

University of Nevada, Reno

Peterson, Frederick F.

Program Leader, Agricultural Experiment Station
Railroad Valley Area, Nevada

Author, *Landforms of the Basin and Range Province Defined for Soil Survey*

USDI Bureau of Land Management

Luscher, Charles W.

Soil Survey of Tuscarora Mountain Area, Nevada

Soil Survey Technical Support

USDA Soil Conservation Service

Campsey, Leland, Range Conservationist

Dimick, Ed, Range Conservationist

Halliday, Blaine, Range Conservationist

Harmer, Renee, Secretary (~1956-1985)

Hatch, Sumner, Area Conservationist, Reno

Hugie, Vern, Soil Scientist

Kimsey, Dwight, Range Conservationist

Langan, L. N., Soil Correlator (1950-1969)

Lysne, Luella, Secretary (1956-1986)

McKenzie, Les, Range Conservationist

Mullins, Gene, Range Conservationist

Palmquist, Dale, Backhoe Operator

Passey, Howard, Range Conservationist

Summerfield, Nancy (Harris), Cartographic Technician (1966-1977)

USDI Geological Survey

Morrison, Roger, Geologist

Soil Survey Program Direction and Management

USDA Soil Conservation Service

Naphan, Ed, State Soil Scientist, Nevada State Office

The Fourth Era, 1970 to 1978

Lasting Friendships

Carole Jett

I will never forget when I first met Lou Langan. It was at Soil Mechanics in Portland, Oregon, where he was one of the instructors. It was about 1976 and I was a newly promoted GS-7. I was arrogant as hell. Lou really kept riding me about Nevada and asking me questions in detail about the textural triangle and aerial photos and blisters and going to the bathroom in the field. I was, of course, irritated at this. I kept answering his questions and he kept pressing me until I blew up. When I tore into him, he started laughing like only Lou could do and said to me, "That's the exact same look you gave me when I fouled you out of your basketball games at Swope Junior High School!!!" It all came flooding into my memory. When I was in the 8th-12th grades in Reno, I played basketball. Lou was a very picky referee and I fouled out more than once. What a surprise to discover this former acquaintance. We became friends and I never blew up at him again, no matter how he pressed. What a guy. So I came into the soil survey with a friend.

Individuals Involved in the Nevada Soil Survey Program from 1970 to 1978

USDA Soil Conservation Service

Anderson, Jon (USDA, Student Trainee)
Soil Survey of Washoe County, Nevada, South Part

Archer, Warren
Soil Survey of Storey County Area, Nevada
Soil Survey of Lyon County Area, Nevada

Baumer, Otto W.
Soil Survey of Washoe County, Nevada, South Part
Soil Survey of Washoe County, Nevada, North Part

Blackburn, Paul W.
Soil Survey of Washoe County, Nevada, Central Part
Soil Survey of Douglas County Area, Nevada
Soil Survey of Humboldt County, Nevada, West Part

Blake, Edward W.
Soil Survey of Washoe County, Nevada, South Part

Candland, David M.
Soil Survey of Carson City Area, Nevada
Soil Survey of Douglas County Area, Nevada
Soil Survey of Big Smoky Valley Area, Nevada

Chadek, Ronald (USDA, Student)
Soil Survey of Washoe County, Nevada, South Part

Dollarhide, William E.
Soil Survey of Washoe County, Nevada, South Part
Soil Survey of Fallon-Fernley Area, Nevada

Dougherty, Brian
Soil Survey of Elko County, Nevada, Central Part

Duckworth, William
Soil Survey of Lyon County Area, Nevada

DuRousseau, Joseph
Soil Survey of Lyon County Area, Nevada

Fisher, John B.

Soil Survey of Washoe County, Nevada, South Part

Gorham, John (USDA, Student Trainee)

Soil Survey of Washoe County, Nevada, South Part

Jett, Carole E.

Soil Survey of Washoe County, Nevada, South Part

Larsen, Leland I.

Soil Survey of Washoe County, Nevada, South Part

Soil Survey of Humboldt County, Nevada, East Part

Leavett, Verr Dee

Soil Survey of Virgin River Area, Nevada

Lunden, Eugene

Soil Survey of Western White Pine County Area, Nevada

Soil Survey of Lyon County, Nevada

Mayfield, George

Soil Survey of Washoe County, Nevada, South Part

McKay, Thomas R.

Soil Survey of Las Valley Area, Nevada

Mitchell, James

Soil Survey of Lyon County Area, Nevada

Soil Survey of Carson City Area, Nevada

Slusser, Steve

Soil Survey of Elko County, Nevada, Central Part

Soil Survey of Humboldt County, Nevada, West Part

Soil Survey of Humboldt County, Nevada, East Part

Smith, Robert

Soil Survey of Elko County, Nevada, Central Part

Soil Survey of Elko County, Nevada, Northwest Part

Staidl, George J.

Soil Survey of Lander County, Nevada, North Part

Soil Survey of Tuscarora Mountain Area, Nevada

Soil Survey of Elko County, Nevada, Central Part

Soil Survey of Eureka County, Area, Nevada

Summerfield, Harry

Soil Survey of Surprise Valley–Home Camp Area, California and Nevada

Soil Survey of Humboldt County, Nevada, East Part

Humboldt National Forest Area, Nevada, Parts of Elko and White Pine

Toiyabe National Forest, Nevada, Central Parts of Lincoln, Nye and White Pine

Soil Survey of Mineral County Area, Nevada

Soil Survey of Esmeralda County Area, Nevada

Woodruff, G.

Soil Survey of Virgin River Area, Nevada

USDA Forest Service

Bare, Norm

River Basin Survey

Private

Cox, Dellon N.

Soil Inventory of Tonopah Range Environmental Impact Statement Area, Nye County, Nevada

Gibson, T. Scott

Soil Inventory of Tonopah Range Environmental Impact Statement Area, Nye County, Nevada

Knecht, Arnold

Sevenmile Wash Area, Nye County, Nevada

Monitor Area, Nye County, Nevada

Soil Survey Technical Support

USDA Soil Conservation Service

Arnold, Harlan, Range Conservationist, Eastern and Southern Nevada

Campsey, Leland, Range Conservationist, Northern Nevada

Chamrad, Dean, State Range Conservationist, Nevada State Office

Fitzjames, Barry, Cartographic Technician, Nevada State Office (1977-1979)

Harmer, Renee, Secretary, Elko Field Office (1956-1985)

Kimsey, Dwight, Range Conservationist, Northwestern Nevada (1969-1972)

Lysne, Luella, Secretary, Nevada State Office (1956-1986)

McLain, John, Range Conservationist, Western Nevada

Mullins, Gene, State Range Conservationist, Nevada State Office

Palmquist, Dale, Backhoe Operator

Reil, John, Range Conservationist, Northern Nevada (1967-1978)

Spencer, Eddie L., Soil Correlator, Nevada State Office (1969-1976)

Staidl, George, Soil Correlator, Nevada State Office (1976-1988)

Sterns, (first name unknown) Range Conservationist, Winnemucca Field Office (1973-1975)

Summerfield, Nancy (Harris), Cartographic Technician, Nevada State Office (1966-1977)

Yeager, Bob, Range Conservationist, Western Nevada (1972-1975)

Soil Survey Program Direction and Management

USDA Soil Conservation Service

Bagley, Don, Assistant State Soil Scientist, Nevada State Office (1950-1976)

Dollarhide, William E., Assistant State Soil Scientist, Nevada State Office (1976-1990)

Naphan, Ed, State Soil Scientist, Nevada State Office (1950-1984)

Price, Boyd, State Range Conservationist, Nevada State Office

USDI Bureau of Land Management

Evatz, Ed, Chief of Resources, Nevada State Office

Linnel, Lyle, State Soil Scientist, Nevada State Office

Spang, Ed, State Director, Nevada State Office (1975-1986)

USDA Agriculture Research Service

Evans, Ray, State Director, Reno

Young, James, Nevada Range Research, Reno (1970-present)

University of Nevada, Reno

Dunn, Larry, Research

Peterson, F. F., Research

Young, Ralph (1969-1975)

The Fifth Era, 1978 to 2000

Working Together

William E. Dollarhide

The 1978 to 2000 era of soil survey in Nevada began with a 1977 court ruling. The National Cooperative Soil Survey in Nevada was about to make a drastic shift. The Bureau of Land Management (BLM) was faced with gathering soils information on more than 50 million acres in a relatively short period. This was a major dilemma with many debates as to how to accomplish this task. At that time, the BLM had no field soil scientists, relatively few private consultants available, and lots of questions about bringing in crews for only short periods who were not familiar with the area, but still requiring quality work from them. The SCS had a history and a reputation for the quality needed, but there was no history of mapping at a rate that could get the job done. The initial attempt was through contract, however, in new country, with new soils, new range sites, and no real provisions for quality control, things were difficult.

With the next attempts, BLM solicited SCS for the quality control. This again was difficult, costly, and a learning curve for all, but a glimmer of hope prevailed. In 1977, Chet Connard, district manager at Winnemucca, hired the first BLM field soil scientist with the intent of mapping soils. The negotiations with SCS had been ongoing. If SCS were to do the job, it would require a great increase in personnel, more vehicles, and equipment. To do this would require a long-term (10-year) commitment. There was still doubt: Could SCS map at the rate needed?

Informally, the agencies agreed to use the Lahontan Environmental Statement Area as a test. It consisted of 2.2 million acres and the data was needed in 2 years. SCS assigned a range conservationist and two project leaders to the task, placing three soil scientists on each of their staffs. The BLM provided a soil survey office, hired a clerk, provided a soil scientist to work on the crew, and assigned a range conservationist to assist. A new chapter in cooperation of the National Cooperative Soil Survey had begun.

The Winnemucca BLM District had a crew of soil scientists and a range conservationist with a project leader working in the Owyhee Desert area. Crews consisting of various combinations of SCS and BLM soil scientists and range conservationists were scattered around the state. At a peak point,

SCS had 31 field soil scientists and BLM had 13 soil scientists, supported by 10 range conservationists between the two agencies, all mapping soils.

With major participation from two disciplines from two agencies, and without an exact pattern to follow, there were many debates. Sometimes, the tension was great, but professionalism prevailed, and we all learned from each other.

During this same period, the Order 3 soil survey was being defined and tested. The previous “low intensity” surveys were not meeting management needs, and soil/site correlations were not consistent. There was a need to delineate relatively broad landscapes so the survey could be completed in an

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economical and rapid fashion. There was a need to have a hierarchy of landscapes with major physiographic parts and major landforms to relate and distinguish map units with each other throughout a survey area. Component landforms, landform elements, and slope components were needed to place each soil component and inclusion within each map unit and to do it in a consistent manner. In 1981, Dr. Frederick F. Peterson published *Landforms of the Basin and Range*

Province Defined for Soil Survey. This publication provided a communication link and allowed range specialists to see the landscapes in a similar manner as soil scientists. It also provided the means for soil scientists and range specialists to begin to see the relationships of landforms/soils/plant communities.

To meet the customer needs, it took effort and learning from everyone involved in the process, and his or her efforts are truly appreciated. However, without the publication from Dr. Peterson, and the special effort by Gary Brackley, state range conservationist, NRCS, to learn the soil-plant (site) relationship and provide the technical leadership to other range conservationists, the quality of the product would not be what it is today.

Kamikaze Cow

Warren Archer

One day, as I was driving up a dry wash in the Pine Grove Hills, a cow fell from the sky, missing my truck by just a few inches. I thought this was rather strange so I investigated to see if I could find out where the critter came from. Apparently what had happened was the hapless cow had been grazing too close to the edge of a very steep slope. Presumably, the cow got nervous or excited because it hadn't seen a truck before, lost its footing, rolled to the edge of the cliff, and fell over. What an interesting accident report that would have made had the cow's aim been a little better. When I came back down later on, it was still twitching so I put it out of its misery with a pick handle. It belonged to Baron Hilton of the Hilton Hotels. Its loss didn't cause the collapse of his hotel empire.

***. . . a cow fell from the sky,
missing my truck by just a
few inches.***

The Twilight Zone

Warren Archer

Some days you seem to pass into another dimension. Up until noon, all had been routine while working on the Conservation Needs Inventory. I had finished the job I had to do on the Quinn Canyon Range in east central Nevada and stopped to eat lunch on one of the peaks. I wanted to get back to Tonopah as quickly as possible to work on the report.

The trip was well over a hundred miles of poor roads to go back the way I came. Having no map of the area, I decided to navigate by dead reckoning, taking a road that headed in the right general direction. The road looked good starting out, but as most unimproved tracks seem to do, it began to get narrower and less traveled. Ahead of me, there was a steep gravelly down grade that I wouldn't be able to climb out of even with four-wheel-drive truck. Over I went, committed to whatever lay before me. It wasn't too bad for the first mile or two, and then the road began to disappear. I had to build the road as I went, filling gullies, moving rocks, etc. The road finally started getting better and it eventually broke out of the canyon onto an alluvial fan in a large valley. Where on Earth was I? The road began veering in the wrong direction; having no choice I had to follow it. Off in the distance, I could see a cloud of dust from another vehicle. Good, I thought. I'll soon be able to ask someone how to get back to Tonopah. When I finally got to the vehicle, it was a pickup driven by a woman, with six or so dogs in the cab with her and at least twice that many in back. She stopped and began frantically chasing the dogs, trying to keep them from running away. She said she was in a hurry, she had to fix a water trough so her cattle could get a drink. I asked her how to get back to Tonopah. She asked if I wanted to go the long way or the short way. The short way would be best, of course, or so I thought.

So, following her directions, another part of this debacle began. It wasn't long before I noticed some A-6 attack planes flying maneuvers off to the left.

***... they came right at me
and began buzzing the truck,
one right after the other.***

Suddenly, they came right at me and began buzzing the truck, one right after the other. After awhile, they tired of their little game and flew away. A short time later, an F-16 came straight for me about 10 feet off the ground. It about blew my ears off when it went over! Then, the A-6's were back with their antics

along with some more F-16's. It seems the "dog lady" neglected to tell me that the short cut went across the Air Force's Nellis Bombing and Gunnery Range. They probably thought, "Here's a live one. Let's have some fun."

The "dog lady" is probably still chuckling.

Stuck in the Mud

Warren Archer

One of the hazards associated with this job is getting one's vehicle stuck in the mud, sand, snow, or having a mechanical failure. Since we had to drive off of the road much of the time, dealing with these problems added a little color to our lives. Many times we would have to walk many miles to get help if we couldn't extract the truck or fix the problem.

One scenario, in particular, remains in my mind. It happened first thing one morning in Steptoe Valley, about 30 miles north of Ely. It seems that a layer of stable soil overlaid a thick layer of saturated lacustrine sediments with no bearing strength. Without my realizing it, the stable surface soil got progressively thinner as I traveled down the slope. Suddenly, all four wheels of the truck broke through the thin surface at the same time.

After a couple of hours of cutting brush to put under the wheels, shoveling, and trying to lift the truck with a jack to no avail, I decided to seek help. I walked to a ranch 4 or 5 miles away and asked to get pulled out. They agreed and took their truck to the rescue. They didn't get within 200 yards of my truck before they were in the same predicament. Off we went back to the ranch for the tractor. The same process was repeated with it. Again we returned to the ranch to get the Caterpillar tractor this time. Yes, we got it stuck, too! Finally, we walked back again, got a flat bed truck, loaded it with chains and railroad ties, and then returned to the scene of our tribulation. After carrying the ties to the Cat and chaining them to the tracks, we were able to get it up out of the mud. By laying the ties in front of the Cat, we were able to pull the other vehicles to solid ground. Upon leaving the unhappy ranchers with my profuse apologies, I finally returned to Ely at about 9:00 p.m.

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Lessons Learned the Hard Way

Paul W. Blackburn

My first experience with government vehicles was at the Winnemucca Field Office when I started as a student trainee. Lee Larsen, the party leader, and I were going to make a long day trip to the east side of the Bilk Creek Mountains. The vehicle of the day was an International 4X4 pickup with a Giddings Augar mounted in the bed. This truck was a gas hog. Lee and I left Winnemucca with a full tank of gas and two full five gallon gas cans, thinking this would be plenty of gas to complete our planned trip. The gas gauge of the truck was on empty while still in the Bilk Creek Mountains so we emptied the gas cans, completed our day's mapping and headed home. About 3 miles from Winnemucca, the International coasted to a stop. Lee

and I hitched a ride into town where we filled one can and returned with a friend of Lee's to the International. A long day had finally ended.

... one of the cardinal rules of back road travel: Never go down a road you can't get back up!

While scouting areas to be mapped during the spring of 1980, Terry Bowerman and I learned one of the cardinal rules of back road travel: Never go down a road you can't

get back up! Terry and I were traveling roads in the Tuscarora Mountains which were very passable except for the occasional residual snow drift that covered some of the trails on north or east slopes. I was driving down a road that was adjacent to a small stream that was full with spring runoff. The stream, for some reason, had left its natural channel and had captured the right wheel rut for its new streambed. As this diversion was only for what appeared to be a short distance, I attempted to straddle the right wheel rut that contained the stream. This attempt eventually failed as I became mired in the mud on the right side. As the vehicle was pointed downhill and the distance left to go before the stream left the road and went back to its natural channel was not far, neither Terry nor I were too concerned. We went through the usual inconvenience of digging the vehicle out and were soon back on dry ground. Our real trouble lay ahead as we could not get back up the short distance to where we had come from. All roads that were available to travel from this point on were either washed out or were covered with a snowdrift. Terry and I finally had no choice but to exit the mountains cross-country and traverse the flooded meadows at the south end of Independence Valley. Our mistake had cost us an extra 3 or 4 hours. One other cardinal rule was learned this day: Never take unnecessary chances late in the day.

Fire was always a problem to be dealt with while in the field. The source of the fire was the catalytic converter on the field rigs. Each vehicle had its own level of fire hazard depending on the make of the vehicle, ground clearance, and location of converter in relation to skid plates protecting the

transfer case. Other variables consisted of the type of country you were mapping; whether there was access to roads with no brush or brush with limited height; whether or not it had been a wet year with good herbaceous growth; or simply the time of day or year. There were days that would get bad enough that we had to clean the glowing embers from the area adjacent to the converter many times a day. Without this diligence, I'm sure we would have started a few range fires.

Twice I have had a nice blazing fire underneath my vehicle while in the field. The first time I had pulled my vehicle into the wind and stopped to discuss a mapping concept. Smelling smoke, I made the usual check and discovered the fire. Informing the passengers that the vehicle was on fire, they immediately bailed out. Adding to the urgency of the fire was that the fire had melted the fuel line, which was plastic, and we had dripping gas adding to the flames. I learned proper use of a fire extinguisher this day, also. Holding the extinguisher in my left hand I could not pull the pin from the handle to activate the spray mechanism. I handed the inoperable extinguisher to Roy Kaiser, the range conservationist and also a volunteer fireman. Roy quickly pulled the pin and put out the fire. In my excitement, I had squeezed the handle so tightly that I could not remove the pin. Needless to say, I felt pretty stupid!

The other fire I extinguished under my field rig was on Connors Pass in White Pine County. The vehicle I was using this day was notorious for smelling of smoke due to the muffler that would get coated with oils from sagebrush and these oils would slowly smoke off. On this particular occasion, when I smelled smoke, I thought this was just going to be another smoke-off, but I decided I better stop just as always and make sure. Fortunately I did, as there was quite a fire going. Most of what was on fire was very difficult to get at as it was trapped in tight areas adjacent to the frame. I lay under the vehicle for about an hour and a half digging out the embers until I was satisfied I would not leave a burning trail the rest of the way to Ely.

Stranded

Alan Wasner

The summer of 1980 was very hot. Terry Bowerman and I were staying alone at the camp, but one evening, Terry had not returned. He had spent that day in the field with Range Conservationist Gary Brackley. Since it was around 7:30 p.m., I drove out to where they were working as fast as I could to beat the encroaching darkness. As I drove down one of the large roads near Tuscarora, I saw a lone figure up ahead in the road. As I approached, the figure dropped to his knees in the roadway! It was Gary! This did not bode well and many thoughts went through my mind like, "What has happened?" "Where is Terry?" "Are they injured?" It turned out that Gary was fine, just very thirsty. The walk out was longer and hotter than it appeared, and he had graciously left most of the water with Terry, who had decided to stay with the truck, knowing I would come to get them. Gary led me to where Terry was and we all made it back to camp by midnight.

Later one evening, after Soil Scientist Rod Douglass had joined the crew, both Terry and Rod failed to return to camp. I raced out to where I knew Terry was working, as he was closest. There was Terry's Jeep standing on its nose at about a 75-degree angle with its rear wheels five feet off the ground right in the middle of the road. The road was a typical flat dirt road that appeared totally dry. But Terry had driven into a spot, where, just below the dry surface of the soil, a spring had opened up, saturating the substratum. Terry had driven over this spot many times before. It had come as a rather abrupt shock when the road had opened up and the truck had plunged straight down. Terry told me, "Put a chain on this and pull me out." I said, "We can't! We have to find Rod before it gets dark!" (He was amazed that two of us would become stuck on the same day.) So, we raced out to where Rod was - a full hour away in the darkening desert. As we came around a

We realized the "blue box" was the bed of his truck standing perfectly straight up in the field.

bend, there was Rod's truck with the hood up. The Jeep J-10 he had was notorious for breaking rotors and Rod had already used the only spare. We could see where he had attempted to tape together a replacement. But there was no sign of Rod. We started driving slowly back the way we had come, honking the horn, and after about 8 miles, there was Rod in the road. He said, "Hey, you guys drove right by me." I said, "How could we do that?" He said, "Well, that was because I was so tired, I laid down beside the road to rest and fell asleep." Fortunately, both of my searches were successful and no one was hurt.

Another time when Rod did not show up at the designated meeting place, Terry and I went looking for him. We found him out in the middle of the

Mary's River floodplain standing next to a large blue box. We could not figure out what this odd box was standing up in the middle of the field until we got closer. We realized the "blue box" was the bed of his truck standing perfectly straight up in the field. Rod had accidentally driven it into a huge gully that had been camouflaged by tall grass. He wasn't injured but was very embarrassed.

The only time I really got badly stuck was trying to get into the extreme northeastern part of Elko County where it meets Idaho and Utah. This area is very rugged with a lot of streams. The only way I could get into this area was across a very muddy creek that had very eroded banks. I had to go in there to map this area so I spent several hours with a shovel working on the banks so I could get across. But my best-laid plans failed me because when I tried to cross the stream, I became stuck in the middle with water up to the windows all the way around the rear half of the truck.

The front end was part way up the far embankment but I could not get enough traction to get up, and it was just far enough out of the water to not stall. What I had to do to get out of this was jack the rear of the vehicle up and put stones and boards under the rear wheels. This meant, standing in chest deep mucky water, I had to reach down and place a large flat piece of plywood under the handyman jack. We carried wood just for such emergencies. Then I was able to jack the rear of the vehicle up enough to get stuff under the rear wheels. It was really hard because the jack was all wet and muddy and kept slipping while I was behind the truck in the stream, and I had to put the jack at an angle. I had to be careful. It took almost all day to find and put enough rocks under the rear wheels to finally get out. But then, of course, I was inside this hard-to-get-to area, completely covered with mud from head to toe. I'm glad no one saw me. I ended up spending another day working on the mud hole crossing, diverting water, and draining it. I also spent time trying to find another way out of there but the two other roads were even worse. To walk out of this place would have been over a 50-mile trek. I should have waited a few weeks until things dried out more, but we were so gung-ho in those days, with large acreage goals, that usually we didn't let ANYTHING stop us. I ended up spending several workweeks in this area mapping.

. . . you just had to take it slow so as not to damage the truck.

While trying to find another way out of this area, I had to skirt around a large mud hole in the middle of the road by slowly driving through the basin big sagebrush. I had done this many times and never had a problem; you just had to take it slow so as not to damage the truck. Well, I hit a stump of sagebrush just right and it pulled off the right front brake line. I immediately realized what had happened, as the brakes became mushy. I found a flat rock and pounded about 6 inches of the brake line flat and then folded it back on itself to stop the flow of leaking fluid. Then, I put the can of brake fluid I

carried into the system, but it still was not full as I had lost a lot of fluid. This was not as bad as it sounds as I was in a very powerful truck with a manual transmission so I could use engine braking. But some of the mountains were very steep and coming out of there, I had some very tense moments with mushy brakes. By the time I got back to the office, a 5-hour drive, the brakes were pretty much gone. When I reached the GSA shop, I had to stop by just dropping the clutch while in second gear, which made the GSA mechanic come out and ask if I needed lessons in how to drive a manual transmission. He calmed down when I explained what had happened.

Another time, while straddling a deep gully in the middle of the road, I slid into it with the right side of the vehicle. With a handyman jack, this was usually a simple problem to fix. However, in this predicament, I had to jack the vehicle up almost to the top notch on the jack. While I was carefully putting stones under the jacked up wheel, the truck suddenly fell off the jack. I was fine, as I always stayed clear of the vehicle in case it fell, but the jack was gone! It was not under the vehicle. I looked around and, to my amazement, it was about 12 feet behind me in the road. It had come off the truck with such force that it had flown right past me and landed in the road.

Once during the monsoon season, we actually had flash floods in Elko County. Roy Kaiser, Dennis Worrel, and I went out to the main road to find it missing. A flood had come down a canyon and completely washed the road away, leaving a gully about 30 feet deep and 100 yards across. Luckily, the banks were gentle enough and the material solid enough that we just drove right across this devastated area. But, we did have to chain up all four wheels and we had Roy drive as he had the most experience driving under such extreme conditions.

The Wrong Stuff

Warren Archer

We were working on a survey of the mountain range east of Pyramid Lake, using a helicopter to get around. We came in for a refueling stop, then as we took off and got up a couple of hundred feet or so, the engine began popping and the helicopter began shaking violently. The pilot was able to make a successful forced landing, but the repairs that had to be made came to about \$40,000. It seems that the fuel truck had been given a load of jet fuel instead of av-gas. Normally we used the Bell Jet Ranger, but we happened to be using the old model 47 Bell on this particular job, and the fuel person at Reno Flying Service made a mistake. Bill Dollarhide and his partner had been stranded up on the hill overnight that night. We found them the next morning, cold and in bad spirits, but otherwise OK.

Quick Thinking

John L. Swenson

One time we were working up north of the Petan Ranch nearly to the Idaho border. The pilot of the helicopter picked me up about 3:30 p.m. urging me to hurry. We flew back to where we had parked the supply truck. It seems that the pilot had forgotten to bring his pump to refuel the helicopter from his gasoline barrel. Richard Trenholme, a member of the party, was still out a considerable distance and the pilot did not have enough fuel in the helicopter tank to go get him. We were concerned because Richard was faced with the prospect of spending the night out in the desert. It was early October and the nights were cold, near freezing. There were three of us at the helicopter: the pilot, Les Beardall; another crew member; and me. Fortunately there was a siphon hose in the truck, which we decided we could use if we could get the truck on high ground with the helicopter below it. We remembered a road cut down the road a short distance. The pilot flew to the cut, which fortunately was wide enough to accommodate the rotors. Then, we got the truck up on the bank above it. We had to waste some gasoline, as we could not lift the barrel up on the cab of the truck when it was full. We were all overjoyed when we finally got the siphon going. The sun was just touching the western horizon when the pilot concluded that he had enough fuel to go get Richard and still get to our camp at the VN Ranch.

Helicopters—An Indispensable Tool

Paul W. Blackburn

In 1978, Dave Candland, the party leader for the Douglas County soil survey, contracted with Pine Belt Helicopters to complete mapping in areas of the Pinenut Mountains. To effectively use the helicopter, Dave established several teams composed of both a range conservationist and a soil scientist that would be moved from place to place in a leapfrog fashion. This was my first experience with helicopter soil survey but was definitely not the last. We also used helicopters to lift us to inaccessible areas of the Pinenut Mountains and Wellington Hills. The helicopter available for this was the B1 with the large bubble windshield. This helicopter could only carry one of us at a time. To gain enough lift to carry us to the top of the steep east face of the Pinenut's, the pilot would make a series of loops in a cork screw fashion flying close to the mountain accessing up-slope drafts. On one occasion, the preselected landing site was heavy with basin big sagebrush in a small intermountain valley surrounded by Pinyon-Juniper woodland. To land safely, the pilot directed me to hang my head out the door and ensure that the tail rotor was clear of the sagebrush as he carefully landed. Once we were dropped off, we would map our way off of the mountain winding up at our vehicles that we had spotted earlier in the day.

Since 1980, all surveys in Elko and White Pine Counties at some time used helicopters to complete mapping in mountainous areas. In northeast Nevada, September was the month of choice to do helicopter survey, as the helicopter was finished with the BLM fire contract and the weather in September is usually clear and calm. Not only was it considered undesirable to fly in stormy weather, but also, it was rather uncomfortable to wait at a drop site, which was usually on a ridge top, while a thunderstorm developed overhead.

When working in Lander County, we engaged in a helicopter survey in November. While in the field, the weather had changed and the afternoon was getting rather windy. The helicopter being used was a B1. Since it was cool, the machine could carry two of us. Karl Scheetz and I were dropped off on a ridge top where we were to descend a steep north slope and meet the helicopter at the bottom of a deep canyon. When we met the helicopter at the bottom, the pilot told us he didn't know if we were going to be able to get out of the canyon as the winds had picked up considerably. Fortunately, the pilot lifted off and managed to exit the canyon even though we were buffeted around quite a bit.

In the early 1980's, most of us either received formal or informal training in helicopter safety and etiquette, such as getting the nod from the pilot that it

was either OK to get out of the helicopter or to approach the helicopter at a drop site. Everyone took these issues seriously and no accidents ever occurred.

About this time, we were required to wear flight suits, helmets, lace-up leather boots and all cotton clothing during all flights. I do not always wear gloves because they inhibited the shuffle of aerial photos that were necessary to select the next drop site.

Since we were using helicopters to help map the most inaccessible and remote areas, we would do a lot of preliminary work in advance. Then the helicopters would get us into those difficult areas to verify what we predicted would be present. The two crews in Elko were commonly combined into teams, which maximized the area mapped as well as minimized downtime for the helicopter. The leapfrog manner of moving the teams was utilized as before in Douglas County, which proved to be very efficient.

Exciting times on helicopters for me have included flying in a "bird" with no doors; standing at a predetermined spot to guide the pilot back to the exact spot he had dropped us off so that the tail rotor would clear the basin big sagebrush found on the landing site; and, last, but not least, assisting with a power check. While doing helicopter work in White Pine County in 1987, Gary Brackley and I were picked up from the last drop site of the day. After we were airborne, the pilot handed me a small note pad and pencil and informed us that he was about to perform a power check. He brought the machine to a hover several thousand feet off of Steptoe Valley and brought the torque on the rotors to 100 percent. As he did this, I recorded the numbers he was reading from the gauges. The test was over quickly and I handed the note pad back to the pilot. However, it was now stained with mud from my hand, which was rather sweaty from the anxiety I felt during the power check.

In their successful attempt to obtain a representative description needed to establish the Eganroc Series in White Pine County, Ian Reid and Leon Lato had to exit the helicopter while it hovered over a narrow rock outcrop ridgetop that was not suitable for landing. I'm not sure how or where they were picked up.

Helicopters were an absolutely indispensable tool for the timely completion of soil survey mapping of the mountains of Nevada.