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HISTORICAL REVIEW OF WATER: WATER CHALLENGES PAST AND PRESENT

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Welcome to everyone. It is good to see some of my old friends and acquaintances that I have and to make some new ones. Karl introduced Lowell Catlett as being a Texan. I wonder what part of Texas he is from, because he talks a lot faster than any Texan I have ever heard. He must have changed after he got here. You have to talk slower or Texans cannot understand you. I can say that because I am from Texas, but I have been in New Mexico for 77 years. I also want to say a couple of other disclaimers. Although I am in the legislature and this is my tenth term, any of the comments that I make are not comments of the legislature. They are my own personal comments. I do feel humbled to be here after such presenters as Em Hall, Lowell Catlett, and Chuck DuMars. The other presenters are great. If you have

not read Em's book *High and Dry*, you need to get a copy of it, because it is a great informational book.

I had a few things prepared, but as the others kept making comments up here, I kept writing different things down on my script, so it is somewhat changed. Keeping to the historical theme, let me go back a considerable amount further than Em did. I will talk about maybe some situations seven or eight thousand years ago and go back further than that in geological time.

I came across a publication by Dr. Walter Clay Lowdermilk who used to be with the Soil Erosion Service, now known as the Natural Resources Conservation Service. He made a trip over into the Holy Land or Lebanon, Iraq, and Iran in the 1930s. He went there for the specific purpose of studying historical agriculture. Starting out about 7,000 years ago, I am

going to build into this theme of change in weather and the climate.

In 7,000 B.C., they had a wetter climate. There was a group of people called the Sumerians that were pretty progressive. They were intelligent people, and they started diverting water from the Tigris and Euphrates Rivers and learned how to efficiently till the land. They had rich alluvial soil, and they were very efficient at tilling it. They learned to do things other than farm. When one fellow could produce enough food for one family or a whole group of people that

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left some time for others to do things other than farming. Thus, they developed other things of importance. We can't thank them, for example,

for the wheel, which they credit to the Sumerian people. Also the sixty minute units in an hour and a twenty-four day came from those people. They were very intelligent people.

In diverting this water from the Tigris and Euphrates Rivers, they built long canals. As they became successful in their agricultural processes, the population grew. One common thread that binds all of these 11 different civilizations together that existed several thousands years BC is that they diverted water, and they were successful. They did have military conflicts that taxed their resources but the main reason for their failure was that silt and sediment from their irrigation projects over decades of time plus population growth made their fields unproductive. The fields became higher than their diversion point and their canals. They couldn't produce enough food and fiber. Consequently, their civilization eventually crumbled.

In Mesopotamia — by the way there are many of these towns that are mentioned in the Bible that we have never found, but as we excavate more and more we are finding those places, and we are finding the Bible to be pretty accurate. There was a town named

Kish, the capital of Mesopotamia 2,000 years B.C. They had a big flood. I don't know which flood. That town was inundated, and that civilization crumbled. The nation failed.

Babylon was about 600 B.C. It also met the same fate. I have a quote here. This is during King Nebuchadnezzar's reign. He did some great things. He even had freshwater canals going to his horse stables, which he had hundreds of. This has been found in writing, credited to King Nebuchadnezzar: "That which no king has done before, I have done. A wall like a mountain that cannot be moved, I have built. Great canals I have dug and lined them with burnt brick laid in with bitumen and brought abundant waters to all the people. I paved the streets of Babylon with stones from the mountains. Magnificent palaces and temples I have builded [Builded here is not a misquote]. Huge cedars from Mount Lebanon I have cut down, with radiant gold and overlaid with jewels and I adorned them..." This was his own testimony about what he had done for the people of Babylon. But as you know, the province of Babylon would meet its demise, and it did. Babylon is covered in silt and mud like a lot of the others, but Babylon is being excavated.

A similar situation like the ones in the Middle East occurred in Egypt in North Africa. Egypt was a very developed and accomplished civilization also. They diverted water from the Nile River. Sediment and silt did the same thing to their fields, even those people who built the pyramids and the sphinx suffered the same fate that the people of Mesopotamia had experienced.

When talking about silt and irrigation work failing, I want to talk about the Pecos River momentarily. The Pecos River was having the same problem. They had a dam that used to be north of Carlsbad about 15 miles called Lake McMillan. That dam silted in where it was no longer efficient and could not serve the Carlsbad Irrigation District storage needs. A new dam, called Brantley Dam had to be built. The same thing has happened here in a way that happened to early day civilizations.

Even carrying it further than that, as you know the Rio Grande is quite a different river. In the upper regions of the Rio Grande it has snow melt, fresh spring water; the water is clear and pretty. When it gets down near Albuquerque, you have the Rio Jemez above Albuquerque and the Rio Puerco that have floodwaters and sediment filled waters flowing into the Rio Grande and into Elephant Butte Reservoir. A huge delta of silt

and sand has developed at the upper end to the point where it had to be dredged to make a channel to get water more efficiently to the lake itself. However, the lake still has many years of useful life left.

Let me now go to another aspect of ancient history. I will talk about this very area itself. Five-hundred-seventy million years ago, the area below Las Cruces, down around El Paso and 75 miles down into northern Mexico and northward into the Tularosa Basin across the other side of the Organ Mountains was all at the shallow end of an inland sea. That was 570 million years ago.

One-hundred-forty million years ago, changes occurred. Some of the land masses raised and some lowered. The seas drained. However, we had a glacial period with a receding ice cap at that time. The seas were re-formed. As the glaciers started melting, the sea filled up again and overflowed. The overflow cut a drainage path that intersected with the Rio Grande river and drained all the way to what is now known as the Gulf of Mexico.

Two million years ago, the ice age advanced again. The ice age brought a lot of water into the area. Seventy-five thousand years ago, that ice cap started melting and refreezing and slowly receded to the north. Thirty thousand years ago, there was a straight now called the Bering Strait, a land formation between Siberia and Alaska. People came across that straight and started settling in North America. Eleven thousand years ago, which is not much in geological times, we had a wetter climate than we do now. That wetter climate also allowed for the fact that there were tropics in this area at the time. It started getting colder from the advancement of the ice cap, and then it started getting warmer as the ice cap receded. Some of these people crossing the Bering Strait settled in the Clovis, New Mexico area, and they became known as the Clovis culture. Through the El Paso area, we find some of their fluted arrow points and the skeletons of mammoths and giant bison that they killed. The Curry and Roosevelt Counties in the Blackwater Draw area are testimony for scientific findings about those cultures.

Also, a lot of people started living in the mountains. The cliff dwellings occurred. People started using agriculture in New Mexico. Because of the receding ice cap, the weather was getting drier and drier. There were occasional years of wet weather with periods of drought. One particular drought in 1280 caused a lot of cliff dwellers to move to more stable water situations,

which would be on the Rio Grande and San Juan Rivers.

We have had some more recent droughts. I was at a drought summit two years ago in 2003, and we were in the middle of the last drought statewide. One of the presenters said that based on temperatures of El Niño and La Niña and temperatures of the ocean water, we would see no relief in New Mexico and Colorado for at least five more years. The next year, 2004, we got 30 inches of rainfall in parts of the state. This past year, 2005, we have received about 15 inches of rainfall in the eastern part of the state, a total of 45 inches of rainfall in two years. When you divide by the 10-12 inch average, I guess starting next year, we are going to have some four-inch rainfall years to bring that average back down to ten.

We have had other droughts. The 1950-56 drought was a terrible one in New Mexico. There was another drought in the 1920s. One that is really recorded quite often in the early day historical books was in the latter part of the 1880s, 1886-1889. I read a book about George Washington Littlefield, one of the founding fathers of the

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University of Texas. He ran large numbers of cattle over on the east side of the Pecos River. Over that three or four year drought, large numbers of cattle died, an estimated 90,000. You could walk across the Pecos River stepping on the carcasses of dead cows. That documentation is written in more than one book. A little more gross description of how bad it was: A chuck-wagon cook set up camp along the banks of the Pecos River. A cowboy rode up to the wagon and went to the river to get a drink of water. The cook said, "No. Don't drink that water. I have some black coffee made." He had strained the water for the coffee through a sock, and the sock was full of maggots from the carcasses of the dead cows in the river. We have had some droughts!

Having told you about dry spells and irrigation, I want to pull it together by saying that the climate has

changed and has been changing over many thousands if not millions of years. I do not know whether it can be blamed on the warming climate and the greenhouse gases or if it is a naturally occurring thing from the effects of the receding ice cap, which is still receding.

I would like to look more recently to some of the problems the state is facing. We have some conflicts starting to occur over water. We have some

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communities that are starting to develop problems. Ruidoso and Ruidoso Downs, for example, have had a water rationing program for the last several years. Cloudcroft had to haul water two years ago

and maybe even this past summer to keep their residents and their households with water. Cloudcroft proposed drilling some wells near Mayhill to pump the water back up to their water storage tanks. There was a disagreement between those two communities over the proposed solution.

My point is that we are starting to have some water shortage problems show up around the state. In Gallup, the water level of the city wells is dropping. We have had on paper for several years a proposed Gallup/Navajo pipeline to divert water from the San Juan River and pump water through the pipeline to water stations on the Navajo Nation reservation and on down to the City of Gallup. I understand the State Engineer and the Interstate Stream Commission are near an agreement, maybe even are in agreement, with the Navajo Nation on the division of the water on the San Juan River, but the plan presented to Congress has not been accepted at this time.

We have another area, the Ogallala Reef, whose water level has been declining steadily for years. The end could be in sight in fifteen or twenty more years on the Ogallala Reef. We have proposed help to the communities on the eastern side of the state with a pipeline from the Canadian River down the east side of the state to supplement the water supply of several communities. The problem is that these pipelines cost huge dollars. I think the Gallup/Navajo pipeline was estimated around \$600 million. The Ute pipeline was \$200 to \$300 million. But when you get to the legislative function and responsibility, each legislator is elected (we have 70 representatives and 42 senators) to represent their own district of people and they sometimes are reluctant to give any of their share of

the available funding to a project that will be of statewide benefit.

In the late 1980s, New Mexico had to pay \$14 million to Texas for under delivery of water for the Pecos River Compact over a 34-year period. The legislature came up with a lease purchase plan about 1990 to resolve the under-delivery problem. It is a lease purchase plan to lease water from the farmers and release it to Texas to build up an over-delivery credit of water to comply with the Pecos River Compact and to buy land and retire it from being farmed. There is not a lot of water available. It is a very complicated issue because we have the community of Ruidoso that brings a lot of dollars into the state of New Mexico because of tourism. Tourism makes them valuable to the state.

There are solutions. We have water. It is just not where the population is and where it is needed. We have, for example, a supply of water in the Salt Basin aquifer. The water from the Salt Basin on the New Mexico side is good potable water, with 100,000 plus or minus acre-feet of recharge per year. It would take a large amount of money to get that water transported back up north to use it but many people think it would be a good investment. One idea would be to build a pipeline from there all the way to Santa Fe with branches going off to the east and the west. I do not think the state would be able to finance it, but I think that a public-private partnership could. It is not a new idea. The Public Service Company of New Mexico (PNM) did own the Santa Fe water system and the lake in the upper canyon until the City of Santa Fe bought it from PNM. We transport natural gas all over the state. I do not see why we cannot do the same thing with water.

Back to a comment that Em Hall made regarding W.A. Hawkins. The Carlsbad Irrigation District, so called now, used to be the Pecos Valley Land and Irrigation Company, which failed because a couple of floods washed out the wooden water conveyance canal that crossed the Pecos River. It cost a good amount of dollars in those days. It washed out a couple of times. So then of course, the soon to be Bureau of Reclamation built a concrete flume. Carlsbad Irrigation District has been in business ever since.

A man named C.B. Eddy was one of the organizers of that project. After Eddy, who promoted the Pecos Valley Land and Irrigation Company, went broke due to the floods washing out the wooden structures across the Pecos River, he moved to El Paso and bought a

railroad project in El Paso. He named it El Paso Northeastern and built the railroad from El Paso to Tularosa and Carrizozo (Alamogordo was not established at the time), on up to Santa Rosa, New Mexico.

They used steam locomotive engines in those days. Steam engines were refilling the boilers with water from the Carrizozo area, but the water tanks would get corroded and had to be chipped out. Eddy decided there was a better way. He went up to the Sacramento Mountains and bought up water rights from the early-day settlers. He bought their homesteads and water rights, he put them to work with teams of horses and built a wooden pipeline made of wooden slats with metal straps around them.

They sent the water down to Carrizozo. It was fresh mountain water, not corrosive to their steam engines. Their waterline also went south toward Tularosa. C.B. Eddy was given the land by Oliver Lee for C.B. Eddy to plat the community of Alamogordo. They also had other pipelines from the Sacramento River further southwest to Oro Grande, New Mexico. The pipeline going northeast from Carrizozo supplied water all the way up to Pastura, New Mexico.

Eventually, railroads stopped using steam engines and started using diesel locomotive engines. Diesel engines did not use water for boilers so the railroad did not need as much water. The railroad sold their water rights to the City of Alamogordo, New Mexico.

Eventually the pipeline from Bonito Lake to Alamogordo had to be replaced. Alamogordo transferred some of their water rights from Bonito Lake to the federal government in exchange for federal funding to replace some of the older pipeline. The City of Alamogordo provides water to Holloman Air Force Base. One interesting point though is that to rebuild the pipeline from Bonito Lake, which is part of the City of Alamogordo and Holloman Air Force Base water system, and interestingly enough it takes water from the Pecos River basin and transfers it over to the Tularosa Basin, which does impair to some degree the water rights of the Pecos Valley Artesian Conservancy District and the Carlsbad Irrigation District and the Pecos River Compact. In contracting to have that wooden pipeline replaced, it took longer for the construction contractors to build a new steel pipeline than it took the old timers to build the wooden pipeline.

There are solutions. We have the water, it is just not where we need the water. We do have the water

to sustain New Mexico's economic needs for some years into the future. It is a matter of transporting the water to the areas where it is needed.