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Conservation
Service**

Reno, Nevada

A History of Soil Survey in Nevada



— from a Report of Bureau of Soils, U.S. Department of Agriculture, 1923

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July 2000

A History of Soil Survey in Nevada

***A Compilation of Short Stories
Commemorating the 100th Anniversary
of the Soil Survey Program***

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Nevada

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Preface

Welcome to the first edition of *A History of Soil Survey in Nevada*. In developing this *History*, we have tried to capture a picture of what it was—and is—like to work hard and love it, to get your hands dirty and your back sweaty analyzing soils in the most remote areas of this great state, and to describe those soils and their respective vegetative communities, so that current and future generations can benefit from this knowledge.

We have attempted to recognize all of the people who have contributed to the soil survey program in Nevada since it began in 1909. However, historical records are scarce or nonexistent, so we relied on the memories of those contacted. We know that many people were missed, and there are many more stories that could be shared. If you have worked on the soil survey in Nevada, if you know of someone we've missed, you find an error, or if you'd like to contribute to this *History*, please let us know so that we can maintain a current, historical record of the efforts and accomplishments of so many hardworking individuals over the past 100 years.

We have divided this document into 5 eras. We began with the first soil survey of the Fallon Area published in 1909, when the first work was done with a plane table and a compass. Work during the second era, 1938 to 1950, started with the plane table, then evolved with the initial use of aerial photos. These surveys were recognized as Physical Surveys and Surveys for Better Land Use.

The third era, 1950 to 1970, had better photography and more effort was focused on interpretations. Mapping was initiated with connotative symbols and reflected the development of soil taxonomy. These surveys were mostly in key agricultural areas and intended for agronomic uses. However, we made our first efforts to meet urban needs with the Soil Survey for the Las Vegas and Eldorado Valleys Area.

The fourth era, 1970 to 1978, was a brief transitional period of time, which saw the completion of the soil surveys of key agricultural areas and those intended for urban uses. During this brief era a new relationship was forged between the U.S. Department of Interior's Bureau of Land Management and the Soil Conservation Service. This relationship paved the way for the rapid acceleration of the soil survey program in the fifth era.

The fifth era, 1978 to 2000, saw the rapid acceleration of the soil survey with major input of both time and money by the U.S. Department of Interior's Bureau of Land Management. During this period, we needed to cover large amounts of country in a short period of time but still provide the quality of range interpretations needed to protect the resources. The

information was being used as fast as it was generated and, using the feedback received, Order 3 surveys, with soil/site/landscape relationships, developed.

Presently, we are working to make the data more user-friendly and accessible. We are doing this by Major Land Resource Area (MLRA) so that the information provides continuous coverage that is uniform for the entire area. We are making a major effort to get our data into the National Soils Information System and to make all of the data available to our customers in digital form.

Because no documents on soil surveys have been found prior to 1909 or from 1923 to 1938, the early eras of soil survey discussed in this *History* are estimates. The dates and the range of time exist as a result of actual dates on soil survey publications. Some surveys and efforts, including the Reconnaissance Soil Survey, do not fit exactly into the eras identified in this *History* and were included where we felt most appropriate. Also, certain individuals assisted with mapping portions of a progressive soil survey many years before the survey was completed. As a result, these surveys overlap the eras identified in this document. A complete list of soil surveys produced in Nevada and their date of publication is included in the appendix.

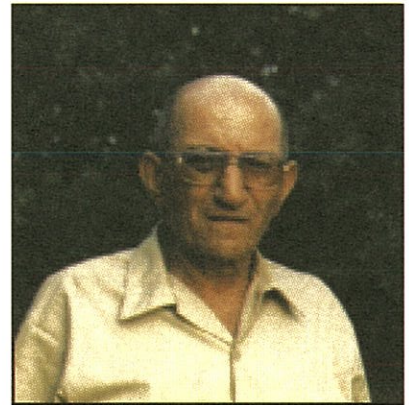
If you wish to contribute to this *History*, please contact Paul W. Blackburn, USDA Natural Resources Conservation Service, Elko Field Office, 2002 Idaho St., Elko, NV 89801; phone (775) 738-8431, Ext. 18; or send an e-mail message to Paul.Blackburn@nv.usda.gov.

William E. Dollarhide
MLRA Leader/State Soil Scientist

Paul W. Blackburn
Resource Soil Scientist

Dedication

We dedicate the first edition of *A History of Soil Survey in Nevada* to Edmund (Ed) A. Naphan, former state soil scientist. Ed mapped soils in Nevada in the 1940's and served as state soil scientist for the U.S. Department of Agriculture, Soil Conservation Service, in Nevada from 1950 to 1984. He provided active direction during more than one third of the soil survey history in the state. As we look at the soil surveys around the state, at the soil survey areas to see the contributions of the project leader, and within us all, we can still see Ed's mark and feel his presence.



To list the contributions Ed made to soil survey work would be a history book by itself. His involvement and guidance in the development of soil taxonomy, to assure the soils in Nevada could be grouped to meet the interpretative needs of the state, has had monumental significance. Ed was instrumental in defining the different orders of survey to meet the different intensities of management needs. He recognized the need to place all components on the landscape at the higher orders of survey. He encouraged Dr. Fred Peterson to write *Landforms of the Basin and Range Province Defined for Soil Survey*, which served as a backbone during the accelerated soil survey in Nevada. Ed's foresight to have two of Nevada's soil surveys included in a digitizing pilot in the 70's, and to start compiling on orthophotography, has put Nevada in a position to have all of the published, and soon to be published, soil surveys digitized, Soil Survey Geographical Database (SSURGO) Certified, and available to the public by 2001.

With his vast technical knowledge of the soils in the state, and after running the program for more than 30 years, it would have been easy to follow a pattern or get in a rut. I assure you, this was not the case with Ed. The day he retired, he was still suggesting new things to try. When computer-assisted writing (CAW) was being developed, we quickly started using it. However, after the first few drafts of manuscripts came in, Ed suggested we stop using CAW. When I asked why, his explanation was simple, "It allows soil scientists not to think, and we can't have soil scientists doing anything without thinking."

Ed always empowered soil scientists to do their job and somewhat insisted they accept this empowerment. As a result, we were all willing to take risks. Whether our decision was right or wrong, Ed would be behind us and support us. Ed liked to push all people to

their potential or limit, and he dearly loved to tease. When he was teasing, there was no difference in his voice tone or his eyes. Only when you saw his left hand go up to scratch his head and a smile, ever so slight, cross his face, did you know you had been had.

Ed, when we are digging a pit in the shadscale overlooking the playa and the temperature is in the 100's, or walking down a ridge line with the north wind pelting snow on our ears, we can all hear you say, "That's just the way I like it."

And, as we proudly look over the first 100 years of the soil survey program in Nevada, we say, "Thank you, Ed."

William E. Dollarhide
MLRA Leader/State Soil Scientist

Acknowledgments

In this document, we have attempted to capture the history of soil survey efforts and accomplishments in Nevada during the past 100 years, to identify the projects and the people who worked on them. We want to acknowledge the assistance and support of others who have contributed to this success. The regional correlators from Berkeley, Calif., the Soils Section at the West National Technical Service Center, the National Cartographic Center, the National Soil Survey Center, the Director of Soil Survey, and all of their staff members, have had a profound effect on the program, providing technical guidance and support. We acknowledge and appreciate the managerial support we have received from state conservationists, state directors, district managers, and other line officers who have supported the soil survey program in Nevada, as well as the administrative support we have received.

We want to acknowledge every soil scientist who turned over a sharpshooter of soil, range scientist who identified a plant or plant community, engineer who assisted with an interpretation, and all the users who provided feedback so we could create a better product. Lastly, I would like to acknowledge the effort made by Paul Blackburn who chaired this project, by Rose Santos for getting this on the web, and by Liz Warner for a fine job of editing.

William E. Dollarhide
MLRA Leader/State Soil Scientist

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The First Era, 1909 to 1923

Letter of Transmittal ^{1/}

U. S. Department of Agriculture
Bureau of Soils
Washington, D. C.

February 9, 1911

SIR: An important project of this Bureau carried to completion during the field season of 1909 was the survey, on a scale of 2 inches to the mile, of the first unit (Fallon Area) of the Truckee-Carson irrigation district in Nevada. This work was undertaken at the request of the U. S. Reclamation Service, which cooperated with the Bureau to the extent of supplying an accurate and detailed base map.

The results of this work should be of great service to settlers in this part of Nevada, which is as yet practically undeveloped agriculturally, and I have the honor to recommend that this be published as advance sheets of the Field Operations of the Bureau of Soils for 1909, as authorized by law.

Very respectfully,

Milton Whitney
Chief of Bureau

Hon. James Wilson
Secretary of Agriculture

^{1/} Soil Survey of the Fallon Area, Nevada: United States Department of Agriculture, Bureau of Soils, Washington Government Printing Office, 1911



Soil survey in Nevada had begun! (Report of Bureau of Soils.
U. S. Department of Agriculture, 1923)

Individuals Involved in the Nevada Soil Survey Program from 1909 to 1923

Bureau of Soils

Carpenter, E. J.

Soil Survey of Las Vegas Area, Nevada
Soil Survey of Moapa Valley Area, Nevada

Strahorn, A. T.

Soil Survey of the Fallon Area, Nevada

Van Duyne, Cornelius

Soil Survey of the Fallon Area, Nevada

Youngs, F. O.

Soil Survey of Las Vegas Area, Nevada
Soil Survey of Moapa Valley Area, Nevada

The Second Era, 1938 to 1950

If there were some standardized, simple remedy for the ills of the land that could be applied indiscriminately, the job of soil conservation would be comparatively easy. But there is about as much variety in soil, in erosion, and in the performance of water and wind and plants, as in the landscape of the country. — H. H. Bennett ^{2/}

In 1938, many of the conservation districts in Nevada were organized at the request of local ranchers and farmers. Supervisors of these conservation districts requested that the Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS), make a physical survey because they recognized the need to procure soil, vegetative, and land use capability data that would be applicable to district planning and detailed farm planning.^{3/} Ten of these physical surveys were completed in Nevada by 1940, most of which were in the western and southern parts of the state. Aerial photography was available for some of these surveys.

In 1940, the regional office of the SCS was located in Berkeley, Calif. Stan Cosby was the regional soil scientist and Henry Fox was Nevada's state soil scientist. Ed Naphan, who would become state soil scientist for Nevada in 1950, left a position with the SCS in California prior to joining the service in World War II. George Borst filled the position vacated by Ed. George would have lost his position if Ed had decided to return to California after World War II. Ed decided instead to take a position as a soil scientist in Elko, Nevada, in 1946.

In 1948, Lou Langan began work for SCS in Nevada as a student-trainee at the state office in Reno. Henry Fox was his boss. Lou related that mobile soil survey crews headquartered in Elko during the summer would head south during the winter to Overton and Mesquite and then back to Elko during the summer.

John Swenson was part of the mobile survey in 1943. Swenson's duty station was Yerington where John McCormick was party leader. Swenson was sent to Ely during the summer of 1943 where he completed mapping on ranches in the Ely area and in the Ruby Valley of Elko County.

The soil mapping during this time consisted of conservation planning surveys of individual farms and ranches. Langan and Swenson related that, when surveying in remote locations, they would stay in the bunkhouse on the farm or ranch they were surveying. The ranch also provided meals. Both men commented on the quantity and quality of the meals they were fed on the ranches. Farms and ranches that were close to their duty station were driven to on a daily basis. While mapping the Cleveland Ranch in Spring Valley, Swenson said fishing was excellent in the creek that ran through the ranch. The ranch manager told him that no one had fished that stream for many years during World War II.

^{2/} Better Land Use in the Meadow Valley Soil Conservation District, U. S. Department of Agriculture, Soil Conservation Service, Region 7, Caliente, Nevada, 1946.

^{3/} Report of the Physical Survey of the Mason Valley Soil Conservation District, Nevada; U. S. Department of Agriculture, Soil Conservation Service, Pacific Southwest Region, August, 1940.

According to John, being precise and accurate in the field using a plane table was a challenge. However, John McCormick, Swenson's boss, was very talented at using the plane table and his work was precise. Mr. McCormick provided critical training to John on establishing a starting point on the plane table. This training consisted of using a 100-foot tape and laying out a distance of 1,320 feet usually along a fence line. Once the starting point was established, all other points on the map were located accurately by triangulation. A stadis rod was used to obtain distance.

John Swenson and John McCormick dry camped in tents while mapping near Baker, Nevada. Each had a truck assigned to them for fieldwork. On the morning of their last day at camp, Swenson had his truck warming up and pointed downhill. Both men finished loading their trucks with their gear and McCormick left first for Ely. When Swenson was ready to leave, he killed the engine when he tried to back up. His battery was dead and he had a long walk to get help. When he finally made it back to Ely, he gave McCormick a piece of his mind for not waiting for him.

Lou said that the Elko office had the first Jeep in the state. The lowest hanging part on this Jeep was the brake master cylinder. The surveyors went to the field daily with brakes and returned home in the afternoon with no brakes. This problem was eventually solved after a skid plate was installed to protect the master cylinder. The Elko Field Office has on file most, if not all, of the original work that was completed during this period. Fieldwork was done by plane table until 1949, which is the date of the first aerial photography for Elko County. These aerial photos were strip photos that were taken in flight lines but only of individual farms and ranches.

Field mapping techniques included general observations of surface and subsurface texture, restrictive layers or bedrock, slope, and, to some extent, percent of soil lost to erosion which, unless obvious according to George Borst, was impossible to predict. Detailed descriptions of soil profiles were nonexistent. Connotative map unit symbols were used for these surveys. These symbols were not always consistent in their use from field office to field office.

George Borst relates that the conservation planning surveys were very detailed and considered excellent work. However, in the early 1950's, Charlie Kellogg "deemed the conservation surveys unsuitable" and they were subsequently replaced by popular surveys that used taxonomy. These conservation planning surveys remained an actively used product in this state until the mid-1960's and even into the late 1970's in those areas that had not been mapped as part of modern surveys.

The Way It Was

Grant Kennedy

During the fall of 1937, I was back in Reno for my senior year at the University and graduated in May of 1938. I had some good professors and, looking back, wished I had taken more advantage of the fine opportunities that were offered, but such is the way with youth.

My botany professor, Dr. Lehenbauer, mentioned a job opening starting early in May. It was a position with the Department of Interior under the Taylor Grazing Act—today this would be with the Bureau of Land Management, U. S. Department of the Interior. He must have put in a good word for several out of his class were immediately hired when we applied. The job entailed working as a member of one of several survey parties making a soil and vegetation reconnaissance

The job entailed working as a member of one of several survey parties making a soil and vegetation reconnaissance survey of Elko County, Nevada.

survey of Elko County, Nevada. This was to be a cooperative survey. Other government agencies involved included the Department of Interior, the Forest Service, the Soil Conservation Service, and several other Federal departments.

Mr. Martineau, who apparently was in charge of the project with headquarters in Reno, picked up some of us graduates and took us to Wells, Nevada. It was early in May and before graduation services were to be held at the University. The work was to get off to an early start to maximize the number of favorable field days before cold weather set in come fall. We were introduced to “Speed” Agee who was in charge of our party of seven, including him. The pay was to be \$105 per month with \$1.60 per diem. There were also several other crews that would be working in other parts of Elko County.

Speed drove a government station wagon—a Ford V8 of the woody variety—and hauled our gear and us to a campsite south of Wells. The exact location escapes me, but when I found an old photo, I see it was Warm Springs. Our “home” was to consist of two large wall tents. One was for sleeping where we rolled out our sleeping bags on folding camp cots. The second was the cook tent and “office.” It held a long table with two benches placed on one side and at the opposite end was the cook stove—a rectangular piece of metal covering a trench in the ground fueled by the nearest source of wood, which was often sagebrush. The

Coleman gas lantern was the source of light. We had a camp cook and members of the crew chipped in to pay his wages and the cost of groceries. Our crew at this time consisted of Charlie York, Chester Jacobsen, Fred Galloway, and myself from the University of Nevada; Otis Orton and Mark Shipley from Idaho and Utah, respectively; Speed, the party chief; and Harrison, the camp cook.

The next day, we were driven out to a corral, which contained some saddle horses. Speed assigned numbers to each horse, and we drew lots to see which one we would be assigned. We each took our horse and saddled up to try out our new companion. The saddles were strictly GI (Government Issue)—they were McClellan saddles such as the Cavalry used during Civil War times and thereafter. We were to ride off some distance and get the feel of riding this particular horse, dismounting several times in the process. My horse seemed a bit spooky at first but reasonably manageable. Now, although I was raised on a ranch, I was never aboard a saddle horse but only a few times. Finally, I pulled up on the reins and dismounted. I walked a short distance and decided to get back in the saddle. As I was almost in the saddle, the horse made a fast movement to his right dumping me off to land in a thorny greasewood (*Sarcobatus*) bush. I held on to the reins and he dragged me several feet and stopped. Then I stood up and dusted myself off and got back on, this time being more prepared for any sudden action by the horse. I had no trouble thereafter with this horse, which I called Sarcobatus. He would

sometimes be a little spirited when out in flat country, but when the going was tough, he would rub his nose on my shoulder and want to be my best buddy.

The method used in making this survey was to run transects along section lines, traversing in either an east-west or north-south direction. At set intervals, the people running transects would scribe a circle having an area of one hundred square feet. Then,

they would identify and record the vegetation and its percentage of cover in relation to the plot. The soil was identified in broad terms, such as landforms, and changes in vegetation and soil boundaries along the transect were to be shown on a small-scale base map. In some places, there was reasonably good correlation between the vegetation and the soils. For example, uniform stands of low sage on alluvial fans seemed to have soils underlain with a caliche layer (hardpan) usually overlain with clay subsoil. Badger holes, although a hazard for your mount's legs, were welcome as inspection of the mounds around the hole gave some insight into underlying soil properties. We were given a forester's compass and

The soil was identified in broad terms, such as landforms, and changes in vegetation and soil boundaries along the transect were to be shown on a small-scale base map.