Karl Wood *was named director of the New Mexico Water Resources Research Institute in June 2000. He joined the NMSU faculty in 1979. Prior to his tenure at the WRRI, Karl was assistant department head and range coordinator for NMSU's Department of Animal and Range Sciences. Much of his research over the years has been related to water resources, and for 20 years, he was a member of the Range Improvement Task Force, which provides scientific expertise to help resolve disputes over management of water and other natural resources. Karl completed a B.S. in 1974 in forestry and range management and an M.S. in 1976 in range science with field emphasis on soils and range improvements both from the University of Nevada/ Reno. In 1978, Karl received a Ph.D. in range science with field emphasis on watershed management from Texas A&M. Karl has nearly 150 journal articles, research bulletins, special reports, and conference proceedings publications to his credit, mainly in the areas of range hydrology, range vegetation and soil assessment, and rangeland management, including reclamation of disturbed lands, range improvement techniques, grazing systems and management of rare and endangered species. At the WRRI he has represented NMSU as chair of the Lower Rio Grande Water Users Organization, co-chair of the New Mexico-Texas Water Commission, and chair of the regional Paso del Norte Water Task Force.*

OPENING REMARKS FOR THE 51ST ANNUAL NEW MEXICO WATER CONFERENCE

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Good morning. I would like to welcome you to the 51st Annual Water Conference. The 50th, as you remember, was held in Las Cruces last year. We had about 300 people attend. We started off with Lowell Catlett and ended with Baxter Black and had a little bit of truth in between. This year, we have about 100 registrants. Why are there fewer this year? I do not think it is because we do not have Baxter. Someone pointed out that it is a wet year, and in a wet year we do not need to know as much about obtaining water because we have plenty. During drought years, people come out of the woodwork looking for some water. It is amazing. I was hired at New Mexico State University because of a drought year. I cannot do much during a drought, but I am very valuable. I got all of my raises during drought years. Drought is not always a bad thing.

Today, the honorable Martin Chavez, the Mayor of Albuquerque, will give us welcoming remarks. We thank the mayor very much for attending our water conference this year. It is time we had a mayor who understands the water quality problems and the opportunities of the city.

Water quality is the theme of our conference this year. I would first like to talk about water supply. Water supply is quite visible. Floods like the ones in Alamogordo and Hatch earlier this year are quite photogenic and easily recognized (Figs. 1 and 2). It is quite obvious whether we have lots of water or not. Water supply is a lot easier to measure than water quality. And it is easy to say if we have too little or too much.

Figure 1. Hatch after August 2006 flood

Figure 2. Rio Grande June 2006

With water quality, contaminants may not be visible, and what is visible may be deceiving. Often, it is difficult to measure water quality. It is difficult to say if it is too little or too much. Do we have too much of something or too little of something? Water quality is often poorest when the runoff is the lowest. We know that, but when the runoff is low, quality is of a lesser concern. That is just the nature of it. During the drought, all we hear is that we need more supply. We did not hear much concern about water quality.

Some of the present initiatives, what I see going through Congress, and what I see going through the New Mexico Legislature deal with water supply. We have a growing population, mined groundwater, exhausted surface water, and drought suppressing surface and groundwater recharge (Fig. 3). However, with water quality, there are some initiatives, but they are few and generally center on the Clean Water Act, health concerns, arsenic standards, and other contaminants such as perchlorate.

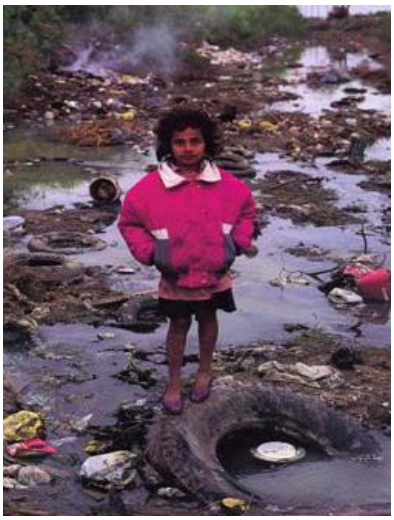

Figure 3. Water quality is often poorest when the runoff is lowest

For any given response variable, such as sediment load, dissolved solids, stream temperature, arsenic content, and so on, there are some questions that should be asked. I see this as a major failing of people involved with water quality as I travel around New Mexico and the nation. Number one, what are the natural levels of sediment, elements, or compounds with variations between hours, days, months, and years? Too often, water quality people are accused of going out with a mayonnaise jar, taking a dip out of a stream one time

during the year, and characterizing the stream for the entire century by that one mayonnaise jar grab sample. There are natural levels of many constituents in the water, and they vary between hours, days, months, and years.

Figure 4 is a picture that is often shown in classrooms throughout the west put together by a professor at Colorado State half a century ago. He showed sediment loads as a function of precipitation. You can see that if there is no precipitation as on the left, then there is no sediment load. That makes sense as it takes water to carry sediment. The sediment load goes up until there is about 10 to 14 inches of precipitation, and then the sediment load comes back down again as precipitation continues to increase. Someone might ask why the sediment load is so high here from 10 to 14 inches of precipitation. At this point there is enough precipitation to cause erosion, but not enough vegetation to protect the soil. Over on the right side of the figure, there is enough precipitation to cause erosion, but it doesn't happen because there is a lot of protective vegetation. How much precipitation is received on most of the lands in New Mexico? Most of New Mexico receives from 10 to 14 inches. Because of that, we need to keep in mind that we have high sediment contents in our water flows because of the nature of our state. The Rio Puerco was called the Rio Puerco at the very beginning of settlement by Europeans because it was always a dirty river. By its nature, sitting on an ancient ocean bed, the Rio Puerco has high sediment loads.

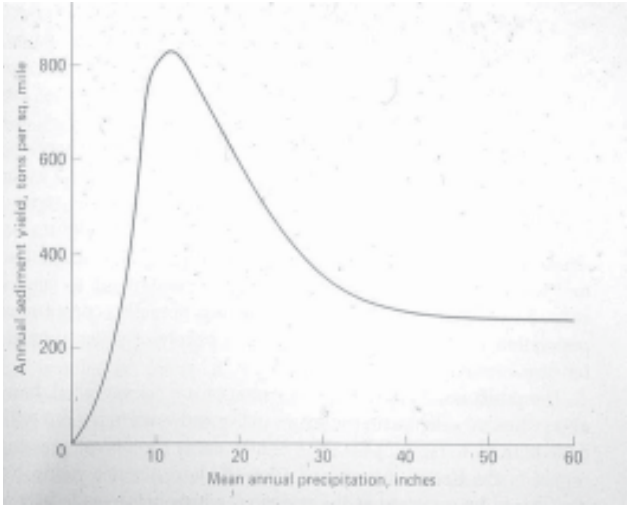

Figure 4. Sediment loads as a function of precipitation

We should also ask what the sources of the natural loads are. Many times we do not know. We find dissolved salts in the Rio Grande. They were attributed to irrigation return flow for decades. Recently, we are finding out more and more that there are natural occurrences of salt in our river beds. How much of the total at any one time is due to human influence? We have that which is natural and that which is human induced. How much is attributed to each? Those are difficult questions to answer. What are the sources of the human induced loads? We hear that lots of bacteria in the Rio Grande come from people walking their dogs in Albuquerque. We should also ask what are the maximum potential levels. How high could it get? Is that a concern? What are the tolerable levels? Maybe we are adding 50 percent of the sediment to a river, but is it still tolerable? That comes back to what the goals of the river are. We should ask what are the desirable levels? And are the desirable levels achievable with the present technology, time, legal, political, and economic constraints?

Here are many questions that when put together are a model that can be used to assess water quality problems and opportunities in our state. We hope you enjoy the conference.