

They Are Going to Miss Me When I'm Gone: The Loss of Knowledge and Institutional Memory Due to Retirement

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Karl has been director of the New Mexico Water Resources Research Institute since 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 BS in 1974 in forestry and range management and an MS 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 PhD 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.



The baby boomer population of 76 million began retirement last year. About 10,000 people will continue to join their ranks every day over the next two decades. About 10,000 people are going to retire every day. And 60 percent of the federal government, or 1.6 million white collar employees, and 90 percent of about 6,000 federal executives will be eligible for retirement in the next ten years. I thought that announcement would make the GS-7s clap. Almost one-third of the federal workforce is expected to retire or resign in the next five years. That is a big turnover.

As an interesting side note, who is going to benefit from an aging population? Well the cruise lines are looking forward to it, and the pharmaceutical companies definitely are, healthcare products and those companies who sell Rogaine and Viagra and those kinds of things, assisted living facility providers are going to gain from it, financial companies holding pension funds, doctors, especially those in orthopedic and physical therapy are going to benefit, and the only other one I can think of is the medical waste disposal companies, so it is not all bad for everybody.

You all know John Hawley, he knows every rock in New Mexico because he is the same age as the rocks, and John made the comment last year of "What are we going to do when all the water professionals are gone in the next few years?" And if you look at the average age in this group here, I think it is over 40, maybe over 50, and we are aging. So I was asked to put together a short presentation on who is going to replace us, and everybody immediately thought this was my swan song to say "Goodbye. I'm retiring and not coming back next year," but I hope to be back next year unless I'm fired, and maybe even the year after that. Eventually all of us are going to be replaced though.

To look at water, a 2008 study and publication by the U.S. Department of Labor predicted the job outlook from 2006 to 2016. They found that the number of hydrologists employed in 2006 is about 92,000, and we are going to need another 23,000 for a 23 percent increase by 2016. That is really good increase, if we have a workforce. Hydrology is growing much faster than the average job growth, and should be strongest in the private consulting firms. Driving this growth is the need to comply with regulations on flood control, clean air, groundwater decontamination, and the need to cope with demands on resources by a growing population.

Geoscientists now number about 31,000, and we are going to need another 22 percent. Geoscience is also growing much faster than the average, especially in energy, environmental protection, and land and water management. Surveyors, photogramists, and survey technicians are needed. There are not a lot of atmospheric scientists. It is argued that we don't need a lot of them and could do with an 11 percent decrease. I have a hard time believing that but maybe that's right.

The Department of Labor goes on to indicate that the need for agriculture and food scientists will increase by 9 percent, about an average growth rate, which is 7 to 8 percent. Eleven percent more engineers will be needed. Keep in mind engineers versus hydrologists, and you may say ask if there is a difference. The increased need for conservation scientists and foresters is only 5 percent, but that is the way it has been forever. The need for economists is 7%. That's reassuring, isn't it? I don't know where lawyers come in, but hopefully they are down there, too.

Where we are going to get the people to fill these jobs? One thing we can do is keep retirees working part-time, and there is a big effort nationwide in many fields to do that. You might want to provide them with additional training if you think they are trainable, offer job sharing, allow flexible time – these are things that are being tried and have worked.

The Ellis Huddleston model is one few people know about but me, but I observed it in the 1980s. Ellis Huddleston was the department head of Entomology, Plant Pathology, and Weed Sciences at New Mexico State University. He knew that there were many retirees moving into Las Cruces from other places. An example was a guy named George McNew who grew up in Alamogordo and

had retired from Cornell University. He was one of the early organic chemists in the 1930s and 1940s. McNew had retired and was living in Las Cruces. Ellis came up with some ideas to put him and several others to work. He recruited professionals in the community who had retired from NMSU or elsewhere to be volunteer researchers. He asked them to research any problem. Ellis knew that often researchers have some things they'd like to work on but didn't have the time during their careers. Ellis gave them the opportunity. It couldn't be something like going to the moon because NMSU didn't have that much money, but if it had to do with determining why harvester ants eat wood then maybe that would work. He expected them to publish an article from their research project; he wanted to put his department on the map so he asked these researchers to publish. That was no problem, they had been publishing for 40 years. He offered them an office on campus – sometimes it was shared – a computer, web and email access, use of a vehicle if they needed to travel to the field, phone privileges, and travel to a professional meeting. After going to professional meetings for 40 years, these retirees were suddenly on their own dime. Ellis said he would send them to their professional meetings and asked them to speak while they were attending. They could see their old buddies and they loved the opportunity. He also gave them campus golf course and activity center privileges, invitations to guest lectures, meetings and classes on campus, and they loved that as well. Ellis gave them a few thousand dollars to conduct their research and total flexibility on time. You would not believe how much time these guys put down on this pet project with no pressure to publish and no pressure to get a raise or tenure; they just had to put out one publication, and they could do the things they loved to do. It worked really well. The benefits included large productivity at a very low cost, and happy retirees with a lasting dignity. We found that many people retire and go away bitter from public and private jobs, and the reason is that their dignity has been taken away. This gave them an opportunity to retain it. Would this model work in non-university settings? I don't know. I'd like to think it would.

We can also increase work visas for foreigners and bring more foreign educated water experts to our country. Or, we can educate and train more professionals. I think that is ultimately where we are going to get the bulk of our new researchers.

What education opportunities do New Mexicans have now to pick up the slack? We have six state universities, only four of them have water education programs: the University of New Mexico has water related graduate research and education programs in many different departments. It also has some special water programs; WRRRI associate director Bobby Creel received a PhD in economics from UNM with a specialty in water. New Mexico Tech has about eight full-time faculty members, seven adjunct professors and sixteen different courses in hydrology including groundwater contamination. New Mexico Tech has a really good groundwater program, and it houses a New Mexico water certification program for people who have their bachelors or masters degree, go away to the work force and want to become certified. New Mexico Highlands has a master's of life science and biology degree with concentration in natural resources management. They graduate several masters students every year.

The program I want to talk mostly about is at New Mexico State University. We realized a few years ago that we have water researchers and educators all over campus, and there was no organization that brought them together. Most of the research today is interdisciplinary research; that is just the way we have gone in the last 20 years. NMSU formed an organization called the Water Science and Education Center. It is a virtual organization. There are eighty-five faculty members at NMSU who conduct water research and educate in that area. That was kind of shocking; that's more than at the other universities, Sandia National Lab, and Los Alamos National Lab put together. The 85 faculty and staff teach 85 graduate courses where water is in the title or in the course description and 112 undergraduate courses. The water-related programs are in 16 different departments across campus and this center brought them together.

What opportunities are on the horizon? Matt Larsen, Associate Director of the USGS last year said "...most hydrologists did not earn degrees in hydrology. In fact, only a handful of undergraduate and graduate hydrology programs exist across the country. It is far more common for hydrologists to come from the hard sciences or an engineering background with a specialty in water." So what does that mean? The national trend today in new programs is to develop a hydrologist with a specialization in multi-disciplinary areas. An example, the existing title we have is hydrogeologist. A hydrogeologist is a geologist

first, one who works with water. The new title would be a geohydrologist, someone who is a hydrologist first with a background in geology.

NMSU recognized this trend and saw the opportunity given that so many faculty were teaching so many different courses. Researchers have developed a proposal that currently is going through the approval process. The proposal is for a master's program in water science and management with core courses and some flexibility. Another proposal is for a PhD program in water science and management with some core courses. Courses are in the disciplines of agriculture, engineering, arts and sciences, and environmental toxicology. The PhD could be earned in 34 credits with some electives. The major advantage of the proposed graduate programs is that they foster a multi-disciplinary research approach that broadens the ability for researchers to acquire grants. The big question in science is always, "Where is the next grant coming from?" These new graduate programs allow water professors and professors without PhDs to advise doctoral students, and that will be a real boost. It allows water professors in PhD-granting departments to advise students in one of two tracks, either the department specialty or the multi-disciplinary specialty. This should encourage more students to pursue a degree in water science and management.

We have many opportunities to help New Mexico develop our replacements. Maybe our personalities can't be replaced. Many years ago I was a pastor and I had a congregation of about 450 people and there were four or five people in the congregation who had a different kind of personality. My wife wouldn't let me call them kooks but that's what they were. I noticed that when they moved away, somebody always took their place. In our hydrology profession, we have some people who have a little different personality, but when they are gone, don't worry, there will be someone to take their place.

We will be replaced, and I include myself with the kooks. The major advantages of proposed graduate programs are that they foster a multi-disciplinary research approach that broadens the ability to acquire grants. In conclusion, smooth seas do not make skillful sailors; these programs are developing and coming along. Have faith, all of us can and will be replaced, and if that isn't enough, as Yogi Berra would say "the future ain't what it used to be."