

Stakeholder Panel: Large-scale Water Users

Editor's Note: The following papers represent a transcription of the speakers' remarks made at the conference; no follow-up papers were submitted by the speakers. Remarks were edited for publication by the editor. The speakers did not review this version of their presentation, and the editor is responsible for any transcription and editing errors.

Moderated by Sam Fernald, NM WRRRI

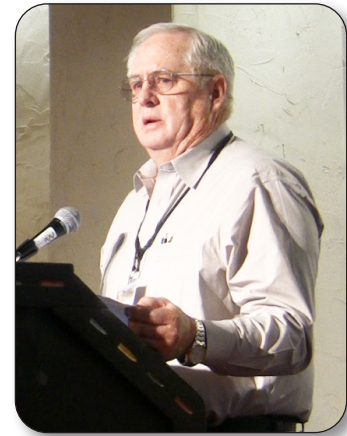
Sam Fernald was appointed director of the New Mexico Water Resources Research Institute (NM WRRRI) in July 2013 after having served as interim director since January 2011. As director, he will lead the institute in its mission to develop and disseminate knowledge that will assist the state, region, and nation in solving water resources problems. The NM WRRRI, one of 54 water institutes in the nation, encourages university faculty statewide to pursue critical areas of water resources research while providing training opportunities for students, and transfers research findings to the academic community, water managers and the general public. Professor Fernald also is a faculty member in the Department of Animal and Range Sciences at New Mexico State University.



Irrigated Agriculture

Bill Netherlin, Pecos Valley Artesian Conservancy District

Bill Netherlin is a New Mexico native, and has lived in southeastern New Mexico the majority of his life. Bill was born in Artesia and raised on a small ranch in Eddy County. Bill is a NMSU graduate with a BS degree. Along with his wife and son, Bill began as a tenant farmer with 100 acres of alfalfa. He and his family now own Alfadale, Inc. which owns and leases 4000 acres of irrigated land. Bill has served on the Pecos Valley Conservancy District since 2002 and as chairman since 2007.



Thank you Sam for the introduction and good morning everyone. I was asked to speak as an irrigator. I didn't bring my rubber boots or my shovel or any of that. I don't feel like an irrigator. I don't even feel like a farmer. I'm a water rights owner. I'm surprised that at every one of these meetings, I look around and I don't see any of my neighbors. I'd like to pose a question: How many people in this room rely solely upon water rights that they own as their income? That is what I do. I see two of us here. Are we getting the stakeholders

involved? That is kind of scary to me. We need them to be involved, but I don't know how to get them here.

I'm from southeastern New Mexico, and those who own the water rights there are a part of pretty large entities. Most of the rights are owned now by oil and gas people who have made a lot of money and looked for a place to invest. Dairies own a lot of water rights as well, and these rights aren't on small 50-acre or 100-acre plots—they are on several

thousand acre plots that have been put together. My point is that water is held pretty tight. It is not going to be changed much. The oil and gas people aren't going to be enticed to let go of their rights for only a small amount of money.

I started out with a hundred acres as a tenant farmer and over the years we have built that up quite a bit, and we are proud of that. I didn't inherit it. I didn't go to school to be a farmer. My degree is actually in animal science. I discovered, though, that water is the future. It has become our I.R.A. It is our retirement. It is the money we have in the bank. It's not only what we will retire on, but also the legacy that we leave our children. I don't intend to get rid of it.

We have heard the comment many times that water in New Mexico is owned by the State, and that is true. But we, the water rights owners, own the right to divert it. That is a personal property right, and we are going to fight for it. It is something we worked hard for. We realize that things are changing. The population in New Mexico is going to grow, and eventually the water supply is going to come from different sources as State Engineer Scott Verhines talked about. Supply sources are pretty limited—eventually it will come from agriculture.

I have attended many meetings as part of the Pecos Valley Artesian Conservancy District (PVACD). From my experience, it seems that we are not putting enough emphasis on adjudications. I was pleased that Scott Verhines had adjudications second on his priority list today. I think that is a drastic improvement, and I believe that funding should go to adjudications. The state needs to have its water adjudicated. Colorado has had its water adjudicated for years. We used to be pretty proud of New Mexico when we first started coming to

these meetings. It appeared that New Mexico was a leader in water law. Over the years, it seems that we continue to have the same discussions. We need to get adjudications done. We need water planning. We need active water resources management, which I'm starting to agree with. It is something we need to do, and we need to do it on a regional basis.

I don't really think that our system is broken. I think we need to work with what we have. There are things that we can change. We were at a conference in California last week that talked about how to expedite adjudications. I don't know exactly what they are, but we can get it done if we work at it. I have always been amazed over my water career years that people don't move to where there is water. In the Homesteading Act, those were the places that were homesteaded—where there was a spring or some source of water where life could be supported. Now though, where are people going? They're going to Phoenix; I mean, good grief! Then there is the hill country of Texas. They are so desperately in need of water I don't know how they will ever catch up. Or there is southern California where they have overused the Colorado River. Eventually they are going to find us and our water rights.

We better get ready because we do have some water. It isn't much, but when they do start moving here, we better have a plan and a way that we can provide the water. I don't think we want to go the way of California and do away with 100 percent of the agriculture in some areas. There are irrigation districts in California that have no irrigation at all. Zero. Everything goes to municipal use. That time could come here pretty quickly.

Thank you.

Urban

John Stomp, Albuquerque Bernalillo County Water Utility Authority

John Stomp is the Chief Operating Officer for the Albuquerque Bernalillo County Water Utility Authority. He is responsible for managing the operations of the water and wastewater utility that provides service to more than 650,000 residents and businesses in the metropolitan area. John has been involved with water issues in NM and the Western U.S. for more than 25 years and is currently participating in the Bureau of Reclamations Colorado River Assessment Team. He is a native New Mexican and holds a bachelor's and master's degrees in civil engineering from the University of New Mexico. John is also a registered professional Engineer in New Mexico and is certified as a Level IV Water and Wastewater Operator.



Good morning. Why do I always have to follow someone like Bill Netherlin? Because, I am one of those large users that Bill is talking about who says we are going to be drying up irrigated agriculture in the future. Bill, thank you very much for what you do, and I have a lot of respect for you. But, I think that municipalities, particularly our municipality, are not looking for pre-1907 water rights for our future. We are looking at other opportunities such as drinking our own sewage, indirect potable reuse, and things like that so that we can reduce the impact on irrigated agriculture and use the resources that we already own. That is a side note though; I will move on to my presentation.

As a water user, ABCWUA has a very diverse water portfolio (Figure 1). We have reuse systems in place. We actually have two reuse systems in Albuquerque, a surface water plant, and a groundwater system. We are operating four different water systems right now as well as a wastewater system. So, being able to acquire and use data on a real-time basis is critical for our operations as we move into the future. Figure 1 shows that we also have new sources way out into the future in 2050, but that triangle on the graph isn't there anymore because of things we are doing such as our conservation efforts.

Figure 2 allows us a bit of bragging, but it is also a lot of "be careful what you wish for" in that people in Albuquerque have not only embraced conservation, but we had such a large change

in usage in the last couple years that it actually affected our ability to collect rates. We had to increase our rates as a result of conservation. In 1994, we had a 252 gpcd rate. That was our gallons per capita per day, and we were considered the water wasters of the West. We adopted an original plan of reducing our use by 30 percent over the

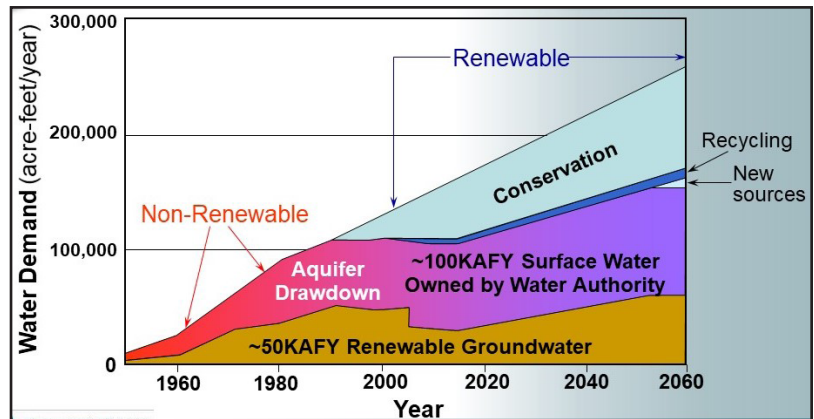


Figure 1. Diversified water resource portfolio requires extensive data/information.

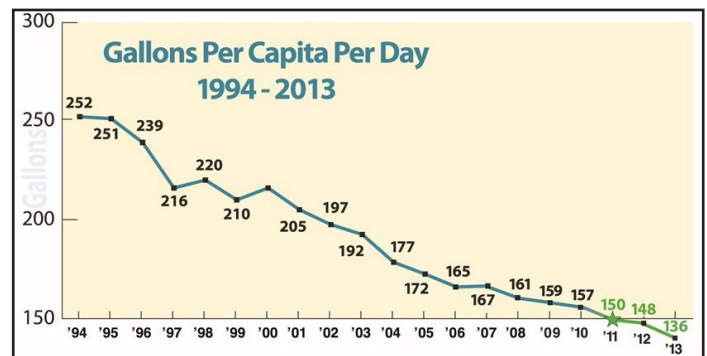


Figure 2. Water authority GPCD 1994-2013.

next ten years. We achieved that goal in about eight years. We adopted a new goal of reducing our use by another 10 percent to get down to 150 gallons per capita per day. We exceeded that and then adopted a new plan to get down to 135, which we met in one year. So you can see that we went from 252 down to 135 gallons per capita per day in the course of about 20 years. That is a huge amount of savings, and frankly, in terms of the western United States, this has been unsurpassed in terms of success. But, it has had impacts on our customers who look us in the face and say, "You tell us to conserve, so I tear out my yard and make all these other changes. Then, you increase my rates." Unfortunately, that is just a fact of conservation. We had to tell them yes, that is what we did, because you have to be honest with your customers. If you are going to increase your customer's rates, you have to explain the reasons why you are doing so. Conservation is one of those.

We also implemented the Drinking Water Project (Figure 3). The reason I am showing Figure 3 is because we have talked a lot about resiliency and being able to move water around, but this is a data driven project. We have a permit that has flow restrictions on it and is gauged on a daily basis of the difference between what the flow is at Central Avenue and the flows upstream of our diversion dam. When those flows reach a critical low-flow period, we have to either shut down or curtail our diversions. Real-time data then becomes critical for us to manage our drinking water resources in Albuquerque. That is to protect downstream water rights holders and to protect endangered species in the Middle Rio Grande Valley as well. Those flow restrictions are critical to protecting those species and to senior water rights holders at the same time. We have to be ready to adjust almost on a daily basis.

We have seen huge impacts on the groundwater resources as a result of the projects we have been working on. With conservation, reuse, and the Drinking Water Project, the aquifer in the Middle Rio Grande is rebounding and is doing so quickly. There are many

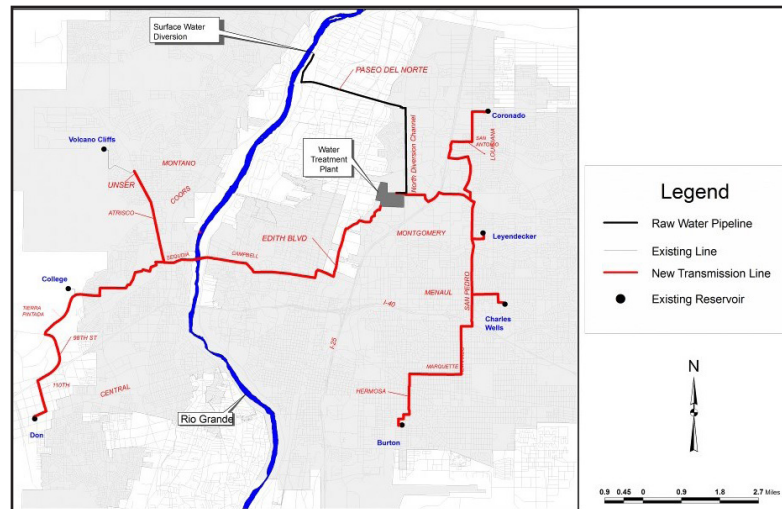


Figure 3. San Juan-Chama surface water - DWP.-

places in Albuquerque where the aquifer has risen as much as 25 feet in five years. From the graphic in Figure 4, in 2008 you can see that period in dark red where we had drawdown of about a 100 feet. These are 20-foot contours. You can see that in a period of only about four years, those areas increased in elevation by about 20 feet. That is widespread in the Northeast Heights and is true in much of the valley. The maps on Figure 4 were based upon nineteen monitoring wells that we built working with the USGS to monitor changes in groundwater elevation in the Albuquerque area. It was a data driven need. We needed to understand the connection between the aquifer and the river and we used data as a way of doing it. This is driven by real-time data. In fact, you can go to the USGS website and look at any of these wells in or

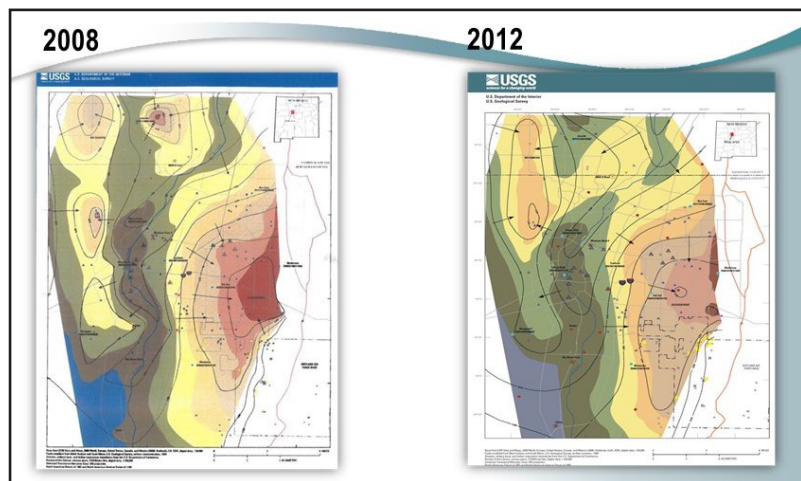


Figure 4. USGS monitoring aquifer levels - major changes in MRG GW levels.

surrounding Albuquerque at any point in time. In other words, the Statewide Water Assessment is critical for water utilities like us that are managing both groundwater and surface water resources. We need to know the impacts of what we are doing in the basin and also to be able to save water at the same time.

We have developed a dynamic simulation water budget model that can use real-time data (Figure 5). We hope to use real-time data to be able to manage our resources. This takes into account water in storage, water we are pumping, water in the river, how much is in our reuse system, what our demand is on a given day, what the demand is that week, and being able to use this water budget model to best manage our water resources and reduce impacts.

Figure 6 is a picture of what the water budget model can do. It can model the impacts of what we are doing on the aquifer. The dotted green line shows what would happen if we would have continued to mine the aquifer in the way we did in 1995 with 252 gallons per capita per day. Then you

can see the solid green line, which starts to show that inflection point around 2008 which is when the aquifer began to rebound. When the Drinking Water Project came on, we started to see that rebound immediately.

Figure 7 is a picture of the water budget model that took real-time hydrology data from the Upper Rio Grande Water Operations Model (URGWOM) that is used extensively in the Middle Rio Grande Valley. It takes data from that, the Corps of Engineers, and other sites for us to be able to manage our resources. Figure 8 is a picture of how we are using that data to develop our annual operating plans.

Figure 9 depicts our actual water usage. The blue line is the impact of surface water. In the drought we are using surface water, and then all of sudden we are shut off because of the curtailment and flow restrictions. You can see groundwater increase in the red and overall use in the yellow. This is an optimization routine that you can use to see what the impacts are of changes in the river on a daily basis.

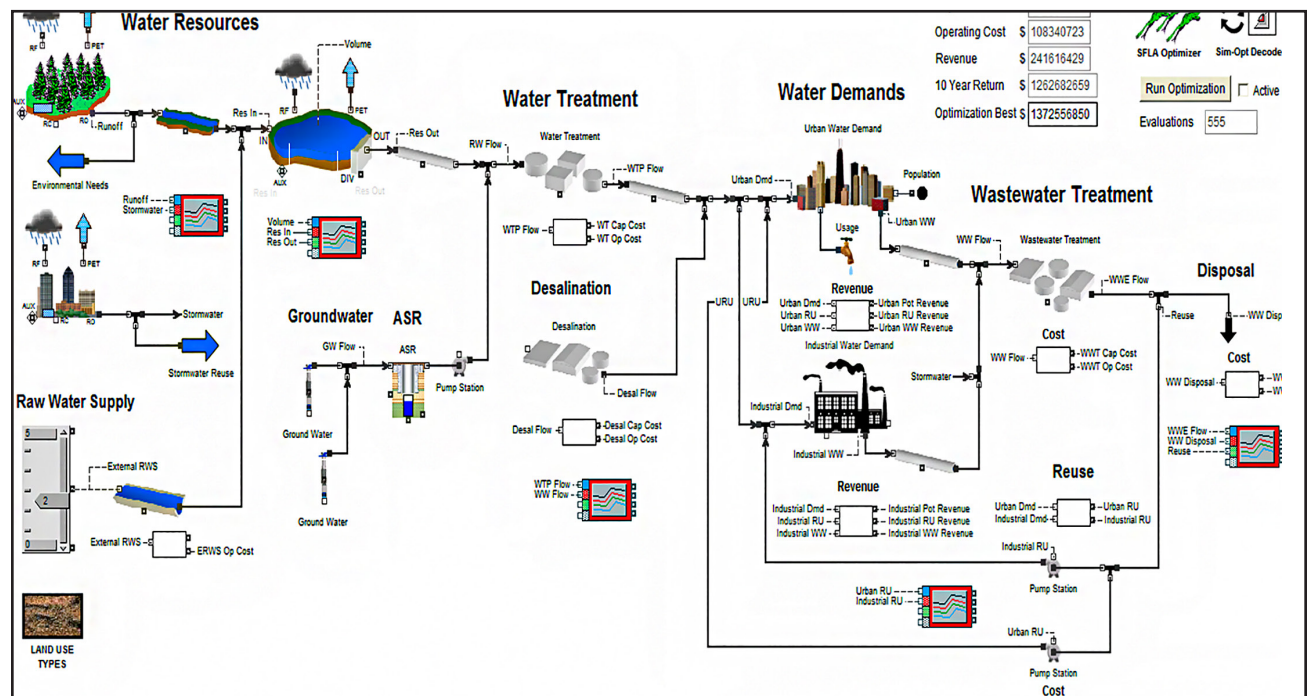


Figure 5. Water Budget Modeling.

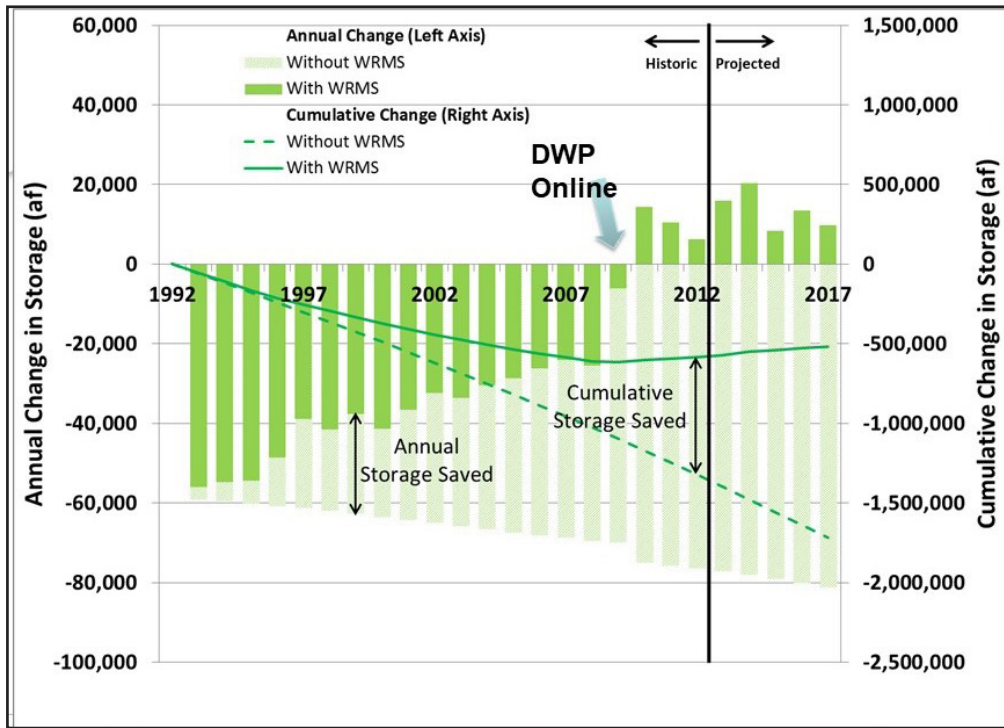


Figure 6. What is happening to the aquifer?

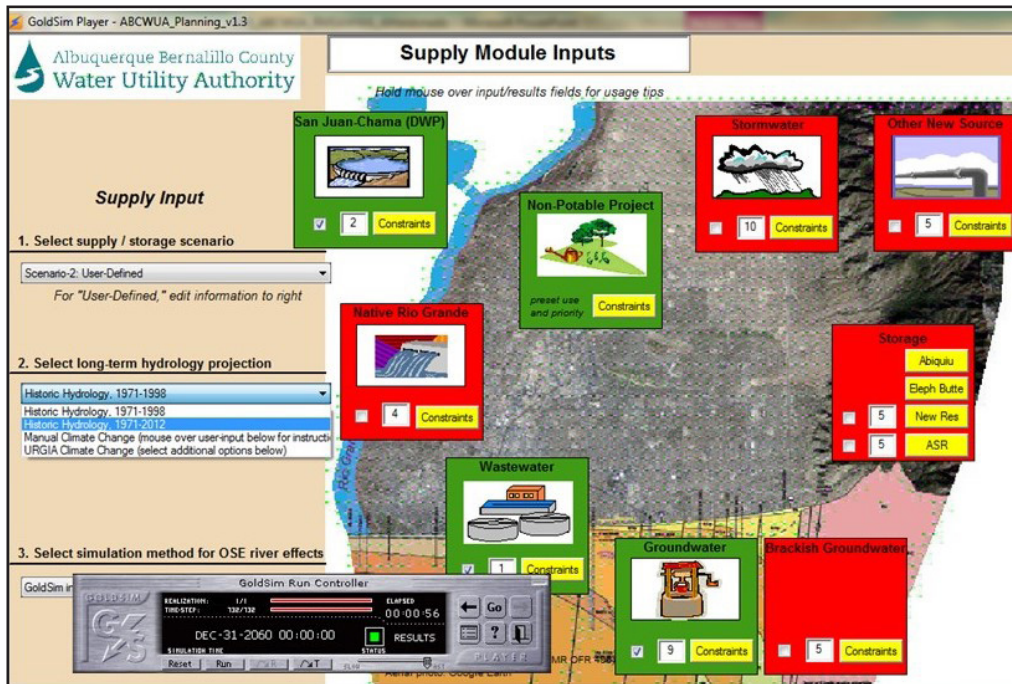


Figure 7. Incorporating real-time hydrology.

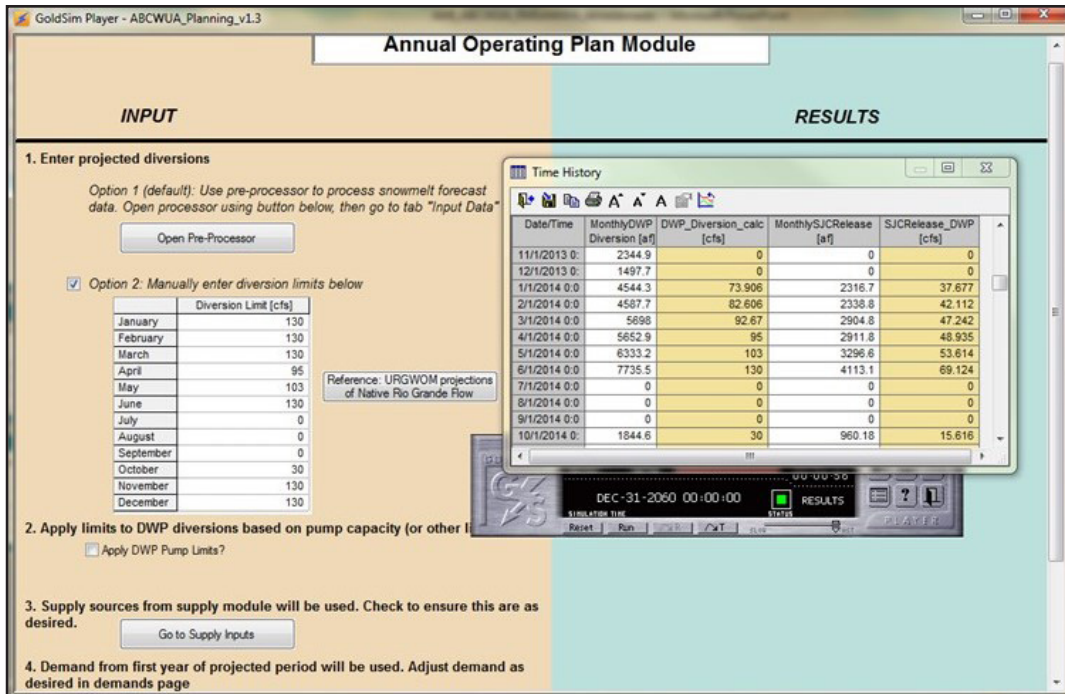


Figure 8. Utilizing real-time data to incorporate URGWOM output.

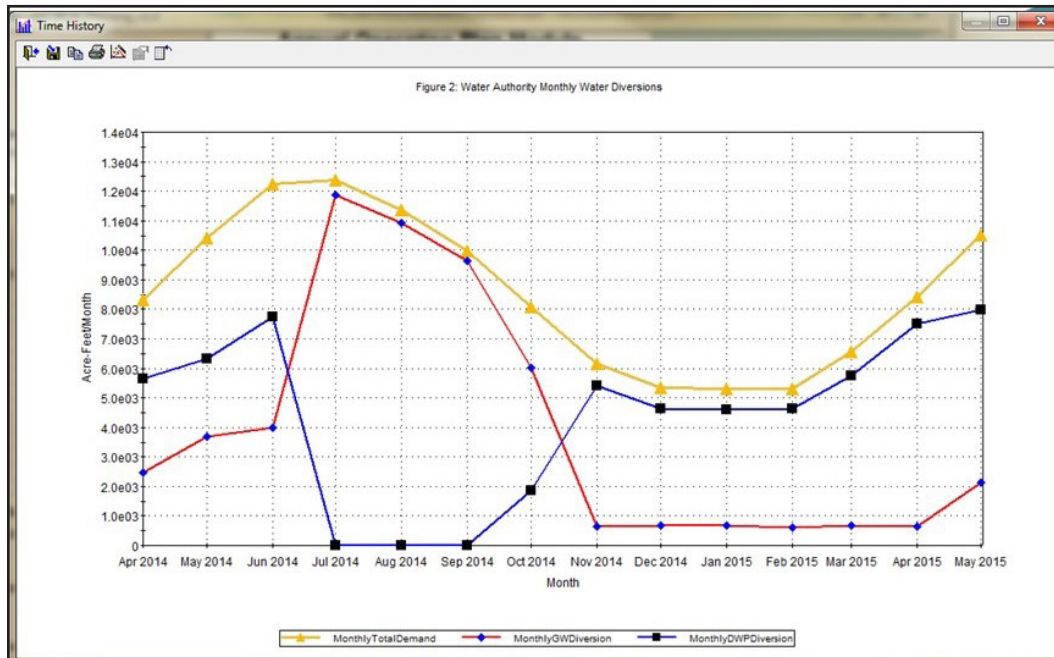


Figure 9. Optimize water resources to meet varied demands.

Being able to optimize our resource use and using aquifer storage and recovery when water is available is a critical aspect for us, and I think for the state as a whole (Figure 10). We are doing an infiltration project right now that is a small project, but there are many other ways to optimize the use of resources when they are available. We don't get a lot of resources and sometimes when the resources do come in, they come in almost all at once. I think that in New Mexico we need to do a better job when we have high water supplies or when we receive high volumes of water instead of just saying, "Whew, thank God, it sure has been a great summer," or "There sure is a ton of snowpack, that makes me feel good." Instead, we should be looking at ways to store that water or use it in different ways so that when the drought comes, we can say we did a good job of planning and taking some of that water into the future. That is an issue we need to address.

We use real-time data all the time. Figure 11 shows our data system. We have full-time operators 24 hours a day seven days a week that watch our reservoirs. The purple indicates our reuse reservoir. We are in constant communication so we can see every drop of water that leaves our reservoir, what the levels are, when we are feeding the reservoirs, and when we are filling the reservoirs. This is just one screen shot, but we constantly use real-time data every day.

We are also incorporating automated metering systems so people can actually see their daily water use (Figure 12). We have 57,000 of these installed out of 200,000 customers. We are ramping that up to get it completed, but you can actually see your water use on a daily basis - you can see that use every fifteen minutes. If you water your yard, you can look and see just how much water you used over that time, or how much you use when you shower. You can actually get that data for yourself. We have

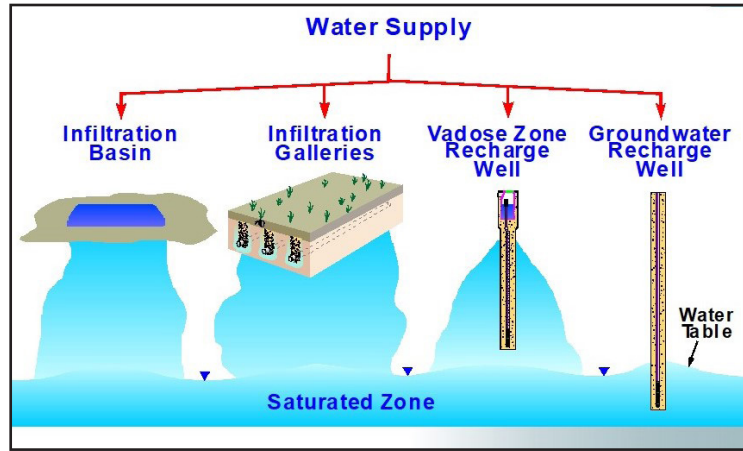


Figure 10. Optimizing water resources when available.

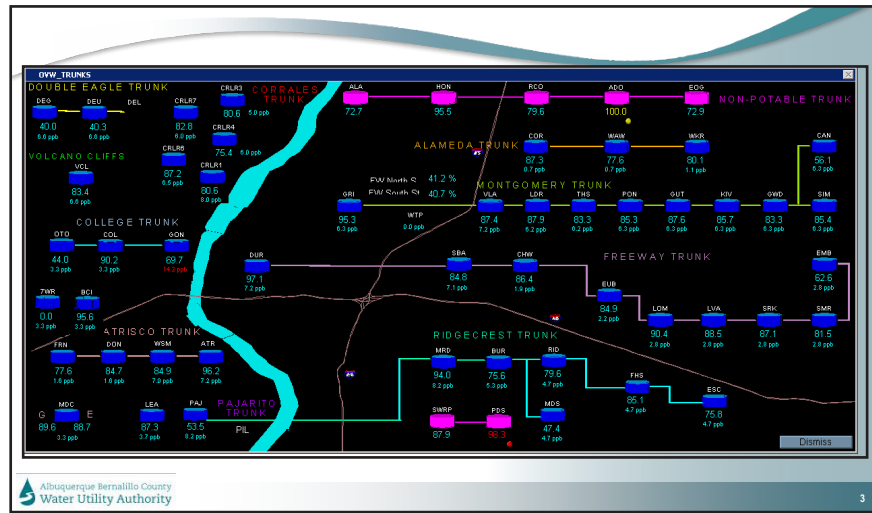


Figure 11 Water authority real-time monitoring – always using ‘up-to-date info.’

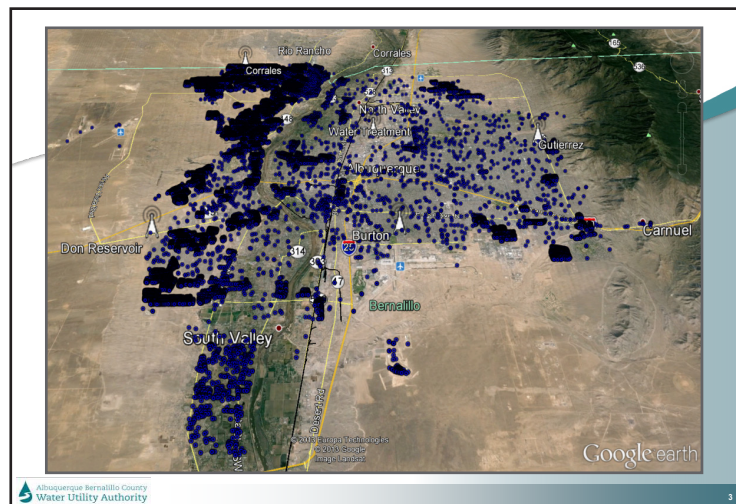


Figure 12. 57,000 plus AMI endpoints 30% installed.

a portal where our customers can go in and do that. Our customers want real-time data. Just as we as a utility want real-time data to manage our resources, customers want real-time data to better manage their use.

How important is this? Figure 13 depicts a meter at 7708 Briar Ridge. I hope none of you live at 7708 Briar Ridge because it had a leak. You can see that they were going along fine, then all of a sudden there is a large spike that started about 10:00 a.m. and kept going up. The automatic meter reading was able to see that increase in usage and we were able to contact the customer immediately

and say, “Hey, I think something is going on with your system. Here, take a look.” Lo and behold, while working with that customer a leak was found. The leak was fixed and you can see the effect; their usage went back to normal in one day. The automatic meter reading is an immediate response to a problem or issue that you have on the customer side. These are the benefits of real-time data and real-time management. The current Statewide Water Assessment is critical for us to be able to use real-time data and then transfer the benefits to our customers.

Thank you very much.

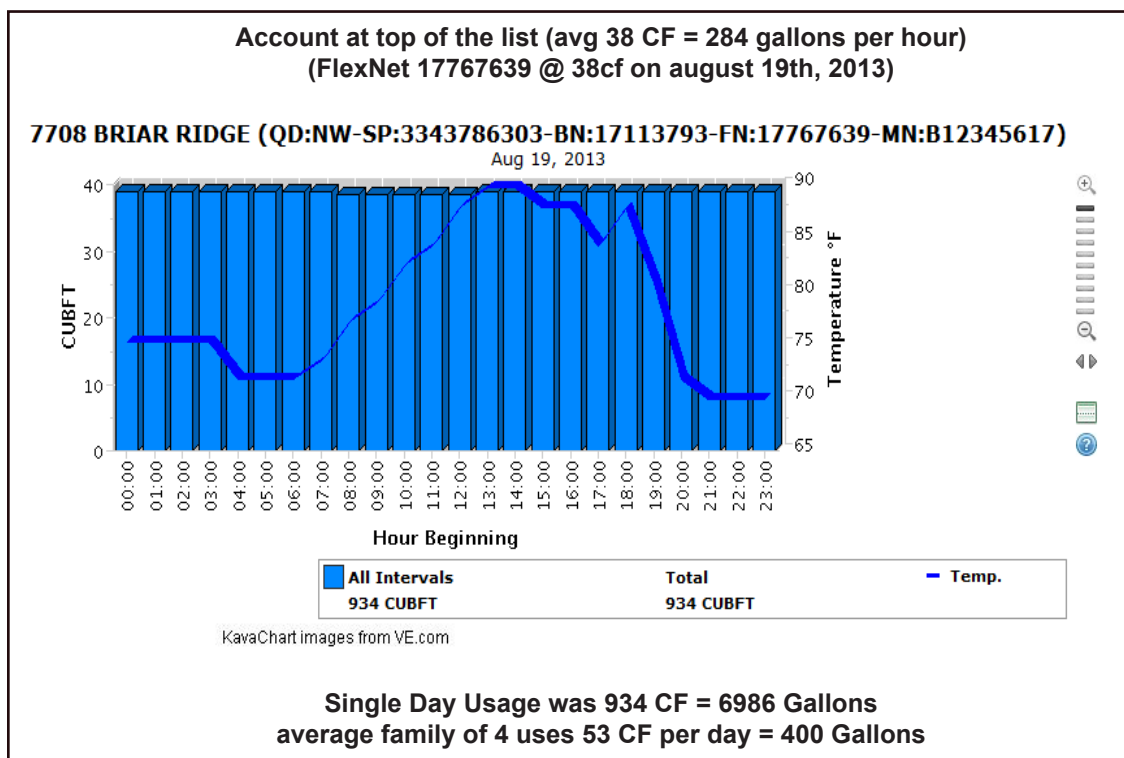


Figure 13. Continuous usage report.

Large Utility

Andrew Erdmann, City of Santa Fe

Andrew Erdmann is a Water Resources Coordinator with the City of Santa Fe's Water Division. Working in this capacity, Andrew has been involved in many large scale water issues including the management of San Juan-Chama project water, watershed restoration and management, water rights permitting, and planning for the impacts of climate change on future water availability. Prior to his work in municipal water management at the City of Santa Fe, Andrew held other positions in the water field including in the fisheries biology program for the US Forest Service and in water rights adjudication and administration at the New Mexico Office of the State Engineer. Andrew has a BA degree from Bard College in upstate New York and MA degrees in both water resource policy and natural resources planning from the University of New Mexico.



Hi, my name is Andrew Erdmann and I'm here speaking for the City of Santa Fe where I'm a water resources coordinator. I'm here to talk about how we manage our water and I thought I'd go over some basic information about our city's system to help explain how we would benefit from the Statewide Water Assessment. We use both surface water and groundwater sources. First I'll talk about how we use our surface water, how we would benefit from the Statewide Water Assessment, and how we could contribute to that effort. Then, I'll provide information about our groundwater and plans for the future in terms of new sources.

Santa Fe consumes about 10,000 acre-feet of water a year, of which 75 percent is surface water. We have 81,000 water customers and our consumption rate is about 101 gallons per capita per day, something the City is quite proud of. Our four water sources include the Santa Fe River, which starts in the mountains; San Juan-Chama Project Water, via the Buckman Direct Diversion; a well field located in the city itself; and the Buckman Well Field located near the Rio Grande.

Our management objectives include:

- Prioritize the use of Renewable Surface Water
- Sustainably Utilize Groundwater as a Backup Supply

- System Efficiency
- Pursue Conservation
- Source Water Quality Protection
- Maintain Resiliency Despite Climate Change

We are trying to prioritize the use of renewable surface water as our primary source. As I mentioned, about 75 percent of our supply comes from surface water in a good year. At the same time, we also have groundwater sources that we use as a backup supply and we want to use that supply sustainably. Another goal is system efficiency at all scales including efficient use of power to run the system (including using solar power) as well as end-user conservation measures that we encourage. We aggressively pursue conservation measures at the end-user level and in terms of identifying and fixing leaks. Source water protection is also very important for both our surface waters and the groundwater sources. These objectives are aimed at making the city more resilient even as the impacts of climate change become more severe.

Our surface water supply includes the Santa Fe River that originates in the mountains just north of town and which has two storage reservoirs holding a combined amount of approximately 4,500 acre-feet. The river is located in, basically, a wild

watershed where there is no land use and it has been closed to the public for decades. Much of the data compiled by the Statewide Water Assessment and related studies that Sam Fernald described earlier today could be very helpful. For example, actively updated satellite-based precipitation and evapotranspiration measurements could help the City to better understand the relationship between rainfall, soil moisture, plant cover and reservoir levels. This could help to time reservoir releases – for the City’s Living River Ordinance, or for deliveries to acequias in order to maximize the usefulness of those releases for urban vegetation as well as creating space in the reservoir at a time when additional inflow is likely.

Another helpful aspect of the assessment would be the Dynamic Statewide Water Budget, which could help to alert the City as to when issues with the interstate compact could be triggered. In times when Article 7 of the Rio Grande Compact is enforced, the City is limited in its ability to store water in its upland reservoirs and needs to adjust its management plans. Techniques and information about forest thinning treatments, and looking at the relationship between these treatments and prescribed burning and the relationship with reservoir storage as well as providing information from other areas of the state to help us better manage our resources could be very beneficial.

Our second surface water source is the San Juan-Chama River Project Water. This water is diverted about fifteen miles northwest of here from the Rio Grande through the Buckman Diversion Facility. This facility works best if the water isn’t too turbid. When it gets too turbid and sandy, it becomes very difficult to treat and is very hard on the equipment. Improved upstream monitoring of precipitation and other conditions likely to cause spikes in turbidity could improve operational efficiency.

The City has a lot of data collected over the years that we could potentially contribute. We have good forestry and hydrology data because of our closed watershed. It is a good location to explore options such as forest thinning as forest thinning

projects have been taking place there since the early 2000s. This information could be useful to other places around the state. Likewise, we have done climate modeling that looks at our usage and the implications for our utility to about year 2050. The model predictions could improve the statewide dataset and could also benefit from data collected and presented in that dataset. We also have reservoir data going back decades. Finally, we have a wastewater plant that releases water downstream. We could provide information about how much water we have released, and we could benefit from learning about the impacts of those releases and how to calibrate releases below town.

We have two groundwater well fields. Our City well field has eleven wells within the city limits. We also have the Buckman Well Field that comprises 13 wells located 15 miles northwest of the City near the Rio Grande. We have an interdependent system: the water that comes out of the Santa Fe River watershed is what recharges the aquifers from which the City well field draws. Likewise, the Buckman Diversion comes right off of the Rio Grande so it directly impacts the river from which we draw our San Juan-Chama River Project Water. Information about groundwater and surface water interaction, how these are connected upstream from us, and what our impacts are could help us manage our groundwater for when it is really needed. We do monitor our groundwater, primarily because it is required by the state engineer, but our monitoring goes back a very long time. We also have the pumping data that goes back quite a while that could be used for calibration. We have extensive studies on the geology of the area. We’d like to share that information regionally and make it available to the Statewide Water Assessment.

Other examples of coordination with the Statewide Water Assessment include the proposed collection of GIS-based data on groundwater level change, especially as the effects of climate change become more pronounced—that could help the City to better balance its use of these resources. Ongoing collection and compilation of groundwater storage

and level change data could also help to identify possible threats to the municipal water supply and allow the City to shift its use. If, as we're told, precipitation starts arriving in less frequent and more dramatic events, the City could use that information to guide land-use decisions.

Looking toward the future, we are also interested in reclaimed water. The tools in the assessment can help the City to evaluate what we need to do to utilize reclaimed water. One of the difficulties in doing this is that the high demand season and the low reclaimed water availability season are the same season. One solution for this may be groundwater storage, which the City is interested in pursuing, both through stormwater management practices and through aquifer storage and recovery projects. Improved data on groundwater levels and flow conditions would greatly help with this effort.

Lastly, we are interested in well-field sustainability analysis. As I mentioned at the beginning of this presentation, sustainable well-field management is a management goal for the City of Santa Fe. But we still aren't really sure what that looks like. A lot of the data in this assessment would be very valuable for inclusion in an analysis, including incorporating the new data along with advances in modelling techniques and technology into the City's well-field management practices. Information about how our use of the groundwater resources impact the aquifers, how the aquifer works, where water moves, and tying in all of the surrounding water users, whether domestic or non-municipal users like irrigators, could help us to better manage what we have.

If anyone has any questions feel free to come and talk with me. Thank you.

Manufacturing, Commercial and Industrial

Dale Dekker, Dekker, Perich, Sabatini Architects Engineers and Planners

Dale R. Dekker is an original founder of Dekker/Perich/Sabatini with extensive experience in architecture and planning projects that are socially, economically, and environmentally sustainable. Dale's contributions to architecture include high tech, one-of-a-kind research facilities for Sandia National Labs, award-winning school designs across the Southwest, and large scale master planning projects such as the UNM Master Plan Update. Water and its use in the built environment has been of particular interest to Dale. He has served as a member of the Customer Advisory Committee of the Albuquerque Bernalillo County Water Utility Authority and most recently as a member of the working group that has developed the Rio Grande Water Fund a Comprehensive Plan for Wildfire and Water Source Protection, an effort spearheaded by The Nature Conservancy. Dale earned a Bachelor of Architecture-Texas Tech University in 1975 and is a registered architect in New Mexico, Texas, Utah, Nevada, Arizona, Colorado, and Wyoming.



Hello everyone. My name is Dale Dekker and I am an architect and planner and this is the unabashed, shameful infomercial about Dekker, Perich, Sabatini. We are an architecture and engineering firm in Albuquerque. I grew up in Albuquerque and we have about 150 employees with offices in Albuquerque, Phoenix, Amarillo, and Las Cruces. We have done several projects around Albuquerque including the renovation of Albuquerque High School and the Rust Medical Center on the west side of town. We also did the renovation of the Del Norte High School, and we have participated in large scale planning projects in our region. My familiarity with water really started when I served on the Business Advisory Committee for the Albuquerque Bernalillo County Water Utility Authority with Stephanie Moore and John Stomp, who were supportive. It gave me a sensitivity for the challenges we have, but also for the opportunities that we have regarding water.

As an architect and planner, I know that you must “study the past if you would divine the future,” as Confucius said. When looking at water in the region, you only need to look at the past to realize that drought is not uncommon. We need to plan for drought. That is just the way it is and how we need to build our communities. If you look at growth projections for our state, they are radically reduced from what they were five years ago before the recession when we were supposed to grow

as a state over the next 25 years by about 675,000 people to 2,775,000. What I think really concerned a lot of people in Albuquerque was that during the recession our millennial population actually decreased, and for probably the first time in the history of our city, we had a net-loss of migration of population (Figure 1). If you look at Bernalillo County and the surrounding four county area that includes Valencia, Sandoval, and Santa Fe counties, about 60% of the growth of our state is going to occur in that four county area. If you look in the rear view mirror, we grew by about 390,000 people from 1985 to 2010.

Millennial's (Ages 20-34)	
Source: PWC Emerging Trends in Real Estate	
AREA (Rank)	5-Year Growth
Albuquerque (46)	-1.4%
Phoenix (25)	11.3%
Dallas (5)	8.7%
Denver (11)	7.3%
<i>Reverse the trend to positive growth – attract opportunity for the next generation</i>	

Figure 1. Reverse the trend to positive growth – attract opportunity for the next generation.

Figure 2 shows our water wheel, at least as provided by the Middle Rio Grande Water Assembly. I, for one, believe that this water wheel will change, but I don't think the change is going to come from agriculture. One of the reasons is that there is a trend toward locally grown and produced food. In Albuquerque, about three percent of our food is locally produced. The Urban Land Institute recently received a urban innovation planning grant to look at what it would take to grow 50 percent of our food locally by the year 2040. I'm a big believer that locally produced food deserves water and will be important.

John Stomp earlier talked about the conservation that has been achieved by the water authority in our region. What he didn't talk about was the fact that they have had an increase of 65 percent in accounts, but a 19 percent decrease in demand, which I think says a lot (Figure 3). When people understand what the issues are and line up all the tools in their available tool kit to conserve, we can achieve that. John also mentioned that in 1994 we were at 252 gallons per capita per day, and we reduced that to 136 gallons pcpd in approximately 20 years. We still have some room to move downward; looking at Santa Fe, which uses 101 gallons pcpd, is a bit higher than San Francisco, which is at 91 gallons pcpd.

I have gained a great appreciation for what it is going to take to protect our groundwater; the options we have for recharging our groundwater supplies through proper management and proper use of our arroyos; management of our bosque and protecting it from extreme fires; as well as protection of our watersheds. We are working with a group from the Nature Conservancy on forest restoration projects. Businesses are becoming very interested in harvesting groundwater as a future source of our green infrastructure. Clearly, we have to adapt, and in the Middle Rio Grande region, we must adapt and change our built urban environment to respond to a drier and hotter future. The question is: how are we going to do that?

It is my opinion that we are going to adapt building codes, our land-use development codes, and use of new technology to achieve some of the things that John talked about earlier like real-time metering and feedback to users as well as creating

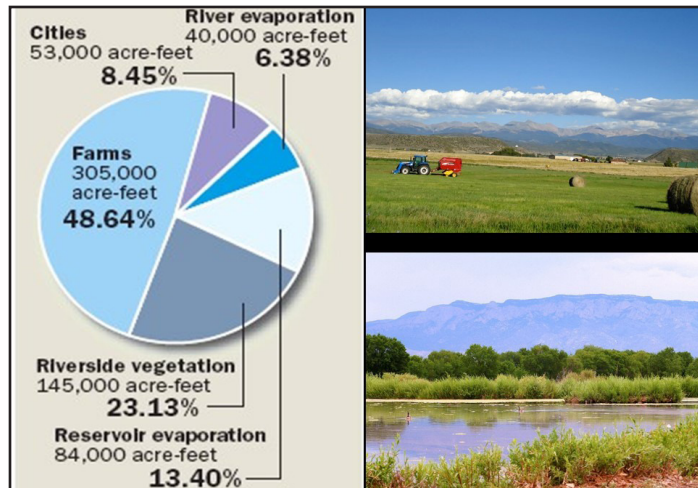


Figure 2. Water wheel provided by the Middle Rio Grande Water Assembly.

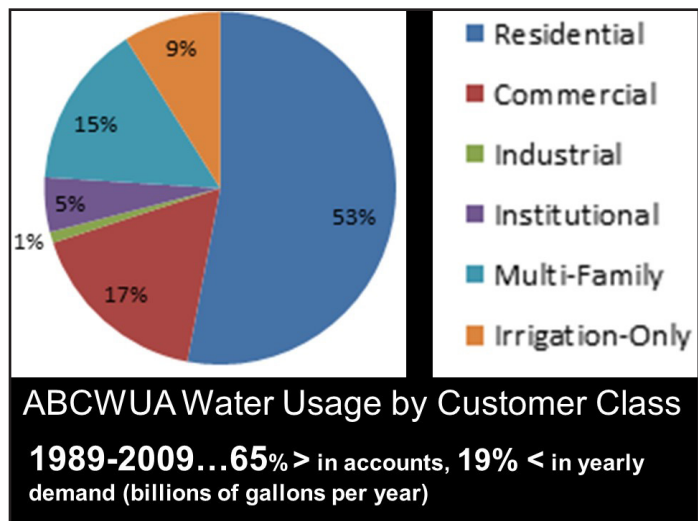


Figure 3. ABCWUA water usage by customer class.

a linkage between our urban form and our use of our resources, be they energy or water. The reality is that we live in a high desert that is subject to drought and we need to talk long-term, which is not a politically correct term, because I don't think politicians think long-term. They think every two years how they can survive the next election, but we citizens need to start thinking long-term. Urban sprawl was how the West was developed, but density is going to be the key in preserving our resources. The key here is that density is not a four letter word. In New Mexico, everybody wants their little plot of land with their landscaping and to take advantage of our beautiful views and vistas. But quite frankly, we are going to need to change our cities to adapt to the future.

An example that I use is the ABQ Uptown Apartment Project that our firm designed where density equals less water. If you look at water use from multi-family and single family units, the average multi-family unit here uses roughly 126 gallons per day. At ABQ Uptown, utilizing all the up-to-date building and landscaping codes, we are at 70 gallons per day.

We often talk about sustainability in terms of a carbon footprint, but I think we are going to start talking about the water footprint. If you look at the aerial footprint of ABQ Uptown, it is a sixth of the size of the single family subdivision that is to the east (Figure 4). A trend which will challenge us, particularly in our urban built areas, is the whole movement toward work, live, play, and the idea of walkable livable communities. It is what the market wants and what millennials want, but density uses less land.

Any number of examples are available and we will see this great renaissance in some of our existing industrial areas such as Journal Center, which was a 1980s single-use suburban office park where we are going to start mixing residential and commercial uses to create 24/7 places. The impact when you start to do these in-fill projects—and Albuquerque has many nodes where this can be done, from uptown Journal Center or downtown to places on the west side—is that you start reducing the impact of single occupancy vehicles traveling from about 90 percent to about 50 percent. It is also multimodal because you can tie into transit such as the Roadrunner, which also cuts down on your carbon footprint.

Density is a fact of life and I think it is going to be something that we New Mexicans are going to need to embrace because it uses less water, energy, land, and requires less transit. These are the things we are going to need to invest in. We talk about innovation and we have all heard about Innovate ABQ and the opportunities there. As Steve Jobs said, “Innovation is the ability to see change as an opportunity—not a threat.” How do we deal with that? If you look at Albuquerque, Santa Fe, Sandoval, and Valencia counties, the area is roughly 7,800 square miles. If you look at Israel, it is only 8,000 square miles. So that four county area is about the same size as Israel. That area has a population of about one million people. Our gross domestic product for the area is about \$48

billion, or roughly 60 percent of our state’s income. In Israel, in the same sized area, they have eight million people and a gross domestic product of about \$290 billion, and they grow 85 percent of their food. We have great examples out there globally that we can draw upon, but also I think we have a lot to offer the world.

Water stress is not just an issue of the Rio Grande Valley. It is a global issue and we are a thirsty planet. It is projected that by the end of the decade, 3.2 billion people are going to live in water-stressed conditions. That is New Mexico multiplied by 1,600. It is hard to fathom what the impact of water shortage will be on a global basis. This is a strategic issue for our whole country.

I think that this is our unique opportunity—and I have talked at length with Scott Verhines about this. Our Rio Grande is a living full-scale research and development lab, and the watershed could

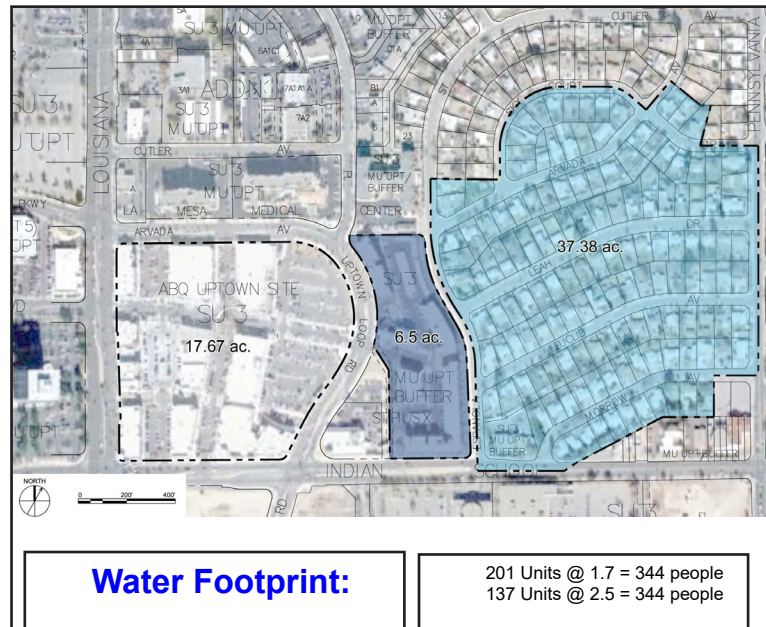


Figure 4. Aerial footprint of Albuquerque Uptown.

become a test bed for many of the technologies, processes, and policies that could be applied globally to deal with this problem. We have the intellectual capital, and the engineering and infrastructure to deal with the situation here in our state. If you look at the economic development cycle of demand driving innovation, businesses are created around that (Figure 5). Innovation provides products and services in response. Our economic cycle allows us to make lemons into lemonade. I think New Mexico has the opportunity to turn water into a global economic development competitive advantage.

New Mexico has a trifecta depicted in Figure 6. We love our nature and we want to preserve it for future generations. We have this unbelievable cultural heritage that is unique in the United States if not the world. We also have technology presented at our national labs, and I want you to look at the technology piece in the figure. That is a nano-machine that is one hundredth the diameter of a human hair—look at the design of that piece. It is something we as New Mexicans can show and celebrate. It is about balancing man with our natural ecosystem and finding the balance to make it all happen. Thank you.

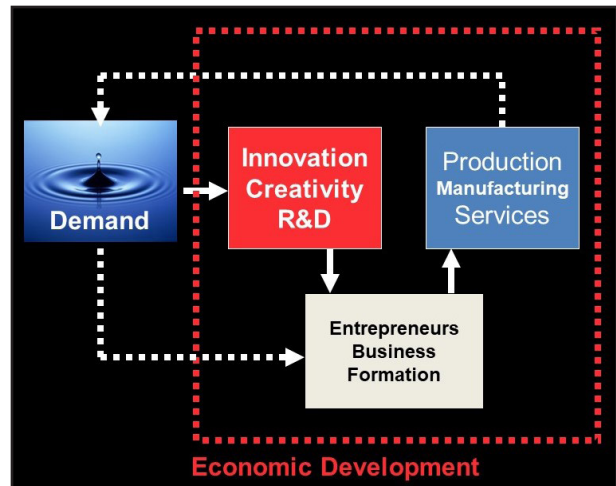


Figure 5. Economic Development Cycle.

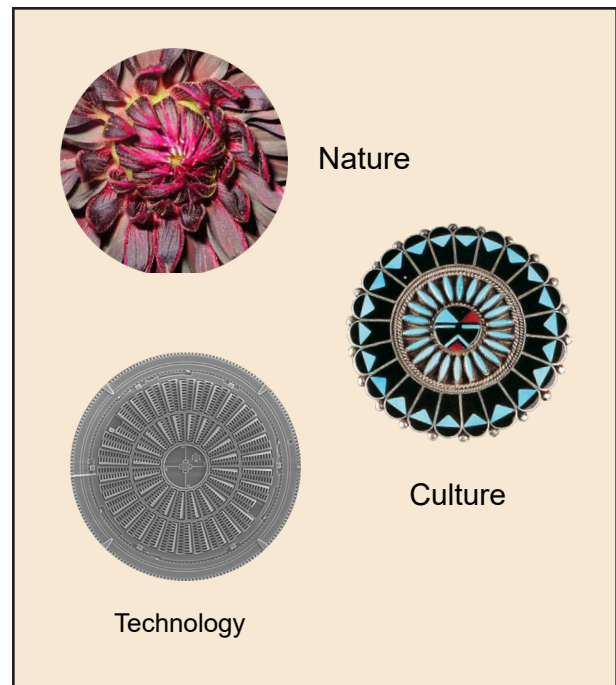


Figure 6. New Mexico trifecta: nature, culture, and technology.

Regional Water Planning/Economic Development

Raymond Mondragon, Eastern Plains Council of Governments

Raymond Mondragon currently represents seven counties (Curry, Roosevelt, DeBaca, Guadalupe, Quay, Harding and Union) and all 22 incorporated communities within those counties on the Economic Development/Government Affairs office for Eastern Plains Council of Governments. Raymond has extensive experience working in the area of economic development and legislative relations. From 1974 to 2001, he served in the Clovis Police Department under various capacities, including Chief of Police. Raymond graduated from the New Mexico Law Enforcement Academy, F.B.I. National Academy in Quantico, Virginia, and Arizona State University's Southwest Command College.



Hello everyone. I'm going to talk about three main issues today: source-water protection, regional plans, and I'll conclude with a presentation about the Ute Pipeline Project in eastern New Mexico, a \$500 million project.

First, I'd like to recognize New Mexico First and its President, Heather Balas, who will be here tomorrow. How many people here attended the New Mexico First Town Hall meeting on the water issue? I can see that we have a large cross section of people here who attended that meeting as well. I know that State Engineer Scott Verhines attended the Town Hall. As a side note, Scott was also our engineer when we were designing the Ute Pipeline Project. We've kind of adopted him on the east side of New Mexico.

New Mexicans want a balanced water policy that plans for future shortages. New Mexicans want to expand water storage and reuse. We want to address legal issues and to protect the environment. New Mexicans also want to explore new water sources including the potential of cleaning brackish waters in our aquifers. They also want to improve the ways that the state finances water projects. These were some of the fifteen recommendations that came out of the Town Hall meeting on water held in Albuquerque recently. Our state engineer mentioned two of those recommendations this morning, and I'd like to point out several others. Recommendation number one was to improve state and regional water plans. Currently there are 16 water plans in New Mexico. I am in Region 1 comprising the counties of Curry, Roosevelt, Quay, Union, and Harding. Our steering committee is now in

place and the chairman of the committee is the honorable mayor of Portales, Sharon King. How many people here today are participating in these state or regional plans? It is good to see a number of people involved in water planning here as well. It is very important that we put these 16 regional water plans together and we are working with the state engineer on this. I encourage those of you on steering committees to work diligently and aggressively to get these water plans completed.

An issue I want to address today is source water protection planning. The Village of Ruidoso just finished a plan. Not only are we concerned with the quantity of water, but the quality as well. How many of you are working on source water protection plans? Just one person? The City of Clovis, in conjunction with Portales as part of the regional water plan, is currently waiting for approval from the State, but has already received approval from the EPA. The Eastern Plains Council of Governments has received a grant to administer, direct, and supervise source water protection, and I will be the director for that effort. Once we get the water, what are we going to do with it? How are we going to protect that water? Remember, when talking about water today, blue is the new gold because water is gold to us. Who would have ever thought years ago that we would be having this discussion? It is important to look ahead and have these source water protection plans. We will save money through prevention. The New Mexico Environment Department has produced brochures about source water protection planning. Hopefully, some of you will start working on these programs in your regions.

To start working on a plan, you need a committee planning team. Our team reviewed source water assessments to identify source water areas to be protected and for sources of contamination. Another step is to develop methods to prevent contamination of source water protection areas such as public education, zoning, ordinances, fencing, and signage. Then, you prepare a source water protection plan to identify actions to prevent source water contamination. Finally, the last step is to implement the plan.

Our blue is the new gold—without water, we have no economic development. In Clovis, we formed the Economic Development Response Team, on which I served as chairman. We have about 175 dairies between Clovis and Portales and several years back, a dairy producer's co-op was formed. New Mexico is the seventh largest dairy producing state in the nation. Clovis recruited a company, Gambia, from Ireland. At the time, I was mayor of Clovis, and we were able to attract and negotiate for Southwest Cheese, the largest cheddar cheese facility in the world. It ships all over the world and provides 300 jobs. It also uses water, but their water is reused. They filter, clean, and recycle their water so they are doing their part to protect our water—our new gold.

Here in the Albuquerque area or anywhere in the state, companies require water. Water is critical to economic development. Helen Keller said, "What is worse than being blind is a community with no vision." You must have vision to move forward and you must work together as a community. I have always said this and the various cabinet chairmen I have spoken with have always said that economic development, water, and water needs should never be partisan issues. Economic development is an issue for all New Mexicans to be concerned with in order to move forward. It is important that we work together as a team to make New Mexico better. When we work together we make New Mexico stronger. When we create jobs, we make New Mexico stronger. When we create jobs, we also have good gross receipts in our communities. Everybody has to work hard to make New Mexico thrive.

The Eastern New Mexico Rural Water System Project is a \$500 million project and has been underway for a very long time. In 1959, the state legislature formed a committee to look at the Canadian River, and they realized that we needed to build a dam to protect our resources for eastern

New Mexico communities. In 1963, construction of Ute Reservoir was completed. It is owned and operated by New Mexico through the Interstate Stream Commission and was built to provide a municipal and industrial water supply to eastern New Mexico communities.

I want to thank Scott Verhines who was our engineer on the project. Also, Gayla Brumfield is the chair of the Eastern New Mexico Rural Water Utility Authority and is here today and I thank her. Sharon King is the mayor of Portales and vice chair of the water utility authority. We have included in this project a water conservation effort. As you have heard from other speakers today, water conservation is a very important component in preserving our water resources. Chris Bryant, commissioner for the City of Clovis is also here today. Chris is the chair of the Water Policy Committee. Fidel Madrid is the current chairman of the Eastern Plains Council of Governments, where I also work as an economic developer of government affairs. My thanks to everyone. I am recognizing these folks because they work as partners. I'd also like to recognize the ISC Commissioner and newly elected State Representative Randy Crowder who has also worked in these areas. The engineering firm on this project is CH2M Hill. I also wanted to thank Kristy Christopherson and Barbara Crockett who put together this PowerPoint presentation for me. They have all been involved in this \$500 million project.

I want to thank former U.S. Senator Jeff Bingaman as he was the chairman of the Energy and Natural Resources Committee in Washington at the time and was a great help to us along with former U.S. Senator Pete Domenici. As I mentioned earlier, Ute Reservoir was completed in 1963 and was built for municipal and industrial water supply needs for eastern New Mexico communities. It is also used for recreation. I remember at the ground-breaking ceremony we were met with quite a crowd that was against the project. It has been pretty tough road. As you know, the Ogallala Aquifer is rapidly declining. The aquifer is a finite resource so it is important that we have this project and that it is supported by the State.

Canon Air Force Base is very important to eastern New Mexico. It has a \$600 million economic impact to the region. They completed a report called The Trinity Report that substantiates and corroborates many of the findings by CH2M Hill. The Project is need.

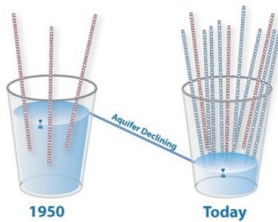
Figure 1 is a good illustration of where we were in 1950 and the draws today in Portales. Portales’s well fields are nearing the end of the lives. I am impressed with Portales, which currently has the largest loan fund of \$27 million for a new wastewater treatment facility. Portales has a lot of support for water usage and reuse. Wells are, in fact, going dry south of Curry County. Residents are having to haul water to their homes.

Figure 2 depicts the Project purpose, a regional solution. You can see the pipeline project flow. It will go through Canon Air Force Base and will have pipeline to connect to all of these communities.

Our water portfolio is shown on Figure 3. Water conservation is very important component for a sustainable future and the Ute Pipeline Project. Figure 4 provides the Project status.

The intake facility is shown in Figure 5. The intake goes down 93 feet. And Figure 6 shows the construction of the transmission water supply that will connect member communities. Thank you.

Project Need: Portales



- City’s well fields are nearing the end of their useful lives as a high-yield source of supply – about 13 years
- This is based on a 9-year average depletion rate of 2.9 feet per year in the City’s primary well field compared with the average remaining aquifer thickness of 38 feet (measured in January 2013)

"The best alternative water supply for Portales continues to be a renewable surface water supply from Ute Reservoir..."
City of Portales 2013 Water Conservation and Use Report, October 2013

Figure 1. City of Portales well fields measurement comparison to 1950.

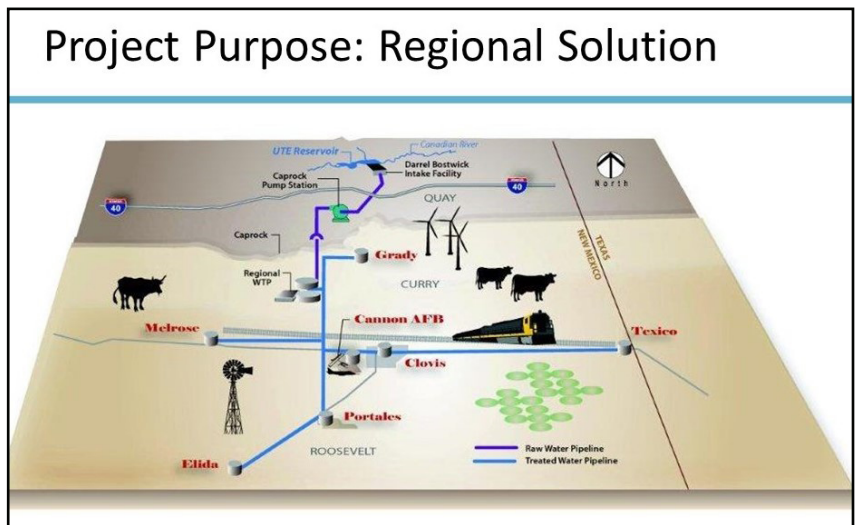



Figure 2. Pipeline project flow.

Project Purpose: Regional Solution

Regional Water Portfolio is Key to a Sustainable Future

- ENMRWS “Ute Pipeline” is the foundation of the Regional Water Portfolio



- Critical to our community – focused public and business leaders collaborating and committing to completion of the project

Figure 3. Regional water portfolio for the sustainable future.

Project Design Status

- Bid Package 1 (Transmission Pipe Connecting CAFB and Clovis)
 - 95% design completed
 - Tank connection drawings/specifications
 - Easements being acquired
- Bid Package 2 (Transmission Pipe Connecting Portales)
 - Potholing, geotechnical field/data report, mapping, base map completed
 - 60% design complete, geotechnical engineering report, corrosion report, scour report
- Elida Pump Station – Construction to begin early 2015
- ENMWUA Water Conservation Plan

Figure 4. Ute Pipeline Project status.

Intake Facility Construction Status

- ▶ Shaft (51 feet diameter by 93 feet deep)
- ▶ Intake Screen Bench (65 feet deep by 115 feet wide)
- ▶ Intake Tunnel (54 inches diameter by 250 feet long)

Figure 5. Intake facility.

Next Steps: Community Interconnection

Construction of the backbone of the transmission water supply pipe to interconnect member communities so interim groundwater can be delivered from outlying areas

Figure 6. Construction of the transmission water supply.