

DRS Report from July 2009 meeting

10 August 2009

TO: Dr. Norman Horner and DRS Planning Grant Committee
Midwestern State University
Wichita Falls, Texas

FROM: DRS Advisory Panel

Jerry L. Cook, Sam Houston State University; Paula E. Cushing, Denver Museum of Nature & Science; Mike Friggens, University of New Mexico; C. William Kilpatrick, University of Vermont; E. Christopher Kirk, University of Texas at Austin; John D. Oswald, Texas A&M University; Kathryn E. Perez, University of Wisconsin - La Crosse; Debra Peters, USDA ARS

CC: Dr. Peter McCartney
National Science Foundation

After visiting the DRS in April and convening at MWSU in July (2009), the Advisory Panel enthusiastically supports the development of the DRS as a research station. We encourage the DRS Planning Grant Committee to submit a proposal to the National Science Foundation for facilities development. The DRS presents unique research and education opportunities within the eastern extent of the Chihuahuan Desert in the US. The site is already attracting activities by scientists and educators that can be expanded with field facilities. The university support and broad interest in this facility will promote its long-term success and viability as a research site. To ensure the long-term success of the DRS, MWSU must commit to long-term development and maintenance of the site. As part of this commitment, we support the plan to hire an ecosystem ecologist as described in the Planning Grant.

Intellectual Merit

The DRS has a very strong potential to be developed as a field research station, with a particular focus on biology, geology, and paleontology. The potential for biological research at DRS is enhanced by the broad diversity of microhabitats found on the property (e.g., Chihuahuan desert uplands, springs, riparian zones, badlands, etc). Similarly, the geological features of the DRS make it an excellent site for basic geological research and teaching. Badlands provide an ideal site for sedimentary geology. The strong potential of the site for paleontological research is a proven asset, with the DRS and adjacent properties yielding a middle Eocene vertebrate fauna that is unique in North America. Furthermore, the potential for additional research at DRS is underscored by the recent discovery of a new spider taxon, probably representing a new family. In all areas of research, there is a rare opportunity for researchers and students to undertake pioneering "baseline" research that has not previously been conducted in this part of North America. DRS is unique in the region for providing an opportunity to conduct DRS Report from July 2009 meeting manipulative ecological studies not usually permitted in adjacent protected areas such as Big Bend Ranch State Park and Big Bend National Park. However proximity to these parks will promote complementary activities with the DRS. The remote nature of DRS and the controlled access to the site will help minimize potential disturbance of research sites that occurs in more publicly accessible areas. With good planning and additional facilities, DRS will provide an ease of access and research infrastructure not available in the adjacent parks.

DRS is currently the only site dedicated exclusively to scientific research in the Big Bend region of Texas. Development of a permanent field station would fill a critical gap in spatial and ecological coverage of research sites in the Chihuahuan Desert. Current research sites occur along a water availability gradient that decreases from central NM at the Sevilleta LTER to the Jornada LTER in southern NM, and the Indio Mountain Research Station in southwestern Texas. Precipitation then increases to the southeast (25 cm/y) where the DRS is located in the Big Bend area of Texas. Because the DRS is maintained as a research and education facility, greater opportunities for experimental manipulation, sampling, and specimen collection are possible than at nearby Big Bend National Park. Thus, the addition of the DRS to this network would expand research and education activities to the eastern extent of the Chihuahuan Desert in the US. In addition, comparisons would be possible with protected sites in the Chihuahuan Desert in Mexico (Mapimi Nature Reserve, La Campana).

Sites in this network share many features that allow comparisons across climatic gradients, yet each site also has unique floral, faunal, and geological characteristics that can provide new insights to the biology of the Chihuahuan Desert. The DRS is unique in the topographic relief that occurs over short distances that likely result in sharp ecotones in plant and animal populations and soil properties. The springs afford research and educational opportunities to study potential hot spots of endemism and biodiversity that could be affected by future climate change. Increases in temperature can be particularly detrimental to species in arid regions where water availability is critical to survival. Climate change may also allow invasive species to expand into these areas. Because the springs are isolated areas on the landscape, reductions in population densities during extreme climatic events can lead to persistent species loss. The DRS is also unique regionally because it has not experienced heavy livestock grazing in historical times. Therefore, DRS can be used to compare effects of grazing with the adjacent parks that had historical livestock grazing.

2. Broader Impacts

DRS has an excellent potential to serve as a multidisciplinary research and educational site for professional scientists, graduate and undergraduate students, teachers, and high school students. For example, the following activities can be accommodated at this desert research station:

- field classes – e.g., Desert Ecology, Field Geology, Spider Biology (or other taxon-specific classes)

- thesis project sites

- K-12 continuing education workshops

- summer research opportunities for under-represented groups

DRS Report from July 2009 meeting DRS will also be one of a network of regional research sites that can provide an opportunity for students and researchers to compare ecological, geological, and biological processes within the Chihuahuan Desert ecosystem.

3. Initial recommendations for site development

-- Infrastructure

In order to facilitate scientific research in all seasons and weather conditions, a permanent field station should be constructed that includes both living space (sleeping and cooking areas) and dedicated research space (ideally including both indoor and shaded outdoor work areas).

Providing access to water for both drinking and research is important for site development. An investment should be made in a well, pump, and water storage system in order to provide a continuous source of potable water. Rainwater collection from the roof of the field station could also be used as a secondary source of non-potable water.

The main road to the DRS (from the ranch road turnoff to the field station; approx. 3 miles in length) should be improved in order to make the site more easily accessible to researchers, field classes, and emergency vehicles. Ideally, the field station should be accessible by 2-wheel drive vehicles.

In order to exclude domestic cattle from the adjacent Auler Ranch, a fence and gate should be constructed on the western border of the DRS.

-- Organizational

In order to publicize the availability of the DRS for scientific research, a web site describing the characteristics of the site and its use policies should be developed. This web site should eventually be expanded as a point of access for data and publications generated by scientists conducting research at the DRS.

MWSU should develop clear policy guidelines for long-term management of the DRS, including but not limited to: (a) procedures for initiating new research, (b) data access, sharing, and storage, (c) on-site safety and emergency medical evacuation, (d) management of invasive species, (e) the collection and disposition of specimens collected at the DRS, and (f) gathering reports on site use from researchers using the DRS facilities.

We encourage arrangements be made for an on-call, part-time, or full time site manager who can periodically check the site, can serve as a liaison with the local community, and can assist in the case of an emergency.