

# 45th Annual New Mexico Water Conference

## PROCEEDINGS

**Water, Growth  
and  
Sustainability:  
Planning  
for the  
21st Century**

December 4-6, 2000  
Hyatt Regency  
Albuquerque

Sponsored by  
New Mexico Water Resources Research Institute



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**45<sup>th</sup> Annual New Mexico Water Conference**

**Water, Growth and Sustainability:  
Planning for the 21<sup>st</sup> Century**

**December 5-6, 2000  
Hyatt Regency, Albuquerque**

**PROGRAM**

**Tuesday Morning, December 5, 2000**

- 7:00 am                    Registration begins, Pavilion Court
- 8:00                    Welcome  
**Karl Wood**, WRI Director  
**Jim Baca**, Mayor of Albuquerque
- Overview of State and Western Water Issues
- 8:15                    Water Issues in the West  
Commissioner **Eluid Martinez**, U.S. Bureau of Reclamation
- 9:00                    Water Issues Facing New Mexico  
**Tom Turney**, New Mexico State Engineer
- 9:20                    Current Issues at the New Mexico Environment Department  
**Peter Maggiore**, New Mexico Environment Department
- 9:40                    International Border Water Issues  
**Luis Mario Gutierrez** and **Alberto Ramirez**, Junta Municipal de Agua y  
Saneamiento, Ciudad Juárez, Chihuahua
- 10:00                    BREAK
- Water and Growth Issues Around the State of New Mexico
- 10:30                    Tribes and Pueblos - **Nelson Cordova**, Taos Pueblo; **Peter Chestnut**, general  
counsel, Acoma and San Ildefonso Pueblos; **Fidel Lorenzo**, Pueblo of Acoma;
- 11:00                    The San Juan River -The Current Controversy - **Randy Kirkpatrick**, San Juan  
Water Commission

- 11:15 Southwestern New Mexico - **Stan Bulsterbaum**, Deming native,  
New Mexico Interstate Stream Commissioner
- 11:30 Lower Rio Grande Basin - **Len Stokes**, water consultant, City of Las Cruces
- 11:45 Water Consumption Based on the Tiered Rate System - **Pat McCourt**,  
City Manager, Alamogordo
- 12:00 pm High School Water Essay 2000 Awards  
Luncheon Address - WRRRI Director **Karl Wood**  
Sendero Room

### **Tuesday Afternoon, December 5**

- 1:30 pm Water and Growth Issues: Carlsbad Irrigation District - **Tom Davis**, Carlsbad  
Irrigation District
- 1:45 Lea County - **Dennis Holmberg**, Lea County Water Users
- 2:00 Current Issues: Roswell Groundwater Basin, Chaves and Eddy Counties -  
**Fred Hennighausen**, Pecos Valley Artesian Conservancy District
- 2:15 Northeastern New Mexico Regional Water Plan - **Lee Tillman**, Eastern Plains  
Council of Governments
- 2:30 Water and Growth Issues: San Miguel County - **Les Montoya**, San Miguel  
County Manager
- 2:45 Northern New Mexico/Acequias - **Paula Garcia**, New Mexico Acequia  
Association
- 3:00 Santa Fe Area - **Craig O'Hare**, City of Santa Fe Sangre de Cristo Water
- 3:15 Division BREAK
- 3:45 *Inside New Mexico* - **Ernie Mills**, moderator; **Fidel Lorenzo**, Pueblo of Acoma;  
**Ray Powell**, State Land Office; **John Stomp**, City of Albuquerque; **Subhas  
Shah**, Middle Rio Grande Conservancy District; **Joe Stell**, New Mexico House  
Agriculture, Water and Natural Resources Committee; **Norman Gaume**, Office  
of the State Engineer
- 5:15- Reception Hosted by Hydrosphere Resource Consultants, Inc.  
7:00 pm Sendero Room

## Wednesday Morning, December 6

- 8:15 am Center for Sustainability of Semi-arid Hydrology and Riparian Areas  
**Gary Woodard**, Assistant Director for Knowledge Transfer
- 8:30 Demographics of New Mexico and the New Mexico/Texas/Ciudad Juarez  
Border Region  
**Jim Peach**, New Mexico State University
- 8:50 Middle Rio Grande Basin  
**John Stomp**, City of Albuquerque  
**Eileen Grevey Hillson**, Governor's Blue Ribbon Task Force on Water  
**Subhas Shah**, Middle Rio Grande Conservancy District
- 9:20 New Mexico Rural Water Users Association  
**Matt Holmes**, Executive Director
- 9:35 The Impact of Domestic Wells  
**Larry Webb**, City of Rio Rancho
- 9:50 Soil and Water Conservation District  
**Debbie Hughes**, Executive Officer
- 10:10 BREAK
- Federal Agencies Respond to New Mexico's Current Water Issues
- 10:40 U.S. Geological Survey  
**Linda Weiss**, District Chief
- 11:00 International Boundary and Water Commission Current Programs  
**Debra Little**, Engineer, US Section
- 11:20 U.S. Bureau of Reclamation Programs  
**Steve Hansen**, Albuquerque Area Office
- 11:40 U.S. Army Corps of Engineers Current Projects  
**Lt. Col. Raymond G. Midkiff**, District Engineer
- 12:00 pm U.S. Fish and Wildlife Service Programs  
**Lyle Lewis**, Endangered Species Branch Chief
- 12:20 Questions from Participants
- 12:30 Box Lunch, Pavilion Court

## Wednesday Afternoon: Water Banking Workshop

- 1:30        **Lee Brown**, Moderator  
Introduction to the Water Banking Workshop Format and  
What We Hope to Accomplish
- 1:40        Senator **Sue Wilson** and Representative **Pauline Gubbels**  
Statewide Water Banking:  
A Solution for Current and Future New Mexico Water Problems
- 2:00        **Timothy J. Henley**, Arizona Water Banking Authority  
The Arizona Experience with Water Banking
- 2:20        **Lawrence MacDonnell**, Colorado  
The Colorado Experience with Water Banking
- 2:40        Questions and Answers from Participants
- 3:00        BREAK
- 3:15        Water Banking in New Mexico Panel Discussion  
**David Benavides**, Community and Indian Legal Services of Northern New Mexico  
**Charles DuMars**, Law and Resource Planning Associates, P.C.  
**Norman Gaume**, New Mexico Interstate Stream Commission  
**Michael Hamman**, Jicarilla Apache Tribe  
**Steve Harris**, Rio Grande Restoration  
**John Hernandez**, New Mexico State University Professor Emeritus  
**Tom McGuckin**, New Mexico State University Department of Economics
- 4:15        Questions & Answers from Participants
- 4:30        Closing Comments, WRI Director **Karl Wood**





*Eluid L. Martinez was appointed Commissioner of the Bureau of Reclamation by President Clinton in 1995. He oversees the operation and maintenance of Reclamation's water storage, water distribution, and electric power generation facilities in the 17 western states. As Commissioner, Eluid has furthered Reclamation's goal of a continued emphasis on water resource management for the West's divergent interests, which consists of cities, irrigators, Native American Tribes, recreational interests, and fish and wildlife needs. Eluid retired from New Mexico state government in 1994 as a distinguished engineer with extensive experience in water resource administration, management, and flood protection programs. His positions included State Engineer and Secretary of the NM Interstate Stream Commission. A native of Rio Arriba County, he received an undergraduate degree in civil engineering at NMSU. He is an accomplished artist who hails from a rich heritage of nine generations of santeros. His sculptures, lithographs, and prints reside in the permanent collection of such museums as the Smithsonian Institute and the Denver Art Museum.*



## WATER ISSUES IN THE WEST

Eluid Martinez, Commissioner  
U.S. Bureau of Reclamation  
1849 C Street NW, Room 7654  
Washington, D.C. 20240

Good morning folks. You are going to have to bear with me as I got a bear of a cold in southern California last week and I'm still trying to shake it. Thanks very much for inviting me. I was unable to be with you last year. While I was on the plane yesterday flying in, I was thinking back to the first time I attended one of these New Mexico water conferences back in 1965. I was a second-year student at New Mexico State University. Now 35 years have gone by.

In those 35 years, I have seen a lot of changes in New Mexico, but I have also seen a lot of things that

remain the same. Some of the discussions on water that took place back then are basically the same discussions occurring here today, and probably will be for decades to come. In those 35 years, I have been fortunate to have gotten to know most of the water players in New Mexico. Some of them are no longer with us, and some of them are reluctant to admit that they have been involved in water and water issues in New Mexico for the last 35 years with me. I see a lot of new faces today, and these new folks are the ones who are going to face some rather interesting water issues in the next 10 or 20

years. It appears to me that water issues and water administration continue to get more and more complicated and that we are facing more special interests.

I recall that early in my career, when I went to work in the State Engineer Office, I was hired by Fred Allen. I don't know if Fred is in the audience today, but he was the key person who hired me in 1971. Back then there were some gentlemen waiting for retirement to come around, people like Earl Sorenson, Jack Kookler, and others. You may recall some of those folks. They finished their careers basically as water engineers whose main task was to develop water projects. Steve Reynolds and the Interstate Stream Commission at the time were mainly concerned with making sure that New Mexico was able to capture and utilize the waters that had been allocated to it through the interstate compacts. That was their primary task.

The Bureau of Reclamation, the agency I now head, was created in 1902. In the 1950s and 1960s, the Bureau had a staff of about 30,000 people building projects across the west. Slowly but surely since the early days of my career at the State Engineer Office in the 1970s to the time I left that agency in 1994, things gradually began to change. The era of development and building projects was coming to a close, except for projects that were badly needed and are still needed in the Native American community.

At any rate, a couple of things have happened. One is that the American public became more aware of environmental issues and more concerned about impacts to the environment. Also, the national budget was in severe deficit. There was not much interest back in Washington to fund large water projects. At the local level, consideration of environmental and similar issues began to creep into the decision-making process of the State Engineer's permitting process. That really came to a head in 1980, if I recall correctly, when the City of El Paso filed an application to divert water from southern New Mexico for its future growth. This move forced New Mexico to react and thus it implemented into its laws the concept of "public welfare." So State Engineer after State Engineer across the West had to deal with a nebulous concept called "public welfare" in the decision making process. The concept brought into the dialog who uses water and how it is used.

Players who had not taken part traditionally in these matters were suddenly at the table.

As an example, the last major application I acted on as State Engineer before Tom Turney replaced me was an application by Intel Corporation to take groundwater out of the Albuquerque regional area. If I recall correctly, the most contentious issue before me was NOT whether the water was available for the benefit of the applicant, or whether taking that water would impact existing water rights. Folks in Rio Rancho and the immediate area were concerned about growth issues involved with allowing Intel to expand and what impact that would have on roads, schools, and the character of life. The issue is still playing itself out across the West including New Mexico. At the time, I decided it was in the best interest of the State Engineer Office to stay out of that quarrel; planning issues and local-land use issues should be dealt with on the local level. I issued an opinion that was not appealed. I don't know if the issue has raised its head again in New Mexico or not—whether the State Engineer should or should not become involved in land-zoning issues by restricting who can and cannot use the water. I chose to stay out of that battle, hopefully that is still the case here in New Mexico. I would hate to see water officials, not only at the state level but at the federal level as well, dictate land-use policies. I think those policies should be dictated by local government authorities and that is the position I have taken and advocated in Washington D.C.

Those of you folks who know me, know I could stand up here for probably four hours talking about water issues and my art, but I only have 45 minutes today and then I have to be off to Santa Fe and Denver. My tenure as Commissioner of the Bureau of Reclamation is coming to an end on the 20th of January. I have made a conscious decision to come back to New Mexico. I have some things I must do here. Notwithstanding whoever gets elected President, my heart is here in New Mexico and I shall return and you will likely see me involved in water issues to some extent.

When I first went to work for the State Engineer Office, Steve Reynolds was 55 years of age and I was about 27. I remember I would sit back and wonder when that old guy was ever going to retire—it is all relative to where you sit at the time. Steve went on working, and as most of you know, he

passed away while still on the job. Had he not passed away, he'd probably still be State Engineer. He remained active in water issues at the age of 74. I don't know if I'm going to be around when I'm 74 years old, but if I am, I will still be involved in New Mexico water issues in one way or another. I want to thank Tom Turney for the good job he is doing as State Engineer. It is a contentious position, a difficult position, and anybody who takes on that job is going to lose a lot of sleep given the issues—no wonder Tom is getting gray hair.

One thing I would like to acknowledge about New Mexico is that given my extensive travel across the West and across the world, I have had an opportunity over the last five years to see a lot of things and to deal with a lot of water issues. The folks in New Mexico, both on the technical level and on the administrative level, are at a par with anyone in the West and in the world. New Mexico water interests will be well protected.

The Bureau of Reclamation is involved in one way or the other in most, if not all, water issues today. The Bureau is that arm of the Department of the Interior that is looked at, at least in Washington, as the water agency of the United States, along with the Corps of Engineers. There are those in Washington and in the West who have been concerned about the direction the Bureau has taken in the past six years. An issue I have tried to address concerns the extent to which the federal government, through the Bureau of Reclamation, should be involved in the management of water and water resources. That issue is still playing itself out.

As I was sitting on the plane last night flying into Albuquerque, I made a list of Bureau of Reclamation water projects in New Mexico. Let me read that list although I will probably miss some. The Bureau of Reclamation is involved in the San Juan/Chama Project—it constructed the project and also is a contractor for water on the project that impacts water users in New Mexico. The Bureau is involved with the Middle Rio Grande Conservancy District, the Low-Flow Conveyance Channel, the Lower Rio Grande Project, the Elephant Butte Irrigation District, and the Carlsbad Irrigation District. It is involved with the Hammond Project and the Fort Sumner Project as well as with the Closed Basin at the head waters on the Rio Grande. It also is a partner with the City of Albuquerque's North I-25 Reuse Corridor Project. The Bureau has authority to work with the

City of Santa Fe to reuse its wastewater and this year's budget includes funds for a feasibility study to begin looking at the reuse potential for both surface and groundwater.

We have an ongoing study on the potential Navajo-Gallup pipeline to bring water to the Navajo Nation and the city of Gallup. We have conducted and want to continue to conduct studies on a pipeline from Brantley Dam to southeastern New Mexico. The Bureau has substantial involvement in the state of New Mexico. The policies and the direction the Bureau takes will impact New Mexico for years to come.

I have been asked questions concerning staffing issues at the Bureau. As Commissioner, I will continue to carry out my duties. I have always kept an eye out for the best interests of the state of New Mexico. You will not only be losing a Commissioner of Reclamation with a history of water and water issues in New Mexico. Regional director, Charlie Calhoun, out of the Salt Lake City office, will be retiring on the 31st of January. The Area Manager, Mike Gabaldon, who I hand selected and placed here in Albuquerque, and who has done a good job for the Bureau and for New Mexico, will be taking the number two position in Washington D.C. for the Bureau.

I was asked what these personnel changes will mean for New Mexico in terms of the Bureau of Reclamation. The replacement for Charlie Calhoun, at least in the interim, is Rick Gold. He has a history of working with New Mexico on water issues and is very knowledgeable. To the extent that I have been able to educate the career staff back in Washington about New Mexico and western water issues, I believe that both will do a good job.

My tenure as Commissioner will end on January 20, 2001. Before that, I will be looking for somebody within the Bureau of Reclamation with the caliber of Mike Gabaldon, Garry Rowe, or Charlie Calhoun to bring to New Mexico as Area Manager. If I am unsuccessful, it will be up to the next administration to make that selection.

Let me talk about western water issues and the Bureau of Reclamation. In the time I have, I can take you through the legal and water issues of one river, the Rio Grande. If I have time, I will get to the other rivers in New Mexico as well as to discuss issues the Bureau of Reclamation and water users across the West face, particularly in New Mexico.

At this time, the Bureau of Reclamation is focused on several activities. One focus is to maintain adequately and operate its facilities. Secondly, it is trying to comply with water delivery contracts, fully realizing we have both national and state laws that impact the ability to deliver that water, including endangered species and state water laws, the Clean Water Act, and other affected statutes. We also are engaged in rural water distribution system development, wastewater reuse reclamation projects, drought emergency assistance, and countless other issues.

I don't know how many of you folks attended the workshop jointly sponsored by the United States and Mexico three or four months ago in El Paso. The workshop was principally driven by Secretary Bruce Babbitt of the Interior Department. That conference dealt with the bottom line: what can be done in the future to increase flows to the Big Bend area of Texas for the park and environmental purposes? It was an interesting workshop. What I submit to you is this: if flows are increased in the Big Bend area of Texas, those flows are going to come from upstream sources. It is in New Mexico's interest as well as Texas' and Colorado's, to keep its ear to the ground on that issue. There are groups in this country—and I won't take a position pro or con, I am just raising this as an issue so you are aware of it—especially the environmental community, who are looking for water flows for environmental purposes. These groups are pressing not only for water flows within our southwestern states, but also for water flows going into other countries. If you are interested in that dialog, follow what is taking place regarding the request by the environmental community to the Bureau of Reclamation to deliver water to endangered species in Mexico in the Colorado River Delta. That is an issue for New Mexico and other water users along the Rio Grande to keep their eye on.

As we work our way upstream, Juárez, the city of El Paso, and southern New Mexico form a major urban area with a limited water supply. Groundwater aquifers are tied to a surface stream and pumping the aquifer affects the stream. We have three straws taking that water out of the aquifer, one straw in Mexico, one straw in Texas, and one straw in New Mexico. The regulation of those straws varies depending on where the straw is located. It's a very contentious issue and will continue to be. The City of El Paso has, I believe, appropriately decided that it

will look toward water resources from the state of Texas—water Texas is entitled to from the district of Texas under the Lower Rio Grande Project, a means by which to convert water from agriculture uses to other uses. The Bureau of Reclamation entered into a contract with the El Paso Irrigation District that allows water to be converted from agricultural purposes to municipal purposes. This contract was not viewed favorably by some in New Mexico and some across the West. But it was a contract, I think, that provides a vehicle for the people in the state of Texas to use Texas water. The City and the District have been having difficulties in agreeing to a third party contract on how that water will be converted, principally driven by the cost the City must pay for that water. The City has been paying, but don't quote me on these figures, somewhere around \$15 an acre-foot for converting agricultural water in the past. Now they are looking at paying somewhere around \$190 an acre-foot with increasing costs in the future—significant increases. At any rate, it appears the City and the water users down in the El Paso area might come to an agreement. To the extent that they come to an agreement and that water is transferred, El Paso will have a firm water supply and they won't bother New Mexico. I have to be careful what I say here because I don't want to get into an area belonging to attorneys. There is litigation currently taking place in New Mexico, and in part of that litigation, New Mexico parties have taken the position that the contract the Bureau of Reclamation has entered into in that area should be voided—it should not be a viable contact. Personally, and I am not speaking as Commissioner, I am not speaking as a person involved in water issues, but I would hate to see the day that contract gets voided. If the contract is voided, it will force El Paso, because it will have no other recourse, to once again reach out with its tentacles to supply water to its citizens. And it will be reaching to southern New Mexico.

Mexico, and Juárez in particular, is growing. Where will Mexico get its water? There are noises being made about renegotiating our compact and treaty. I don't know how far that idea will get, but that is for future generations to look at. We have an adjudication taking place on the Lower Rio Grande. At issue is what the Federal interest is in terms of water rights and the issue will play itself out. Tom Turney is having to deal with groundwater administration in the lower reaches—I don't know how that

situation will play out, but its results will have an impact on the development of southern New Mexico. Many of the issues are more complicated than I have lead on and future state engineers and attorneys are in for an interesting time.

Traveling upstream we get to the reach from San Acacia to Elephant Butte where we have the Low-Flow Conveyance Channel that is very instrumental in delivering water across that reach so that New Mexico can make its deliveries to the downstream entities. There is some discussion as to what the future holds for the Low-Flow Conveyance Channel. The Bureau of Reclamation is in the process of finalizing, but not during my tenure, its position on the Low-Flow Conveyance Channel. New Mexico has a fairly crucial interest in this because to the extent that the channel is not utilized or not properly utilized, it increases depletions into the river that decreases the amount of water delivered to Elephant Butte. And of course, this impacts the ability of the State of New Mexico to deliver its compact obligations.

We have the silvery minnow involved in the San Acacia reach and that has been the subject of intense discussion and litigation over the last couple of years. That is an issue yet to play itself out. Ultimately, if the decision by the courts is that the river will be keep wet, that will have immense ramifications for New Mexico upstream water users. Not only New Mexico upstream users, but also those in Colorado. I think Colorado interests have not come into play yet but they will as well as native Rio Grande water. This issue even impacts the state of Texas. Putting aside my Commissioner hat, I don't think it's fair for one state or one reach of a state to bear the entire responsibility for providing habitat for an endangered species on a given river. To the extent that water is necessary for an endangered species, I think that water should come proportionally from all users of the river. I am glad it is snowing up on the mountains because if it continues to snow and we have a good run-off this year, we will have some breathing room. I would hate to see a new Commissioner and other new personnel as well as the State Engineer have to deal with these issues given the same kind of drought conditions you had last year. If they do, Tom won't just have his hair turn gray, he'll lose his hair—the issues are that insurmountable. The City of Albuquerque is trying to implement its water resources plan and deliver water on the San Juan/

Chama water contracts. The City is going through a process with state and federal environmental regulations. We will see where that leads. Albuquerque is trying to put in a wastewater recycling project and the Bureau of Reclamation is involved in that effort. Going from Cochiti to San Acacia, there is some activity taking place concerning a habitat restoration plan that will look at improving the habitat for the silvery minnow on that reach of the river. The Bureau is involved in that effort along with other water agencies.

Let's continue up the river to Santa Fe. We are quite concerned whether Santa Fe will be able to effect its San Juan/Chama water contract. You may have read in the paper where Tom Turney has probably appropriately stated that you guys better start using your water because you guys don't know what Uncle Sam might do in the year 2016 if you haven't used your water and used it effectively, especially given the issues on the Rio Grande. It would appear to me, notwithstanding the fact that the contractors of the San Juan/Chama water have that water under contract, there is a well-known old premise in western water law that says "use it or lose it." Beneficial use is the basis of a water right. My advice to the Mayor of the City of Santa Fe, or to any water user to be, if you have a contract or a right of water that you have not exercised, you better get out there and exercise it, especially given a system with higher demand than supply. I expect to see a flurry of activity on the part of contractors on San Juan/ Chama water—those who to date have not beneficially used their water will make sure they start beneficially using it. And there are some interesting implications because once they start using their water and that water does not become available for other purposes, you will have interest groups who will want to weigh in on that matter.

Continuing up the river, the City of Española has sent a delegation to talk to me to express their concern about San Juan/Chama water and about making better use of their water resources. Española area groundwater has some nitrate concentrations. Through the efforts of New Mexico's Congressional delegation, the Bureau of Reclamation will begin a feasibility study of the potential to reuse the ground/surface water in the Espanola valley. Leaders of that area came to me in Washington and said they wanted to go one step further. They would like to do a study of the potential to incorporate a massive

regional water system and wastewater reuse system that would go from Abiqui to Embudo to Velarde down to Santa Fe County and maybe as far south as Santa Fe. The Bureau of Reclamation, while it is not in the wastewater business, it is in the business of building regional water systems. We are now building regional water systems in the Dakotas and have been authorized to do a regional water system that will involve three states. These are multi-million dollar projects. I look forward to a future Reclamation official working with the State Engineer, the Española delegation, and water users in northern New Mexico, if, in fact, that regional water system project turns out to be feasible.

The drought issue continues to be with us and the Bureau of Reclamation is working on it and will continue to do so as this issue will be revisited throughout the West depending on our climate. The Bureau of Reclamation is the only federal agency today that has been authorized by Congress to provide assistance to the states by its local entities through drought contingency plans. We have worked with Tom Turney and with water users across the state to try to implement plans. Once plans are prepared, they will be forwarded to Congress, where they will seek approval for implementation. No entity that I am aware of has sent a plan to Congress through the Bureau of Reclamation for implementation. Whether implementation leads to federal dollars remains to be seen, but I expect to see more of that kind of activity.

Let me leave you with this thought. The issues that are playing themselves out in New Mexico are the same issues playing themselves out across the American West. They are a bit more acute in New Mexico because we have less water—that is a given. The water needs of endangered species and endangered habitats will continue to play a major role, not withstanding whoever gets elected President. While the policies of the Bureau of Reclamation may change, there will still be people litigating issues and judges making decisions. It looks to me that at this time, the majority of the American people are interested in environmental issues and thus those demands will continue on a limited water resource.

To give you an example, in the Pacific Northwest, we have the endangered salmon. I don't know how many of you have had an opportunity to see the Columbia River. When I became Commissioner of the Bureau of Reclamation and had the opportunity

to see many of our country's rivers, I wondered about our mighty Rio Grande. It certainly gives you a different perspective on things. On the Columbia River, the Bureau of Reclamation is now purchasing 420,000 acre-feet per year of water to move fish down the river in their early stages of development. On a river like the Columbia, the Bureau of Reclamation is purchasing on the average of 420,000 acre-feet per year, representing not even 1% of its flow. When you contrast that with the Pecos River in New Mexico and the Bureau's effort to buy water of 15 cfs in the river for one summer, you begin to see that the magnitude of a river's flow doesn't provide relief. The national Marine and Fishery Service is now on the verge of asking the Bureau to increase that requirement to over 600,000 acre-feet. Those issues will continue to be important.

I have not touched much on Native American issues, and I need to do that in closing. New Mexico is fortunate to have as many Pueblos and Indian Tribes as it does. However, when the State of Colorado settles the Animas/La Plata project issue, it will have settled its Native American water right issues. When some states deal with Native American water issues, they deal with two or three tribes. Here in New Mexico we have 19 Pueblos and two reservations. Except for the Jicarilla Indian water rights settlement, there are no final settlements on Indian water rights claims with any of the Native American communities. When and if claims are settled and to the extent they are settled, it will have a significant impact on the state's water resources and its ability to use its water resources. At the rate settlements are taking place, I don't know whether Tom Turney in his tenure, or me in my lifetime, will ever be able to see them come to closure. I went to work when I was 27 years old and the Aamodt lawsuit was already eight years old and it still has yet to be concluded. The Bureau of Reclamation has been very active trying to work with the Indian Tribes and the states to bring some issues to closure.

Now I have painted a picture as best I can, and let me leave you with this thought. I feel comfortable that there is no reason for panic, but there is reason for concern, not only in New Mexico but across the American West, about the fact that we have increasing water demands and a limited resource. However, I think we have the expertise, the knowledge, the ability, and the will to work through these issues.

## Water Issues in the West

Working through these issues will mean that there must be some give and take. There will not be, in my opinion, a solution by consensus. But there will be solutions that I think will be acceptable. I plan to join you here in New Mexico in 60 days to continue to wrestle with these issues and to continue to give Tom Turney a little bit more gray hair.

Thank you very much.





*Tom Turney has served as New Mexico State Engineer since 1994. A professional engineer for more than 20 years, Tom is licensed in the fields of civil, electrical and architectural engineering. He earned both bachelor's and master's degrees in civil engineering from NMSU. Tom is a native New Mexican, his grandfather having settled in Jornada, New Mexico in the 1880s. He came to the post of state engineer at a time when the role of state government in the protection of the state's water resources is critical. His goal is to develop a water resource strategy that protects existing water right holders, while at the same time addressing the growing population pressures on the state's limited water supply.*



*Editor's Note: The slides referred to by Mr. Turney in this paper were not available for the conference proceedings.*

## Water Issues Facing New Mexico

Tom Turney  
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This morning I want to present our request to the state legislature. It describes some of the issues facing the Office of the State Engineer (OSE) as well as solutions to address these issues. I'll give you a brief overview of some external and internal challenges facing the state. Then I'll talk about Active River Management, which includes three aspects: measurement, management, and markets. Also, I want to talk about the funding we will request from the state legislature, the ongoing WATERS database project, state adjudications proposed legislation, and finally, regional water planing.

For many decades the OSE has been issuing permits for water rights. However, there is more to our office than merely overseeing appropriations. It is time to become concerned about water for the state's future. Basically, we need to make the same amount of water go further. To do that requires a legal and a planning infrastructure. We must have

hydrographic surveys and adjudications completed. We must implement plans for demands to meet the available water supply. This approach requires tremendous amounts of basic hydrologic data to support our computer modeling efforts.

External threats come from our neighbor states. For example, the state of Texas, imposed "challenges" on us this summer—we don't call them problems anymore, we call them challenges—Colorado challenged us on the Costillo Creek and the La Plata River, and we underdelivered on the Pecos River. We also have challenges dealing with Arizona and California.

We have a number of issues with federal agencies. We have started to see cut-backs of water development projects and data collection, and scientific investigations. Unfunded federal mandates that include minimum flows for the Endangered Species Act continue to challenge us.

We must remind ourselves that New Mexico is a desert state and we have a finite supply of water. We are gradually reducing our groundwater supply—we are, in fact, mining our aquifers.

In the future, there is a good chance we will be faced with a reduced surface water supply. Over the last 50 years, the Rio Grande has increased its flow by 30 percent. The Pecos River has 10 percent additional flows. The San Juan River has increased by 10-15 percent during 1950-1980. The Gila River is running at 10-15 percent above average.

The Office of the State Engineer (OSE) must make the transition to become an Active River Management agency. Such an agency would manage our finite water supply in accordance with state water law. It would be responsible for delivering water to those who have water rights.

We need to investigate how to replace water in the aquifers that we are mining today.

Water markets must be developed. They are the only effective means to re-allocate water.

To demonstrate the complexity of Active River Management, I want to show a slide (*ed. note: slide not available*). Active River Management includes water development, water regulation and restoration. On the left is a bar representing what will happen in our office internally. To manage the state's water resources, we must create the necessary internal structures.

We are at an ideal time to begin Active River Management. About two years ago, the legislature initiated Performance-Based Budgeting. For the last year we have implemented this initiative. We have completed a major office reorganization. Performance-Based Budgeting requires the agency to become goal oriented. As an example of reorganization, the Hydrographic Survey Bureau used to function on its own. When the Bureau completed a hydrographic survey, it would go on and start another. There was little coordination with our Legal Division on how these completed surveys could be produced through the court. We have now physically moved the Bureau next to the Legal Division. The Hydrographic Survey Engineer is located in an office right beside the legal attorney pursuing an adjudication. Now when hydrographic staff finish a section of a survey working in consultation with the legal staff, they begin moving surveyed claims through the court system. This change is working well and is moving existing adjudications forward at a more rapid pace.

We also have established a protested Hearing Unit. I am sure some of you are involved with this unit. We have full-time hiring officers assigned to the Hearing Unit and have established an Administrative Litigation Unit to represent the Water Rights Division before the Hearing Unit.

Our WATERS database, which is a unified database designed to support all programs in the office, is being updated with information daily.

Let's talk now a bit about the three components of an Active River Management. The first includes measurement of flow diversions, groundwater levels, and the acreage of land being irrigated. After measurement, the next step is management. This includes delivering water to senior water rights holders in a priority based system. Finally, we have water markets which necessitate a willing seller and a willing buyer.

We receive lots of complaints concerning the length of time it takes to process a water transfer. The backlog is being reduced. The Hearing Unit now has 185 protested applications. This is not an unreasonable number. Currently, we have 650 unprotested applications pending. We receive about 50 new applications a month. One way of looking at this is to say we have on average a 13-month turn-around time for unprotested applications. As recently as four or five years ago, we had applications that had been sitting around for 30 years. I don't mean to imply that we have eliminated applications from years ago, but we now have a process to address applications.

One thing I worry about is increasing depletions. If we increase depletions, we jeopardize our ability to make Compact obligations. The absence of adjudications makes water transfers highly questionable.

We have recently heard a lot of discussion about water banks. Water banking should be implemented only when our house is in order. As of this morning, our house is not in order.

Concerning water rights, we must comply with our various Compacts. For example, along the Pecos River, if I don't comply with the Compact and curtail water usage, there will be serious economic damage—some have estimated in the order of \$240 million. We have already spent \$50 million addressing this issue.

Along the Rio Grande, there is a lot of development that is eroding the state's ability to meet its Compact obligations. There are delays in the completion of river projects designed to protect Compact

deliveries. There has been a lot of discussion in the press about water supplies for the City of Santa Fe. The City of Santa Fe must develop a water diversion infrastructure. In 1971, the City of Santa Fe was given a permit for 10,000 acre-feet of water with the assumption that the City would secure water rights for this amount. The City is pumping 5,000-6,000 acre-feet of water a year and has only secured about 300 acre-feet of permanent offsetting rights. Ultimately this pumping will catch up with the City. It is like selling short on the stock market. You're going to have to secure additional water rights to pay for the water pumped. We have issued a number of these types of dedication permits. We have river depletions when many existing permits are fully exercised. We are going to see river depletions because of economic development, changes in federal activities such as the Endangered Species Act as well as habitat restoration.

Active River Management will require us to basically offset these new uses. We are going to take measurements of water, both acreage and water diversions. Markets will be needed to meet the state's water demands.

We also must look at the water development projects occurring around the state. These include the cities of Santa Fe and Albuquerque, the beneficiaries of San Juan-Chama water. Incidentally, let me tell you why Santa Fe needs to get a perpetual water supply. The OSE approves all subdivisions. Recently we recommended denial of a 300-unit subdivision in Santa Fe County because of lack of a 100-year water supply, per county subdivision regulations. Unfortunately, we will have to continue to do so if subdivisions use San Juan-Chama water as their supply. The City's contract for this water expires in 2016. There is no guarantee it can be renewed.

Another concern is maintaining a water supply in the eastern part of the state. The Ogalala Aquifer is declining. To provide water, there is a project to bring a water transmission line from Ute Dam to supply the Clovis/Portales/Tucumcari area.

We have 16,000 acre-feet of water available to us as a result of the Central Arizona Project water. This water may be needed in Deming or Silver City. Recently, I heard Santa Teresa may need this water.

Santa Teresa is an interesting predicament. Water rights are going to become a major issue.

The Animas La Plata Project will provide water

for Farmington, Bloomfield, and Aztec. A water supply is necessary for the Navajo communities along the front range of the Chuska Mountains as well as the City of Gallup.

Some of the desired outcomes to do this within the office are some of our office functions. We must have a very strong data collection effort. This is essential for Active River Management. We are working with the Elephant Butte Irrigation District and the Middle Rio Grande Conservancy District to install measuring devices. Water flow devices will be installed in San Juan River within the next four years.

Concerning our water supply and well applications—the State Engineer does provide permits for new wells taking into account whether the new well will affect other wells in the area. We need to have a thorough understanding of the hydrologic system so we can approve or deny these permits. We also need to augment our data collection and to be able to analyze data.

We must develop a State Water Plan. I have requested about \$1.5 million to complete the regional water plan.

The blue bar represents the Water Administration Technical Engineering Resources System (WATERS). WATERS will ultimately include a GIS component. We hope it will help our staff as well as people outside. We now have our basic WATERS information on our web page. About a year and a half ago, we were getting 7-8 hits a day and now we are getting 70 a day. Those hits come mostly from people wanting information on domestic wells. We are requesting a little more than \$14 million over the next four years in order to put in all the files in our office into the WATERS database. We have hundreds of thousands of files. These documents are priceless. One document might be worth millions, perhaps billions of dollars. The documents must be preserved.

Water right determinations are very important. We need to continue completing hydrographic surveys, error and omission claims, adjudications, and move the adjudication process through the court. Last week we had a formal signing with Judge Conway in Federal District Court. We closed out two adjudications, one on Indian claims on the Jemez River and another on the Red River. These cases have been sitting out there for 17 years. Adjudications establish who owns the water rights and indicates the priority year, which is of absolute

importance to administering water by priority. Adjudications will allow the State Engineer to develop a plan for effective administration during a drought and it will allow us to process water right applications more effectively along with meeting Compact obligations. These adjudications are expensive but they guarantee a long-time future for the state of New Mexico.

We are requesting \$15 million over the next five years for the lower Pecos and lower Rio Grande.

Indian claims and negotiations are beginning to occur. We are making progress on Navajo claims. I'm sure you will start to see news on that within the next few months and a formal signing between the President of the Navajo Nations and the Governor of New Mexico. The state is going to have to participate financially in settlement of Indian claims. Last year the legislature set up \$2 million as a settlement fund.

The state is going to have to get involved at a very different level than it has in the past. One example is on river operations. We have an interesting working relationship with the Bureau of Reclamation. On one hand they are an adversary but even though we are adversaries, we must be partners, too. We need money for certain operations and maintenance. Senator Domenici passes this money through the Bureau of Reclamation so we must be partners.

We must comply with federal environmental laws, the Clean Water Act, the Endangered Species Act, and the National Environmental Policy Act. Every water user in the state is impacted by these laws.

We have three critical lawsuits that will shape the future of the state of New Mexico. First is the *Silvery Minnow vs. Martinez*. This suit deals with upstream reservoirs and endangered species on the Rio Grande. A second suit is one initiated by my office. It deals with the critical habitat rule promulgated by the Fish and Wildlife Service. I felt that people had the right to know where the water to satisfy the critical habitat was going to be coming from, whose water rights they are taking, and what is going to be the economic impact to the state.

Last week we had a major victory for the state on this suit. The Judge gave the Fish and Wildlife Service 120 days to prepare an Environmental Impact Statement.

On the Pecos River, we have another environmental lawsuit. The U.S. Fish and Wildlife Service has established a minimum flow. It is based upon causing rippling of the river bottom, a component the Service says is necessary for spawning of the fish.

We are requesting funds for the state to participate in defense of these lawsuits. We will hire hydrologists and biologists so we can understand what is going on.

The State for the first time has a cooperative status in preparation for an Environmental Impact Statement on the Rio Grande. This is the first time the State has ever done a joint lead. The Bureau of Reclamation did not want us to participate as a joint lead. We had to develop Congressional support to become a joint lead. The Corps of Engineers were cooperative from the beginning and were willing to let us sit at the table. If it is a highly successful process, it will have very powerful consequences for the state.

Active River Management is the Office of the State Engineer/Interstate Stream Commission answer to the complex water challenges that face New Mexico. It includes 3 Ms— measurement, management, and finally markets.

But it is not enough just to accept Active River Management as a phrase. The concept must also be embraced. Active River Management will not happen overnight. It's going to take time along with unprecedented commitment by all.

Thank you.

*Peter Maggiore is Secretary for the New Mexico Environment Department, appointed to that position in 1998 by Governor Johnson. Previously he was Environmental Protection Division Director for the NMED. Pete is a certified professional geologist and holds a B.S. degree in geology from Stony Brook State University and an M.S. degree in geology from UNM. He has more than 17 years experience in the field of geology, and has worked in the fields of mineral exploration, oil and gas exploration, academia, and environmental consulting.*



## Current Issues at the New Mexico Environment Department Presentation Outline

Peter Maggiore, C.P.G.  
Cabinet Secretary  
New Mexico Environment Department  
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PO Box 26110  
Santa Fe, NM 87502

### **Current Issues at NMED**

Pharmaceuticals in Ambient Water  
NPDES Permitting  
TMDL Development in New Mexico  
Water Management in New Mexico

### **Drug Residues in Ambient Water**

30-60% of pharmaceutical doses:

- pass through humans
- not always destroyed by conventional sewage treatment
- discharged in sewage

Drug residues widely detected in ambient European waters (ng/L)  
Impacts on bacteria, fish and birds documented

### **Ecological Impacts**

Antibiotic-resistant bacteria in rivers and birds, including salmonella in the Rio Grande  
Sexual disruption in male fish exposed to ng/L estrogenic hormones discharged in sewage  
Intersexuality:

- Appearance of female characteristics in males
- Progressive disappearance of male characteristics
- Threat to survivability of species

### **New Mexico Surveillance**

Initial surveillance - sample at locations where drug residues would most likely occur:

- treated sewage effluent
- surface water receiving sewage
- groundwater contaminated by sewage
- drinking water served by surface water or by contaminated groundwater

SLD developed capability to test for estrogens and anti-depressants at ng/L

### Results

All sewage effluents contained at least one drug residue, but not a complex variety (amitriptyline @ 30 ng/L, caffeine @ 1000 ng/L, phentoin @ 320 ng/L, propoxyphene @ 820 ng/L)

Drugs detected in only two of eight surface-water samples:

- ethynyl estradiol @ 10 ng/L in San Juan at Bloomfield
- caffeine at 200 ng/L in Rio Grande at Sunland Park
- Middle Rio Grande not sampled yet

Drugs not detected in any of eight groundwater samples

### Conclusions

No evidence of widespread drug residues, for those tested, in ambient surface water

Estrogens, often found in Europe, were detected in only one surface-water sample, but not in any sewage effluent

Antibiotics, cholesterol and cardiovascular drugs not included in study due to lack of analytical capability (expected in 2001)

### National Pollutant Discharge Elimination System Permits

Current NPDES Permit issues:

- Backlog of expired and non-issued permits
- Integrating NPDES permit requirements with Total Maximum Daily Loads and Water Quality Standards
- Implementation of Storm Water Phase 2 permitting of runoff from smaller urban areas

### NPDES Permit Issues

Backlog of expired and non-issued is of concern

- Outdated permits may not be fully protective of current water quality standards
- Backlog problem is not unique to NM
- In last two years, significant progress toward reduction; NMED has reviewed 60 proposed permits for renewal; total of 128 permits in New Mexico

Integration with TMDLs and water quality-based permitting

- NPDES permits are the tool for implementing TMDL plans for Point Source Discharges
  - NPDES permits also protect water quality standards and may result in stringent requirements
- Implementation of Storm Water Phase 2
- Requires Permit coverage—mostly under general permits—for discharges from certain small municipal separate storm sewers
  - Construction activity disturbing more than one-acre of land

### What is a Total Maximum Daily Load (TMDL)?

A watershed or basin-wide budget for pollutant influx to a watercourse

Calculated after study of waterbody to determine amount of pollutants that can be assimilated without causing violation of water quality standards

$$\text{TMDL} = (\text{LA} + \text{WLA} + \text{MOS})$$

LA= Load Allocation (nonpoint sources)

WLA= Waste Load Allocation (point sources)

MOS= Margin of Safety (uncertainty)

A TMDL is **not** a regulation, but the load calculations in a TMDL are used for both regulatory (NPDES permits) and non-regulatory programs (CWA section 319 projects)

A TMDL is developed with extensive public and stakeholder participation

### Required by the Clean Water Act Section 303(d)

(C) Each State shall establish...the total maximum daily load, for those pollutants... suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety ...

### 1999 TMDLs

- 47 individual parameters on 11 stream reaches from the 1996 303(d) list
- 21 TMDLs written for the Consent Decree listed parameters
- 26 TMDLs not necessary for the Consent Decree listed parameters
- 5 additional TMDLs written outside of the Consent Decree listed parameters
- Total TMDLs written and approved: 26

**2000 TMDLs Drafted**

Middle Rio Grande

Fecal coliform in storm water

Santa Fe River

Dissolved oxygen

pH

Cieneguilla Creek

Metals (aluminum)

Rayado Creek

Stream bottom deposits

Cimarron River

Metals (aluminum)

**Water Management in New Mexico**

Recent events underscore how intertwined water quality and quantity are:

- ESA issues on Rio Grande and Pecos
- TMDLs

Current management structure does not promote integration of quantity and quality

- Decision making compartmentalized
- Not suited to holistic water management

Administration currently looking at ways to better integrate water management decision-making

- Information systems
- Boards and Commissions
- Quality and quantity

Considering options for upcoming session





*Luis Mario Gutierrez is the CEO of the Juárez Utilities Board, Ciudad Juárez. For the past two years he also has been the Juárez Zone Director of the Bancrecer Bank. Luis has had extensive experience in the banking business having worked for the Comermex Bank for 13 years and the Serfin Bank for eight years. He received a B.A. in accounting from the University of Chihuahua.*

Conference presentation was given by Alberto Ramirez.



## INTERNATIONAL BORDER WATER ISSUES JUNTA MUNICIPAL DE AGUA Y SANEAMIENTO (JMAS)

### Presentation Outline

President Luis Mario Gutierrez  
Junta Municipal de Agua y Saneamiento  
Ing. Pedro N. Garcia #2231  
C.P. 32030, Col. P. Romero  
Ciudad Juárez, Chihuahua

#### INTRODUCTION

- Ciudad Juárez is located in the Mexican state of Chihuahua, and is the largest border city along the Rio Bravo/Grande international reach
- Current population: 1,219,926
- Annual rate growth: 4.23
- Main economic activity: Assembling Industry (maquiladora)

#### WATER SOURCES IN THE REGION

- Considering the climatic and environmental conditions prevailing in the area, as well as the accelerated growth rate in the city, water provision for the city of Juárez constitutes an extraordinary challenge and probably the main environmental issue in the coming years

- Mexico receives annually 74 million cubic meters from the Rio Bravo/Grande, as part of the 1906 Convention
- This water is used entirely for agricultural irrigation in the Juárez Valley
- At the present time the sole source of water for the city is a binational aquifer, Bolsón del Hueco.
- Annual average extraction from El Hueco: 150 million cubic meters

#### EXISTING SITUATION

- The city has more than 145 wells along the entire urban area, which provide previously chlorinated water to the distribution system

- Total population connected to the system: 1,122,331, which is 92 percent of the total population, 84 percent with sewage service
- Existing population consisting mainly of young people; 65.2 percent of the population is under 29 years of age
- Average *per capita water consumption*: 330 l/h/d (less than 100 gal/p/d)
- Maximum water production capacity per year: 176.6 Mm<sup>3</sup>
- Considering existing population trends and no additional well drilling in the Hueco Bolsón, unless additional sources are developed, a major deficit could be faced by 2004, as well as increasing water quality degradation.

#### JUÁREZ AQUIFER'S CHARACTERISTICS

- The Bolsón del Hueco is a binational aquifer, the northern part located in the USA and the lower southern part in Mexico.
- The aquifer's limits are: to the north, the state of New Mexico; to the east, the Sierra Hueco; to the west, the Franklin Mountains and the Sierra Juárez; and to the South, the Sierra de Presidio. (Figures 1 and 2)

Location of groundwater sources (Figure 3)

#### WATER DEMAND FORECAST (Figures 4-6)

- Existing maximum water production capacity: 5,600 l.p.s. (176.6 Mm<sup>3</sup> per year).
- A water deficit will start in the year 2004, if the actual groundwater extraction rate continues.
- This scenario considers that no new wells will be drilled and the population will continue to grow at the highest rate.
- Additionally, it doesn't consider closing down wells that are producing poor water quality, especially in the downtown area.

Water extraction from the Hueco Bolsón (Figure 7)

#### WATER PRESERVATION MEASURES TAKEN BY THE JMAS

Existing programs:

- Industrial and Commercial Discharges Pretreatment Program
- Groundwater Protection Program
- Water Reclamation and Reuse Program
- Internal planning process

- Participation and promotion of city planning activities through the Interagency Planning Committee

Planning activities:

- Update the Water and Sanitation Master Plan

Main issues:

- Financed by Border Environment Cooperation Commission (BECC)
- Search for additional water sources
- Analysis of alternative growth areas
- Follow-up and coordination with the Texas/New Mexico Commission's Project
- Long-term analysis of regional development based on water sustainable use
- Additional wastewater treatment and reuse systems evaluation; water markets design
- Identify potential location and technology for additional wastewater treatment plants

#### ALTERNATIVE WATER SOURCES

Surface water: Río Bravo

Existing groundwater: Bolsón del Hueco

Future groundwater: Bolsón de la Mesilla (Conejos-Médanos); Bismarck's Aquifer; Valle de Juárez's shallow aquifer

Water reclamation programs

#### LA MESILLA BOLSÓN (CONEJOS MÉDANOS)

Project description:

- 24 groundwater wells
- 30 kms (18.6 MI) aqueduct
- Approximate water production capacity: 1 m<sup>3</sup>/sec
- Storage tank (5000 cubic meters)
- Connection and branching lines
- Approximate cost: \$30 million (US dollars)

#### RÍO BRAVO'S WATER POTABILIZATION

Issues:

- Existing international water delivery agreements
- Seasonal water availability and river's hydraulic operation
- Legal framework concerning the Mexican farmers' water rights on these waters, derived from the 1906 Agreement
- Technical issues concerning water quality and treatment

Project description:

- Estimated that the average flow that could be obtained for treatment is 1,500 l/sec.
- Water treatment plant could be located on either side of the border, depending on the results of feasibility study and financial resources available
- Approximate total cost: \$14 million (US dollars)
- Conventional treatment technology has been considered, membrane systems are an option, considering seasonal water quality variations

- Increase community participation on rational water-use educational programs
- Increase water reclamation and reuse programs
- Apply constant improvement policy to service

SUGGESTED BINATIONAL COORDINATION ACTIONS ON WATER ISSUES IN THE PASO DEL NORTE REGION

- Identify common interest issues
- Define joint planning strategies
- Joint analysis of growth trends in the region
- Evaluate existing and future water demands in the region
- Joint water uses prioritization
- Define common water management policies
- Joint water conservation programs
- Exchange and share technology

WATER MANAGEMENT STRATEGIES IN JUÁREZ

- Develop sectarian service areas
- Reduce water loss (leaks)
- Base rate structure on effective cost

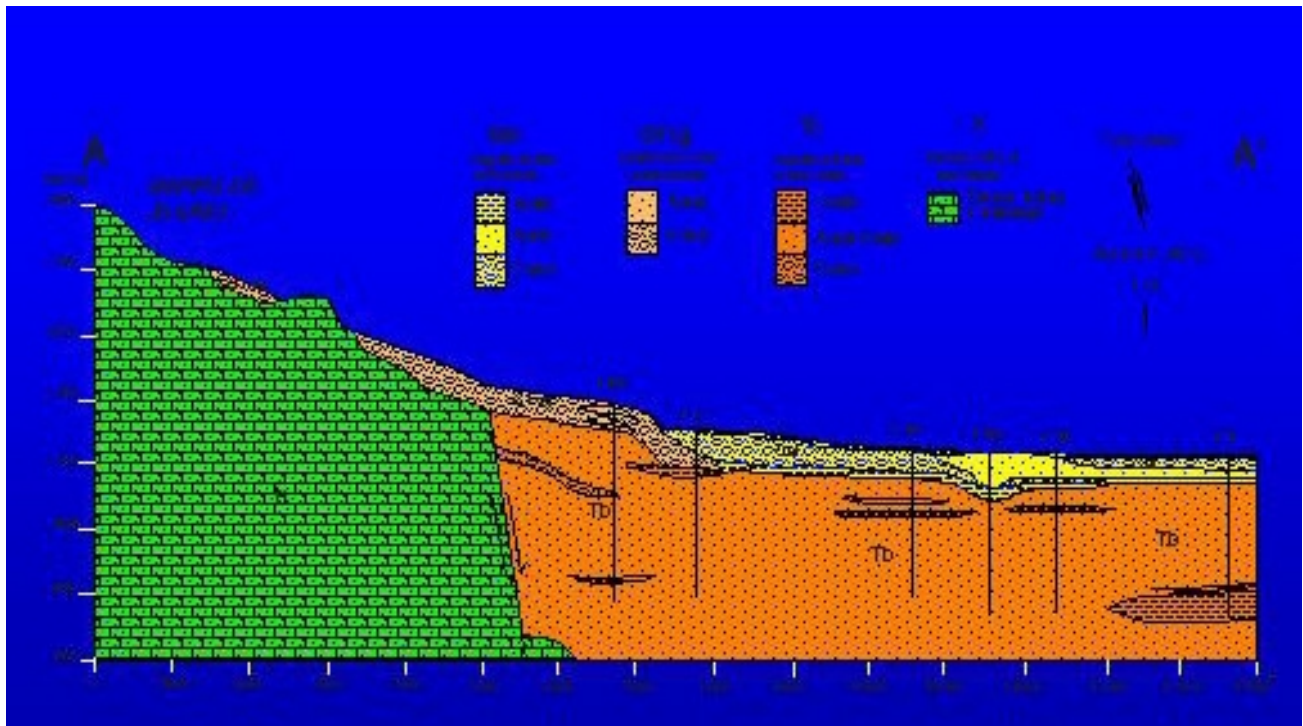


Figure 1. Bolsón Del Hueco: Hydrological Description of the System. The aquifer system in Juárez is formed by a shallow aquifer settled on alluvial rocks from the Quaternary and a deeper aquifer located on the Bolsón’s deposits, made mainly of gravel, sand silt and clay from the Tertiary. The shallow aquifer, named Acuífero del Aluvion Rio Grande, gets its water mainly from infiltration from the river bed and from irrigation discharges. The extraction is performed mainly through wells. The deeper aquifer, called the Bolsón del Hueco, is recharged through lateral groundwater flows and water coming from the shallow aquifer.

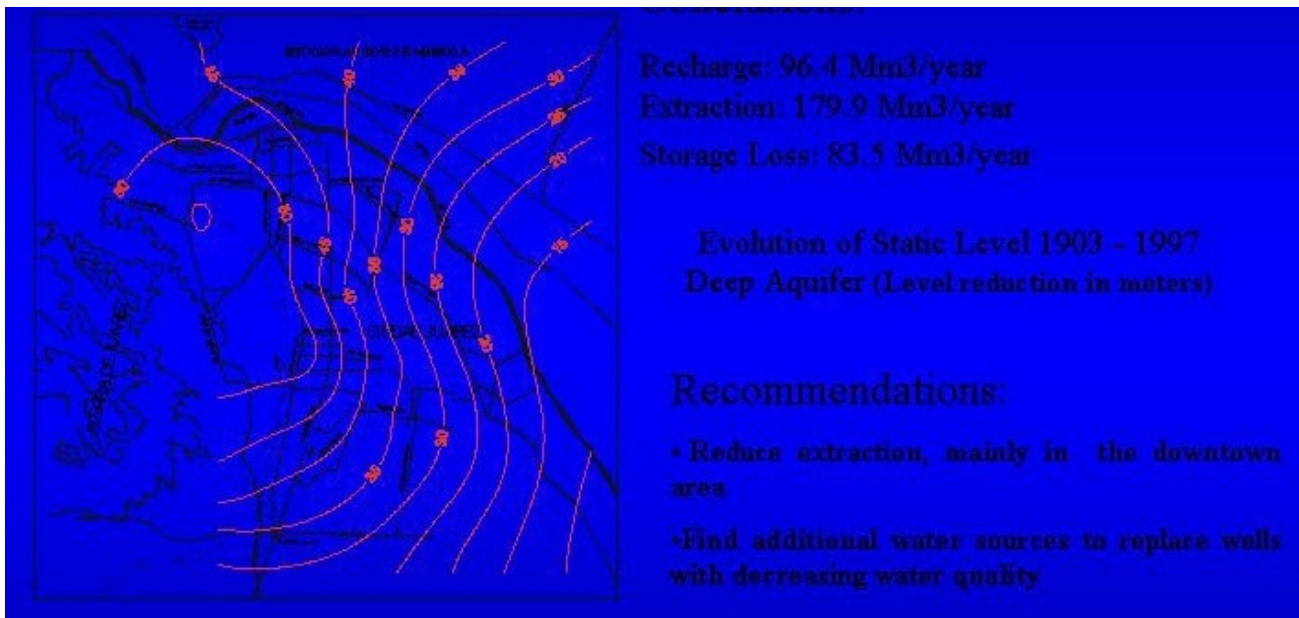


Figure 2. Bolson del Huevo (Zone de Cd. Juarez, Chih.) Hydrodynamic Flow Simulation Model

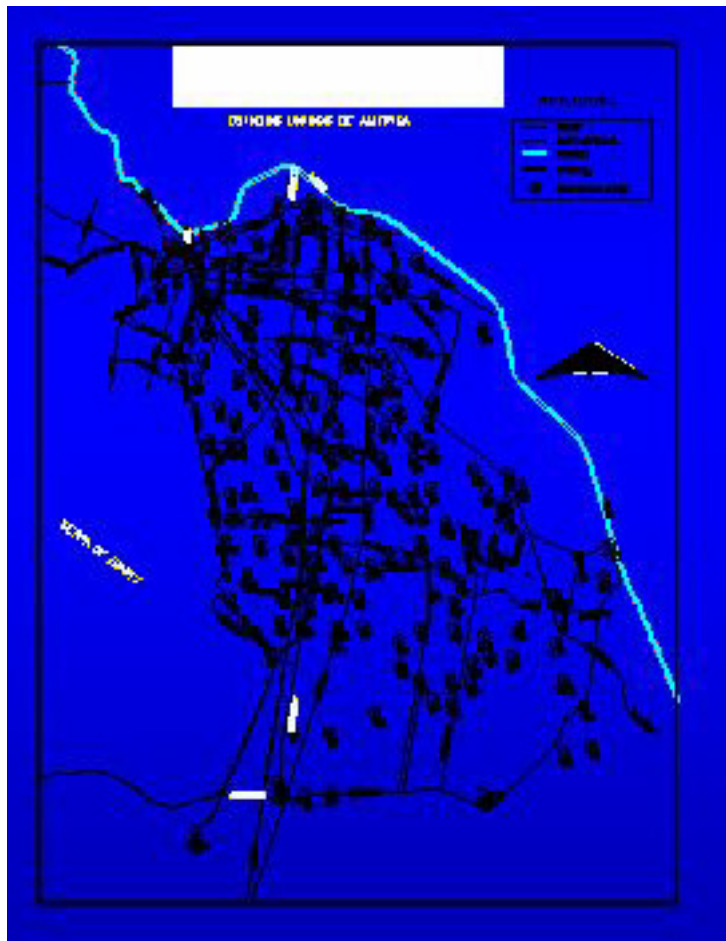


Figure 3. Location of groundwater sources

International Border Water Issues  
 Junta Municipal de Agua y Saneamiento (JMAS)

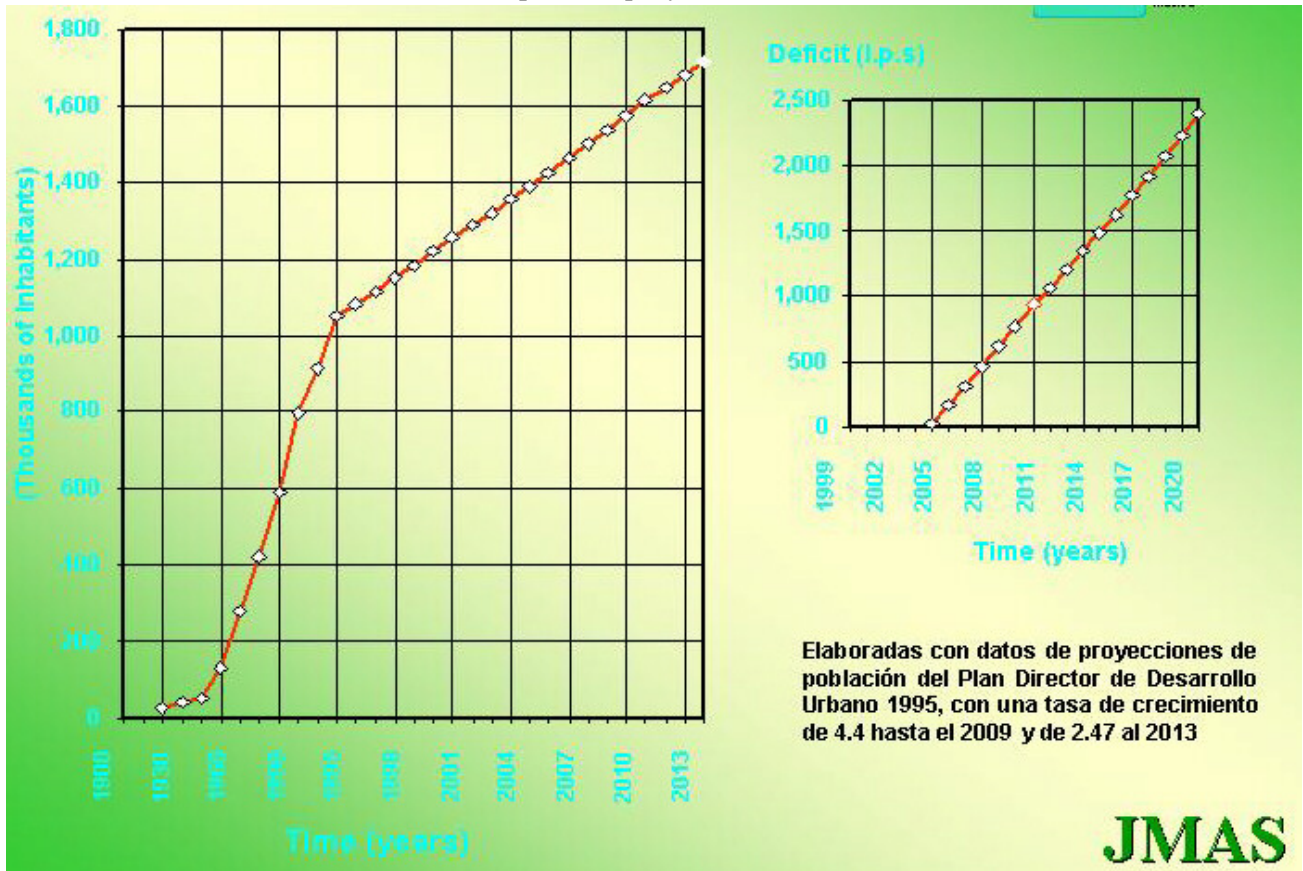


Figure 4. Population and water deficit projections in Cd. Juárez

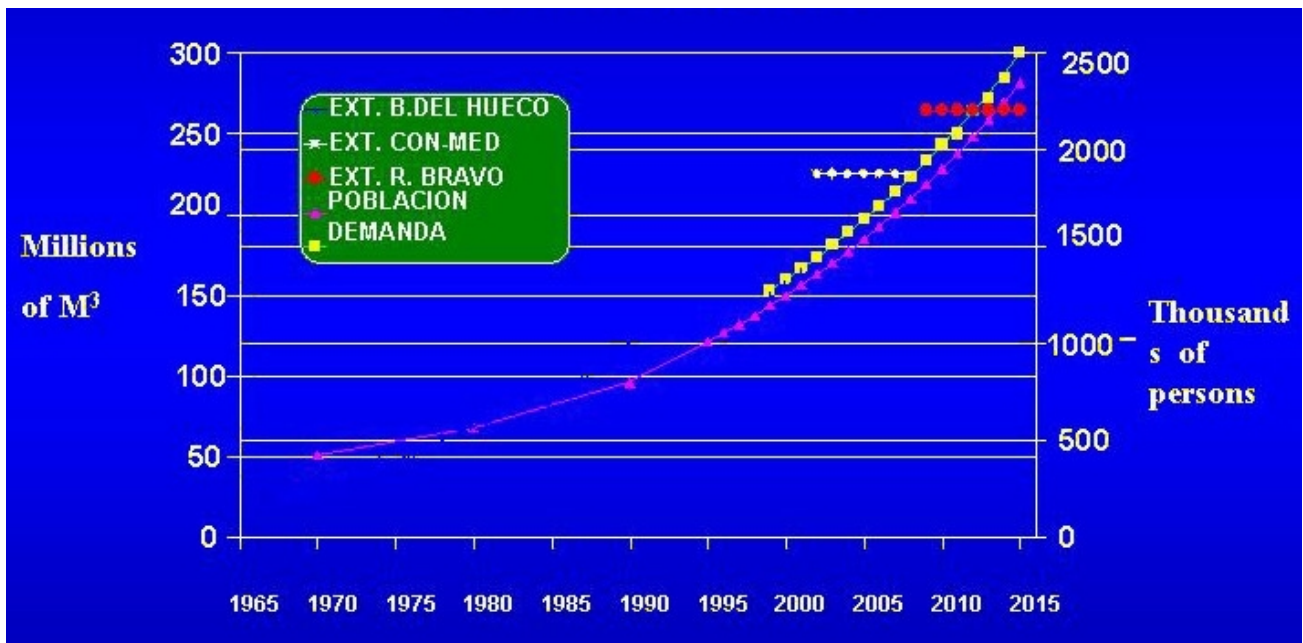


Figure 5. Projection of extraction, population and demand without closing wells in the downtown area

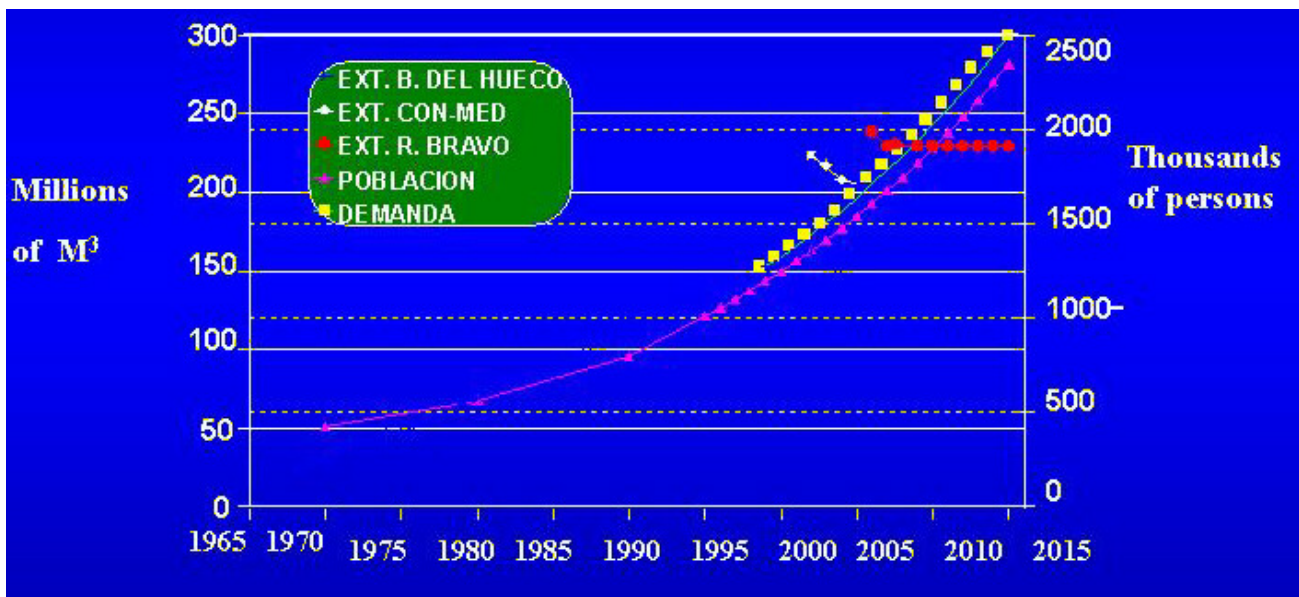


Figure 6. Projection of extraction, population and demand closing wells in the downtown area

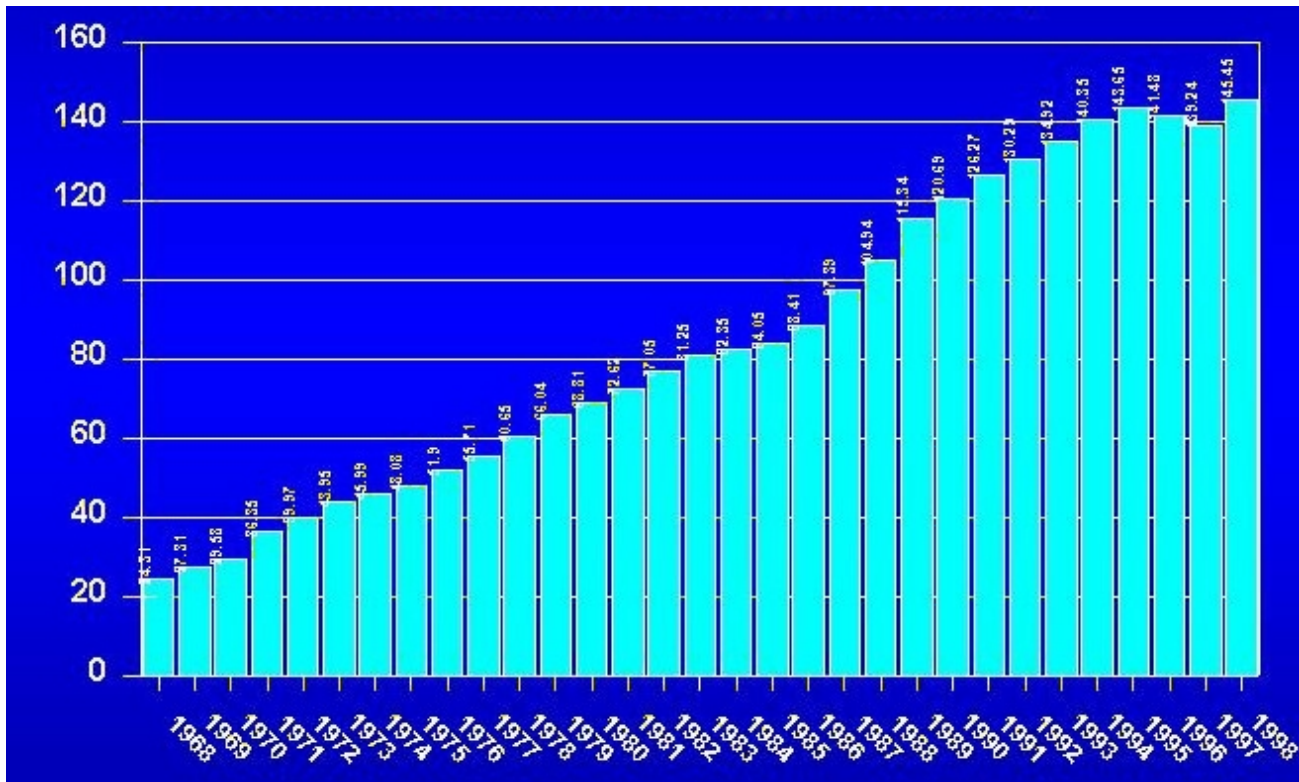


Figure 7. Water extraction from the Hueco Bolsón

*Nelson J. Cordova is a member of the Taos Pueblo Tribal Council and serves as the Water Rights Coordinator for the Pueblo. He is one of the negotiators appointed by the Tribal Council to represent the Pueblo in the Abeyta water right adjudication. As Coordinator, Nelson oversees the activities and efforts of the federal government and the Pueblo's legal and technical consultants to protect and preserve the Pueblo's water resources. Nelson has served Taos Pueblo in various capacities including Tribal Administrator, Tribal Secretary (three times) and War Chief. He also serves on the Department of Interior's Joint Federal and Tribal Water Funding Task Force and is a member of the All Indian Pueblo Council's Water Committee. Nelson received a bachelor's degree from NMSU and a master's degree from Pennsylvania State University.*



## Water and Growth Issues Around New Mexico Taos Pueblo

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Good morning. Thank you for giving me the opportunity to address this conference. My name is Nelson J. Cordova and I serve as the Pueblo's Water Rights Coordinator, am a member of the Taos Pueblo Tribal Council, and the Taos Pueblo Water Rights Task Force. The Task Force was created by the Tribal Council to protect the Pueblo's interests and to ensure the Pueblo's continuous presence in the *Abeyta* water suit. Since 1969, Taos Pueblo has been engaged in the *New Mexico v. Abeyta* water rights adjudication suit filed by the State of New Mexico. The purpose of the suit is to quantify and prioritize the water rights of all water users in the Taos Valley namely Taos Pueblo, the town of Taos, the acequias, the mutual domestics, and sanitation districts.

I mention the *Abeyta* adjudication because it represents a microcosm of the same issues and

concerns we face statewide. These issues revolve around stretching available water resources, conserving our current supplies, protecting its quality, finding new sources, and most importantly, whether we can continue to sustain the growth that is occurring with our existing water supplies. All of us at this conference are familiar with the contentious nature of water rights adjudications; it can create disputes among brothers, sisters, neighbors, cities, states, and even nations. This summer when our Governor, in response to dwindling water supplies, implemented an irrigation water allocation and use schedule, there were many disgruntled tribal members and complaints from our downstream neighbors. The problems subsided when everyone realized there was no water to fight over.

Historically, Taos Pueblo was blessed with a stable and exclusive source of water. The snow pack



that accumulates in our Blue Lake Wilderness area is a source of pristine quality water for our lakes, streams, and springs that are an important part of our religion and culture. Also, our upstream location from other communities in the valley gives us comfort that we will always have water for all our needs. The Buffalo Pasture, a wetland area located west of the Pueblo, is an area everyone in the valley agrees must be protected as it is a source of water for domestic wells and ditches that serves the surrounding communities.

Recently, we experienced another phenomenon that may have a more profound impact on our water resources—the weather. Some meteorologists are predicting that we are entering a period of drought that may last for several decades. This summer was the driest on record; with minimal runoff and no rain, tribal members were fortunate to irrigate even once. There was no forage for our animals, the pastures burned up, fish died in the streams, and there was only a trickle of water in the Rio Pueblo for ceremonial uses. Statewide, the picture was pretty much the same. Reservoirs that store water for cities and municipalities were frightfully low as were the acequias. As a result, I think we all realize how vulnerable we are as human beings. If we do not improve our water management practices, we may find ourselves in a worse situation than the one experienced this past year.

Changing attitudes on water use is difficult. As soon as we see rain or snow, we forget about the problem—witness the decrease in newspaper articles related to water. Also, some folks refuse to admit there is a water shortage, they believe water is a resource that can replenish itself indefinitely and that even if supplies do not increase, future demands can be met by shifting uses or contracting for San Juan/Chama water. Changes in use might mean allocating water to those uses that are deemed to be of a higher economic value, which could result in more water for cities and industrial uses, and less for agricultural and livestock use. If this is to be the case, I wonder how ceremonial uses would fare in comparison to golf courses. Perhaps a better alternative is to manage water like money; start with a balanced budget and institute a regime that will ensure that it remains in balance. New uses should not be permitted unless it is determined that a source of water is available to support that use.

In the future, an important factor to consider in

any water allocation scenario is the water rights of Indian tribes and Pueblos. In the aforementioned *Abeyta* adjudication, even though water rights of the non-Indian irrigators, municipalities, and mutual domestic have been quantified, the rights of Taos Pueblo have yet to be adjudicated. When our claims are adjudicated, the quantified rights will include most of the surface water in the valley and thus will have a tremendous impact on other water uses in the valley.

To give you some idea of the magnitude of the impact that could be felt by our neighbors, it is estimated that approximately 75,000 acre-feet of surface water is produced in the valley annually. Depending upon the outcome of the adjudication, even at a worse case scenario, the Pueblo will still obtain a sizable amount of water based in part on an anticipated ten-fold population increase and related demand for domestic, agricultural, livestock, industrial, and ceremonial uses in the next hundred years. With regard to just irrigated agriculture, for instance, we have plans to increase the acreage now under irrigation from our current 1,300 acres to approximately 5,000 acres on the original Pueblo Grant and the adjacent Tenorio Tract. In addition we are planning to put approximately 8,000 acres under irrigation in our replacement lands, which will require over 20,000 acre-feet per year. When domestic, industrial, ceremonial, and other uses are combined, we are looking at a claim that is in excess of over 30,000 acre-feet per year.

Currently, a major constraint on the acreage we can put under irrigation is the poor condition of our irrigation infrastructure. Our system needs at least five million dollars worth of improvements, conservatively speaking. The last improvements on the system of any magnitude were made in the 1930s and 40s in order to implement some of the recommendations of the Pueblo Lands Board. Since that time, the efficiency of our irrigation system has decreased to less than 30 percent despite the efforts of the tribe to keep it in good repair. In 1998, the Bureau of Reclamation and the Bureau of Indian Affairs conducted an appraisal of irrigation system rehabilitation and repair needs among the New Mexico pueblos. Although they were successful in documenting the current conditions of these systems, they were not successful in securing the funding to repair these systems. In spite of these problems, the Pueblo

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believes it can once again revive its strong agricultural tradition that is the cornerstone of its existence.

The word “competition” should be banned from use in any discussion on water. It denotes that there is going to be winners and losers, which is probably realistic, but it should not detract us from working together to find solutions. As was noted earlier, we are cognizant of the impacts that would befall our neighbors if we are adjudicated all or substantially all of the water we are claiming. Because we know from our technical experts that surface water alone cannot meet future demands of the valley, it must be supplemented with ground or imported water. To help seek a solution to this potential problem, the Pueblo has joined its neighbors at the negotiation table to find ways to address everyone’s needs while minimizing the negative impacts that will most certainly occur when its water rights are fully quantified.

The potential for success in negotiating a valley wide settlement lies with the development of substantial, previously untapped deep groundwater. To learn more about this resource and to avoid any negative impacts to groundwater by hastily implemented development of this resource, a deep groundwater drilling and testing program has been underway for the past two years. If the study demonstrates there is sufficient groundwater of good quality and there is no hydrologic connection between the shallow and deep aquifers that could eventually impair our streams, wetlands and springs, the parties may proceed to develop it. Jointly, the parties are also exploring ways to enhance current supplies by recharging the aquifer, improving irrigation system efficiencies, recycling, and managing the valley’s water resources more efficiently through regional water and wastewater systems that would include every community in the valley.

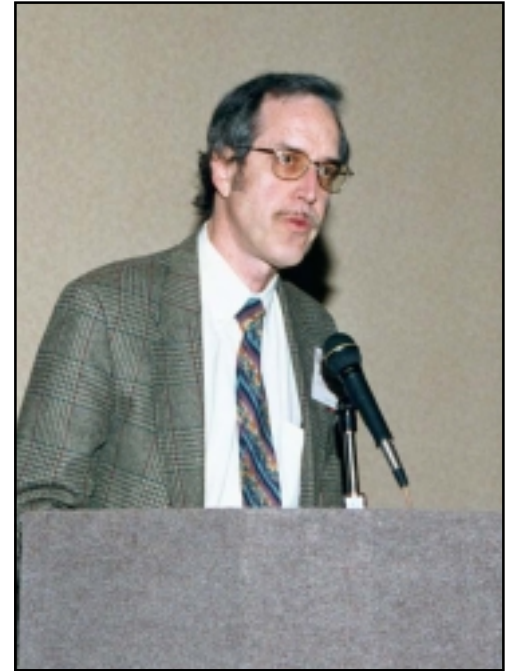
The scenario in the Taos Valley is similar to that of many areas in the state that border Indian communities. In most instances, because the rights of the pueblos have not been quantified and because the infrastructure needed to put this water to use is non-existent or in poor condition, water belonging to the pueblos has been flowing to non-Indians who have become accustomed to its availability and claim a right to it. Once the claims of the pueblos are adjudicated and since their water rights are generally senior to those of their neighbors in terms of priority, much of the water now being used by non-Indians

will eventually revert to the pueblos. In the Taos Valley, we are proposing that the return of pueblo water rights, currently used by non-Indian irrigators, take place over time. The concept, which has gained general acceptance, is to create a mechanism by which water voluntarily relinquished by non-Indian irrigators would be purchased and returned to pueblo use. The concept is creative and will require concessions on the part of all water uses to make it work.

How water problems created by generations of confrontations are addressed will depend upon the ability, vision, and compassion of persons given the awesome responsibility of coming up with solutions. But, they must be resolved if we wish to live in harmony.



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## Water and Growth Issues for Tribes and Pueblos in New Mexico Legal Considerations

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### THEME

*Water is a finite resource with competing demands. Full use of tribal rights can have significant impacts on existing uses.*

A. Pueblos are Federally Recognized Tribes. The United States federal government recognizes 557 Indian Tribal governments. Of these, 227 are in Alaska, and over 100 in California, New Mexico has 22: the 19 Pueblos, Navajo, Mescalero Apache Tribe, and Jicarilla Apache Tribe.

B. Components of Pueblo Indian water rights (see Appendices 1 and 3): Pueblo ancient aboriginal rights remain federally protected in the 21<sup>st</sup> Century. The leading case involving Pueblo Indian water rights is *State of New Mexico v. Aamodt*, a federal water

rights adjudication for the Pojoaque River Basin. Pueblo Indian water rights are measured according to and protected by federal, not state, law. *State of New Mexico v. Aamodt*, 537 F.2d 1102 (10th Cir. 1976) ("Aamodt I"). Pueblos are governments that pre-date European presence here. Pueblos remain governments today, with responsibilities for meeting present and future needs. Each of the 19 Pueblos of New Mexico retain all aboriginal rights, except as Congress limited in the Pueblo Lands Act of 1924. *State of New Mexico v. Aamodt*, 618 F.Supp. 993 (D.N.M. 1985) ("Aamodt II").

1. Historically irrigated acreage (HIA)
2. Replacement rights, based on Pueblo Lands Acts of 1924 and 1933.
3. Livestock/stock ponds/reservoirs, other catchments, and wells.
4. Domestic present and future needs.

- a. Households
  - b. Community infrastructure
  - c. Economic development
  - d. System losses and unaccounted (leaks)
  5. Traditional and ceremonial - continuous flows through Nambe Dam for traditional and ceremonial purposes recognized.
  6. Both surface water and hydrologically related groundwater available to satisfy Pueblo Indian water rights.
  7. Not subject to forfeiture or abandonment for non-use.
  8. Place and purpose of use within Pueblo can be changed without state involvement.
- C. Senior priority water rights for Pueblos.
1. Protected by Congress in 1933 Act, § 9 (see Appendix 1).
  2. Rio Grande Compact (see Appendix 4).
    - a. Does not affect Indian rights.
    - b. Pueblos above Otowi Gauge at San Ildefonso Pueblo - uses have no effect on Rio Grande Compact delivery requirements, which are based on measurements at that gauge.
- D. Indian “trust assets” include water rights--federal duty to protect.
1. Tribal rights to meet present and future needs. Rooted in Pueblos’ aboriginal rights, respected and protected by other sovereigns, including Spain, Mexico, and now the United States.
- E. Endangered Species Act - effects on water rights and water management.
- F. Concern: Office of State Engineer (OSE) allows non-Indian pumping without water rights, until stream flows are affected, (see Appendix 2).
1. Economic benefits taken by junior users.
  2. Long-term effects fall on senior wafer rights holders - stream flow diminishes and water table drops.
- G. Water quality standards - federal law recognizes Tribes can be treated as states for purposes of setting water quality standards.
1. Several Pueblos have set standards, others do not.
  2. Upstream users can be affected by tribal

standards. *See City of Albuquerque v. Browner*, 97 F.3d 415, 423 (10th Cir. 1996) (Pueblo of Isleta water quality standards must be met by City of Albuquerque); *Montana v. Environmental Protection Agency*, 137 F.3d 1135 (10th Cir. 1998).

## APPENDICES

Appendix 1: Fact Sheet on Pueblo Approach to Regional Water Planning

Appendix 2: Fact Sheet on New Mexico Water Law

Appendix 3: Fact Sheet on State ex ref. State Engineer v. Aamodt

Appendix 4: Fact Sheet on Rio Grande Compact

**Appendix 1**  
**Fact Sheet**  
**Pueblo Views of Regional Water Planning**

The initial Pueblo position in the Jemez y Sangre regional water planning process has been to look for ways to be partners with state, based on State recognition that water is a resource over which both jointly share regulatory rights and responsibilities. Rather than using the planning process to “quantify rights,” the approach was to acknowledge the different types of rights and interests in the resource held by tribes and the states, but then to work cooperatively to meet reasonable need. This approach is radically different from the highly adversarial approach now taken by some regions in the State. Rational water use cannot flourish where it is a we vs. them approach. To quote POGO, we have met the enemy and it is us. Rational water use can only come through recognition and respect for each others’ rights and needs. This is not new. The first water rights case recorded in New Mexico took this approach.

**The oldest recorded water rights case in New Mexico is the Taos repartimiento of 1823. During that period, the approach was practical, it respected the senior water right, but looked to meeting need through cooperative agreement.** Here are excerpts from that basic ruling:

STATEMENT OF WHO HAS THE RIGHT

The natives of this Pueblo of Taos, besides the water of the river which cuts through their pueblo, have always used the water from the Rio de Lucero for irrigating their cultivated fields, and it appears that they have done so from the period of their paganism,. That is, since the foundation of their pueblo, with the sole object of enjoying the water of both rivers, from which it is inferred clearly that, those natives, from time immemorial, have been the sole owners and have complete right to the water of the Rio de Lucero.

The settlers of Arroyo Seco ... have no right to the source of the Rio de Lucero for the irrigation of their lands, because the old grant which they claim favors them does not give them the right.

Your excellency will see from this report that the sons of this Pueblo, the aforesaid Indians, are the ones who have the right to the Rio de Lucero.

MEETING NEED

But this ayuntamiento, having pity on the new settlers of Arroyo Seco, considered it carefully at various sessions and has ordered that one surco of water shall be allowed them from the Rio Lucero when the water is abundant, and when water is short it shall be given to them proportionately and according to the judgement of this ayuntamiento, so that there is no lack for the first ones who enjoy the antiquity and priority, who are the sons of said Pueblo, and the surplus of these to those residents of San Fernando who settled there long before those of Arroyo Seco.

Taken from SANM (Spanish Archives of New Mexico) Series I, No. 1292; translated by Myra Ellen Jenkins, and quoted in State of N.M. ex rel. Reynolds v. Aamodt, 618 F. Supp. 993, 9991 (D.N.M. 1985). By allowing the need to be met, the Pueblo did not permanently give up its senior priority right; it merely allowed others to use its water.

Reasonable need is not a wish list, but a practical accommodation in light of all of the relevant facts.

The process is not intended to quantify rights. For example, it is unreasonable for a municipality to insist on

“right” to a 250 gpdpp (gallons per day per person) minimum need, and at the same time limit tribal users’ water rights, the senior rights holders who have a much smaller gpdpp due to clearly inadequate infrastructure, for the same municipal water uses.

With acknowledgment of the Pueblos’ senior rights and other federally reserved water rights for the benefit of Indian tribes, the parties can cooperatively plan to accommodate, to the extent feasible, each other’s needs for certain specific uses for a certain period. This can be done through voluntary agreement or through legal process as was done in 1823.

Federal law supports this approach:

The Pueblo Lands Act of 1933, Section 9 states:

Nothing herein contained shall in any manner be construed to deprive any of the Pueblo Indians of a prior right to the use of water from streams running through or bordering on their respective pueblos . . . For the lands remaining in Indian ownership, and such water rights shall not be subject to loss by non-use or abandonment thereof as long as title to said lands shall remain in the Indians.

FOCUS should not be on rights but meeting need based on recognition of present situation, planning was to define the need at present and into the future for a certain period. The best way to alter this focus is through explicit recognition by the State of what the Spanish and Mexican Governments, as well as the United States have recognized - the senior right of the Pueblos to water for their needs. However, it is not the State’s job to define that need - that is the responsibility of tribal governments, just as it is the responsibility of the State’s communities, under regional water planning, to define those communities’ needs.

**Appendix 2**  
**Fact Sheet**  
**A Brief Description of Water Law in New Mexico**

**How New Mexico Manages Water**

Since 1907, the New Mexico State Engineer has regulated water use. Initially the Engineer only had authority over surface water. Since 1931, this authority applies to all declared groundwater basins as well. The State Engineer is appointed by the Governor and confirmed by the New Mexico Senate. The State Engineer must act upon any application for new water uses or any application to change the point of diversion or the purpose or place of water use (referred to as a transfer). The State Engineer must deny an application when he determines that the use would result in **impairment** (i.e., diminished supplies or water quality) to existing users or that the proposed use is contrary to the **public welfare** or conservation of water. After an application is filed with the State Engineer, existing water users and others may file protests stating why the State Engineer should not approve the application. If a protest is filed, the protestant or the applicant may request a hearing or the State Engineer may require a hearing. State Engineer decisions can be appealed to the district court.

An **adjudication** is a lawsuit filed to determine “all rights to the use” of water within a stream system. Water rights are never fully determined until there is an adjudication because a water right is measured under state law by the water put to actual **beneficial use**. For example, the State Engineer may permit Joe Smith to use 40 acre-feet of water per year. However, if Joe Smith only uses 20 acre-feet under the permit, a court will not automatically grant Smith a right to 40 acre-feet per year. For purposes of water planning, municipalities and counties are allowed to apply for a permit for sufficient water to meet need for the succeeding forty years. However, if not used within that time frame, there is no “water right” to the amount of the permit. The **adjudication** begins with a hydrographic survey of the stream system that maps all water uses, surface and groundwater. The priority date declared by the user is deemed to be correct until the priority date is determined by a court. Many adjudications are on-going in the Jemez y Sangre Regional Water Planning area, two of which are: *State of New Mexico v. Aamodt* (Pojoaque, Nambe and Tesuque Basins ) and *State of New Mexico v. Anaya* (Santa Fe River Basin). These adjudications are not completed. In the future, there will likely be another adjudication in the region: the adjudication of the mainstem of the Rio Grande.

Water quality is generally controlled by the New Mexico Environment Department and the Water Quality Control Commission. The State Engineer, when ruling on applications, can take effects on water quality into consideration.

**Regional Water Planning**

The New Mexico legislature enacted a statute in 1987 enabling regions in the state to plan their water future. Pursuant to that statute, the Jemez y Sangre Regional Water Planning Council area was established in 1998. Water planning was initiated at the regional level so that unique characteristics of each region of the state could be equally protected. Regional water plans are to determine future water demand and, based upon the available *supply*, determine how the region will balance demand and supply. Through this process, the region can significantly impact any evaluation of what uses are consistent with the public welfare.

**The Prior Appropriation Doctrine**

In water rich areas of Europe and the United States, water is acquired from natural water courses on or adjacent to a person’s land. The measure of the right is one of reasonable use. If the use is reasonable, there is no limit on the quantity that can be put to that use. This is called the **riparian doctrine**. Where water is relatively scarce, the riparian doctrine is not used to define rights to water. Because of the scarcity of water in



New Mexico, a different doctrine developed to define rights to water. New Mexico and other western states use some version of the “**Prior Appropriation Doctrine.**” The exact origin of the doctrine is disputed. Some say it came from California miners; at least one New Mexico case finds the origin in the water practices of the Pueblos; others say it comes from Spain. In New Mexico, two clear principles govern establishment of water rights:

1. Priority of appropriation shall give the better right;
2. Water may be used only for beneficial purposes.

An **appropriation** means dedication of water for a beneficial use. **Priority of appropriation** is often summarized as “**first in time, first in right.**” This means that the person who first puts water to use has the senior priority and each additional user has a junior priority. The senior priority holder is entitled to receive the full quantity of water that the senior priority holder can apply to beneficial use or the maximum quantity permitted, whichever is less. Junior priority holders must satisfy their uses out of what remains in the order of their relative seniority. The first recorded priority call in New Mexico was in 1823. The *ayuntamiento* of Taos determined that, despite that Taos Pueblo owned all of the rights to a stream, since the Pueblo was not putting it all to use at that time, junior users were permitted to use what was not needed by the Pueblo.

**Beneficial use** has not been fully defined. Only waste and mine dewatering have been ruled to be a non-beneficial use of water. Unlike other western states, New Mexico has no statute giving any use more beneficial status over another use. New Mexico statute 72-12-1 does provide a different standard to be met for issuance of a domestic use permit. If water is available, the State Engineer cannot deny this type of permit. Generally, the permitted use is up to a maximum of three acre feet per year. However, when these rights are adjudicated, the adjudicated right will depend on what has actually been used. A water right may be **declared forfeited** and it can be **abandoned** for non-use.

### **Establishing Water Uses**

As discussed previously, after 1907 or the date when the State Engineer declared authority over any ground-water basin (1956 for most of the Rio Grande basin), one must obtain a permit to use water from the State Engineer. These uses will have a priority date of the date the application for a permit was filed. When these uses are transferred, the priority date is retained but the amount of water that can be transferred may be significantly less.

If a water use began before 1907 or the date when the State Engineer declared authority over any ground-water basin, then the date that the use began determines the priority of the right. The State Engineer cannot adjudicate or determine a water right.

### **Federal Water Rights**

On federal lands (e.g., Forest Service, Park Service, Bureau of Land Management), water rights are reserved by the United States for use on those lands. The priority date of **federal reserved water rights** is the date the United States reserved the land for the particular use, not the date that the actual use began. In some cases, the United States may have state law rights under the prior appropriation system, if, for instance, the United States acquires lands with existing, water rights.

### **Pueblo and Tribal Water Rights**

The Pueblos of New Mexico can have state law created rights in some instances where they acquire lands with appurtenant pre-existing state law water rights. They can have federal reserved water rights where lands outside Pueblo grants have been reserved for them by the United States. Pueblos also have a third type of water

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right, referred to as "**Mechem doctrine**" or "**aboriginal**" water rights. The Pueblos of New Mexico, unlike many other tribes, reside on lands that they have never left. While the United States recognized those prior holdings, thereby giving Pueblo rights to land and water federal protection, these rights do not depend on any federal action for their existence. In *Aamodt*, Judge Mechem held that these rights have the senior priority right as the Pueblos were the first land holders. This right extends to **historically irrigated acres, livestock watering, municipal and domestic uses**. Historically irrigated acreage means all lands used for irrigation as of 1846 and any additional lands placed into irrigation from 1846 to 1924. In addition to senior priority, these rights cannot be lost through forfeiture, abandonment, or other forms of non-use.

Pueblos are governments, and pursuant to their inherent powers as confirmed by federal law, each Pueblo has authority to **regulate water quality and water use** by users within Pueblo boundaries.

### **Interstate Stream Compacts**

Streams and rivers ignore political boundaries. Where a river runs through several states, those states form a compact to determine each state's share. The United States Congress must approve these compacts. New Mexico is a party to several compacts, including the Pecos, the Rio Grande, and the Colorado River Compacts. The Compacts obligate the State to deliver water to other states. No matter how vested a water right might be, if using it violates a compact, it cannot be used. Pueblo water rights are not affected by the Rio Grande Compact. Compacts can place significant constraints on the water supply available for use.

**Appendix 3**

**Fact Sheet**

**State of New Mexico, et al. V. Aamodt, et al.**

U.S. District Court No. 6639 M Civil

State of New Mexico v. Aamodt, et al., in the federal District Court for New Mexico, filed in 1966, is the lead case determining the nature and extent of Pueblo Indian water rights. Many important elements of Pueblo Indian water rights have been decided in the *Aamodt* case. These rulings are the “law of the case” subject to review on appeal. Decisions, so far, include:

1. Tributary is adjudication unit. In 1971, the federal court decided that adjudication of water rights in the Rio Pojoaque tributary of the Rio Grande could proceed separate from the main stem.
2. State law rejected for Pueblo rights. The Tenth Circuit Court of Appeals in State v. Aamodt, 537 F.2d 1102(10th Cir. 1976) (Aamodt I) ruled that Pueblo water rights are not governed by State law in measure or administration.
3. Junior non-Indian wells restricted. In 1983, the District Court enjoined the State from issuing domestic well permits unless restricted to indoor use only for “household, drinking, and sanitary purposes.” This unpublished opinion affects over 600 permits issued, and almost 300 wells drilled since January 13, 1983. The District Court’s Order filed July 22, 1994 limited defendants’ water rights under subfile judgments for domestic and livestock wells to historic beneficial use. In 1999 several parties negotiated a settlement that is available for these claims. In exchange for accepting a maximum water right of .7 acre-feet, metering and fees, households joining in the settlement can use water for any non-wasteful purpose.
4. Winters doctrine limited. In 1983 the court decided that the *Winters* doctrine does not apply to Pueblo Indian grant lands. Each of the nineteen federally-recognized Indian Pueblos in New Mexico has a land grant recognized by Congress. In addition, some Pueblos have “reservation lands,” as a result of additional action by Congress or the executive branch. These “reservation lands” have *Winters* rights. Such rights are for present and future uses, generally measured by “practicably irrigable acreage (PIA)” but also by grazing and wildlife needs when reserved by United States of America for that purpose.
5. Senior Pueblo priority: aboriginal priority recognized. The *Aamodt II* opinion, 618 F.Supp. 993 (D.N.M. 1985) made numerous conclusions of law about water rights during the Spanish and Mexican periods of sovereignty, as well as discussion of the Pueblos’ water rights under the United States law. The federal court concluded that Pueblo water rights held the senior priority in relation to “any non-Pueblo in the stream system.” It determined that The Pueblos have the prior right to use all of the water of the stream necessary for their domestic uses and that necessary to irrigate their lands, saving and excepting the land ownership and appurtenant water rights terminated by the operation of the 1924 Pueblo Lands Act. The acreage to which this priority applies is all acreage irrigated by the Pueblos between 1846 and 1924. Acreage under irrigation in 1846 was protected by federal law including the Treaty of Guadalupe Hidalgo, and the 1851 Trade and Intercourse Act. The Pueblo aboriginal water right, as modified by Spanish and Mexican law, included the right to irrigate new land in response to need.... The 1924 Act, which gave non-Pueblos within the Pueblo four-square-leagues their first legal water rights, also fixed the measure of Pueblo water rights to acreage irrigated as of that date. 618 F.Supp. at 1010 (D.N.M. 1985).
6. Surface and groundwater source. The *Aamodt* court determined that the Pueblos’ senior water rights apply to both surface water and hydrologically related groundwater. The Special Master held that this principle applies to the *Winters* rights for the 1902 Nambe Reservation.

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7. Purpose of use unrestricted. Subsequent rulings decided that Pueblo water rights can be used for any purpose within Pueblo boundaries (Order of December 1, 1986). No impairment of other uses occurs until there is a showing that Pueblo uses exceeds the amount of federally-protected water rights.
8. Non-Indian priority. Non-Indians must prove priority on a tract-by-tract basis, and not on a state desired shared aboriginal basis, or ditch-by-ditch basis (Order of February 26, 1987).
9. Pueblos' water rights measured by historically irrigated acreage (HIA). The measure of Pueblo Indian aboriginal water rights was determined on the basis of a 1931 letter from a federal attorney describing a hydrographic survey done during the Pueblo Lands Act proceedings. In 1987, the District ruled that the four Pueblos have first priority rights for water necessary to irrigate 1,094 acres of HIA land.
10. Pueblo Replacement rights. The Pueblos are entitled to first priority water rights acquired, reacquired or developed to replace those taken pursuant to the Pueblo Land Board activities. These additional "replacement" water rights have been recognized based on the Pueblos Lands Acts of 1924 and 1933.
11. Hydrology. A major stipulation and order on the hydrology of the basin exists only for the *Aamodt* case. The hydrology facts were approved by the Court on May 6, 1993.
12. Duty of water. Pueblo irrigation water requirements include the right to divert 4.65 acre- feet. and consumptively use 1.84 acre feet per year, per acre, based on the crop mix in the 1964 hydrographic survey. This will apply for both Pueblo and non-Indian irrigators.
13. In-stream aboriginal water use recognized. Aboriginal water use for hunting and grazing on San Ildefonso Eastern Reservation, or other aboriginal in-stream uses to establish water rights. Right to continuous flows through Name Falls recognized, in a limited amount.
14. Domestic uses. The Pueblo Compensation Act of 1933, in section 9 states: Nothing herein contained shall be in any manner be construed to deprive any Pueblo Indians of a prior right to the use of water from streams running through or bordering on their respective Pueblo for domestic, stock water, and irrigation purposes for the lands remaining in Indian ownership, and such water rights shall not be subject to loss by non-use or abandonment thereof as long as title to said lands shall remain in the Indians.
17. Alienation prohibited. Only Congress can terminate or limit the senior priority water rights of a Pueblo.

The *Aamodt* case continues to produce the guiding principles for Pueblo Indian water rights. The New Mexico Court of Appeals relied on the *Aamodt* rulings about *Winters* rights in another water adjudication involving other Pueblos. See, State v. Kerr McGee Corporation, 898 P. 2d. 1256, 120 N.M. 118, 126 (Ct. App. 1995).

**Appendix 4**  
**Fact Sheet on**  
**The Rio Grande Compact**

A. **The Compact allocates surface waters of the Rio Grande**, first to Colorado, second to the Lower Rio Grande, below Elephant Butte Reservoir (San Marcial Gauge) based on flows at Otowi Gauge, located within the Pueblo of San Ildefonso. The Lower Rio Grande, commonly referred to as “Texas” for Compact administration purposes, includes one irrigation district in New Mexico and one in Texas. Note that New Mexico’s southern boundary for Compact administration differs by 165 miles from the New Mexico state border with Texas. See El Paso v. Reynolds, 563 F.Supp. 379 (D.N.M. 1983).

B. **The Middle Rio Grande (between Otowi and San Marcial Gauges)** is entitled to native waters, according to Compact Article IV (4), plus storage from El Vado Dam. The Middle Rio Grande includes about 160 miles of the main stem, beginning at San Ildefonso Pueblo (Otowi Gauge) and ending around Socorro (San Marcial Gauge). This is “**New Mexico**” for Compact administration purposes.

C. **New Mexico obligations under the Compact** are described in Article IV. That article requires uses of flow measurements at the Otowi Gauge as the basis for determining the delivery requirements at Elephant Butte Reservoir, “except for July, August, and September.” Groundwater is not mentioned in the Compact.

D. **No Impairment of Tribal Rights:** Compact Article XVI (16) states:

Nothing in this compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian tribes, or as impairing the rights of the Indian tribes.

E. “Indian tribes” referred to in the Rio Grande Compact include the Pueblos. The six Pueblos of Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta. are all on the mainstem and within the Middle Rio Grande Conservancy District (MRGCD) service area.

F. Pueblo water law (“the ancient law of the Indians”) is the basis for New Mexico’s prior appropriation doctrine. See discussion in the State v. Red River Valley Co., 5 I.N. M.207,221; 182 P.2d 421 (1947).

G. **Congress recognized and protected Pueblo water rights in the Middle Rio Grande Conservancy District Act** of March 13,1928. Chapter 219,45 Stat.312. These include “prior and paramount” rights for irrigation and for domestic and livestock purposes. For irrigation, the six Pueblos have “prior and paramount” rights to irrigate 8,847 acres, and co-equal priority with the MRGCD for “newly reclaimed” lands. These rights together total enough water to irrigate over 20,000 acres for the six pueblos.

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## Growth and Development for Tribes and Pueblos in New Mexico

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“All the traditions that the Pueblo of Acoma is familiar with, whether they be dramatic rituals, anecdotal historical narratives, cycles or specific incidents in history, speak about a source: where people come from.

Wherever it all began, when elements came together, there was fire, there was water, there was earth. When people recognize this beginning, it gives them significance.

Land is the source of physical and spiritual life. People reaffirm their relationship to the land by telling of this relationship, making the telling their document for owning, protecting, or fighting for it. Never a moment, never a day passes without telling something

about the water and land. And not only how to plant it, not only its spiritual and religious nature, but giving it, in this day and age, a political nature too. That's what oral traditions do. It constantly reaffirms, it constantly gives substance to our development and it constantly gives credence to sustainable Tribal homelands.”

Today, New Mexico no longer comprises only a population of Hispanic and Native people who earlier were the inhabitants this region. There was once a very large population base of Native people before the inquisition of the Spanish, Mexican, and European governments.

The Pueblo tribes once accounted for more than the current 19 Pueblos of New Mexico, as one can

see throughout New Mexico—the once great cities of those other Pueblos that no longer exist. Sixteen Hundred and Eighty spelled the year of the great Pueblo Revolt. After a time of peace and tranquility amongst the tribes, the re-entrance of the Spanish militia created the lowest ebb of the population downtrend of the Pueblos. Some Pueblos experienced an almost total devastation of its people.

It is with this that I begin to tell a new story. For many of you who have attended conferences and meetings where Native people are involved, you will notice that much of what is said is in stories. I stand before you today to put the finishing touches on the old story that was begun by Nelson Cordova and Peter Chestnut and begin to tell a new one.

We're now in the 21<sup>st</sup> century and a new dawn in history is beginning to awaken the Pueblo, Apache, and Navajo tribes in the region. We are no longer just the agricultural based people growing crops for sustainment—we as Native people are evolving as new business entrepreneurs—planting the seeds of economic sustainment in a world that is very new to us.

With this change comes the increase in demand for basic services. As Peter commented, it does not make sense to compare basic services of rural communities to those full services of a city or municipality. On some Navajo reservations, basic water service is non-existent with consumable water at less than two 50-gallon barrels. These two 50-gallon barrels are used for cooking and drinking, washing dishes, and bathing, and what is left is used to wash a few clothes—for a two-week period!

## **TRIBAL DEVELOPMENT AND PUEBLO INDIAN WATER RIGHTS**

### **Pueblo and Tribal Population Growth**

Our native populations are growing, in some instances, two- to four-fold. With this growth, comes the development of infrastructure and the increase of tribal water use. Pueblos and tribes are facing the reality that their water rights must be protected and they must begin to use their full tribal water rights. This will rekindle age-old controversies pitting tribes against cities, towns, and municipalities and stir up relatively new controversies with, for example, the Endangered Species Act (ESA).

The battle lines have been drawn in some instances, and in the middle Rio Grande region, the

issues surrounding the ESA have only begun to surface in the past several years. Tribes must now contend with protecting their full beneficial water rights, not only for surface water, but also for groundwater. The scenario has been set and how the final scene plays out is up to the parties involved. But that final scene must acknowledge the senior water rights of New Mexico's Pueblos and tribes.

### **Changing Economics**

Pueblos and tribes are becoming key economic powers in New Mexico as are other tribes in their home states. These economic gains are readily visible by the development of major resorts that include hotels, casinos, and golf courses. However, even in this day and age when economic powers seem to collide on an everyday basis, tribes continue to develop for the good of the entire community. An example is the soccer multiplex built by Santa Ana Pueblo. The project contributed to the greater good of the community and is an example of where beneficial use of irrigation water lent itself to tribes asserting their water rights. Isleta Pueblo's championship golf course is another fine example as are many other tribal endeavors.

New developments are being planned by tribal entities and these developments will create more water demand. Thus the developments surely will enable tribes to exercise and assert additional water rights. Tribes also must plan to develop in such a way as to not impair the quality of its water resources, both surface and groundwater. We must continue to be stewards of not only our lands but, most importantly, our water resources.

### **Senior Water Rights**

As tribal needs grow, junior water uses may need to yield or pay a fair price to tribes for impacts on senior priority water rights. As tribal entities push forward with development projects and as they watch their populations grow, competing demands for water use will undoubtedly force adversarial issues with junior water uses. With tribal demands growing, the need for tribes to expand and use their full beneficial rights becomes an immediate reality.

Given increasing water demands, impacts from years of tribal water use by non-Indian junior water users will be felt more acutely. Just as tribes will have to contend with these impacts, so must those junior users. The end result may be junior users

paying fair market value for the impacts to tribal senior priority water rights' holders. Unless the Office of the State Engineer begins to enforce and control what is being used in its application process, junior water users will unknowingly face this reality. However, the same goes for junior water users in ensuring that they do have a real water right.

### **Tribal Water Leasing**

Tribal water leasing generally requires an act of Congress. However, tribes are now in the position to look at their water rights not being currently used within their own tribal jurisdictions, and consider creative ways to utilize those rights through such avenues as water banking and water leasing. However, leasing or banking of water rights generally requires Congressional approval.

Another disadvantage to leasing or banking water may be that after years of leasing water, the concept of ownership of that leased water may arise. Tribes and others interested in water banking and leasing should look at all possible repercussions before getting involved in such an arrangement, lest they sell themselves short. The age-old native adage of "we gave an inch and they took a mile" is one that should be heeded.

## **IMPACTS OF GROWTH ON GROUNDWATER**

As cities, towns, Pueblos and tribes continue to expand and grow, we will feel the impacts of each other's water use and development.

### **Contamination**

Impacts of Pueblo and tribal developments are felt throughout the state. Superfund sites are currently impacting both surface and groundwater supplies. In addition, rural areas also are adversely affected by septic tanks.

With many tribes located downstream of large cities and towns, the effects of surface and groundwater pollution is felt. In the instance of the Pueblo of Acoma, during the 70s and 80s, the City of Grants dumped raw effluent into the Rio San Jose. After many years of legal posturing and hearings, the parties in the matter reached a settlement. The end result has been zero discharge to the river. This has cost the City of Grants millions of dollars to build a new wastewater treatment facility. Be that as it may,

long-term impacts on the Rio San Jose from years of discharge may never be known.

### **Sewage Treatment and Effluent Reuse**

Treating sewage and reusing effluent will play a larger role in the 21<sup>st</sup> century. In a water-short state like New Mexico, we must be prepared to explore the possibility of water reuse. A first step begins with public education. If we are to be efficient water stewards, our towns and municipalities must be willing to conserve water and reuse treated wastewater for beneficial uses. Pueblos and tribes must jump on the band wagon and look at our consumable supplies and then look at how we can replenish that supply without taxing other water resources.

### **Recognizing Senior Pueblo Water Rights**

Getting senior Pueblo water rights recognized and putting that water to use benefits our larger society. Traditional Pueblo cultural views benefit not only Pueblo members and lands, but also our neighbors.

As Pueblos and tribes, we have a long road to travel in getting our senior water rights recognized. We feel it is fairly simple, and it is in that simplicity that we see the larger benefits to society. Surely there would be a great advantage in quantifying our water supply; there would be no question as to the amount of water that would go to meeting New Mexico's compact delivery requirements.

In essence, if we open our minds to exercising "first in time, first in right," water planning would become straight forward. We would not have to guess if there really is an available supply. It is a disservice to the regional water planning process if the large amounts of senior Pueblo water rights are not recognized. That wrong must be corrected or no one will benefit.

### **Tribal Water Management Programs**

Many of you are well aware that Pueblos and tribes have made substantial gains in the management and regulation of its tribal natural and water resources. The Water Quality Standards of Isleta Pueblo have demonstrated that the Pueblos and tribes are serious about protecting its resources. This trend will continue as Pueblo and tribes see the definite need to protect their tribal resources.

Below is a list of some of the current management programs where tribes have regulatory control.



It should not be assumed that all the tribes have such programs in place. We have encouraged tribes to begin the process and to build upon that process.

- Water Quality Standards Authority
- Section 319 Non-Point Source Authority
- Source Water Protection
- Wellhead Protection Management
- Groundwater Protection
- Wetlands Regulation Control
- Water Codes

From this point, let the story begin where we build upon the idea that we can, as a species, survive through our cooperative efforts. So that in the future, we do not list our unborn as the endangered species.

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## THE SAN JUAN RIVER - THE CURRENT CONTROVERSY

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### INTRODUCTION

The New Mexico San Juan River Basin (the Basin) located in northwestern New Mexico represents the classic western conflicts for an available water supply. The controversy in the Basin is the conflict among the historic users, Native American claims and settlements, future growth, and endangered species. The difficulty comes with balancing these demands within New Mexico's allocation from the Upper Colorado River Basin Compact and within the available water supplies of the San Juan, Animas, and La Plata Rivers. To give just one illustration, basin water development began after 1878, while Native American reservations were established in 1868, or earlier. These reservations provide an early priority date compared to the majority of non-Indian rights. However, even these early priorities, are, in effect, being challenged by the Endangered Species

Act (ESA or the Act), and the Indians may not be able to develop their water even though they have early priority dates. The Act intended to protect the Colorado Squawfish (now known as the Pikeminnow) and subsequently the Razorback Sucker, currently limits the water supply for the Animas-La Plata Project (ALP) and may deny water for some additional uses in New Mexico. In effect, the Act holds New Mexico's remaining allocation of Upper Basin Water hostage, including the water with the earliest priority date, which belongs to the Indians.

Contributing to the controversy is evolving opposition to any structural water development; that is, a diversion structure, dam and reservoir. Major environmental organizations have chosen the ALP as their "poster child" project and oppose it at seemingly all costs. A partnership between these environmentalists and fiscal conservatives opposed to large federal projects bodes ill for western water projects.

Local entities nearing the limit of their real wet water supplies are truly challenged to oppose these emotional nay sayers. All this controversy and conflict means that today demands in San Juan County projected under New Mexico's forty-year planning horizon cannot be met with existing or anticipated water supplies.

## **THE ISSUE - HOW MUCH WATER WILL EXISTING USERS LOSE?**

The most controversial issues are the needs of the endangered fish and the Indian claims, which together may use all the available water. When the Navajo Nation and the Jicarilla Apache Tribe complete their planned developments and the endangered fish are satisfied, there is not enough water both to continue existing uses and provide for growth. One possible, but painful, solution may be to take water for growth in the municipal and industrial (M&I) sector from other current users, who most likely will be the agricultural users. While we may accomplish a transition from agricultural to M&I use, it will be very expensive for New Mexico, the Indian Tribes, the local governments, and the federal agencies. Great resistance can be anticipated to the transfer from existing users to the tribal entities and the fish. The controversy, *water for the citizens or for the fish*, is the center of current and future issues in the Basin in New Mexico.

## **BACKGROUND**

### **Location**

The San Juan River Basin is in the Four Corners area of Arizona, Colorado, Utah, and New Mexico. The Basin extends approximately 250 miles east to west and 160 miles north to south. New Mexico encompasses 39 percent of the whole Basin.

The San Juan River Basin drains an area of approximately 25,000 square miles and makes up about one-fourth of the Upper Colorado River Basin. The San Juan River is the second largest tributary to the Colorado River. Its source is on the Continental Divide in Southern Colorado, and it flows about 350-river miles west to its confluence with Lake Powell.

### **Climate**

The climate of the San Juan River Basin varies from alpine to desert. The higher part of the Basin is in Colorado with more than 30 peaks of the San Juan Mountains ranging from 12,000 to more than 14,000 feet in elevation. The lowest elevation of the Basin is at the confluence of the San Juan River with Lake Powell, about 3,700 feet above sea level. The areas above 10,000 feet have more precipitation and lower winter and summer temperatures. The areas less than 7,000 feet have relatively mild winters, hot summers, and low precipitation.

The wide range of Basin climatic conditions has resulted in a diversified agriculture, ranging from alfalfa, grass, hay, and pasture at locations of short growing seasons and cooler temperatures; to corn, small grain, dry beans, truck gardens, orchards and melons in the lower elevations.

The San Juan River Basin has several developed recreation areas, including national forest lands, national parks and monuments, historical and scenic locations, and private recreation sites and developments. Tribal units have developed gambling and other recreational facilities to tap the growing demand. The tourist and recreational industry is economically crucial to the San Juan River Basin.

### **Minerals**

Natural gas, crude oil, uranium, vanadium, zinc, lead, sand and gravel, and coal are the more important minerals produced in the San Juan River Basin. Petroleum products, including helium as well as natural gas and crude oil, account for the largest percentage of this production. The total natural gas resources of the San Juan River Basin have been estimated at about 12 trillion cubic feet. The associated helium resources have been estimated at about 13 billion cubic feet.

The coal resources (mineable) are located mainly in the Mesa Verde group of Upper Cretaceous Age, which is to or within 3,000 feet of the surface around the margins of the San Juan structural basin in Colorado and New Mexico. An estimated 4 billion tons of bituminous coal and 28 billion tons of sub-bituminous coal were originally present in New Mexico. At present, coal production is relatively low.

### **Land Ownership and Use**

The New Mexico San Juan Basin has three Indian reservations, which are prominent in the land ownership pattern of the Basin. The lands of the Navajo Nation in the Basin include 11,500 square miles, and include the majority of the New Mexico San Juan Basin. The Ute Mountain Ute land is composed of 890 square miles in Colorado and New Mexico, with a relatively small amount in New Mexico. The Jicarilla Apache land area occupies about 1400 square miles in New Mexico, with the majority of that located in the San Juan River Basin. Indian holdings represent approximately 60 percent of the San Juan River Basin. The private non-Indian land is 13.1 percent of the San Juan River Basin and is in all states except Arizona. Of the total land in the San Juan River Basin, 2.9 percent is state and local government land, with the majority of that being State land.

The Bureau of Land Management, the Forest Service, and the National Park Service administer Federal land. Forest Service land includes a large part of the San Juan National Forest in Colorado, portions of the Carson and Santa Fe National Forests in New Mexico, and a portion of Manti-La Sal National Forest in Utah.

National Park land comprises of Mesa Verde National Park, Yucca House National Monument, and a portion of Hovenweep National Monument in Colorado. In New Mexico, the National Park Service has Aztec Ruins and Chaco Canyon National Monuments. In Arizona, National Park Service areas include a portion of Navajo National Monument, and all of Canyon de Chelly National Monument. However, the Canyon de Chelly land area is considered in Navajo Indian ownership. In Utah, a small number of acres of Natural Bridges and Hovenweep National Monuments are in the San Juan River Basin.

### **The Natural Water Supply**

Annual precipitation varies considerably with elevation. Average values range from 50 inches in the high San Juan Mountains to 6 inches near Mexican Hat at the confluence of the San Juan and Colorado Rivers. The San Juan and its principal tributaries, the Navajo, Piedra, Mancos, Los Pinos (Pine), Animas, and La Plata Rivers originate in the high San Juan Mountain slopes. Several other tributaries drain large areas but contribute little to

sustained stream flow. Less than 20 percent of the San Juan River Basin area produces more than 90 percent of the water supply.

Sixty-five percent of the stream discharge of the Basin is produced from April through June, the high spring runoff months. This results from melting winter snow from October to April. These surface flows account for 98 percent of water used, and they represent 63 percent of New Mexico's entire surface water annually.

At its confluence with Lake Powell, the San Juan River produces an average of about 2 million acre-feet (AF) of natural flow annually. Navajo Dam controls about half of this amount upstream. While this is a relatively small part of the 15 million AF of Upper Basin flow at Lee's Ferry, the San Juan is the sole source of all New Mexico's Upper Basin Colorado River water.

### **Navajo Dam and Reservoir**

The primary San Juan River storage facility in New Mexico is Navajo Dam and Reservoir. This facility was authorized as one of the initial units of the Colorado River Storage Project in 1956. The dam is 402 feet high, 2,566 feet long and has a total storage capacity of 1,708,600 AF. Construction was completed in 1963 and the facility is truly the management cornerstone for the San Juan River Basin. Navajo Dam plays the critical role in providing river regulation, an assured water supply for the Navajo Indian Irrigation Project, other contractors, and flow regulation for the seven-year endangered fish research period. This stable water supply has allowed contracting for municipal and industrial water.

However, while the Navajo Dam construction was essential for New Mexico water development, that construction and operation altered the natural river, its ecosystem and character. Natural events and riverine habitats were altered and migration routes were blocked. These physical and biological changes contributed, among other factors, to the decline of some fish species in the San Juan River and the listing of two as endangered, the Colorado Pikeminnow and the Razorback Sucker.

### **The Compacts and Current Use**

Water users such as the NIIP, the San Juan-Chama Project, the ALP, and M&I uses along the

river all depend on both the natural runoff and on the regulation of Navajo Reservoir. Their use is constrained by historical compacts and statutes, primarily the Colorado River Compact (NMSA 1978 § 72-15-2) and the Upper Colorado River Basin Compact (NMSA 1978 § 2-15-26). The former allocated the flow at Lee's Ferry between the Upper and Lower Basins while the latter divided the Upper Basin allocation.

The 1948 Upper Colorado Basin Compact allocates to the State of Arizona 50,000 AF. From the remainder available to the Upper Basin, the State of Colorado receives 51.75 percent, Utah 23 percent, Wyoming 14 percent, and New Mexico 11.25 percent. New Mexico's share is approximately 727,000 AF per year.

Current New Mexico development represents about 450,000 AF per year (AFY) of depletions. This is comprised of all the identified historic private development, plus developed state, federal and tribal projects. It includes contracts for municipal and industrial use and reservoir evaporation. The 110,000 AFY transbasin delivery to the San Juan-Chama project represents a substantial part. However, NIIP is incomplete and only about 133,000 AFY of the project's approximated 267,000 AFY of depletions is included in New Mexico's current depletion of approximately 450,000AFY.

## **NATIVE AMERICAN RIGHTS**

### **Navajo Nation**

For most of its path from Navajo Dam to Lake Powell, the San Juan River either flows through or forms the northern boundary of the Navajo Nation. The San Juan River and the NIIP represent critical Navajo Nation resources.

Congress authorized the Navajo Nation to divert 508,000 AFY for NIIP for irrigation of 110,630 acres with flood irrigation techniques, but the currently planned irrigation will require only about 330,000 AFY of diversions. This lower diversion number is due to NIIP being redesigned for pivot sprinklers. NIIP is currently diverting approximately 200,000 AFY for irrigating the currently developed lands.

The Navajo Nation asserts that any large-scale water development in the Basin could adversely affect their ability to fully develop their water

resources. The Navajo Nation supports the ability of the Colorado Ute Tribes to fully exercise their Colorado Ute Indian Water Rights Settlement Act of 1988. Although the Navajo Nation has never officially supported the ALP, it fully supports and encourages the implementation of the Settlement Act, as promised by the United States.

Until the Navajo Nation's water rights are quantified, development and use of available water will continue. The Navajo Nation and the State of New Mexico have begun discussions, but no agreement on the quantification of the water right has been reached. However, if and when quantification happens, the Nation most likely will hold the most senior priority date on the river. If that date is the date establishing the reservation, 1868, all users would be junior, which could jeopardize a dependable water supply for junior rights.

### **Colorado Ute Tribes**

In June 1986, the United States, the State of Colorado, the Ute Mountain Ute Tribe, the Southern Ute Indian Tribe, and certain Colorado non-Indian water users were successful in reaching an Agreement in Principle concerning the Colorado Ute Indian Water Rights Settlement. A Binding Agreement for Animas-La Plata Cost-Sharing (Cost-Sharing Agreement) included the parties listed above and New Mexico entities. Continued negotiations by the United States and Colorado interests led to the December 10, 1986, Colorado Ute Indian Water Rights Final Settlement Agreement (Settlement Agreement). The Ute Mountain Ute and Southern Ute Tribes, by resolution of their respective Tribal councils, approved the Settlement Agreement and sought Federal implementation of its terms. Special legislation, the Colorado Ute Indian Water Rights Settlement Act (Settlement Act), Public Law 100-585, implementing the Settlement Agreement, was enacted by the U.S. Congress on November 3, 1988.

The Settlement Act was the culminating event of years of effort, negotiation, and compromise by the Tribes and Colorado non-Indians to remove the cloud and settle the outstanding water rights in southwestern Colorado. The Settlement Act also serves to clear a cloud over New Mexico water rights in the Animas and La Plata rivers. Important is that the Settlement involved the rights of both Indians and non-Indians, a fact the opponents of the ALP and other parties to the controversy often overlook. Thus,

delivery of water to only the Indians—or non-Indians—will not complete the implementation of the settlement. Both groups have a stake in the settlement, and any reworking of the settlement must therefore consider the water needs of both groups. The Colorado Ute Indian Reservation was created in 1868, and as such, the Tribes have a priority date for their water rights that precedes the priority date for most, if not all, of the non-Indian water users. The Settlement Act effectively changes that priority to 1938. In the absence of the Settlement Act, development of senior Tribal water rights claims could disrupt non-Indian water rights on both the Animas and La Plata Rivers in New Mexico. The water rights supporting the cities, rural communities and industry could be endangered.

That part of the Settlement Act related to the ALP mandates Animas-La Plata Project water be delivered to the Tribes by January 1, 2000, to avoid future litigation or renegotiation of Tribal water rights claims. Final settlement of the Tribes' reserved water rights claims on the Animas and La Plata Rivers, which is critical to New Mexico, was subject to the following Settlement Act conditions:

- Ridges Basin Reservoir, Long Hollow Tunnel, and the Dry Side Canal to the turnout to Dry Side Lateral are to be completed to enable delivery of water to the Tribes on or before January 1, 2000. This is accomplished by completion of Phase I of the ALP.
- If Phase I was not completed by January 1, 2000, then by January 1, 2005, the Tribes must elect to either retain the Project water rights or commence litigation or renegotiate their pending reserved water rights claims.

The provisions of the Settlement Act satisfy the water rights claims of both tribes and provide for a stable water supply in Southwestern Colorado. As an example, a portion of the Ute Mountain Ute water rights claim is settled by development of waters in McPhee Reservoir and the construction of the Towaoc-Highline Canal, features of the Dolores Project. There are numerous other actions unrelated to ALP and integral to the Settlement Act that have been taken toward completion of the Settlement Act, including the payment for a \$60 million economic development fund.

Final consent decrees, which implement certain provisions of the Settlement Agreement and the Settlement Act, were signed in U.S. Court for Water

Division No. 7, State of Colorado, on December 19, 1991. With the consent decrees in place, the Tribes waive any and all claims to water rights in the State of Colorado not expressly identified in the decrees after certain requirements are completed. Decrees addressing the Tribes' water rights settlement on the Animas and La Plata Rivers have yet to be entered. These are pending completion of certain portions of the ALP (see above).

Currently, the battle over the Animas-La Plata Project has shifted from its authorization to its funding for construction, which is supposed to take only the next seven years.

President Clinton signed the scaled-back Animas-La Plata Project into law as part of a massive \$450 billion spending bill on December 21, 2000. The House had approved the measure 292-60 on December 15. The Senate, which had approved the ALP in a separate bill in October, passed it again in the House appropriations bill by a voice vote.

The project, estimated to cost around \$300 million, would pump water during high flows from the Animas River near Durango, Co., into Ridges Basin Reservoir, a off-stream reservoir, for later release back into the Animas. Depletions from the project are capped at 57,100 acre feet per year, only about a third of the depletions authorized in the original ALP. Two Colorado Indian tribes, the Southern Utes and the Ute Mountain Utes, will receive about two-thirds of the depletions. The remaining depletions will go to non-Indian water districts in New Mexico and Colorado and the Navajo Nation.

The legislation sets out an ambitious seven-year schedule for construction, authorizing the necessary appropriations over the next five fiscal years, beginning with FY 2002. The current request from the Bureau of Reclamation, however, for FY 2002 is only \$2 million. When the budget was written last Fall, the Bureau could not ask for a larger appropriation because the project had not yet been authorized, and the environmental compliance was not complete. Both of these milestones have been reached, and now the Bureau says it needs about \$28 million for the next fiscal year to meet the aggressive construction schedule.

Backers and opponents expect appropriations will be the battleground for the ALP in the Congress. Even though the project and the appropriations are

now authorized, the actual appropriations will take a separate act of Congress each year. The legislation allows, but does not mandate, the money be spent on the project. Thus, the project could be stalled or even stopped if Congress fails to appropriate the money to fund it. Legal challenges also are possible, but no lawsuits had been filed by mid-January.

The Bush Administration includes a strong supporter of the project in Gale Norton, Interior Secretary. Ms. Norton, former attorney general for Colorado, is an avid supporter of the ALP legislation. She personally attended all of the meetings facilitated by Colorado Gov. Romer between proponents and opponents of the project to try to reach consensus over the project. When no consensus could be reached, Ms. Norton concluded that the scaled-back version of the ALP proposed by the project sponsors was necessary to produce a settlement of water claims acceptable to the Ute tribes. She wrote several letters supporting the "ALP Lite" proposal and lobbied for it in Congress.

The San Juan Water Commission, a water agency for municipal users in Northwest New Mexico, has started the process to obtain its part of the New Mexico water permit for the ALP now held by the Interior Department, as provided in the legislation. The Commission is seeking the permit because its neighboring water districts in Colorado hold their state permits directly.

Shortly after President Clinton signed the legislation, the Commission asked New Mexico State Engineer Tom Turney to request the Secretary of Interior to assign the Commission's portion of the state water permit back to the Commission. The Senate Indian Affairs Committee report on the legislation notes that the return of the permit is "proper and necessary to equalize the positions of the two states." The Commission anticipates the State Engineer will make the request and help the Commission regain control over its water permit.

### **Jicarilla Apache**

The settlement of the Jicarilla Apache water rights claims was negotiated over a period of about eight years and culminated in congressional approval of the settlement pursuant to the Jicarilla Apache Water Rights Settlement Act of October 23, 1992 (106 Stat. 2237). This act included a contractual arrangement with the Tribe for the diversion and depletion of 6,500 AFY of San Juan-Chama Project

water from Heron Reservoir, and the diversion of 33,500 AFY of Navajo River water of which 25,500 AFY will be depleted, for a total divertible supply of 40,000 AFY and a total depletion of 32,000 AFY. The Tribe has the ability to market this water through third-party contracts, with the approval of the Secretary of Interior.

Although the Tribe obtained state court decrees for its water rights in 1998 and 1999, which allow it to use the water under New Mexico law, no water can be depleted yet because of the Endangered Species Act. The Act has limited the amount of depletions in the San Juan River Basin, and none of the Jicarilla water has been included in the allowable depletions. Thus, at present, the Jicarilla Tribe has quantified "paper" water rights, but no "wet" water. Understandably, the Tribe is working to assert its claims into any additional allocations of depletions in the Basin, which will create conflicts with other potential users of that water.

### **KEY ISSUES OF THE CONTROVERSY**

As outlined above, many parties have claims to the water. Casting doubt on the claims are the Federal claims on behalf of the endangered fish, which often set all the other interests against each other.

Endangered fish demands have increased controversy in the San Juan River Basin and jeopardized the water supply. Hypotheses that the fish require large "plug" releases of water have led to proposals to release large amounts of water into the spring from Navajo Reservoir, reducing the water available for delivery for other purposes. These high releases, coupled with existing demands and the Navajo expectation of further development, resulted in concern by current users including recreational fishermen, who enjoy a world-class trout fishery below Navajo Reservoir. Other downstream residents have been threatened by flooding and water shortage as well. Instream flow requirements to benefit the fish, even though they are not recognized as "beneficial uses" under New Mexico law, may reduce the allowable consumptive use in New Mexico, and may also lead to forced compromise about how to meet the Basin needs. Fish needs are based on limited scientific basis and a host of scientific hypotheses, with admitted low chance for success for recovery of the fish. Clearly, users

who depend on Navajo Reservoir are at risk due to the endangered fish instream flow requirements.

### **ESA Limitations on Development**

Even though the ALP and other potential users have valid State water rights for the development and use of water, the ESA has placed limitations on project development and restricted water use levels significantly below the limit of the State water rights. This situation has led some to the belief that restrictions stipulated in ESA opinions written by the Fish and Wildlife (F&W) Service now supersede the priority and administration of valid State water rights. The F&W Service points out that their opinions deal with biological and hydrologic information and should in no way be viewed as affecting State water rights. However, it is clear that water rights holders are prevented from exercising their water rights through development of Federal Projects, or use of Federal Public Lands, or issuance of Federal permits because of ESA opinion restrictions; thus, their water rights are impaired.

When fully developed, the NIIP will deplete about 254,000 AFY. The ALP could deplete 149,220 AFY (34,000 AFY in New Mexico) in the San Juan Basin. The current Biological Opinion limits the ALP to depletions of 57,100 AFY (about 14,000 AFY in New Mexico). These depletions, including San Juan Water Commission (SJWC) use, for ALP are allowed only because of “reason-able and prudent alternative” elements in the ALP Biological Opinion, that the F&W Service determined is likely to avoid jeopardy to endangered species. The allowable ALP depletion is about one-third of the anticipated depletions for the full project, which has created severe problems for ALP participants. Some additional depletions have become available through the San Juan River Basin Recovery Implementation Program (discussed below), but they have been claimed by the Navajo Nation for NIIP, so they are not available for other users, including the Jicarilla Apache Tribe. Additionally, the Navajo Nation hopes for additional water development (e.g., the Navajo-Gallup Pipeline) and is concerned about administration of the ESA. It believes that much of the non-Indian Basin development has occurred, but Tribal water adjudication’s and Tribal water development are lagging and will now be prevented because of ESA restrictions.

### **San Juan River Basin Recovery Implementation Program**

The San Juan River Basin Recovery Implementation Program was established with two goals: 1) to research the needs of the fish and recover their populations and 2) to proceed with water development consistent with applicable law. Tribal entities and water users recognize that the ESA opinions of the F&W Service decisions severely hamper the exercise of New Mexico water rights.

Water rights and the priority of those rights are not the determining factor in depletion amounts allowed in the Biological Opinions rendered by the F&W Service. For example, the water right for a Federal (or Tribal) project (e.g., ALP in New Mexico, 1956) may have seniority over rights that were filed and perfected since the Federal application. Thus, the long time frame required for developing the Federal permit may create a situation where the senior Federal right is not included in the accounting of the “baseline” and junior rights that have been perfected are in the baseline. Further, a Biological Opinion on the proposed Federal project has determined that the proposed, but senior, Federal depletions would create jeopardy to endangered species and is not allowed. This scenario is the reality—not hypothetical—in the San Juan Basin and is the source of frustration and possible lawsuits from water users and Tribes.

### **Last Chance to Use New Mexico’s Allocation of Colorado River Water**

Non-Indian New Mexico water users are concerned the planned developments are the last chance to use our Colorado River water. In the 1955-1968 period, State Engineer Steve Reynolds issued permits to the Department of Interior for all the then-unappropriated water in the San Juan, and the intended use for the water was the Federal projects then planned, including NIIP, the ALP and others. No permits were issued for the full quantification of the tribal water rights that are now being asserted.

However, even if that water becomes available, it will not be enough. An engineering report, prepared in January 1995 for the SJWC state water permit applications, estimated that the San Juan County’s M&I supply, including the ALP, will be exhausted by



2011 or sooner. It will be, **much** sooner, if the ALP is not built, and if the ESA precludes access to this water. In that case, M&I water suppliers must look to existing agricultural water supplies to meet their needs with the unhappy prospect of forcing agricultural users to sell their water rights.

### **Water Quality Also Could Limit the Water Supply**

New Mexico faces several emerging water quality issues. Significant oil and gas activities potentially could result in hydrocarbon contamination. New Mexico's adoption of strict selenium standards in 1995 created major quality concerns, because the natural background river concentration often exceeds these standards. That strict selenium standard, adopted through an excess of caution, could have led to even lower water supplies. Following the two-year effort by the San Juan Water Commission, the standard was returned to the less stringent Federal standard in 1999. On another front, while no evidence to date has arisen, biologists hint that water quality may be impacting the potential for endangered species' reproduction and recruitment. In that case, if more water must be left in the river to dilute toxins and improve water quality, less will be available for use by water rights holders. The process for reviewing and changing the quality standards for surface water is in serious disrepair. If the process cannot be improved through new procedural rules that will be proposed, changes may be needed in New Mexico's statutes. The Federal Clean Water Act requires that State standards be reviewed every three years in a "triennial review" process. The last two triennial reviews in New Mexico have not been completed in that time frame, and the process has been painful and expensive for the parties involved. In each review, the first report to the Water Quality Control Commission had to be discarded, and a new hearing officer had to be appointed to compile a new report and recommendations to the Commission. Obviously, this wasted a lot of effort, and it shows that the process needs significant improvement. The San Juan Water Commission is working with several other parties involved in the last triennial review to propose changes to the hearing process to make it more efficient, timely, and fair.

## **WHAT NOW?**

### **Completion of NIIP Development**

Completion of NIIP is essential to provide the Navajo Nation water. Funding is the culprit preventing completion now. The President's fiscal 2000 budget included millions for the continued design and construction of the Project. NIIP is being developed in irrigatable land blocks of 10,000 acres each. Block 8 facilities construction was started in 1992.

Currently, Blocks 1 through 7 are producing high value crops (including potatoes, wheat, corn, and beans) on approximately 65,000 acres and providing Navajo people opportunities. At full development, NIIP will consist of 11 blocks totaling 110,630 acres. In July 1999, the F&W Service consented to an informal consultation that allocates enough water to NIIP to allow the completion of Blocks 9 through 11. Blocks 1 through 8 had already been allowed by a F&W Service Opinion in 1991.

### **Future of the Animas-La Plata Project**

As described above, the authorized ALP cannot be built under existing ESA restrictions, because only about one-third of the needed depletions are available. The ALP participants, including the San Juan Water Commission, have proposed a vastly scaled-down version of the ALP that would meet the ESA restrictions. Environmentalists, however, continue to oppose the Project, seemingly no matter how much the participants agree to change it. The Clinton Administration, in August 1998, proposed an even smaller ALP, which included \$40 million for the two Ute Tribes to buy additional water rights, and a water supply pipeline needed by the Navajo Nation's Shiprock community. The proponents have conceptually agreed to most of the Administration proposal, and some final details of the plan, including the size of reservoir, will depend on studies of what the endangered fish need. The ALP participants' proposal, which should be acceptable to the Administration, was introduced this fall in the House of Representatives by Congressman Scott McInnis, R-Colo. (H.R. 3112.) Given the late introduction date, it is unlikely the legislation will pass in 1999, but it will probably be re-introduced in early 2000.

### **Public Service Company of New Mexico Contract Concerns**

The Public Service Company of New Mexico (PNM) has requested the U.S. Bureau of Reclamation (BOR) to renew, and extend through 2025, the San Juan Generating Station water service contract. The San Juan Generating Station operations require a dependable water supply through July 1, 2022; post-project decommissioning would require the water until 2025. The current contract allows PNM to withdraw and consume 16,200 AFY through December 31, 2005. The 16,200 AFY is included in the San Juan River Basin Recovery Implementation Plan baseline. PNM's long-range investment-driven decisions require long-term, reliable water sources.

A Draft Environmental Assessment (EA) for the contract renewal has been prepared and distributed for public review. The EA cannot be finalized until agreements can be obtained and Indian Trust Assets satisfactorily addressed.

During the NEPA process, required for contract renewal, all tribes with water interests in the San Juan Basin raised issues with the BOR about potential impacts to Indian water rights and associated projects. Before it received clearance in July 1999 to develop the remainder of NIIP, the Navajo Nation had opposed issuing any more San Juan River water contracts, because the Nation is concerned there will not be sufficient water for NIIP. The Nation asserts paramount water rights to San Juan River water. The Southern Ute Indian and Ute Mountain Ute Tribes oppose PNM Contract renewal as it may interfere with ALP completion, thereby preventing them from securing the water to which they are entitled, and affecting their Indian Trust Assets. Both Tribes assert that all such depletion contracts have the same effect. It is anticipated the three Tribes will continue to voice objections to any other non-Indian water development. Due to tribal opposition, PNM has initiated parallel discussions with the Jicarilla Apache Tribe for a subcontract of the Navajo Reservoir water owned by the Tribe as a result of its settlement of water rights with the United States.

### **Jicarilla Apache Contract**

As described above, the Jicarilla Apache Tribe has secured a settlement of its water rights, but no water as of yet. It has "paper" water rights through a contract with the federal government and state

court decisions, but the water is not available due to the restrictions of the Endangered Species Act. The Tribe is working to secure a wet water supply, but it will be difficult given the restrictions on depletions under the Endangered Species Act.

### **Navajo-Gallup Pipeline**

Likewise, the Navajo Tribe's hope for a pipeline to serve the Nation down to the Gallup area is lacking "wet" water, as well as a state water permit. It is anticipated that the water for the pipeline may be part of an overall settlement of the Navajo Nations water rights, but that is still in very preliminary stages.

### **Regional Water Planning**

The need for the separate interests to work together is critical. One forum for that cooperation is regional water planning. The San Juan Water Commission was an integral part of an earlier regional water planning effort, but a new regional process is needed. The Commission is willing to help begin the process again, but support from the State in the form of funding is needed. Through regional planning, the various interests can discuss their needs, and work toward finding solutions that will cause the least disruption and create the most benefit for the Region. One of the stumbling blocks, as this brief paper demonstrates, is that the problems themselves are complex and inter-connected. Regional planning offers a forum for the people and decision-makers of the Region to understand the complexities and relationships, and to begin to take a broader view of what needs to be done. The Interstate Stream Commission supports regional planning throughout the State, but the San Juan River Basin may be the one place it is needed most.

### **Endangered Fish Species, Long Range Funding**

The New Mexico San Juan Basin, Colorado River water supply is threatened by the failure to recover the Colorado Pikeminnow and Razorback Sucker. Of the fourteen native fish species in the Upper Colorado River Basin and the San Juan River Basin, three are declining and two are endangered. If we do not protect the declining fish and fail to recover the endangered fish, serious impacts to both existing uses and the full development of New Mexico's compact water will be felt. The San Juan Chama, Navajo Indian Irrigation Project, the Jicarilla

Apache Tribe settlement, and the water contractors, including PNM, from Navajo Reservoir, must share shortages, including those caused by the demands made by the fish.

Between 1990 and 1992 water users and the State of New Mexico entered into a cooperative program, which took advantage of the fact that much of the water originating in the Basin is allocated for use in the Lower Basin. Under the guise of being environmentalists, local anti-development activists have prevented the environmental element from participating to date. In Colorado and New Mexico, the recovery program has protected current uses and may allow for an additional 136,000 AF of depletions in New Mexico (14,000 AF for ALP and 122,000 AF for NIIP). To support the continuation of existing uses and the increased uses of the future, certain capital projects have been identified. Federal legislation has been introduced to fund these projects, \$18 million in New Mexico. The legislation requires the participating states to contribute to the funding. New Mexico's share would be \$2.75 million. Without this program, New Mexico and our neighboring states may be precluded from developing our full Colorado River compact supplies.

**PROPOSED LEGISLATION**

**Cost of Program**

Construction Program	\$ 80 million
Replacement Power	\$ 15 million*
Water Rights/Reservoir Storage	<u>\$ 5 million*</u>
Total	\$100 million

**Sources of Revenue**

Cost Sharing:

Federal	\$ 46 million
Non-federal (local)	<u>\$ 54 million</u>
Total	\$100 million

**Breakdown of Local (Non-Federal) Cost Sharing**

CREDA (Power)	\$ 17 million
States (New Mexico's share \$2.75 million)	\$ 17 million
Power/Water (Ongoing)	<u>\$ 20 million*</u>
Total	\$ 54 million

\* New Mexico is more likely to be the first to benefit and must participate; the other states have their funding share in place. The legislation is timely, allowing for the recovery of the fish while we develop our compact allocations to the benefit of our State. The facilities are technically supported and are essential for the socioeconomic well being of the Basin and the four states of Colorado, Utah, Wyoming, and New Mexico.

**SUMMARY**

Before the controversy generated by the demand for more water for endangered species, the San Juan River essentially was a known quantity. The major Indian water rights settlement issues of how much and where, were future issues but, the principles for reaching compromise were in place. The F&W Service declaration that "few additional depletions are allowed" has changed the plan. If the endangered fish are to have the remaining New Mexico San Juan River flow for their recovery, then all those who envisioned and planned must view the future with skepticism. Potential solutions might exist under the Recovery Program; to purchase existing water rights, to expand ESA Section 7 Consultations and enlarge participation in the solution, and to modify endangered species water demands, which could result in additional water for development. However, consideration of any one solution affects all the other interests and concerns, opening yet another box of issues.

*John S. (Stan) Bulsterbaum is a native of New Mexico and graduated from NMSU with a degree in agriculture. He worked for the USDA Natural Resource Conservation Service for 28 years and accumulated a wealth of experience in water-related natural resource issues. He has served in positions in New Mexico, Colorado, Kansas and Montana. Stan currently is a member of the New Mexico Interstate Stream Commission and serves on the water planning committee.*



## Southwestern New Mexico Water and Growth Issues

Stan Bulsterbaum  
Interstate Stream Commission  
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People often ask me what I've learned while being on the Interstate Stream Commission. I have learned that you can do anything in an instant that will give you heartache for life. Sometimes when reviewing issues before the Commission, I wonder exactly what is happening. I have learned that you can keep going long after you think you cannot. For those of you who have seen the agenda for the Commission, I do not need to say more. I have learned that you can either control your attitude, or it will control you. The Commission faces many conflicting water issues and I have learned that your life can be changed in a matter of hours for people or conditions that you do not even know about. A few years ago, I didn't even know there was a silvery minnow.

Southwest New Mexico is a very diverse part of the state. Primarily I will be talking about the area of Luna, Grant, Hidalgo, and Catron counties. The area has very high, steep mountains with narrow entries

into the watersheds that continue down to the every flat fluvial planes at the bottom. Temperatures in the winter time are very mild in the southwestern area but it is quite cold in the mountains. Major surface flows in the area include the San Francisco, Gila, and the Mimbres rivers. Average rainfall in the Deming area is about 9 inches a year, which contrasts with the higher elevations that receive 18-plus inches yearly. These facts are important to consider when you look at the water resources in the area.

Figure 1 depicts the area's three rivers and nine underground water basins. The yellow area is the Mimbres. You can see the small area comprising the Animas Basin as well as the Gila-San Francisco Basin to the north. The Office of the State Engineer has declared the closed basins, meaning that you must obtain a permit to drill a well in those basins.

Populations are increasing in all four counties—Hidalgo, Catron, Luna and Grant. Catron and Luna



counties are growing a bit faster than Grant and Hidalgo. Water use for domestic wells remains at about 2-3 percent of total water used. Our part of the state is predominantly irrigated agricultural with the exception of Grant County, which has the mining industry. The mining industry consumes about 76 percent of the total water use of Grant County.

I think that sets the scenario for what is happening concerning economic development in southwestern New Mexico. For example, Deming successfully recruited a truss manufacturing plant. The plant utilizes very little water compared to some of other types of industry that could come into the area. Border Foods operates in Deming and they use a lot of water for 2-4 months each year; after that, they utilize little water especially compared to some other kinds of food processing plants that operate on a year-round basis.

Most of the livestock grown in our part of the state are exported somewhere else. We do not have large feedlots so we do not have large quantities of water going to those operations. Let me share with you quickly the relationship we do have with the ranching and meat industry. We have a plant in Deming that takes meat from the slaughterhouses off the rail, cuts it, wraps it, and sends it to market. This plant uses very little water compared to slaughterhouses.

These are the types of industry I think the economic development folks in the southwest part of the state need to continue recruiting. They are labor intensive activities but use very little water. I think that is the direction southwestern New Mexico must go, not only right now, but in the years to come.

Recently I talked with city officials in Deming after we had our water rate increase in March. I wondered what percentage of that rate increase would be going to activities that increase the efficiency of the well-pumping plants and storage facilities that store water for the city of Deming. Fifty percent of that rate increase will go for those purposes.

You'll recall seeing the closed or "declared basins" from Figure 1. Obviously, water resources in this part of the state are fixed. Towns are doing what they can to improve the pumping efficiency for storage facilities while customers who buy their water have the opportunity to share in improvement costs. Municipalities in the southwestern part of the state are also starting to use tertiary treatment for sewer fluid. Some of you may be familiar with an entity that

may be coming to Deming, a power plant facility called Globe Energy. If they do locate in Deming, they will buy some tertiary treatment water from the City. Some local golf courses are being irrigated with that kind of water. When water is not used for human consumption, I think it is a wise use of our water—it certainly benefit us because it reduces our pumping of the aquifers.

Although you might not think about it a lot, ranchers in our part of the state are certainly contributing to water conservation. I don't know how many of you have ever listened to an old-time rancher, but if you have, you have probably heard him say that a windmill pumping a stream the size of a pencil, or maybe a little bigger than a pencil, all day long will water roughly 100 head of cattle. You may say, "Well, Stan, what does that have to do with this water conference and water conservation?" Folks, it does not take long for that to amount to a lot of water if you continue pumping from a windmill a regular basis. Let me give you a little food for thought. A few years ago the Office of the State Engineer published a brochure called "Aqua Action." One fact that it presented had to do with turning off the water every time you brush your teeth, instead of letting it run. Each person would save roughly 6 gallons per day, or an estimated nine million gallons statewide per day! Do you realize what 9 million gallons of water will do? According to this publication, it is more than enough to supply the city of Carlsbad for one day! Folks, a little conservation of water can go a long way in a very arid state such as ours.

I have a few suggestions I think are not only very pertinent to southwestern New Mexico but to other parts of the state as well. The Interstate Stream Commission is an entity on which I serve and from which I try to assist in the leadership of water resources in this state. Regional water planning is at various stages of progress around the state and depends upon the participation of local folks. Everyone, whether you are a business owner, a municipal official, a state citizen, an irrigation district official, a water district person, and whatever your expertise, needs to take the opportunity to be involved in this program very seriously. We must have grass roots participation and a broad spectrum of people involved in this effort if we are to consider the differing views on water issues that exist. We have already seen here today many differing views.

## Stan Bulsterbaum

Do not leave our future water planning solely in the hands of special interest groups. Some state statutes may benefit you now but being passive to our current water situation may not be in your best interest. The Interstate Stream Commission is in the process of developing data for inclusion into a state framework water plan. We need your assistance in preparing accurate data.

Second, I personally think it is high time that all of us sit down across the table from county planners, real estate people, landscape designers, and contractors to implement some form of rules for the increased application of xeriscaping. Here's a question for you: do you think it is time for those who live in town, and have two yards, to be required to have one of those yards desert landscaped? Now before you react, I want to acknowledge that there is a point of view that says government does not have the right to tell me what to do with both of my yards. And I can understand that, but there is another point of view from the perspective of water resources—conservation efforts should benefit the total welfare of our state. If you figure the amount of water saved from irrigating only one yard for each home in all the towns in New Mexico, you might find that the welfare of the state is greatly benefitted from that kind of conservation. It certainly benefits the aquifers in southwestern New Mexico as well as other aquifers around the state.

Third, I think we must continue to develop realistic and beneficial education programs related to water. Not only in the public schools—and I certainly applaud teachers and others who are involved in that educational effort—but of our citizenry, also. I have been surprised as I visit with people around the state how little knowledge they have about what our interstate compacts provide. I think it is time that we have some type of educational program to post-high school, post-college, grownups if you will, on the economic development efforts and the resources involved in interstate compacts and how they may affect each other. We certainly do not want to repeat the situation we have on the Pecos River—there is no sense in that type of litigation if we can prevent it.

I would also like to encourage you to support expenditures for conducting hydrologic investigations in our state. The Commission spends a fair amount of money on these investigations as does the Office of the State Engineer, and it is very much needed. We must know how much water we have and hydrologic investigations are our best avenue, at least at this point, to determine the extent of our water resource.

As I look to the future of water resource's management in southwestern New Mexico and the rest of this state, I find that the agenda looks pretty full and it's very complicated. There are lots of opportunities for folks and the private sector to conduct water planning and water planning implementation. New technology will assist in resolving some water issues. There are various activities going on around the state that you should be aware of including those in conjunction with the Governor's Blue Ribbon Task Force, the New Mexico Water Resources Research Institute, and the newly formed water task force at New Mexico State University. Legislative efforts will be important and I'm glad to see some legislators in the audience today—thank you for taking the time to be here.

I hope I've provided you with helpful information about the water situation in the southwestern part of the state and a bit about what is happening statewide. I can assure you that the Interstate Stream Commission is ready and willing to do its part in resolving New Mexico's water problems. Thank you very much.

*Len Stokes is President of Progressive Environmental Systems, Inc. He consults in the areas of water, wastewater, and environmental issues. Len is originally from the Roswell area where his family has been active in the ranching and farming industry for many years. He attended New Mexico Military Institute and NMSU. He has managed the design, permitting, and construction of four major solid waste landfills in southern New Mexico. He also has served as project manager on three wastewater treatment plants. For the past six years, Len has focused primarily on water supply and water rights issues. He serves as consultant, facilitator, and as a legislative lobbyist for his clients on those issues. Currently his clients include the City of Las Cruces, the City of Alamogordo, the Lea County Water Users Association, and the Village of Ruidoso.*



## WHAT'S HAPPENING IN THE LOWER RIO GRANDE BASIN IN NEW MEXICO?

Len Stokes  
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The answer is, a whole bunch of things. For the next fourteen minutes, I will attempt to bring you up to date.

### FEDERAL QUIET TITLE SUIT

As many of you know, the United States filed suit in Federal District Court a couple of years ago in an attempt to gain legal title to, basically, all of the water in the Lower Rio Grande Basin. Mediation was attempted and abandoned, as no one was willing to give up his or her water to satisfy the Federal Government's claim. Motions to dismiss the federal action based on jurisdictional and other issues were filed and briefed by the New Mexico entities. The United States and the Texas entities argued that the Federal Court was the proper jurisdiction. I can happily say that Judge Parker agreed with us and dismissed the federal action. We won the first round.

The U.S. has appealed. We will now see what happens in round two.

### EBID ACTION

In an effort to retain administrative and operational control of Rio Grande Project Water in the Lower Rio Grande, the Elephant Butte Irrigation District (EBID) filed suit against the U.S. in Federal District Court in New Mexico on September 18, 2000. The complaint seeks to declare the contractual relationship among all parties involved with the operation of the Project, compels the defendants to enter into an operating agreement regarding the Project and the appointment of a Special Master to administer the agreement. The complaint also seeks a declaratory judgment that the 1920 Sale of Water for Miscellaneous Purposes Act is inapplicable to transfers of water and conversion of uses within the Rio



Grande Project. This is based upon the fact that the EBID has fully repaid its debt to the U.S. on the Project. It is certainly in the best interest of the City of Las Cruces and the other New Mexico entities for the District to prevail in this action.

### **ADJUDICATION OF WATER RIGHTS IN THE LOWER RIO GRANDE BASIN IN STATE DISTRICT COURT**

The effort to adjudicate the water rights in the basin is proceeding at a fair pace. The hydrographic survey is nearing completion for the entire basin. The offers of judgment for the Nutt-Hockett Basin were well received. Now we get to the fun part, the farmers and other water users that rely on Project surface water and/or related groundwater in the basin. While offers at this time have dealt only to acreage, it is evident that the key issue at hand is the duty of water associated with the lands within the EBID, and the priority dates associated with those rights. This may take months of negotiation or years of litigation with the affected parties. It will be hard to address any of the other issues until those are resolved, solely because of the amount of water involved. Then the State Engineer can look forward to the massive number of "claims of rights" in the basin.

### **LAS CRUCES/EL PASO SUSTAINABLE WATER PROJECT**

At this time, the Las Cruces/El Paso Sustainable Water Project is ninety percent El Paso and ten percent New Mexico. The main crux of the project for El Paso is to utilize more Rio Grande Project surface water for municipal and industrial (M&I) purposes and reduce the dependence upon non-renewable groundwater in the Hueco Bolson, which will be depleted in the near future. In short, El Paso needs to acquire surface water and build treatment capacity ASAP.

The City of Las Cruces and other entities in New Mexico, are in a different position at this time. While the City of Las Cruces has made the commitment to begin phasing in the utilization of surface water in the next ten to twelve years, the other municipal water providers in the area do not, at this time, have the information at hand to make that commitment. Therefore the money being spent at this time in the New Mexico portion of the project is going to-

ward providing that information so informed decisions can be made.

### **FORTY YEAR WATER PLAN**

The last item really shows the importance of having our forty-year water plan in place to protect our water for future use in New Mexico. The City of El Paso needs surface water and they would love to have ours. They have enough in the Texas allotment for their needs, but if they could get New Mexico water as well, the available supply would increase and their price would decrease.

It's kind of hard to swallow if you live in southern New Mexico. The City of Las Cruces, for example, has been planning a transition to the use of surface water over a long period of time as dictated by demand. This will enable the City to acquire the surface water rights or allotments in an orderly fashion as development and urbanization of the agricultural land occurs over time. The last thing that we want in our valley is the wholesale retirement of agricultural water rights and the fallowing of our precious farmland. If you don't agree, go see the Owens Valley in California. Our best protection from that occurring in the Lower Rio Grande is to have a forty-year water plan in place that shows the need for New Mexico water in New Mexico. I am happy to report that the forty-year water plan for the Lower Rio Grande is being prepared at this time and will be completed within the next two years.

### **CONVERSION OF RIO GRANDE PROJECT SURFACE WATER FROM AGRICULTURAL TO MUNICIPAL USE IN THE LOWER RIO GRANDE**

The City of Las Cruces and the EBID have discovered that we can work together to make positive things happen. Over the last four years, the City of Las Cruces and the EBID have gotten together and begun to understand each other's needs and concerns about future water supply in our region. I call this the development of a positive relationship that will grow closer over the coming years. It is very interesting because we have found that we need each other for the future. To date, we have entered into a joint resolution that sets up basic guidelines for the City to acquire Project water rights and annual allotments of water. We have come together and initiated

## What's Happening in the Lower Rio Grande Basin in New Mexico?

two significant pieces of legislation for the conversion of Project water; the forty-year lease period and the Municipal Water Users Association statutes. The City has begun entering into forty-year term leases this year. The City Council will pass a resolution forming the first Municipal Water Users Association this month with the EBID Board approval coming shortly afterward. By the first of the year, steps one and two toward Ag to M&I conversion will be complete. The final step has also been started. Legal counsel for the City and the District believe that existing state statutes allow for the completion of the process and we have begun the process of protecting those statutory provisions.

The municipal water providers and the EBID will be responsible for the conversion of Project surface water from agricultural to municipal use in New Mexico. We can do this in a positive manner or we can fight for it, be assured we will do it.



*Pat McCourt has been the City Manager of Alamogordo since January of 1998. He has served in a variety of positions as administrative officer for municipalities in the southwest and the midwest. He also has worked for Council of Governments, county government, and as a contractor for the state Medicaid program in Arizona. Pat has 20 years experience in public administration. He possesses a master's degree in public administration from the University of Columbia, and bachelor's and master's degrees in business administration from the University of Cincinnati.*



## **Water Consumption Based on the Tiered Rate System Presentation Outline**

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### **Goals for Implementing a Tiered System**

- to reduce consumption of water
- to bring in more money to address capital improvements of the Water and Sewer Fund

### **Water Fund is kept separate from other operations**

- Five-year financial estimates by fund
- Breakdown of ICIP projections
- List of necessary projects in water and sewer

### **Comparison of a Tiered and Non-Tiered System**

Breakdown of a 1999 Utility Bill (Figure 1)

### **Residential Customers on 3/4" Meters**

Graphed by Trimester and Year with proposed tiers (Figure 2)

### **Proposed Tiers by Type and Meter Size**

Residential and Nonresidential (Figure 3)

### **1999 Water Use on Seven Accounts**

Comparison of customers using the Tier Proposal vs Across the Board 5% and 10% increase (Figure 4)

### **Goals for Implementing a Tiered System**

- to reduce water consumption
- to bring in more money to address capital improvements of the Water and Sewer Fund

*Water is a Precious Resource*

If you have any questions or concerns, please call our Utility Billing Department (505) 439-4260

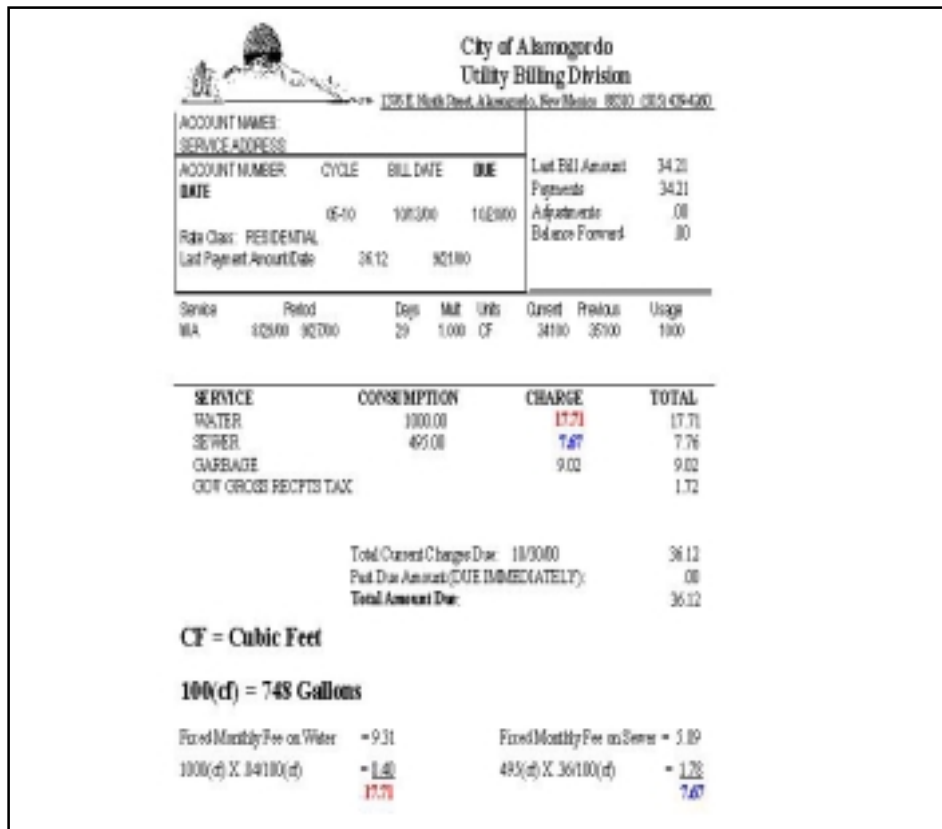


Figure 1. Breakdown of a 1999 Utility Bill

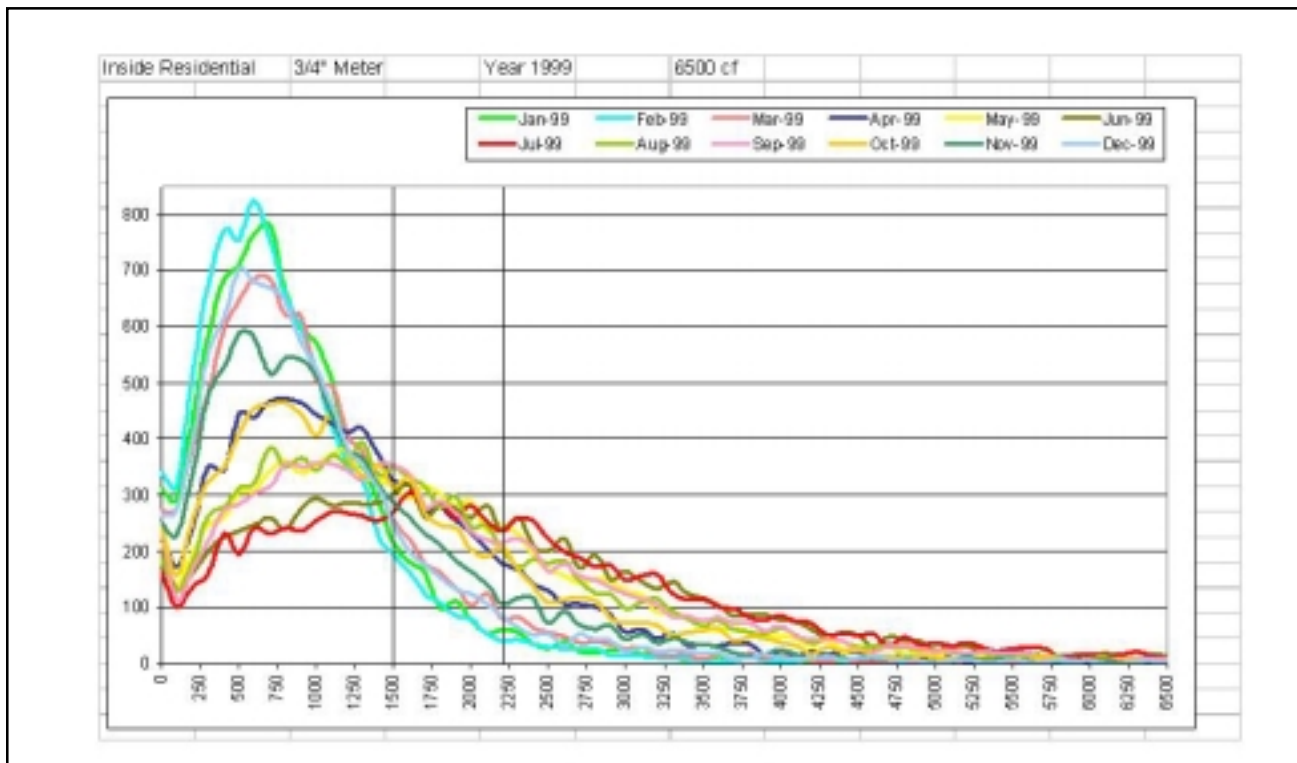


Figure 2. Proposed tiers graphed by trimester and year

Water Consumption Based on the Tiered Rate System  
City of Alamogordo

<b>Proposed Tiers by Type and Meter Size (Inside Rates)</b>				
Residential		Non-Residential		
.75"	\$9.31/Month	9407	\$21.91/Month	489
	1-1500cf = .84/100cf		0-3000cf = .84/100cf	
	1600-2200 = 1.10/100cf		3100-5000 = 1.10/100cf	
	2300- = 1.50/100cf		5100 = 1.50/100cf	
1"	\$11.85/Month	179	\$37.05/Month	130
	0-2000cf = \$.84/100cf		0-5000cf = .84/100cf	
	2100-3000 = 1.10/100cf		5100 -9000 = 1.10/100cf	
	3100 = 1.50/100cf		9100 = 1.50/100cf	
1.5"	\$15.25/Month	15	\$65.65/Month	35
	0-3000cf = \$.84/100cf		0-9000cf = .84/100cf	
	3100-4500 = 1.10/100cf		9100-15000 = 1.10/100cf	
	4600 = 1.50/100cf		15000 = 1.50/100cf	
2"	\$24.56/Month	7	\$116.96/Month	101
	0-4000cf = \$.84/100cf		0-15000cf = .84/100cf	
	4100-6000 = 1.10/100cf		15100-20000 = 1.10/100cf	
	6100 = 1.50/100cf		21000 = 1.50/100cf	
3"	\$93.12/Month	1	\$126.26/Month	8
	0-6000cf = \$.84/100cf		0-20000cf = .84/100cf	
	6100-9000 = 1.10/100cf		21000-25000 = 1.10/100cf	
	9100 = 1.50/100cf		25100 = 1.50/100cf	
4"	\$118.51/Month		\$191.82/Month	14
	0-8000cf = \$.84/100cf		0-25000cf = .84/100cf	
	8100-12000 = 1.10/100cf		25100-45000 = 1.10/100cf	
	12100 = 1.50/100cf		45100 = 1.50/100cf	
6"			\$338.20/Month	6
			0-45000cf = .84/100cf	
			45100-65000 = 1.10/100cf	
			65100 = 1.50/100cf	

The numbers in Blue indicate the number of active meters.

Figure 3. Proposed tiers by type and meter size

<b>Comparison of Seven Residential Accounts, 1999 usage</b>							
<b>Current structure vs tiers and to an Across-the-Board 5% and 10% increase</b>							
	<u>Act. 1</u>	<u>Act. 2</u>	<u>Act. 3</u>	<u>Act. 4</u>	<u>Act. 5</u>	<u>Act. 6</u>	<u>Act. 7</u>
Tier increase	-0-	\$3.52	\$5.22	\$6.76	\$8.74	\$53.62	\$70.82
Across-the-Board 5%	\$9.66	\$11.81	\$11.85	\$13.28	\$14.03	\$17.22	\$18.96
Across-the-Board 10%	\$19.31	\$23.60	\$23.69	\$26.54	\$28.05	\$34.44	\$37.71

Figure 4. Comparison of customers using the Tier Proposal vs Across the Board 5% and 10% increase



*Tom W. Davis has been Manager of the Carlsbad Irrigation District (CID) for the past 12 years. Prior to his employment with CID, Tom worked for the U.S. Forest Service for 15 years. Five of those 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 had extensive experience in managing natural resources in Texas, Idaho, Arizona and New Mexico. Tom is a native of Oklahoma with a B.S. degree from Oklahoma State University. He is active in the National Water Resources Association and the Family Farm Alliance.*



## WATER AND GROWTH ISSUES: CARLSBAD IRRIGATION DISTRICT

Tom Davis  
Carlsbad Irrigation District  
201 S. Canal Street  
Carlsbad, NM 88220

Thanks, Tom, for that introduction. It is an honor for me to speak to this group. I want to tell Karl Wood that I appreciate his taking on the job of Director. I wish you the best, Karl. In anyway that we can be of value to you, just contact us.

We have heard some very interesting topics this morning, but most of all I have been intrigued by the essays. Very thought provoking and a neat idea. I think it did us all good to stimulate our thinking toward just what the future could possibly be like.

Fifteen minutes is not long—so many topics and so little time. So, I'm going to brush right through these and hopefully I can make some sense to you out of what I jotted down here to say today. First, I want to remark on the comments we heard this morning. I recognized one common theme that ran through everyone's talk and that is the impact the Endangered Species Act is having on all of us. And I think that is going to be a growing concern. It is only going to

increase the tension among the people who use water, who administer or manage water, and those who develop water. Somehow the great minds of this country are going to have to bring that Act into reality, into some functional situation. No civilized people want to deliberately destroy a species. However, species have been going extinct ever since the beginning of time. Extinction has happened through the eons of time and when more species compete, including humans, some species are naturally going to go into extinction. And somehow, we have got to bring our laws and our concerns for other species into a functional reality with our needs. It is not going to be an easy task.

There are three major issues on the Lower Pecos that I want to mention today. I told Cathy last night I went high-tech this year, I have one overhead, and darn if we didn't have problems making it work. But if you look on the screen what you will see basically



is the watershed of the Pecos Basin, excluding the very upper head waters that are located in the Pecos Wilderness area (Figure 1). But you can see the area of concern for Carlsbad Irrigation District begins at Santa Rosa Dam. From Santa Rosa Dam, come down the river and you see Sumner Dam, come a little further down—Tom’s going to point this out with his deadly accurate laser pointer—Santa Rosa Dam downstream to Sumner Dam, and down to Fort Sumner Irrigation District. Above Santa Rosa Dam there is a series of acequias that divert from the river. At the very headwaters of the river is Truchas Peak and Pecos Baldy. The Pecos River is primarily a rainfall generated river. There is not a large area for snowpack so the Pecos is not a snow-melt generated river like most of the rivers of the west. The Carlsbad Irrigation District basically lies along the west side of the Pecos River, southeast of Carlsbad. All the water stored in Santa Rosa, Sumner, Brantley, and Avalon reservoirs is stored for the needs of the Carlsbad Project. The Carlsbad Irrigation District (CID) storage authorization under the Pecos River Compact is 176,500 acre-feet total storage in all four of those reservoirs.

The Pecos Valley Artesian Conservancy District exists in Roswell at the Artesia reach of the river and its water is supplied by underground pumping primarily from the Artesian Aquifer. Fred Hennighausen is going to talk about this later, but I think they irrigate somewhere in the neighborhood of 90,000 acres of land. You can see the very light area I am outlining there—that is the principal area of critical habitat for the threatened minnow, the Pecos Blunt Nose Shiner. So after having given you a sort of “the lay of the land” with this map, I want to say that the Pecos has traditionally, let’s speculate 95% of the time, been in a drought stage and the other 5% of the time in a flood stage. The Pecos is not a dependable, reliable, or trustworthy river from the standpoint of consistent water yield. The dams provide more certainty to our water supply.

Of the many issues affecting the CID today, I want to mention three that are paramount. First regards New Mexico’s efforts to comply with the Pecos River Compact. Without getting into too much history, the U.S. Supreme Court, in the mid 80s, amended the Compact to set up a system where New Mexico must deliver a certain amount of water to Texas each year according to a complex formula. The State of New Mexico must meet its annual

deliveries to the State of Texas. However, New Mexico can accrue credits if they over-deliver in any given year. The State Engineer and Interstate Stream Commission have, in recent years, chosen to look directly at Carlsbad Irrigation District as the source of the water that is delivered for Compact purposes.

This strategy puts CID, being the senior water right on the lower reach of the river in New Mexico, in a very difficult position. There are so many junior diverters upstream, whether surface or underground, that can affect how much surface water reaches the lower end of the basin.

The Interstate Stream Commission (ISC) and CID began a water lease program in 1992. In this program, the ISC leases water from members of the Carlsbad Irrigation District who are willing to forego the delivery of their annual allotment and fallow the land on which the leased water would be applied. CID then diverts that water into the Pecos River at Avalon Dam to flow to the Texas state line. In November 1991, at the request of the then State Engineer Eluid Martinez, the Carlsbad Irrigation District Board of Directors released 41,000 acre-feet of water, free of charge to the State of New Mexico, into the Pecos River to prevent a shortfall and establish the initial credit of deliveries to Texas. At present, the state-line delivery credit is 23,000 acre-feet, but that amount of credit can be erased in one year.

Since 1994, the State of New Mexico has not had a clear policy in place that results in a permanent solution to the Pecos Compact obligations. One thing is for certain, the current CID lease program is not the permanent solution.

The Endangered Species Act is the second of the three major issues affecting the District. For the past nine years, the District has had a Memorandum of Understanding with the U.S. Fish and Wildlife Service, Bureau of Reclamation, and the State of New Mexico Game and Fish to study the habitat needs of the minnow and to what extent this habitat is affected by the traditional operations of Sumner Dam. We have experimented with various scenarios of releases from Sumner Dam and monitored the impact, if any, on the minnow and its habitat. You can note on the overhead (Figure 1) the critical habitat in the first 65 miles below Fort Sumner Irrigation District. Reclamation has been very supportive of the District throughout this process. When we incur additional depletions due to modified operations on behalf of the

Water and Growth Issues: Carlsbad Irrigation District

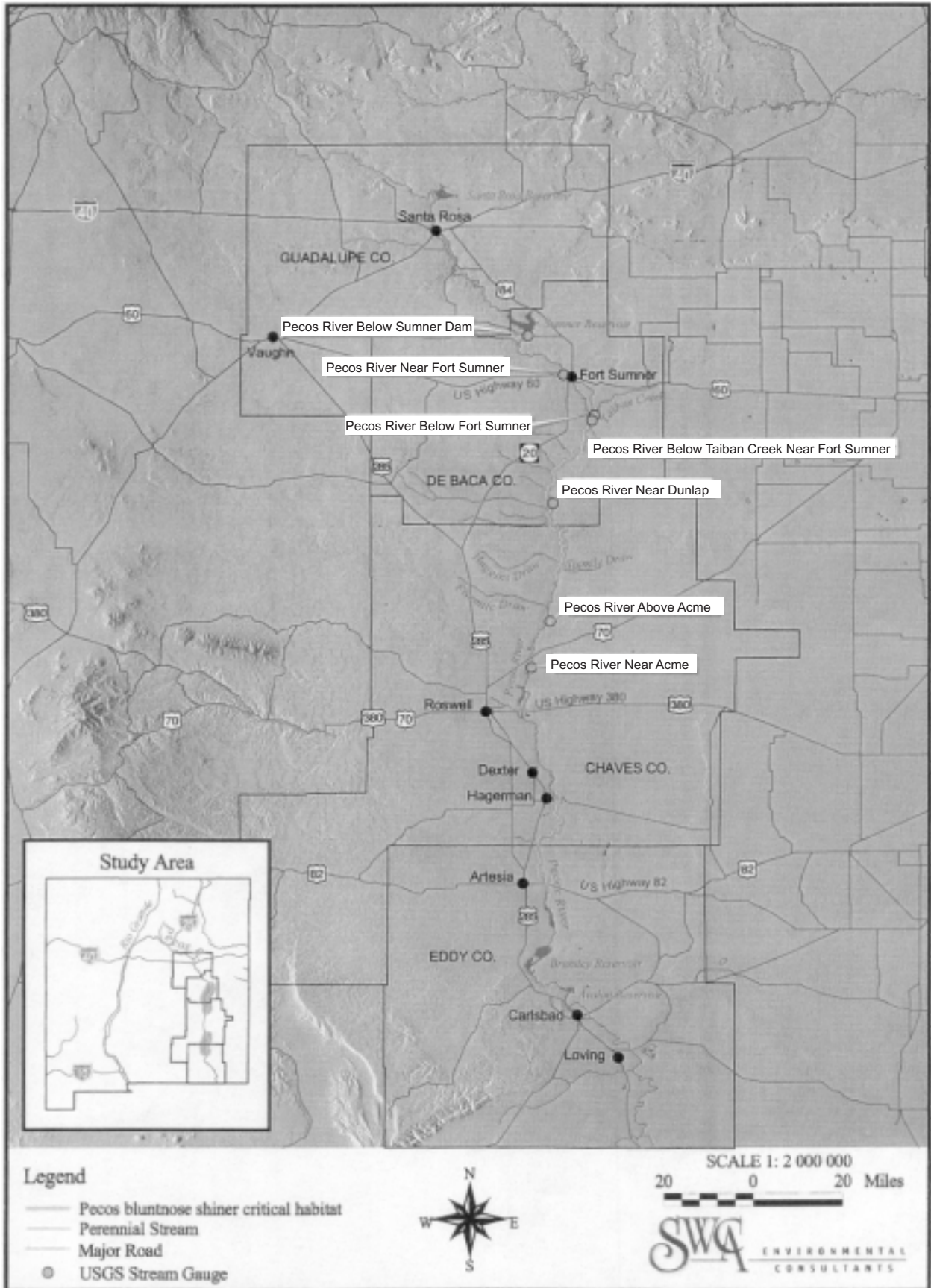


Figure 1. Pecos Basin watershed

minnow, the Bureau of Reclamation has been able to lease and/or purchase water in the system above the District to keep us whole so that the additional water depletions do not come out of our farmers water supply. At the same time, these leases and purchases by the Bureau have kept the state whole in their ability to deliver water for Compact purposes. Fish and Wildlife Service has recently come out with a new study, someone made reference to it this morning, which more than doubles the current recommended flow at the bottom end of the critical habitat necessary for the minnow. The CID and its consultants are in the process of evaluating this study. We hope to actually get some good science involved in determining the habitat requirements of the minnow. If the flow that is recommended in the latest study is instituted, it is going to be impossible in most years to have an adequate water supply for the Carlsbad Irrigation District. I don't think that there is enough available water in the basin for the Bureau to buy or lease or purchase to keep us whole. At the same time, I believe this latest flow recommendation, if instigated, is going to impair the state's ability to deliver water for Compact purposes.

The third major issue is the adjudication of the Carlsbad Project by the New Mexico Office of the State Engineer. In the mid 70s, the Carlsbad Irrigation District filed a priority call on the Pecos River because we had been short an adequate supply of water for several years. Steve Reynolds was the State Engineer at the time. State Engineer Reynolds took the position that the state would have to adjudicate the entire river basin before priorities could be enforced. Although the rights of the Carlsbad Project were adjudicated in a federal District Court decree in 1932, Reynold's position was that a state adjudication must be made of the district before a priority call could be enforced. The State Engineer's adjudication of the Carlsbad Project began in the early 1980s. The State of New Mexico had never adjudicated a Bureau of Reclamation project before. Bureau of Reclamation projects are different under state law than other irrigation districts or than individuals. There are only two Bureau of Reclamation projects in New Mexico and they are governed under the same state statutes. They are the Elephant Butte Irrigation District and the Carlsbad Irrigation District. Where irrigation districts were formed in cooperation with the Bureau of Reclamation, those statutes gave our board certain

authorities normally reserved for the State Engineer. The Board of Directors of these two districts have authority over permanent transfers of water rights, authority over annual allocations of water, the authority to tax and assess private acreage, and collect these assessments. Forfeiture of water rights does not apply in these projects. Needless to say, this ongoing adjudication has been very expensive for our farmers and has been very contentious with our neighbors upstream, with the current Office of the State Engineer and even amongst our own membership.

I am going to draw this to a quick close by saying that, in New Mexico, there is not a clear legal understanding how a state water right adjudication should be carried out in a Bureau of Reclamation project. I know that the Elephant Butte Irrigation District just recently went into the adjudication phase and I think we are all learning as we go, and certainly we hope that these things can be worked out without damage to our farmer members. I can say this, it is disheartening to look at your budget over a period of five years, as I have had to do, and see about 70% of the budget that has traditionally been used for ground improvements being reduced to about 30% with the balance being spent on lawyers. It just doesn't make sense.

Karl, hopefully I hit on some of the topics you had in mind.

Thanks.

*Dennis M. Holmberg is Lea County Manager. He was born in Pueblo, Colorado and grew up in Albuquerque, where he attended high school, and then went on to NMSU. He worked for the Las Cruces newspaper and with NMSU's Pan Am Center as Assistant to the Director of Public Events. In 1979 he accepted a position as Comptroller with the Pine Bluff Convention Center and Visitors Bureau, the largest convention center in Arkansas. In 1994, Dennis returned to Lovington to work for the Lea County Commission as Director of Facilities to oversee the Fairgrounds Complex and the completion of the Cultural Center. In 1995 he was promoted to County Manager overseeing 250 county employees.*



## LEA COUNTY WATER USERS ASSOCIATION

Dennis Holmberg  
Lea County Water Users Association  
214 S. Love Street  
Lovington, NM 88260

The Lea County Water Users Association (LCWUA) has recently completed their regional water plan which will be presented to the Interstate Stream Commission (ISC) in December 2000. The plan will have been completed in two and a half years with minimal funding from the ISC and the unanimous support of the municipalities. The LCWUA is the only water planning region in New Mexico that is strictly defined by political boundaries. As such we may have it easier when it comes to implementation of the various programs and projects outlined in the water plan. All of the municipalities involved have already adopted the plan, they paid for the plan and understand that their continued financial support is needed.

A major component of any water plan is the proposed alternatives to help meet future demands. The LCWUA water plan focuses on alternatives that

will do one of the following:

- conserve water
- develop additional supplies
- improve water infrastructure
- increase or preserve water quality

All types of users of water were considered when listing what alternatives could have the most impact. As an example, under the alternative of water conservation, the following suggestions would affect irrigated agriculture:

- use LEPA attachments or center pivots
- monitor soil moisture so that water is applied only when needed
- use tillage methods which promote soil water retention
- use crop types compatible with the climate and soil type

- encourage dry land farming

Over the next three years, we will continue the process of reviewing the various alternatives available to us and develop prioritizations and timetables for implementation.

While we proceed to work on the implementation of the water plan, our group will continue our efforts in Santa Fe to promote water legislation that will protect our water supply for future generations. Our legislative issues for this coming session are:

- Memorial directing basin closure
- Funding to continue and expand monitoring program and developing groundwater flow model
- Legislative support of efforts to work with Texas
- Commitment to financial support for legal effort if necessary
- Grants for effluent reuse projects
- Funding of pilot program for treatment of produced water
- Funding for investigation of deep aquifer potential

*Fred H. Hennighausen specializes in water rights law with the firm of Hennighausen & Olsen. He received degrees in general and mechanical engineering from Duke University, and a J.D. from the University of Tulsa College of Law. Fred is a registered professional engineer and was District Supervisor with the Office of the State Engineer with responsibility for water resource investigations and water rights administration in southeastern New Mexico. He currently is Counsel to the Pecos Valley Artesian Conservancy District.*



## CURRENT ISSUES: ROSWELL GROUNDWATER BASIN CHAVES AND EDDY COUNTIES

Fred Hennighausen  
Pecos Valley Artesian Conservancy District  
PO Box 1415  
Roswell, NM 88202-1415

The Roswell Groundwater Basin is located in Chaves and Eddy counties, New Mexico. It comprises most of the middle Pecos River basin. The general area of use extends up to 15 miles west of the Pecos River from about 30 miles north of Roswell to midway between Artesia and Carlsbad. The Pecos River forms the eastern boundary of the basin beyond which significant quantities of groundwater are scarce. The basin is recharged by snow melt, rainfall, and stream flow from the watershed to the west.

The basin was declared by the New Mexico State Engineer in 1931 after enactment of the pioneering New Mexico Groundwater Code. This legislation was passed in response to the concern of parties in the Roswell/Artesia area worried about

apparent overdraft of the basin. At the same time, legislation was introduced that provided for the creation of the Pecos Valley Artesian Conservancy District (PVACD) to protect and conserve the groundwater supply.

At the present time, over 350,000 acre-feet, more than one hundred billion gallons of water are pumped from the groundwater basin each year. The municipalities and towns of Roswell, Artesia, Dexter, and Hagerman, all commercial and industrial users, and over 110,000 acres of irrigated farmland rely and depend on the groundwater supply. Approximately 93% of the water pumped is used for irrigation; less than 7% is used for municipal, industrial and commercial purposes. About 65% is pumped from deep artesian aquifers in limestone formations and the

remaining 35% is pumped from shallow aquifers in sands, gravels, and valley fill materials. On the eastern side of the basin, the groundwater aquifers are hydrologically related to the Pecos River, which is a gaining stream as it traverses the basin from north to south.

In recent years, groundwater levels in most of the area have generally stabilized or have risen. This situation has been the result of considerable long-term efforts on the part of all parties concerned, including water users, the State Engineer, and the Pecos Valley Artesian Conservancy District. In the early 1950s, hydrographic surveys were commenced and in the middle 1950s litigation was started to adjudicate, or define by court decree, all water rights within the basin as to place and type of use, point of diversion, priority and quantities to be pumped. During the process, some 12,000 acres of farm land, found to be illegally irrigated, were enjoined from further irrigation. In 1966, the Court ordered the installation of water meters on all wells adjudicated and established a basin Water Master under the direction of the State Engineer, with expenses reimbursed by the Pecos Valley Artesian Conservancy District. Subsequently, a five-year accounting period was confirmed by the Court wherein the amount of water adjudicated for each use could be exceeded in any year provided the total amount in a five-year period did not exceed five times the average annual duty.

The compulsory use of meters had several benefits: 1) it made the water user aware of the actual quantity of water being used, and thus made the user more careful with that use; 2) it prompted the use of conservation measures throughout the District to meet the Court decreed limitations on the quantity that could be pumped; and 3) it resulted in considerably less total water being pumped from the basin.

Even prior to the installation of the meters, the District instituted a low interest loan program to further implement water saving conservation measures and to help reduce overall pumpage. The funds for the loan program are borrowed from the New Mexico Interstate Stream Commission Irrigation Works Construction Fund. These funds are then re-loaned by the District for conservation purposes at 3 1/2% interest. Close to \$20,000,000 has been loaned to date for those measures. There are now probably more conservation measures in place in the District

than in any other area of the state. Individual users have benefitted by a more stable long-term water supply, decreased pumping lifts and costs, more efficient farming practices and decreased labor costs.

In the same period of time, the District purchased, banked, and retired some 6,700 acres of irrigation water rights to further help reduce overdraft on the groundwater basin.

At a still later date, the New Mexico Interstate Stream Commission purchased and retired some 6,100 acres of surface water and groundwater rights adjacent to the Pecos River for the purpose of meeting requirements under the Pecos River Compact. Many of the rights purchased had supplemental groundwater wells and the reduction of that pumpage further reduced any overdraft on the basin.

Water right transfers are made within the basin between different types and places of use under the law of supply and demand. In addition to municipal transfers from irrigation use, in the past ten years many irrigation rights have been transferred to commercial dairies. The State Engineer generally conditions such transfers to prevent impairment and to prevent additional effects on the Pecos River that might affect deliveries to Texas under the Pecos River Compact. The diversions under water right transfers are limited to the consumptive use value of the right transferred and return flow if any can be proven.

Unfortunately, some of the progress made to bring the Roswell Groundwater Basin into balance has been diminished by other factors. These factors include the unrestricted drilling and use of domestic wells in the watershed and recharge area to the basin; changes in vegetation in the watershed; the invasion of non-native, high-water using plants adjacent to the Pecos and tributaries; and periods of severe drought in the entire Pecos Stream System.

Other problems having the potential to affect severely the availability of groundwater remain. First, water users downstream claim that pumpage from the basin should be further reduced to increase flow in the Pecos River to meet their claimed surface water rights. These claims are now involved in the adjudication of all water rights on the Pecos Stream System that has been ongoing since 1978.

Secondly, the Pecos River Compact between New Mexico and Texas and subsequent Court decisions mandate that shortfalls to Texas related to

Current Issues: Roswell Groundwater Basin  
Chaves and Eddy Counties

1947 conditions can not occur. If potential shortfalls do appear eminent, a priority call on the whole stream system could be made with draconian economic effects for all. The Interstate Stream Commission, the State Engineer, and the New Mexico Pecos River Compact Commissioner have made heroic efforts to prevent this from happening by purchasing and leasing water rights to meet projected shortages and build credits against such shortages.

Thirdly, and more recently, there has been an increased demand for more water in the stream system for habitat for the Blunt Nosed Shiner, the Pecos Pupfish, the Roswell Spring Snail, the Pecos Sunflower, and other species considered to be threatened or endangered.

The Pecos Valley Artesian Conservancy District appreciates the work being done by the New Mexico Interstate Stream Commission, the New Mexico Pecos River Commissioner, the State Engineer, and others to resolve the ongoing problems on the Pecos River Stream System. The Conservancy District is cooperatively involved in many of these programs and also is actively involved in the ongoing adjudication of all rights in the Pecos River Stream System, numerous studies, regional water planning, and other related matters.





*Leland D. Tillman has been Executive Director of the Eastern Plains Council of Governments, which serves a seven-county area in Northeastern New Mexico, since 1975. EPCOG is headquartered in Clovis, but serves an 18,000 square-mile region including Union, Harding, Quay, Guadalupe, DeBaca, Roosevelt and Curry counties. Lee was appointed U.S. Commissioner and Chair of the Canadian River Compact Commission in April 1995. He has been actively involved in other water-related organizations and currently serves on the Board of Directors of the New Mexico Water Dialogue, Inc., a non-profit organization which sponsors periodic statewide forums to facilitate citizen involvement in water resources issues. As an early proponent of regional water planning in New Mexico, he served on the Interstate Stream Commission's "template committee," which established the broad framework for regional water plans. A native New Mexican, Lee graduated from Eastern New Mexico University in 1971.*



Northeastern New Mexico Regional Water Plan  
Presentation Outline

Lee Tillman  
Eastern Plains Council of Governments  
418 Main St.  
Clovis, NM 88101-7404

**The Water Planning Region**

Approximately 20,000 Square Miles  
Three major surface water basins:  
    Southern High Plains  
    Canadian River Basin  
    Pecos River Basin  
Six declared groundwater basins  
Large undeclared groundwater areas  
    Union County  
    Roosevelt County

**Region Also Includes**

Four major reservoirs:  
    Ute  
    Conchas  
    Santa Rosa  
    Ft. Sumner  
Arch Hurley Conservancy District  
Fort Sumner Irrigation District  
Eight Soil & Water Conservation Districts  
Eleven Acequias in Guadalupe County  
Ute Water Commission Service Area

### **Regional Water Use**

Withdrawals: 801,760 AFY  
Depletions: 580,729 AFY  
(SEO Technical Report 49)

### **Issues and Concerns**

Serious groundwater depletions  
Water quality protection  
Condition of watersheds  
Water conservation incentives  
Limited groundwater monitoring  
Drought planning  
Precipitation enhancement needed  
Maintaining recreation uses

### **Local/Regional Strategies**

Cooperative planning  
Future municipal and industrial supply  
Infrastructure development  
Water conservation  
Water quality protection  
Special programs and projects

#### **Cooperative Planning**

Local water security plans

#### **Special districts:**

Soil and Water Conservation Districts

Special Groundwater Conservation Areas

Public information/education

Citizen participation

Ute Reservoir Area Master Plan

### **Infrastructure Finance: The 80-10-10 Strategy**

Based on the South Dakota Model

Supports large regional projects

Requires unified local effort

Specific authorization requirements

State Water Trust Fund needed

New Mexico Finance Authority supports local capital costs

All operations and maintenance costs become local responsibility

### **Water Conservation**

More must be done at all levels

Public education and awareness

Agricultural water conservation

Rangeland/watershed improvements

Conservation incentives needed

### **Water Quality Protection**

Water quality source protection

Municipal wellhead protection

Watershed improvement programs

Best management practices

Public education and involvement

Requires on-going monitoring effort

### **Special Programs/Projects**

Drought contingency planning:

Local plans and policies

Coordination with State Drought Plan

Expanded groundwater monitoring:

Increased state and federal funding

Active involvement of counties

Increased SWCD Role

Precipitation enhancement

### **Federal Policy Initiatives**

Authorization of the Eastern New Mexico Water Supply Project

Improved groundwater monitoring, modeling and mapping

Designation of groundwater conservation areas

Establishment of Groundwater Conservation Reserve Program

Agricultural Water Conservation Cost-Share Assistance Program

### **Comments on the Plan**

Regional Water Plan Input

c/o Eastern Plains COG

418 Main Street

Clovis, New Mexico 88101

*Les Montoya is San Miguel County Manager. He is a lifelong resident of Las Vegas and has served in municipal and county government for 20 years, including serving as Las Vegas City Manager for nine years. He owns and operates a local business, Frosty Mountain Ice Company. Les received a B.A. in geology from New Mexico Highlands University.*



Water and Growth Issues  
San Miguel County  
Presentation Outline

Les Montoya  
San Miguel County Courthouse  
Annex Building  
Las Vegas, NM 87701

<b>San Miguel County Demographics</b>	
Area	4,000 square miles
Elevation	3,800-9,000 feet
Population	28,490 (1995) 22,000 (1980)
Hispanic	80%
Other	20%
Education	68% high school diploma 16% college degree
Labor force	11,761
Unemployment	7.0%
Annual income	\$15,291 per capita \$28,800 median family

<b>Economic Trends</b>	<b>1988</b>	<b>1998</b>
Government Transfer Payments	59.0%	38.0%
(welfare 20%, retirement 80%)		
Farm	1.0%	-
Manufacturing	3.8%	3.0%
Retail	9.4%	-
Government	25.3%	40.9%
Commuting	1.2%	18.0%

## Water Systems in San Miguel County

City of Las Vegas Population 18,000

Surface supply:

Gallinas Watershed (84 sq.mi.)

Gallinas River 3100 acre-feet annually

Annual storage at Peterson Reservoir, Bradner Reservoir and Storrie Lake

Multi-media filter plant

10 mil/gal/day capacity

## Village of Pecos

Population 1,161

Water source groundwater

? acre feet annually

water system

well and storage tank

distribution system

not metered flat rate

## Community Water User Associations

Thirty-five villages and communities exist in San Miguel County. Groundwater provides water for all residents within these areas. Most communities are serviced by wells and storage tanks. Distribution mains are in place in some areas. Many homes or businesses in these communities are serviced with private wells.

## Acequias

A total of over 100 designated acequias exist within San Miguel County. Acequias are used to transport water through a series of ditches or canals for use by residents for domestic purposes, farmers for irrigation of field/crops and ranchers for watering of live stock. This historic use and distribution of water continues to take place today.

## Priority Water Issues in San Miguel County

Surface water rights:

- litigation on appropriative right off Gallinas River
- state engineer recognizes city possessing 2,600 acre-feet
- City annual river diversion is 3,100 acre-feet
- maintaining water service to existing customers

## Water Conservation

- ordinances in place to set controls
- enforcement
- county-wide

## Wastewater Re-Use

- irrigation green space
- conserve 230 acre-feet domestic supply
- funding needed for 2<sup>nd</sup> phase

## Village Water Systems

- 35 village water systems
- inadequate or undersized systems
- upgrades required
- training on administration of water associations
- reoccurring revenue sources

## Acequias

- historical
- in use today, domestic and agriculture
- respect and include acequia groups in future water planning

## Water Quantification of Available Groundwater in San Miguel County

Residential and commercial development:

- I-25 corridor, north from Pecos to Las Vegas
- lack of technical information on quantity of available groundwater
- present demands impacting exiting users
- city limited water supplies
- local collaboration to obtain funds to quantify groundwater supply in high demand areas
- results may contribute to local shortages of water

Water and Growth Issues  
San Miguel County

Additional water supplies:

- shortages of water supply for present uses in city of Las Vegas
- need to increase surface water supply to meet existing demands and future growth
- local efforts with City to identify available financial resources
- need assistance from Office of the State Engineer, legislators, and congressional delegation on funding
- involve New Mexico Highlands University in the technical approach and grants writing



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### **Water and Growth Issues: City of Santa Fe**

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Thank you very much. My first overhead illustrates what we did as a city to respond to the drought this past summer. I think we probably have the most severe water shortage emergency of any large city within the state and have implemented water use restrictions I want to share with you. As a result of that, the items listed under number two are really under a microscope. The mayor came out with a four point water plan. It is rather fitting that the title of this whole water conference is "Water, Growth and Sustainability," because there is probably no other three words that are being spoken more in Santa Fe than water, growth and sustainability. The drought has really brought a lot of attention and planning efforts on the following two issues. What are we doing growing so much when our water supplies are scarce? What are we doing in the area of conservation to make better use of our existing supplies?

As a result, in August the mayor came out with a "Four Point Water Plan for a Sustainable Future." Mayor Larry Delgado's first point is to increase our demand management efforts. The second point is to fast-track our San Juan-Chama Project water and increase, to the extent that we can, improving our near-term supply production capacities. The third point is to establish a water budget for new growth. That is very controversial, and in Santa Fe as you might imagine in any city, while nobody has mentioned the "m" word, moratorium, a growth management ordinance has certainly gotten the development and business community's attention. There is a discussion about limiting the number of new building permits in Santa Fe, before, or until we get our next big source of supply on-line, the San Juan Chama Project. Finally, the fourth point is the "Jemez y Sangre" long-range regional planning effort, which is



basically under the Interstate Stream Commission's regional planning initiative. I won't be discussing that. I will discuss the other three points in the mayor's four point plan.

In addition, there is something somewhat unique to our system I want to share with you. Our surface water resource, the Santa Fe River Watershed, poses a severe fire danger similar to what happened in Los Alamos last year with the Cerro Grande fire. We are working with the Forest Service on that. The watershed provides 40 percent of our water supply. We are concerned that we could lose that supply with a catastrophic fire.

I'd like to outline our three main sources of supply. The first is our watershed. On the right side you can see McClure and Nichols reservoirs coming out of Santa Fe Canyon, out of the Sangre Cristo Mountains. Again, providing about 40 percent of our supply on average. Eight wells in town, the "city wellfield," contribute 20 percent of our supply. Down along the Rio Grande is the Buckman wellfield making up about 40 percent of our supply. The real key for us during the drought was that our wells, both in the Buckman area and in town, will produce a maximum of about nine million gallons per day (MGD). That is including the new "Northwest well" that is still under protest. We were able to operate the Northwest well only under an emergency-use permit during the summer. Any demands above 9 MGD we basically have to pull out of our reservoirs. The reservoirs in April and May were at 55 percent of total storage capacity with our demands in the neighborhood of 16 to 18 million gallons per day. Virtually no runoff (less than 1 MGD) was adding to reservoir storage because of the bad snow season in 1999-2000. The hot, dry April, May, and June resulted in unusually high water demands that led to a significant decline in reservoir levels. The threat of running out of reservoir storage became very real. That resulted in a declaration of a "water shortage emergency" and the implementation of our supply shortage emergency ordinance. We included a sign in every public restroom in Santa Fe so that visitors and locals would know about the drought and what the water use restrictions were.

In early June, we initially went into Stage One, which was a voluntary program. Due to the restrictions being voluntary, it was not effective enough. In late June, we went to Stage Two, which included three day per week outdoor watering restrictions, a ban on home car washing, strict enforcement of "fu-

gitive water," and a whole host of signage and literature distribution requirements for businesses. Another requirement was that hotels and motels were to install low-flow faucet aerators and showerheads if they did not have them already. I ended up getting the staff from the fire department and planning department to be our water cops. We had fines ranging from \$20 to \$100 for watering on the wrong day or for letting water run down the street. We issued over 700 violations and had the threat of turning off someone's water if they did not comply with those restrictions. We also had drought emergency surcharges. This was done both as an emergency demand reduction incentive and also to promote revenue stability during this time of reduced water sales. We were not able to implement them on our residential customers because of billing system problems, but we were on our commercial customers. Stage Two worked somewhat, dropping demands to around 11-14 mgd. We were dropping about 2-3 percent per week under Stage Two.

We did go to Stage Three, which included once a week irrigation restrictions, a full ban on planting outdoors, and a host of other restrictions. By limiting outdoor irrigating to once a week, we had concerns about turf quality in our parks and people losing trees. Nevertheless we were trying to ration what was left of our reservoir supply to get us into the fall when our demands are naturally down and to really try to avoid Stage Four. Stage Four would have banned all outdoor irrigating and all vehicle car washing. Stage Four also includes a building moratorium. By late summer, our reservoirs were down to 19 percent of total storage capacity with about the last 5 percent deemed to be not usable. So we were pretty close to running out of our reservoir supply. We were one storm, I believe, away from Stage Four. Luckily on August 18<sup>th</sup> and 19<sup>th</sup> we got the only decent monsoon event all summer. That one monsoon storm basically bought us about seven or eight weeks of reservoir storage space, and without that we probably would have gone into Stage Four.

So that was our drought, and basically what came out of our drought was a lot of folks arguing! What are we doing growing? How come I can't water my vegetable garden yet you're hooking up that new subdivision? Some really valid equity concerns were discussed. So there were those who wanted to focus on the demand side of the solution and those who wanted to focus on the supply side of the solu-

Water and Growth Issues:  
City of Santa Fe

tion and those who really wanted to talk about linking up water and land use with growth and developing a nexus between all three of these.

An important message I would like to add is that Santa Fe is already a water conserving community. We have reduced our demands from 1995 through 1999 by over 21 percent, population adjusted. Our gallons per capita, per day usage is 143. I really do think that is the envy of many states around the west. That is our entire consumption divided by our population and a lot of cities are proud to have a rate of 180 gallons per capita per day. I think Albuquerque's goal is about 180. While we're going to be getting more into demand management, getting more involved in more aggressive conservation programs, we're not going to hang our hat on demand management as a way of getting out of a supply shortage and the problems of matching up supply and demand.

The business community has been focusing on the idea of drilling more wells, doing more immediately with getting supply online. We do have some capabilities with rehabilitating our existing wellfield, but one thing that is not totally understood by the business community is, given state groundwater law and the realities of legal protests, we just can't simply go out and drill eight or nine more holes in the ground and start pumping like mad. Nevertheless, we are going to be pursuing what we can in the way of increasing our supply production capacity in the next few years.

Our main supply-side focus is on our San Juan-Chama Project water. We are going to pursue return flow credits by delivering effluent back to the Rio Grande to get the right to divert more San Juan-Chama Project water. We have yet to work out the details of return flow credits with the Office of the State Engineer, and it is one of the \$64,000 questions in our water planning strategy.

This is our San Juan-Chama Project implementation schedule. We're going to be constructing a pilot infiltration gallery on San Ildefonso Pueblo land within the next month. In addition, we are pursuing a full-scale project on a "dual tract" right now –the San Ildefonso Pueblo site and a site near our Buckman wells. Before this year's drought emergency, we were pursuing just an infiltration gallery project on San Ildefonso Pueblo land. Council has given us direction that they do not want to put all our eggs necessarily in that basket because of concerns

that if it doesn't work out from a feasibility standpoint, we're going to be left a year-and-a-half down the road without a project.

When it comes to water and growth and, particularly, determining what is our reliable water supply, it is a very tough figure to come up with. Do you assume an average surface water runoff year or are you conservative and assume a drought year, or are you optimistic and assume you are going to have a wet year? Well, what we have done is to assume a median surface water flow in the Santa Fe River because that is our big supply variable. Our wells basically are relatively consistent in their production from one year to the next. We have said that if we have an average surface water runoff, we have 12,700 acre-feet per year of water to work with. Now what we used last year in 1999 was 11,200 acre-feet per year, so we have about 1,500 acre-feet per year of new growth that we can accommodate until we get up to that 12,700 acre-feet per year figure. Obviously that is assuming you have a normal surface water runoff year. But now and then, if we have another year like this year, we are going to be back in Stage Two, Three or even Four, and all bets are off as far as relying on a non-existent "median" runoff. What we are using for planning purposes is the median number and that is really hard to communicate to the general public. Half the time runoff will be below the median!

This is where our city planning department gets involved. We are working closely with our planning department on how many new housing units we can accommodate if we can "grow" up to 12,700 acre-feet per year in demands. We have additional demands of about .45 acre-feet per new dwelling unit per year. That's new demand created by that dwelling unit and the associated commercial and governmental demands with that. So with each new residential unit, it is assumed that an additional .45 acre-feet per year of new demands will be generated. If we grow at a rate of 600 dwelling units per year, we will get to 12,700 acre-feet in the year 2004, before our San Juan-Chama Project water is on-line. If we grow at 450 dwelling units per year, we will get there at 2006, roughly about when optimistic projections are for getting our San Juan-Chama Project water on-line. Finally, if we grow at 300 dwelling units per year, we have until 2010. That gives us a little bit of a cushion. Our long-term growth average has been about 475 new residential units per year. As a result,

there is discussion, not about a moratorium, but about a ramping down of the rate at which we issue new building permits.

One of the big issues in Santa Fe, along with other communities, is that when you constrain housing growth, the issue of affordable housing quickly becomes a serious concern. That concern has yet to be fully addressed, and this is something the council is grappling with. The business and development communities are urging the city to do whatever we can to increase our supply to avoid a growth management program.

Quickly I'll touch on our watershed concerns. We are in danger of having a Cerro Grande-like fire in our watershed. The fire danger in the watershed, a total of 17,000 acres, is primarily in the ponderosa pine and mixed conifer forest types. Again, the watershed contributes 40 percent of our water supply. If we have the weather conditions that existed during the Cerro Grande fire, and given that our forest conditions are identical to the Cerro Grande area—way over-grown from more than 100 years of fire suppression—our entire watershed could go up in one eight-hour burn period. This would result in a catastrophic crown replacement fire, creating major concerns about the sediment and ash run-off that would come into our reservoirs, potentially filling up our reservoirs and rendering our surface water treatment plant unusable. This could necessitate going to Stage Four immediately, whether or not we had a good snow year. Unfortunately, some members of the public view the proposed tree thinning program as a guise for full-scale commercial logging. There is a lot of mistrust of the national forest agency from past practices.

Ponderosa pine forests that have been allowed to naturally burn every five to twelve years from lightning will have in the neighborhood of 50 to 120 more mature, larger ponderosa pines per acre. Our watershed has in the neighborhood of 800 to 2000 very small diameter trees, densely packed together, just like the Cerro Grande site. What we are ultimately concerned about is that a catastrophic “stand replacement fire” would result in the decimation of our surface water supply for a number of years.

Thank you very much.

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## New Mexico Demographic Trends in the 1990s

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Counting the nation's 281 million people, like counting votes in Florida, is no easy task. No one is ever satisfied with the final census counts. In part the controversy stems from the political and economic importance of the census data. In the political arena, census data are used for redistricting and reapportionment and as a guide to strategy in election campaigns. The data are also used to distribute nearly \$200 billion dollars a year in federal funds and some unknown multiple of that amount in private sector investment spending. The census data and the trends implied by the data are also critical elements in almost all water-related issues.

When this paper was presented at the December, 2000, conference, none of the data from the 2000 Census were available.<sup>1</sup> The main theme of my presentation last December was the possibility of a demographic slowdown in New Mexico during the 1990s. The 2000 Census data indicate that New

Mexico's population grew more rapidly during the last decade than could have been expected from the Census Bureau's annual population estimates. The contrast between the population estimates and the census count is more subtle than it might appear at first glance.

### **New Mexico Demographic Change: A Long-Term Perspective**

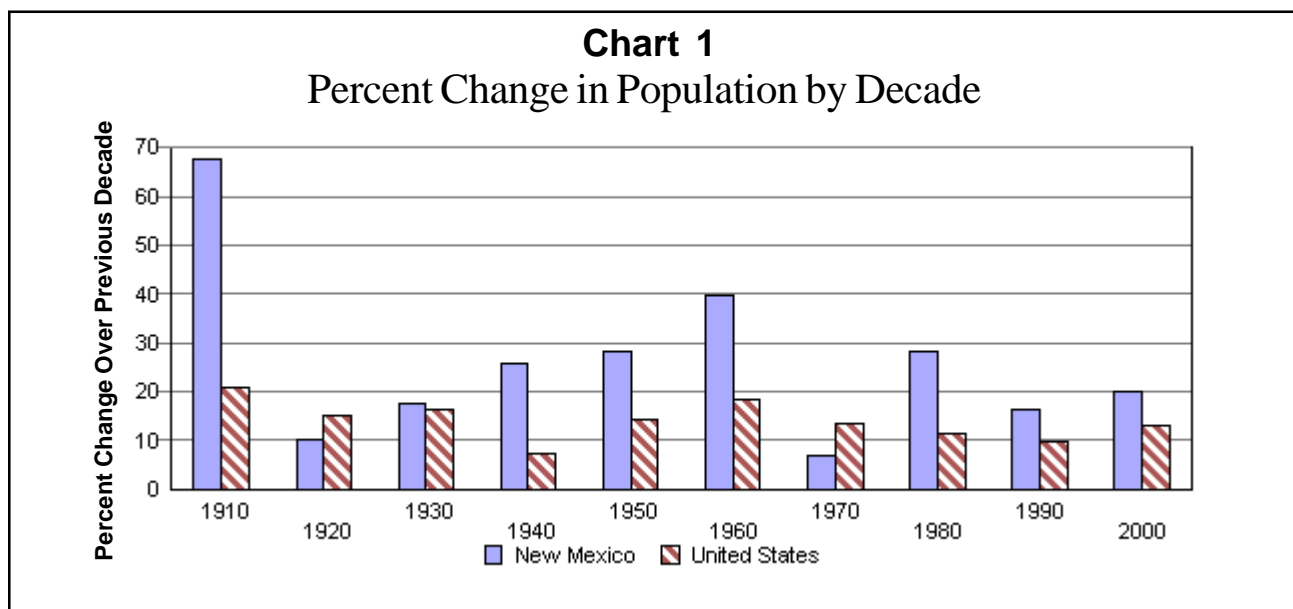
For most of the 20<sup>th</sup> century, the population of New Mexico grew faster than in the nation as a whole. In the 20<sup>th</sup> century, New Mexico's population increased ninefold, from 195,000 in 1900 to 1.8 million in 2000. In contrast, the U.S. population increased from 75 million in 1900 to 281 million in 2000, or about 3.5 times its 1900 population.

New Mexico's decade to decade population growth rates have been high compared to the nation

but they have also been highly variable (Chart 1). Between 1910 and 1920 and again in the 1960s, New Mexico's percentage increase in population was lower than in the nation. Since the 1960s, however, New Mexico's population growth rates have been much higher than the national figure. During the 1970s, the state's population increased by 28.4 percent –nearly three times as fast as the nation's growth rate of 10.1 percent. During the 1980s, the state population increased by 16.3 percent –more than 1.5 times the national increase of 9.8 percent.

### New Mexico's Disappearing Demographic Slowdown in the 1990s?

The Census Bureau's annual estimates suggested that New Mexico experienced a substantial slowdown in population growth rates during the second half of the 1990s. The estimates indicated New Mexico's population growth rates in the early 1990s were higher than in the 1980s and appeared to be increasing (Chart 2). According to the estimates, the state's annual population growth rate reached

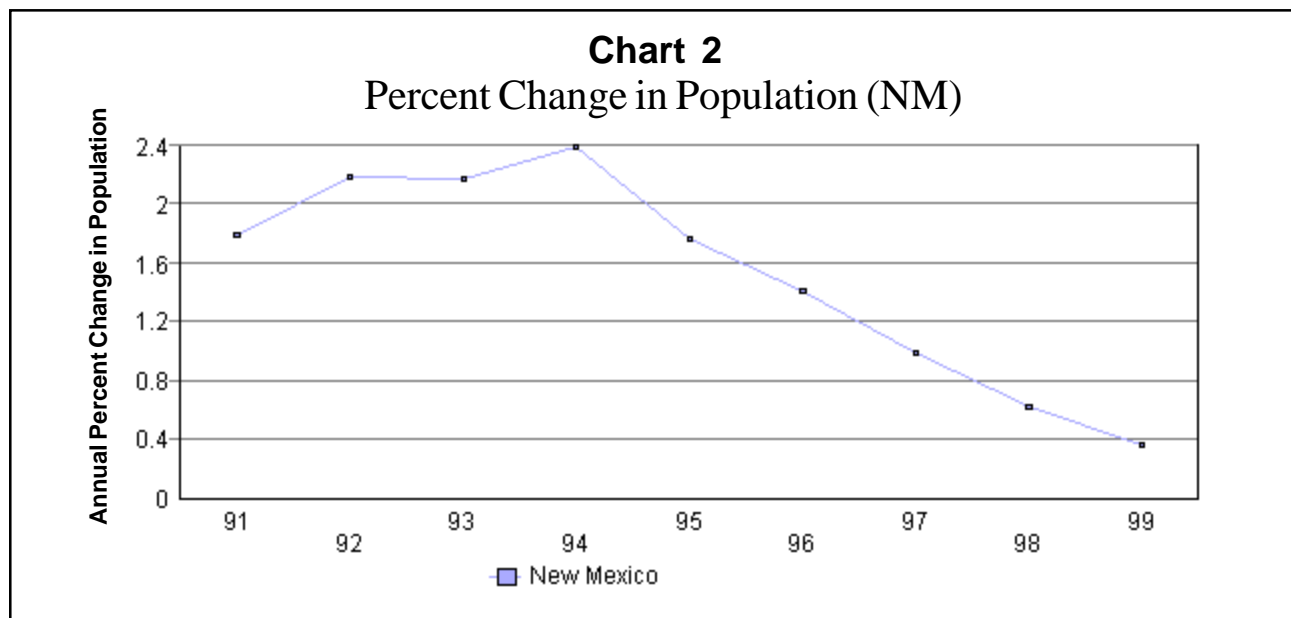


New Mexico's overall population growth rate in the 1990s (20.1 percent) again exceeded the national average (13.2 percent)<sup>2</sup>. Among New Mexico's neighboring states, Arizona (40.0 percent), Texas (22.8 percent), Colorado (30.6 percent), and Utah (29.6 percent) grew more rapidly than New Mexico, while Oklahoma (9.7) percent grew less rapidly than New Mexico or the nation.

New Mexico's county population growth rates (Table 1) have been highly variable as well. Nine New Mexico counties (Catron, Colfax, De Baca, Guadalupe, Harding, Hidalgo, Mora, Quay, and Union) had a smaller population in 2000 than in 1930. From a different perspective, two thirds of the growth in New Mexico's population between 1950 and 2000 occurred in only four counties (Bernalillo, Doña Ana, Santa Fe and San Juan).

2.38 percent in 1994, but declined steadily through 1999. The estimates indicated also that the state's 1998 to 1999 growth rate was only 0.36 percent. Why did the estimates indicate such a sharp demographic slowdown in New Mexico? The simple answer is that all three components of demographic change (fertility, mortality, and migration) contributed to the estimated decline in New Mexico's population growth rate.

There is nothing much to gain from worrying about the relative accuracy of the estimates compared to the census. There is ample room for error in either data source. Both data sets provide useful information about New Mexico's changing demographic dynamics. Both the estimates and the census data indicate that natural increase (the excess of births over deaths) will be a less important source of New Mexico's future population growth than in the past.



**The Estimates and the Census**

The U.S. Census of Population and Housing is a decennial event. The census has been conducted in all years ending in a zero since 1790. In each census year the Census Bureau does its best to count all persons who are residing in the geographic territory of the United States. Errors occur in all censuses, including the U.S. censuses. Some people are not counted. Less frequently, some people are counted twice. The best that any census bureau can do is to report the results of its best efforts and to try to evaluate the size of the errors.

In intercensal years there are no attempts at a complete count of the population. However, the Census Bureau has provided annual estimates of the population since 1900. For the current purpose, what is important is that the Census Bureau now provides population estimates—including details such as age, sex, and components of change—for each of the nation’s 3,141 counties or county equivalents. These estimates along with vital statistics data collected by the National Center for Health Statistics are important indicators of population change in non-census years.

The methods used by the Census Bureau to produce the estimates are complex but the essentials are rather straightforward.<sup>3</sup> All of the Bureau’s estimates start with the most recent Census data as a base. Current year estimates of births and deaths are created using vital statistics data compiled by the National Center for Health Statistics. The migration component of the estimates consists of four parts.

Net Domestic Migration is the difference between in and out-migration to a county from other parts of the United States. Net Domestic migration is based on federal income tax return data from the Internal Revenue Service. Net International Migration is based on an allocation of total migration to the U.S. from other countries provided by the Immigration and Naturalization Service. Net Federal Movement reflects U.S. federal government employees returning from overseas assignments. These estimates are derived from a variety of administrative records. Finally, there is a residual component of migration that is used to make the estimates consistent with state and national totals. The latter two components of migration are generally small compared to the first two components.

The estimates of state and county populations always differ from the next census count. This is to be expected for several reasons. First, the estimates are not based on counts of the population. Second, the undercount in the decennial population census varies from decade to decade. The Census Bureau evaluates the annual estimates after each new Census.<sup>4</sup> Comparing the 1990 Census results to the 1990 estimates for all 3,141 counties, Long (1993) found a mean absolute percentage error (MAPE) of 3.6 percent<sup>5</sup>. The errors varied considerably by the size of the county population. For counties with a population of 100,000 or more, the MAPE was 1.8 percent, while for counties of less than 2,500 persons the MAPE was 7.7 percent. New Mexico had a 4.3 percent error as measured by the MAPE.

Anyone evaluating the estimates should be aware that the estimates of births and deaths are much more likely to be correct than the estimates of migration. The system of vital statistics in the U.S. is virtually 100 percent complete. Remaining errors in the estimates of births and deaths arise mainly because the data are incomplete at the time the estimates are made.

### **Births in New Mexico**

According to the annual estimates, total births in New Mexico remained roughly constant during the 1990s. The estimates indicate that there were 27,649 births in New Mexico between July 1, 1990 and July 1, 1991. Between July 1998 and July 1999, the estimate is that there were 27,855 births in New Mexico. The number of births in New Mexico during the 1990s reported in the annual estimates is fairly consistent with the 271,799 persons under ten years of age reported in the 2000 census. The comparison, however, cannot be exact because the census is reporting the number of persons in particular age categories and not the number of births.

While the annual number of births remained roughly constant during the 1990s, the population of the state had grown by about 220,000 people between 1990 and 1999. What is notable in these figures is that even with 220,000 more people, the number of births remained at roughly the same level during the 1990s.

In an arithmetic sense, two factors have combined to reduce the importance of births to New Mexico's overall population growth. First, fertility rates declined. In 1980 there were 84.1 births per 1,000 women of child bearing age (15-44) in New Mexico compared to 68.4 in the U.S. By 1999, there were 71.9 births per 1,000 women of child-bearing age in New Mexico compared to 65.0 per 1,000 in the U.S.<sup>6</sup> The decrease in fertility in New Mexico has been more rapid than the fertility decline in the U.S. Second, the proportion of women in child-bearing ages in New Mexico declined. In 1990 45.6 percent of all women were between the ages of 15 and 44, but that figure decreased to 42.6 percent by 1999.<sup>7</sup>

The importance of these changes can be illustrated with some hypothetical calculations. If the fertility rate of New Mexico women had not declined

during the 1990s, there would have been 14,300 additional births in the state. If the percent of women of child-bearing age had remained constant during the decade, there would have been an additional 9,938 births during the decade. Combined, the decline in fertility rates and percent of women of child bearing ages account for a decrease of about 24,000 births during the first nine years of the decade—or roughly 26,400 fewer births for the entire decade. This is about the same as the annual number of births in the state (27,000).

The arithmetic of New Mexico fertility patterns does not adequately address the more important question of why New Mexico fertility rates have been declining. There are a number of possible answers. Nationally, age at first marriage has been increasing in recent years. In 1970, the median age of women at first marriage was 20.6, while the comparable figure for 1990 was 24.6 (Statistical Abstract of the United States, 1996, p. 105). Also consistent with lower fertility rates are rising education and income levels in New Mexico. There are no doubt many other reasons, but that is another story.

### **Deaths in New Mexico**

The Census Bureau annual estimates also suggested that both the number of deaths and death rates in New Mexico increased during the 1990s. The absolute number of deaths increased from 10,790 in 1990-91 to 13,550 in 1998-99. Death rates in New Mexico also increased. The increase in death rates is not necessarily because New Mexicans are becoming less healthy. Rather, it is mainly because New Mexicans are aging. For example, in 1998 there were 175 deaths per 100,000 males aged 15 to 24 in New Mexico, while the corresponding figure for males aged 65 to 74 was 2,739 (New Mexico Department of Health, October 2000, p. 37).

Using a crude death rate of 7.12 per thousand in 1990 compared to 7.82 per thousand in 1998, New Mexico would have had approximately 1,000 fewer deaths per year during the 1990s. In brief, New Mexico's population would have been about 35,000 higher without the increase in death rates, the decline in fertility rates, and the state's changing age-distribution.

## Net Migration

While births and deaths are relatively easy to track during non-census years, migration is not. No agency systematically keeps track of the movement of individuals between or within states on an annual basis. As a result, the annual estimates of net migration to New Mexico probably contained larger absolute and relative errors than did the estimates of births and deaths. Nevertheless, the annual migration estimates are worth a quick look.

According to Census Bureau estimates, net migration to New Mexico during the 1990s peaked in 1994 with 22,496 persons added to the state population. Net migration slowed considerably after 1994 with the net migration figures indicating a loss of nearly 8,000 persons by 1999. Net domestic migration during 1999 indicated out-migration from New Mexico of 12,500 persons. Net Federal Movement (-26 persons) and the residual (+414 persons) were not substantial factors in the state's migration patterns during 1999 (or other years in the late 1990s).

Particularly noticeable in the estimates was a decrease in net-migration in Bernalillo County. Historically, net migration accounted for a substantial portion of Bernalillo County's population growth. In sharp contrast to these historical trends, only 4.1 percent of Bernalillo County's population growth between 1990 and 1999 can be attributed to net migration. This pattern does not hold in Bernalillo County's rapidly growing neighbors, Valencia and Sandoval counties. In those counties, net migration accounted for nearly 75 percent of population increase in the 1990s.

The detailed data from the 2000 Census needed to evaluate the annual net migration estimates are not yet available. Nor, do we have the data to examine the characteristics of those who are moving. However, since the birth and death data are largely based on the vital statistics data, it seems highly likely that the largest errors in the annual estimates are due to an underestimate of net migration to the state.

## Conclusions

Both the annual estimates of population and the decennial Census of Population contain useful information about the changing demography of the state. The annual estimates correctly identified the decreasing importance of natural increase as a source of population change in New Mexico. Decreases in crude birth rates and simultaneous increases in crude death rates should be expected with an aging population. Traditionally the median age of New Mexico's population has been considerably lower than the national median. The 2000 Census reported New Mexico's median age as 34.6 years compared to the national median of 35.3 years. New Mexico, like the nation is aging and as a result, New Mexico can reasonably expect a lower population growth rate due to natural increase.

Net migration, of course, is the wildcard in the population trends game. It is reasonably clear that the annual population estimates failed to capture state migration flows adequately. This is not surprising: migration is a complex, multi-dimensional process. Adequate migration data are difficult to collect in a free society. Yet, it is migration that is the critical factor in understanding future population growth in New Mexico.



Table 1  
The Population of New Mexico

County/Area	1990 Census	2000 Census	1990-2000 Percent Change
Bernalillo	480,577	556,678	15.84
Catron	2,567	3,543	38.24
Chaves	57,849	61,382	6.11
Cibola	23,794	25,595	7.57
Colfax	12,925	14,189	9.78
Curry	42,207	45,044	6.72
DeBaca	2,252	2,240	-0.53
Doña Ana	135,510	174,682	28.91
Eddy	48,605	51,658	6.28
Grant	27,676	31,002	12.02
Guadalupe	4,156	4,680	12.61
Harding	987	810	-17.93
Hidalgo	5,958	5,932	-0.44
Lea	55,765	55,511	-0.46
Lincoln	12,219	19,411	58.86
Los Alamos	18,115	18,343	1.26
Luna	18,110	25,016	38.13
McKinley	60,686	74,798	23.25
Mora	4,264	5,180	21.48
Otero	51,928	62,298	19.97
Quay	10,823	10,155	-6.17
Rio Arriba	34,365	41,190	19.86
Roosevelt	16,702	18,018	7.88
Sandoval	63,319	89,908	41.99
San Juan	91,605	113,801	24.23
San Miguel	25,743	30,126	17.03
Santa Fe	98,928	129,292	30.69
Sierra	9,912	13,270	33.88
Socorro	14,764	18,078	22.45
Taos	23,118	29,979	29.68
Torrance	10,285	16,911	64.42
Union	4,124	4,174	1.21
Valencia	45,235	66,152	46.24
New Mexico	1,515,069	1,819,046	20.06

Source: U.S. Bureau of the Census, PL94-171 data, ([www.census.gov](http://www.census.gov)) April, 2001.

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## Endnotes

<sup>1</sup>After each U.S. Census, the first data released are the so-called reapportionment and redistricting data required under PL94-171. The PL94-171 data includes the total population by sex and 63 race and ethnicity categories. The only age breakdown in the PL94-171 data is the population 18 years old and older. The PL94-171 data were released in April, 2001. In July, 2001, Summary File 1 data containing additional detail on the demographic characteristics of the population were released. Additional data from the 2000 Census containing even more detailed social and economic characteristics of the population will be released during 2002 and 2003.

<sup>2</sup>The figures cited in this paragraph are growth rates from 1990 to 2000 based on the Censuses in those years. The data may be obtained from ([www.census.gov/census2000](http://www.census.gov/census2000)).

<sup>3</sup>The Bureau has two basic methods: the component method II and the ratio-correlation method. The currently preferred method is the ratio-correlation method in which various indicators are used to infer current population characteristics. The details may be found in: U.S. Bureau of the Census, "Methodology for Estimates of State and County Total Population" available on the web at: [www.census.gov/population/methods/stco99.txt](http://www.census.gov/population/methods/stco99.txt).

<sup>4</sup>The comparisons provided here are from John F. Long "Postcensal Population Estimates: States, Counties and Places," U.S. Bureau of the Census, Population Division Working Paper No. 3, August, 1993.

<sup>5</sup>The Mean Absolute Percentage Error takes the absolute value of each error before computing the percentage. This method is generally preferred over a simple percentage error because it eliminates the possibility of "doing well" by missing in both directions. For example, if one estimate were 5 percent over the census count and another estimate was 5 percent under, the ordinary percentage error would be zero.

<sup>6</sup>These are general fertility rates expressed as births per 1,000 women. The Total Fertility Rate (TFR) is a more informative measure. A TFR is a hypothetical number that represents the number of children a woman would have if she were subject to the age-specific rates at a point in time. In New Mexico, the 1998 TFR was 2.24. The year 2000 TFR for the U.S. is estimated to be 1.93. The so-called replacement level TFR is 2.08.

<sup>7</sup>The 1999 estimate of the proportion of women aged 15-44 (42.6 percent) is very close to the 2000 Census figure of 42.3 percent.



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## **COMING OUT OF OUR BOX: ALBUQUERQUE'S BUSINESS COMMUNITY ENTERS THE WATER ARENA**

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Good morning. I am here today representing the New Mexico Chapter of the National Association of Industrial and Office Properties—a group of about 150 firms employing some 19,000 New Mexicans associated with real estate development and the Economic Forum, whose membership represents over 100 businesses in Albuquerque. The mission of both organizations is to sustain and enhance the economic welfare of our city, county, and state while helping to preserve and protect the clean environment and rich cultural heritage that make this “the land of enchantment.”

Until about a year ago, the Albuquerque business community was not really engaged in water policy

discussions. Then the drought, coupled with threats to the security of our city's San Juan/Chama water posed by the critical habitat designation of the Rio Grande silvery minnow, aroused us from our complacency. The late Adlai Stevenson once said, “man is a curious animal, he never sees the wall until his back is up against it.” We did not like how close our back was getting to that wall. We realized we could not continue to sit idly by as long as the sustainability of our community --- our children and their children's future--- was at risk.

Our organizations formed a joint water task force and for the following 12 months, we met regularly to listen to water experts from around the

state. It didn't take long for us to realize that it was not just Albuquerque that was beset with water woes, but the rest of the state as well. We learned about the external threats to our state's water supply posed by both adjacent states and California, and how the water supply and quality problems of Mexico could impact us in the future. We became aware of the many apparent attempts at federalization of our waters going on in virtually all of our river basins—actions which if left unchallenged, could rob us as New Mexicans of control over our own economic destiny and traditional ways of life.

We began seeing internal threats to our water future as well: in attacking each other to save our own piece of what looked like a shrinking water pie, the state might become polarized and engaged in a civil war, thus less able to protect New Mexico's waters for all New Mexicans.

We decided that the business community had to become proactive. We could not afford to just keep on talking to one another. We had to come out of our box and take a place with other water stakeholder groups from around the state at the various tables where water policy plans were being forged. We joined the Middle Rio Grande Water Assembly, the Governor's Blue Ribbon Task Force on Water and the Middle Rio Grande ESA work group. While we were still on a learning curve, circumstances required us to begin speaking up and putting our money where our mouths were:

1. To support the sanctity of Albuquerque's San Juan/Chama water, we hired attorneys and entered an *amicus curiae* position in the *Minnow v Martinez* lawsuit;
2. To register our conviction that the federal government gave inadequate consideration to the economic impact on the people of the Middle Rio Grande in its designation of critical habitat for the silvery minnow, we hired more attorneys and became a Friend of the Court in the *MRGCD v Babbitt* case. (We were gratified to see Judge Mechem's November ruling in that case echo the arguments we had made in our brief);
3. We submitted comments to the EPA opposing their proposed arsenic standards on the grounds that such costly standards need to be based on sound scientific data;
4. We met with the Middle Rio Grande Conservancy District concerning water use efficiencies within irrigated agriculture, and

encouraged the district to proceed expeditiously with their plans to complete metering both their diversions and return flows; and,

5. Realizing we all bear individual and corporate responsibility for being wise stewards of our water, we began internal discussions of how, where and at what cost the business community could save more water.

To become a true partner with others in crafting viable water plans for New Mexico, we have felt the need to dispel some unfair misperceptions that cast Albuquerque as a monstrous water consumer and ourselves as "greed-is-good" business people advancing massive growth, whatever the cost:

1. We keep hearing that by our size, Albuquerque will be threatening water availability for rural areas of the state, and that sustainable growth for Albuquerque will be an oxymoron. We need to tell everyone that just because Albuquerque is big does not mean the city is a 1,000-pound gorilla. (That's unless we don't get our San Juan/Chama water for which we have been and are continuing to pay.) And in response to the charge of being the state's water hog, we are told that municipalities consume only between 5 and 15% of the state's water pie.
2. Albuquerque's developers and the business community-at-large do not blithely or greedily seek growth for growth's sake. We understand that between 60 and 70% of our growth is natural growth --- our kids having kids. The decisions to have this natural growth are not made in boardrooms by the business community, but in everyone's bedrooms. The business community tries to build the shelter and provide the good-paying jobs necessary to accommodate this "growth" so as to ensure an enhanced standard and quality of life for all the city's residents. So yes, we do want to ensure that there is sufficient water available in our city environment to allow our kids and theirs to live here, maintaining their traditional urban way of life, but this is nothing more or less than the aspirations every other group of folks in the state have for their own kids.

We recognize the contribution that all geographic areas of the state and all sectors of the economy make to New Mexico's overall economic well-being, as well as how the state is enriched by the cultural heritage of its people and by its natural environment

and biological diversity. Correspondingly, we realize that all these areas of the state, sectors of the economy, the traditional life-styles, and quality of our environment are at risk because we do not have our water house in order. Thus, our organizations have come up with a legislative agenda which we hope will help get us on the right path. It includes requests for adequate funding for the State Engineer and the Interstate Stream Commission to:

- complete the waters database project which involves the transfer of priceless water records into a digital format;
- complete adjudication efforts on the Lower Rio Grande and on the Pecos River, and eventually throughout the state, so that we know who owns what water, where, and since when. (While we realize that we are not senior water rights holders, like the Native Americans or the acequia associations and their parciantes, we know that the only way our state will ever get its arms around its water resource problems is to know what we have and who has title to how much of it. How else can we devise a state water plan that provides for our individual and collective futures?);
- hire the staff necessary to defend the state's water for New Mexicans in ESA-related litigation and collaborative process efforts while meeting interstate compact and treaty obligations; and,
- complete the state's 16 regional water plans.

In addition, we support the funding requests of our conference host, the WRRI at NMSU--- ranked by the U.S. Geological Survey as one of the top 4 institutes of its kind in the nation--- to administer peer-reviewed scientific research grants that will help identify the habitat requirements of our endangered aquatic species.

We also support the NMSU College of Agriculture and Soil and Water Conservation Districts proposals to help private landowners develop Best Management Practices that will offer enhanced water-shed restoration and management, thereby maximizing water yield and improving water quality.

We support our legislature requesting our congressional delegation and the appropriate federal agencies to give Sandia National Laboratory and Los Alamos National Laboratory the funds necessary to become the national test beds for water research and development in areas of critical significance to the

state, such as desalination, evaporation suppression, arsenic treatment, and integrated water resource management modeling.

Last, but not least, the business organizations I represent urge the creation of an Endangered Species trust fund, much like the Native Species Conservation Trust Fund in Colorado, to provide the state's necessary cost share for endangered species recovery programs and/or the creation of a water trust fund to finance needed capital outlay projects that would include monies to finance the endangered species programs. We believe, in a legislative session where oil and gas severance tax funds and other unanticipated state revenues have provided us a huge surplus, that the time is right to create water legacies that can protect present and future generations of New Mexicans.

It is clear that we in "the big city" cannot not worry solely about our own water woes. We must listen and be responsive to the water needs of our rural neighbors as we ask them to be empathetic to ours. We will never have windows of opportunities through which we can resolve our water problems if we don't build in windows... together we can create sensible yet visionary water plans for New Mexico that lead somewhere positive for all our citizens. We must do this because, in truth, we will either all hang together or we will hang separately.

Here's to doing all we can to conserve, preserve, and wisely use our most precious liquid resource for our children and future generations of New Mexicans. As Yogi Berra once said, "...the future ain't what it used to be..." – but it still can be good if we all pitch in.

Thank you for your attention and again for extending to me the invitation to address you today.



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## THE MIDDLE RIO GRANDE CONSERVANCY DISTRICT: SUSTAINING THE MIDDLE VALLEY FOR OVER 70 YEARS

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*“Sustainability: A characteristic of a process or state that can be maintained indefinitely.” From:*

*Caring for the Earth: A Strategy for Sustainable Living IUCN, 1991*

### INTRODUCTION

From the vantage point of the new millennium, it is apparent that the sustainability of New Mexico agriculture has been under severe stress for more than a century, even though the word “sustainability” itself is of recent vintage. The current water war in the middle Rio Grande valley, in which agriculture is pitted against endangered species protection and urban sprawl, was preceded in the early 20<sup>th</sup> century by an equally devastating and complex struggle that threatened the valley’s agricultural economy with extinction.

In this paper, we briefly examine the recent history of some water problems in the middle Rio

Grande valley and describe how the Middle Rio Grande Conservancy District was created to respond to those difficulties. Recent developments in Conservancy District operations, designed specifically to support endangered species, are described in the context of the District’s mission to sustain agriculture in central New Mexico.

Apparently, some of the solutions applied to the water problems of the early twentieth century had unintended consequences, among them the degradation of wildlife habitat in the Rio Grande channel. As a result, farmers who rely on the Rio Grande as their only source of irrigation water are now struggling to maintain a way of life that has roots that extend back to long before the first Europeans appeared in the southwest. Today, the Middle Rio Grande Conservancy District, which was created to restore sustainability to agriculture in 1925,



is in the midst of a new struggle to protect and support the farms that are the only truly sustainable part of New Mexico's modern economy.

## **EARLY HISTORY OF THE CONSERVANCY DISTRICT**

Aldo Leopold, who later developed the ethic of modern-day environmentalism, did not have the word "sustainable" in his vocabulary in 1918 when he wrote that "...agriculture is Albuquerque's one best bet..." As Executive Director of the Albuquerque Chamber of Commerce, he was pleading for help to solve the serious water problem of the day, a problem that threatened to wipe out the economy of his adopted home. In the 1920s, much of the once-irrigable land within the middle Rio Grande valley was saturated and unusable due to aggradation of the river and a corresponding rise in the water table. Irrigation works were in disrepair and needed much work. Moreover, the valley was subjected to periodic flooding, often with devastating effects.

The organizing push from Leopold and others led property owners within the middle Rio Grande valley to seek passage of a state law authorizing formation of conservancy districts. These efforts culminated in passage of the Conservancy Act of 1923, pursuant to which the Middle Rio Grande Conservancy District was formed in 1925 to provide flood control, drainage, and irrigation for the middle Rio Grande valley.<sup>1</sup> Formation of the Conservancy brought together 70 acequias into one unified entity, designed to make lands in the middle valley irrigable.

During the 1940s, the Conservancy was financially unstable. There were inadequate funds to operate and maintain the system and the Conservancy was unable to make regular payments on its bonds. The canals, drains, levees and other works were deteriorating. Consequently, the Conservancy asked the United States Department of the Interior, Bureau of Reclamation, to take over the operation of the District temporarily and retire its outstanding bonds.

In 1951, the Conservancy entered into a 50-year, interest free repayment contract in the amount of \$15,708,567 with the Bureau of Reclamation for the benefit of the District. In addition to retirement of the bonds, that Project included the construction or rehabilitation and improvement of the water storage, diversion and distribution systems to support irri-

gation, drainage and river flood control facilities. In late 1999, the Conservancy paid off the debt to the Bureau of Reclamation. Now that the debt is paid, the Conservancy intends to seek removal of all federal encumbrances on the Conservancy's title to district works and assets, including El Vado Dam and the three diversion dams on the Rio Grande (Angostura, Isleta and San Acacia).

The Conservancy District has been successful in accomplishing its goals of drainage, flood control, and rehabilitation of irrigation works. Because of these efforts, the middle Rio Grande valley and its citizens are now protected from flooding, the once-saturated soils have been drained and restored to a condition suitable for farming, development, and other uses, and the old irrigation works have been rehabilitated or replaced.

One of the key reasons the Conservancy District is able to sustain its works and continue to protect agriculture is that it has a stable source of income to operate and maintain the works of the District: an ad valorem assessment on all real property within the "benefited area" of the District (non-residential property pays a 25% premium); and a \$28.00 per acre water service charge levied only on lands that are served by the District's water delivery system. In 1995, the District revised the assessment structure to eliminate a long-standing controversy over the previous "class A and class B" assessment procedures. The new unitary classification system is simple to administer and helps the District sustain agriculture and promote the open space and green space values of irrigated farmland. To further support agriculture in the middle valley, the Conservancy District also encourages irrigators to take advantage of the greenbelt property tax exemption administered by each county, which reduces the assessed value of irrigated land and thereby lowers the irrigator's property tax as well as the Conservancy District assessment.

## **THE CONSERVANCY DISTRICT TODAY**

The Middle Rio Grande Conservancy District extends from Cochiti Dam south for approximately 150 miles to the Bosque del Apache National Wildlife Refuge (the last irrigator on the last canal in the system). The Conservancy encompasses approximately 278,000 acres in four counties of which 128,787 acres are irrigable lands. At present,

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approximately 70,000 acres were using irrigation water. Within the District's boundaries are thousands of property owners and parts of many towns and villages, six Indian pueblos, and much of the City of Albuquerque. Over one quarter of the population of New Mexico resides within the Conservancy District, much of it in some of the most rapidly urbanizing areas in the state. The Conservancy maintains and manages four diversion dams, 834 miles of canals and ditches, and 404 miles of riverside drains that are capable of delivering water for irrigation and a variety of other purposes.

Since the formation of the Conservancy in the 1920s, land and water use have changed considerably. Flood protection and drainage of saturated lands have helped Albuquerque and the towns and communities of the valley to grow and prosper. Now, land that was once used for agriculture is being developed for residential, industrial, and other purposes at a rapid rate. Thus, water that is no longer needed for irrigation is now needed for a multitude of other uses, including industrial development, residential use, and recreation. Water is also needed for environmental uses such as maintaining riparian habitat and assuring minimum in-stream flows for fish and other water-dependent species, such as the endangered Rio Grande silvery minnow and Southwestern willow flycatcher.

As guardian and advocate of the waters of the middle Rio Grande for its constituency, the Conservancy is adapting its water policies and methodologies to meet changing needs. One way that the Conservancy meets those needs is through the use of a water bank, discussed below; another is the Conservancy's planning efforts for protecting endangered species, also discussed below. First, however, this paper reviews the power and authority of conservancy districts and describes the types of water rights within the Conservancy District.

## **WATER RIGHTS WITHIN THE CONSERVANCY DISTRICT**

Formation of the Middle Rio Grande Conservancy District brought together six pueblos and 70 acequias into one entity that not only began serving existing farmers but also reclaimed large amounts of previously unirrigable lands. Because of the varied history and make up of the Conservancy, seven categories of legally recognized water rights are found within the District boundaries.

### **Individual Pre-1907 Diversionary Water Rights**

Before the creation of the Conservancy District and prior to 1907, when the State Engineer was given jurisdiction over water rights, individuals within the middle valley had perfected surface water rights by diverting and putting water to beneficial use. These pre-1907 water rights are outside the jurisdiction of the State Engineer and are vested in the individual water rights holders who reside within the District. Upon obtaining a State Engineer permit, an individual owner can lease or transfer a pre-1907 water right to a new point of diversion, place or purpose of use.

### **Individual 1907-1927 Water Rights**

A very small number of individuals within the District may hold permits from the State Engineer for water rights established before the creation of the District, but after 1907.

### **District's Permitted Surface Rights**

Shortly after its inception, the Conservancy District applied for water permits from the Office of the State Engineer to effectuate its goals of delivery, conservation, and reclamation of water along the middle Rio Grande valley. In addition to individual vested, pre-1907 surface rights appurtenant to 80,785 acres, the Conservancy has obtained water rights, under its two permits filed with the State Engineer. These additional water rights under permit Nos. 1690 and 0620 represent 42,482 acres of reclaimed lands developed by the works of the Conservancy.

### **Pueblo Reserved Water Rights**

The six Pueblos within the Conservancy acquired surface water rights through assignments by the United States or through reservation under the federal reserved water rights doctrine. Pueblo water rights are senior to all other rights within the Conservancy and irrigate approximately 8,847 acres of Indian land.

### **Pre-1956 and Permitted Groundwater Rights**

Individuals and the Conservancy own water rights based on wells drilled prior to 1956, when New Mexico's State Engineer asserted jurisdiction over the underground waters of the Rio Grande Basin. Groundwater rights based on permits from the State Engineer issued after 1956 are also abundant in the Conservancy.

### **San Juan-Chama Water Rights**

In 1963, the Conservancy contracted with the Bureau of Reclamation for 20,900 acre-feet of water per annum from the San Juan-Chama Project (SJCP). The United States has approved SJCP water for irrigation and other beneficial purposes. In return for the water rights, the Conservancy agreed to pay a portion of the construction, operation and maintenance costs of the project.

### **Storage Rights**

The Conservancy has water storage rights of 198,110 acre-feet at El Vado reservoir pursuant to State Engineer Permit No. 1690. Although the storage right is for reservoir space and not a water right per se, it is a valuable water asset held by the Conservancy.

In total, the amount of consumptive use allowed by State Engineer permits within the boundaries of the Conservancy from surface flows of the Rio Grande is approximately 298,339.4 acre-feet. However, the acreage under permits held by the Conservancy may be greater than land actually irrigated today because the permits have not been fully developed. As outlined below, determining the total perfected amount of the Conservancy right or the "Proof of Beneficial Use" is a complex process, currently under way.

Moreover, as discussed above, water rights held by the Conservancy are not subject to the forfeiture and abandonment statutes enforced by the State Engineer against private water right holders. Section 73-17-21 of New Mexico's Conservancy Act provides the "[t]he rights of the District to the waters of the District, or the use thereof, or the land within the District and property owned by it shall not be lost by the District by prescription or by adverse possession, or for nonuse of the waters." Therefore, the Conservancy has a right to full use of the water under Permit Nos. 1690 and No. 1620. That right is fully vested and water under these permits is deemed to be put to beneficial use as a matter of law.

## **THE CONSERVANCY DISTRICT WATER BANK**

### **Purpose and Functioning of the Water Bank**

In order to meet the changing needs of its constituents, the Conservancy District established a Water Bank on November 13, 1995, when the

District's Board adopted Rule 23, the Water Bank Rule.

The Water Bank is essentially a water management system and a method by which the District manages the distribution of water within the Conservancy by moving water from areas where it is not being used to areas of need. In this way, the District can maximize the beneficial use of water within the Conservancy.

The Water Bank concept is quite simple. Holders of current water rights within the Conservancy who are not using their rights can place the rights in the Water Bank. Persons or entities that need water can "borrow" water from the bank. Thus, water use can be maximized by delivering it to where it can continue to be put to beneficial use. The Water Bank serves the further purpose of providing the District with a mechanism to quantify water rights within the Conservancy and to track the use of water. It also generates revenue for the Conservancy, thereby reducing the tax burden on Conservancy constituents.

Deposits in the Water Bank come from vested Conservancy District water rights and from individual holders of valid pre-1907 rights. It is important to understand that the operation of the Water Bank does not result in a new appropriation of water. The District accepts into the Water Bank only water rights that have been perfected through actual beneficial use. Therefore, in order to determine the total number of water rights available for placement in the Water Bank, the Conservancy is in the process of calculating the number of irrigation rights that are no longer needed on the lands where they were perfected. The District will accomplish this by determining the maximum amount of water historically used by the Conservancy under its permit and then subtracting the amount of water currently being used to determine the "surplus" water that is available for placement in the Water Bank.

Holders of valid pre-1907 water rights within the Conservancy may also deposit all or a portion of their water rights that they are not using into the Bank. When a pre-1907 water right holder presents his or her right to the District for deposit, the holder must verify with the State Engineer that the right is valid and then the Bank will accept the water right for deposit.

At the time that the Conservancy District accepts the deposit of private rights into the Water

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Bank, the right-holder must sign a written agreement that temporarily assigns to the Conservancy all rights to the use of the water for the term of the deposit. Terms of deposit shall not exceed five years. This temporary assignment allows the Water Bank to loan the water to third parties. In return, the right-holder will receive the income when the right is loaned out. All Water Bank transactions are recorded on the bank ledger. The ledger includes the amount of the water right in acre-feet and a property description of the land to which the deposited rights have been appurtenant.

The Conservancy Board of Directors sets the price for water loans when the loan originates from Conservancy water rights. The rate may depend in part on the intended use of the water. Pre-1907 right holders may set their own rate or rely on the rate set by the Conservancy Board. The Conservancy may charge borrowers an additional annual administrative fee to cover the costs in administering the loan. This fee may be charged for District and pre-1907 rights. The Conservancy retains the income that it receives from loaning water rights that belong to the Conservancy. The Conservancy deposits this income into a special Water Bank fund to be used to offset expenses of District operations. Income from pre-1907 rights is paid directly to the right-holder who deposited the rights.

The Water Bank does not affect the rights or responsibilities of owners of individual water rights within the Conservancy. The owner of a pre-1907 right may sell his or her right without going through the Water Bank. However, it might be to the water right holder's benefit to deposit the right into the Water Bank rather than selling it. This is because the right-holder would receive revenue from the lease of the water while still retaining ownership in the event that he or she decides to begin irrigating again. The second important point with respect to individual rights and responsibilities is that placing water rights in the bank will avoid forfeiture for non-use. The Conservancy District's water right is not subject to forfeiture for non-use; however, pre-1907 rights are. Thus, as long as the pre-1907 right is being leased for a beneficial use, it cannot be forfeited.

Any person or entity who needs water for a beneficial use within the District boundaries may apply for a loan from the Water Bank. A key requirement is that the use must be beneficial. Because land use has changed dramatically since the

Conservancy's inception, water that was once beneficially used for irrigation is now being used for other beneficial purposes. A host of uses of Conservancy water could and should be considered a "beneficial use," such as leaving water in the ditches to promote riparian habitat, leasing water for fisheries, or use of water for recreational purposes. The use of water for fish, wildlife and recreational purposes has been recognized in New Mexico as a beneficial use. Also, we need to recognize the role of acequias and agriculture in preserving open space, expanding riparian habitat and recharging the aquifer. The Bureau of Reclamation documented that 50% of the recharge of the Albuquerque aquifer comes from irrigated agriculture.

When a person requests a water loan, the request must be on a standardized form prescribed by the Conservancy. The request must include the amount of water requested, the purpose of the water use, the place of diversion, the place of use, and the duration of use. If the request is approved, the borrower enters into a standard lease agreement with the Conservancy. Loans shall not exceed five years but are renewable for an additional term if water is available. Loans are on a first come, first served basis.

Renewals may receive preference over new borrowers. At the present time, approximately 1,400 acre feet of rights are under lease and have been withdrawn from the Water Bank, all for irrigation.

Potential Water Bank uses include:

**Agriculture** - As the need for water in the Middle Valley for purposes other than agriculture continues, more and more individual water rights holders within the Conservancy sell their pre-1907 rights to third parties. While the Conservancy does not want to interfere with any individual's exercise of a property right, the Conservancy would like to see as much water as possible remain in agriculture. The Water Bank promotes agriculture by: (a) providing an alternative source of water to municipal and industrial users other than permanent severance of pre-1907 rights; and (b) providing a replacement source of agricultural water from Conservancy water to individuals who choose to sever their pre-1907 rights.

**Municipal and Industrial** - The Conservancy already leases some water for municipal and industrial purposes. The Water Bank will document these existing leases and bring them under its

umbrella as well as providing a more efficient clearinghouse for future leases of Conservancy water for these purposes.

**Protection of Endangered Species**— Periods of low river flow since 1996 have been very difficult for water users in the middle valley as a result of the drought conditions and the new water customer with which the conservancy and others must contend—the Rio Grande silvery minnow. As discussed below, more proactive water planning by the federal agencies charged with protecting the minnow, and on the part of the Conservancy as well, will result in the avoidance of future crisis management such as occurred this year. Certainly, the Water Bank provides one clear mechanism for provision of water for the minnow.

## **ENDANGERED SPECIES AND ECOSYSTEM REHABILITATION**

There is some irony in the fact that, as a direct result of the dams and levees that were put into place to solve the problems of Aldo Leopold's day, the Conservancy District today faces new challenges to the sustainability of agriculture. Primarily as a result of the dams, levees, and channel narrowing works installed from the 1930s through the 1960s, much of the habitat for endangered species in the middle Rio Grande has deteriorated. As the human population has grown along with awareness of the environmental consequences of what we consider today essential human infrastructure, the Conservancy District finds itself fighting new assaults on the District's attempts to support and sustain that infrastructure for agriculture in the middle Rio Grande valley. Foremost among the new challenges is the Endangered Species Act, the Federal law that protects and promotes the recovery of the Rio Grande silvery minnow and the Southwestern willow flycatcher.

Not as well known as the silvery minnow, the willow flycatcher is a small migratory bird that spends about half of each year nesting and breeding in the southwestern U.S., and the other half of each year in Central and northern South America. It was listed as endangered in 1995. The flycatcher depends on riparian (i.e., riverside or lakeside) trees and shrubs for nesting and reproduction. Because many riparian areas in the southwest have lost their large

stands of native trees, or seen those stands converted to water-wasting non-native plants like salt cedar, many flycatcher populations seem to be declining. Notable exceptions to this trend are the middle Rio Grande, where numbers of flycatchers have recently increased, and the Gila River in southwestern New Mexico, where the largest population of flycatchers in North America continues to flourish in dense stands of box elder trees above flood-irrigated pastures on a private cattle ranch. The draft official recovery plan for the flycatcher is likely to be published by the end of 2000, after which some measures to enhance flycatcher habitat will probably be incorporated into ongoing ecosystem rehabilitation work on the middle Rio Grande.

The Rio Grande silvery minnow, a small fish that today appears to survive only in the middle Rio Grande between Cochiti Dam and Elephant Butte Reservoir, was listed as an endangered species in 1994. The Conservancy District is working closely with the U.S. Fish and Wildlife Service, the Bureau of Reclamation and other federal and state agencies to protect the minnow and plan for its recovery. In January of this year, the Conservancy entered into a Memorandum of Understanding with other stakeholders to develop a collaborative program for protecting and improving the status of the minnow. That effort will lead to creation of the Middle Rio Grande Endangered Species Act Collaborative Program, a multi-agency, multi-year effort to improve the habitat for the silvery minnow, protect state water law and interstate compacts, and allow legally authorized water use and development to proceed.

Recovery of the silvery minnow is complicated because the biology of the minnow, including its need for water flow in the Rio Grande, is not yet well understood. To date, the Fish and Wildlife Service has insisted upon a continuously flowing Rio Grande to support the minnow, in spite of the historic hydrograph that includes extended dry periods. However, in spite of the provision of some 165,000 acre-feet of leased water in 2000 for no other purpose than support of silvery minnow habitat, the population of that species appears to have declined further. Ongoing mediation in Federal court is intended to resolve disputes about the biology of the fish and management of the Rio Grande that to date have prevented agreement on permanent solutions for recovery the species.

The Middle Rio Grande Conservancy District:  
Sustaining the Middle Valley for Over 70 Years

To improve Rio Grande water management consistent with actions agreed to during a dry period in 1996, the Conservancy in the 1997, 1998, 1999 and 2000 irrigation seasons developed and distributed water operations plans to work cooperatively with the Fish and Wildlife Service, the Bureau of Reclamation, and other entities to demonstrate support for sustainable ecosystem management of the habitat of the silvery minnow and willow flycatcher.

One result of that cooperation is the widespread recognition that the potential for dewatering a segment of silvery minnow habitat in the middle Rio Grande is very high, due to multiple use of the water throughout the river system, conveyance losses that depend largely on weather conditions, and other river conditions outside the control of human water users. These uses and conveyance losses from the Rio Grande occur from its headwaters in Colorado to the Elephant Butte Reservoir.

The Fish and Wildlife Service has recognized that recovery of the silvery minnow is primarily a responsibility of federal agencies including themselves, the Bureau of Reclamation, and the Army Corps of Engineers. As such, the Fish and Wildlife Service has pledged to make good faith efforts to assure that river flows to protect the silvery minnow during the irrigation season will be made available by providing federal water.

During the 2000 irrigation season, most of the 165,000 acre-feet of supplemental water used to support the silvery minnow was provided through Bureau of Reclamation leases of San Juan Chama Project water from the City of Albuquerque. The City in turn provided that water to the Conservancy District for irrigation, thus allowing native Rio Grande flows to remain in the river without diversion. When emergencies arose involving the imminent drying of a portion of the river habitat of the silvery minnow, the Conservancy facilitated, as it has agreed to do within existing physical constraints, the delivery of non-Conservancy water to the appropriate river reaches. When necessary, the Conservancy also provides, consistent with legal and physical constraints, the needed water so long as that water is replaced in a timely manner by federal water.

Once the federal agencies achieve a better understanding of how much water is needed in what reaches of the Rio Grande for the minnow, and that decision is reviewed by affected parties, the

Conservancy and other river users, including the City of Albuquerque, may have to adjust their uses of federal water. That will not be easy.

For example, reduced river flows during the very dry spring of 1996 led water managers to produce a collaborative agreement on future water operations needed to protect the silvery minnow during drought. The *Water Management Strategy for the Middle Rio Grande Valley* (J. Whitney, et al., November 14, 1996, now usually referred to as “the *White Paper*”) is a summary of actions recommended to help ensure adequate flows in the Rio Grande. Representatives of the Fish and Wildlife Service, Bureau of Reclamation, Army Corps of Engineers, New Mexico Interstate Stream Commission, the Conservancy, and the City of Albuquerque joined together to identify a number of measures that could, if undertaken in a timely manner with the necessary legal, financial, and political support, help protect the silvery minnow. To date, some of these measures have been implemented in whole or in part, and the implementation of others awaits action at the federal or state levels and will be addressed pursuant to the recently executed Memorandum of Understanding. The most important of those measures are the following:

**Operational Changes** - Changes in state and federal water operations could increase the capability to store native Rio Grande water in reservoirs upstream from the middle Rio Grande valley, thereby making additional water available for the river during drought. Although the reservoirs upstream of the middle Rio Grande valley were not designed or originally intended to store enough water in wet years to sustain Rio Grande flows through several consecutive dry years, recent changes in operations demonstrate that, under some conditions, Rio Grande flows might be stabilized during dry periods. Some changes in reservoir and river operations to cope with extended drought would require new federal authorizations, while others could be accomplished under current authorities by changing federal water control manuals. As happened in 2000, some San Juan Chama Project water is made available under separate contractual arrangements to supplement native Rio Grande flows for the silvery minnow. However, there is little likelihood that Project water will be anything more than a temporary source for supplemental water, as most municipal contractors will eventually put their water to beneficial use.

Other options for consideration include:

- storing Rio Grande water in Heron Reservoir when space is available;
- transferring water from El Vado to Abiquiu Reservoir;
- increasing the storage capability in Abiquiu and Jemez Canyon Reservoirs; and
- using Cochiti Lake for a re-regulation reservoir during the irrigation season.

These and other modifications of reservoir operations may have significant hydrologic and legal implications that should be evaluated before changes are implemented.

**Supplemental Water and Forbearance** - Acquisition of water from willing sellers could put supplemental water in the River. Two particularly important elements of this strategy would include sustained funding from Congress of water acquisition, and the development of an institutional mechanism to obtain water in a timely manner. If water were to be acquired from current water users, the Conservancy would need to be a party to water acquisition agreements, so that the rights of other water users would be protected while meeting the needs of endangered species. Although forbearance of irrigation water use by farmers is sometimes mentioned as a potential source of water to supplement river flows, at this time there are no practical institutional or physical means to implement agricultural forbearance. The Conservancy has agreed to work with the Bureau to evaluate the feasibility of a pilot district-wide forbearance program for river water management during periods of low river flow.

**Irrigation Efficiency** - Increased efficiency in the delivery and use of Rio Grande water could, under some circumstances, contribute additional water to river flow. Efficiency in water use is always important, but the issue is very complex in the middle valley. For example, studies by the Bureau of Reclamation show that fully half of the water that recharges the crucial aquifer beneath Albuquerque comes from the Conservancy's water conveyance system. Therefore, the lining of irrigation canals, which in other places might seem to be a reasonable efficiency measure, could have negative consequences in the middle Rio Grande valley. Moreover, questions about the disposition of the water "saved" by any increases in efficiency would have to be resolved according to federal and state law, possibly involving agreement by the

Conservancy so that water saving measures can effectively help water managers meet the needs of human water users as well as the silvery minnow.

Another efficiency measure, called "water rotation," is routinely implemented by the Conservancy District in times of water shortage. However, rotation can have some adverse impacts while at the same time conserving irrigation water. For example, under strict water rotation, certain reaches of the Rio Grande may not receive normal return flows, potentially resulting in a dewatering of the river that could have adverse impacts on endangered species. Nonetheless, the Conservancy continues to implement and evaluate this method as a means of increasing efficiency in times of drought.

**Metering of Diversions and Return Flows** - The Conservancy District, with crucial financial and logistical support from the Bureau of Reclamation, the U.S. Geological Survey, and the New Mexico Interstate Stream Commission has made great progress in upgrading the metering of water flows at many points throughout the middle valley, and work on that program continues. The Conservancy anticipates continued support by the federal agencies for the acquisition of additional funds to complete the instrumentation of all return flows from the Conservancy's conveyance system to the Rio Grande.

Metering surface and groundwater irrigation deliveries and return flows to the river helps to clarify existing water uses and needs, quantify the available water supply, and identify water management options. Water rights in the middle Rio Grande valley are not adjudicated and only about half of the irrigation water return flows to the river are currently metered. To respond to calls for better water management, the Conservancy is working hard to improve the measurement of the water flowing through the system. In 1996 the Conservancy began the process of upgrading all of its measuring gauges, and that process continues with the installation of real-time meters on diversions and return flows, as well as ten automated weather stations to provide yet another dimension of data for improved water management. Diversion, return flow, and weather data are available to anyone 24 hours per day on the Bureau of Reclamation website.

## CONCLUSION

The increased urban population of the middle Rio Grande valley has brought with it new demands on our water resources and increased the complexity of water management in the middle Rio Grande valley. To respond to the new physical and regulatory challenges, the Conservancy District is improving operations and increasing its ability to meet those changing demands. As demonstrated by the extensive list of ecosystem rehabilitation projects contemplated for improvement of habitat for endangered species along the middle Rio Grande, the Conservancy District recognizes the need to find balanced solutions to environmental challenges, so that the centuries-old culture of irrigated agriculture can be sustained for our children who will inherit this magnificent valley.

### Endnotes

<sup>1</sup>The original Conservancy Act was enacted in 1923 (1923 N.M. LAWS, ch. 140). However, this act was repealed and replaced with the 1927 Conservancy Act (see *Gutierrez v. Middle Rio Grande Conservancy Dist.*, 34 N.M. 346, 282 P. 1 [1929]).





*Matthew Holmes was born and raised in Los Alamos. He received an undergraduate degree in business economics from the University of Arizona and a master's degree in natural resource and environmental economics from UNM. Matt's professional experience includes wetland planting and riparian restoration, environmental cost benefit analysis, satellite data modeling, and business consulting. He now works for the New Mexico Rural Water Association, a nonprofit technical assistance provider for water and wastewater utilities. Matt initially started with NMRWA as a Groundwater Protection Specialist and recently became the Executive Director.*



## New Mexico Rural Water Association

Matt Holmes  
Rural Water Users Association  
3413 Carlisle Boulevard NE  
Albuquerque, NM 87110

### MISSION AND STRUCTURE

The mission of the New Mexico Rural Water Association is to provide top quality, responsive technical assistance and training for rural water and wastewater systems in New Mexico. The Association was established as a non-profit organization under New Mexico laws in 1978 and is affiliated with the National Rural Water Association in Duncan, Oklahoma. The Association currently has over 450 members collectively serving over 460,000 persons throughout the state of New Mexico. The active membership of the State Association elects a Board of Directors to oversee the affairs of the Association. The general membership is made up of the mutual domestic water associations, small municipal government water utilities, community water cooperatives, public water and wastewater sanitation districts, and non-profit water utility

organizations in the state. The Executive Committee of the New Mexico Rural Water Association Board of Directors provides policy direction and fiscal oversight for all of the programs of the organization. The Board of Directors commissions an annual independent audit to review all programs, contracts, and practices of the New Mexico Rural Water Association.

The New Mexico Rural Water Association maintains its office at 3413 Carlisle NE in Albuquerque, New Mexico. The services, programs and emergency responses are deployed from this centralized location throughout the state. Logistical and fiscal support is provided to the technical support personnel to assure quality, responsive services to water and wastewater systems in need of technical assistance or training. The programs and services of the New Mexico Rural Water Association are implemented by a team of highly experienced

professionals, who provide on-site assistance, training, and troubleshooting support to the operators in charge of water and wastewater systems in rural communities throughout the state. The Board of Directors and the staff of New Mexico Rural Water Association have established an excellent track record in their response to the emergency needs of small water systems in all sectors of the state, often after normal working hours or on weekends.

## PROGRAMS AND SERVICES

At present, the New Mexico Rural Water Association implements the following services on a statewide basis:

- Circuit Rider and Field Specialist Technical Assistance and Training Program
- Water System Operator and Board Member Training
- Source Water/Groundwater Protection Program
- Native American Circuit Rider Technical Assistance and Training Program
- Native American Source Water Protection Program
- Wastewater Specialist Technical Support Program
- Board Training and Technical Assistance Program

These services are provided free-of-charge to the recipients. The Association is funded by membership fees and contracts with the Environmental Protection Agency, the USDA Rural Utility Service, and the New Mexico Environment Department in support of the Safe Drinking Water Act.

Our Circuit Riders and Field Specialists assist small utilities in rural areas and in Native American communities with various technical assistance needs such as installing and maintaining disinfection systems, repairing pumps and motors, conducting leak detections, providing water storage tank inspections, spearheading wellhead protection, preventing cross connections, demonstrating water sampling procedures, and troubleshooting water pressure losses. Equally as important is the promotion and implementation of training and mentoring experiences for water and wastewater operators to obtain State Certification. Our Circuit Riders and Field Specialists made over 2400 contacts with rural entities in 1999 - a remarkable feat and record of accomplishment. They are on the road most of the time, and in

emergencies, they work around the clock to help small systems.

The Native American technical support program provides technical assistance and training in the Nineteen Pueblos, the Navajo Nation and the Mescalero and Jicarilla Apache Tribal areas. The Native American source water protection program works with Tribal communities to protect drinking water sources.

The New Mexico Rural Water Association Training Program features classroom training for water system operators and water system Board members. In years past, the classes for water system operator and water system Board members have been averaging fifty or more participants in each class—and we typically hold 35 classes each year around the state. We utilize a group of instructors who are highly experienced water utility operators, water industry experts, and governmental specialists in technical or regulatory procedures. Coordination of the statewide training calendar and quality assurance of the various training activities are the responsibility of New Mexico Rural Water Association Training Specialist. There is on-going consultation and coordination throughout the year between the Program and Training Specialist and the Facilities Operation Certification Office of the New Mexico Environment Department to ensure that our classes are approved for credit toward New Mexico Utility Operator Certification.

Each March, the New Mexico Rural Water Association organizes and implements a Technical Assistance Conference for water and wastewater systems in New Mexico. This past year, over 300 water system representatives attended the Conference held in Albuquerque, New Mexico. The focus of the Conference was leadership development, capacity development, operator training, and funding support.

**The strength of the New Mexico Rural Water Association is its commitment to being responsive to the needs of the many community water systems in New Mexico. Both at the leadership and the staff level, the focus of the New Mexico Rural Water Association is development of the capacity of small public water and wastewater systems to provide quality, consistent services to rural families.**

The New Mexico Rural Water Association, because of its strong collaboration with the National

Rural Water Association, is able to provide its water and wastewater system members with top-quality models and tools to meet the regulations of the Safe Drinking Water Act. Among these tools are the Consumer Confidence Report, the Capacity Development Self-Assessment Questionnaire, the Five-Step Wellhead Protection Plan, and the Long Range Plan outline.

Under the Board Training Program the NMRWA is providing on-site assistance to rural water systems covering financial management, budget development, review of rate structures, and long-range financial planning.

## **PARTNERSHIPS**

We are proud of the solid network of support that is present in New Mexico to assist community water and wastewater systems with their needs. Four key partners in providing assistance to communities in their water and wastewater utility needs are the New Mexico Rural Water Association, the New Mexico Environment Department, the USDA Rural Utilities Service and the United States Environmental Protection Agency. In addition to these resources the New Mexico Legislature, the New Mexico Finance Authority, the New Mexico Finance & Administration Department, the New Mexico Office of the State Engineer, and others enhance this network of support for the rural utilities in New Mexico.

The most important factor in our partnerships continues to be the leadership and operational representatives at the local community levels. Community members provide the local commitment and talent that makes our enterprise work to provide safe, affordable, consistent drinking water, and to provide dependable, affordable, sanitary wastewater services to the families of New Mexico.

The talent and skill needed to operate, maintain and effectively manage water and wastewater utilities is present in every corner of the state in the mutual domestic water associations, villages, Pueblos, towns, small cities, water cooperatives and the water and sanitation districts. To support these local efforts, a strong partnership for technical assistance, troubleshooting, training and support is active state-wide through the New Mexico Rural Water Association. Additional information can be obtained by calling the Association at:

**(505) 884-1031 (Office) (505) 884-1032 (Fax)**

or surfing to

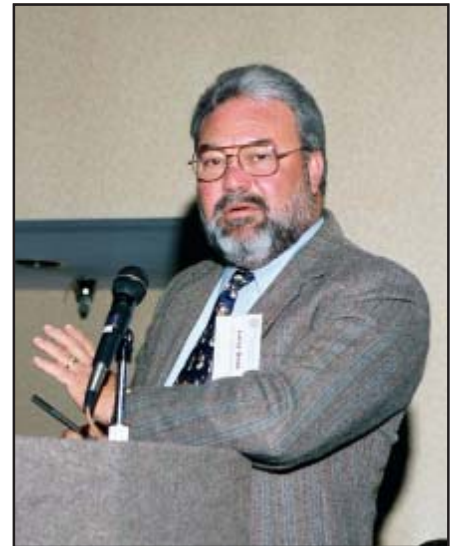
**[www.nmrwa.org](http://www.nmrwa.org)**

or writing:

New Mexico Rural Water Association  
3413 Carlisle Blvd NE  
Albuquerque, NM 87110



*Larry Webb was raised in Hobbs and after graduating from Hobbs High, he spent four years in the Air Force. He received an associate degree from NMSU in Water Utility Operations and then worked for two years in Silver City. Larry has a bachelor's degree in environmental management from University of Houston-Clear Lake. He worked for 17 years with League City, Texas as Director of Utilities. Larry is President-elect of the New Mexico Environmental Quality Association and Vice Chair for the NM Municipal League Domestic Well Task Force. He also is an active member of the American Water Works Association and the Water Environment Federation.*



## THE IMPACT OF DOMESTIC WELLS

### Presentation Outline

Larry Webb  
City of Rio Rancho  
PO Box 15550  
Rio Rancho, NM 87174-0550

#### **Domestic Wells Influence Our Future**

- Limited water resources
- Groundwater quality
- Community planning

#### **NMSA 72-12-1**

- Requires State Engineer to approve application
- States rules of “who, where, when”

#### **Rural New Mexico**

- 1931 Law

#### **Over 106,000 Domestic Wells Permits (1995)**

- 306,000 people on self-supplied wells

#### **6,000 Domestic Well Applications Annually**

- 3 acre-feet allocation per well
- 60-70 percent drilled
- 1 acre-foot = 325,851 gallons

#### **Compliance with NMSA 72-12-1**

- \$5.00 application fee
- 3 acre-feet or 977,553 gallons

#### **Office of the State Engineer**

- lack of resources
- lack of inspection
- lack of follow-up

#### **Concerns for Current Situation**

- contamination of aquifer
- unchecked construction
- lack of conservation
- abuse of water use

#### **Domestic Wells and our Water Resources**

- Who is watching the domestic wells?
- How much water are we using?
- Water quality issues
- What can we do?

**Water Resources Management**

- Change law
- Allow county and municipal growth in the Middle Rio Grande
- Compliance with local and regional development plans

**Communities with Well Laws**

- Taos
  - adopted July 6, 1994
  - court order March 5, 1973
- Santa Fe
  - Reviews state applications at Office of the State Engineer

**Change NMSA 72-12-1**

- allow local government to help
- increase application fee

**Protect Our Water Resource**

- prevent contamination of aquifer
- track depletion of aquifer

*Debra E. Hughes has been the Executive Director for the New Mexico Association of Conservation Districts for five years. She is the Chair of the Lower Pecos River Regional Water Planning Organization and has been with that group for seven years. Debbie also is a member of the Dialogue Board of Directors, the secretary/ treasurer for the Pecos River Native Riparian Restoration Organization, a member of the Agriculture Drought Committee for New Mexico, and an affiliate member of the Governor's Blue Ribbon Task Force on Water.*



## Soil and Water Conservation Districts

Debbie Hughes  
Soil and Water Conservation Districts  
163 Trail Canyon Road  
Carlsbad, NM 88220

### PRESENTATION OUTLINE

NMSA 73-20-44 District Act directs soil & water conservation districts to plan:

“Develop comprehensive plans for natural resource conservation and development, including flood prevention, control and prevention of soil erosion, and the development, utilization and disposal of water.”

Conservation plans that are developed with individual landowners (cooperators) are individualized to “Needs.”

Plans consider “water, growth, & sustainability”

- Water Conservation
- Irrigation Efficiency
- Growth of Food & Fiber
  - Sustainability of Natural Resources
  - Soil/Water Quantity & Quality
- Watershed restoration and management is a very high priority for soil and water conservation districts; New Mexico water supplies are totally dependent on water yield from our watersheds.
- Our future, our children’s future, and growth depend on sustaining our water supplies and educating our children about how to do this.



- Outdoor classrooms and educational tours are very important tools utilized by soil and water conservation districts.
- New Mexico Association of Conservation Districts sponsored *Conserve the Enchantment* teacher workshop to “grow” their knowledge about watershed and conservation issues. Dr. Karl Wood, WRRRI Director, developed our curriculum.
- Soil and Water Districts are going into schools and conducting water fairs and festivals with the new “Rolling Rivers” mobile watershed trailers. These trailers are an exciting tools to teach about river systems and watersheds.
- This past year a very historic Memorandum of Understanding was signed with the U.S. Forest Service, the Claunch-Pinto Soil and Water Conservation District, and the New Mexico Conservation Commission to allow partnership work on a local watershed.
- Soil and Water Conservation Districts also work with New Mexico acequias utilizing assistance and technology to sustain their water supply.
- Drought-Fire-Endangered Species Act (ESA)-  
Water Demands

*It all comes down to managing our limited water resources and restoring our watersheds to allow for growth and sustainability. Soil and Water Conservation Districts are planning for the 21st Century as “Conservation’s Local Response”*

Note: For a copy of the video “Restoring the Promise,” which describes watershed management practices for pinon-juniper ecosystems, contact NMSU Agricultural Communications at 1-888-750-4165.

*Debra J. Little received bachelors' degrees in secondary education and civil engineering from the University of Texas at El Paso. She received a master's degree in public administration from UTEP in May 2001. Debra is the Principal Engineer of the Engineering Department for the U.S. Section of the International Boundary and Water Commission, an international agency established in 1889 comprising two sections, with the original mandate to survey, mark and map the boundary between the United States and Mexico. Since its inception, the Commission's jurisdiction and responsibility have expanded, and today it is charged with application of the boundary and water treaties between the two countries and settling differences that may arise in the application of these treaties. She is the first woman to serve in the treaty position of Principal Engineer for the Commission. Before working for the Commission, Debra worked for the Corps of Engineers and before that, taught high school mathematics.*



**International Boundary and Water Commission  
Current Programs  
Presentation Outline**

Debra Little  
International Boundary and Water Commission  
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El Paso, TX 79902-1441

**INTRODUCTION**

Challenges of International Cooperation (framework for response to upstream and downstream concerns)

- Competing interests, jurisdictions, authorities, and histories, agricultural vs. urban, jurisdictions cover two US states and two countries
- Water for the environment - there is great interest in water for the environment which poses a challenge for the Sustainable Water

Project, Canalization Project, and Rio Grande/Rio Bravo Binational Symposium follow-up

- Arid area vs. flood control concerns - Canalization Project must provide flood protection although many in the community may not be aware of historical floods
- Complete information on transboundary aquifers - Work is well underway with regard to the Hueco Bolson but a challenge for the future is to get more information on transboundary aquifers

(Mesilla Bolson) and to consider binational cooperation in managing these aquifers

- Understanding a technically (and politically) complex situation - Many factors influence the basin and how these factors all interact is very complex and subject to interpretation. Examples are discussions of potential impacts of Sustainable Water Project, those of Canalization Project, and adequate mitigation
- Parity and comity with Mexico - Existing treaties dictate certain aspects of how the Rio Grande/Rio Bravo are managed. There is a challenge in addressing issues with Mexico related to groundwater and the impact of US-side activities on Mexico
- Identifying and providing full participation to all stakeholders - It is important to involve stakeholders with a variety of interests related to the river. Water agencies need to move toward greater transparency and stakeholder involvement (Citizens Forum)
- Role of the IBWC — historical role vs. demands for leadership beyond traditional jurisdictional limits

## **IBWC BACKGROUND**

- Established in 1889 with a U.S. Section and a Mexican Section
- Applies water and boundary treaties between the U.S. and Mexico
- Resolves differences that may arise in application of the treaties

## **HISTORY OF IBWC**

### **Convention of 1906**

- Provided for the distribution between the U.S. and Mexico of the waters of the Rio Grande in the greater El Paso-Juarez area
- Mexico to receive 60,000 acre feet/year (approx. 10% of the river's apportioned flow) at the Acequia Madre or Old Mexico Canal
- In drought, the amount delivered to Mexico is reduced in same proportion as the water delivered to U.S. irrigators

## **1944 Water Treaty**

### **HUECO BOLSON**

- U.S. and Mexico both use the Hueco Bolson aquifer for drinking water
- Main source of water for Municipal and Industrial use in Juarez
- In 1999, 191,000 acre-feet pumped from the Hueco, 63% by Mexico
- Municipal pumping increased 13% in Mexico between 1990 and 1994 while U.S. municipal and military pumping decreased 24%
- Withdrawals currently exceed recharge. If this situation continues, the Hueco Bolson could be totally used up by 2030.
- Information exchange between El Paso and Juarez water utilities began in 1995 for such topics as:
  - 1) Well construction data and use of wells
  - 2) Pumping records
  - 3) Groundwater quality analysis
- Binational Report
  - 1) Binational Technical Group established to include local, state, and federal representatives (USIBWC, Texas Water Development Board, New Mexico Water Resources Research Institute, USGS, EPA, MxIBWC, CNA, Junta
  - 2) Through this group, a report was published in early 1998: "Transboundary Aquifers and Binational Ground-Water Data Base, City of El Paso/Ciudad Juarez Area"
    - Report includes a data base on groundwaters in the area
    - Summarizes and integrates material received through the information exchange

Note: minimal attention to Mesilla Bolson, although Juarez is looking at feasibility of utilizing the Mesilla Bolson

- Modeling Effort

- 1) Binational Technical Group established including USIBWC, USGS, El Paso Water Utilities, MxIBWC, Junta.
- 2) Group has been working to develop mathematical groundwater models for the aquifer on both sides of the border. Each country has been working on a model. IBWC will prepare a Joint Report summarizing and accepting the technical reports developed by each country.

International Boundary and Water Commission  
Current Programs

- 3) The groundwater models will assist authorities in both countries with planning for optimum utilization and administration of groundwater resources of the region.
  - 4) Work is in its final stages, and we expect a Joint Report in the coming months.
- Challenges
    - 1) Moving from data exchange to agreement for managing shared groundwaters, yet obtaining complete information on the aquifer
    - 2) Technical challenge: merging two parallel models of Hueco Bolson
    - 3) Due consideration to Juarez's planning efforts in view of dwindling groundwater supply and minimal resources (to study)

### **RIO GRANDE CANALIZATION PROJECT**

- Constructed 1938-1943
- For 106 miles from Percha Dam, NM to El Paso, TX
- River channel with mowed floodway and levees in most areas
- Purposes:
  - 1) Flood control
  - 2) To facilitate deliveries of Rio Grande water to Mexico per 1906 treaty

### **RIO GRANDE CANALIZATION PROJECT ENVIRONMENTAL IMPACT STATEMENT (EIS)**

Purpose and need:

- To preserve the integrity of flood control
- To continue water deliveries
- To identify and consider environmental enhancement opportunities and non-structural operational practices that support restoration of native riparian and aquatic habitats

Draft Alternatives for further analysis

- No action - maintain current practices (dredging, mowing, some no-mow zones and fish habitat structures)
- Selective Operations and Maintenance modification - raising levees or construction of flood walls, expansion of fish habitat structures at existing locations, expansion of no-mow areas
- Integrated IBWC Land Management - same as above plus additional enhancements within USIBWC right-of-way such as fish habitat structures at additional locations, enhance

wetlands, additional tree planting, modification of grazing leases, channel splits and embankment treatments

- Targeted Stream Restoration - same as above plus acquisition of flood easements and levee setbacks, planting sites and meanders outside of USIBWC right-of-way
- Multipurpose Watershed Management - same as above plus sediment control in sub-basins, runoff control, backwater habitat at dams, improvement of water quality, additional recreation areas, adoption of minimum instream flows, seasonal peak flows. Requires cooperative agreements with other agencies and the private sector

Challenges

- The flood control project is in an arid area. People may not be familiar with the historical floods in the area and the need to provide flood control to protect life and property
- Water for the environment vs. need to eliminate obstructions to passage of flood flows
- Competing interest - environmental enhancements challenge traditional methods of providing flood control; watershed approach vs. jurisdictional approach

Draft EIS December 2001 followed by public comment period, Record of Decision April 2002

### **RIO GRANDE CANALIZATION PROJECT - Siphon Rehabilitation**

Need:

- Rincon and Hatch siphons are 80 years old
- Siphons are big pipes that transport irrigation water from one side of the river to the other; a failure would negatively impact the agricultural economy of southern New Mexico
- River channel has dropped over the years; siphons are not safely below the river channel bottom

Rehabilitation work:

- Recommended alternative (as of 9/26): driving a sheet pile wall at the crest of the drop below each siphon and the placement of boulders downstream of the sheet piling
- Design to be completed in the first half of 2001
- Construction expected during the next non-irrigation season after completion of design

**RIO GRANDE CANALIZATION PROJECT -  
Picacho Flume Rehabilitation**

- The flume transports irrigation water over the river
- Drop in river channel has exposed the top of the wooden pilings which support the concrete piers for the flume
- Study for the rehabilitation has just begun
- Construction would be done during the non-irrigation season

**NEW MEXICO/TEXAS WATER COMMISSION PROJECT - EL PASO LAS CRUCES REGIONAL SUSTAINABLE WATER PROJECT**

- Provide year-round drinking water supply from the Rio Grande for communities in southern New Mexico and the greater El Paso area
- Protect and maintain the sustainability of the Mesilla Bolson and extend the longevity of the Hueco Bolson
- Increase supplies through more efficient delivery, water conservation, and treatment
- Provide benefits to the riverine ecosystem
- Meet treaty, compact, and contract requirements for deliveries to Mexico, farmers, etc.
- Meet the region's drinking water needs through 2030, providing an additional 174.5 mgd of surface water to communities
- Convert agricultural water to Municipal and Industrial uses
- Construction of water conveyance structures and treatment plants - Preferred Alternative
  - 1) Construction of three water treatment plants in New Mexico: Hatch, Las Cruces, and Anthony
  - 2) Construction of Upper Valley Water Treatment Plant and expansion of Jonathan Rogers Water Treatment Plant in El Paso
  - 3) Construction of a 32-mile aqueduct to convey water from Upper Valley Treatment Plant to northeast and northwest El Paso
  - 4) After transport via aqueduct, treated water would be stored in the Hueco Bolson aquifer during periods of excess supply
  - 5) Construction costs through 2010 - approximately \$300 million

- Fish and Wildlife Enhancements and Mitigation - under preferred Alternative
  - 1) 2% of project construction costs set aside to fund these enhancements; additional funding will be sought
  - 2) Possible enhancements/mitigation include:
    - a) Widen active channel with embayments, backwater areas, and sloughs to create quiet-water areas for fish
    - b) Planting of native riparian vegetation such as willow and cottonwood
    - c) Control of exotics and noxious weeds
    - d) Establish no-mow zones
    - e) Develop wetlands at treatment plant sites
    - f) Construction practices that would control erosion, protect sensitive areas, restore disturbed areas, etc.
- USIBWC is federal lead environmental agency
- EIS finished Nov. 27, 2000; ROD by Dec. 27, 2000; signed Jan. 16, 2001
- Challenges
  - 1) Competing interests, jurisdictions, authorities and histories (municipal vs agricultural, NM vs. TX, etc.)
  - 2) Identifying and providing full participation to all stakeholders
  - 3) Understanding a technically complex situation - There are different perceptions among observers of the long-term effect of the project on the river ecosystem, farmland that would be taken out of production
  - 4) Providing water for the environment, a relatively new concept, in a region where some feel there is not currently enough water for humans
  - 5) Parity and comity with Mexico; there are varying viewpoints about the extent to which impacts in Mexico should be considered during implementation of projects in the U.S.

**RIO GRANDE CITIZENS' FORUM - El Paso-Las Cruces Area**

- Represents cross-section of interests in the community; Co-Chairs are Carlos Marin of IBWC and Kevin Bixby of Southwest Environmental Center

International Boundary and Water Commission  
Current Programs

- Facilitating dialogue about IBWC projects from Percha Dam, NM to Ft. Quitman, TX
- Quarterly meetings held alternately in Las Cruces and El Paso
- Topics covered have included:
  - 1) Proposed river parks
  - 2) El Paso-Las Cruces Regional Sustainable Water Project
  - 3) Salt cedar eradication
  - 4) Canalization Project EIS
- Next meeting: evening of August 2001 at NMSU in Las Cruces (tentative)

**RIO GRANDE/RIO BRAVO BINATIONAL SYMPOSIUM, FT. QUITMAN TO AMISTAD**

- Held in Juarez in June; led by Secretary Bruce Babbitt and SEMARNAP Secretary Julia Carabias
- Joint Declaration
  - 1) Binational task force under IBWC to implement Symposium recommendations (task force to be formed after new government takes office in Mexico. Workgroup will be formed to advance items in the Joint Declaration in the interim)
  - 2) Examine opportunities for minimum flows
  - 3) Strengthen binational cooperation and coordination to conserve natural resources in this part of the Rio Grande
  - 4) Research on biologic and hydrologic conditions and transboundary species (baseline reports on biologic and hydrologic conditions from Ft. Quitman to Presidio expected to be completed by early 2001)
  - 5) Develop and exchange compatible information systems/data bases (digital orthophoto quadrangles expected to be provided to workgroup members in the coming weeks.)
  - 6) Facilitate public participation in developing strategies for environmental sustainability (workgroup to recommend public participation strategies by early 2001.)
  - 7) Cooperative efforts to develop natural resource initiatives



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Editor's Note: The figures referred to by Mr. Hansen in this paper were not available for the conference proceedings.

## U.S. BUREAU OF RECLAMATION PROGRAMS

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I am going to start this series of discussions with a little bit of levity. I think anyone who has been involved in New Mexico water for the last several years probably has experienced this feeling before, it's a bit ironic but sometimes very good things happen under pressure. Sometimes things happen that require people to work together in a partnership to search for solutions that satisfy many competing interests. This morning I am speaking for Mike Gabaldon, our Area Manager, who couldn't be here today. He is speaking in another part of the country. Mike is a New Mexican, a native of Belen, and was just recently selected to head the second highest post in Reclamation in Washington. New Mexico will be blessed with having a fairly high-level official in Washington at the Bureau of Reclamation and only good things can come from something like that.

Reclamation has been involved in just about anything you can think of having to do with water. Today I would like to touch briefly on those areas and projects that we are involved with in New Mexico. Reclamation's Albuquerque Area Office is involved in three basins: the Rio Grande, the Pecos, and the Canadian.

On the Rio Grande Basin, the San Luis Valley Project in southern Colorado helps Colorado assure its Rio Grande Compact deliveries to New Mexico and Texas. The San Juan-Chama Project diverts water out of the Colorado River Basin into the Rio Grande Basin. Heron Reservoir stores that water at the top of the Rio Grande Basin in New Mexico. The water for this Project will ultimately comprise a diversion of 235,000 acre-feet per year, with an initial phase development of 110,000 acre-feet and



constitutes about a full quarter of the middle basin water supply. El Vado Dam is an historic structure completed in 1935 and was originally constructed to provide conservation storage for the Middle Rio Grande Conservancy District. It is one of the few dams with a steel face and its storage facility allows the Middle Rio Grande Conservancy District to meet its irrigation obligations in the valley. San Acacia Diversion Dam is one of four diversion points that the Middle Rio Grande Conservancy District uses to divert its releases of water or flows out of the river to its irrigation works.

The Low-Flow Conveyance Channel, built by Reclamation in the 50s, is an artificial channel that runs alongside the Rio Grande between San Acacia and Elephant Butte Reservoir. The Bureau built the low-flow channel as part of the Middle Rio Grande Project's river channelization program for the purpose of reducing consumption of water, providing more effective sediment transport, and improving valley drainage.

Figure 1 is a picture of the headwaters above Elephant Butte Reservoir during high water years, and it should make each of us shudder if we think in terms of depletions. You can literally see water evaporating into the air. Also shown in the photo is some of the temporary channel work that is required to get the river through this area, through this "Bermuda Triangle" where the water would disappear if man didn't help it find its way to Elephant Butte Reservoir.

Figure 2 shows some of the handiwork of our staff at the Socorro field division doing river maintenance work. These guys get to go out and play with some of the biggest Tonka toys available. Once the water finds its way to Elephant Butte, it's stored behind historic Elephant Butte Dam. A side benefit is our ability to generate power from the water released to the lower basin to meet our Compact obligations.

These projects require a whole slew of various types of support programs. One of the most obvious is dam safety. We look at a huge dam full of water and find it is not hard to imagine what effects an unsafe dam could pose to society. We pay very serious attention to dam safety issues. We routinely inspect conveyance facilities and the different types of works in our projects to make sure they maintain their integrity and are reliable.

Figure 3 is a photo showing an inspection of project facilities that can not be seen from the surface. We sent divers underwater to look at the outlet works that are located far below the surface of the water. The photo depicts El Vado Dam earlier this year after a very dry year in which most of the stored water reserves were used for irrigation. This is the lowest level it has been in many years. The divers found that sometime during the past couple of decades a big pile of concrete debris was dumped on the top of the outlet works. At the end of this season, the reservoir was actually drained down an additional 15,000 acre-feet and the waste material had to be removed from the top of the outlet structure, taking about two weeks.

Finally, we must find effective ways to interface our water operations and our dam safety programs and the various concerns the public has with these water projects with emergency operating plans and standard operating procedures. And, of course, any project delivering water to water users who pay money for that water is expected to keep good track of its books. We have now joined in partnerships with several federal agencies and other interested parties like the state and various cities to develop the Upper Rio Grande Water Operations Model (URGWOM). The model will allow us to not only automate water accounting but eventually it will be used as a daily water operations tool that will assist in water planning in the basin.

Also on the Reclamation list of responsibilities is that of Native American affairs and trust responsibilities. Figures 4 and 5 show subsurface drainage installation at Isleta Pueblo to drain high groundwater areas on irrigated lands.

Reclamation's Albuquerque office has been involved in both municipal and regional water planning. The most high profile product that we recently produced was the Middle Rio Grande Water Assessment that represents a partnership with many parties; the biggest partner being the City of Albuquerque. The assessment looked at water use in the middle basin and the best strategies to making that water stretch as far as possible. That will include quite a few different types of field investigations. For example, we determined how much water was lost in the conservancy district's canal conveyance system. A very large portion of the water lost to canal seepage ends up as recharge to municipal systems.

We also learned from that investigation that we need to do a better job of understanding depletions in the basin. That led to creation of the interagency evapotranspiration (ET) workgroup, to the ET research that we undertook, and to developing the ET monitoring network. Figure 6 shows one of the weather stations that supplies real-time information to the ET Toolbox, a product of that work. The research brought together a very impressive consortium of participants that used state-of-the-art technology and modeling capabilities to take a look at new ways of measuring water vapor flux from crops and riparian vegetation.

Figure 7 is an example of a real-time snapshot of water vapor flux over a transpiring surface, in this case, of salt cedar at Bosque del Apache National Wildlife Refuge. Researchers from Los Alamos National Laboratory used their atmospheric modeling capabilities to model how moisture leaves the source and moves up and away from the basin—a loss of water supply. An ET toolbox has been developed and is available on the Internet via <http://usbr.gov/rsmf/nexrad>. A video entitled *Pulsing the Bosque* has been produced and has been shown on the public education channel a couple of times. Contact Steve Bowser of USBR's Albuquerque Area Office to obtain a copy of the video.

The ET Toolbox estimates high-resolution daily rainfall and water depletions within river reaches of the Middle Rio Grande. The Toolbox provides GIS land-use maps to specify acreage, crop and riparian water use, and open water evaporation estimates on a grid cell (resolution about 4 km x 4 km) along the Middle Rio Grande. Irrigators are able to click on an area of the map representing their fields to find out what the water requirements for their crops are for that day.

Part of Reclamation's responsibilities are to determine how to improve our measurement capabilities as well as the water supply and conveyance system in the Middle Rio Grande Basin. We are definitely lacking in the ability to monitor and measure our water and determine where it goes. In partnership with the Middle Rio Grande Conservancy District, we are building a special real time monitoring network of surface flows, also available on the ET Toolbox.

We also have a responsibility to protect the environment with respect to our operations and our

water management partnerships. Most of you are familiar with our three most infamous characters in our state—the Rio Grande silvery minnow, Pecos bluntnose shiner, and the Colorado pike minnow. Most of you are aware that last year we were under a court order to keep the river flowing from Cochiti Reservoir all the way down to Elephant Butte Reservoir with a minimum flow target of 50 cfs at San Marcial. Figure 8 shows what that lower part of the river looks like at those kinds of flows. This effort took quite a bit of cooperation and resulted from the mediation process. Figure 9 shows an emergency pumping effort out of the Low-Flow Conveyance Channel to return water that is being lost from the river into that channel, acting as a drain, back to the river. We pumped about 120 to 130 cubic feet per second with these large pumps. We spent several million dollars getting the equipment in place by mid to late summer. It was one of the key factors that allowed us to keep the river flowing.

Figure 9 shows the view of the pump outlet pipes into the river. Each pump has a pumping capacity of about 22 cubic feet per second. Water is not the only solution to taking care of endangered species. We also have to incorporate habitat considerations, the biological needs of the fish themselves, and this is done through a couple of programs in our environmental group and our design, construction, and river maintenance group. We have done some channel habitat work and have an ongoing restoration project at Santa Ana Pueblo. Additionally, our design and construction group has been active in assisting the Velarde Irrigation District in rehabilitating their project to make it as efficient as possible.

With that I would like to thank you for having me here today. And one last comment. I stand here as a New Mexican and as a federal water manager, and I am proud of both. I think that if we can all view ourselves as brothers in arms in terms of dealing with the issues in this basin, we will get much further, much quicker.

Thank you.



*Lieutenant Colonel Raymond G. Midkiff assumed command of the US Army Corps of Engineers, Albuquerque District in July 2000. He was commissioned as an Engineer Officer upon graduation from Texas A&M University in December 1981. His command and staff assignments include positions in Germany, South Korea, Kentucky, Saudi Arabia, Fort Worth, Texas and Fort Riley, Kansas. Midkiff's civilian education includes a B.S. in agricultural engineering from Texas A&M and an M.S. in environmental management from Murray State University. He was born in Dayton, Ohio and raised in San Antonio, Texas.*



## **U.S. Army Corps of Engineers Current Projects**

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Good morning, It is a special privilege for me to be here today. I've been in my current position since early July and this past summer's activities have helped me quickly gain a great appreciation for the complexity and criticality of water issues in this beautiful state.

This past June, the United States Army celebrated its 225th birthday. For most of that time, the Corps of Engineers has dedicated itself to solving many of our nation's toughest challenges: mapping our frontiers, building our harbors and coastal defenses, and building locks and dams to help control our largest and mightiest rivers. During these exciting times, the Albuquerque District continues this proud tradition in support of the people of New Mexico.

As all of you well know, the theme of this week's conference is "Water, Growth and Sustainability: Planning for the 21st Century." Today, my presentation is designed to provide you an update on our water operations and some of the programs and projects the Albuquerque District is currently working that support the goals of Growth and Sustainability of this critical resource.

### **Water Operations in 2000**

Very simply, this year's severe drought precluded flood control operations...flooding was not an issue with which we had to deal. However, we were still heavily involved with water operations and

releases due to the Silvery Minnow Endangered Species mediation. This involved many of us in this room and resulted in close and extensive inter-agency coordination. Low-flow releases were made this summer from two of our reservoirs; Abiquiu and Jemez were part of the court ordered mediation from the silvery minnow litigation. The bottom line is this: We ended this past summer with extremely low reservoir storage in Santa Rosa on the Pecos, and Abiquiu and Jemez Canyon. At Santa Rosa and Abiquiu we had to close or alter boat ramps during the summer recreation period.

### **Mediation - Water Operations on the Rio Grande**

Due to the early release of 11,000 acre-feet at Jemez Canyon, we initiated an extensive mitigation program this fall. Initial work included temporary fencing, alternate water sources, seeding, and a grade control structure at the upper end of the reservoir. Also, this Spring we will start a Silvery Minnow demonstration project as part of our Middle Rio Grande Flood Control Project. Current alternatives being looked at are side channels for slack water areas where the minnow can breed and multiply.

### **ESA Workgroup**

We are actively participating with other federal, state, and local groups in the Endangered Species Workgroup looking at alternatives for the silvery minnow. We will continue with this effort this year and our FY 01 program currently includes funding under the Continuing Authorities Program to initiate studies for silvery minnow habitat and fish passage studies. There is, of course, potential for additional future involvement under our restoration authorities.

### **URGWOM**

As presented during last year's conference, there is the Upper Rio Grande Water Operations Model. This joint effort with the State, Bureau of Reclamation, U.S. Geological Survey, Corps of Engineers and others is an excellent example of interagency coordination and partnership and gives us a powerful tool for Rio Grande water operations short and long-term planning. The work started in

1997 and the backbone is completed down to El Paso and is currently undergoing validation testing.

### **URGWOR and EIS (Gail Stockton, 505-342-3348)**

Another outstanding on-going effort is the comprehensive, systemwide Upper Rio Grande Basin Water Operations Review and EIS. This is a joint effort among three lead agencies, U.S. Bureau of Reclamation, New Mexico Interstate Stream Commission, and the Corps of Engineers, and is not just an H&H review, but a complete study of ecosystems, socioeconomics, cultural resources, and aquatic systems as well. Initial scoping meetings are complete and we are currently working on developing alternatives. The EIS is scheduled for completion in 2004. Public involvement and comment is the key and there will be several forums such as web sites, newsletters, and public meetings for doing this as well as involvement through the proposed steering committee.

### **Middle Rio Grande Regional Water Supply Study**

This effort was completed under the Corps' Section 22 authority for planning assistance to states and was cost shared with the New Mexico Interstate Stream Commission. The end product provides data on water coming in and going out of the region and is an excellent tool for regional water planning.

### **Habitat Restoration**

Three local restoration projects being studied under the Continuing Authorities Program are the Riparian and Wetland Restoration at the Santa Ana Pueblo, channel and riparian restoration on the Jemez River on the Zia Pueblo, and the Albuquerque Bio Park Tingley Beach marsh and meadow restoration. **Santa Ana Pueblo:** Sect 206, Grade control structures to increase channel width, removal of non-native trees (salt cedar and Russian Olive), establishment of wetlands.

**Jemez/Zia Pueblo:** Increase channel width, remove non-native trees replace with cottonwoods and willows.

**Albuquerque Biopark:** Pond reconstruction 18 acres, wetlands restoration 13 acres, Bosque restoration 25 acres.

### **Middle Rio Grande Flood Control Study**

This is an on going Construction General project that involves the raising and rehabilitation of levees from Corrales and Belen to provide 270-year level of protection. The Corrales Section was completed in July 1997 and reevaluation of the Mountainview, Isleta, and Belen units are underway and scheduled for completion in July 2002. Construction of the Belen unit is scheduled to start in 2004 and the rest in 2006.

### **San Acacia Levee**

Another Construction General flood control project is the Rio Grande Floodway from San Acacia to Bosque del Apache. The original project scope consisted of the reconstruction of 43.5 miles of existing west side spoilbank levee. The feasibility report is scheduled for completion by April 2001.



*Lyle A. Lewis received a B.S. in rangeland resources from Oregon State University in 1977. Lyle began his career with the Bureau of Land Management (BLM) in Rawlins, Wyoming in 1978. Lyle has worked for the BLM, U.S. Forest Service, and U.S. Fish and Wildlife Service in Wyoming, Idaho, and New Mexico. During his 23 year career, Lyle has worked as a range conservationist, watershed specialist, hydrologist, fisheries biologist, ecologist, wildlife biologist, and most recently as the Endangered Species Branch Chief with the NM Ecological Services Field Office in Albuquerque.*



## **U.S. Fish and Wildlife Service Programs**

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Although it varies from geographic to geographic area, roughly 70 percent of all wildlife are associated with riparian areas at some stage of their life cycle. They use these areas for food, security, shade, and water. Since all fish rely on aquatic habitats, there is a large preponderance of fish and wildlife that are associated with these green vegetated areas along rivers, streams, and lakes. Livestock are drawn to these areas for many of the same reasons as wildlife. People are also drawn to these areas for the recreational opportunities they provide.

Obviously as more and more people choose to live along the lakes, rivers, and streams, more conflicts arise between wildlife and people. I think that the Rio Grande Silvery Minnow probably best exemplifies the conflicts here in New Mexico. It is important to realize that New Mexico isn't unique. Whether it's Bull Trout in Montana, or Steelhead in

Idaho, or Silver Salmon in Oregon, or Lahontan Cutthroat in Nevada, all across the west there are controversial issues surrounding threatened or endangered aquatic species. A large percentage of native fish and aquatic species are either listed as threatened or endangered, or are on some type of state special status list right now because of the increasing demands placed on limited water resources.

The Endangered Species Act was created in 1973 to protect endangered species. From what I have read, people were killing each other over water at least 150 years before the creation of the Endangered Species Act. I think people sometimes lose their perspective when controversy occurs between wildlife and water on how controversial water issues have been and will continue to be without endangered species. Endangered species



conflicts are often the first sign of a limited resource being pushed to its limits.

Obviously it depends on climatic conditions, but even if there wasn't an Endangered Species Act and there wasn't a Rio Grande Silvery Minnow, it is likely that in New Mexico in three to five years we would be facing a lot of these same water conservation problems, but instead of wildlife vs. people, it would be people vs. people.

The Fish and Wildlife Service is an agency of about 7,500 employees nationwide and the mission of the Fish and Wildlife Service is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

We do this through a system of fish and wildlife refuges; there are 520 nationwide and seven of those are in New Mexico. We have 130 national fish hatcheries, fish technology centers, and fishery resource offices of which there are four in New Mexico. There are 78 ecological services field offices in the United States with one in New Mexico.

Congress passed the Endangered Species Act in 1973. The Act was amended and re-authorized in 1978, in 1982, and again in 1988. Congress stated that the purpose of the Act was to provide a means whereby the ecosystems upon which endangered and threatened species depend, would be conserved.

Congress gave all federal agencies the responsibility to use their authority to carry out programs for the conservation of threatened and endangered species. Congress gave additional responsibilities to the Fish and Wildlife Service and to the National Marine Fisheries Service and, of course, here in New Mexico we only have the Fish and Wildlife Service. Those additional responsibilities include determining which species should be listed, delisted, or their status changed in some way. Also our responsibility is to designate areas of land termed critical habitat that are essential to the conservation of the species. And those of you who live in New Mexico have probably heard a lot in just the last week or so about critical habitat for the Rio Grande Silvery Minnow. The Service has been directed to re-look at that issue here in New Mexico. We are taking steps in that direction right now.

We are also responsible for the development of recovery plans for species that are listed as threatened or endangered, and a lot of our critical habitat

designations are based in part on those recovery plans. Our recovery plans are usually put together by a team of scientists and people who are knowledgeable about whatever the species in question.

We are required to consult with all federal agencies regarding the efforts of their actions on threatened and endangered species. And, of course, we are also mandated to enforce the prohibitions the Act put in place for endangered species. The Fish and Wildlife Service enforces the provisions of the Endangered Species Act through species listings and protection of habitats and insuring that the amount of harm that may come to individuals in a population is not so great that it will prevent the species from recovering to levels where the species can be delisted.

The Service makes every effort to do this with minimal impact on other federal agencies and private land owners while insuring the public's continued use of rivers like the Rio Grande and Pecos. It is really in everyone's best interest to conserve endangered species and wildlife in general but also to conserve water. And whether there is an Endangered Species Act or not, people living in arid regions have to learn to be more efficient in the conservation of water as more and more people move into the area and more and more demands are put on a very finite resource.

Thank you.