game and Fish, and the City of Albuquerque. These entities have worked together to continue the propagation of the silvery minnow and certainly the recovery efforts worked because of their efforts. Fish rescue efforts have expanded with help from many of the stakeholders. I think if you ever have a chance to go

see the refugia that has been built down there where they are actually raising silvery minnows, you should take that opportunity because it lets you see some of the other things that are being done rather than people just standing back there in their foxholes yelling for more water to be released down the river. In terms of habitat restoration, Reclamation and Fish and Wildlife Service have been working very closely together in cooperation with the Pueblos, the State of New Mexico, the City of Albuquerque, and MRGCD. We have been successful and have tried to do some long-term planning.

The cooperation of the Pueblos has been integral in our recent successes on the river in trying to meet their prior and paramount water needs and at the same time deliver minnow water. We certainly appreciate the level of the Pueblos' involvement and their commitment and willingness to work with us on those deliveries. All of these accomplishments are significant improvements and I am not sure a few years ago we could have expected to accomplish as much.

Another great partner in this whole effort has been the State of New Mexico. Their cooperation was extraordinary this past spring because of the Interstate Stream Commission's willingness to work with us to find a creative solution to meet water users' needs as well as the minnow needs. In the spring and early summer of this year, representatives of the State of New Mexico went to Texas and talked the Texans into agreeing to allow New Mexico to relinquish credits that it had accrued under the Rio Grande Compact. It allowed Reclamation to store 30,000 acre-feet to supplement existing river flows for the minnow. It allowed MRGCD 46,667 acre-feet for irrigation purposes. Without that water, it would have been a dismal summer in the Middle Rio Grande.

Let me just put in a word here for the two people who lead those two agencies: John D'Antonio and Estevan López. They are great people to work with. We have hardly had a month or a week go by that we have not had exchanges of information and telephone calls about how to keep flows in the river, how to find the waters that we need to make available, and certainly they have been great partners. I commend the State of New Mexico for those two people and the work they have done.

Now that we have talked about the good, I guess I could say the bad and the ugly are coming up next. When we talk about litigation and the 10th Circuit Court Opinion, the complication of an already difficult situation gets worse. I can not even talk about a lot of

it because of ongoing litigation. But let me just give you the bare bones and then we will quit. In 2002, the Federal District Court held that Reclamation had the discretion to reduce contract water deliveries and to restrict water diversion for an endangered species. Certainly that was plowing new ground for all of us. All of the intervening parties with the United States appealed the District Court's decision to the 10th Circuit of Appeals. In June of this year, the 10th Circuit upheld the District Court's decision. The United States and other parties have petitioned the 10th Circuit to rehear the case and the court ordered supplemental briefs on whether the case is moot and should be vacated. Legally, the case might be moot at the end of the year, and if it is, the 10th Circuit should vacate the lower court's decision and the 10th Circuit's decision. Reclamation still strongly feels that the 10th Circuit's decision is wrong and we will pursue that issue through the appropriate appeal channels in the future all the way to the top if that is what it takes.

Now let me talk a little bit about this year's operations. With the legal backdrop I just described, we operated most of the irrigation season this year with that looming over us as to whether there was going to be an additional decision or not. Reclamation had been trying to purchase water from willing sellers in the basin and we have had some success. The minnow water that is there is certainly the result of that effort. It became apparent last year that we are going to need about 14,000 acre-feet this year. At the same time, the department was committed to meeting the needs in the basin to the highest level possible, including the irrigation needs of the six Middle Rio Grande Pueblos. We were unable to purchase enough water to guarantee that we would be able to meet the requirements of the biological opinion early and we actually had to delay delivery of some San Juan-Chama water. We had to hold that water back until later in the year. For awhile, we did not know if we were going to make it or not. In the end, we finally got that water on the flipside and were able to release that water later on. And yes, we did meet the biological opinion flow requirements. So results for this year are OK and certainly further cooperation will be needed next year.

At lunch I was handed some information that shows that Elephant Butte and Caballo are right now at about 7 ½ percent capacity, that is not much water. If we look at other reservoirs in the basin, they are almost in as bad a shape. I will tell you that is not very encouraging. Although on my way here this morning,

I was delayed because of a snowstorm in Denver, so maybe there is some hope.

It is in all of our best interests to cooperate on minnow flows, deliveries to the Pueblos, and the deliveries to the district shareholders, both cities and irrigators. If we fail to take proactive steps to cooperate collectively, we lose a lot of our ability to plan for the management of that water in the future. Certainly the *Minnow vs. Keys* case brings it to a point. Further detrimental judgments, I don't know where that is going to go, but piecemeal litigation issues are very hard to work with, especially when we have a lot of people trying to do the right thing. Ongoing collaborative consultation is the name of the game for us, because without having everyone at the table trying to figure things out, I don't think we have a chance.

We were very pleased that Governor Richardson asked the federal government to be at the table to discuss long-term solutions for the river. We are looking forward to the continuation of those discussions. I know from my perspective, the talks initiated by the Governor have created the foundation for further cooperation among all the interests on the river.

Let me talk just for a minute about the Pecos River. Certainly over the past couple years there has been a lot of focus on the Middle Rio Grande, but another clear example of how collaboration and consultation have been successful between competing stakeholders can be seen in the Pecos River Basin. It has actually contributed to a non-jeopardy biological opinion from the Fish and Wildlife Service for the management strategies on the river. In 2003, the Pecos River team, comprising representatives from Reclamation and Fish and Wildlife Service, worked closely together to develop creative solutions in water management, but also to improve the working relationships with the State of New Mexico. It was successful because collectively we were able to focus on the needs of the species and on the hydrological reality that was brought on by the drought. Certainly while there was not a full delivery of water for the irrigators, there was a consideration of all the interests in that process. The Pecos River team also worked with Fort Sumner Irrigation District to reach a multi-year agreement on fallow land to leave water in the river for the upper reach critical habitat needs that have been identified. As part of the agreement, the State of New Mexico and the Carlsbad Irrigation District agreed to a proposal to provide a quantity of water at Ft. Sumner to be released for river habitat. An equal amount of water

will be pumped from the wells in the Carlsbad District. I think the results of these efforts were stellar. They were even recognized in the Senate Committee report findings: "The Committee is pleased that the Bureau and the State of New Mexico have forged a good working relationship with regard to the contentious issues relating to the Pecos River."

The collaborative efforts going on in the basins here in New Mexico are getting attention outside of the state. I think the drought has brought that about and how we deal with some of the critical times and flows are bringing some of our interests together very well.

Let me talk about another success this year at Navajo Dam on the San Juan River shortage share. There has been an agreement reached there that has been described as nothing short of phenomenal. In the San Juan Basin in New Mexico, in May of 2003, a group of ten water users along with the New Mexico Interstate Stream Commission, Fish and Wildlife Service, and Reclamation developed a cooperative solution on how to deal with a potential situation that they had never been in before. Since the construction of Navajo Dam, there had never been a situation where the water supply was less than the demand in a particular year. Those ten entities represent two Native American tribes, both the Navajo and the Jicarilla Apache, three power production companies, two of them are coal fired and one is a coal mining company, a municipality, and four irrigation districts. All of those folks got together and even with that bleak water supply outlook, they looked at the big issues facing all of them. Those issues included: ongoing adjudication of the water rights in the San Juan; the Navajo Nation's unsettled water rights claims; the absence of measurement structures for most diversions; the lack of administration on the river; a lot of legal opinions on whose water right permits are better than others; and diversion records. Then throw into that environment a general distrust of the state and federal governments by all attendees. To meet the endangered species requirements that were before them, those folks put aside big problems. They honed in on immediate needs and their efforts bore tremendous results.

They worked very closely throughout the process with Reclamation and with the Interstate Stream Commission. And to do that, like I said, they set aside those big issues to deal with the immediate issues. That does not mean that the big issues went away; they are still out there. However, maybe by being able

to deal with the immediate issues we can approach some of the big issues that face us down the road. The big issues deal with some of the same type of cooperation. They were able to implement an agreement that allowed all water users to get through a very dry year. Inflow and outflow this past year was 38 percent and all those users got by with almost a full supply. It certainly was not as much as every one of them individually would have liked to see, but it got them past a very dry year. The Secretary's four "C's" were what made that happen without somebody out there preaching the four C's: Conservation through Consultation, Cooperation and Communication. It worked very well. We are now working with those same parties for a similar agreement in 2004 and our folks from Durango, Fish and Wildlife, and Interstate Stream are to be commended on that effort.

That brings me to another topic that we have talked to a number of folks about already, and that is the *Water 2025* effort that is underway in the Department of the Interior across the western United States. Its main thrust is trying to reduce conflict and trying to meet those future water requirements that we all have, and trying to stay out of crises work, in other words, trying to address water needs during crises. As we said in some of those meetings, the worst time to plan for a drought is when you are in one, and certainly we are in one, and it's the worst time to try to plan for it, although we have had to do a lot of quick steps here to meet our requirements. Secretary Norton recognized the need to avoid that crises and conflict when she started *Water 2025* this past year.

Across the western United States we have had ten *Water 2025* meetings, the latest one was yesterday, the first one was in June, and we had one here in Albuquerque in August where we had folks come in to tell us about how the water supply situation stands in that area and what we could do to address some of those needs and try to refine the projections that we had put together showing where those problem areas are. Across the West we had nearly 3,000 people attend those meetings and work with us on trying to see where those problem areas are, how we could address them, and how we can provide water for some of our needs at least 25 years into the future. I will tell you that our President supports this thing and in the request to Congress this year, he asked for about \$11 million dollars. The Conference Committee is meeting even as we speak, marking up our appropriations bill for next year and we are looking forward to having

some of that money to use as seed money across the western United States to get *2025* up and running.

Now for some good examples of *Water 2025* activities that are going on right here: water banking; some of the conservation measures that we have talked about all over the west; water transfers; and trying to get some of the old ways of doing business off the books so that it will be easier to protect our water while at the same time making water available for new needs. We are looking at desalination and trying to find ways to desalinate water cheaper. We are working closely with the Geological Survey and Sandia Labs on the Tularosa Desalination Research Facility project. Later in the program some of our folks are going to talk about that project.

Certainly collaboration and communication are a great part of what we are talking about in *2025*. The other part of *Water 2025* recognizes state water rights, it recognizes tribal rights, it recognizes our contracts, our local governments, and their water requirements. All of those have a leading role in trying to meet water supply and management requirements in the future. I will tell you that it is a forward-looking document that all of us should refer to as we plan for our waters in the future. You heard at lunch about some of the challenges that we face along the border, some challenges that we had not even heard before today. Those are the kinds of issues we'll be facing 20 to 25 years into the future.

In a nutshell, *Water 2025* is common sense. It is a philosophy that says we have to work together to meet our future water requirements and none of us can do that by ourselves.

Let me close by saying that solving the water problems on the Rio Grande will require a clear understanding of the history of the River's uses and management. I do not think any of us can step back and say we are going to start over, or we are not going to pay attention to contracts, or we are not going to pay attention to compacts with other states, and so forth. We can not do that, we must recognize those requirements. The Department of Interior through the Bureau of Reclamation will continue to provide the overarching support and in some cases, infrastructure. We are trying to find ways to provide seed money to get some of the conservation measures started.

Change is upon us. Change is difficult and sometimes leads to conflict. Many of the conflicts that we are in now are due to changes in water requirements. But I will tell you that it is inevitable and if we do not deal with it, it will run over us. When

developing sustainable solutions for managing the Rio Grande, the big picture has to be recognized: how the upper parts of the basin fit with the lower parts of the basin, how the different users fit with each other, and how the different government agencies work with each other to enforce laws and provide water.

Progress will be slow. Just a couple weeks ago we were in Las Vegas with our Secretary where she signed the Quantification Settlement Agreement. After 70 years of arguing on the Colorado River, the settlement once and for all puts to rest that division of water on the Colorado. It took 70 years to get that done. We do not have 70 years for the Rio Grande but it is not something that we can take care of overnight. As *Water 2025* points out, we are in it for the long haul. There is no silver bullet and we look to all the agencies with which we work to help us get there.

It is my pleasure to be here. I will be here the rest of today and tonight. I look forward to talking with you on your ideas concerning *Water 2025* and some of the things that we can do together to solve the water problems on the Rio Grande and all of New Mexico.

Fidel Lorenzo is director of the Pueblo of Acoma's Haaku Water Office. Fidel has an A.A. in administration of justice from Hartnell Community College in Salinas, California, a B.A. from the University of Oklahoma, and additional training in Indian law and water law issues. His background includes extensive administrative experience in the private sector, paralegal experience within the Tribal Court System of the 19 New Mexico Pueblos, and construction oversight, fiscal management, and tribal coordination for the Acoma Development Authority. In his current position as director, Fidel is responsible for management of the current litigation/negotiation process regarding Pueblo water rights and for oversight and coordination of federal contracts that support the development of the Pueblo's water resources.



Laura Watchempino has been the Water Quality Specialist with the Pueblo of Acoma since 1998. She received her B.A. in political science and education in 1980, and her J.D. in 1984 from the University of New Mexico's School of Law. In addition to her legal background, Laura has a long-standing interest in Acoma's water rights and has extensive experience with Indian law and water law issues. She has served as a member of the Acoma Water Rights Commission since its inception nine years ago. Laura was also instrumental in the development of the Pueblo's water quality standards.



ACOMA PUEBLO TAKES A UNIQUE APPROACH TO WATER PLANNING

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Fidel Lorenzo

Good afternoon. I just recited the traditional greeting of the Pueblo of Acoma. Basically our greeting refers back to our homelands, our families, all that we possess as humans here on earth, and asks that each and every one of you are blessed with a new day for your families and for all that is life.

I am Fidel Lorenzo. Many of you know me, and I know many of you professionally and as friends also, and it is a pleasure to be here. The State Water Plan has been a very long, hard process since being initiated by Governor Richardson. My topic today is presented from the Pueblo's point of view. First, let me qualify myself. The first part of my presentation basically is a presentation and a joint statement that was given by the two tribal governments of the Pueblos of Laguna and Acoma in 1998 regarding the regional water planning process in Region 6.

Today I am here to give part of this statement to help describe the Pueblo's perspective. The statement in its entirety is contained in the Region 6 State Water Plan that was presented to the Interstate Stream Commission in 1998. It is a very historic statement for both Pueblos of Acoma and Laguna who share a very small stream system.

I feel very honored to be here among my sister Pueblo tribes and my sister Apache and Navajo tribes, who I consider to be municipalities and who I consider to be very water rich. Even though we are in a drought, I still consider them to be very water rich. Our river system flows anywhere from one cubic-foot-per-second to three-cubic-feet-per-second, so you can understand my appreciation for water.

The Pueblo of Acoma is recognized as the oldest continuously inhabited community in the Western Hemisphere. Acoma lands are located in the Rio San

Jose Basin and cover an area of 900 square miles. The Rio San Jose provides the only surface water in the entire drainage basin. The Pueblo derives all domestic and commercial use water from groundwater wells.

The New Mexico State Water Plan “The Pueblo View of Their Role in the State Water Planning Process.”

When public meetings were held throughout New Mexico on the potential for regional water planning in the early 1980s, Harold Ranquist, the attorney for the Pueblo of Acoma, spoke on behalf of the Pueblo in support of water planning for the Pueblo’s non-Indian neighbors, with the idea that the communities surrounding the Pueblo and other Indian lands should consider the existence of tribal water rights in their water planning efforts. The planning process would be a means of quantifying its federally recognized and protected water rights.

At that time, however, Ranquist was very careful to state explicitly that the Pueblo of Acoma would not be actively joining in the planning process as a means of quantifying its federally recognized and protected water rights. In 1996 and 1998, the Pueblos of Acoma and Laguna jointly participated only as observers in the ongoing planning process, consistent with Mr. Ranquist’s statement of almost a decade ago.

Several reasons exist for the Pueblo to take this position. The Pueblo people have made use of the region’s water for several centuries. Acoma Pueblo is recognized by many to be the oldest continually inhabited area on the continent. Before the Spanish arrived, before the State of New Mexico even existed, the Pueblo people of the region were regulating water use through a formalized system based upon cultural concepts of what was a valid use of a very scarce but essential resource. The United States, as did their predecessors Spain and Mexico, recognizes that the Pueblos have a right of self-governance, and part of that right is that others cannot impose their definitions of what is and what is not a valued use of waters on the Pueblos.

The reason is very fundamental: beneficial use of water is tied to what is considered to be the public welfare of the state, the values that are important to the people of the state. The Pueblos’ treatment of water for their public welfare is not always consistent with the State of New Mexico. Acoma has never been comfortable with the notion that values concerning the use of their water resources can be left solely to

privately driven economic trends or the populations at any one time.

Their long history in the region and cultural concepts about the importance of the physical location of their lands require that a high value be placed on sustainability long into the future. The fact that this traditional system remains undefined in the written law does not mean that there is no water use regulation at the Pueblos. Instead, there is an ongoing system that looks to sustainability as a primary concern: sustainability of amount, quality and in some cases, sustainability of a source. Sustainability as to water quality should be evident; the Pueblos were some of the first tribes in the country to bring action against a state municipality for water pollution.

Acoma Pueblo and Water Planning

Our approach to the state water planning process is based upon the very fundamental principal of tribal sovereignty that was recognized long before the inquisition by the United States, long before the inquisition by the Mexican government, and long before the inquisition by Spain. Based upon these concepts, our traditional concepts of management of water resources goes into the very practice of how we manage our water resources at the Pueblo.

We are one of the very few Pueblos located downstream from a major municipality and from some very major uranium mining operations. In the heyday of uranium mining in the early 1970s and 1960s, we had a little over 30 to 40 mining operations upstream from us. During this period, a lot of our springs that were on Pueblo lands dried up, they were gone. We have seen the resurgence of these water resources in the past five years. We have seen water that had been gone for nearly 20 years come back to life. It was at this very time that the Pueblo began to look at a water resource management plan in 1994. I must give credit to the Pueblo for this unique approach. As with any of Pueblo tribes, we have a very traditional, formalized system of water resources management. The Pueblo has taken the approach that the value we place upon our water can be a value that can sustain us into the future by bringing these values to the forefront. I give credit and really appreciate past tribal governors, councilmen, and chairmen who had the foresight, the courage, and the vision to look at what water resources were about in the early 1970s, early 1980s, and early 1990s.

Credit also goes to the Haaku Water Office. On a side note, I must applaud John Leeper, who has been the only person I have heard give lectures across the country who has been able to say “Haaku” and not some other word. Haaku, basically, in our traditional language, means a place that always was prepared and a place that is always going to be. That is the traditional name of Acoma, Haaku, and we have been there for quite a number of years, quite a number of generations and centuries. The approach the Pueblo took was to create an agency, an office within the tribal structure that would begin to look at re-importing the values, the traditional values of the Pueblo into a modern-day vision. That vision is born out of the protection of our natural resources. The Haaku Water Office is an agency with primary responsibility over all the water resources within the 900 square miles of tribal and Pueblo land. I sometimes have to correct people when I refer to our lands as Pueblo lands and not as reservation lands. We were never removed from our homelands, hence, we consider it to be traditional Pueblo lands as with many of the other Pueblo and sister tribes in New Mexico.

One of the first things the Pueblo did was to create its water office to insure that water quality enforcement took place not only within tribal lands but outside of tribal lands. It was a long process that included review by the State of New Mexico and the EPA. At times, tribes are very hesitant to work with federal or state agencies. However, the Pueblo took the initiative to protect its water resources. We operate a water resources program and we have several components to this program. We operate in the same manner as State Engineer John D’Antonio does on behalf of the State of New Mexico.

Part of our Pueblo protection program is for our water resources to meet water quality standards. In the early 1980s, the Pueblo was involved in a federal water quality lawsuit. The municipality above the Pueblo, the City of Grants, had been discharging raw effluent for a number of years into the Rio San Jose, which basically was used by the Pueblo. At the end of a long, hard battle between the tribe, the EPA, the State and the state’s Environmental Improvement Division, the Pueblo had a very hard choice to make. Were we going to continue to have our water degraded by Grants through their discharging (we had a flow of a little over six-cubic-feet-per-second that sustained several thousand acres of Pueblo farming lands adjacent to the river)? After the decision was made, we lost three-cubic-feet-per-second but it also meant

that the Pueblo had to take some initiative on its own. We had to look at how we were going to sustain our agrarian society, which basically is our identity as a tribe.

One of the programs that the Pueblo runs is a solid-waste or point-source protection program. I have to say that I feel for my rural communities out there because they have to deal with these problems each and every day. Part of our responsibility is to look at point-source discharges, point-source pollution.

We also deal with non-point source (NPS) protection and are running a Section 319 program, including an assessment and management watershed protection program. We have been successful in restoration efforts. For example, an erosion channel located adjacent to tribal lands was very over-grazed after the Pueblo purchased a ranch. Through our restoration efforts, cows are now grazing as part of our successful program.

We deal a lot with of public education and involve the public in our NPS program.

We run a wellhead protection and assessment program. Some of the wells on the Pueblo had to actually be purchased from adjacent tribal lands. We are a very unique tribe; we are probably one of a very few tribes throughout the country that operates these types of programs, while taking into account the cultural concepts of management. Traditional value management practices exist for tribes and Pueblos. We are careful not to take away from cultural values; we enhance the cultural values of water resources management.

We also are involved in well development and we make sure that quality management and quality assurance take place, whether they are public wells or livestock wells.

Part of our obligation to the Pueblo is to conduct surface water quality and wastewater quality sampling. On our casino and business enterprise property, we have primacy and enforcement power to do wastewater quality sampling. We also go one step further. Currently the Pueblos and most tribes are beginning to look at economic development as a very first source in order to bring forth protection for the environment. The Pueblo assures that the primacy over our economic development takes place.

One of the most important things we do is infrastructure development. Most rural communities that I have seen or traveled to are Pueblos in the very same situation. About two months ago, I was giving a talk at an EPA meeting. We were talking about

asbestos and the scary thought that many Pueblos and tribes in rural communities still have asbestos-lined main water lines. This would cause an uproar in most communities but because of a lack of funding to the Bureau of Indian Affairs as well as to the Indian Housing Services, we are having to take a band-aid approach to a lot of these projects.

The good thing about the Pueblo of Acoma with our economic development process is that we have been able to generate some revenue and that revenue goes back into community infrastructure. I really applaud the Pueblo for taking the initiative. The Pueblo believes that it is essential to create a safe environment for its people on Pueblo lands. It is something that has kept us going for ages.

We have our own engineering department to ensure that construction inspections and safety assurance occurs. It is amazing to see some of the equipment we have.

It is important in the water planning process that the state recognize that the tribes are just barely beginning to look at development in their own communities to sustain them. To have a well-defined state water plan, the tribes and the state must come to some conclusion. I feel the state must recognize the tribes for what they are. It is very, very important, otherwise, as one of my governors used to say, "one week you sure plan long." Many of our planning books are up on the shelf collecting dust and I hope that does not happen in this instance.

Let me discuss control measures as part of the planning process. Our program management plans deal with non-point source pollution. One of the biggest concerns for the Pueblo has been to look at how to manage its growth whether it is economical, social, or cultural. As you travel onto Acoma land, you see evidence of growth and I applaud the efforts of all our planning and cooperative team members who are able to bring quality drinking water to our Pueblo members.

The Pueblo of Acoma is identified by its agrarian practices. We dry-farm chile plants, meaning there is no irrigation system used. We basically depend on the rain. The plants are healthy because of good agrarian practices and good management. We have leadership from not only our traditional ditch bosses, but the community in general. We place a high value on sustainable crops. The Pueblo has been able to focus its entire existence for centuries, through droughts, on good agrarian practices. We have been able to survive and have developed very good financial practices, traditional and modern.

We are trying to provide better sustainable surface flow and are working on a salt cedar eradication project in joint partnership with the Bureau of Indian Affairs Forestry Department. The Rio San Jose covers a little over 14 miles right down the center of Pueblo lands. We have to shear through this area to clear out five miles of the salt cedar. It has been a very interesting process to see and affects not only quality but return flow. We hope to finish the entire 13 mile stretch by March of 2004. Through the efforts of the non-point source program and Environmental Protection Agency Region 6 and the National Watershed Protection Program, we are going to rehabilitate the entire 13 miles with re-vegetation, native trees and native grasses in the area.

We depend on the river for our farming, but a lot of our farmers no longer farm. By the time our diversion at the head of the river comes in, we are lucky if we can get one day of irrigation, at least for those of us who are on the eastern half of the Pueblo lands, which is more than the water delivery on the Rio San Jose to our sister Pueblo, Laguna, who receives none during the entire summer.

Another thing we do is wildlife habitat preservation and restoration. We have an abundance of wildlife: turkeys, elk, deer, bear and antelope. We have trophy elk and are currently ranked fourth in the top 10 in the world for our elk. We have cougars and bobcats. I think wildlife is an unheard voice when it comes to water planning. We forget that we are not the only ones in this community of ours. We forget there are other species that have a right to water also. It is unfortunate that in today's political climate we often forget that. Instead we concentrate on urban sprawl and the economical forces that are out there.

The Haaku Water Office operates as the enforcement arm of the Pueblo through the following laws: Acoma Water Quality Standards, the USEPA Clean Water Act, Acoma Wellhead and Groundwater Protection, Source Water Assessment Protection Program, Aquifer Protection Program Regulations, Section 319 – Non-Point Source Protection Program, MS-4 Storm Water/NPDES Permitting, and the Safe Drinking Water Act.

After all is said and done, the Pueblo has a regional plan and we are coming to the conclusion or at least the beginnings of a state water plan. Where do we go from here? I think it is a question that we all need to ask one another. Municipalities must be looked at on an equal footing with their rural community neighbors, the Hispanic communities, and the small rural towns

like Datil and Reserve, that have basically no economic development. If these communities are not considered on equal footing with growing municipalities like the City of Rio Rancho, the City of Albuquerque, or Santa Fe, can a plan really work?

Our luncheon speaker, Ambassador Székely, talked about international institution and what is happening in Mexico. I mentioned to one of my colleagues that it is the same song that the Pueblo tribes have been singing since the early 60s and 70s. The Pueblos can be a force, and if the State truly wants us to become a partner in water planning, it must recognize tribal water rights for what they are.

Concerning the State's water compacts that require water deliveries to Texas and Mexico, the tribes were left out of the process, which is good, in our opinion, because it does not bind us to any delivery compact obligations. However, we can be a partner, if the State so chooses. Water is a scarce resource in New Mexico, it must be respected. The Pueblo of Acoma, unlike any other community, cannot leave and remain a federally recognized sovereign Indian nation. Under federal law, the United States has a compelling duty to protect sufficient resources for the Pueblos so as to enable them to not only survive, but to thrive where they are located. An important component of this is the duty to support the Pueblos' governance of their resources, the determination what is a valid use, and the identification of value trade-offs as perceived by each Pueblo. In looking to water use in this state for the next 40, 50 or 100 years, it is essential that the surrounding non-Pueblo communities understand the constraints placed on their potential uses, where there exists a tribal presence.

I would like to conclude by saying in matters of State vs. State, in matters between Tribes vs. the State, or the State vs. the International Community, we must give reverence to that life sustaining force that makes each and every one of us who we are.

Laura Watchempino

Thank you Fidel. I am Laura Watchempino, Water Quality Specialist for the Pueblo of Acoma. I would like to welcome all of you here this afternoon, and Councilman Ray as well.

I am here today to be a voice for the earth and her lifeblood, water. I want to share with you some guiding principles that we use as indigenous peoples, indigenous peoples all over the earth. I think there is

I always like to take these opportunities to ask the gentlemen from the Bureau of Reclamation if there will be a line item in the mark-up that is going to Congress this year concerning the Pueblos need for over \$30 million dollars for irrigation delivery systems. A study done by the Bureau of Reclamation several years ago regarding Pueblo irrigation needs indicated that \$30 million is the level of assistance required.

Also, concerning *Water 2025*, I hope the Bureau of Reclamation has taken into consideration the Pueblo of Acoma's recommendation that in order to address water planning and water resources and sustainability, it request additional funding to begin the process of adjudicating water rights. It must be done, there is no way around it. It is a federally protected right, a right that the United States Government took into trust for each sovereign government.

Our tribe is a very unique tribe. It is very progressive not only concerning management but also what we do in developing our surroundings to make sure it is environmentally friendly and that it does not impact what we have as a traditional community.

I would like to recognize Acoma Councilman Ray who is here today. He is one of our best supporters, along with our tribal council government.

I want to emphasize to state water planners: please do not take our comments as confrontational. They are very real to us, our needs are very real, our wants are very real, our sustainability is very real. If you come to our community, you will see and realize that. I invite each and every one of you to visit a Pueblo tribe next to you and see their needs regarding water resources and water planning. I hope that someday here in the near future that we can all sit at the table and share a glass of water and say, "yes, the state water plan was a success." But that can only come about by recognizing tribal water rights.

My colleague, Laura Watchempino, is a water quality specialist and the in-house attorney for the Haaku Water Office. She will be speaking next.

Thank you very much.

no denying that we are in the midst of global climate change. This year it has been evident to all of us. As I drove up here and looked at the mountains and the vegetation, I realized that we are in a very, very critical point because of the lack of moisture. At the same time I realized that the earth still has a lot of power and a lot of beauty. I think we are all here today to protect that resource and do our best to protect the waters of the earth.

What I wanted to share with you today was a declaration that was put together at the third world water forum at Kyoto, Japan, in March of this year. Some of these basic guiding principles are the introduction to the Pueblo of Acoma water quality standards. Indigenous people all over the world share basic beliefs. Indigenous peoples of the world want to share this with the rest of the world because we do feel that we are at such a critical time.

The first few statements that I will make describe our relationship to water. As indigenous peoples of all parts of the world were assembled in Kyoto, Japan, they re-affirmed our relationship to Mother Earth and responsibility to future generations. We realize that we are placed in a sacred manner on the Earth, in our own sacred way, and on sacred and traditional lands and territories to care for all of creation and to care for water. We honor and respect water as sacred and sustaining all life and our relationship with our lands, territories, and water is the physical, cultural and spiritual basis for our existence. This relationship requires us to conserve our fresh waters and oceans for the survival of present and future generations. We assert our role as caretakers with rights and responsibilities to defend and insure the protection, availability, and purity of water.

The next few statements that I will make describe the current conditions of our waters throughout the world. We realize that the ecosystems of the world have been compounding and in change and in crisis. In our generation, we see our waters being polluted with chemicals, pesticides, sewage, diseases, radioactive contamination, and ocean dumping from mining to shipping waste. We see our waters being depleted or converted into destructive uses through diversion and damming, mining and mineral excavation, and mining our groundwater for industrial and commercial processes and unsustainable economic resources and recreational development. In the tropical southern and northern region, deforestation has resulted in soil erosion and thermal contamination of our water.

Another statement summarizes that the burning of oil, gas, and coal, known collectively as fossil fuels, is the primary source of human-induced climate change. If we do not halt the climate change, it will result in increased frequency and severity of storms, floods, drought, and water shortage. Global climate change is worsening. Desertification has occurred. It is polluting and drying up our subterranean water sources and causing the extinction of precious flora

and fauna. Many countries in Africa have been suffering from unprecedented droughts. The most vulnerable communities to climate change are indigenous peoples, impoverished local communities occupying marginal rural and urban environments.

We see our water increasingly governed by outside sources such as economic and foreign domination as well as trade agreements and commercial practices that disconnect us from the ecosystem. Water has been treated as a commodity and a property interest that can be bought, sold, and traded in the global markets. These inhumane practices do not respect that all life is sacred, and that water is sacred. When water is misused or poorly managed, we see the life threatening impacts on all of creation. We do recognize our responsibility to protect water throughout the indigenous territories and worldwide. Since Fidel also mentioned interstate and international agreements and compacts, it is important to note that tribal communities do assert the right to self-determination and by that we mean that we have the right and the responsibility to control and protect our natural resources, especially water. When we refer to our sovereignty we are also referring to that responsibility to protect water.

Most of the principles that I just shared with you are pretty much a summary of what is our customary and traditional law and I think that most of you or probably all of you can agree that it is a shared ideal. I do not think that there is anyone in this room who does not agree that we do need to protect water, each and everyone of us.

One of the recommendations that came out of the gathering in Kyoto, Japan, was to protect our traditional practices as dynamically regulated systems that are based on natural laws that ensure sustainable use through traditional resource conservation. Our traditional knowledge has been developed over millennia and should not be compromised by an over reliance on narrowly defined scientific methods and standards. We support the implementation of strong measures to allow full and equal participation of indigenous knowledge throughout the world.

The bottom-line really is a common goal: we want to protect water for future generations and sustainable development. We realize that over reliance, even at Acoma where we over rely on pumping groundwater, can be disastrous. I think many communities who are now relying on groundwater as their primary domestic water source are seeing that their practices must be sustainable. We cannot just go in and act as if groundwater resources are infinite, because they are

not. There is a certain amount of water for the world that continues circulating through the clouds, and as precipitation falls back to the ocean, then evaporates - the entire hydrologic cycle. Each and every part of the cycle has to be protected, including air quality.

I thank you for allowing me to share these ideals with you and I think it will help you to understand that when tribes are asserting their water rights in the Rio Grande Basin and throughout New Mexico, that it is really nothing to be feared. It is something that can be used as guidance for all of us, because I think that the impacts of the crisis in water management and protection of that finite resource have yet to be felt. I think we are all sensing that we are at a critical crossroads in the Earth's geologic time, and time as we know it. I hope that we will all take on that responsibility in our particular professions and jobs so that we can ensure that water is there for our children and our children's children, and as Fidel said, for all species. If you go outside and look at how beautiful it is, I think you will all realize that we all are connected. It is pretty easy to sense and feel and that is why I came here today, to share that with all of you.

Thank you.

Ron Curry has served as Secretary of the New Mexico Environment Department for Governor Bill Richardson since January 2003. Ron developed the first environmental strategic plan for the Public Service Company of New Mexico (PNM), worked on an Environmental Impact Statement for Los Alamos National Laboratory, and represented both the New Mexico Environmental Law Center and the Coalition for Clean and Affordable Energy before the State Legislature. In the early 1990s, he served as the Environment Department's first Deputy Secretary. Born in Hobbs and raised in Albuquerque, Ron is also an avid balloonist. He has flown KKOB Radio's flagship hot air balloon at rallies around the state for 22 years. Ron has two grown children and lives in Albuquerque.



HOW WATER QUALITY AFFECTS PLANNING

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Thank you, John. Always when I have an opportunity to speak in front of a group of folks, I like to bring greetings from Governor Bill Richardson. Because, after all, if he hadn't put me here, I wouldn't have the opportunity to bring you his greetings. It is a real pleasure working for Bill Richardson, as some of you in this room can attest to, as Bill Hume certainly can attest to because he works more closely with him on a day-to-day basis than I do. But I have to tell you that it is one of the most exciting things that I have done in my life, and it is probably the most rewarding. So I bring you greetings from the Governor.

One of the things that the Governor always tells us, whether we're a cabinet secretary or whether we're anywhere in his staff, and I think you heard him say this in the paper this morning, he would prefer that we err on the side of being bold rather than err on the side of the status quo. So everyday when I go to work at the Environment Department, where we have over 600 employees in 23 different offices scattered around the state, that is the message that we continually try to get across to our staff. Governor Richardson has spent most of this day busy with President Fox from Mexico. One thing that I can say

about President Fox is that he is a very eloquent speaker and he is very tall, very tall. He was a real pleasure to listen to this morning and I was able to use some of my Spanish ability to understand at least two-thirds of what he said.

I don't have to tell this group how important the issue of water is. What I would like to stress today, and what we stress every day at the Environment Department, is the linkage between water quantity and water quality. It is a linkage that I have been preaching a lot lately but it is particularly important to a group like this that deals with water planning every day.

Most of the time when people think about water in the state of New Mexico, and again my friend Bill Hume would attest to this, we spend a lot of time talking about Las Campañas up in Santa Fe and how they're trading water with the City of Santa Fe, or the silvery minnow case down in the Albuquerque area. People often think that water is all about water quantity, how much water each user or each fish will get. Quantity is an important issue, I grant you that. But we also we have to wonder about how much water the Texans get. Do we have any Texans here today? I was born in Hobbs, New Mexico, which is almost like being born in Texas. My mother used to tell me that for the grace of God and five miles I would have been a Texan today. Whatever the reason, I'm glad to be a New Mexican, a native New Mexican, even though a lot of people say Hobbs is a little Texas. I often wonder about the fact that we have to give Texas so much of our water. Why must we give a state like Texas so much of our water when you look at some of their laws they have on their books in the State of Texas? I will tell you about some of these laws as we go along today. You know, New Mexico has to send Texas a certain amount of water each year. Texas has a law in their state that says when two trains meet each other at a railroad crossing, each shall come to a full stop, and neither shall proceed until the other is gone. And we have to give them water? Why?!

The Environment Department is charged with making sure that our state's water, whether it's in an aquifer, in a river, or in a glass sitting in front of you, is protected. It is a huge job and probably the most fascinating job I have ever held in my life. We literally have the opportunity in the Environment Department to engage in one form or another with every business and every organization in the state of New Mexico and every part of our Department deals with water. And it usually deals with water quality. We do

everything from operating the Groundwater Bureau and Surface Water Bureau all the way to inspecting restaurants and the quality of water that is served to you everywhere in New Mexico, except Albuquerque. Then we're thrown things to make it even a little more interesting given the Department's wide mandate. We even have the Occupational Safety and Health Bureau within our Department. We are concerned with protecting workers safety and also with the water they drink while at work.

We have a Drinking Water Bureau in our Department responsible for monitoring and regulating 1,300 to 1,400 drinking water systems of all sorts whether it is a mutual domestic, the City of Albuquerque, or the City of Santa Fe. We're responsible for regulating the drinking water as it travels into homes throughout the state. It is a huge responsibility. We find we are protecting our natural resources as well as workers on the jobsite, in diners, and in restaurants. In one way or another, everything we do is tied to water. Because of that, we think about things like air quality and limiting acid rain by making sure our air is clean and making sure our landfills are properly lined to prevent seepage. It's a big job, and has gotten even bigger as the drought has deepened.

As water supplies diminish, the water we have becomes that much more valuable and it becomes that much more important that we keep it from becoming polluted. Protecting our water resources has been a high priority for the Bill Richardson administration. To make sure that everyone in the Department shares this priority, we have created unifying themes for the agency. This may sound a little bit philosophical or like we're holding hands all the time trying to make ourselves feel good. But I believe that you need to have a unified theme like water because it runs through everything we do at the New Mexico Environment Department.

We have three themes. The first theme is the one that over arches all of them. We intend to focus our resources at the New Mexico Environment Department with a holistic approach to the protection of human health and environment. This will mean a lot of things and will touch every program and every bureau and affect every decision we make.

I want to tell you briefly something about our approach. As I mentioned, we do a wide variety of things at the Department. We have had the opportunity to move a few people around within our Department to try to get them to more closely communicate with one another. That is part of our holistic approach.

When you first hear the word “holistic” you think, “well they went off on some retreat and they got some consultant to talk and they came up with the word.” Well it’s true, we did. The important thing is that now we are going about taking that holistic theme and putting it into place in every part of the Department. Why is that important to you? When Governor Richardson named me to this post on December 13th of last year, I was confronted by the press that was assembled on that day and they asked me point blank, “Are you going to make fast changes in the organization of the Department?” I said I didn’t think so. At the time I said we won’t get into it. I said that I thought the biggest problem in the Environment Department is that it’s “management challenged.” I still think that. One of the reasons that we came up with the holistic themes was because we thought that the Department was management challenged, and not getting enough leadership from the top-down. Another reason is pretty simple. For those of you who have been in our building, you know that many of our programs are located on the second floor. Our Surface Water Bureau and our Ground Water Bureau are literally a few feet away from one another. As it turns out, because of one thing or another, in the past few years the Surface Water Bureau Chief and the Ground Water Bureau Chief have not communicated with each other, even though they are just down the hall from each other. Yet it so happens that they deal with the same medium and that’s protecting water quality.

As we take a holistic approach, there are other things that we need to think about. One of the things that came to me with this job, also from the Governor, was my Deputy Secretary, Derrith Watchman-Moore. She’s the former head of the Navajo EPA and the former Chief of Staff. Her father was a state legislator for over 20 years and her brother was a state legislator for about four years. Derrith brings an immense amount of talent to the Department, and she also brings a holistic approach about managing and helping people in the Environment Department as well as the people that we affect understand how a holistic approach coming from the Navajo Nation is helping improve New Mexico’s Environment Department. For those of you who have not met Derrith, I encourage you to do so. She is a very, very bright woman. She is 39 years old, has five children, and lives in Rio Rancho and Crystal, New Mexico, which is 60 miles north of Gallup. The thing that she liked when she first met me was that I was from Hobbs and I didn’t have a Hobbs accent. Because of that, we’re going to take a balloon

ride over to Crystal, New Mexico together one day and we are going to fly out near her home. Derrith has brought so much soul to the Environment Department. Having some soul when you are talking about the environment or environmental regulations is important, especially when you are talking about water. We are going to learn so many things from Derrith, about how water is appreciated in the tribal nations in our state and, hopefully, we will be able to transfer some of that understanding into our daily workplace.

Let’s talk about the public perception of the Department – as it’s the NMED that protects the public and the environment and in order to do that we need to work together across programs. One of the things we are going to do is to establish help baselines for communities across the state. This big picture, or holistic approach, will help us inform the public and drive our actions and decisions.

How many of you have bottled water in here today? I saw some in the back of the room. I was reminded recently about what are often unforeseen impacts of the big picture. I was reading an article, I think it was in *E Magazine*, about the bottled water boom. Because bottled water is perceived to be healthier, many people now only drink bottled water. That’s fine. Although, as a guy who makes sure tap water is safe, I’m a little bit offended. The problem comes when it is time to throw all those damn plastic bottles away. Studies indicate that nine out of ten of these bottles either end up as litter or in a landfill, those that aren’t recycled. That equals 30 million bottles a day that have to go somewhere. If that place is in the landfill, then those plastics will take up to 1,000 years to breakdown. And as they do, they can release chemicals into the environment, potentially polluting groundwater. So think about that the next time you go and get a bottle of water. Hopefully none of you are in the bottled-water business. It is an ironic problem; by trying to live healthier and drink bottled water, we can end up polluting our own local resources. It’s kind of a circle: It is a holistic thing going on but not in necessarily a positive way.

Another thing that comes to play when you start talking about managing water quality from a holistic approach is the 220,000 septic tanks that we have in the state of New Mexico, and that’s a guess as to how many septic tanks exist. The Environment Department is responsible for septic tanks and we became more responsible in 1997 when there was a law change that took some of the responsibility that used to be with the Construction Industries Bureau

back to the Environment Department. We estimate that as many as half of those septic tanks are either illegally installed, which means they were improperly installed at midnight or they are leaking. The problem now becomes, especially in certain parts of our state where you have septic tank on top of septic tank on top of septic tank on top of well water, and if one of those septic tanks starts to leak and effluent gets into your well water or groundwater, you're polluting yourself. That's a holistic problem because not only are we charged with protecting groundwater, we also are charged with protecting drinking water. If your drinking water comes out of a well that's being polluted by you or your neighbor, it's again a holistic situation. Stop and think about those 220,000 septic tanks in the state of New Mexico. We believe that it's not leaking underground storage tanks and gasoline tanks, nor mercury coming from power plants, that are causing most of our problems. Septic tanks in the state of New Mexico are our biggest source of groundwater pollution. We launched a very aggressive program about 90 days ago where we go out and find as many septic tanks as we can and make sure they are in compliance. The Environment Department must be consistent on how they enforce septic tank rights or liquid waste regulations whether it's in Hobbs, Farmington, Belen, or Cordova.

We will continue to take a step back and look at problems like this so that we can see them through a holistic approach. We will be doing a community assessment that will be on-going and regularly updated. The information will be freely shared among programs within the Department and with the public. The Environment Department is great at collecting and analyzing information. It is now time, using the best technology available, to find ways to combine and make information more accessible.

The second of our unified themes is diversity. All qualifications being equal, you will see this department hiring more people of color and promoting more into management positions. Diversity isn't just about gender or race, it's also about geography in our state. I often tell people it is hard to believe when you are standing in downtown Hobbs, New Mexico, my hometown, that there is a place as beautiful as Taos in New Mexico. How many of you have been to Hobbs? Let me say that again. When you're standing in downtown Hobbs, it's hard to believe that there is a place as beautiful as Taos in New Mexico. We have a diversity of geography in New Mexico and as the Environment

Department is implementing and enforcing regulations, we have to be aware of that diversity as well.

Just as a side note, we have 12 operational bureau chiefs in the Department including our district managers. When Derrith and I arrived after our appointment by Governor Richardson, there was one woman bureau chief. Today there are five, and we are very proud of that. I am a white boy, by the way, and I am very proud of that. We are going to continue to move forward in this area.

We recently launched a contract between the University of New Mexico and the State of New Mexico concerning environmental justice. Environmental justice is also an area that comes into play with water quality. I often like to refer to this story, and it's a true story. My children graduated from La Cueva High School in the early 1990s and have since gone on to New Mexico State University and graduated as Aggies. Both of them are very successful in their lives after having gone through college here in New Mexico. But back in the early 1990s, and to a certain extent still today, there was almost a "right of Spring" down in the South Valley of Albuquerque at Pajarito Elementary School where oftentimes you could see raw sewage come right up to the playground level if it had rained very hard. There was a problem down there at Pajarito, and almost every year you would see this happen. When you think about environmental justice I always think, "...you know, if raw sewage had come up on the La Cueva High School campus, I suspect it would only come up there once." But it went on year after year after year because of the location of Pajarito Elementary. Environmental justice issues occur all over the state of New Mexico and they are all different and hard to define. We realize it is a controversial issue, but what we want to do is illuminate the issue so that it becomes something that we think about and talk about in water quality. People should have good water quality no matter who they are or where they live or what they do. We think that by addressing the issue of environmental justice, we'll help alleviate that thought process and come up with some suggestions.

The third theme concerns a high performance and accountable workforce in the Environment Department. The Department, as many of you know, has some incredibly dedicated staff in the bureaus, folks who come to work everyday because they believe that by doing so they have a positive impact on the environment. Our task in this new administration

is to harness the energy of our best employees in order to achieve results that matter to the mission of the Environment Department, and most importantly, to New Mexico's health and environment. We are going to reward high performance workers, and conversely, provide sanctions for workers who aren't accomplishing what we need them to do. This will not be a sink or swim situation. We will provide more training to help people improve their skills, the skills they need to do their job successfully. By doing this, we will increase our productivity, give our employees greater personal responsibility, and most importantly, have more fun.

Now I mentioned earlier that Texas is taking our water and I want to give you another example of the laws they have on their books. In Texas, the state that is taking our water, it is illegal to milk another person's cow. Yes, taking our water...

I am going to talk briefly about some of our accomplishments. I know Governor Richardson is going to come to me and the other cabinet secretaries, and to Bill Hume, sometime soon and say, "What have you done for me lately?" Is that a fair statement, Bill? More importantly, "What have you done in the first year or the first 10 months since you and we have been in office?" "What have you done to be bold?" So I am going to list some things that we have done in the Environment Department that I think are very important in the areas of water.

First of all, back in April, working through the Environmental Protection Agency, we were the first state in the U.S. to get our impaired waters list submitted. We have 181 segments identified on the list. We also were the first state in the nation to have seven water sources identified on the Department of Energy's property list. They are all on the Parajito Plateau. We had to fight like the dickens to get those listed because the Department of Energy fought against us having that happen. However, the EPA took our side and so now we will be allowed to take measurements up there on dissolved solids. We also might be a little stronger as far as regulating those streams. It's a big deal because DOE started fighting us last year and continued to fight us into the new administration. But the end result is that EPA has listed those seven sources on the Impaired Water List.

Through the work of Mimi Stewart, who was here earlier today, we enacted graywater legislation this past year. The Governor signed the legislation into law in the first 60-day session of his administration. The law will allow New Mexicans to reuse water such as

the water that comes out of the washing machine and not worry about breaking the law anymore. We are still tweaking with this a little bit and some of these issues will go before the Environmental Improvement Board next month. But it was a great accomplishment to get that legislation through and a lot of credit goes to Representative Stewart and Governor Richardson.

We are rewriting our liquid waste regulations. We have a committee that is being led by Anna Marie Ortiz, who is Director of the Field Operations Division in the Environment Department. The liquid waste regulations were all over the map and we couldn't tell whether they had been written for the people who sell liquid waste systems, or they had been written for realtors, or they were just being enforced poorly by the Environment Department. The rewritten regulations will go before the Environmental Improvement Board either in December or January.

The Drinking Water Bureau is charged with drinking water assessments and regulations for 1,300 to 1,400 water systems throughout New Mexico. Had it been a private sector entity on January 1st of this year, the bureau would have been in Chapter 7, it was belly-up financially. It had not met any of its responsibilities to the EPA, and more importantly, it was letting down a lot of the communities. We have turned that around completely, financially, and the EPA likes us again. They're not going to make us pay money back based on what was going on. This is a big accomplishment and it affects almost every New Mexican in the state.

The Governor along with the Attorney General recently joined 11 other states on new source review and opposing some of the changes proposed by the Bush administration. Why is this important to the quality of water? Simply because we have coal burning generating stations in the state of New Mexico that can affect the quality of water. We believe that opposing the Bush rollback of these regulations is important to the quality of water in this state, even though Public Service Company of New Mexico will not be changing any of its operations.

Let me list some of the things we are going to be doing in the future that I think are important. New Mexico is one of four states that does not have primacy for NPDES and over the next 12 to 18 months we are going to start looking at ways to get primacy in this state. The Environment Department has primacy on almost all other programs that we regulate: hazardous waste, solid waste, drinking water, and so on. There is no reason why we shouldn't have it in surface water.

The usual argument has been made that we can't afford to do it, that we can't fund the people. My response is that it is important that we in New Mexico have control over as much as we can without having to rely on the people in Dallas or Washington. We have talented people in the Environment Department to get it done, along with working with a number of you folks.

I am going to close here in just a minute, but I have to tell you one other reason I am upset about the Texans taking our water. You know in Texas, and this is a real concern to me since I am a single guy, but in Texas – remember, the people who are taking our water – you can be legally married by publicly introducing a person as your husband or wife three times. Now that's risky business, that's very risky business.

I would like to ask you as you leave your water conference today to keep in mind the word "holistic" because we keep that in mind everyday at the Environment Department. We are trying to get it ingrained, if you will, in the people who work there and into the people we affect because everything we do is connected to water quality. We have to continue to step back so that we can see if somebody does something in drinking water how it might affect somebody in air quality or vice-versa.

I want to thank you all for allowing me to speak to you today and I want to say again that I am having as much fun in my professional life as I have ever had and I thank the Governor for that. It's really exciting to get up in the morning and look forward to going to work, and I do that everyday, seven days a week, maybe six. It is a pleasure to work for the Governor and it is a pleasure to have the opportunity to affect change and to help things get better in our environment and our health in the state of New Mexico.

One of my favorite quotes that I started telling my kids when they were young children comes from Ralph Waldo Emerson and I think it encapsulates a lot of the things that we talk about holistically in the environment. Ralph Waldo said, "We do not inherit the earth from our ancestors, we only borrow it from our children."

Thank you.

Letty Belin graduated from Stanford University and Stanford Law School, and has spent her entire legal career practicing environmental, land use, and water law. From 1993-1999, she was Director of the Environmental Enforcement Division of the New Mexico Attorney General's office, where she drafted Attorney General opinions, brought environmental enforcement actions, and focused on water issues. Before that, Letty was a partner with Shute, Mihaly & Weinberger, a law firm specializing in land use and environmental matters, with a substantial Indian law practice. For ten years Letty was special counsel on environmental and Indian law matters for the Colorado River Indian Tribes. In 2000, she co-founded Belin & Sugarman, a private law firm representing citizens' groups in environmental and water litigation. Letty also serves as New Mexico Counsel for the Advocates for the West and Chair of the Executive Committee for the Alliance for the Rio Grande Heritage.



PANEL DISCUSSION: PLANNING FOR NEW MEXICO'S WATER FUTURE

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Recently, the Interstate Stream Commission and State Engineer released the first draft of the new State Water Plan. They state that the Plan will be finalized by the end of 2003, but will be a "living plan" that is revised and updated as circumstances change.

New Mexico is way overdue in getting a State Water Plan. One thing is certain: we cannot protect the things that we care about, be they senior water rights, rural communities, rivers, aquifers, jobs, or simply what we call our "quality of life," absent a strong State Water Plan. An effective State Water Plan must have clear policies and requirements, must integrate the regional water plans into a cohesive whole, and ultimately must integrate closely with local land use and zoning requirements.

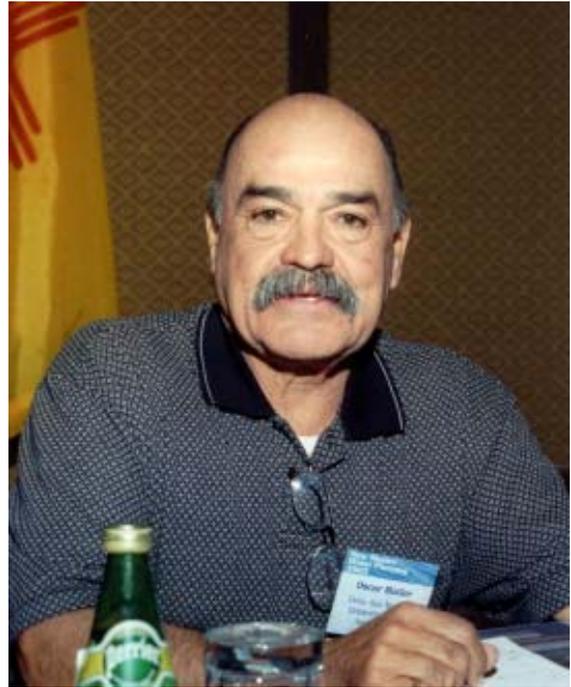
The draft State Water Plan has a long way to go, but it is a good start. The hardest part lies ahead, as the State begins to implement the policies of the Plan and to determine how we might be able to meet the water needs of our ever-expanding population, which the U.S. Census Bureau projects will increase by nearly a million people by 2025. Some major concerns are:

- We should not count on significant new water supplies: Many ideas for significant new water supplies will not prove feasible or desirable or will have substantial unintended negative consequences. Major new proposals to increase supplies (e.g., new dams or reservoirs, large-scale forest thinning or salt cedar removal, underground storage, reclaiming brackish or produced water) should be studied

carefully before making major commitments. We are spending tens of millions of dollars dealing with unintended negative consequences of many of our past water supply infrastructure works. We should do our homework before plunging ahead.

- We should invest heavily in conservation. Problems with creating new water supplies or transferring large quantities of water from rural areas to cities make conservation our best and probably cheapest new source of water.
- Major new funding is required for effective Plan implementation. A portion of the funding should be set aside for protection of rivers and riparian areas (compliance with federal Endangered Species Act and Clean Water Act requirements).

Oscar Vásquez Butler is President of the Doña Ana Mutual Domestic Water Consumers Association. The Association is the largest in the State of New Mexico, consisting of over 3,000 residential and commercial meters serving approximately 33 square miles, and is currently planning and designing a Regional Water and Waste Water project encompassing approximately 75 square miles. Oscar is also a Doña Ana County Commissioner and a board member of the New Mexico Association of Counties. He is a board member of several groups including the Lower Rio Grande Water Users Organization, Regional Water Planning Board for Doña Ana County, New Mexico Rural Water Association, New Mexico Dialogue Board, and a member of the Alliance of Water and Waste Water Providers, Doña Ana County. Oscar is a retired Human Resources Manager and received his master's degree from the University of Southern California.



PANEL DISCUSSION: PLANNING FOR GROWTH NORTH VALLEY OF DOÑA ANA COUNTY, NEW MEXICO

Oscar Vásquez Butler
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My name is Oscar Vásquez Butler and I am President of the Doña Ana Mutual Domestic Water Association. I am very honored to be here today. In 1974, Doña Ana Mutual Domestic Water Consumers Association was legislatively established in accordance with the Sanitary Projects Act of the State of New Mexico. At the time, there were only 74 members (74 water meters) comprising approximately 228 household members receiving service in the Village of Doña Ana. The challenge then, and the challenge now, is dealing with uncontrolled population growth and demand for water and wastewater services. Presently in 2003, we have over 3,000 meters and a household population

of over 10,000 and Doña Ana Mutual Domestic is the largest and fastest growing mutual domestic in the state of New Mexico. Therefore, the challenge and opportunity now is to address both the water/wastewater problems and demands of our community. As a mutual domestic, we are not in the position to control growth, nor the demand for services, and by law obligated to provide water. According to the Sanitary Projects Act, it is our charter to provide water/wastewater to our communities as requested and within a reasonable period of time.

Consequently, you are looking at a Regional Water and Wastewater Plan that will provide regional services

to eight colonias (rural communities), the Leasburg and Picacho Mutual Domestic Water Consumers Associations, and two private water utilities. The area Doña Ana Mutual currently serves is approximately 42 square miles and the regional plan would be approximately 70 square miles. The objective of the regional plan is to remove from use approximately 1,200 domestic wells, and as you know, those straws in the ground (domestic wells) are depleting the aquifer, including the removal of over 6,000 septic tanks and cesspools; there is an undetermined number that are setting in the water table or submerged in the water table. We call this current septic and cesspool situation a form of domestic terrorism that must be corrected. That is, there is a great potential for groundwater contamination, which is emergent and that has already, we believe, started to permeate our aquifer. The regional plan will address and comply with the Environmental Protection Agency, New Mexico Environment Department, and the State of New Mexico Water Plan. This effort will implement a regional water plan and will address the future growth and economic development of our communities. We know the challenges are great when you are working with various state and federal agencies, such as the New Mexico Environment Department, New Mexico Finance Authority, Department of Finance Administration, Environmental Protection Agency and the United States Department of Agriculture - Rural Utilities Service to develop and implement a regional plan.

Additionally, we are also working with the Elephant Butte Irrigation District, our irrigation district, to develop a conjunctive water management plan, along with the City of Las Cruces, Doña Ana County, and other mutual domestics in our community to address the groundwater and surface water demands to meet the Rio Grande Compact requirements. It's an opportunity where we can finally build partnerships with other public entities and the irrigation district to meet the water demands of southern New Mexico.

I don't know what else to say other than it has been a difficult road, especially for the Doña Ana Mutual Domestic Water Consumers Association. As mentioned before, we are the largest in the state of New Mexico and considered a public entity under the Sanitary Projects Act of 1942. We are probably one of the most aggressive mutual domestic associations, and sometimes I like to call it pro-active; and as you may know, you can get condemned for being too aggressive, or too assertive or pro-active, but in our

case we had to take the lead because it is our community that is endangered by aquifer depletion and septic/cesspool contamination. Accordingly, we took the initiative and responsibility for the safety, health, and welfare of our customers and region. We have served a larger population than some counties and municipalities and hopefully this year, or next year, we are going to design and construct the surface water treatment plant and our wastewater treatment plant; phase one will be the wastewater treatment plant and, phase two, the surface water treatment plant. We are planning on each unit having a two-million-gallon capacity and a wastewater treatment that creates, after treatment, tertiary water use. We are working with the Elephant Butte Irrigation District in moving through legislation for tertiary water re-use for irrigation (non-food products), and possibly recharging the aquifer to mitigate any loss of groundwater.

We are on the forefront on working closely with Elephant Butte Irrigation District and our legislators. With their continued support, we will hopefully become the model for our area, if not the state of New Mexico.

Thank you.

Tom Davis has been Manager of the Carlsbad Irrigation District for the past 15 years. Prior to his employment with Carlsbad Irrigation District, Tom was employed by the U.S. Forest Service for 15 years. Five of these years, Tom served as District Ranger and was responsible for the management of the 289,800-acre Guadalupe District of the Lincoln National Forest. He has extensive experience in managing natural resources in Texas, Idaho, Arizona, and New Mexico. Tom is a native of Oklahoma and a graduate of Oklahoma State University. He is active in the National Water Resource Association, Family Farm Alliance, Western States Water Council, and serves on the New Mexico Water Trust Board.



PANEL DISCUSSION: PLANNING FOR NEW MEXICO'S WATER FUTURE

Tom Davis
Carlsbad Irrigation District
201 South Canal Street
Carlsbad, NM 88220

Thank you for that introduction. What a marvelous place we are gathered in. A place where water that was once used to grow corn is now used to entertain people and grow lawns and golf courses. Could this be a sign of future water uses for the state?

It is an honor for me to sit with such a distinguished panel. This is maybe the only time you will see Letty Belin and myself sitting side by side on friendly terms.

You know, what a great time to live and what a great county we live in. Never before in the history of mankind have we had such a safe, dependable, abundant supply of water and food, as we have today. You can go anywhere in the United States and drink water safely from a public water system. That has never been possible before in the history of mankind. You can go anywhere in the United States and eat food

from public restaurants safely—that has never been possible before.

We produce more food in this country per acre, with less water than has ever been accomplished before. We have made some great strides. You can go to almost any dwelling in the United States and flip a switch and the lights come on, or go to the tap and get a drink of safe water. We need to believe in ourselves and to appreciate the generations of builders who went before us who were able to get us where we are today.

But we cannot stop there, as you have heard some of the other speakers say, because of the current drought, because of our increasing population. We are ever changing and must be evermore vigilant, as Secretary Curry said, in protecting the quality and quantity of our water supply.

In the business I'm in, we are concerned not only with water quality and keeping the Pecos flows as unsalty as possible for our crops, we are also very concerned about the quantity of water we have. The current drought drives us to competition with other uses: Pecos River compact demands and endangered species demands are all factors when considering available water supplies needed for the economic viability of our farmers.

Having talked about all our accomplishments, we cannot rest on our laurels and expect all of these things to be available to succeeding generations. In my small world, I have a few buzz words today that I think may need to be viewed from a different angle—for instance, our state's adjudication process. Adjudications are necessary to determine who and how much, or who and what has how much, so to speak. However, adjudications are not working in this state. The adjudication in the Carlsbad Project has been ongoing for 30 years, and may well go on another thirty years. I predict that the adjudication process, as it functions today, will not be completed statewide. We need to look at some way to accurately streamline the adjudication process. But we still need to get it right. The Settlement Agreement that we just reached on the Pecos River could be an example of how we might deal with other adjudications throughout the state.

I hear a lot of talk about water conservation and irrigation efficiency. I want to say those efforts are not silver bullets either. Often, increased irrigation efficiency actually deprives or impairs the water supply for downstream users. Conservation, carried to the extreme in some cases, could impair water supplies for a downstream senior diverter or reduce return flows to rivers. So none of these things are crystal clear and can be applied with a broad-brush. We hear of silver bullets like watershed management. Watershed management may be an opportunity in some areas, for example, in areas with high enough rainfall that some water yields could be increased. Watershed management could also be used for re-establishing grass cover or improving range conditions, but in some cases, watershed management may not result in any great water yields. Regions that have underground aquifers that depend on areas of recharge would benefit from high surface runoff flows of water passing through those areas of recharge rather than the same volume of water being evapotranspired by vegetation upstream of the recharge areas or slowly percolated into the soil. Those of us who store water in downstream reservoirs would like to see tremendous

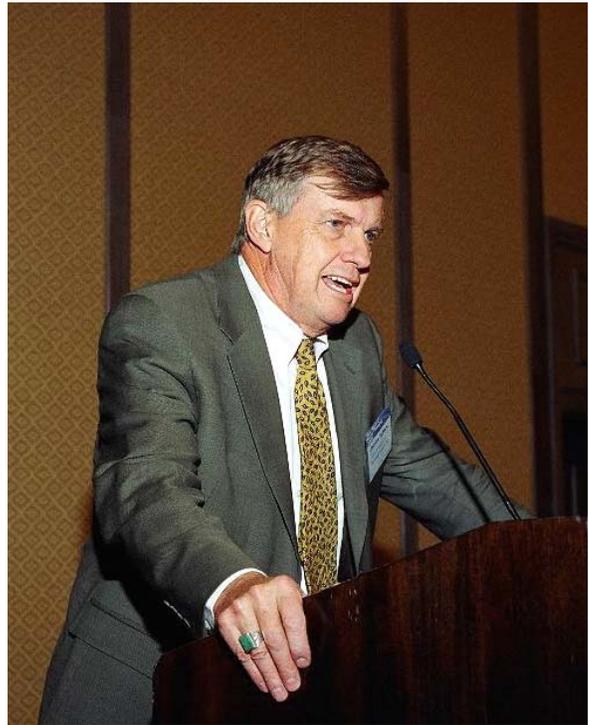
overland flows to fill our reservoirs and less evapotranspired or infiltration upstream.

Sometimes things get oversimplified in a time of impending crisis, like we may be in now. We need to take care to think things through and look at possible unintended consequences that might result from any action before we take off and spend a lot of time and money on such actions. One of the things I think Letty Belin mentioned was, "there is no new water," and I agree with her to a large extent. However, I believe we should spend time, energy, effort, and brainpower into looking for economical ways to produce and clean up brackish deposits of underground water that lie thousands of feet under the surface of New Mexico. These deposits could be a source of water that is not available to us at this time and could be cleaned up to the extent that it could be used for agricultural production. That would free up some higher quality agricultural water that then could be shifted to some other use, such as M & I uses, or entertainment for the public and growing golf courses.

I think it is incumbent on all of us to not just look for the easy solution, because generally easy solutions are not going to be there. It is going to take a lot of thoughtfulness, and a lot of effort, and a lot of cooperation, and a lot of collaborative effort to insure that we in New Mexico can maintain necessary economic growth and at the same time, maintain the standards of living to which we are so accustomed.

Thank you.

Charles T. DuMars is Professor Emeritus at the University of New Mexico School of Law. For over twenty-five years, he has taught courses in water law, constitutional law, comparative Mexican and United States law, Indian water rights law, and constitutional issues in natural resource law. He is a consultant to the World Bank on water marketing and allocation mechanisms for groundwater in developing countries. Chuck has served on committees for the National Research Council of the National Academy of Sciences relating to water including a study of protection of the Mexico City water supply in which he served as Co-Chair. He is currently a shareholder with the law firm of Law & Resource Planning Associates, P.C., in Albuquerque, where he practices water and environmental law. An author of numerous articles in both English and Spanish relating to water law and Mexican environmental law, Chuck has served as a guest lecturer on resource issues at the Universidad Autonoma de Guadalajara, Universidad Autonoma de Guanajuato, and at the Instituto de Investigaciones Juridicas in Mexico City. He has worked on cases involving equitable apportionment of waters between states in the United States Supreme Court as well as interstate compacts, and is currently a Special Assistant Attorney General to the State of Georgia, where he was one of the draftsmen of the proposed Interstate Compact between Georgia, Alabama and Florida. Chuck recently testified to a Senate Subcommittee on proposed amendments to the Endangered Species Act and is involved in the endangered species litigation on the middle Rio Grande. Chuck earned his J.D. from the University of Arizona and a B.S. in psychology from the University of Oregon.



PANEL DISCUSSION: PLANNING FOR NEW MEXICO'S WATER FUTURE

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1. The Middle Rio Grande is fully appropriated and has been since prior to the Rio Grande Compact and probably prior to the turn of the last century. It is subject to recurrent droughts that have occurred in the fifties, the eighties, and are occurring now. The demand for water is burgeoning and there is no effective methodology for accommodating shortages.
2. The Rio Grande Compact contemplated full development of the agricultural acreage in the middle Rio Grande Valley, including Pueblo acreage. No water was contemplated for future growth of municipalities, no water was allocated for excess evaporation caused by siltation at the mouth of Elephant Butte Reservoir, or for the invasion of non-native species of plants. With the

exception of Albuquerque, none of the municipal users has imported new sources of water, none has a clear mechanism for acquisition of water rights, and none of the users have determined how to compete with non-native species.

3. The Rio Grande Compact does not allow storage in post-1929 reservoirs if Elephant Butte contains less than 400,000 acre-feet. Presently there is no methodology to store native water in post-1929 reservoirs, other than using Rio Grande credits built up over a number of years. If there is no storage, then the agricultural community will suffer greatly, and in the long run, municipalities anticipating use of surface water supplies will have to determine the best method for conjunctive management of ground and surface water.
4. The Endangered Species Act and the Clean Water Act both contain federal expectations for the hydrograph and quality of the Rio Grande riverine system. These conflict with established uses of water, and have spawned an extraordinary amount of litigation. This will continue; these uses are financially supported by a great deal of national money and value based perceptions as to the future shape of the Rio Grande.
5. The six Middle Rio Grande Pueblos have congressionally quantified their entitlement to irrigate slightly more than 8,500 acres of land. They hold first priority on those lands. Determination as to the location, water demand and delivery expectations of those Pueblos provides a challenge to water planning in the region.

Paula Garcia is Executive Director of the New Mexico Acequia Association. Paula is a native of Mora where her family continues to practice traditional farming, ranching, and forest harvesting. Paula is completing a master's degree in community and regional planning at UNM with an emphasis in community-based natural resource planning. She has given presentations for legislative committees, conferences, and various community-based organizations and schools about sustainable rural development.



THE PLANNING PROCESS: THE NEW MEXICO ACEQUIA ASSOCIATION PERSPECTIVE

Paula Garcia
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Buenas tardes, señores. My name is Paula Garcia and I am the Director of the New Mexico Acequia Association. I want to thank the Water Resources Research Institute for bringing this conference together every year; it's a great honor and great privilege to be able to be a part of this panel.

Our organization was founded about 10 years ago. We are working on a continuous struggle that began 150 years ago. The struggle remains the same, trying to retain our culture and our way of life, strengthening ourselves and our determination for our community. That struggle hasn't changed. We are now at a crossroad and a very critical era with water. We must determine whether water is to be treated as a mere commodity to be bought and sold.

The acequias have taken an interest in how water policy is going to evolve in the next few years. In

particular, our concern has been that we are very vulnerable to the potential for water transfers, for water leaving our community as water demands increase. Senior water rights are being sought by entities needing water rights for their new housing or commercial developments. This situation has made the acequias a target for those entities seeking to acquire water rights.

Acequias are concentrated in some of the forested, rural communities in the state, mainly around Taos, Mora, San Miguel, Santa Fe, and San Juan counties. Please be prepared to see challenges in our own communities in terms of addressing poverty and building our economy. Not only are we trying to protect our culture and way of life, we are very well aware that all future decisions can change our water and we know that our biggest challenge is to retain local

ownership and control of our water so we can have a voice in shaping the future of our community. That is the critical issue for us.

We have been involved in water disputes asserting our historic rights and assuring protection of the acequias. We are also making the case that water is so widely important that any decision about water should be carefully considered in regard to what our statutes say concerning impairment, public welfare, and conservation. Public welfare is of a tremendous interest to us and protects us against economic value. We have a great deal at stake in terms of the survival of our community, but we also think the broader public at large has a stake in our continued survival; we are a part of the cultural link in New Mexico.

Agriculture in the acequias is one of our leading issues and concerns our future for food production. We don't want to foreclose on any options for rural development by seeing our water moved from rural to urban areas for commercial uses.

We are also aware that our community is changing and evolving. We want to be assured that water decisions are made as democratically as possible. We want to meet our own local water needs and we do have some challenges providing drinking water for our own communities.

We are doing two things: trying to revitalize our agricultural economy so we can rely on it, and maintaining our farmland and our agricultural traditions. We are also trying to balance the need to provide for growth in our communities while our rural water systems are looking to Acequias for some of their water rights. In fact, the governing boards of the mutual domestics and the Acequias are often the same people. We are looking at how to make sure our Acequias can continue to provide their vital function in the future while we adapt to changing community conditions. Our solution so far has been to strengthen our government and policy making processes.

We are also concerned in general about the possibility that if water is viewed only as a commodity, water as well as our community can be controlled by the transferring of that water. This can occur not only through water transfers in the marketplace, but also, as has happened to some rural communities, where some land owners won't allow their water to run downstream to the Acequias.

We are seeking very specific attention to our water rights in the state water plan. Recently, we have made a small bit of progress in legislation that allows us to protect our water use laws through water banking.

We have also made some headway concerning our ability to make executive decisions that impact transfers of water out of the Acequias. We also need enforcement and protection of our rights. We are engaged in the regional planning process and the state water planning process and expect that our efforts will lead to some protection for our water rights. We are at the table and ready to work.

Thank you.

Randy Kirkpatrick is the executive director of the San Juan Water Commission. He received a B.S. and an M.A. from New Mexico State University in agricultural education and public administration. Since the late 1980s, Randy has worked with water issues and participated in the drafting of the original Regional Water Planning Template. In 1989 Randy became actively involved with the San Juan Water Commission and in 1994 became the Executive Director for the Commission. Randy currently serves on the Board of Directors of the Colorado River Water Users Association and is a member of the National Water Resource Association.



PANEL DISCUSSION OBSERVATIONS OF ONE

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Water planning, like any endeavor we undertake, has a beginning, where we identify challenges; a middle, where we encounter obstacles, address concerns, and provide opportunity for growth and development; and an ending, where a product is completed.

My involvement in water planning began a decade and half ago with the recognition that a guide needed to be established to assist water planners. I, along with about twelve others joined to draft a document that would provide this assistance. This resulted in the creation of the Regional Water Planning Template. Early in the process, the State staff failed to recognize that uniformity in plans was unrealistic and was not the point of the Template. The Template does not call

for each plan to be written the same, but rather that each plan take a uniform approach and consider the same issues within the regions' unique situation. Over time, I have come to realize that a failure of the planning process is the early recognition by most, that plans, like people, will not be the same.

It has been my observation that the first challenge any effort faces is that everyone comes to the table with an agenda, which is not a bad thing, but it does present an obstacle that has to be overcome. To achieve the best result and avoid having this challenge turn into a problem, we must work with all agendas and reach a solution that everyone can live with. However, most of the time, this is easier said than done.

Resolving differences within the region associated with sources of water supply, demographics, economics, ethnic/cultural diversity, and environmental concerns is the second challenge. Efforts to protect traditional ways of life and the traditional use of water, whether it is agricultural, municipal, or industrial, make surmounting this challenge even more difficult. In the San Juan Basin we are constantly faced with these differences and we continually work to find workable solutions to meet this challenge.

Along with multiple agendas, the voluntary nature of planning brings different levels of understanding about water's role and the laws governing it. The leadership challenge is to correct the misinformation regarding both, and keep everyone talking. The fact is regional planning should, and rightly does, only address 'wet' water supply, and not water rights. Meeting the 'wet' water supply with legal water rights is not done during the planning stage, but rather, during the implementation stage, which is carried out according to existing water law.

The role of the planning committee has been poorly communicated and understood, both in our Basin and others. I recall Gary Davies, formerly with the City of Albuquerque, raising the question at the beginning of the current effort; "are water planners the decision makers?" The answer is a simple "no". However, I have found that no matter how this point is conveyed, nothing seems to change the public's misconception about planning. The planner is not a decision maker and the plan is not a binding decision. Planning is a series of ever-changing steps and the planners' role is to plan well and market the plan to the general public and governing entities. The plan is not a definitive decision; it is a tool that governing bodies can use to gain insight into the public's opinion to assist them in determining which direction to take. Ultimately, governmental entities are the authority, as long as they follow State processes.

The role of regional planning in defining the "Public Welfare of the State" has become confused. When he was serving as State Engineer, Eluid Martinez indicated he would use regional water plans as he had used zoning ordinances of local governing bodies in making 'public welfare' determinations for his office. Subsequently, a statement was included in the Template that said, "regional plans may contain relevant and substantive elements for use by the State Engineer in "public welfare" and "conservation" determinations in actions before the State Engineer within the regional planning area or affecting the area." Correctly, the

decision of whether or not to include a 'public welfare' statement in any plan should be left up to the region. However, these 'public welfare' statements represent only one group's opinion at a given time, and they most certainly cannot and should not bind the OSE.

The "authority" of State and Regional Water Planning is confusing. State Water Planning is what the Legislature and Administration makes it. Regional Water Planning authority is the integrity of the process and is what the local governing bodies make it. Although there is no binding authority forcing any governing body to follow regional plans, it does make sense that the governing body would use regional plans for assessing the will of the public at a given time.

Ignorance can lead to both disaster and genius. A 'good' planning process affords all interests a forum to test, sell, and/or modify their ideas to develop realistic solutions for real or perceived water issues. A planning effort that addresses the concerns and meets the challenges created by multiple agendas, regional demographics, and cultural diversity produces an informed core of individuals and most importantly, provides an escape from the "BOX" we are often trapped within.

Jennifer Wellman is the Hydrologist and Water Resources Division Manager for the Pueblo of Santa Ana, Department of Natural Resources. Over the past two-and-a-half years she has conducted watershed monitoring and water resource planning with a technical application of hydrologic principles to projects that also require a broader understanding of issues and policy implications. Working for the Pueblo continues to be an interesting and diverse professional challenge. She previously worked for the New Mexico Environment Department and the USDA Forest Service. Jennifer's educational background is in watershed science, hydrology, and geography and her interests lie in community participation in water resource management and international water issues.



WATER RESOURCES PLANNING ON THE PUEBLO OF SANTA ANA

Jennifer Wellman
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Department of Natural Resources
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Good afternoon, I'm Jennifer Wellman. I manage the Water Resources Division of the Pueblo of Santa Ana Department of Resources. I want to thank you for attending this conference at the Hyatt Regency Tamaya Resort on the Pueblo of Santa Ana.

I would briefly like to cover a few Water Resource Planning initiatives as they relate to opportunities the Pueblo has taken in planning for its future. As you know, the technical elements of water planning are a companion to the legal and water policy framework

that others have discussed previously. The Pueblo of Santa Ana is at the forefront of actual implementation of water resource planning.

The Pueblo of Santa Ana's boundaries are depicted in Figure 1. Most of the population lies along the Rio Grande at the southern end and there is no longer water stored in the Jemez Reservoir along the Rio Jemez. Much of the Pueblo's land is undeveloped and provides beautiful open areas and a wildlife corridor into the Jemez mountains.

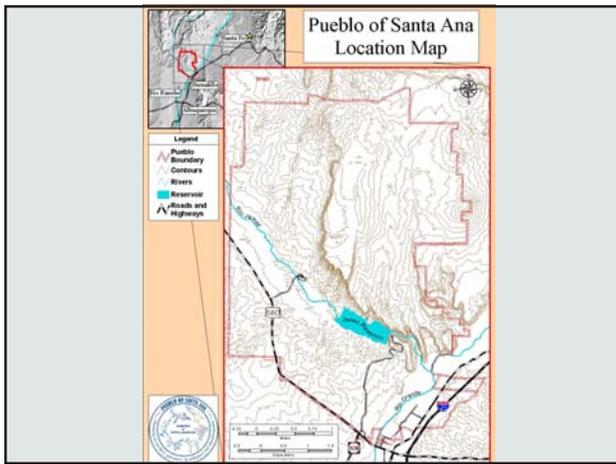


Figure 1. Boundaries of the Santa Ana Pueblo

The three topics I would like to focus on pertain to the Pueblo’s leadership initiatives with regard to Water Resource Planning: Bosque Restoration, Water and Wastewater System Improvements, and Community Outreach initiatives.

Bosque Restoration has been one of the most significant things the Pueblo has been involved with over the past 10 years (Figure 2). Figure 3 is an aerial photo of the Rio Grande taken in the 1950s when the channel was broad, braided and sediment rich. Later, with the implementation of reservoirs and levees on the Rio Grande, it became channelized and sediment starved, and then encroachment of exotic species in the bosque took over the landscape adjacent to the river. The Pueblo’s Bosque Restoration initiative involves several objectives that include the restoration of braided river channel characteristics, the re-establishment of cottonwood and willow species along the Rio Grande, and the restoration of the active floodplain to reconnect with the river.



Figure 2. Rio Grande at Santa Ana Pueblo in 1950

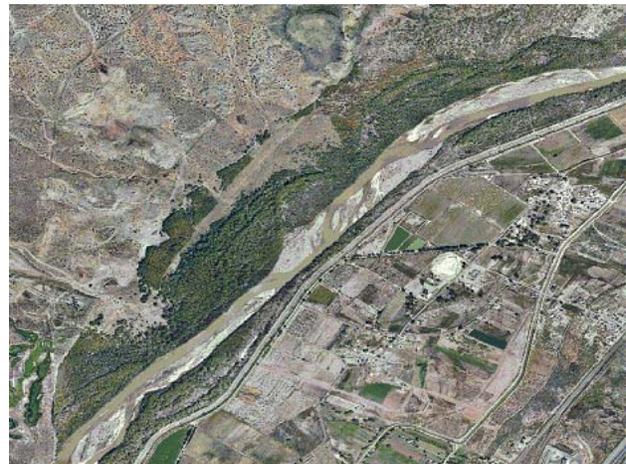


Figure 3. Rio Grande aerial view

Several years ago, if you went out the doors of the Hyatt and looked toward the mountains you would have seen a view similar to that shown in Figure 4 – a field of Russian Olive and saltcedar trees. Within the past several years, the Pueblo has been able to eradicate those species in this field and restore native grasses to complement the cottonwood bosque. Some native species such as New Mexico Olive have come back naturally. Also, many cottonwoods have resprouted along the channel, which thereby increase streambank stability and provide wildlife habitat.



Figure 4. Russian Olive and saltcedar at the Santa Ana Pueblo in the early 1990s before eradication

Water Resources Planning on the Pueblo of Santa Ana

As part of the water planning process, the Pueblo is working on water and wastewater system improvements that increase effluent storage capacity and protect the entire water system (Fig. 5). We are also improving effluent reuse on the Pueblo's lands. (Fig. 6). We are increasing youth involvement in water resources through education and management activities, and incorporating Pueblo members into natural resource management. It is our goal to involve the local community and expand our outreach to the greater community to further develop our environmental education capacity.



Figure 5. Water and Wastewater System Facility



Figure 6. Improved effluent reuse for landscaping on the Pueblo of Santa Ana

I invite you all to attend one of the tours of the bosque that we offer down on the Rio Grande as part of the restoration project. You can actually tour by yourself and walk down along the bosque and enjoy the openness of the cottonwood forest there.

In conclusion, I want to highlight one of the most important elements of Water Resource Planning – the ability to obtain support from Tribal Council and mobilize resources from a number of funding sources, federal partners, and private funding agencies, including the Pueblo of Santa Ana, the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, the Fish and Wildlife Service, the Bureau of Reclamation, the Bureau of Indian Affairs, and the Environmental Protection Agency. This is a critical component to on-the-ground implementation of any planning effort – and the Pueblo of Santa Ana has been very successful in this regard.

Thank you.

Anne Watkins was appointed Special Assistant to the New Mexico State Engineer by Governor Bill Richardson in January 2003. In that capacity, she is responsible for state drought planning as Director of the Governor's Drought Task Force; oversees development of comprehensive statewide conservation programs for municipal, industrial and agricultural water users; provides policy and planning support for the Water Trust Board; is the agency liaison for watershed restoration and management; and serves as the agency's legislative liaison. Prior to her appointment, Anne was Executive Director of the Rio Grande Agricultural Land Trust. She was Director of the City of Albuquerque Transit Department from January 1994 through December 2001. Anne was recycling consultant for the City of Albuquerque for several years, responsible for developing the city's collection programs and recycling facility. She also worked in Washington for several years as Executive Assistant to then-Congressman Bill Richardson.

Anne has a B.A. from New York University, an M.S. from the University of Texas at Austin, and has also completed the Program for Senior Executives in State and Local Government at Harvard University's John F. Kennedy School of Government.



PLANNING FOR DROUGHT

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Thank you very much, Karl. I really appreciate the opportunity to be here with you today. As the latest drought assessment indicates, and I'm sure most of you have seen the paper this morning – things are not looking good in New Mexico and the Southwest. Even if we started having average precipitation today, it would take years to get out of the current drought situation. I know you heard John D'Antonio talk yesterday about a number of things in the State Water Plan and about some of the active management that is going on right now to deal with drought situations all over the state. What I'm going to talk about today is the Governor's Drought Task Force, which is focused on trying to get ahead of the game instead of trying to

deal with drought as an emergency response issue. We need to develop a "preparedness" approach to avoid some of the drought crises that might otherwise happen.

I'm Special Assistant to the State Engineer and as such, one of my responsibilities is Director of the Governor's Drought Task Force. In that capacity, I have the opportunity to work with dedicated staff at local, state, and federal agencies, Indian government agencies, representatives of constituent organizations, and many others around the state who are focused on "what to do about the drought" and prevent its unpleasant impacts. So today I'm going to give you an overview of activities of the Drought Task Force and

its new focus so you may understand how the state is trying to evolve and prepare in this mode for drought.

I'm going to talk about three things today: what we know about drought, what is the impact of drought, and what can we do to reduce the impact of drought. What we know about drought is that we are in one! The Drought Task Force sponsored a drought summit in September 2003. I don't know if any of you had an opportunity to go, but it was quite interesting. What we did at the summit was focus on the science of drought, all the aspects and all the components of drought from the monitoring, to predictions, to the hydrological and ecological and economical impacts, and the message was basically that we need to prepare for dry times and focus on preparedness.

What we also know about drought is that New Mexico is not alone and that we are not in a unique situation. Colorado has predicted that it will need more water than the state can supply by 2025. California has been using more than its share of the Colorado River water for a long time and now must figure out how to correct that situation. Arizona's Governor, Janet Napolitano, set up their first drought task force in 2003, saying that they had a very long-term problem and that she expected it to occupy a lot of her time. It's not just the West or Southwest either. States like Rhode Island, Georgia, and Michigan are all facing severe water shortages in the face of drought.

We also know that this isn't the first drought that we've experienced here. I know you've all seen this famous tree-ring chart (Figure 1) so I'm not going to dwell on it much, but what you can see here is that drought is not cyclic, you cannot predict it because it does not recur regularly. What we do know is that we will have droughts, and we will have mega-droughts, and we need to figure out how to live and thrive under those conditions. Figure 2 is the latest map of drought conditions in the state. You can see how serious it is, with red (or the dark areas) being quite serious. Every area in the state is in a drought situation right now.

Just to hammer this home a little bit more, Figure 3 is a graph of the reservoir storage levels in the state. As you can see, there is a significant decline in storage in all of our reservoirs. Figure 4 depicts reservoir storage level at Heron Reservoir. You can see how

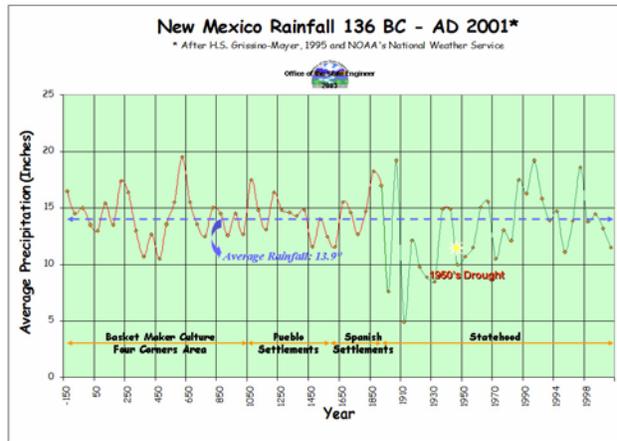


Figure 1. New Mexico Rainfall 136 BC - AD 2001

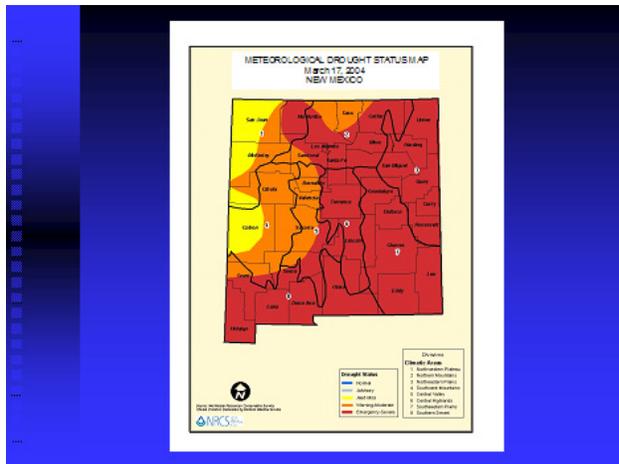


Figure 2. Meteorological Drought Status Map

significant the decline there has been. That is very important, particularly for those of us along the Rio Grande because this is where a lot of water is stored. Figure 5 is a chart addressing whether or not the recent rains have been enough to end the current drought situation. The important column to look at is the 36-month deficit. We started having a little bit of rain here and there over the past couple of months, but as you can see, we are still in a very, very serious deficit, three or four inches to nine or even 14 inches in some areas – so the rain is helping some, but the drought is not going to go away. It's not going to go away for quite some time.

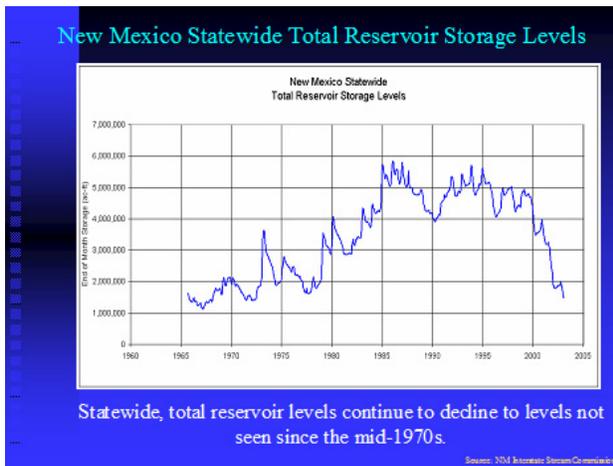


Figure 3. New Mexico Statewide Total Reservoir Storage Levels

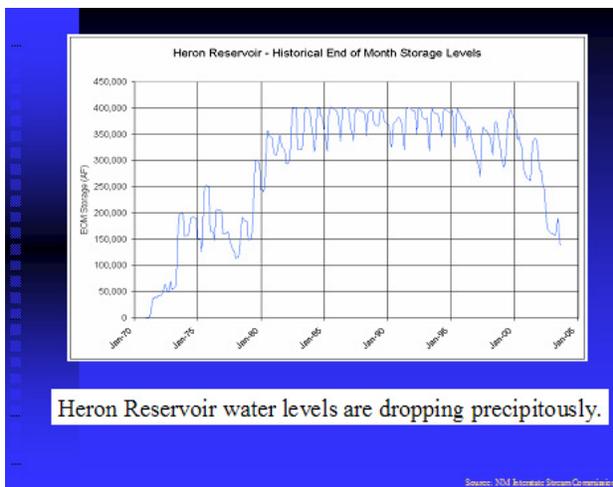


Figure 4. Heron Reservoir Storage Levels

Climate Division	30-36 Month Deficit
Northwest Plateau	3.9 inches
Northern Mountains	12.1 inches
Northeast Plains	9.4 inches
West Central Mountains	4.7 inches
Central Valley	5.3 inches
Central Highlands	10.8 inches
Southeast Plains	9.6 inches
Southern Desert	7.9 inches

Current Precipitation Deficits
March 2004

Source: National Weather Service

Figure 5. Current Precipitation Deficits

What we also know is that there are various stages of drought.

- meteorological drought, with low precipitation
- agricultural drought, when soil moisture levels start to drop
- hydrological drought, when there are decreases in reservoir levels and spring flows
- social-economic drought, when it starts to affect businesses, tourism, and recreation.

I'm sure you've all read the papers enough to know we have been feeling the effects of the drought. We've added another one recently. I know the State Engineer talked about this some yesterday. It is administrative drought. Administrative drought is trying to deal with such things as compact delivery and shortage-sharing arrangements during times of drought. This is much of what the State Engineer's staff is doing these days – trying to figure out how administratively to deal with drought conditions.

What we can't predict about drought is when it will happen. As I mentioned, it is not cyclic and it's not predictable. We can't predict how serious or how severe it will be, or how long it will last. What we do know is we live in an area where **we will have droughts**. As Casey Stengel said and this is one of my favorite quotes, "Making predictions is difficult, especially about the future." This is kind of the situation that we are in here. People are always asking me, "So is the drought over?" I have people asking me the day after a rain, "So you aren't working on the drought any more?" Well, we are going to be working on the drought for a long time! We can predict that we will have periods of drought, and that we will have another mini-drought someday, and we need to be prepared.

So what is the impact of drought? We know about the impacts of drought historically (Figure 6). We know that Chaco Canyon and Mesa Verde disappeared due to a very serious drought several centuries ago. There may not be a lot of folks who remember the 1950s drought. I wasn't living in New Mexico at the time, but I remember it from growing up in Texas where I watched the lake levels drop and drop and drop and drop. Drought impacts all facets of life in New Mexico. Water touches everything we care about and so does drought. Drought is really a human event in many ways. Natural systems tend to expand or recede based on availability of resources. We humans don't do that, so

we have a much higher vulnerability level in this state because of our population.

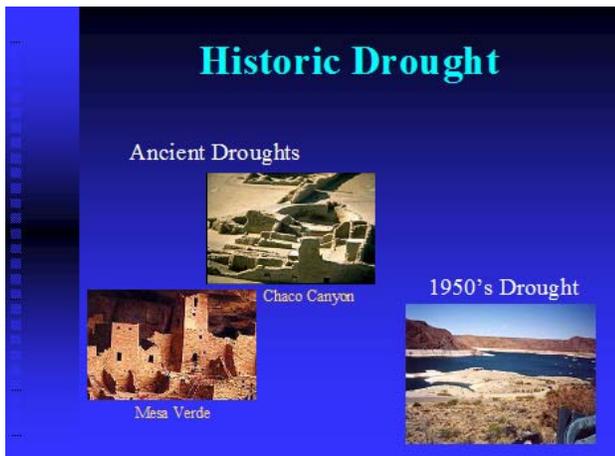


Figure 6. Historic Drought

We are at risk for drinking water emergencies. We have identified more than 75 water systems in the state that are at serious risk due to drought conditions. Farming and ranching sectors are adversely affected by drought, as are watersheds and ecosystems, endangered species, including species at risk that may become listed because of drought conditions. New Mexico's environment and quality of life, all of these things are affected by drought (Figure 7). There is no easy solution. Decreased stream flows threaten interstate compact compliance. As we know from last year at Elephant Butte, decreasing reservoir levels can adversely impact the water sport industry. There is just not an easy tradeoff. Rural county governments often rely upon agricultural industries that are adversely affected by drought. Gross receipts taxes drop when suppliers can't make sales, and this has an impact on the state budget as well. Reducing alfalfa production may save some water, but that may adversely affect our booming dairy industry. And fallowing crop land may invite thirsty non-native plants. It's just not easy to come up with solutions.

Another one of my favorite quotes is from Mark Twain: "History never repeats itself, but it does tend to rhyme." We have an idea of what the impacts of drought are from previous droughts and so we know what we can expect, and now we need to look at what we can do to reduce the impact of drought. That is where the Governor's Drought Task Force comes in.

The Task Force was established in the late spring of 2003 by Governor Richardson. It continues the work



Figure 7. Drought impacts all facets of life in New Mexico

of a previous drought task force, which did a lot of great research and work on emergency response. What the Drought Task Force is focused on now is preparedness and trying to prevent drought emergencies. The Drought Task Force is a policy level group of state agency heads, and it is chaired by the State Engineer. It is responsible for looking at policy changes, legislative and funding needs, and making recommendations to the Governor and the Legislature. The Drought Task Force also interacts with the various drought planning activities going on regionally and nationally, including the Western Governors Association, which has a strong focus on drought mitigation, and the Interim National Drought Council (INDC), and other regional and national activities.

As I've mentioned, the past focus has been primarily on emergency response. We now need to move to managing the risk of drought. We've been gearing up over the past four months to figure out how to go about this. And I want to emphasize that, although the Task Force is made up of agency heads, many of the work groups include local, state, and federal government agency staff. We also are including quite a few other constituency groups, business groups, the recreation industry, the tourism industry, the agricultural industry, that is, a really broad range of groups. We need to develop an awareness in the state of what we may be facing if we are in the early phases of a severe drought, and get all kinds of folks involved in helping think about preparedness. This cannot be just a government effort. A lot of it will be rethinking the things that we do and this is why it's very important to involve all of these realms of activities in the state.

The Drought Task Force has five work groups and one Strike Team right now. The Monitoring Work

Group (Charlie Liles is on this group as are a number of folks who may be here today) looks every month at what drought conditions exist in the state, then creates those maps that you see on the back page of your newspaper in the weather section. The Monitoring Work Group is starting to look closely at how we identify triggers as well as making information about drought conditions more available at the local level, whether to help with fire emergency response or trying to avert drinking water emergencies or whatever. This work group has been doing a great job for some time and is now focusing on how we can bring this information about drought conditions down to the local level and make it much more useful to people in figuring out action plans.

We have a Strike Team that has been in operation for a couple of years that responds to emergency requests for drinking water. We had quite a few drinking water systems in the past several years that ran out of drinking water because their wells went dry from drought conditions. The first step is to provide what we call “water buffalos” or “tankers” to relieve the immediate situation, and then we try to figure out what kind of assistance to provide to that system that will help get it back up and running.

There is also a Drinking Water Work Group. This group focuses on how we can prevent people from running out of drinking water. The bottom line is: we don’t have enough “water buffalos,” we don’t have enough “tankers” for the state. We need to come up with other ways to deal with this problem. The Drinking Water Work Group has developed a bold water conservation water plan that is really a framework to guide state water conservation program development to prolong our existing water supply.

The Drinking Water Work Group is also doing a very interesting project. They have selected three areas of the state where they are working with a number of small water systems and/or municipalities and counties, and irrigation districts and acequias in that area, trying to figure out how they can regionalize and restructure in order to better meet local needs for drinking water as well as other water needs.

The Agricultural Sector Work Group has done a great job in the past in identifying when drought trigger points are reached so that farmers and ranchers can apply for federal and state assistance for crop and livestock losses. We have a subcommittee of that group, chaired by a professor from New Mexico State University, that will address agricultural water conservation. A lot of water in the state is used for

agricultural purposes. There is this perception that if we can just figure out how to increase agricultural water conservation, we can solve many of our water needs. So they are going to focus on what really is the opportunity for agricultural water conservation. Again, it’s not as easy as putting in drip irrigation everywhere. There are places where it will work and places where it won’t. It’s much more complicated, and we are trying to figure out what the opportunities are and what incentives can be provided for additional agricultural water conservation efforts.

We also have a new subcommittee that will focus on the watershed restoration. The Office of the State Engineer would like to see where in the state we might be able to increase aquifer recharge or increase wet water in streams through watershed projects.

We also have the Wildlife and Wildfire Work Group that will continue focusing on fire response and prevention. We heard at the recent drought summit from Julio Betancourt – he is actually one who has done a lot of the tree ring research that has resulted in the 2000-year precipitation graphs – who believes we are going to go from having a “fire season” to having a year-round fire season because things are so dry. So there needs to be a continuing strong focus on fire response supervision and prevention.

We have a new subcommittee that is going to address species at risk. A UNM professor is going to help us with this. We need to tie this to watershed restoration and some other activities going on as well. What we need to look at is the species in the state that are already listed and those that are at risk of being listed, so that we can figure out what we can do to prevent those listings. We are also coordinating very closely with Butch Blazer with the State Forest Health Initiative.

The Recreation, Tourism, and Economic Development Work Group is a very important group. This is where we will be doing even more work with the Association of Commerce and Industry, the various chambers of commerce, and other entities involved in economic development as well as the recreation industry and the tourism industry. This group wants to figure out how to decrease the socio-economic impacts of drought. They will need to look at the economic impact of drought, and where water is important to the local economy, whether it be skiing, boating, or fishing. We need to determine whether or not we need to shift into other activities because water is not going to be available. For example, one state has changed its marketing focus somewhat so that there is less

emphasis on skiing and more on the opportunities for hiking and biking for longer periods of the year. New Mexico may need to look at doing this as well.

We have a new group that State Engineer John D'Antonio has asked me to put together to look at the whole issue of water development. This includes desalination, aquifer storage and recovery, and wastewater treatment. This committee, with funding from the Bureau of Reclamation, will be doing a workshop on small-scale desal opportunities. It will also try to identify all of the non-potable water in the state and figure out all the opportunities and technologies available to make that water potable. We also need a better plan for all our large water projects as well as our small water projects in the state. We also need to figure out how to improve our storage capacity for those opportunities when (we hope in the near future!) we have wet periods again. This group is still coming together. It has lots of interest from folks across the state.

To summarize: What do we know about drought? We know we will have droughts, and we WILL have another mega-drought someday, and it might just be starting today. We know we need to be prepared for the current drought. We know that drought can severely impact all sectors of New Mexico life and that we need to gear up and be prepared for it. This is why the Task Force is focused on developing "preparedness." The Drought Task Force is bringing together action-oriented work groups, lots of smart people from all sectors of New Mexico life to try to find ways to extend our water supplies and avoid drought emergencies. We will need to look at the combination of new programs and some policy revisions and obviously funding for not only the current activities of the Office of the State Engineer but some new activities that are going to be necessary to deal with shortage-sharing and other drought administrative needs.

I want to close with another one of my favorite cartoons as shown in Figure 8. This is from Don Wilhite, who is the director of the National Drought Mitigation Center. He talks about how we need to break the hydrological cycle. This is what I talked about a little bit earlier. It starts to get dry and people get nervous and start thinking about what needs to be done about the drought. Then it rains and everyone thinks it is okay and that the drought is over and we don't need to do anything else. But we live in an arid climate, we live in a place where we will have drought and will have mega-drought. So we need to break the "hydro-

illogical" cycle and develop an ongoing preparedness focus for our drought planning activities .

Thank you very much and I appreciate getting to talk with you today. If any of you are interested in working with the Drought Task Force or any of its workers, please let me know.

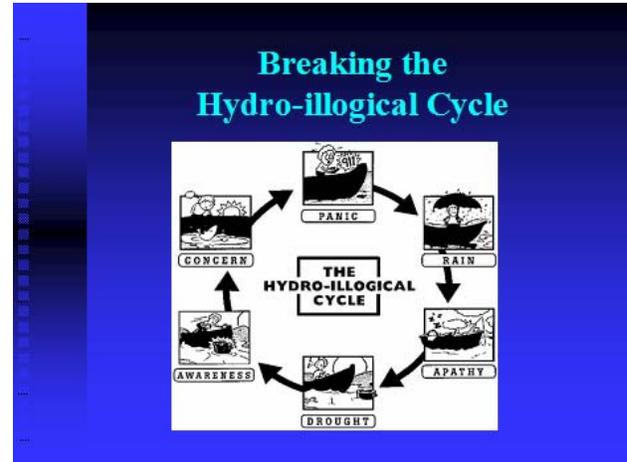


Figure 8. Breaking the Hydro-illogical Cycle

QUESTIONS

Question: Anne, you mentioned a new subcommittee on agricultural conservation that is headed up by a professor from New Mexico State. Could you tell us who that is and are they going to be coming around to see those of us in the business?

Response: Dr. Phil King is heading that subcommittee and Julie Maitland of NMDA will be working with him along with some folks from the irrigation districts. This is just now starting. So if you haven't heard about it, don't feel like you are being slighted. We have folks from the Bureau of Reclamation and various other agencies, Indian nations, tribes, and pueblos. The first thing we want to do is a survey of agricultural water use. This survey will focus on irrigation and conservancy districts and other purveyors of agricultural water, just to see where they are, what kinds of conservation measures and technologies they already have implemented, what the additional opportunities for agricultural water conservation would be, and incentives that need to be in place or statutory changes in order to move further forward with agricultural water conservation.

James Brockmann received a B.S. in natural resources from the University of Nebraska, Lincoln, a J.D. from the University of Utah College of Law, and was admitted to the New Mexico Bar in 1986. He has extensive experience in water rights in New Mexico and is responsible for water rights planning, acquisition, transfers, leasing, new appropriations, and administrative hearings for several New Mexico municipalities. Mr. Brockmann is a shareholder with the firm of Stein and Brockmann, P.A., which represents the cities of Albuquerque, Las Cruces, Alamogordo, Española, and Gallup in their water rights matters. The firm is involved in numerous adjudications throughout the state. Mr. Brockmann served as counsel to the Water Defense Association during litigation of claims by the Mescalero Apache Tribe to waters of the Rio Hondo stream system. The firm also participated extensively in interstate litigation representing the State of Nebraska in Nebraska v. Wyoming.



WATER RIGHTS TRANSFERS: KEY TO WATER PLANNING

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INTRODUCTION

Drought, or what some people have called a return to normal weather patterns in New Mexico after several years of wetter than average conditions, has had a huge impact on all citizens in the State of New Mexico in the last several years. Nearly every day, newspapers across the State contain articles on drought, water shortages, dry streams and low reservoirs, water rationing, conservation, low levels of snow pack, or below normal precipitation.

Municipalities have been among those most impacted by the return to drought conditions. Several municipalities, including Alamogordo, Santa Fe, and

Las Vegas, have had to resort to severe measures such as rationing and surcharges in the last several years or they would have literally run out of water. All three of those municipalities rely heavily on surface water so they are particularly vulnerable in times of drought. Municipalities also have special considerations related to the health, safety, and welfare of hundreds of thousands of people, industry, and commerce worth millions of dollars which rely on the cities for safe drinking water and sanitation.

Irrigated agriculture has fallen on hard times. Elephant Butte Irrigation District, Middle Rio Grande Conservancy District, Carlsbad Irrigation District, Arch Hurley Irrigation District, and many acequias have

been forced to cut back drastically on the allotment of water to their farmers.

Fish, wildlife, and plants have also suffered. Many rivers and reservoirs are at all-time lows, and in some cases, dry, adversely affecting fish and wildlife. Insects like the bark beetle are killing drought-stressed trees, creating fire danger and changing our landscape for years to come. Recreational pursuits, such as skiing, rafting, and camping, have additionally been affected from the water shortages, as national forests close to protect from fire danger. In recognition of all of this, Governor Richardson has made water one of the top priorities of his administration.

The purpose of this presentation is to discuss the increasing importance of water transfers in water planning. The lack of water in the State of New Mexico makes it increasingly evident that prudent water rights planning must almost always take into account transfers of surface or groundwater rights. This paper will analyze the current trends in water administration, explain the procedure and the particular problems that arise in undertaking a successful water rights transfer, and will focus on the needs of the State of New Mexico's municipalities in planning for sufficient water supplies in the future.

Background of New Mexico Water Administration

New Mexico has had a nearly 100-year history of water administration. The current surface water code was enacted in 1907,¹ but a territorial water code was first created in 1905. The groundwater code was enacted in 1931.²

Surface waters have long been allocated by compacts between New Mexico and its neighboring states. New Mexico is party to nine interstate compacts, with the first entered into only ten years after New Mexico became a State. Nearly all interstate streams crossing New Mexico were divided by compact by 1951, one-half century ago. These compacts include:

- (a) Colorado River Compact – 1922
- (b) La Plata Compact – 1923
- (c) Rio Grande Compact – 1938
- (d) Rio Costilla Creek Compact – 1945
- (e) Pecos River Compact – 1949
- (f) Upper Colorado River Basin Compact – 1949
- (g) Canadian River Compact – 1951
- (h) Rio Costilla Creek Compact amended – 1963
- (i) Animas-La Plata Project Compact – 1969

The United States Supreme Court, having original jurisdiction over interstate compact cases, has been active in resolving disputes in interstate compacts in which New Mexico is a party. In fact, five of New Mexico's nine compacts have been the subject of United States Supreme Court litigation, including the Colorado River Compact, the La Plata Compact, the Rio Grande Compact, the Pecos River Compact, and the Canadian River Compact. In addition, two other interstate streams, the Vermejo and the Gila, have been divided, or equitably apportioned, by the United States Supreme Court between New Mexico and its neighboring states.

After taking out interstate delivery obligations, New Mexico's share of surface water in its stream systems has long been fully or over-appropriated.

Unlike surface water, groundwater has not been allocated by interstate compact or equitable apportionment with New Mexico's neighboring states. Groundwater in New Mexico is not subject to State Engineer jurisdiction unless and until the State Engineer "declares" a groundwater basin with reasonably ascertainable boundaries. The State Engineer then exercises jurisdiction over the declared underground waters of that basin.

Today over 99 percent of the State's groundwater is under the State Engineer's jurisdiction in declared basins. These declared basins cover over 80 percent of the State's geography. Several aquifers within New Mexico are interstate aquifers. For instance, the Ogallala aquifer, that underlies several states in the Great Plains, is available in a relatively small part of New Mexico.

New Mexico has many mined groundwater basins. Mined basins are those in which water withdrawals exceed recharge to the aquifer, resulting in a diminishing water level. Although not fully appropriated like New Mexico's surface waters, a good share of New Mexico's fresh groundwater has already been appropriated. New appropriations of groundwater still occur, but with less frequency and generally in smaller quantities than in the past. Brackish groundwater appropriations will occur more frequently in the future.

Because surface water is not available for new appropriations and because new fresh groundwater appropriations are becoming less frequent and more difficult, those seeking new or additional water rights will have little choice but to look at existing uses as a source of available water. Accordingly, transfers have become and will continue to be a critical element of

planning for water users and increasingly important for State administrators.

The Philosophy of Water Transfers

Water transfers are a reallocation of a finite resource. Two divergent and competing views exist in the use of water transfers as a source of available water. The first approach envisions private, open markets for water transfers, based upon economics effecting a reallocation of resources that provides the maximum benefit to the individual and thus society. In contrast, the second approach advocates protection of traditional uses with a strong public sector role in regulating transfers, and less emphasis on economics. The traditional uses that this second approach protects include acequia rights, agricultural rights, Native American cultural uses, and the environment.

The limited availability of water is also a lightning rod for the political debate regarding the growth of population and economic growth in the State of New Mexico. There exist two opposing arguments on the issue of growth. One side argues that growth must be limited because of scarce water supplies and the desire to not reallocate water resources. The other side postulates that because of the desire to prevent growth, the scarcity of water is conveniently used as an excuse or justification to achieve political goals. Almost inevitably, additional water rights can be obtained – the issue is the cost and the willingness to pay. This question will continue to be debated at the local and State levels.

Because of the existing statutory criteria in New Mexico, public welfare considerations are already part of the evaluation process of water transfers. Accordingly, New Mexico has started down the road with market-oriented policies that still must take into account public interest and public welfare. This policy allows the State of New Mexico to be flexible and to adjust to both ends of the water transfer debate. The future direction of transfers and water use will be guided by the executive, legislative, and judicial branches of State government.³

The Nature of a Transfer

There are four basic types of water rights transfers. The simplest form is a change in ownership of the water right. This leaves the purpose of use, place of use, and point of diversion of a water right

unchanged. An example of such a transfer is the sale of a farm and its appurtenant water rights.⁴

A second type of transfer involves a change in the point of diversion of a water right. A change in the point of diversion typically involves: 1) changing from one surface water point of diversion to another surface water point of diversion; 2) changing from one groundwater point of diversion to another groundwater point of diversion; or 3) changing from one surface water point of diversion to a groundwater point of diversion.⁵ In the later instance, the *Templeton*⁶ case provides specific criteria that must be followed to prevent impairment to other water users.

A third type of water transfer involves a change in the place of use of a water right.⁷ A change in place of use can be within the same water basin, transbasin, interstate, or internationally.⁸

The fourth type of water transfer is a change in the purpose of use.⁹ A change in purpose of use can exist with the same or a different water user, the same or different place of use, and the same or different point of diversion. The most common example of the change in purpose of use is a purchase of agricultural water rights and the conversion of those rights to municipal and industrial purposes.

Procedural and Substantive Requirements for Transfers

The procedural and substantive requirements for water rights transfers are the same for surface water and groundwater.

The procedure for water rights transfers is set forth by statute, and begins with an application to the Office of the State Engineer. To comply with statutory requirements, notice of publication must appear in a newspaper that is published and distributed in each county affected by the surface water diversion or in the county where the groundwater well will be located and in each county where the water will be or has been put to beneficial use or where other water rights may be affected, or if there is no such newspaper, then in some newspaper of general circulation in the county in which the surface water division or groundwater well will be located, at least once a week for three consecutive weeks.¹⁰

Protests to the application must be filed within ten days of the last date of publication.¹¹ In order to qualify as a protestor to such an application, an objector must have standing. Those who own water rights *and* object that the granting of the application will impair their

water rights have standing.¹² Standing is also conferred on objectors who claim that the granting of the application will be contrary to the conservation of water within the State or detrimental to the public welfare of the State, *and* show that the objector will be substantially and specifically affected by the granting of the application.¹³ With increased attention on water issues, more protests are creating greater administrative burdens on the process. Standing has not been strictly enforced according to statutory guidelines in the past. The Office of the State Engineer, and likely the courts and the legislature, are going to have to look carefully at this issue in the future, or protestants with no water rights or protestants who are not substantially and specifically affected will be able to effectively prevent transfers of water rights.

The substantive statutory criteria to grant an application to transfer is also governed by statute.¹⁴ The applicant must first prove the validity and the extent of the existing water right. The applicant's burden is lightened if the water right has been adjudicated. Adjudicated rights are assumed to be *prima facie* evidence of the validity and the extent of the water right. The burden is then on the protestant to show otherwise. An applicant must also prove that there is unappropriated water available for appropriation. The applicant must then prove that there will be no impairment to existing water rights because of the water transfer. To protect existing uses, only the consumptive use is allowed to be transferred. The issue of impairment to existing water rights is decided on a case-by-case basis by examining the incremental effects of the proposed transfer. The impacts on fully or over-appropriated surface waters typically require offsets or purchases and transfer of existing surface water rights on a stream system so that there will be no new net depletion of surface water, keeping all existing water users whole. Drawdowns in existing wells are allowable, but when an acceptable level of drawdown becomes impairment is decided on a case-by-case basis, with factors including static water column, saturated thickness, drawdowns that would occur without the new well because of the existing well itself or other pumping in the area, and the age of the well (whether it would have to be replaced anyway).¹⁵

In some areas of the State, the Office of the State Engineer has adopted more specific criteria or guidelines by which to measure impairment to existing groundwater rights or the aquifer in general. The Office of the State Engineer has promulgated administrative

criteria in regions where it deems groundwater levels to be critical, including the Middle Rio Grande, Tularosa/Alamogordo, the Lower Rio Grande Basin, and the Estancia Basin.

Other substantive requirements are that the applicant must prove that the transfer is neither contrary to the conservation of water within the State nor detrimental to the public welfare of the State. Neither of these concepts is defined by statute, rule or regulation, so the exact elements necessary to prove each requirement are unknown. However, both requirements are increasingly raised by protestants in their attempts to prevent water rights transfers or to gain concessions from applicants.

An additional potential obstacle for water transfers is the 40-year water development planning statute, NMSA 1978, § 72-1-9 (1985). This statute allows municipalities and other named public entities to acquire and hold unused water rights for their "reasonably projected additional needs" for up to 40 years. The first issue, which is yet to be resolved, is whether a protestant to a water rights application has the right to challenge a municipality's 40-year water development plan. One side of the argument is that a 40-year municipal water development plan must be prepared and adopted by a municipality's governing body. The plan has significant financial ramifications; it affects the health, safety, and welfare of the community, and it greatly impacts the community's quality of life. These policy decisions that affect a municipality's future should be left to the governing body, with the Office of the State Engineer reviewing the plan to ensure it is acceptable for filing. By statute, this is not one of the criteria by which an application is evaluated and it should not be an issue for a protested hearing. On the other hand, some argue that protestants should be allowed to challenge a 40-year water development plan to ensure the water sought to be acquired is necessary.

If a municipality's 40-year water development plan is found to be a proper matter for protestants to challenge at hearing, the next issue will be the proper interpretation of the statute. One interpretation allows municipalities to determine the quantity of water that they can reasonably rely on in times of drought and to acquire new sources of water based upon reasonably projected additional needs. This interpretation is particularly essential for cities that rely heavily on surface water. The other interpretation that has been advanced limits municipalities by adding up water rights, whether or not they can be exercised in times of

drought, and compares them to a 40-year projected demand, and the difference is the limit of a transfer or new appropriation. These contrasting interpretations are present in several pending, protested applications. Adoption of the latter view would force municipalities to wait to address their water needs.

Emerging or Special Considerations for Water Rights Transfers

Many water rights transfers have unique considerations depending on the type of transfer sought.

Markets, Transactions, and Due Diligence

Because water rights are private property rights, value is determined on a market basis. Numerous factors must be taken into account in negotiating the price and the assumption of risk. The price of the water right is typically the starting point. The prospective purchaser will then undertake his due diligence to review the validity and extent of the water right. Whether a water right has been fully adjudicated in a final decree, partially adjudicated as between the individual and the State without an *inter sese* proceeding, declared, perfected, permitted, licensed, or had a proof of beneficial use filed are all important considerations. In addition, the chain of title must be reviewed for properly completed forms, instruments of conveyance, and notices of publication. The prospective buyer and seller can negotiate who will bear the risk and costs of an administrative proceeding before the State Engineer in which an application to transfer water rights can be approved, denied, or approved with specific conditions of approval.

Irrigation Districts

Irrigation districts typically have some nexus to the federal government, the State of New Mexico, and certain authority in the irrigation district itself. Generally, irrigation districts can change the place of use of irrigated land within their district without approval from the Office of the State Engineer.¹⁶ There are requirements, however, before such changes may take place. The change in place of use must be advertised, and the irrigation district must hold an open meeting to consider the proposed change in place of use. Members of the district that may be adversely impacted by the proposed change in place of use may protest at the meeting where the resolution is being

considered. The board of directors of the irrigation district must approve the change in place of use.

Recognizing the benefits of working together, the Elephant Butte Irrigation District (EBID) and the City of Las Cruces have started to establish, with the help of the Office of the State Engineer, an orderly process to transfer water from the irrigation district to municipal use. EBID recognized that some farmland was going to be lost to urbanization and risked decreasing the land base on its assessment roles. The City of Las Cruces is fully dependent on groundwater and needs to diversify its water supply to include surface water so it can use both sources of water conjunctively. Las Cruces' goal is to handle growth through surface water and to reserve as much groundwater as possible as a drought reserve.

Together, EBID, the City of Las Cruces, and the Office of the State Engineer lobbied for and had enacted a law that allows the formation of Special Water Users Associations (SWUA).¹⁷ SWUAs are allowed to lease annual allotments within an irrigation district. The amount of the annual allotment can vary from year to year, just as each individual farmer's annual allotment will vary. Assessments are paid by the SWUA to the irrigation district and the district stays whole because all assessments continue.

Administration over these leases is shared by EBID and the Office of the State Engineer. Regulations are being promulgated that will establish criteria for all transfers of annual allotments of project water to ensure all statutory criteria are met. The SWUA will submit an application to the Board of Directors of the irrigation district. Notice and opportunity to protest is allowed by persons owning water rights within the district whose rights may be impaired. The Board of Directors then considers the transfer in its normal course, considers claims of adverse impacts on other district members, and approves the lease if it finds it to be in the best interest of the district. The State Engineer then reviews the Board of Directors' decision to ensure compliance with the rules and regulations. The State Engineer must issue a decision within 30 days and his decision may be appealed to the district court to determine whether the State Engineer's decision was made in accordance with the rules.

An issue that must be resolved is the federal government's role, if any, in the transfer of water rights from irrigation districts. The Miscellaneous Purposes Act of 1920 allows the United States to regulate conversion of water rights from agriculture to other

uses in irrigation districts in which it holds title. EBID and the Carlsbad Irrigation District have repaid their share of construction obligations and have obtained title to certain portions of their respective projects. Accordingly, they argue that they should not be restricted by the Miscellaneous Purposes Act of 1920.

The El Paso County Water Improvement District No. 1 (EP#1), the counterpart of EBID in Texas on the Rio Grande Project, entered into a conversion contract with the federal government that acknowledged that the United States holds title to the project and gives the United States a *pro rata* payment from every conversion contract. EBID does not believe that the United States has authority to be involved with transfers or conversions because the District has repaid its construction obligations. The City of Las Cruces has become involved in this issue because of its role in leasing annual allotments of project water. These parties are now litigating these issues in New Mexico Federal District Court, that is, whether the Miscellaneous Purposes Act of 1920 relating to conversion contracts is applicable in districts that have fully repaid construction obligations.¹⁸

Leases – Temporary Transfers

Pursuant to New Mexico law, water rights can be leased. The statutory scheme that governs water leases is NMSA 1978, § 72-6-1 *et seq.* One of the limits to water leases is that the initial and any renewal term shall not exceed ten years. However, municipalities and other entities covered by the 40-year planning statute, NMSA 1978, § 72-1-9 (1985), can lease up to 40 years. Water rights owned by a water right owner under an acequia or community ditch or by the acequia or community ditch itself, may only be leased for ten years.

In order to obtain a valid water rights lease, the lessor must file an application, subject to notice and protest. The grounds of protest are limited to impairment of existing water rights for water lease applications, although the State Engineer must ensure that the transfer is not contrary to the conservation of water within the State or detrimental to the public welfare of the State. At the termination of the lease, the water rights revert back to original purpose and place of use and point of diversion.

Transbasin Transfers

The most famous transbasin transfer in New Mexico is the San Juan-Chama Project. The San Juan-Chama Project diverts water from the Colorado River

Basin and transports it into the Rio Grande Basin. Another example is the transfer of water from the Pecos River Basin from Bonito Reservoir for use in the Tularosa Basin.

Transbasin transfers are expressly allowed by NMSA 1978, § 72-5-26 (1907). The same criteria applicable to intrabasin transfers also apply to transbasin transfers.

The issue of transbasin transfers within the State of New Mexico should be addressed in the regional water plans and the State Water Plan. With limited water resources, individual regions of the State may want to be parochial and limit transfers of water rights outside of a region. To maximize the use of the resource within the State and to encourage economic development, the State Water Plan should encourage the transbasin transfers of water to high demand areas.

Additionally, interstate compacts can and have affected intrastate transfers. For example, transbasin transfers are affected above and below Otowi gage as the Rio Grande Compact has been administered. Interstate compacts will have to be carefully reviewed as more pressure is brought to bear to move water across regions of the state to high demand areas.

Interstate and International Transfers

Because water is an article of commerce, embargos that prevent water from leaving the State are unconstitutional.¹⁹ New Mexico has a specific statute that allows transfers of water rights out-of-state, but only after application, notice, opportunity for protest, and consideration of specific criteria by the State Engineer.²⁰ Interstate or international transfers could also be limited by considerations in compacts, equitable apportionments, or other federal laws that have already allocated surface water resources among New Mexico, its neighboring states, and neighboring countries.

Native American Water Rights Transfers

Many existing and unresolved issues surround Native American water right transfers that will become of increasing importance in the future. Such transfers are likely to be in the form of leases. Issues must be resolved regarding the administration and regulation of these rights on and off reservations and pueblos.

The McCarran Amendment states that the states have the right to adjudicate federal reserved water rights on behalf of Native Americans in state adjudications and to administer those rights once

adjudicated.²¹ Nonetheless, state, federal, and tribal governments are seeking cooperative relations regarding the administration of federal reserved water rights of Native Americans. Who will regulate transfers and how transfers will be administered is an unresolved matter, and it will likely vary by tribe or pueblo.

Acequia and Community Ditch Approval of Transfers

Recent legislation provides the acequias and community ditches with the authority to approve or deny transfers to or from the acequias or community ditches under certain circumstances.²² The State Engineer cannot approve an application to transfer water rights unless the applicant has received permission from the acequia or community ditch and the acequia or community ditch has duly adopted applicable requirements. This restriction on the State Engineer's power applies to water rights held by individuals or the acequia or community ditch. The legality of these statutes has not been tested in court.

Water Banking

Water banks allow temporary transfers of water rights in an efficient and less burdensome way in terms of administration. Many western states, such as California, are encouraging water banks. The Office of the State Engineer's website has draft Lower Pecos River Basin Water Banking Regulations. Undoubtedly, water banks will be thoroughly debated and tried in New Mexico as vehicles to accomplish temporary, efficient transfers of water resources.

Restrictions on Transfers That May Result in Constitutional Violations

Laws that restrict transfers must be carefully tailored to avoid constitutional violations, including the commerce clause, equal protection, and the right of due process.²³ In addition, involuntary transfers of water rights through the Endangered Species Act can result in the taking of property without just compensation. This is not a transfer in the traditional sense, but it is a reallocation of resources vested under State law under the guise of federal environmental laws.²⁴

Additional Sources of Water have Some Potential to Ease the Demand and Need for Transfers, but None of These Will Satisfy All Additional Needs

The State of New Mexico has limited unappropriated water. One additional source of water is the desalination of brackish groundwater. This process has great potential to convert unusable, brackish water into potable water supplies for municipalities. As desalination projects are permitted and constructed in New Mexico, they will relieve pressure from existing fresh water sources, both in new appropriations of fresh water and in transfers.

Another alternative "source" of water is through aquifer storage and recovery. This does not create new water, but is more akin to water storage. Aquifer storage and recovery can work in some instances, but the timing and percent of recovery must be carefully evaluated. No applications for aquifer storage and recovery projects have yet been filed in New Mexico, although such an application has been considered by the City of Albuquerque and the City of Alamogordo.

Another alternative water source is available through the tertiary treatment and use of reclaimed waste water. The use of reclaimed waste water reduces demand on outdoor public recreation areas, parks, golf courses, cemeteries, construction, and other green spaces and non-drinking uses of water. Reclaimed water is extensively used today in the City of Alamogordo.

Some pressure on water supply can be reduced through conservation. Conservation can produce gains in both agriculture and municipal and industrial use, but not in the quantities that are currently needed.

CONCLUSION

As new appropriations of groundwater become less available and as there become fewer opportunities to obtain "additional" water from conservation and other non-traditional sources of supply, transfers will become more and more important for all forms of water resources planning.

ENDNOTES

¹ See NMSA 1978, § 72-5-1 *et seq.*

² See NMSA 1978, § 72-12-1 *et seq.* The State's first effort to enact groundwater code declared unconstitutional in 1929

³ This philosophical debate is discussed in more detail in *Public Policy Considerations in State Water Allocations and Management*, Charles T. DuMars (Adapted from the Proceedings of the Forty-Second Annual Rocky Mountain Mineral Law Institute 1996) and *The Current New Mexico Experience—Is the Water Market Working?* (Tim De Young, Water Law Symposium: A Legislative Briefing on New Mexico Water Issues, February 7-8, 1997).

⁴ See NMSA 1978, § 72-1-2.1 (1991)

⁵ See NMSA 1978, § 72-5-24 (1907), and NMSA 1978, § 72-12-7 (1931).

⁶ See *Templeton v. Pecos Valley Artesian Conservancy Dist.*, 65 N.M. 59, 332 P.2d 465 (1958).

⁷ See NMSA 1978, § 72-5-23 (1907) and NMSA 1978, § 72-12-7 (1931).

⁸ See NMSA 1978, § 72-5-26 (1907) and NMSA 1978, § 72-12B-1 *et seq.*

⁹ See NMSA 1978, § 72-5-24 (1907) and NMSA 1978, § 72-12-7 (1931).

¹⁰ See NMSA 1978, § 72-5-4 (1907) and NMSA 1978, § 72-12-3(D) (1931).

¹¹ See NMSA 1978, § 72-5-5 and NMSA 1978, § 72-12-3(D).

¹² *Id.*

¹³ *Id.*

¹⁴ See NMSA 1978, § 72-5-6 (1907) and NMSA 1978, § 72-12-3(D)(E) (1931).

¹⁵ A new approach to measuring drawdown levels in New Mexico is that of irrigation dynamic drawdown. This method was introduced for the first time at a hearing for the City of Alamogordo in October 2003 as a new means to assess impacts on existing wells. Irrigation dynamic drawdown analyzes the effects of a new well on existing wells *in a pumping condition* as opposed to in a static condition. A problem with irrigation dynamic drawdown is that it can protect inefficient or shallow wells and would bring in a whole new level of scrutiny to the construction and efficiency of every well by the State Engineer.

¹⁶ See NMSA 1978, § 73-13-4 (1935)

¹⁷ See NMSA 1978, § 73-10-48 *et seq.*

¹⁸ See *Elephant Butte Irrigation District v. United States, et al.*, No. 00-1309-BB, 2000 U.S. Dist.

¹⁹ See, e.g., *Sporhase et al. v. Nebraska ex rel. Douglas*, 458 U.S. 941 (1982); *El Paso v. Reynolds*, 563 F. Supp. 379 (D.N.M. 1983); *City of El Paso v. Reynolds*, 597 F. Supp. 694 (D.N.M. 1984).

²⁰ See NMSA 1978, § 72-12B-1 *et seq.* (1983).

²¹ See 43 U.S.C. § 666(a).

²² See NMSA 1978, § 72-5-24.1 (2003); NMSA 1978, § 73-3-4.1 (2003).

²³ See, e.g., note 19, *supra*.

²⁴ See *Tulare Lake Basin Water Storage Dist. v. U.S.*, 49 Fed. Cl. 313 (2001).

Tracy Seidman Hephner is a full-time rancher. She and her husband, John, share responsibilities on two ranches, seventy miles apart in Mora and Colfax counties. They raise commercial Brangus cattle, registered Corrientes, and ranch horses. Tracy served on the New Mexico Interstate Stream Commission for nearly fourteen years, under four governors and a progression of State Engineers. She has been actively involved in water planning since the regional legislation was enacted in 1986 as co-chair of the ISC Water Planning Committee, a director of the New Mexico Water Dialogue, and a member of her local planning group. She represented Mora County on the ISC Ad Hoc Committee of Regional Water Planners and at the recent State Water Planning Town Hall. In June 2003, Tracy was appointed by President Bush to the Board of Trustees of the Valles Caldera National Preserve. Tracy is a well-known basket maker, utilizing native materials and paying homage to Anasazi baskets fragments found in the nearby Canadian River Canyon. Her work has been shown throughout the West and has been featured in several national publications.



Joanne Hilton is a Senior Hydrologist at Daniel B. Stephens & Associates, Inc. She has a B.S. from the University of Arizona and an M.S. from Colorado State University, both in hydrology, and more than 15 years of experience conducting hydrological and water resource investigations. Her experience includes regional hydrogeologic investigations, regional water planning, groundwater/surface water interactions, preparation of 40-year water plans, surface water analyses, analysis of water policy and water rights, water quality investigations, groundwater supply investigations, and design and implementation of surface and groundwater monitoring programs. She has been the project manager for development of regional water plans for five New Mexico regions (Colfax, Jemez y Sangre, Socorro-Sierra, Mora-San Miguel and Southwest New Mexico), two of which have been accepted by the Interstate Stream Commission. The regional planning efforts have focused on synthesizing information regarding New Mexico surface and groundwater resources, water rights, institutional and policy issues, and future water demands. Water resource alternatives considered in the planning efforts include options such as agricultural water conservation, watershed management, desalination, drought contingency planning, and improvements to infrastructure. In addition to her regional water planning experience, Joanne has also worked on the wetlands restoration, water supply development, development of water quality standards, groundwater monitoring, and watershed management projects.



A RURAL PERSPECTIVE ON REGIONAL WATER PLANNING FROM THE MORA-SAN MIGUEL WATER PLANNING REGION

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The Mora-San Miguel Planning region encompasses all of Mora and San Miguel counties in north-central New Mexico (Figure 1). The region contains portions of both the Canadian River and the Upper Pecos River, as illustrated on Figure 2. These two river systems provide the primary water supplies for the region.

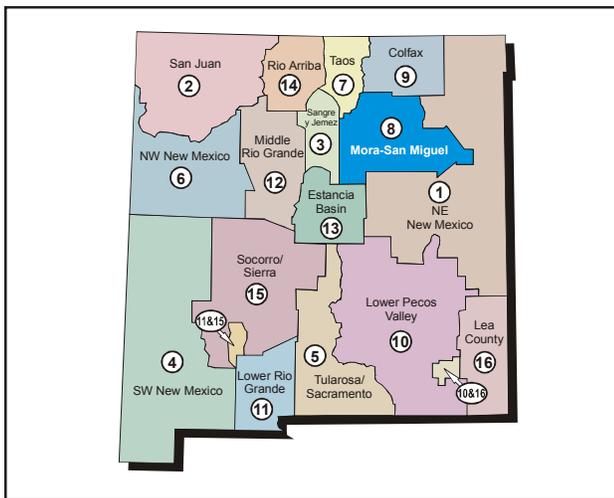


Figure 1. Location of Mora-San Miguel Planning Region

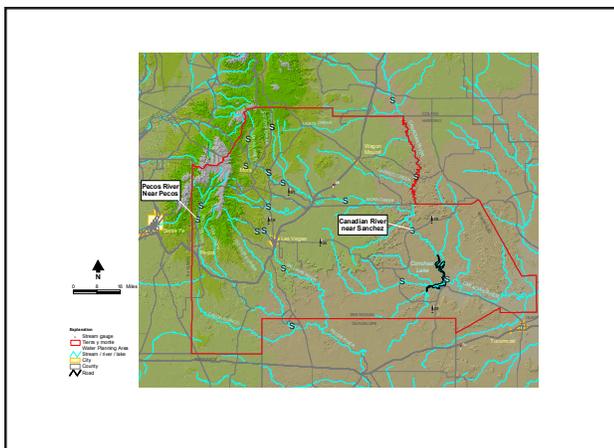


Figure 2. Surface Water Resources

The population of Mora County is about 5,200, and the San Miguel population is about 30,000. Both of these rural counties are growing, especially along the Interstate 25 corridor near Santa Fe. Mora County is expected to reach a population of 6,000 to 8,500 in the 40-year planning period, and the San Miguel County population is expected to be 44,000 to 54,000 in the same time frame. Much of the population of San Miguel County is clustered around Las Vegas, New Mexico.

The vast majority of the water supply in the Mora-San Miguel region is provided by surface water. Greater than 95 percent of the Mora County water use is for irrigated agriculture (Figure 3). In San Miguel County, surface water also represents more than 95 percent of the water use, with irrigation and reservoir evaporation the primary uses (Figure 4). Though groundwater use is small, it is an important supply for domestic and stock wells and provides a portion of the municipal supply for the City of Las Vegas. Groundwater is present in two Office of the State Engineer (OSE) declared basins (the Canadian and Upper Pecos) and in undeclared basins in the southeastern portion of the planning area.

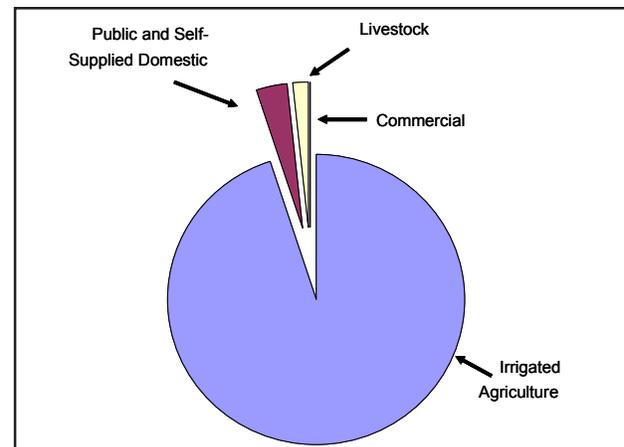


Figure 3. Mora County Water Use in 2000

A Rural Perspective on Regional Water Planning from the Mora-San Miguel Water Planning Region

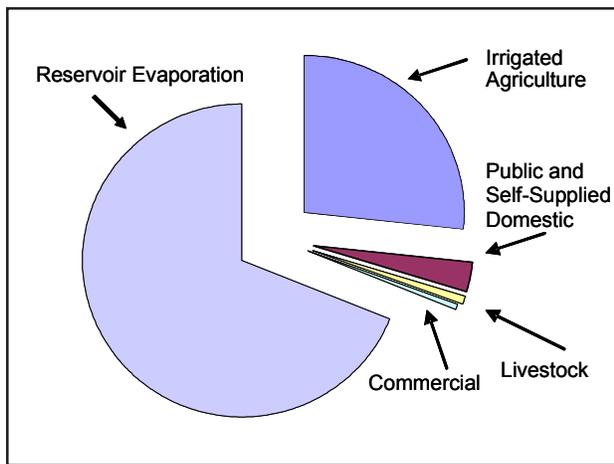


Figure 4. San Miguel County Water Use in 2000

In Mora and San Miguel counties, there are 116 acequia associations and 70 domestic water systems. These large numbers of relatively small systems covering the large planning area present a unique water planning challenge in terms of bringing together water users in the region. Many of the residents in the rural areas can trace their lineage back hundreds of years on the same family land, and for these residents, the acequia systems still form the basis of community and sustenance. Preservation of the acequia systems and irrigated agriculture in the region is therefore an important water planning goal.

Like many other picturesque places in New Mexico, Mora County has been discovered by wealthy newcomers, and many large ranches have changed

hands over the past few years. Many of these new ranchers, who in some cases come from places where water is more abundant, have taken advantage of a provision in state law that allows ranchers to build ponds of less than 10 acre-feet without a permit and have built multiple small ponds for scenic appeal or for fish and waterfowl.

The many acequias of Mora County depend on that same water to feed their farms and families. Accustomed to sharing shortages, the local irrigators had assumed that the lack of water flowing down the Mora River was due to drought. However, it appears that the new ranch owners, many of whom neither actively ranch or farm, have captured water considered the lifeblood of the downstream communities. Unfortunately, as is common in rural areas, senior water rights holders often do not have the resources to successfully implement legal challenges to the upstream diversions. Even with recent stock pond legislation, the question of how to address these impoundments continues to challenge the communities.

Other key water issues facing the planning region include:

- Because the acequia systems and many of the domestic water systems rely on surface water, vulnerability to drought is also a key issue in the planning region. As shown on Figure 5, supplies vary greatly between wet and dry years, and in dry years the available supply is insufficient to meet demands.

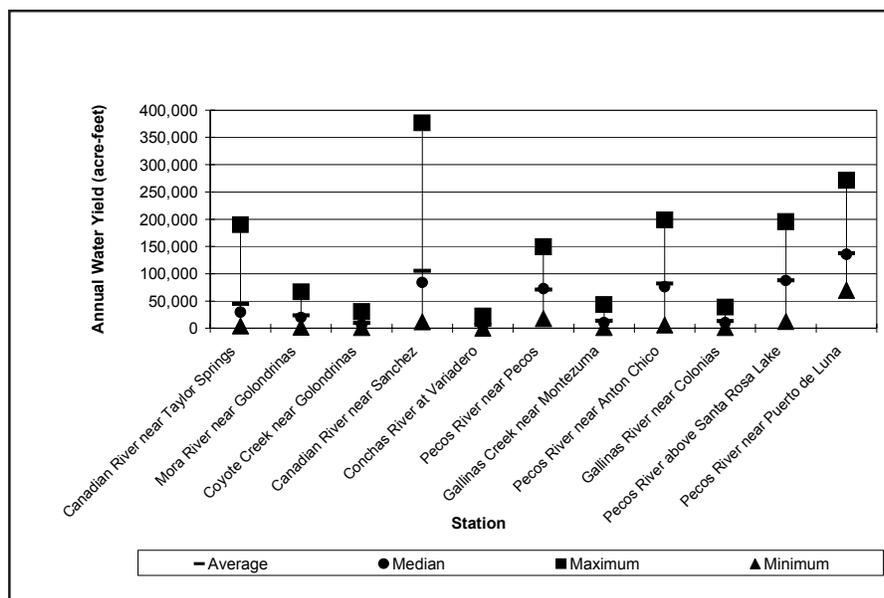


Figure 5. Annual Water Yield, 1950-2002

- Improving the efficiency of agricultural deliveries and crop production, particularly when supplies are short, is also a key planning objective for the region.
- In conjunction with drought vulnerability, the dependence on surface water supplies creates a vulnerability to forest fires and potential sedimentation of reservoirs.
- A New Mexico Supreme Court decision that granted the City of Las Vegas water rights of historic significance (deemed pueblo water rights) helped secure water for the City. A group of irrigators in outlying communities, joined by the OSE, later asked the Court to reexamine its decision. The case has traveled through the state court system and now rests again with the New Mexico Supreme Court. Whatever the verdict, it will bring change and challenge to San Miguel County.
- In the undeclared areas, citizens have no recourse when new water users impair existing users.

In summary, the changes facing rural communities all over New Mexico are present in the counties of San Miguel and Mora. Their citizens struggle to maintain a treasured way of life in the face of increased demand for water and financial resources. The rural nature of the planning area presents both some obstacles and some opportunities for regional water planning. The size of the area presents logistical challenges in bringing together the various stakeholders. Conversely, the smaller population as compared to the urban planning regions makes it easier to work together on water issues.

Bob Wessely is serving his third year as Chair of the Water Assembly, organizing the regional water planning effort for the Middle Rio Grande Region – Sandoval, Bernalillo and Valencia counties. Prior to working with the Assembly on water issues, he co-founded SciSo, Incorporated in 1971 to provide expert consulting services on large scale scientific, engineering, and software systems. He was responsible for business development and for the technical execution of systems engineering projects in support of commercial businesses and major government prime contractors. Bob's Ph.D. is in theoretical solid state physics from Rutgers University.



REGIONAL WATER PLANNING IN A MIXED URBAN, RIVERINE AND RURAL AREA — THE MIDDLE RIO GRANDE

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ABSTRACT

The Middle Rio Grande Region: Sandoval, Bernalillo, and Valencia counties. Three main watersheds. Two-fifths of the State's population. Predicted doubling in fifty years. Over 12 tribal entities. Over 18 local government entities. Over 130 public water supply providers. More than 30 acequias. Habitat for endangered species. Sixty percent of the State's economy. Substantial agricultural interests. Heavily studied hydrology. A seriously drawn down aquifer. A leaky transmission line for meeting downstream water obligations. And thirsty neighbors.

On average, we had about 15-18 percent more rainfall than in the last two millennia. On average we consumed 15-23 percent more water than was renewed. And we recognized that our aquifer sources of underground water were severely limited. All three of these occurred in the last quarter of the twentieth century.

“Balance Water Use with Renewable Supply.” That's our adopted regional water planning Mission. Some say it's a mission impossible. We want to continue to have enough affordable, quality water to meet human and environmental needs while maintaining our desired New Mexican life styles - for generations to come.

The Water Assembly, a grass roots organization of diverse interests, entered a partnership in 1998 for regional water planning with the Mid Region Council of Governments, a voluntary association of local governments.

The controversial draft plan is now in its public review cycle. It is the result of an extensive public meeting and technical analysis process, touching nearly 3,000 members of the general public to guide the plan. In addition, it involved about 30,000 person-hours of Water Assembly volunteer labor and expertise, a contribution comparable to paid staff and funded consulting support.

This Region had both the blessing and the curse of extensive hydrological studies. These studies allowed us to understand our serious deficit spending situation, enabled endless debate on whose study was ever so slightly better, and obligated us to try to quantify our planned remedial actions.

The presentation discusses the steps and the logical flow from obtaining early-on public and technical input, through the ingestion of diverse stakeholder interests, identifying 44 candidate alternative actions, to having a documented plan with its family of recommendations.

In aggregate, we did not find the single silver bullet that will solve our shortfall situation. We see that nearly all of the candidate actions will have to be implemented, at least to some extent, so as to have a chance of achieving the Mission.

The overall resulting scenario is one of balancing interests. It describes a sharing of the impacts. It will take intense conservation on the part of all individuals, sectors, and jurisdictions. There will be incentive, regulatory, volunteer, engineering, and cost actions. It will take across-the-board moderation – moderation in our indoor uses, moderation in our lawn and garden uses, moderation in our land and water recreational facilities, moderation in our municipal and industrial uses, moderation in our agricultural activities/uses, moderation in our environmental needs/uses, and moderation in our new users/uses.

We see the difficult part as yet to come. The water plan is a set of recommendations to individuals, to businesses, to non-governmental organizations, to communities, to local governments, to state government, to tribes, and to federal agencies.

Now the challenge before the Region is building the support by these entities to follow through with actions to implement the recommendations. Each person, each entity will have to think cooperatively and broadly - beyond the boundaries of their individual

jurisdiction, beyond the duration of their term of office, beyond traditional special interests, and beyond our current generation.

INTRODUCTION

The purpose of this article is to review the regional water planning issues and process in a mixed urban, riverine and rural region. This review can serve as a counterpoint to a similar discussion of a primarily rural region, Mora-San Miguel². The Middle Rio Grande Regional Water Plan is scheduled for completion and delivery to the New Mexico Interstate Stream Commission in early 2004³. After establishing the setting for the planning, we will look at the major regional issues we have identified, discuss our publicly driven process, the results up to this point in time, and then note how we see the planning going in the near future.

OUR SETTING FOR THE PLAN

The following paragraphs briefly identify the region for water planning and the planning entities that are involved:

Middle Rio Grande Region

The Middle Rio Grande region is one of sixteen regions in the State of New Mexico (Figure 1). In the early 1990s, New Mexico was divided into these regions according to a combination of political and hydrological criteria - hydrological because that's the way the physical world acts and political because that's the way any regulatory and incentive implementation actions are likely to be taken. Our region is Sandoval, Bernalillo and Valencia counties, spanning much of the Rio Grande basin in the upper half of the Rio Grande Compact apportionment reach. The region is quite diverse including the Albuquerque/Rio Rancho urban area, farming areas, and very lightly populated desert areas. We have three main watersheds flowing generally from north to south - the Rio Puerco on the west, the Rio Jemez in the north central and the Rio Grande in the east (Figure 2). The people in the Rio Puerco and Rio Jemez watersheds chose to plan for water separately from the "mainstem" Rio Grande. This article will mainly address the mainstem, treating the Rio Puerco and Rio Jemez simply as tributaries to the Rio Grande.



Figure 1. In the early 1990s, New Mexico was divided into sixteen political/hydrological regions for purposes of Water Planning.

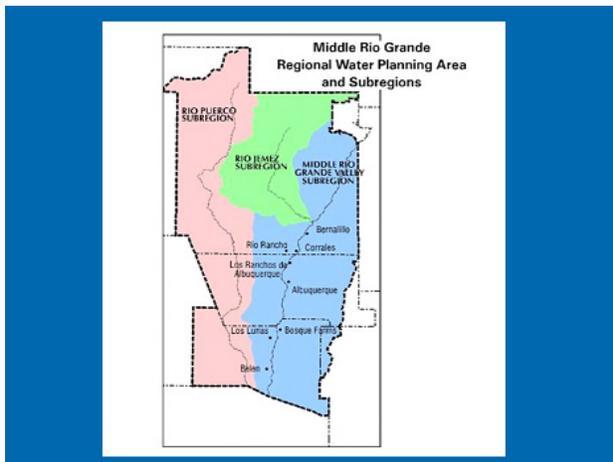


Figure 2. The Middle Rio Grande Region consists of Sandoval, Bernalillo and Valencia Counties. It contains portions of the Rio Puerco, Rio Jemez and Rio Grande watersheds.

Water Planning Partnership

The co-equal partnership between the Water Assembly and the Mid-Region Council of Governments was established in late 1998 to accomplish the regional water planning. While there was and is substantial overlap of roles, the Water Assembly has been mainly responsible for the plan development. The Mid-Region Council of Governments' Water Resources Board has been responsible for establishing plan implementation.

The Water Assembly failed to obtain more than superficial participation from the pueblos on the Rio Grande, despite efforts and desires to involve them actively.

The Water Assembly is an independent, all volunteer, grass roots, not for profit organization that

was established in 1997⁴, following up on a request from the State Engineer to the University of New Mexico to set up an independent water planning process for the region.

The Water Assembly is made up of five internally diverse constituency or advocacy groups so as to balance and draw in the expertise and various viewpoints about water:

- Agricultural, Cultural and Historic Water Use Advocates
- Urban Users and Economic Development Advocates
- Environmental Advocates
- Water Managers – utilities and cooperatives
- Specialists – hydrologists, lawyers, engineers, etc.

Then, to accomplish the needed planning activities there are six working teams, all coordinated by an Action Committee and its supporting Executive Committee.

The Mid-Region Council of Governments is a voluntary association of local government entities in a four county area⁵. It was established in 1967 for the purpose of regional transportation planning and coordinating federal funding for transportation projects.

The Council of Governments established a Water Resources Board with representation from governments within the water planning region in 1998 to deal with water issues:

- Municipalities
- Counties
- Special Districts
- Other Governmental Entities

Supporting this Board and its Water Providers Council, the Council of Governments staff included an Executive Director, a Water Planning Coordinator and all important Office Staff.

OUR REGIONAL ISSUES

The Region has physical/hydrological, human, and institutional issues, all of which bear on the water planning process:

Regional Water Budget

The regional water budget shows an ongoing deficit spending of water during the last quarter of the twentieth century. With data drawn from the twenty-six year period 1972 through 1997, we see an average

of 261 thousand acre feet per year⁶ (kafpy) of renewable supply balanced against an average 316 kafpy of consumptive use (Figure 3). That reflects an annual deficit spending of 55 kafpy, enough water to fill a football field to a depth of about eleven miles.

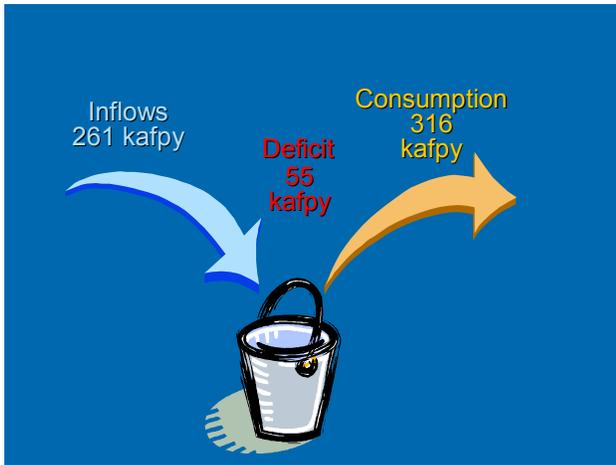


Figure 3. Summary of the Regional Water Budget. During the last quarter of the twentieth century, the region had an ongoing annual deficit spending of water. The planning mission is to eliminate the deficit.

These numbers were calculated primarily from The Water Budget 1999⁷. As with all hydrological data and reports, qualifiers are important. Key qualifiers include:

- All of the numbers we deal with are estimates and are coarse approximations (As examples, other studies show deficits 41 kafpy⁸, 60 kafpy⁹, and more¹⁰).
- Average delivery water southward has been excluded from inflows and outflows (Socorro/Sierra uses, Elephant Butte evaporation, and Rio Grande Compact deliveries).
- Heron Reservoir was being filled with regional inflows during the data period.
- Changes in Elephant Butte Reservoir content were not incorporated.

A breakdown of this budget appears in Figure 4. The data in that figure include the 169 kafpy average consumptive use of water by the downstream Socorro/Sierra Region, embedded among the inflows and explicitly identified as a downstream outflow.

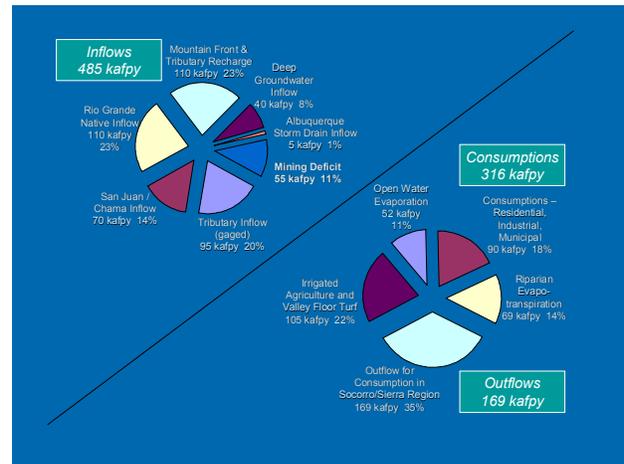


Figure 4. Breakdown of the Regional Water Budget. In this heavily urbanized region, residential/industrial/municipal consumption, irrigated agriculture consumption, and riparian/open water consumption each represent about a third of the total regional consumption.

A USGS Report¹¹ corroborates the indications of significant deficit spending over the period through a chart showing the drawdown of the aquifers in the Albuquerque area (Figure 5).

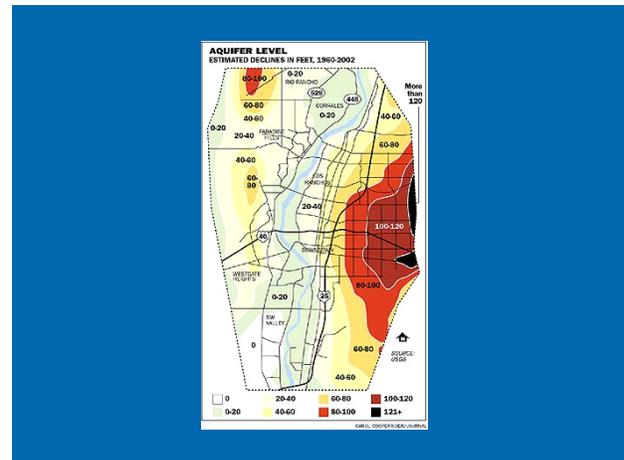


Figure 5. Cones of depression show a lowering of water table levels in excess of 120 feet on the east side of Albuquerque since 1960.

Now that we have noted the deficit spending during the last quarter of the twentieth century, we can take a bit longer term view. Figure 6 shows tree-ring precipitation data at El Malpais (about 75 miles west of Albuquerque) across a 2000 year period¹². The figure depicts a 100 year running average of single year data. We should take caution from the indication that the last quarter of the twentieth century shows as the wettest quarter century in 2000 years.

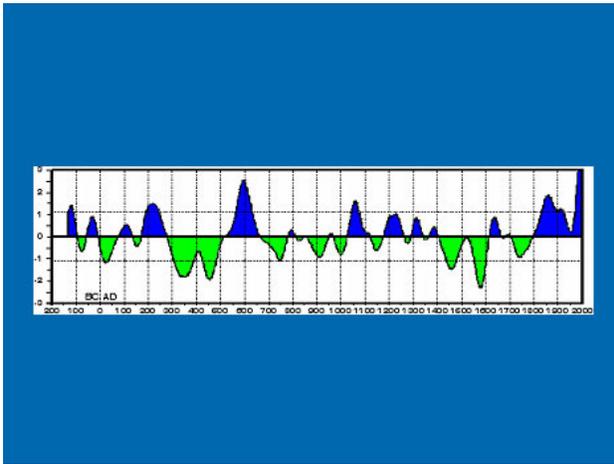


Figure 6. Reconstruction of 2000 years of Precipitation at El Malpais from Tree Ring Study (inches of precipitation relative to the 14.5 inch average). The last quarter of the twentieth century, the period of devicit spending, was relatively wet.

As a qualifier, it should be noted that the 100 year running average gives a slanted picture of the infamous 1950s drought. The annual data shows that the drought was quite intense, dipping well below the chart bounds, but was relatively short lived at that level. The 100 year averaging makes the 1950s appear to have occurred during just-above-average rainfall.

Our demand for wet water relative to renewable supply essentially places us in a perpetual state of drought, characterized by intermittent periods of newsworthy drought intensity increases. This entire plan for water management is effectively a drought management plan.

Selected Regional Attributes

Characteristics of this region had and continue to have great influence on the planning process:

- Over 12 Tribes – possessors of unquantified prior and paramount water rights
- Over 18 Local Government Entities – each with its own issues and goals
- Over 30 Acequias – ancient traditions and governmental authorities
- Over 130 Public Water Supply Providers - each with its own rules and procedures
- 40% of the State’s Population, Predicted Doubling – within about 50 years
- 60% of the State’s Economy – industrial/urban job center
- Substantial Agricultural Interests – major water user under market pressures

- Habitat for Endangered Species – newly enforced demands with implicit water rights
- Heavily Studied Hydrology – provides both knowledge and debates
- A Seriously Drawn Down Aquifer – dwindling asset base having risks for our future
- A Leaky Transmission Line for Downstream Uses – impacting compact obligations
- Thirsty Neighbors – no one is offering the Region new fresh water

However, as with the hydrology, we need to remember that there is negligible return on trying to make the above quantities overly accurate or precise. Measurement quality is often not there. The choice of study assumptions make for disparities. And regulatory/incentive tools to influence the situation are blunt instruments. All we really need are numbers that are close enough to convey their respective messages.

Water Planning Focus

A water planning focus is needed because the problem is too complex to tackle all at once. We have chosen four key foci:

- We should recognize the region’s role in **broader issues** than just within our boundaries. For example, meeting the Rio Grande Compact obligations is rigorously the State’s responsibility. However, since we are the major consumer of the State’s allocation, we believe we really need to consider this obligation in our planning. Further, it’s really an arbitrary choice of semantics. Either we consider the amount of impending shortfalls in meeting the Compact, or we consider the amount we need to reduce our consumption within the Region when the State preempts enough supply to meet the Compact - same problem, same numbers, different words.
- We chose to deal with **wet water**, the kind you can pour and drink. This is as distinguished from paper water or water rights. Paper water is essentially a license to use wet water if you can find it, and we appear to have three or four times as much paper water as we have wet water. Without denigrating the importance of water rights and associated ownership prerogatives, we felt it to be of first importance to assure our collective ability to find enough water.

- We also decided to focus on **averages**. The Region's water supply is highly variable. It can vary as much as by factors of three from year to year. We wished to concentrate on the multi-decade term, rather than transient remedies for this year's lower than normal precipitation or next year's higher than normal snowmelt.
- We chose to concentrate on **consumption or depletion** of water. That is the water that evaporates out of the system or is combined into plant life. Once it has evaporated, it is really gone. We get no credits when the vapor drifts out across state lines. We make this choice instead of counting diversions (or rerouting) of water and return flows, where the same drop of water can be diverted and counted multiple times as it flows from Colorado to Texas.

Through an extensive public process (see below) we chose "Balance Water Use with Renewable Supply" as the mission for the Regional Water Plan. The key figures of merit relative to this mission became the aquifer depletion implications and implications for compliance with the Rio Grande Compact obligations. In the process of dealing with these implications, however, the important and most intensely debated issue was how to maintain a strong balance among side effects in areas such as the environment and species, water rights prerogatives, decision making authorities, deep traditions and ancient cultures.

OUR PUBLIC-DRIVEN PROCESSES

The Interstate Stream Commission's Regional Water Planning Handbook¹³ declares that besides a sound technical basis, public involvement in the regional water planning process is important. We took that guidance very seriously. Rather than develop a plan through a consultant and then bring the plan to the public for ratification, we chose the reverse - to involve the general public from the very beginning.

Overall Objective

The overall objective was to find a broadly acceptable solution to a difficult and complex problem, via an open, inclusive and participatory process. We identified the planning problem to be continuing to have sufficient affordable clean water to meet human and environmental needs while maintaining all of our desired New Mexican lifestyles.

These are very stringent constraints. If we were willing to remove any of the above requirements, the problem would become substantially easier. For instance, at \$169.9 per gallon, we could have all of the highly purified water we could ever want. However, for example, in Albuquerque we are accustomed to paying somewhere between one and two tenths of a cent per gallon for tap water. Nearby municipalities are somewhat more, and irrigation water is less. In all cases, the charges are for delivery systems, not for water. How high a price is "affordable" and is politically acceptable without having a debilitating impact to the economy?

Key Components

The key components in the planning process were public involvement, technical integrity, governmental involvement, and the planning infrastructure. Throughout the planning period, there were ongoing and iterative information exchanges among the components.

The public involvement component included the Water Assembly as well as the general public at large. Technical integrity was aided through understanding of the Region's hydrology, analyses of alternative actions, and computer modeling. We involved the local governments directly and through the Council of Government's Water Resources Board, and conducted dialogue with acequia, state, federal and some tribal entities. For the process of developing a deliverable plan, we had the need to maintain administrative and documentary infrastructure.

The public ingredients in the planning process are illustrated in Figure 7. Over the seven-year period and through far more than 100 general public meetings throughout the region, we gathered and ingested public input on topics. This is indicated in the upper row of boxes, from visions and values through goals, action suggestions and building scenarios. The lower row of boxes identifies the kinds of events that were conducted along the way, annual assemblies, community conversations, telephone surveys, and briefings.

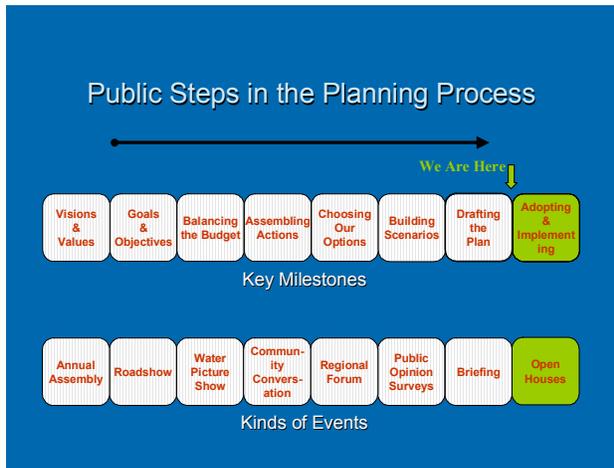


Figure 7. Involving the General Public in the Process from the Very Beginning. Key milestones reflecting topic discussions and the events in which the discussions took place.

The technical ingredients were developed interactively across the same time period and are similarly shown in Figure 8. The upper row indicates the technical products that we obtained from water budgets to future predictions to action analyses and the lower row indicates the sources that were used to develop those products, both volunteer expertise and funded consultants.

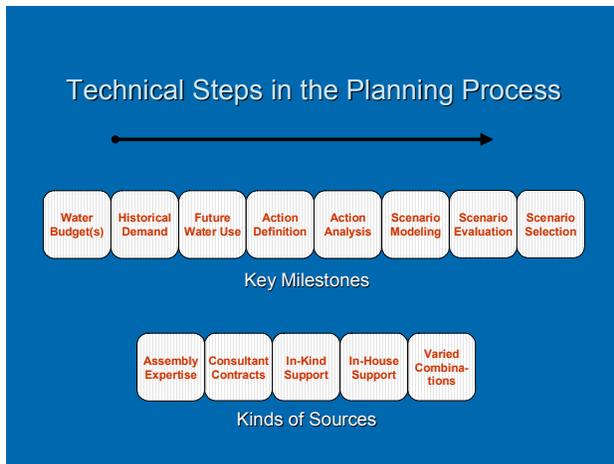


Figure 8. Ensuring the Technical Integrity of the Process. Milestones showing the technical products that were used to keep the public process on track. These were developed from various sources of expertise.

The governmental involvement took place through numerous briefings to local, state, tribal and federal staffs as well as to local elected officials. In addition, the members of the Water Resources Board served to some extent as a two-way communication link between the represented local governments and the detailed water planning process.

The documentary infrastructure was characterized by a thirty page “Annotated Table of Contents” that was developed relatively early on in the planning process. Being tailored from the Regional Water Planning Handbook, it identified about 100 chapters, sections, and paragraphs to be placed in the plan, along with a textual description of the intended content of each. Water Assembly working teams, per their respective expertises, populated those paragraphs as the indicated information became sufficiently developed.

A flow for organizing the public input and technical data, and for making decisions is depicted in Figure 9. As we proceeded in developing the plan in an attempt to meet the developed mission, goals and objectives, we gathered some 270 suggestions from the public and from the experts about possible actions. These were massaged into 44 “alternative actions” whose separate implications were analyzed. These alternative actions were gathered into five planning “scenarios” based upon advocacy emphases and later merged into a single “preferred scenario.” The preferred scenario was then mapped into a set of 43 recommendations in the plan document.

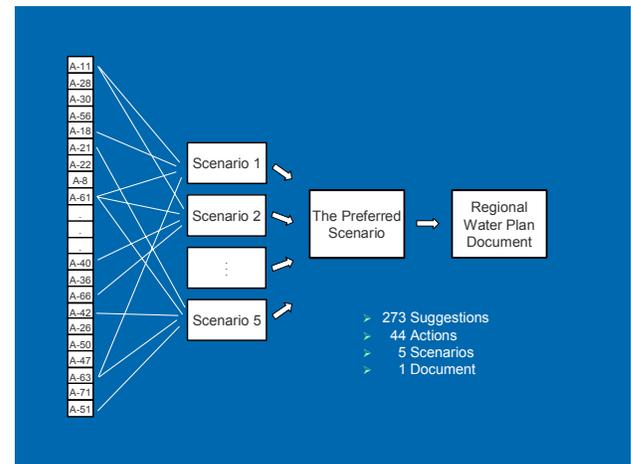


Figure 9. Converging Public Suggestions into a Plan. Suggestions led to Alternative Actions. Analyses, Modeling, and Viewpoints led to Scenarios. A blended “preferred” scenario became the basis for the plan’s recommendations.

Computer modeling supported the selection and evaluation of scenarios. Scenario development teams used the model as partial guidance in setting and re-setting scenario parameters. The model was also effective as a demonstration and education tool during general public meetings.

The Water Assembly and Sandia National Laboratories cooperatively developed the computer model to help in the planning process. The intent was to allow the model user to adjust numeric parameters regarding alternative actions, and then to observe the water and cost implications of a collection of such adjusted alternative actions. Some of the key attributes that went into and/or came out of the modeling were:

- The use of a multi-constituency management team to help with model credibility
- Identification of model adjustables and water figures of merit near the outset
- Use of the model as a public education tool
- Being able to see the model results in real time
- Having the model usable for evaluation during scenario building
- Performing figure of merit sufficiency checks on a collection of actions
- The necessity to recognize that the model has limitations
- The importance of applying model results with good judgment

Figures 10, 11, and 12 are annotated images of model screens. The left side of Figure 10 indicates the categories of adjustments that the user can make (Bosque, agriculture, residential, etc.). Figure 11 is a typical adjustment screen showing parameter adjustment slider bars whose positioning the user can control with a mouse. And Figure 12 depicts figure of merit plotted from 1960 through 2050. For each graph, one curve is the “no-action” data and the second curve shows the results with the full collection of slider bar adjustments.

RESULTS TO DATE

The plan is close to completion. The draft plan was built to closely track the attributes identified in the Regional Water Planning Handbook. However, we did make some adjustments to meet the needs of the Region, to consider some broader implications, and to acknowledge our limited resource situation. Key content items in the draft plan include:

- Technical Background and History
- Actions and Analyses
- Future Budgeting
- Preferred Scenario
- Recommended Actions
- List of Projects
- Public Welfare Statement

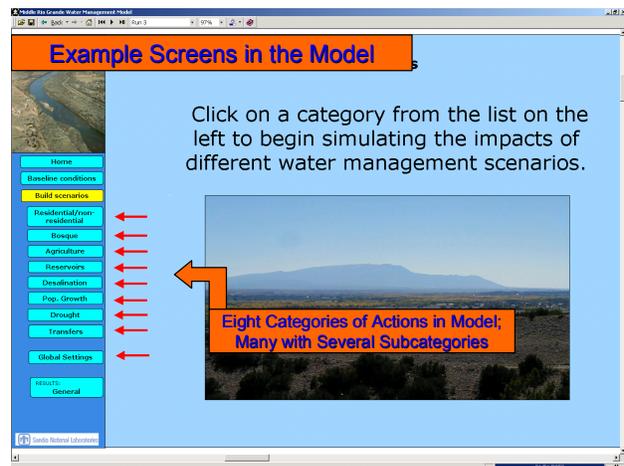


Figure 10. A Human-Usable Computer Model allowed the scenario builders to explore the quantitative implications of collections actions, using some 60 adjustable parameters.

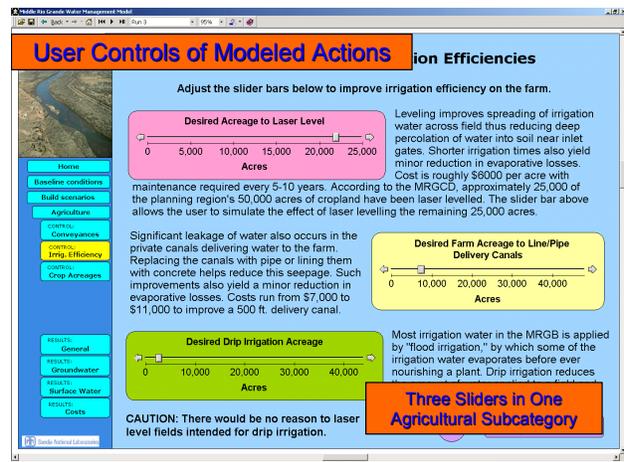


Figure 11. In building/evaluating their scenarios, users set and re-set parameters of multiple selected actions, by using a mouse to move a pointer along the calibrated slider bar.

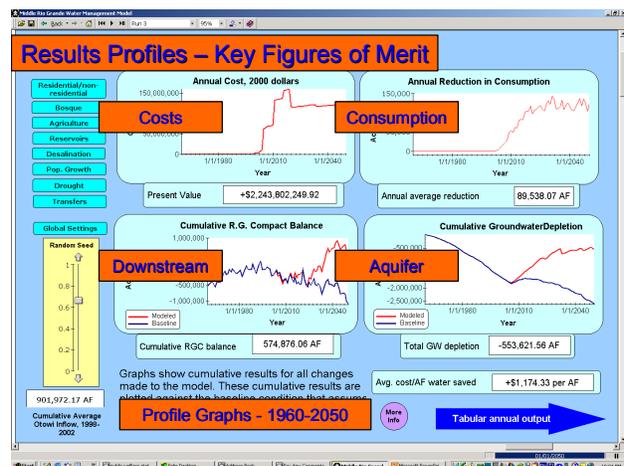


Figure 12. The main model results appeared in real time as graphs depicting surplus/deficit on obligations and aquifer impacts, along with the associated costs to implement/maintain and water savings.

- Implementation Strategies
- Shopping List of Tools for Implementation

The intent of the preferred scenario was to balance the water budget. We had to select from among the candidate alternative actions. Our conclusion was simply that we have too many “needs” and too little water. We need to adopt/recommend nearly all of the alternative actions. The real question was how much of each? The considerations here included:

- Current Overspending
- Population Doubling
- Environmental Obligations
- Downstream Obligations
- Lifestyle Considerations
- Economy Needs for Cheap Water
- Minimal New Water Sources

It became clear that there would be no single “silver bullet” to solve our problems. There would have to be many actions in many spheres to even come close. Further, we found for the diverse region, there was no “one size fits all.” Each locale (e.g., local government) would have to determine which and how much of the recommendations to actually implement. And because of the time needed to implement change, the modeling suggests that we may see compact shortfalls lasting many years, and the resultant need for additional urgent action. Regularly, the underlying political issue, topic after topic, was the dichotomy between individual rights/desires and community rights/desires, which drove an ongoing balancing act.

OUR COMING ATTRACTIONS

The controversial draft plan is now in its public review cycle. It is the result of an extensive public meeting and technical analysis process, touching nearly 3,000 members of the general public to guide the plan. In addition it involved about 30,000 person-hours of Water Assembly volunteer labor and expertise, which contribution was comparable to about \$1.2 million of paid staff and funded consulting support.

Where do we go from here? In the short term, we have acceptance of the draft plan yet to accomplish – open house reviews with the general public, draft review and critique by the Interstate Stream Commission, and acceptance by the local governing bodies in the Region.

However, the difficult issue is the longer term one - implementation or how do we keep the plan from gathering dust on a shelf? The Regional Water Plan has no authority. It contains only recommendations. Various types of action on the specific recommendations must be taken. These include:

- Incentives/Exchanges
- Regulatory/Enforcement
- Volunteer/Social
- Education/Media
- Engineering/Construction
- Substantial Funding

The work is just beginning. We need to encourage the decision makers at various levels to take action (individual, local, state, tribal, and federal). We see a serious challenge for each person and for each entity. The very difficult challenge is to think wisely:

- Think Cooperatively
- Think Broadly
- Think Water

And that challenge means doing things many of us are not accustomed to. We need to think and act for our grandchildren and their grandchildren:

- Beyond the Boundaries of Our Jurisdiction
- Beyond the Duration of Our Term of Office
- Beyond Our Own Special Interests
- Beyond Our Current Generation

If we choose to address the problem together (Figure 13), we in the Region and the State can meet the challenge.



Figure 13. Two of the biggest obstacles to a healthy water future are long term apathy and denial.

ENDNOTES

¹Contact the author via Wessely@sciso.com or (505) 259-7842.

²Tracy Seidman Hephner and Joanne Hilton, *A Rural Perspective on Regional Water Planning from the Mora-San Miguel Water Planning Region*, NMSU Water Resources Research Institute, 48th Annual New Mexico Water Conference, November 6, 2003.

³The Regional Water Plan as well as other planning data appears on the website WaterAssembly.org.

⁴Contact the Water Assembly via WaterAssembly.org or (505) 867-3889.

⁵Contact Mid-Region Council of Governments via www.mrcog-nm.gov or (505) 247-1750.

⁶One acre foot of water is approximately 326,000 gallons.

⁷Action Committee of the Middle Rio Grande Water Assembly. *Middle Rio Grande Water Budget: Where Water Comes From, & Goes, & How Much – Averages for 1972-1997*. Middle Rio Grande Water Assembly, October 1999.

⁸S.S. Papadopulos & Associates, Inc. *Middle Rio Grande Basin Water Supply Study*. Prepared for the New Mexico Interstate Stream Commission and the U.S. Army Corps of Engineers, Albuquerque District, under contract no. DACW47-99-C-0012. Boulder, Colorado, August 2000.

⁹Bartolino, James R. and James C. Cole. *Ground-Water Resources of the Middle Rio Grande Basin, New Mexico*. U.S. Geological Survey Circular 1222. 2002.

¹⁰S.S. Papadopulos & Associates, Inc. *Middle Rio Grande Water Supply Study, Phase 3 DRAFT*.

¹¹Bexfield, Laura M. and Scott K. Anderholm, *Estimated Water-level Declines in the Santa Fe Group Aquifer System in the Albuquerque Area, Central New Mexico, Predevelopment to 2002*. US Geological Survey Water-Resources Investigations Report 02-4233, December 2002.

¹²Grissino-Mayer, Henri D. "Climate Reconstructions." Last updated June 1, 1999. <http://www.valdosta.edu/~grissino/geog1112/henri.html>. December 15, 2003.

¹³ New Mexico Interstate Stream Commission, *Regional Water Planning Handbook*, December 1994.

Karl Wood was named director of the New Mexico WRRRI in June 2000. He joined the NMSU faculty in 1979. Prior to his tenure at the WRRRI, Karl was assistant department head and range coordinator for NMSU's Department of Animal and Range Sciences. Much of his research over the years has been related to water resources and for 20 years, he was a member of the Range Improvement Task Force. Karl completed a B.S. in forestry and range management and an M.S. in range science with field emphasis on soils and range improvements, both from the University of Nevada/Reno. In 1978, Karl received a Ph.D. in range science with field emphasis on watershed management from Texas A&M. Karl has nearly 150 journal articles, research bulletins, special reports and conference proceedings publications to his credit, mainly in the areas of range hydrology, range vegetation and soil assessment, and rangeland management, including reclamation of disturbed lands, range improvement techniques, grazing systems and management of rare and endangered species.



WHY DO WE NEED RESEARCH FOR REGIONAL AND STATE WATER PLANNING IN NEW MEXICO?

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Regional and state water plans need extensive information, which is not always available. Additional research and information gathering is required because of spatial and temporal variability that is found in a state of immense physiographic and cultural diversity. How do we get the best information for regional and state water plans? Information is acquired from literature reviews, public input, expert witnesses, and new research.

There are basically four reasons to do research. The first reason is curiosity, and this leads to basic research, which may not have any apparent applications. An example is the exploration of Mars,

which currently probably does not affect many human lives on Earth, but the results are fascinating to many. The other three reasons to conduct research lead to applied research. These include research for making management decisions, research to aid in enforcing regulations, and research for effective planning.

Regional and state water plans require extensive information. Where should we find this information? As an example, suppose someone makes a simple statement like: "We irrigate with a full ditch for 3 hours." Someone may ask, "How do you know that is adequate but not wasteful?" An appropriate answer is to cite some "way of knowing" such as (1) an appeal

to tradition such as, “That is the way we have always done it,” or (2) an appeal to authority such as “If you don’t believe me, you can ask the Ditch Master,” or (3) an appeal to faith or religious authority such as “The good book says...,” or (4) an appeal to deductive or inductive logic such as “We always get a good crop,” or (5) an appeal to experience such as “I saw this same thing in Alaska,” or (6) an appeal to science. Each of these six ways of knowing truth has its strengths and weaknesses. However, an appeal to science should be the strongest if scientific investigation is adequate to meet objectives.

After initial formulation, regional and state water plans will always need updating. Initial formulations and updates need new information that may necessitate new research. The most credible research involves the “Scientific Method.” The scientific method is a means by which researchers are able to make conclusive statements about their studies with a minimum of bias. The interpretation of data can be laden with bias. As any skilled debater knows, just about any opinion can be justified and presented as fact. In order to minimize the influence of personal stakes and biased opinions, a standard method of testing a hypothesis is expected to be used by all members of the scientific community. Data selectively collected are often cheap, collected rapidly, can give results to meet political goals, have maximum opportunity for bias, and often appeal to government land management agencies and litigants in law suits. Data collected by the scientific method are usually more expensive, time consuming, give the least bias, may help avoid law suits, and represent the information with the most integrity.

Bias can be minimized by (1) randomization of samples, (2) replication of the study, (3) obtaining an adequate sample size, and (4) using peer reviews. As an example, suppose a client has a problem. The client provides a grant or hires a researcher. The researcher is sometimes called a consultant and has a couple of options. In Option A, the researcher designs a research project, conducts the research, and gives the results and interpretations to the client. Private consultants often chose this option. Their research often only appears in final reports to the client and maybe the client’s regulatory agency. In Option B, the researcher designs a research project, solicits peer review of the objectives and methods, conducts the research, solicits peer reviews of the data interpretation, and gives results and interpretations to the client. Researchers in academia often chose this option. Their research

often appears in final reports to the client and in refereed scientific journals. Many researchers have fears and may choose Option A because they may see peer reviewers as potential competitors and convince their client of their own competence so that peer review or assistance is not needed. The client may see the peer review process as time consuming and costly.

What do clients do with the results? Clients and/or their lawyers take the researcher or consultant to regulators, a management agency, or court. The researcher is expected to support the client. The client and their lawyers may (1) accept and present all of the findings, (2) present part of the findings, or (3) sit on or hide findings. If the researcher supports (2) or (3), then the researcher is now a “hired gun.” If the regulator, management agencies, and courts are public institutions, then the study is probably public information and the peer review process can prevent options (2) and (3). The client needs to be educated about the peer review process and the importance of presenting all findings. This is seldom done. Also regulators, management agencies, and courts need to be educated about the peer review process and the importance of presenting all findings. This is also seldom done. These groups often are not satisfied that all findings are presented. These groups may not be competent enough to understand the objectives, so they ask for satisfaction of related or unrelated objectives. Great distrust often results. The risk to the client of accepting all findings means more time and money.

What are judges and juries most likely to accept? Peer reviewed or non-peer reviewed research? Judges and juries are most likely to accept either and anything. Therefore, it is best to avoid courts and litigation. The best opportunities to avoid courts and litigation are with the best possible science. Insisting on going to court is often an indicator of not enough scientific evidence to achieve a political agenda any other way. Two recent examples of where scientific knowledge was used to help settle disputes are the Klamath Falls endangered fish situation and the safe arsenic levels controversy. Scientific scrutiny showed that the management and regulatory agency was wrong in the first situation, and probably right in the second.

Sound science is the bridge between problem and solution. Regional and state water plans without credible scientific knowledge are scary.

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***Thomas Jennings** is a program coordinator with the Bureau of Reclamation's International Affairs Office and is currently acting as manager of Reclamation's Desalination & Water Purification R&D Program (DWPR) in Denver. Tom received his Ph.D. in instructional systems design and technology from Pennsylvania State University in 1979. Prior to joining the U.S. Government, he served on the faculties of Penn State and Kent State universities. He was also active as a consultant to business, industry, and government providing expertise in training, research and organizational effectiveness. His 25-year career in international affairs focused primarily on the Pacific and Middle Eastern arenas with the U.S. Interior and Labor Departments and the Government of Guam. For many years, he directed Reclamation's desalination program (technology transfer) with the Saline Water*



Conversion Corporation in Saudi Arabia and served on the advisory council of the U.S./Saudi Arabian Joint Economic Commission. As DWPR Manager, he is leading Reclamation's efforts to develop a National Desalination Research Roadmap as well as the National Desalination R&D Facility in the Tularosa Basin of New Mexico. On the personal side, Tom was recognized by the American Athletic Union in 1992 for his contribution to youth sports.

DESALINATION TRENDS AND ISSUES

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Background

Access to fresh water is an increasingly critical national and international issue, especially since demand for fresh water in many regions of the world has already outstripped supply. Based on the latest figures from the United Nation's "World Water Development Report," more than 50 percent of the nations in the world will face water stress or water shortages by 2025, and by 2050, as much as 75 percent of the world's population could face water scarcity (United Nations, 2003). Like so much of the world, access to fresh water is an increasingly critical issue in the southwestern United States. Over the past several decades, a tremendous growth in population and industry in the Southwest has increased the demand for water and has led to unsustainable water management practices. The consequences of these practices are groundwater mining, falling water tables with ground subsidence and associated building and utility damage, and reductions in surface and groundwater quality and availability.

To meet these water challenges, populations will need to better balance water demands with available water resources in a sustainable manner. This requires a combination of approaches including water conservation, recycling, and treatment of impaired water from nontraditional resources to "create" new water. One area that can no longer be overlooked for increasing water supplies is the application of desalination technologies to treat brackish surface and groundwater resources. As shown in Figure 1, much of the United States, including the Southwest, contains extensive brackish ground water resources (Krieger et al., 1957). Since much of this supply underlies more easily-accessible and higher-quality fresh water resources, it has remained primarily untapped. As fresh water supplies become more limited, however, desalination of these brackish water resources will become more common.

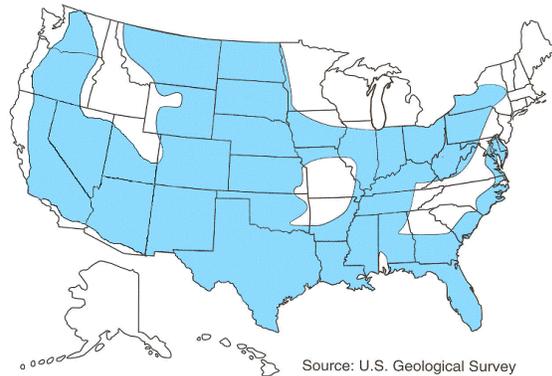


Figure 1. General location and extent of saline groundwater resources in the United States.

The Growing Utilization of Desalination

Desalination research and development efforts since the mid-1960s have led to significant improvements in the performance and costs of brackish and sea water desalination. By the late 1990s, there were more than 12,500 desalination plants in operation in the world, generating more than six billion gallons of fresh water per day and accounting for about 1 percent of the world's daily production of drinking water. Industry projections suggest that in the next 20 years, over \$20 billion will be spent for new desalination facilities worldwide, doubling the volume of fresh water being generated through desalination (Martin-Lagardette, 2001). For example, the number of membrane-based desalination and water reuse plants constructed in the U.S. in the past 20 years is shown in Figure 2 (Mickley, 2001). While many of these systems have been built in coastal areas for sea water desalination, many of the newer systems are being used in inland areas for both brackish water desalination and water reuse applications. In 2000, desalination systems were in operation in almost forty states in the U.S.

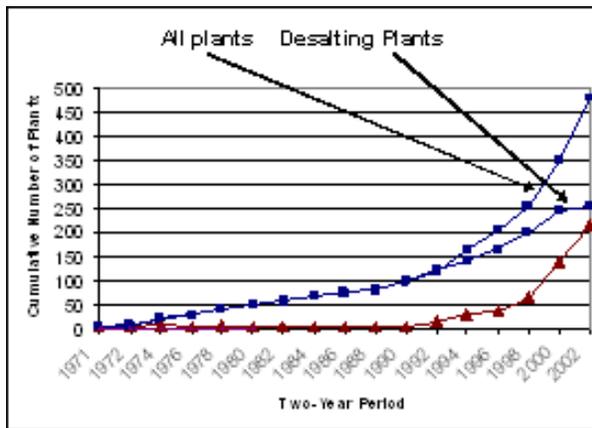


Figure 2. Construction of membrane treatment plants in the U.S.

Desalination Trends in the Southwest

From Virginia and Florida to New Mexico and California, desalination plants are being installed across the country in an effort to supplement fresh water supplies for a wide range of industrial and domestic needs. The growing interest in the Southwest and other inland areas to apply desalination includes:

- Enhancing domestic water supplies. Many southwestern water districts are evaluating brackish groundwater desalination to supplement limited fresh water supplies and provide water for a wide range of industrial and municipal uses.
- Fossil energy production. Large volumes of saline or brackish water are commonly co-produced in oil and gas production. Using desalination technologies to treat this water may offer oil-producing areas a beneficial use for this water.
- Treatment of impaired surface water. Many of the river systems in the Southwest suffer from salt buildup caused by surface runoff, agricultural irrigation practices, urban uses, and evaporation. Desalination of these impaired rivers will become increasingly important to meet more stringent water quality standards for domestic and ecological-based total maximum daily load requirements.
- Industrial and domestic water pretreatment and reuse. As water conservation and reuse become increasingly more important, desalination-based water and wastewater treatment technologies could meet water quality standards for water reuse in various applications.

The many applications of desalination are being evaluated and pursued by municipalities and industries across the Southwest. El Paso, Las Vegas, Phoenix,

and Tucson are each considering desalination plant options to supplement or improve water supplies. Cities such as Scottsdale, Arizona and Ft. Stockton, Texas have already built and are operating desalination facilities. Even mid-sized cities like Alamogordo, New Mexico, with a population around 30,000, is planning to construct an approximately 10 million gallon per day (mgd) desalination plant to help supplement its fresh surface and groundwater resources to meet future growth. Pat McCourt, City Manager for Alamogordo suggests “the cost of acquiring new fresh water supplies has increased to a level that desalination of local brackish water is now competitive with developing and bringing in fresh water from remote locations.” As an example of other desalination applications, oil companies in cooperation with federal and state resource management agencies in New Mexico, Colorado, and Texas are evaluating the treatment and desalination of oil and gas produced water for supplementing river flows during drought, rehabilitating rangeland, and cooling water for power plants.

Inland Desalination Concerns

Desalination in inland areas, like the Southwest, has lagged behind coastal desalination applications. Most water professionals agree there are three major concerns critical to the wider use of desalination in inland areas. These include addressing the environmental issues of concentrate and salt disposal, improving desalination efficiency, and reducing the costs of inland desalination.

There are several concentrate disposal methods practiced today: surface water discharge, discharge to sewers, deep well injection, land application, evaporation ponds/salt processing, and brine concentration. The feasibility of each disposal option depends primarily on location and desired efficiency. Surface water discharge is used extensively in coastal applications where the concentrate can be easily mixed with coastal water to dilute the concentrate, providing an inexpensive and often environmentally benign disposal option.

The other methods, while viable, each have disadvantages. In inland areas, concentrate disposal options, including surface water discharge, sewer discharge, and land application, can increase the salt load in the receiving waters and soils, which will contaminate water resources and reduce soil fertility. Evaporation ponds often require large land areas and

are only appropriate in arid climates with low land values. Like other brine concentration techniques, they typically require impervious disposal areas to prevent contamination of fresh water supplies and soils. Deep well injection is not permitted in many states, but those that do (such as New Mexico and Texas), require permits, monitoring wells, and completions in deep contained aquifers to insure that fresh water supplies are not contaminated.

Concentrate disposal may be the biggest roadblock to widespread inland desalination. Mike Gritzuk, Director of the Phoenix Water Services Department, likens the potential accumulation of salts and the possible long-term negative environmental impacts from inland desalination as a “train wreck in slow motion.” New research into areas such as concentrate reuse and salt sequestration technologies are needed to address the environmental issues with inland desalination concentrate disposal.

Desalination efficiency is also an important issue for the Southwest, according to Bruce Johnson, Assistant Director of the Tucson Water Department. Today, common desalination systems have recovery efficiencies of 60 to 85 percent for brackish water desalination (U.S. Bureau of Reclamation, 2002). Unfortunately this means that 15 to 40 percent of the available water is not used and often must be disposed, wasting potentially valuable water resources and requiring additional pumping. Improving recovery efficiencies to 90 or 95 percent could significantly reduce concentrate disposal volumes, extend the supply of brackish resources, and potentially reduce overall desalination costs.

To reduce costs, many coastal desalination plants are designed to treat large volumes of water, often 50 mgd or greater, and are co-located with coastal power plants to take advantage of common intake and outfall structures and less expensive power. These strategies enable coastal facilities, such as the Tampa Bay Desalination Facility, to maintain desalination costs as low as \$2.00-\$2.50 per 1000 gallons of water produced. Similar facilities in inland areas may cost twice as much to operate because of smaller plant sizes, higher concentrate disposal costs, higher water pumping costs, and higher energy costs (U.S. Bureau of Reclamation, 2002). These cost issues will have to be addressed and reduced to make inland desalination more cost effective and have even wider utilization.

Expansion of the National Desalination Research Program

While significant strides have been made in desalination over the past several decades, additional improvements in desalination efficiency, cost effectiveness, and concentrate disposal are still needed for desalination to become widely used as a long-term, environmentally friendly enhancement for fresh water supplies in many areas, including inland applications. The Water Desalination Act of 1996 was the first of recent efforts by Congress to accelerate desalination research and help meet growing future water demands through utilization of nontraditional and brackish water resources. Unfortunately, funding appropriations never met the program authorizations, and often as little as \$1 million per year was designated for desalination research.

Recently, Senator Domenici has supported congressional legislation to develop concepts for an inland brackish groundwater desalination research center in the Tularosa Basin of New Mexico as well as the development of a national “Desalination and Water Purification Technology Roadmap.” Both of these activities have been conducted jointly through Sandia National Laboratories and the U.S. Bureau of Reclamation. The Tularosa Basin Desalination Research Facility is being designed to complement the capabilities of existing national water research centers, focusing on the unique issues of brackish groundwater desalination and renewable energy applications (Sandia, 2002). The roadmap effort included nationwide input to help identify the future desalination research objectives and goals for the U.S. in both 2010 and 2020 (U.S. Bureau of Reclamation, 2003).

The purpose of the roadmap was to help ensure that the major concerns and issues associated with future applications of desalination and water reuse are adequately addressed, helping to accelerate the development and utilization of cost-effective and environmentally friendly desalination technologies that can help supplement our limited fresh water resources and help meet the growing water demands in the U.S. as well as the Southwest. This roadmap is being used by Congress to extend the Water Desalination Act of 1996 and develop a more comprehensive and better-supported national desalination research program. The development of an expanded national desalination program is presently being debated in Congress for initial implementation in FY04.

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GROUNDWATER AND SURFACE WATER MODELING FOR WATER PLANNING

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Introduction

Water resources managers and planners are faced with the task of identifying optimal or near-optimal solutions in highly complex systems. One of the most important classes of management tools is models, which provide an analytical framework for evaluating likely outcomes of various natural and management scenarios.

While the hydrologic systems that models represent are infinitely complex, modelers use fundamental hydraulic and hydrologic principles with acceptable simplifying assumptions to create a mathematical

formulation to evaluate the behavior of the hydrologic system under various system designs and operating policies. Depending on the complexity of the mathematical model, it may be solved analytically or numerically. The rise of computers has made sophisticated numerical solutions widely applied. Because of the different hydrologic, temporal, and spatial characteristics of surface water and groundwater systems, models tended to focus exclusively on surface or subsurface hydrology. As water managers have found that the problems of surface water and groundwater are inexorably linked, modelers have developed closely coupled models to

better represent the interaction between the two hydrologic regimes.

This paper describes the evolution and application of three modeling case studies that illustrate the utility of computer-based models for water planning and management. The first is primarily a groundwater modeling effort in the Middle Rio Grande, a MODFLOW model of the aquifer system underlying the Albuquerque area. The second is primarily a surface water model, a RiverWare model of the storage and delivery operations on the Rio Grande from its headwaters in Colorado to Caballo Dam. The third is an externally linked surface water/groundwater model of the Pecos River in New Mexico. Finally, a model under development in the San Acacia reach of the Rio Grande presents an example of a more closely linked representation of surface water/groundwater interaction.

Need for Hydrologic Models

While this paper focuses on hydrologic modeling for planning, there are several other uses for water models, for example in engineering design, in which the engineer simulates individual flood events to get design flows, so that the system to be designed will have adequate capacity. Our focus is on larger scale models for planning.

Models help us to take diffused, scattered, and very complicated data, and use that in a modeling format to develop a quantitative understanding of that data. In fact, we would even go beyond quantitative, to an executable understanding of that data. Secondly it provides a scientific and objective basis for water management and for the administration of water resources. For example, the State Engineer needs tools that he can point to and say, these are the methods by which we will evaluate whether or not you are negatively impacting other water rights holders. They will be based upon the best scientific understanding and data, unbiased, and objective.

Models can be used to help us understand what has happened under past management regimes and hopefully by understanding the strengths and weaknesses of past management regimes, we can plan better for the future and to evaluate or potentially even optimize our management options for water planning and management.

In developing a model for water use planning, it is important to be sure that (1) the model will answer the relevant management questions and (2) sufficient

data and understanding of the system are available to create a representative model. If you are asking very simple questions, you will get by with a very simple model. Similarly, if you really don't have much relevant data, it doesn't help to put it in a big, complex model. However, if you are asking very complex, very important questions, which we are all doing in this planning process, you need very sophisticated and very data-rich models to meaningfully answer those questions.

Types of Models

In describing types of models, we stress that most functional models incorporate elements of each type we discuss here. However, it is useful to examine the basic types as separate entities for clarity.

Statistical models rely on historic behavior of hydrologic systems, and characterize them statistically by parameterizing their statistical distribution or by some sort of time-series model. For example, a 100-year return period, 24-hour duration rainfall in Las Cruces is 3.8 inches. This means that, based on statistical analysis of rainfall records for the area, in a given year, there is a 1/100 chance of getting more than 3.8 inches of precipitation in a 24-hour period. Note that the hydrologic processes by which precipitation occurs are entirely left out of the model.

Hydraulic and hydrologic models focus on the physical processes that statistical models neglect. The simplest of such models are the analytical models. An analytical model is a model where we formulate our understanding of the hydraulics of water movement and develop mathematical models that we solve explicitly to describe the behavior of a hydrologic system. An example of this would be the Theis Method¹ for examining the effects of pumping groundwater from an aquifer. The Theis formula expresses drawdown in an aquifer as a function of distance from the well and time of pumping. The formula is:

$$h_0 - h(r, t) = \frac{Q}{4\pi T} \int_1^{\infty} \frac{e^{-u}}{u} du$$

where h_0 is the initial piezometric level in the aquifer (before pumping), $h(r, t)$ is the piezometric level in the aquifer at time t since pumping began and distance r from the pumping well, Q is the rate of pumping, and T is the transmissivity. It is simple and quite commonly

used. However, in order to get the model simple enough so that we can solve for it mathematically, we have to make several simplifying assumptions. Theis assumes that the aquifer has infinite lateral extents, that it is homogenous, that is, the properties of the aquifer don't vary around the aquifer, and so on. These are very major simplifying assumptions, but often we are asking fairly simple questions, so we can live with them. For example, if you have a small well and a big aquifer, it is probably acceptable to make these assumptions.

Numerical Models

The numerical models are much more flexible regarding the necessary simplifying assumptions. This approach takes advantage of the rise of computing resources and the growing body of data available to us to build much more sophisticated models that are capable of answering much more sophisticated questions.

To illustrate this modeling approach, we look at four case studies: the Middle Rio Grande groundwater model, focusing very much on groundwater hydrology. The Upper Rio Grande Water Operations Model (URGWOM) is a surface water model. A model of the Pecos River is an example of a semi-combined surface water/groundwater model. Finally, a more recent model of the San Acacia reach of the Rio Grande represents the interaction between surface water and groundwater in more detail.

Middle Rio Grande Groundwater Model

We stress that the development of any model is an evolutionary process, and while at any stage of this evolution there is a product, the evolution never ends. The current generation of numerical modeling of the Middle Rio Grande groundwater system began with a MODFLOW (a U.S. Geologic Survey modeling package) model by Kernodle,² and has been updated. Analytical models were used for planning purposes in the area before Kernodle. The model developed in stages, the objective being to look at the effect of groundwater pumping on the river, on potential Rio Grande Compact implications, and so on. If you wait until you have full data on a hydrologic system before you develop a model, you will never develop a model, hence the evolutionary approach. This model, shown in Figure 1, goes from Cochiti to San Acacia. It represents an infinitely complicated hydrogeologic system that is discretized, divided up into kilometer

squares, each one of which has the average hydrologic properties of that square kilometer. Unlike Theis, the representation in this model has lateral limits and is heterogeneous, and its representation is much more realistic than that of Theis.

The plan view in Figure 1 represents the lateral variability in the groundwater system. Vertical variability is represented by layers, shown in Figure 2.

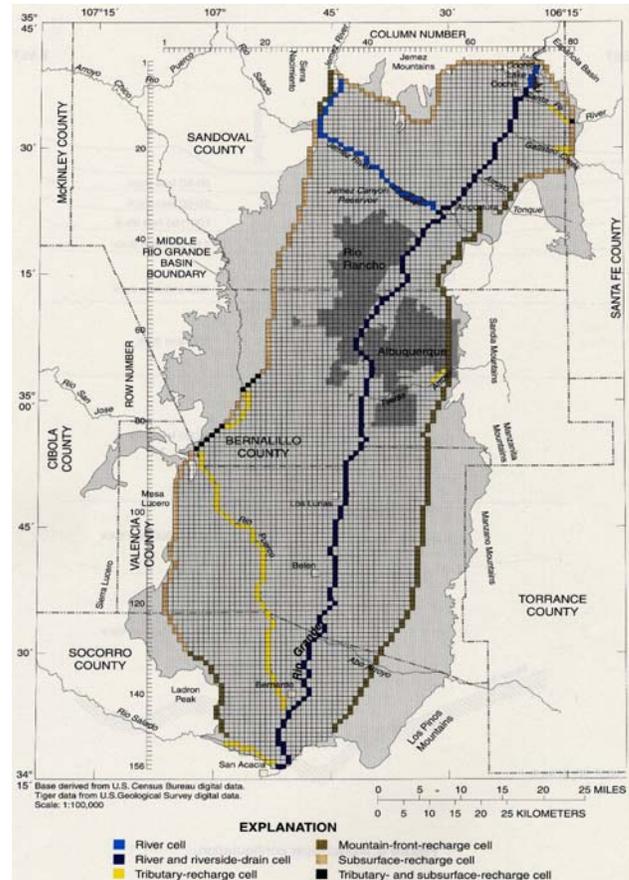


Figure 1. Plan view of Middle Rio Grande groundwater model.

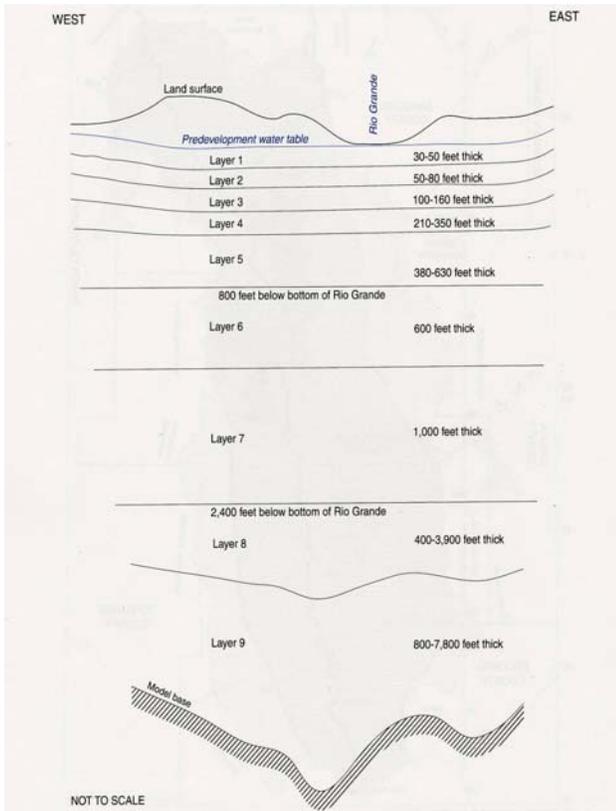


Figure 2. Cross section of Middle Rio Grande

This is strictly a groundwater model; surface water is represented in it but it is almost an artifact. The URGWOM, on the other hand is primarily a surface water model and conceptually it is completely different.

A number of agencies have been involved in the development of URGWOM. It is developed using RiverWare Software, which is a river modeling package, sort of the surface water equivalent of MODFLOW. It currently is being developed for the Rio Grande from the Colorado state line to El Paso, Texas, and again its development is ongoing and probably will always be ongoing. It allows river managers to simulate the operational effects of reservoir operations, floods, irrigation, municipalities and industrial uses, the use by Native American tribes and channel losses. It also incorporates river accounting systems such as the Rio Grande Compact. A schematic of the model from one of its operating screens is shown in Figure 3.

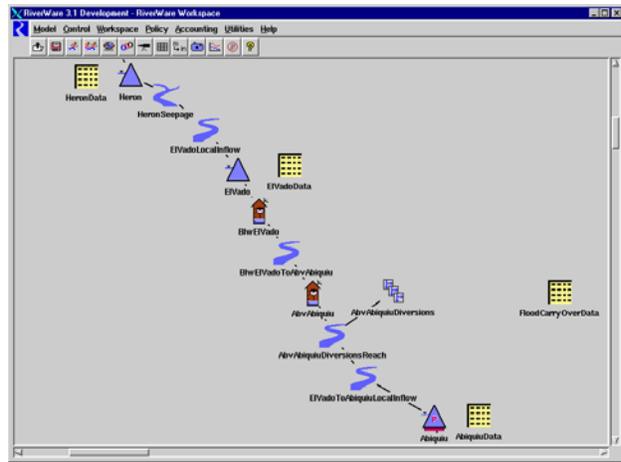


Figure 3. URGWOM schematic screen.

This is a fundamentally different conceptualization of the system that the Middle Rio Grande groundwater model used. Rather than a three-dimensional grid and layer system, this is very much a linear structured model with nodes along the river that represent measurement and control points. They are connected with links that represent the characteristics of the river channel and its effect on flow. One of the problems with trying to isolate either groundwater, and modeling in the absence of surface water, or modeling surface water in the absence of modeling groundwater models, is that the two are so highly interactive that separation is often an unacceptable simplification.

Combining surface water and groundwater models to better represent reality is a difficult undertaking. First of all, they tend to operate on very different temporal scales. Not only do we discretize things spatially, the MODFLOW with the layers and grid, and the RiverWare with the nodes and links, we discretize things temporally. Each of these models has an operating time-step. The operating time-steps in a typical groundwater model and a typical surface model are extremely different. Groundwater models tend to run on time-steps something along the order of months to a year; things tend to move more slowly through the groundwater system. With a surface water system, if you were releasing water from Cochiti and you wish to route that through the Albuquerque reach, a time step of a few minutes to a few hours would be appropriate. It may take multiple days for the flow to make it through the section, but you do have to track it in much shorter time-steps.

An example of an effort to reconcile the different conceptual models and represent the interaction between surface water and groundwater was developed on the Pecos River, one of our more

controversial rivers, by Interstate Stream Commission and State Engineer staff working along with Reclamation, Intera, and Hydrosphere. They developed a decision support system that links surface water and groundwater models. Basically it depends on a groundwater model for the Roswell-Artesian Basin and another one for the Carlsbad area, and through it runs a Riverware model. A schematic of the model is shown in Figure 4, and a flow chart of its computational logic is in Figure 5.

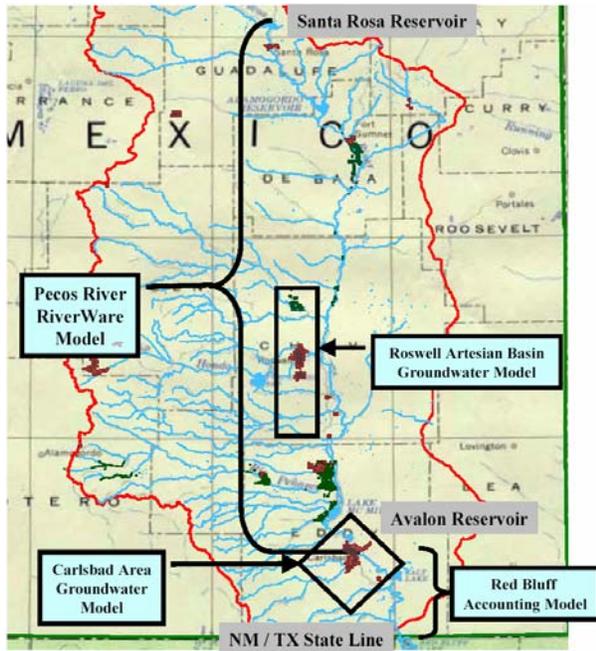


Figure 4. Schematic of Pecos River decision support system, combining groundwater models with a surface water model.

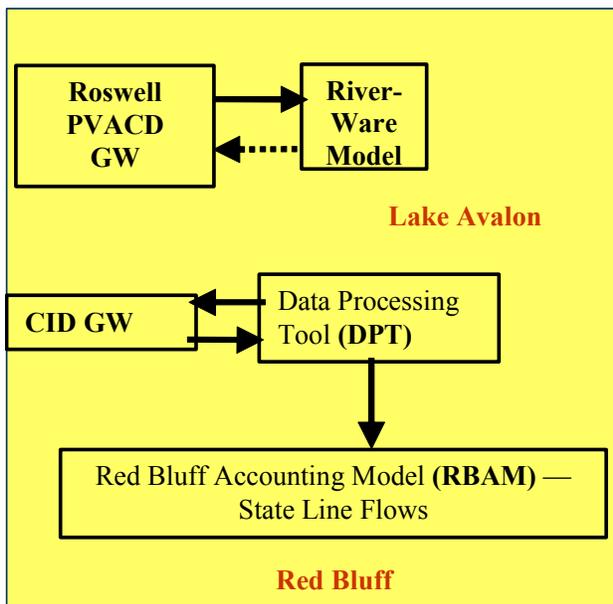


Figure 5. Flow chart of Pecos River decision support system.

The Pecos River decision support system relies on external linkages between essentially stand-alone surface water and groundwater models. A more integrated approach is being developed on the San Acacia reach of the Rio Grande by the Interstate Stream Commission. The objective is to simulate the effect of operation of the Low-Flow Conveyance Channel on seepage losses from the river. Note in Figure 6 that the model, developed using MODBRANCH (A USGS package for modeling stream-aquifer interaction), the representation of the groundwater system is much like that of MODFLOW, and the representation of the river is much like that of RiverWare.

The logic of the MODBRANCH model of the San Acacia reach is shown in the flow chart of Figure 7. Rather than stand-alone models that are reconciled externally, MODBRANCH compares results of the two systems during each time step. This is computationally intensive, one of the reasons for the smaller geographic extent of this model.

As modeling tools improve and computer speed increases, we anticipate seeing more models of this general type that explicitly recognize the connection between surface water and groundwater systems, and model them in an integrated fashion, much as they exist in nature.

ENDNOTES

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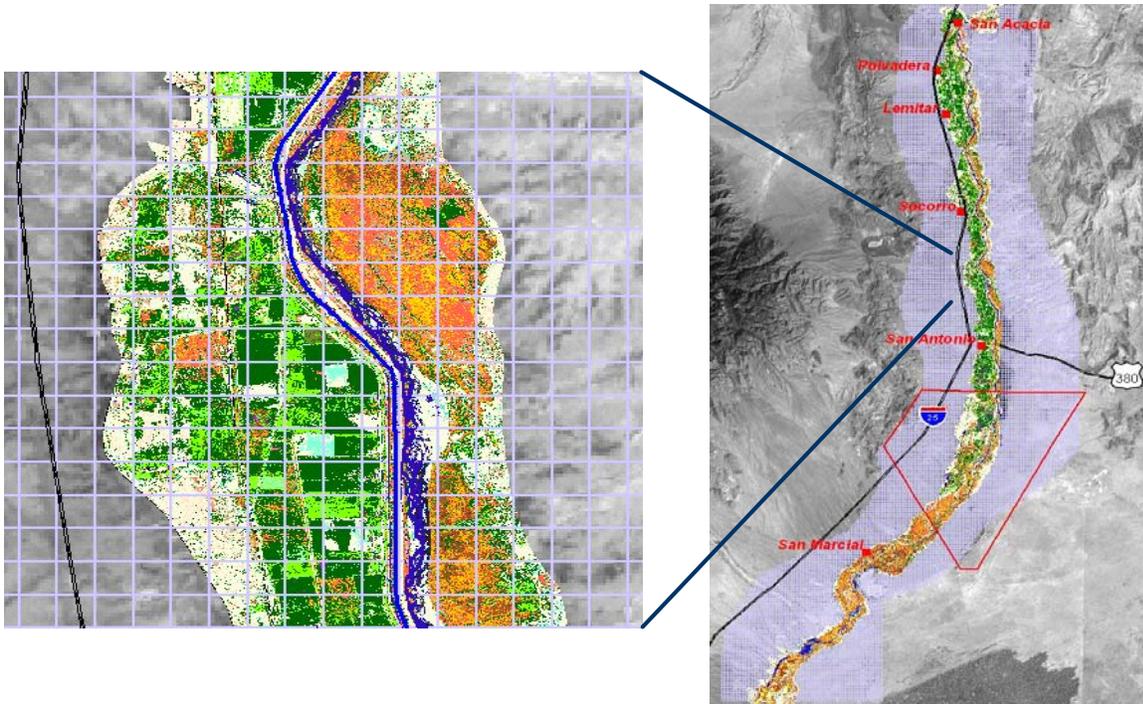


Figure 6. San Acacia reach MODBRANCH model, intended to simulate the effect of Low Flow Conveyance Channel operations on river seepage.

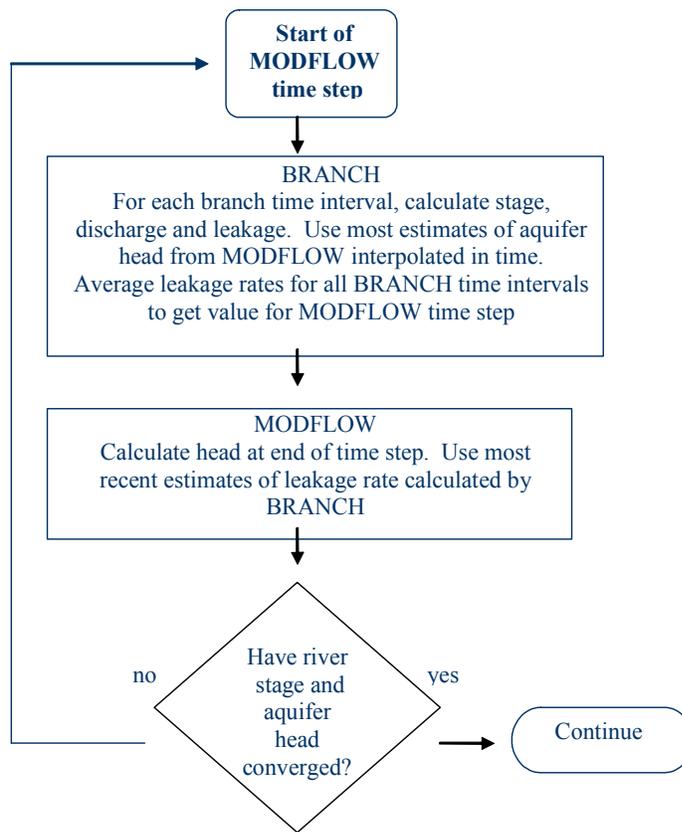


Figure 7. Overview flowchart of San Acacia reach MODBRANCH model.

Ed Archuleta has served as General Manager for the El Paso Water Utilities Public Service Board since 1989. He is responsible for all aspects of water and wastewater service to the Greater El Paso Metropolitan Area, a population of approximately 700,000 people. Under his management, the utility has been recognized regionally and nationally for leadership in conservation, reclamation, and management. From 1974 to 1989, Ed worked for the City of Albuquerque in various positions including Assistant Director/Operations, Public Works Department. Prior to that, he planned and designed water and wastewater projects for a multinational consulting engineering firm in Iowa and a regional firm in Albuquerque. Ed earned bachelor's and master's degrees in civil engineering from New Mexico State University, and a Master of Management Degree from the University of New Mexico. He is a registered Professional Engineer in Texas, New Mexico, and Iowa and is Chairman of the American Water Works Association Research Foundation, a trustee of the Association of Metropolitan Water Agencies, and an American Academy of Environment Engineers Diplomat.



PLANNING AND DEVELOPMENT OF IMPAIRED WATERS AT EL PASO WATER UTILITIES

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ABSTRACT

El Paso Water Utilities serves approximately 700,000 people in the greater El Paso metropolitan area with water and wastewater services. The Utility has well-established strategic and water resource management plans.

El Paso's water management portfolio includes one of the most aggressive and successful conservation programs in the country, conjunctive use of groundwater and surface water, and a growing utilization of reclaimed water.

The strategic and prudent use of brackish groundwater (impaired waters) will assist El Paso in

meeting its current and long-term water supply needs, this is, employing total water management.

This presentation describes El Paso's successful reclaimed water program that includes both indirect potable reuse, as well as direct non-potable reuse. Furthermore, it discusses El Paso's plans to design and build the largest brackish groundwater desalination plant in the country with an output of 27.5 million gallons per day. The plant is currently being designed and completion is expected in late 2005.

Editor's Note: The following PowerPoint presentation was given by Mr. Archuleta at the conference.



Good Morning.

The availability of water for human use is reported to become, within this century, one of the world's top challenges to overcome. Here in El Paso, it will be our top challenge within the next 25 years.

“Water Planning” is a very timely topic in the Southwest today.

For instance, San Antonio just completed a huge reclaimed water project that is serving multiple customers. I believe that the public, the user, and professionals all need to be familiar with reclaimed water and to promote its safe and effective use. The public will increasingly come to accept reclaimed water as one of several alternative solutions to our water supply problems.



Reclaimed Water Projects

- Currently, we reclaim 3.8 billion gallons per year or 11% of water production
- 2012 goal — to recycle 7.0 billion gallons per year

Reclaimed Water Benefits

- Saves potable water
- Drought Resistant – Watering
- Low Cost Water Rate
- Adds Nutrients to landscaping uses
- Sustainable Quality of Life
- Reduces Peak Water Demand



Pricing Reclaimed Water

Type of Water	Cost of Water (\$/CCF)
Reclaimed Secondary	\$0.56 (60% block I)
Reclaimed Tertiary	\$0.75 (80% block I)
Block 1 Potable	\$0.94
Potable Yard Meter	\$1.90

Reclaimed water is priced lower than the rate charged for potable water. The price is a big incentive for many customers to convert. In El Paso, the Fred Hervey plant sells its water for \$0.75 per one-hundred cubic feet while the other three plants sell water for \$0.56 per one-hundred cubic feet. This is about half of what most people pay for water in El Paso. The lowest potable water rate available is \$0.94 per one-hundred cubic feet.

Reclaimed Water Uses

- **Type I: Unrestricted Use**
 - Parks, Schools, Apartments, Golf Courses, Homes, Fire Systems, Recreational Ponds, Toilet Flushing
- **Type II: Restricted Use**
 - Farms, construction uses, cooling towers
 - Public is not present during irrigation



Two “types” of reclaimed water meet water quality standards.

Water quality standards are based on the potential for human exposure to this water.

An important qualifier in the definition of reclaimed water is whether human exposure potential is unrestricted or restricted.

Reclaimed Water Standards EPWU – Meets Type I

Parameter Use	Type I Unrestricted	Type II Restricted
BOD5 Mg/L	5	20
Turbidity NTU	3	15
Fecal Col. Avg CFU/100ml	20	200
Fecal Col. Max CFU/100 ml	75	800

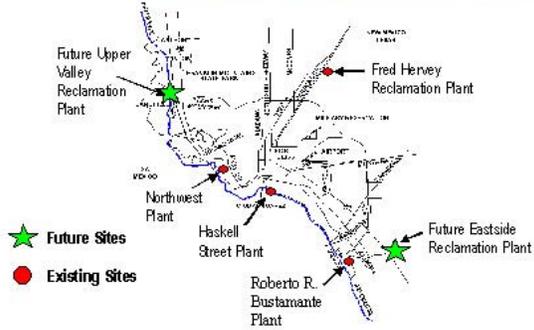
Primary wastewater treatment removes contaminants primarily through gravity separation (coarse organic and inorganic solids).

Secondary wastewater treatment removes dissolved organics through biological or chemical treatment. Type I water requires at least secondary treatment in order to meet water quality.

Tertiary treatment involves the removal of nutrients and other contaminants.



EPWU Reclaimed Water Facilities



Present – Annual 2002 Total Reclaimed Use By Plant

- Bustamante Plant – 635 MG/YEAR
- Haskell Plant – 684 MG/YEAR
- Fred Hervey Plant – 2,160 MG/YEAR
- Northwest Plant – 317 MG/YEAR
- Total Reclaimed Used – 3,796 MG/YEAR

Includes Distribution, Injection, In-Plant, and Standpipe Uses

Summary Current Peak Day Reclaimed Water Use

Northwest Plant - West Side	1.8 MGD
Fred Hervey Plant - Northeast	6.0 MGD
Bustamante Plant - Lower Valley	2.0 MGD
Haskell Plant - Central	2.6 MGD
Total Of All Plants	12.4 MGD

↑
OFFSETS PEAK WATER
DEMAND

Includes Distribution System and In-Plant Uses

Total Projected Use Summary (All Plants)

2002	3,796 MG/YEAR
2004	3,940 MG/YEAR
2012	6,820 MG/YEAR

Includes Injection, Distribution, In-Plant, and Standpipe Use

El Paso’s Joint Desalination Facility Project will eventually supply 27.5 MGD of water to the El Paso area, and has been in the making for over 10 years. The implementation of a large inland desalination project involves many considerations not readily apparent to many considering a project employing reverse osmosis desalination. It involves more than constructing a treatment plant—many issues must be considered when planning a desalination project. While no two projects are identical, many of the issues we have addressed in developing this project may reasonably be expected in development of an inland desalination project. Similarly, project specific requirements not required in this project, may be required in another. El Paso Water Utilities, the water service purveyor for the greater El Paso area, began analyzing desalination as a treatment option over 10 years ago with feasibility studies and small pilot efforts to characterize the resource. In 2000, EPWU formalized and committed to desalination as a supply option with the publication of the Eastside Brackish Groundwater Desalination Facilities Plan. MCI and CDM were retained for this project in the spring of 2001.



- ### Project Background
- El Paso Water Utilities
 - Derives 40% of Supply from Freshwater of Hueco Bolson
 - Both Freshwater and Brackish Water Present in Hueco Bolson
 - Brackish water now represents a significant resource

- EPWU water portfolio currently consists of three supplies: Rio Grande surface water, the Mesilla Bolson, and Hueco Bolson groundwaters. EPWU formerly derived 60% of its supply from the Hueco Bolson, but that amount has been reduced through development of surface water.
- The economics of water supply and the state of technology have evolved such that desalination is now an economically viable option. Therefore, EPWU embarked on this project to serve a twofold function: preserve the freshwater of the Bolson for drought periods, and develop this new source of supply for the future as a first alternative to more expensive importation options.



- The Hueco Bolson is an approximately 200-mile long groundwater basin extending from New Mexico through Texas and into Mexico. It also encompasses the Tularosa basin, although there is a slight topographic divide near the Texas/New Mexico border that defines the border of the Hueco/Tularosa. While there are substantial fresh water deposits in the Hueco Bolson, they are small in comparison to the more than 25 million acre-feet of brackish water.

Project Summary

- Project to provide new 27.5 MGD blended supply to El Paso
- Cooperative effort between Fort Bliss and EPWU
- Significant improvements and ancillary facilities required to support the Desalination Facility



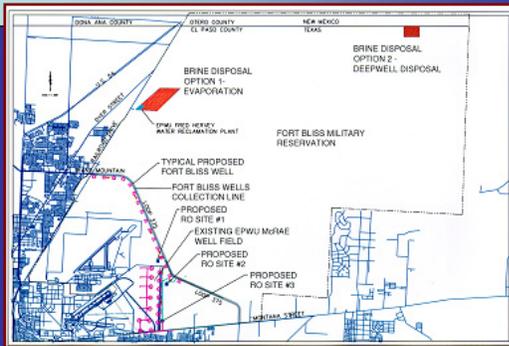
- The raw water supply will be treated with reverse osmosis technology and then blended with raw water that is bypassed around the treatment facility to produce water, meeting the goals of the project.
- Fort Bliss and EPWU were both considering building separate plants of 20 and 7.5 MGD. Talks were initiated to evaluate the feasibility of a combined plant, and through diligent efforts by both participants, it was determined a combined project addressed both parties needs better than independent ones, with the additional benefit of being more cost effective.
- This project, as most inland plants, involved consideration of much more than the simple design of a reverse osmosis desalination plant.

Facilities Included in Project

- 15 MGD Desalination Plant
- Rehabilitate 15 Existing Wells – 18 MGD
- 12 MGD of new well supply (est. 16 Wells)
- Brine Disposal Facilities
- Pipelines
- Water Resources Learning Center



Facilities Included in Project



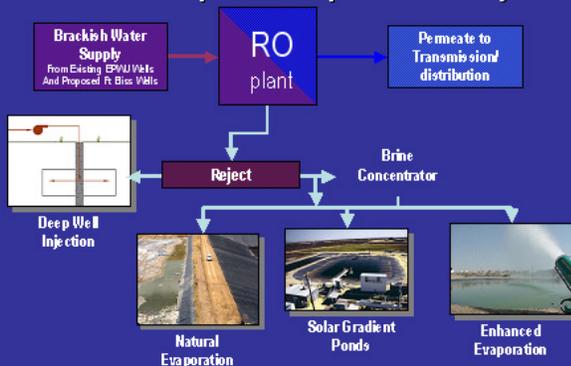
Project features being considered and evaluated according to the National Environmental Policy Act (NEPA) include two concentrate disposal locations and methods (evaporation ponds vs. deep well injection) and three potential plant locations.

Work Accomplished

- Brine Disposal Study
- Evaluation of existing well facilities and Design of improvements
- Test and Monitoring Well program
- Deepwell Disposal site investigations
- Pilot Studies
- Preliminary Design of Desalination Facilities

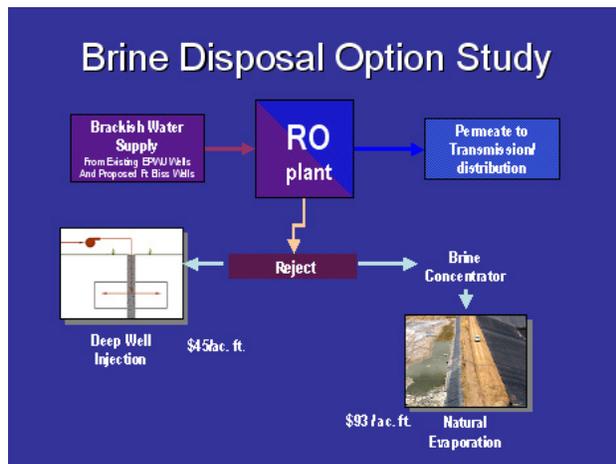


Brine Disposal Option Study



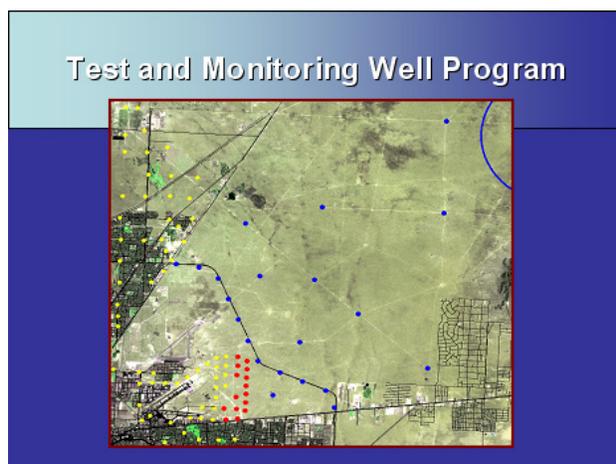
A brine disposal option study was implemented in the early phases of the project because the brine disposal investigating, permitting, and construction requirements represented the critical path for the project schedule. The options being considered can be immediately implemented technologically. Certainly, there are many other options that might be considered, but they are project specific.

Following screening of the available options, it was determined that deep-well disposal was the most cost-effective option. However, the requirements for the regulatory permitting cycle necessitated substantial subsurface investigations.



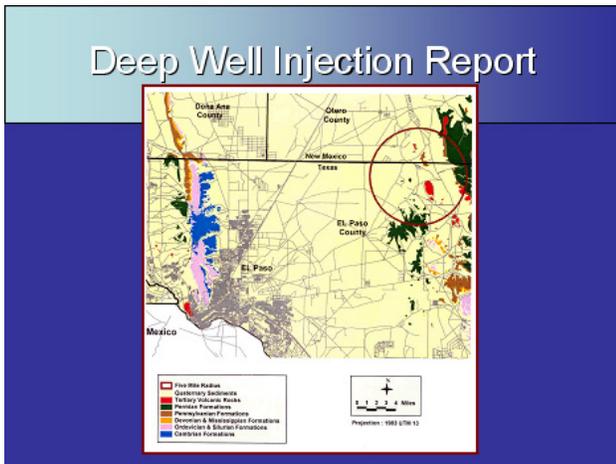
It was decided that, based on cost considerations, the project would pursue the deep-well option as the preferred option with evaporation ponds as the alternate. However a critical path schedule was developed identifying the point at which a go/no-go decision would be made on the implementation of deep-well disposal. This approach will allow the maintenance of the original project schedule.

The deep well disposal option is anticipated to cost approximately \$11 million to implement in terms of capital, while the evaporative option will require as many as 640 acres of dual lined ponds and approximately \$21 million in capital costs. Disposal costs including amortized capital operation are estimated to be \$45/acre-foot for deep-well disposal, \$93/acre-foot for evaporation with brine concentration, and \$115/acre-foot without brine concentration.

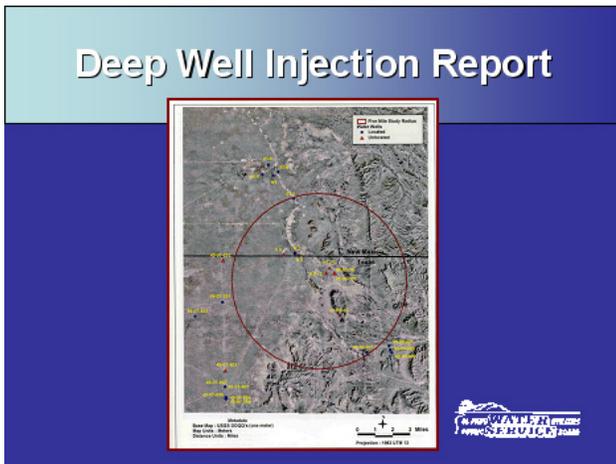


To address the lack of data on the Fort Bliss property, a program was initiated to define the resource quality.

- The slide shows the monitor and test well locations required to characterize water quality in the previously unexplored area.
- Once these wells were drilled, simulations of alternative well locations were completed to predict aquifer response.
- The best quality of water was determined using the so-called “blend 1 alignment.” We also were able to protect the existing freshwater supply by forming a groundwater trough to intercept the movement of brackish water.



- The ground siting area for deep well injection of concentrate was located using the consultant’s Brine Disposal report, based upon previous work by Witcher and others on the McGregor range.
- Investigations focused on the area within a five-mile radius as shown in the slide.
- An existing well survey, gravity survey, seismic evaluations, and investigative drilling program were then developed.



Deepwell Injection Status

- Four wells drilled, favorable strata encountered
- Drilling indicates containment due to area faulting
- Pilot hole to be drilled in December for reservoir study

- The top of the Fusselman Dolomite was encountered at 2200 feet in one exploratory well, and 2900 feet in a second well to the south. Over 1500 feet of consolidated bedrock existed above the Fusselman.
- Seismic results on area faulting are still being compiled.
- A pilot hole program will commence in December for reservoir studies, water quality acquisition and developing regulatory permit data for injection of the concentrate.
- TCEQ has been instructed to expedite processing of desalination projects.

Value Engineering Session

- Conducted December, 2002
- Outside Technical Review



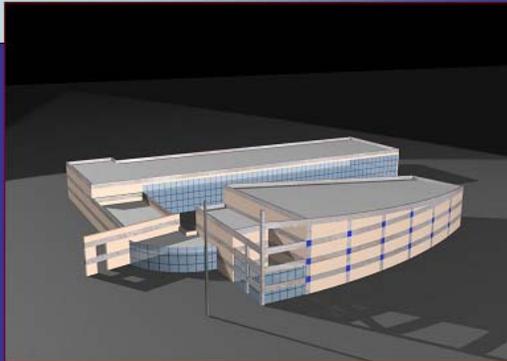
Completed by Parsons Engineering with subconsultants at approximately 35% design level.

RO Plant Design



- Preliminary Design Report completed May, 2003.
- 5 each – 2 stage modules. 3 MGD nominal capacity (48:24), 336:168, 2520 total membranes.
- Target blend water quality is 230 chlorides, approx. 600 TDS.
- Acid feed facilities will be provided. However, pilot studies indicate the possibility of operating without an acid feed facility
- One spare module space is left for a membrane concentrator or potential third stage concentrator.
- Sand separation is conducted on site.

RO Plant



The targeted blended water quality is 250 mg/l chloride and 600 to 700 mg/l total dissolved solids (TDS).

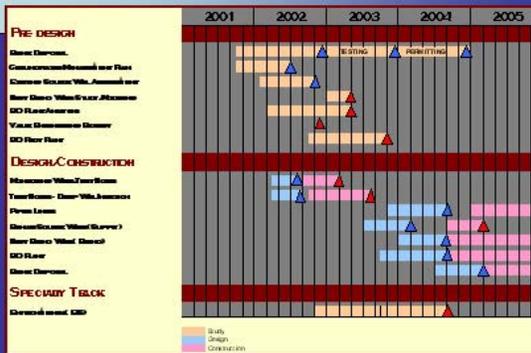
Estimated Project Costs

Blend Wells	\$12.0 M
Supply Wells	4.5 M
Pipelines	14.5 M
Desalination Plant	25.0 M
Disposal (Deepwell)	11.0 M
Estimated Project Total	\$67.0 M



The estimated cost of the finished water produced is \$700 per acre foot; using a 5% discount rate for capital and O&M.

Project Schedule

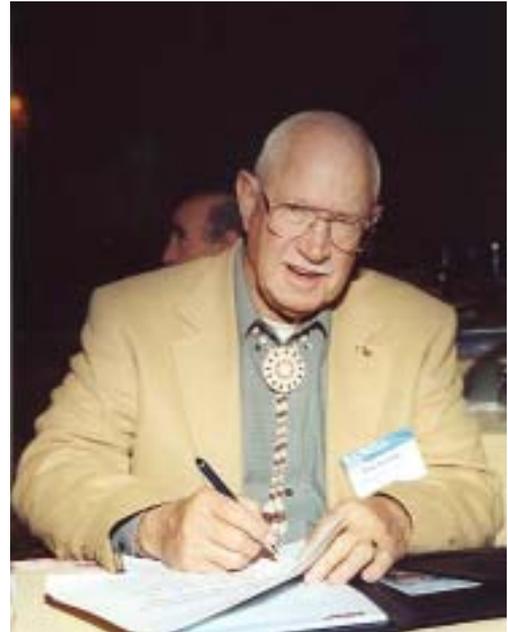


Milestones

- Completed Design of Well Improvements –October, 2003
- Commenced Design of Desalination Plant – September, 2003
- Pilot Hole Drilling , December 2003
- NEPA Studies – Projected Completion in August 2004



Jim Dunlap is the Chairman of the New Mexico Interstate Stream Commission. He is the past president of the National Rural Water Association, current President of the Upper La Plata Water Users Association, Vice Chairman of the San Juan Water Commission, and Founder of the New Mexico Rural Water Users Association. Jim graduated from Tatum High School, and received B.S. and M.A. degrees from New Mexico State University. He is the owner of The Farm Center - John Deere Equipment and L-Ranch. Jim is a retired vocational agriculture teacher.



THE NEXT STEPS - IMPLEMENTATION OF THE STATE WATER PLAN

Jim Dunlap
Interstate Stream Commissioner
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I was going to say good morning but it's nearly too late to say that. But Karl did tell me that at the end of the program he was going to call role so that he could see whether everybody who received per diem stayed here all the way through. So no matter how boring I am, you better stay in that seat.

I want you to know that I haven't been here for the last couple days. I am the kind of person who likes to get out and really get something done. So I have been up in the high country in Colorado looking at the snowpack. While I was up there, I took a camera and I had a rifle with me. The camera was to take pictures of the snow pack, which there wasn't, and the rifle was just to protect myself from any big-horned animals that might come along. So keep in mind what I said, we don't have any snowpack at this point in Colorado.

By the way, Ed Archuleta, I am sure glad you got a good basis for your education in Mosquero, Wagon Mound, and up in that country because it shows.

I want to congratulate Dr. Wood and his staff for the far-reaching idea of having this water conference on the state water plan. I know planning started back probably at least a year ago (and at that time we didn't even have a new governor), but Dr. Wood had been listening evidently that we were going to have a state water plan. And I marvel at the fact that the Governor thought that we could come up with a plan in one year. Also, I felt the burden when he asked me to serve on the Interstate Stream Commission. But I have a very good Stream Commission, and more importantly, we have an excellent staff in the Office of the State Engineer. I don't think anybody expected us to have a

state water plan in the short time that we did, and wouldn't have, without the quality of OSE staff. I would like to give those people a hand because they are the basis of the state water plan in the state of New Mexico.

Now, as I said earlier, I have spent the past week in Colorado and probably have not prepared quite as well as I should have. I go back to the time when I first started giving speeches when I was about 20 years old and my speech professor said that if you are nervous, just look out over the audience - I'm sure you have all heard this before - just imagine that no one has clothes on, and you'll be alright. My perspective has changed since that time, so it doesn't have that same effect on me anymore.

I want to talk a bit about portions of the state water plan and the fact that we do have plans being put forth for implementation. The underlying policies of those are to provide security, certainty, and transparency. By doing that, we have to complete our adjudications. You heard the State Engineer say that we only had a small fraction of those completed. We have to move forward as fast as we can, and do a credible job as we progress.

Installation of Measuring and Metering Devices

Now, I am sure that in some areas in the state, as I have been learning in the last several years, water has been very well metered. But I come from San Juan County. We measure nothing, or practically nothing. Installation of measuring and metering devices must be completed in order to reach a fair adjudication of water rights. We must move forward on the settlement of Indian water rights. If we are going to adjudicate a water basin, we need to have a complete knowledge of the water rights that are spoken for in that basin. Indian water rights basically were being spoken for a long time ago, so we have to quantify those water rights as the next step.

Installation of Water Masters to Assure Water Deliveries

In our area of New Mexico, we joke that it would probably take a water master and two armed guards to start with in order to have a water master who can meter water because people are accustomed to using all the water that comes down the canal. You and I know that's not a practice we can allow to continue.

Adjudication Component of Our Implementation

We have to develop timelines with a level of work effort developed for all outstanding basins. The people in an area that have an ongoing adjudication process need to understand exactly what the law calls for, understand exactly what the timelines are, what they must produce for documentation, and what those people from the Office of the State Engineer have to provide, and what the judicial system will require. Priorities can be set for the completion of the adjudications so that people can understand what those timelines are and what must be done in order to meet the requirements of the adjudication. We have people in our county who believe that their water rights are just going to be taken from them. We don't like to hear those comments, but until we educate people on how to complete an adjudication, that's the kind of reaction we're going to get. It's them against us or it's the state out to get us. We don't want that to continue to be the thoughts out there. Before we can adjudicate Indian rights, we have to gather data and know how much water we have to allocate to the various parties. We have junior rights, we have senior rights, and we have Indian water rights, not necessarily in that order. However, that is the public perception with which we are dealing.

Metering and Measuring Components

We can't manage without knowing how much water is in what location. It's ridiculous to remember and to try to determine how much water we have in any kind of adjudication without having some kind of metering to measure water use. Metering diversions at a wellhead is a priority also. We have an unknown amount of water being pumped in our basins, which happens when you can drill a well with only a \$5.00 permit from the Office of the State Engineer. And while that permit may tell you how much water you are allocated from that particular well, it doesn't have any monitoring requirements that forces you to live within those means. We believe we should meter diversions at wellheads as is already being done in the Pecos Basin.

Analysis and Interpretation of the Data Collected

You have seen the work that Dr. King has done, as well as Ed Archuleta and others, on data analysis and interpretation. We must continue to do a better job in this area in the state of New Mexico.

Integration of GIS Platform for Accessibility and Usability

GIS is a wonderful tool and it should be used more often. We ought to all be on the same scale for GIS mapping so that the data collected can be used by all the various agencies including the federal government.

Water Masters Component

We need the creation of water districts with a water master assigned to those districts. We have water masters in the various basins but we do not have them in all the basins and until we measure what is being done with that water, and who is using it, we will not have a valid basis for any of the information that we need for administration.

Local Control and Responsibility

The water master should be under local control and should be paid for by local people.

Conservation Component

A sound plan for conservation and increasing efficiency of our delivery systems is a very important part of any attempt to maximize the water resources of our state. Conservation alone will not solve our water shortages, but it must be used as a tool to meet our ever-growing needs.

We must employ water conservation where possible to bridge drought impacts and maintain a reasonable supply. I think conservation is something that is a feel good word, at least, in my opinion, and we hear it quite often. Conservation is something that we have relied upon and on which we have spent a lot of money. But too many times we have conservation on our minds and we say that it is the solution. You have to understand that if Ed Archuleta in El Paso can conserve 35 percent of his water, as he has done in the past, and then El Paso continues to grow, and he uses up that 35 percent, he does not have 35 percent to conserve the next time he has a drought. We have to think of conservation realistically, and provide for those things that really will enhance our long-term water supply such as water banking and a significant reduction in depletion, so that we'll have available resources when we need them. First and foremost, we must recognize that we live in an arid part of the United States.

Bridge the Gap While Waiting Implementation of Certain Components

To bridge the gap, we use conservation, we use water banking, and we use water storage projects. Conservation protects water quality because less water is used and returned for reuse. Conservation keeps maximum flexibility of our water supplies, but the supplies vary.

Data Component

The Office of the State Engineer will need to maintain and continue to develop the WATERS database. This database will make valuable information available for all to use, including the general public.

The OSE will need to continue to maintain and improve their web page and provide continuous, up-to-date information for all to use. We recognize that a quality web site will save many man-hours of research for State personnel as well as the general public.

The OSE has made major advances in the last few years in data gathering and must continue to integrate water rights administration, databases, and hydrographic surveys as well as other current information.

Conclusion

In closing, let me say that we will be judged in the future on how well we interpret our present and future water needs. The State Water Plan is a tool that needs to be used, changed, and implemented on a regular basis. We will all learn as we work through this new State Water Plan.

With that, I will turn it back over to Karl. I thank you.

Carlos Rey Romero is the director of intergovernmental relations for the New Mexico Finance Authority. In that capacity, he works on policy development with federal and state agencies and on legislative matters pertaining to public finance. Carlos also works extensively with the tribes and pueblos of New Mexico on public project financing. Before coming to the NMFA two-and-a-half years ago, Carlos was a visiting professor of economics at the Armand Hammer United World College and an adjunct professor of economics and business at New Mexico Highlands University. He also was assigned to work on special projects at the Condensed Matter and Thermal Physics Group at Los Alamos National Laboratory for a semester. Carlos obtained his undergraduate and graduate degrees at New Mexico Tech and New Mexico Highlands University, where he pursued study in chemical engineering, physics, chemistry, and economics.



THE NEXT STEP: IMPLEMENTATION

Carlos Rey Romero
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Thank you. I don't have any slides today although I thought I'd have some but because I just left the legislative special session yesterday, I haven't had a chance to prepare slides.

We just spent a week talking about how we are going to finance our highways, about \$1.6 billion in highway financing. Governor Richardson came to us and said we need to be bold and we need to be innovative to get this done. I think it is the same story for water project financing.

Why plan for water? Because people need it, whether it's the environment, individuals, communities, or businesses. We have multiple issues when it comes

to water, including water quality and water quantity. When it comes to quantity issues, we look at projects and collaboration. How are we going to grow our quantity of water? We listened earlier today to the people from El Paso and how they are growing their quantity of water. Many communities in New Mexico are considering the same sorts of projects.

Governor Richardson is pushing a bold plan of state water planning and state water project financing. Concerning water project financing, the State of New Mexico is going to dedicate between \$490-\$606 million over the next ten years in water projects. We are asking the federal government to provide \$500 million

for water project financing and research to New Mexico. This funding will support technology research and community water projects.

We will also involve private industry. We have developed and continue to develop mechanisms for private industry to get involved in water and wastewater projects. I think it is very important that we remember wastewater. I know there are some city officials here. I see people from Deming who we worked with in water protection projects to clean up the mines and mine-tailings around their community. They are dealing with wastewater and water projects. Anytime you think about water you must also consider wastewater, because it is not only a water quality issue, but a water quantity issue as well when we begin to contaminate our water sources.

How do we get there? How do we get this plan into place? How do we work together and get these projects done? We must be bold, we have to think beyond ourselves, we have to think collaboratively and cooperatively for the betterment of our state and our people.

I was at New Mexico Tech when I first met John Hawley, who is probably one of the best minds in groundwater modeling and mapping in the state. He said, "You know, there's not an ocean under Albuquerque, we have a limited water supply." And everybody kind of laughed and said, "...no, we have a huge lake under Albuquerque that's never going to dry up." We need research and development to determine what supplies we actually have. Research is a very important part of our water plan. Then we begin to plan for our uses, our businesses, and our communities.

How is the State going to participate in financing? During this past legislative session, the Governor recommended that the Speaker of the House carry a bill that would take 10 percent of the state's severance tax bonding capacity every year and put it toward water projects. And how will that be accomplished? It's not just putting money out there, but utilizing the water trust for New Mexicans. The fund will be built up over time and will cost between \$10-\$12 million per year.

Next year there will be another proposal before the legislature to take 10 percent of our general obligation bonding capacity and put that toward water projects. We are also going to look at non-recurring general fund money. These are funds that kind of show up every so often. We have money that we can't count on every year, but we get some funding every so often.

Much of this money comes from the oil and gas industry. As gas prices at the pumps rise, the money that comes to the state is greater because those oil wells located at the eastern part of the state are pumped more and more. We hope to utilize some of that money to pump into water projects. In doing so, we believe we can obtain a goal of putting a billion dollars in water projects over the next ten years. This must be done in New Mexico to keep pace with our current growth levels and to encourage economic development.

In closing I would say that everyone is doing a great job when it comes to the State Water Plan. Many people have put so much effort and so much time into it. Soon we are going to have to make some very tough decisions. Small water systems need to come together and work cooperatively on regionalization. We must put our money in the best available technology and the best available water systems. Many communities are already doing this, but we need to price water appropriately. Water needs to be priced at a level that helps pay for operations and maintenance and for expansion when necessary.

Thank you for listening. I think the Hyatt Tamaya is a wonderful facility and a great economic development for the Pueblo of Santa Ana. I think this place is a model for many other communities that want to pursue economic development.

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