

PRESERVING 45 YEARS OF PHOTOGRAPHS

OF WESTERN NORTH DAKOTA

BY EDWARD C. MURPHY

I began working for the North Dakota Geological Survey as a temporary field inspector for the coal exploration program in June of 1977. The job was straight forward, but it did require me to quickly master the public land survey system (township, range, sections, quarter\quarter\quarter). I would typically spend Mondays in the office plotting coal exploration holes on maps and then take those maps into the field the rest of the workweek to field check the exploration holes for proper reclamation. My boss, Wes Norton, arranged for me to visit a coal exploration drilling site to see the size of the truck-mounted rig, portable mud pit, and the water truck so I could estimate the minimum area that was needed for a drill site and could better determine the likely location of an exploration hole (fig. 1). The hole, drilled by H & H Drilling out of Bowman, ND, was part of a multi-county coal exploration program managed by the ND Geological Survey and paid for by the U.S. Geological Survey. I searched through old files and found a photograph of that visit that I had not seen in 46 years. I was surprised but not shocked, since these things seem to happen in North Dakota, when I realized that two of the people in the photo are Slope County landowners (Kelly Lorge and Loren Jacobson) that recently gave us permission to take rock samples for our critical mineral project. I had not recalled that either Kelly or Loren had

worked for H & H Drilling. The coal exploration permit program had begun two years earlier so there was a backlog of 7,000 test holes to field check across all 24 coal-bearing counties. The job provided an excellent opportunity to travel all over western North Dakota and to meet the farmers and ranchers on whose land the exploration had taken place.

The first thing I did was to gather three or four dozen ND Geological Survey publications on the surface geology of western North Dakota. Foremost among them were the county geology reports (County Bulletins, Part 1). Those reports contain descriptions of the rocks and sediments present at the surface in each county along with black and white photographs of the prominent outcrops. Each report is accompanied by a surface geology map at a scale of 1:125,000. The resulting small library was housed in two field boxes that I kept in my field vehicle, a 1976 Plymouth Fury -- not the best vehicle for offroad driving. I plotted the highlighted outcrop locations on my field maps and read up on the surface geology of the area that I was working in. It was much easier to learn and retain things when you could match the outcrop photos and descriptions to the actual outcrops. However, color photographs would have been much easier to interpret because rock color is one of the primary distinguishing criteria between formations within the Fort Union Group. Little did I know that five years later my first mapping assignment would be to map the surface geology of the 44 USGS quadrangles that cover Dunn County, an area that I had thoroughly crisscrossed as a field inspector.

I quickly realized that the Kodak Instamatic camera I was using was not adequately capturing the geology as well as the scenic beauty of western North Dakota. Some of the best photographs that I had seen were in University of North Dakota geology seminars presented by professors Walter L. Moore and David B. Johnson. Both Walt and Dave used Nikon FM 35mm cameras along with Nikon 50mm and Vivitar Series 1, 70-210mm lenses. So, I bought that camera and those lenses along with a Nikon 18-55mm lens, the latter quickly became my main lens. It took me awhile to realize that there was more to taking pictures than just a good camera and lenses. In those days, you mailed the 35mm canister of film to one of Kodak's film processing centers



FIGURE 1.

Ed Murphy (fifth from the left) inspecting the drilling of a coal exploration hole in Oliver County in 1977. Kelly Lorge is first from the left and Loren Jacobson is fourth from the left.

(925 Page Mill Road, Palo Alto, California is burned into my memory) and waited a week or so for the 35mm slides to come in. I primarily used Kodachrome because it was said to resist fading longer than any other color film. In 2005, twenty-six years and 445 rolls of film later (16,000 slides), I conceded that the days of 35mm film were numbered and reluctantly switched over to a Nikon digital single-lens reflex (SLR) camera (D7000, D7100, and eventually to a D7500). The cameras and lenses were similar in size, but the D7000 was lighter because it contained more plastic (fig. 2). The major advantage of digital over film was immediately knowing that you had captured a quality image. On the other hand, it eliminated the thrill and anticipation that came with the first opening of those yellow Kodak boxes to see the images you had captured.

It is difficult to convey geologic processes or concepts, especially to the nonscientific community, without using photographs, geologic maps, or illustrations. I have never forgotten how important the photographs in those geologic reports were to me in the late 1970s when I was trying to understand what was being said. For that reason, the articles that I have written and the presentations that I have given over the years contain an abundance of photographs. The majority of my photographs illustrate geologic features that were taken as part of specific projects. For example, I have taken 1,900 photographs in support of surface mapping projects and 1,100 photographs in support of a number of landslide projects. However, since I was often

working in some of the most scenic areas in North Dakota, the badlands, major buttes, and other areas of rugged beauty in western North Dakota, I occasionally took photographs of the local scenery (figs. 3-6). Conversely, I find I did not take near as many photographs when I was working on oil and gas reserve pits, municipal garbage dumps, or wastewater



FIGURE 2.

The Nikon FM (on the right) and the Nikon D7000 have both performed well under trying field conditions. In the field, I typically just carry the camera, not the camera bag, slung over my shoulder. The Nikon FM was still going strong when I switched over to the D7000 despite being subjected to 26 years of dust, the sun's rays, constant jostling, and numerous droppings. Over the years, I went through several leather camera cases, camera bags, and numerous straps.



FIGURE 3.

Shadows stretch across Bullion Creek and Sentinel Butte strata at sunset in outcrops adjacent to East River Road north of the South Unit of the Theodore Roosevelt National Park in Billings County.



FIGURE 4.

The setting sun turned the clouds a pink hue in the Limber Pines Special Use Area in western Slope County. Photo taken looking to the east.

impoundments projects. Early on, I would photograph wildflowers, wildlife, sunrises and sunsets, lightning, rainbows, clouds, old farms and ranch buildings, and old windmills to augment my presentations, often ending a talk with a photograph of a sunset. Many of the old farm buildings and windmills I first encountered 45 years ago have long since disappeared. Additionally, since I have done fieldwork during all four seasons, I have documented all kinds of weather conditions; blizzards, hailstorms, lightning storms, tornadoes, windstorms, freezing rain, fog, unbearable heat, and in recent years, choking smoke from forest fires.

Most of my fieldwork was done alone, especially in the early years. As a result, very few of my photographs contain images of people, and since I was often working a half mile or more from my vehicle, few also contain images of field vehicles. Maybe that is why I find that some of the most intriguing photographs taken by A.G. Leonard in the early 1900s are those that include people dressed in the field clothes of the time along with images of saddled horses, teams of horses, or early automobiles.

I generated sixteen thousand 35mm slides in the 26 years between 1979 and 2005. These 35mm slides fill 41 three-ring binders that take up an entire 3x7 foot bookcase. I initially began by consecutively numbering my slides, but quit when the number approached 8,500 and

switched to grouping my slides by either stratigraphic unit (e.g., Sentinel Butte Formation or Rhame bed) or locality (e.g., Killdeer Mountains or Logging Camp Ranch). I wrote cryptic notes, or better yet the public land survey system location, on the cardboard frames of many, but not all, of my slides. Approximately 12,000 of these slides have been digitally scanned, taking up 56 GB of memory. In the last 18 years, I have taken 22,500 digital photographs, adding 170 GB in images to my collection. I find it interesting that I averaged six hundred 35mm slides per year from 1979 to 2005 and 1,250 digital photographs per year from 2005 to present. Especially because there were numerous times when I took little or no digital photographs because I had photographed that locality years before. Additionally, the digital photography timeline roughly coincides with my time as State Geologist when administrative duties have curtailed some of my fieldwork. Several recent projects have likely somewhat skewed these numbers (6,400 photographs were taken as part of our critical minerals project from 2015 to the present and 1,800 photographs were taken during a ceramic proppant feasibility study in 2011).

With close to 40,000 photographs, it is likely not surprising that I have trouble finding specific images. I have always wanted to create a better filing system, but could never find the time to devote to it and instead just kept adding to the



FIGURE 5. A double rainbow appears behind a windmill near the VVV Ranch in western Slope County.

problem with more images. Many of these photographs are preserved in the more than 500 PowerPoint presentations I have given in the last 20 years. In the Geological Survey, we took our time switching over from slide presentations to PowerPoint presentations because we determined that while the early PowerPoint projectors did a good job projecting graphs and figures, the projection quality of photographs was terrible. This problem went on for more than a decade, likely because most people's presentations did not contain a lot of photos. As a result, the Dept. of Mineral Resources purchased portable projectors and laptops in 2007 and to this day we carry our own projection system whenever and wherever we give a presentation.

At this point of my career, I find myself running out of time at the same time I am hoping to find the time to create a digital library of my photographs. The NDGS has never had a searchable photo library, but we have also never had tens of thousands of photographs, not to mention the 22,000 drone photographs we have generated in the last seven years. I am hoping to get these images into a system that will enable future geologists to quickly find them. Thus, saving them the time and expense of traveling to some of the more remote areas in western North Dakota to obtain an image. Although I for one could certainly understand why someone would want to experience the beauty of western North Dakota firsthand.



FIGURE 6. An assortment of my photographs of western North Dakota.



FIGURE 6. continued.

BRUCE HICKS retires



In August of 1978, Bruce Hicks began working as a temporary employee for the North Dakota Geological Survey while a University of North Dakota student. Bruce graduated with a Petroleum Engineering degree in 1980 and then went to work full-time for the Geological Survey in the Bismarck office. In 1981, the Geological Survey's oil and gas regulatory portion was split off creating the Oil and Gas Division. Over the years Bruce held several positions including Water Injection Supervisor and Manager of Horizontal Drilling. For the last 24 years he served as the Assistant Director of the Oil and Gas Division and the last 18 years as an Assistant Director of the Dept. of Mineral Resources. At the end of June, Bruce retired after 45 years of dedicated service to the State of North Dakota.