

Philip L. Boyd Deep Canyon Desert Research Center

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Location within Domain: Colorado Desert on the extreme western edge of Sonoran Desert sub-domain. (Lat. 33.649, Long. -116.376)

History: The Philip L. Boyd Deep Canyon Desert Research Center (Deep Canyon) is a 2,469 ha (6102 ac) reserve that was established in 1956 in the Coachella Valley about 115 km east of Riverside, California. Deep Canyon is one of 35 Reserves that comprise the University of California Natural Reserve System (NRS; <http://nrs.ucop.edu>).

Key Characteristics: Deep Canyon is located on the northeastern flank of the Santa Rosa Mountains near the western edge of the Colorado Desert. The Deep Canyon Research Area consists of 2,469 ha of UC owned land without public access, and 4372 ha of adjacent federal land with nonexclusive Research Use Agreements. The Research Area includes Deep Canyon, a major north-trending gorge that drains over 100 km² of the Santa Rosa Mountain watershed, a 2,438 m descent over a 16 km distance. Lower Sonoran and Upper Sonoran life zones link the flora and fauna of the Colorado Desert with the Peninsular Mountain Ranges. These mountain ranges create a rain shadow that makes the Colorado Desert one of the driest regions in North America. The climate is characterized by hot summers, scant and erratic rainfall, and strong vernal winds. At Boyd Center (290 m) July is the hottest month with average daily high and low temperatures of 39.0 and 26.5 °C. The 43-year average annual rainfall is 142 mm with extremes of 27 mm (2002) and 478 mm (1983).

Facilities: Boyd Center is the headquarters and primary developed site at Deep Canyon. Facilities for researchers include two laboratories with common lab equipment, a collections room housing the herbarium, seed, and seedling collections, and a library. The Mayhew Residence houses up to 14 researchers with shared kitchen facilities and commons area. All of the facilities are air conditioned with full service utilities. All of the facilities have access to a wireless local area network with a high speed connection to the UC San Diego Computer Center via the High Performance Wireless Research and Education Network (HPWREN) (<http://hpwren.ucsd.edu>), an NSF-funded program.

Research Capabilities of the Reserve: Four primary assets contribute to the research capabilities of Deep Canyon: (1) its status as a protected research area; (2) well developed databases; (3) accessibility from numerous campuses; and (4) support services including a technical staff and available laboratory and housing facilities to complement field studies. Deep Canyon is the only protected site in the Colorado Desert dedicated to research and teaching. There is no public access or recreational use of Deep Canyon. Scientists may undertake long-term projects with confidence that their sites will not be disturbed by conflicting uses. Additional protection is conferred by encompassing state

and federal administrative overlays that limit activities on adjacent lands. The entire research area is within a no-hunting State Game Refuge and the Santa Rosa and San Jacinto National Monument. The quality and diversity of habitats coupled with a facility that is readily accessible to the scientific community is novel to Deep Canyon. These resources are within a three hour drive of four University of California campuses (UC Irvine, UC Los Angeles, UC Riverside, and UC San Diego), six California State Universities, and a plethora of community colleges and private institutions (e.g., University of Southern California, University of Redlands).

Existing Infrastructure: Existing Instrumentation: three CO₂ and H₂O flux towers (UC Irvine); seismograph (USGS and Cal Tech); stream gauge (USGS); ultrasound detection array (UC San Diego and United Nations); rain gauges and air temperature weather stations (8) over an altitudinal transect from 250 m to 1333 m elevation. Databases: long-term data base for weather, plants and animals.

Potential Contributions to the Domain: Deep Canyon is uniquely located between a rapidly urbanizing area and protected wildlands. The area that can be developed in the future is restricted by protected conservation areas and state and federal land that will not be developed. The mosaic of urbanized areas, urban-wildlands interface that will be developed and adjacent wildlands that will never be developed can be exploited to address climate, land use, and invasive plant and animal response themes representative of the Sonoran Desert.