

<b>Name &amp; Title:</b> <b>Cliff Landers, Senior Soil Scientist</b>	<b>Project Assignment:</b>
<b>Years of Experience with Firm:</b> 1	<b>Years of Experience With Other Firms:</b> 41
<b>Education: Degree(s) / Year / Specialization:</b> B.S./ 1969 / Soil Science, Texas Tech University Soils Course 105 / 1972 / University of California at Davis	<b>Registrations / Certifications:</b> Licensed Professional Geoscientist (Soil Science) by the state of Texas (License #606) Certified Professional Soil Scientist (Soil Classifier) by the American Registry of Certified Professionals in Agronomy, Crops, and Soils (ARCPACS)

**Experience Record****2010 to Present: STETSON ENGINEERS INC.-Albuquerque, NM**

Mr. Landers is a Supervisory Soil Scientist for Stetson Engineers, Inc. and is the manager of Stetson's office in Albuquerque. He supervises all personnel assigned to the Albuquerque office and provides technical direction and oversight for all soil-related projects. These include (1) irrigation suitability studies on projects in New Mexico, Nevada, Arizona, Montana, and Idaho; (2) soil salinity studies on irrigated lands and native vegetation habitat restoration projects; (3) soil surveys; and other projects involving the evaluation and inventory of soil physical and chemical properties.

**1988 to 2010: SOIL AND WATER WEST, INC.-Rio Rancho, NM; Corpus Christi, TX**

Mr. Landers was the founder and President of Soil and Water West, Inc. He served as Principal Investigator for various irrigation suitability studies, soil surveys, and soil quality studies in the states of Arizona, Alabama, California, Idaho, Montana, New Mexico, Nevada, Oregon and Texas, and in the countries of Ghana, Eritrea, and Ethiopia. He has also been involved with several projects involving environmental concerns and in the preparation of Environmental Assessments.

Mr. Landers directed and conducted numerous studies to determine the suitability of land for irrigation. These projects involved the examination and mapping of the physical and chemical characteristics of soils, topography and ecological aspects to determine the suitability of the land for irrigation. Approximately 20 components of land were systematically mapped and evaluated to aid in the assessment of the cost of land development, the productive capacity of the land, and the management requirements to achieve the targeted production. These data were usually used by inter-disciplinary teams consisting of economists, engineers, hydrologists, agronomists and others, to determine the feasibility of the project development. Since 1988, Mr. Landers supervised the following irrigation suitability studies:

- Little Colorado River Project Area (Recon.); Arizona
- Little Colorado River Project Area (Semi-detailed); Arizona
- Soboba Indian Res. (Recon.); California
- Soboba Indian Res. (Semi-detailed); California
- Duck Valley Indian Res. (Recon.); Nevada/Idaho
- Duck Valley Indian Res. (Semi-detailed); Nevada/Idaho
- Tule River Water Development Plan (Recon.); California
- Salton Sea Area (Recon.); California
- Umatilla Indian Res. (Recon.)
- Ruby Valley Area (Semi-detailed); Nevada
- Fort Mojave Indian Res. (Recon.); Arizona/California
- Globe Equities 59 Project; Arizona
- San Juan Watershed Project Area (Recon.); New Mexico
- Nez Perce Indian Reservation (Semi-detailed); Idaho
- Gila River Indian Reservation (Semi-detailed); Arizona
- San Xavier Area (Recon.); Arizona
- Fort Independence Area (Recon.); California
- Fort Independence Area (Semi-detailed); California
- Crow Indian Res. (Recon.); Montana
- Crow Indian Res. (Semi-detailed); Montana
- Tohono O'Odham Irrigation Project; Arizona
- Ghedem Irrigation Project (Recon and Semi-detailed); Eritrea (Africa)
- Rio Jemez (Semi-detailed); Jemez, Zia, Santa Ana Pueblos; New Mexico
- Ghana Irrigation Project (Semi-detailed); Accra, Ghana (Africa)
- Flathead Indian Reservation (Semi-detailed); Montana

**Cliff Landers, Project Contact / Coordinator***(Continued)*

Mr. Landers has extensive experience in conducting soil surveys. Since 1988 he has conducted soil surveys and terrestrial ecosystem (soil-plant community) surveys for the USDA Forest Service, the National Park Service, Indian Pueblos on the Rio Grande, and private businesses. These total well over 100,000 acres in extent. Mr. Landers supervises the irrigated lands Salinity Assessment Program of Soil and Water West, Inc. This program consists of conducting soil salinity surveys on irrigated lands and lands under planning for habitat restoration, and advising the land operators of causes and solutions to soil salinity problems. Assessments have been conducted on the Palo Verde Irrigation District near Blythe, Ca; on the Welton-Mohawk Irrigation District near Yuma, Az; on Isleta Pueblo irrigated lands near Albuquerque, NM; on Isleta Pueblo lands along the Rio Grande River bosque); and on the Colorado River Indian Reservation in Arizona.

Mr. Landers served as Principal Investigator for various environmental projects. Recently, Mr. Landers was project manager and lead soil scientist for a 5-year project at Owens Lake near Lone Pine, California. This project involved the propagation of salt grass on highly saline and sodic soils. Mr. Landers provided the lead in monitoring soil chemical and physical conditions on various research plots on the dry lakebed and recommending management alternatives to the client.

Mr. Landers has testified as an expert witness in court or deposition on numerous occasions. His clients have included the U.S. Department of Justice as well as private law firms.

**1985 to 1988: BUREAU OF INDIAN AFFAIRS-Albuquerque, NM****Supervisory Soil Scientist:**

Mr. Landers served as the head of the Soils Section in the Branch of Rights Protection, Albuquerque Area Office. He was responsible for providing guidelines and technical direction for soil studies conducted by the BIA, both in-house and under contract. He was the final technical authority concerning these studies. During this time, Mr. Landers provided direction on the classification of about 30,000 acres on the Jemez, Zia, and Santa Ana Indian Reservations in New Mexico. He did much of the field work himself and testified in various depositions and in court as an expert witness for the Department of Justice concerning this work. Also during this time, Mr. Landers provided technical support regarding the environmental impacts of various activities on Indian Reservations. He assisted Los Alamos National Laboratories in the investigation of radionuclide soil contamination on San Ildefonso Pueblo. He collaborated with BIA Geohydrologists to determine the impacts of land spreading of animal wastes on Isleta Pueblo lands. Mr. Landers received an outstanding rating and a cash award for sustained outstanding performance while in this position.

**1981 to 1985: STONEMAN-LANDERS, INC.-Albuquerque, NM**

Mr. Landers was co-founder and principal in the firm. He served as co-director of soil investigation activities. His duties ranged from project leader on certain projects to soil classifier on others. Additionally he was responsible for preparing or reviewing reports prepared by the firm.

During this time, Mr. Landers was involved with projects concerning Irrigation Suitability Land Classification for several Indian tribes; Mescalero, Southern Ute and Ute Mountain Indian reservations, Acoma-Laguna, Jemez, Zia, Santa Ana, Taos, San Juan, and Santa Clara Pueblos. Other large projects Mr. Landers was actively involved in include: An Ecological Soil Survey of the Mescalero Apache Indian Reservation (460,000 acres); Environmental Impact Studies for the Acoma-Laguna Indian tribe to determine the land damage due to waste disposal activities; Environmental Contamination Studies for Artesia Oil Refinery and review of the refinery's environmental mitigation.

**1980 to 1981: FOREST SERVICE, USDA - Albuquerque, NM****Soil Correlator:**

In this position, Mr. Landers served on the Soil and Water Staff Unit in the Southwestern Regional Office of the Forest Service. His primary duty was to provide technical guidance to the Forest Soil Scientists in Arizona and New Mexico regarding the preparation of ecological soil surveys and to conduct field reviews of these surveys to determine their accuracy and quality. He developed regional guidelines and methodology for Terrestrial Ecosystem Studies and assisted in the preparation of the technical manual concerning these criteria. In addition, Mr. Landers developed procedures for evaluating watershed conditions for forest service planning. He served as a member of an Interdisciplinary Team to assess the environmental impacts of selected projects.

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**1978 to 1980: FOREST SERVICE, USDA - Alamogordo, NM**

**Soil Scientist:**

Mr. Landers primary duty was to provide technical advice to the Lincoln National Forest Supervisor and his staff concerning the soil resource in regard to lumber, crop, and watershed management as well as the environmental impact of various forestry activities. Mr. Landers performed ecological soil surveys on the Lincoln National Forest for use in planning of Forest activities and management. He was responsible for reviewing and assessing all forest projects and activities that had significant environmental impacts within his area of expertise. A project of special interest that Mr. Landers worked on as a member of the Forest Interdisciplinary team was determining the ecological factors involved with restoring the natural resource to a functional condition in the aftermath of an ecological disaster. Mr. Landers also participated in range allotment analyses and in the preparation of various Environmental Impact statements.

**1974 to 1978: SOIL CONSERVATION SERVICE, USDA – Capitan, NM**

**Soil Survey Party Leader:**

Mr. Landers directed soil survey activities of the SCS in Lincoln County and supervised the soil scientists assigned to his office. These survey activities included studies for soil and wind erosion, cropland suitability, rangeland planning and productivity potentials, and soil and vegetation studies. He provided assistance to five SCS Field Offices on projects dealing with engineering recommendations and irrigated cropland management. Mr. Landers worked on the conservation Needs Inventory Program and assisted in the preparation of subdivision regulations for Lincoln County.

**1973 to 1974: SOIL CONSERVATION SERVICE, USDA – Palmetto, FL**

**Area Soil Scientist:**

Mr. Landers was Area Soil Scientist on the Staff of the Area Conservationist in west-central Florida. His duty was to provide soil surveys in the area (10 counties) as needed for farm, ranch, and urban planning. He conducted site evaluations to determine flood zones, and surface and subsurface drainage. Mr. Landers participated in several workshops to teach city planners, engineers, developers, and other land users to extract and apply the information contained in soil survey reports. Mr. Landers was involved in the reclamation of land strip-mined for phosphates. He characterized the mine spoils and provided recommendations for the reclamation. This work was one of the first efforts to classify these areas using standard soil taxonomy criteria. Mr. Landers classified extensive areas of hydric soils (wetlands) throughout west central Florida.

**1970 to 1973: SOIL CONSERVATION SERVICE, USDA – San Francisco Bay Area, CA**

**Soil Scientist:**

In this position, Mr. Landers performed soil surveys in the heavily populated San Francisco Bay Area. The surveys were designed for land suitability engineering interpretations in the more populated areas and for irrigated cropland and rangeland in the more rural areas. Mr. Landers assisted in the writing of the Contra Costa County Soil Survey Report, the Western Alameda County Soil Survey Report, and a long-range development plan for the city of Hayward, California, and is named as a contributor on each of these reports. He classified thousands of acres of hydric soils (wetlands) on the east side of San Francisco bay and in the delta area of the Sacramento and San Joaquin rivers.

**1969 to 1970: SOIL CONSERVATION SERVICE, USDA – Lubbock, TX**

**Soil Scientist:**

In this position, Mr. Landers performed soil surveys in Lubbock County. Federal funds were provided for soil conservation measures installed on irrigated cropland and the soil survey was the basis for determining the eligibility of local farmers for those funds.

- Responsible for collecting scientifically defensible aquifer characterization information in active Indian Water Right Adjudications. Well site geologist for the Karavas Tract, Tract "A", Buffalo Pasture and Tract "C" investigations in Taos, NM. I developed a Mod Flo ground water model based upon structure of the basement rock below the Taos Plateau.
- Well site geologist on 10 exploratory test wells of 300' to 2000' on the Pueblo of Taos. At each site drill cuttings were collected, subsequent analytical characterization of same by examination and description, and cataloged in chip trays for long term preservation. Geophysical well logs were obtained at all locations. Aquifer Pump Testing Investigations were performed and analyzed to estimate parameters of transmissivity and determine coefficients of storage.

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**Other Experiences, Qualifications, and Affiliations**

Texas Association of Professional Geoscientists  
American Society of Agronomy  
Soil Science Society of America  
Professional Soil Scientists Association of Texas