



The Dalquest Research Site

by Dr. Norman Horner

In August of 1968, I thought I was going to get to see the property in Brewster and Presidio counties that ultimately became known as the Dalquest Research Site (DRS), but as it turned out I had to wait another year to see this magnificent place. At that time, Dr. Walter W. Dalquest was 51 and a 16-year veteran teacher and researcher in the Department of Biology of what was then known as Midwestern University. I was completing my first year as a young instructor of Biology. Dalquest was an energetic professor who knew what I thought was “most everything” about biology, and was a very productive research scholar.

Dr. Dalquest knew I enjoyed field work and asked me to go with him to see the land (two sections) he had recently purchased south of Marfa. He bought it so he would have a place to hunt desert mule deer and enjoy the outdoors. After traveling for about 10 hours, we took a break approximately 15 miles from the property. Dalquest saw a bat flying and being the avid mammal collector, he immediately tried to shoot it so it could be added to the collection. In the process of following the bat, he stepped over a 30-inch Western Diamondback that nailed him on the inside of his left ankle. Well, our plans changed quickly, and I started a 3-hour drive to get him to the nearest hospital, which was in Alpine. My fun vacation turned into a week waiting for him to recover to a point where I could get him back to Wichita Falls. Since that failed first journey, I have had the privilege of visiting the site frequently over the last 40 years. The first 30 years were with Walt (Dr. Dalquest) and the last 10 with students and colleagues from Midwestern State University (MSU).

◀ *Mitchell Mesa rhyolite.*

In 1996 Dr. Walter W. Dalquest and his wife, Rose, donated the two sections of land to MSU. They knew the scientific value of the property and the need to preserve it for future generations of researchers. Deed restrictions limit the site to be used for scientific research. Dr. Dalquest lost his battle with Parkinson's and passed away in September of 2000. A few years later Dr. Dalquest's widow, Rose, provided funds to purchase an additional 2 2/3rd sections of adjacent land to bring the total to approximately 3,000 acres. Obviously Midwestern State University would not have this property if it was not for the generosity of the Dalquests.

It is difficult to describe the site in a manner so that you can comprehend its vastness, beauty, deep canyons, isolation, and ruggedness. This is a place where a satellite phone is the only means of outside communication, and your feet are the only reliable means of transportation. Currently no facilities are on the site and visitors must be primitive campers and carry an ample supply of water. Climatic changes can occur on short notice. The wind blows to the point of picking up small sand grains. The canyons can flood quickly and you can become trapped. Several years ago in March, I remember having a group of students on the site and we experienced snow, rain, hail, and sleet all in the same day! No individual can visit the site unless they are accompanied by at least one other person for safety.

To a naturalist the DRS experience is a dream come true. The majority of the site has had little human influence; in fact, the property owner prior

to Dr. Dalquest had fenced the canyon lands to keep cattle from getting into the area. Because it is an undisturbed area and is so isolated, two years ago a pair of nesting Golden Eagles were observed. Their nest was constructed on a canyon ledge about 100 feet above the canyon floor and 60 feet below the canyon rim. It was a thrilling sight to watch the adults feed the nestlings. One afternoon while waiting for the return of the eagles, I thought about the silence we were experiencing. Essentially no man-made noises other than an occasional high altitude plane flying over. We routinely observed fresh kills of mule deer and collared peccary by cougars. Also on two occasions Zone-tailed Hawks have been seen flying with a group of Turkey Vultures.

Based on the time of the year and the amount of moisture, the desert

will have plants blooming like Mexican buckeye, yucca, sotol, acacia, ocotillo, and a variety of cactus species.

While absorbing all of the beauty and solitude, visitors must be aware of potential dangers. Rattlesnakes (western diamondback, Mexican black-tailed, mojave, and the rock rattler) are present, slipping and falling is always possible, and contending with extreme summer heat can be life-threatening. Common sense or good judgment for safety is essential.

Mission Statement

The Dalquest Research Site's primary objective is to promote research and education about the Chihuahuan Desert for undergraduates and graduate students. It is the intent of Midwestern State University to utilize the site to contribute to a better understanding



▲ *Three-flowered living rock cactus (Ariocarpus fisseratus).*

of the Chihuahuan Desert through biological and geological research and education. The site is owned and operated by Midwestern State University, but it is open to scientists from other universities pending approval of their research proposal.

Geology of the Site

Dr. Christopher Kirk, Associate Professor of Anthropology at The University of Texas at Austin has collected fossils on the DRS for the past five years and gives the following account of the geology, which is based on the literature and his first hand experience of being on the site.

The geological features of the DRS are highly varied and the topography is complex. The uplands in the western part of the site consist primarily of desert pediments overlying the early Oligocene Tascotal Mesa Formation and the 32 myo Mitchell Mesa welded tuff. Both features are the product of volcanic activity in the Chinati Mountains far to the west. The eastern part of the site includes extensive exposures of the late Eocene Devil's Graveyard Formation approximately 200 m (650 ft) below a north-south tending escarpment. Water and wind have carved these tuffaceous sediments to produce a stunning landscape of deep red, white, and green "whalebacks" and steep-sided arroyos. The two forks of the Alamo de Cesario Creek run through the center of the property and have cut into the escarpment to produce a labyrinth of mesas, hoodoos, and deep canyons (see Nelson and Preston, 2006). The southern part of the DRS is transected by a



▲ *Tascotal Mesa faultline that projects east-west across the property.*

major east-west tending faultline—the Tascotal Mesa Fault. South and west of this fault are outcrops of the Rawls Basalt, produced 28 mya by volcanic activity in the Bofecillos Mountains.

Biodiversity Surveys at the DRS

The majority of the preliminary biodiversity surveys that have been done

or are currently underway are being conducted as masters' theses by MSU biology students. In addition, Dr. Kirk and his students enrolled in paleontology/anthropology field camps at the DRS have found several interesting and evolutionary important fossils. They have been collecting vertebrate fossils from the Devil's Graveyard Formation.



These collecting trips have yielded one of the best preserved Late Uintan Faunas known from North America (Kirk and Williams, 2009). Descriptions of new primate species in two genera, a new primate genus (Williams and Kirk, 2008) and a new genus of amphisbaenian (reptile) are currently being described (Kirk, in prep.).

Based on initial surveys of the invertebrate fauna, several species are new to science. A preliminary survey of the ground-dwelling spiders at DRS using pitfall traps yielded 1326 specimens. They were collected from two habitat-types, one being typical desert pavement/shrubland and the other in the floodplain of Alamo de Cesario Creek. The specimens included 66 species distributed in 46 genera and 24 families (Broussard, 2002; Broussard and Horner, 2006). Several species are new to science (Platnick and Horner, 2007) and one is likely a new family to science. These specimens are currently being evaluated by Dr. Norman Platnick and his staff at the American Museum of Natural History. They appear to belong to a new family or at least one not known from the new world.

Killion's (2005) 26-month floral survey of a 10,000 m² plot yielded 68 identified species from 29 families, with the exclusion of the grasses. The Chihuahuan Desert indicator species of lechuguilla, creosote bush, and tarbush were abundant.

◀ *The Devil's Graveyard Formation is composed of multicolored tuffaceous mudstones.*



▲ *Flame skimmer dragonfly (Photograph by James Lasswell).*

To date, 84 species of birds have been sighted (Holbert, in progress) including: Common Raven, Turkey Vulture, four species of wrens, Golden Eagle, Spotted Towhee, Doves (White-winged and Mourning), Scott's Oriole, Say's Phoebe, Black-throated Sparrow, Western Kingbird, and Northern Waterthrush.

Common native mammals seen or identified by tracks include Merriam's kangaroo rats, hispid pocket mouse, cactus mouse, desert cottontail, black-tailed jackrabbit, collared peccary, mule deer, kit fox, coyote, bobcat, mountain lion, and squirrels (rock and Texas antelope ground squirrel). Introduced species include the aoudad sheep which have an established population and the feral asses are occasional visitors.

A total of 994 cursorial coleopterans were collected at the site using pitfall trapping from three habitat-types (Middleton et al, 2007). This sample

included 53 species from these three taxa, Carabidae, Scarabaeoidea, and Tenebrionoidea.

During two 12-month surveys for aquatic insects from Alamo Spring and a freshwater pool, Hamilton (2000) and Weger (in progress) have produced more than 40 genera in 31 families and 6 orders. Weger appears to have at least one new species of aquatic beetle. In addition to the above organized studies, a preliminary butterfly list has 25 species. We've also documented 6 species of dragonflies and 14 species of herps.

Future Development

When funding can be obtained, the Biology Department at MSU intends to construct a Field Station on the site. At this point the name will be changed from the Dalquest Research Site to the Dalquest Research Station. MSU will seek the participation of ecologists from other universities, and it is our

intent to cooperate with the Long Term Ecological Research (LTER) Programs in the Southwest.

The establishment and development of the DRS will provide the first scientific, academic station devoted exclusively to research and training in research methods in the Big Bend region. It will also provide the most southeastern node of a network of permanent Chihuahuan Desert research stations ranging 750 km at 200 to 250 km intervals from Sevilleta LTER near Socorro, NM in the north, to Jornada Basin LTER north of Las Cruces, NM, and then to Indio Mountains Research Station, southwest of Van Horn, TX, which is about 200 km from DRS. The

closest field station to DRS is the Indio Mountains Research Station, which is operated by the University of Texas at El Paso (Johnson, 2004). However, the geologies of the two sites differ, with the Indio Mountains site composed of Late Cretaceous sedimentary rocks.

MSU is committed to a site that conserves both energy and materials as well as the native environment of DRS. A preliminary goal is to NOT bring electric service to the Station and to refrain from air-conditioning the structures. The goal is to build structures that do not disrupt the environment nor the native biota. Plans are to build a main structure of either mud or earthen walls, which will provide insulation

and that is powered by renewable solar and/or wind power. Cooling will be passive and involve insulation, window placement, size, orientation, and shuttering as well as thermal towers. We are anticipating employing waterless toilets, specimen driers that use passive heating and air flow to dry specimens effectively without damage, rainwater capture in stainless steel cisterns, wind-driven pumps for the water well(s), and passive orientation of the main building that makes use of wind-cooling, and wastewater capture. In short, the buildings and facilities must be energy efficient. We are cognizant of the potential for visiting scientists to introduce, inadvertently, alien species and for the struc



tures to attract non-native fauna. Policies that might inhibit both these possibilities are being developed.

In order for this to be a functional research facility, the infrastructure clearly needs to include: laboratories; dormitories; a kitchen; storage for equipment; fencing to maintain the natural integrity of the site; and telecommunications and computer systems for the exchange, storage, and interpretation of data and for visiting scientists to maintain contact with their labs, students, and other scientists. However, MSU seeks input from the community of field biologists and geologists to provide optimal facilities and programs.

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▲ *Drainage from Alamo Spring just above the Tascotal Mesa faultline.*

◀ *Eocene mudstones and sandstones photographed from the canyon floor.*



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