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New Mexico Municipal Representatives on the Use of Surface Water for Their City: Santa Fe

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Hello. It is a pleasure to be here like many speakers have said. I am a newcomer to these conferences, but I have been very pleased and felt that I have learned a lot by coming to these conferences, especially because of the broad cross-section of people that are here as well as the geographic distribution throughout the state and our neighbors. It is really a great way to learn about what is going on in New Mexico and the surrounding area. Today I will be telling you about Santa Fe's surface water use in the past and future. I will also tell you about we have learned about using surface water in the past and considerations for using surface water. The themes in my topic you have already heard today, but there is one thing I will talk about that you have not heard today. True to our form that Santa Fe is different, we are also different in water resource management.

Figure 1 is an old sketch of Santa Fe from 1882. The first surface water use in Santa Fe began in 1881, just before this was drawn. You can see where the Santa Fe River flows through town. When I say the use of surface water, I mean for municipal purpose. Obviously the Native Americans and Spanish colonists used the Santa Fe River for agricultural and other uses prior to 1881 when the first dam and distribution system were built.

Let's take a look at that history in graphic format (Fig. 2). On the bottom of the figure are years 1881 to 2007, and along the y-axis is acre-ft per year. This is our water use over that time period. Over the first 50 years, you can see that the amount of water was primarily under 2,000 acre-ft, and beginning in the 1940s and 1950s, what we see throughout the state is an increase in demand as the population grew. One thing I will talk

about a little later is the decline and what happens to the line when you implement conservation programs and your demand decreases.



Figure 1. Santa Fe, NM 1882

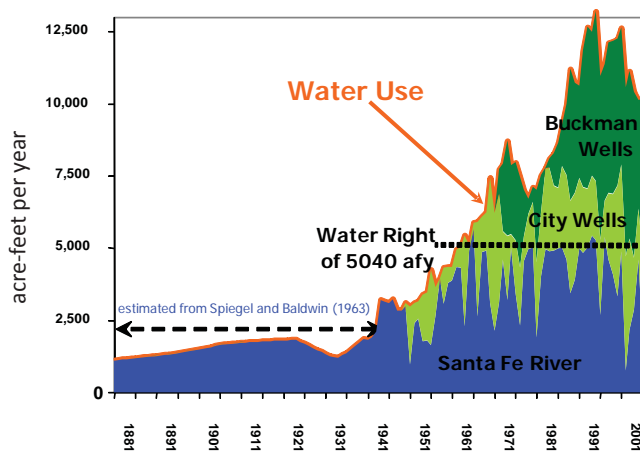


Figure 2. Historical Use of Surface Water

Let's take a look at what role surface water has played in filling that demand over time (Fig. 3). The blue is Santa Fe River use since 1881. For the first 50 years, the Santa Fe River was adequate to meet all of Santa Fe's needs, and then beginning in 1951, demand exceeded available surface water supply. Nonetheless the use of the Santa Fe River did give the City a license to use 5,040 acre-ft of water, which I have shown here in the black line. Another thing to note that has not been mentioned as much today is variability. You can see that over the last 50 years, flow has been highly variable, including the worst year on record (2002), where the watershed yield was around 700 acre-ft. Now this of course means that to rely on surface water, you have to have something else to supplement supply. That is where the City wells came in the 1950s, the wells within the City limits along the Santa Fe River. The City's most recent supply was drilled in the 1970s. It also marks a shift that occurred in most municipalities from using surface water to groundwater. Currently we get between 50 and 75 percent of our water from groundwater, which is not sustainable.

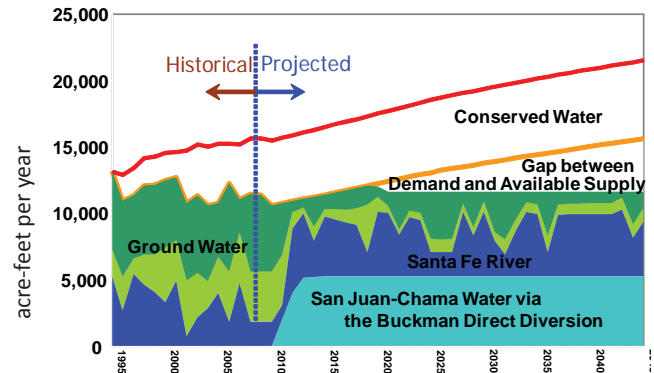


Figure 3. Santa Fe's Future Surface Water Use

There are two things that led the City to change from what is our current water use to what will be our future water picture, which I will show next. The other reason to change, besides unsustainable use of groundwater, was because we had an unused asset in our portfolio. We have 5,230 acre-ft of San Juan- Chama water but no way to use that water as a source of supply. So we needed to build an infrastructure project to access that water, and that is the Buckman Direct Diversion Project, which several people have mentioned today. Figure 4 is a view from the White Rock overlook, which is on the eastern side of the Jemez Mountains looking north. You can see the Rio Grande in the near foreground and the Sangre de Cristo's in the background and where the diversion site will be. We broke ground on the project a month ago. Our project is at the confluence of the Rio Grande and this big arroyo. It is not like Albuquerque with a dam across the river; it will only be a riverside diversion facility.



Figure 4. Santa Fe Future Surface Water Use: Buckman Direct Diversion Project

John D'Antonio gave some details on this project so I don't know if I need to repeat those. The regional project partners are allowed to divert 8,730 acre-ft per year, of which 64 percent is San Juan-Chama water, the rest is native water. This is a project with regional partners, City of Santa Fe, Santa Fe County, and Las Compañías, which is a private development in the area and we are scheduled to be online in 2011.

Let's see what role the combination of San Juan-Chama water and Santa Fe River water will play in our future. First I want to go back to the demand that would have been had we continued to use water at 1995 water levels (Fig. 3). In 1995, we were using 168 gallons per capita per day, and that projected out into the future is this red line. Aggressive conservation measures have brought down consumption down to about 105 gallons per capita per day total use, which has resulted in all this conserved water. Ed Archuleta mentioned how much you can save in infrastructure costs. We project that out 40 years and see how much we have reduced our supply needs by 33 percent, and that is a lot of projects we don't have to build in the future. We take away all the demand that we don't have and look at how we will fill the demand that we do project. Note the combination of Santa Fe River with the San Juan-Chama supply in 2011. You can see that the variability of the Santa Fe River continues, however, we consider San Juan-Chama water to be fairly drought resistant for three reasons. One, if you know the project, the amount of water contracted is already a firm yield, meaning seasonal variability has been taken out of San Juan-Chama. The City has an additional contract for leased San Juan-Chama water with the Apache Nation, and we can use that to supplement any shortages we might foresee. In addition, we also use stored water to supplement any shortages. Groundwater will continue to play a role in meeting our future demands. As you can see, we are going to reduce the amount of groundwater we are currently using by two-thirds of our portfolio to less than one-third or one-fourth of our portfolio using groundwater as a drought backup when surface water is not available. We still have a gap, even though we are spending \$210 million on the new Buckman Direct Diversion Project. The gap begins in 2021, and is approximately 2,700 acre-ft by 2045. We have some options on how to fill that gap that include increased conservation, purchasing water rights on the Rio Grande, or using the effluent we are not utilizing at the moment.

What issues are there to consider in using the Santa Fe River water that we have learned? First of all is adjudication. We have a license for 5,040 acre-ft, but we don't really know how many other water rights there are in the basin and that makes it hard to plan our water resources, but that isn't a new thing at all. Also I mentioned variability. If you are going to rely on surface water you have to have alternative supplies, by 2011 we will be lucky enough to have that. We will have both surface and groundwater, but it is expensive to have two systems for water sources in order to meet demand one time under varying conditions. Also

vulnerability is something to worry about. Many watersheds are susceptible to catastrophic fire as ours was. Our watershed was closed in 1932. There had been no fire in over 100 years. We are fortunate that there have been \$10 million dollars spent on thinning projects to reduce our risk of catastrophic fire in that area, but there are still 10,000 acres that have not been treated. Any watershed that supplies surface water is vulnerable to fire. Source water protection is also an issue as Robert Pine mentioned earlier. Any surface water is more vulnerable than groundwater.

These next two topics that I will go into greater detail on are ecosystem impacts and unpredictability. This is where the City is different. We have the dubious distinction of having the Santa Fe River being named America's most endangered river in 2007. Looking at the photograph in Figure 5 would make you wonder if it even is a river. One of the mayor's top three priorities is to bring the Santa Fe River back to life. That is a tall order for a river that looks like this. So what are we doing to try and accomplish this priority? I should mention it is not just his priority, it is also a community priority. We have instituted a River Check-Off Program that allows community members through their water utility bills to donate money to the river fund that will be used to purchase water rights and dedicated to instream flow. The fund is also matched dollar for dollar with City money. To date we have collected around \$40,000, which in today's water rights market buys you about 2 acre-ft. And if any of you don't know how 2 acre-ft translates into flow, it would be about 1.5 cfs for a day or two. So this is a long path if this is all we were doing to bring the river back to life.

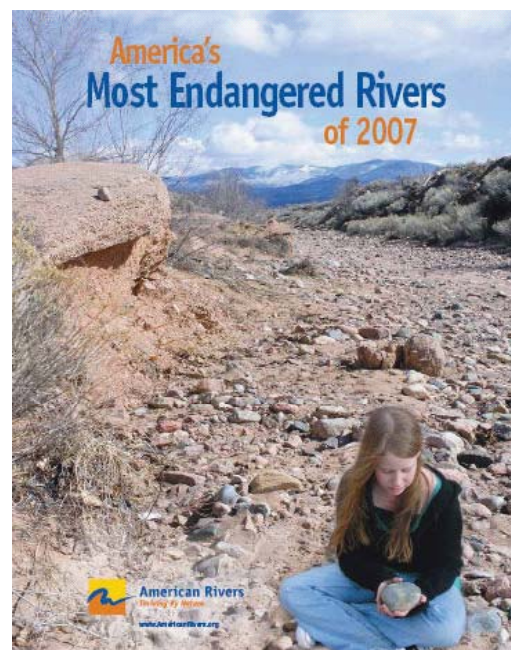


Figure 5. Santa Fe River

We are doing river and watershed restoration because a healthy watershed means a healthy river and vice versa. We are currently doing environmental flow studies to ask the question, how much water does this river want for it to be living or healthy? That necessitates defining “healthy” and “living,” which is about as tricky as defining “sustainability,” but we are trying to do that.

The last thing that is significant is that the City has recently adopted its long range water supply plan. In that plan, the City dedicated 1,000 acres of its water rights portfolio to the river, so that water will run down the river for an instream flow, and that is a condition under normal, wet years, but it is a large step toward getting water in the river. What we haven’t figured out yet is what our options are concerning recovering that water. In light of the Bear Canyon Recharge Project, we certainly will be looking at how we can recover that water. We are not ready to do that yet, but we will be looking into how that water can serve multiple purposes. One is to keep the Santa Fe River alive and second is to have it serve as a source of supply after it meets its first purpose. Also, we heard Mike Connor and others speak about the SECURE Water Act this morning. There are people who have been arguing that releasing water into the Santa Fe River sets us up for a secure water future because it puts water into the system that will be there for a long time. I don’t think we have figured that out hydrologically yet, but we believe it will bear out in a long time frame even if it is hard to justify now. But there could be a security benefit to releasing water now.

Finally, I will say a word on the unpredictability that comes with climate change and the impacts to groundwater resources. We know that water supplies are vulnerable to changes. You may disagree on the causes of climate changes but there is positive proof that things are getting warmer.

So what has helped Santa Fe manage our surface water issues? Figure 6 is also right in line with what we heard about the SECURE Water Act. We have been monitoring and collecting stream flow data, groundwater data, water use data, and treatment data. We have done this with the USGS in some cases and in other cases on our own. I’m sure I am forgetting all kinds of things on the list, but the fundamentals of understanding our system is really important to us in order to use surface water.

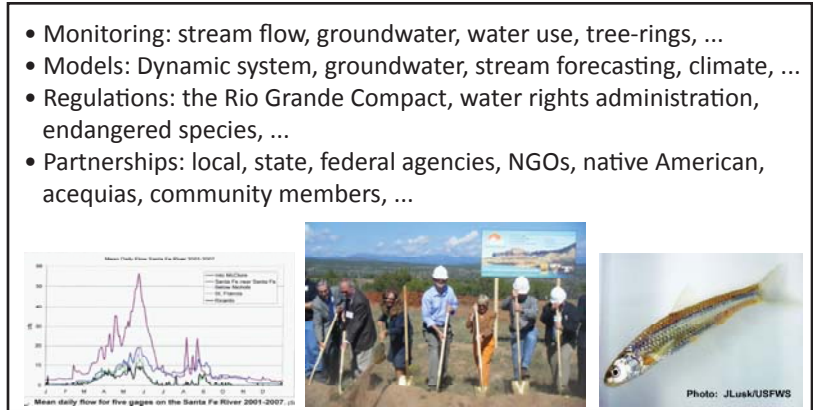


Figure 6. What has helped Santa Fe Manage surface water issues?

We also use models; we have a dynamic systems model for our water supply system that really helps us understand the ramifications of “what if” scenarios. For example, we are using it right now to answer questions about how much storage should we carry over from year to year in our reservoirs, or what happens if our demand increases because of global warming. We plan to use study data to expand our understanding of past stream flow data and to see if it makes any sense to use maybe a 500-year reconstructed stream flow record as a proxy for the future (even though we realize the future will probably be different). It is also important to understand regulations because they provide the framework in which we can make decisions and see opportunities. We are affected by the Rio Grande Compact on the Santa Fe River because about three quarters of our storage is post- Compact water so we have to comply with the Rio Grande Compact on 3,000 acre-ft of stored water. Finally, something that is not to be underestimated is partnerships. Our Buckman Direct Diversion project is a partnership with regional entities, and everything that we work on that deals with water issues requires that we work together with our larger community.

In conclusion, Santa Fe recognizes the need to rely on renewable surface water for supply. We have in the past and plan to continue in the future. Some final questions to ponder are what are our decisions and the associated tradeoffs. There are always tradeoffs in water supply, only one of which is expense. Surface water comes with responsibility to have a drought resistant backup supply. Drought requires the responsibility to figure out who owns what water. Stewardship requires that we make wise use of the resource and the ecosystem, and protect our watersheds. Whose responsibility is this? Relying on surface water requires monitoring and models to understand the resource and the opportunities, recognition of the regulations we must work within, and collaboration. Thank you.