

SOIL AND PLANT SCIENCE DIVISION

Technical Soil Services

Southwest Soil Survey Region

Templeton, CA, Major Land Resource Area (MLRA) Soil Survey Office (SSO) and Sonora, CA, MLRA SSO

SPSD Staff Support the Annual Professional Soil Scientists Association of California Meeting in Santa Cruz Island, CA

Purpose

From June 12–16, 2023, SPSD staff, Templeton MLRA SSO soil scientist Taylor Cullum-Muyres and Sonora MLRA soil data quality specialist Julie Baker, assisted with the annual Professional Soil Scientists Association of California (PSSAC) meeting on Santa Cruz Island, part of the Channel Islands off the coast of Santa Barbara, California. Prior to the meeting, SPSD staff journeyed by boat to the island to sample four previously sampled soil pits for dynamic soil properties and mid-infrared spectroscopy (MIR) calibration. The four sampled soil pits were then left open for examination and discussion for the five-day meeting.

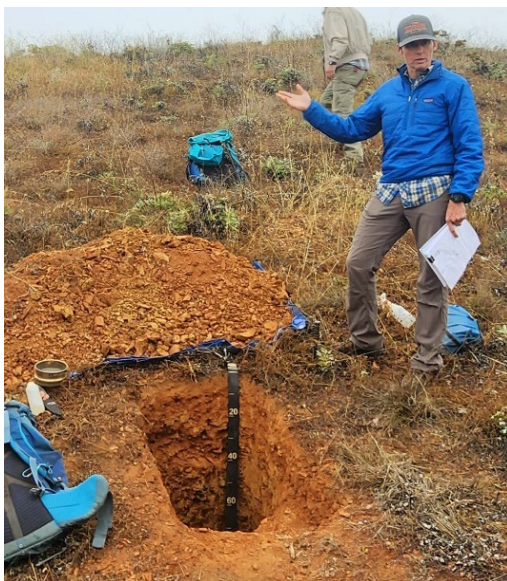


Figure 1. SPSD staff, Julie Baker, discussing the Delphine soil series.

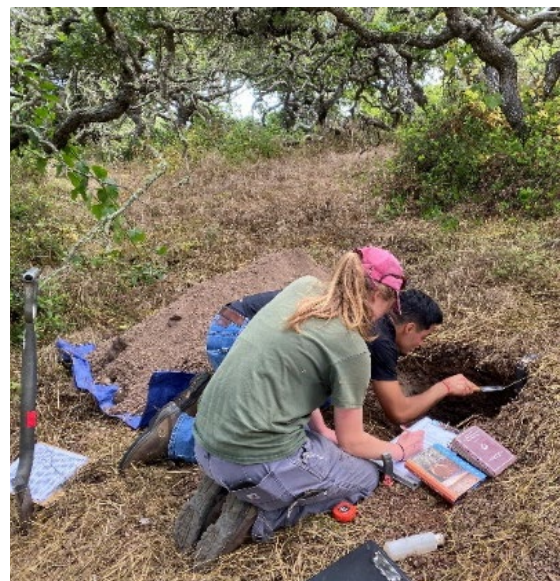


Figure 2. Cal Poly soil judges describing the Forestay soil series.

Background

Santa Cruz Island is very diverse, with an array of volcanic, metamorphic, and sedimentary geologies separated by a central fault. Since the island was acquired by the Nature Conservancy and the National Park Service in 1980, and a soil survey was completed in 2007, the island has been home to many research projects. Several long-term ecological monitoring and restoration projects are still underway.

The Channel Islands have a history of use by native peoples dating back thousands of years, with fishing, a chert quarry, and shell bead production on Santa Cruz Island that supported a robust trade with the mainland. More recently, the long history of grazing since the late 1800s has accelerated erosion on many of the steep mountain slopes and facilitated the introduction of invasive plants and animals. The island is home to several endemic plants and animals, including the formerly endangered Santa Cruz Island fox (*Urocyon littoralis santacruzae*) and the Island scrub jay (*Aphelocoma coerulescens insularis*), both of which were observed on the trip.



Figure 3. Group photo overlooking the central valley of Santa Cruz Island.

In addition, the size, topography, and location of the island at the confluence of the northern cold and southern warm ocean currents create many microclimates and unique soils and ecosites, with vegetation ranging from coastal-sage scrub, chaparral, grassland, oak woodland, and pine forest.

Key Outcomes

SPSD staff took soil samples at the time of the conference to examine the sites for permanganate-oxidizable carbon (POXC) and water stable aggregates. POXC and water stable soil aggregates are relatively new analyses used as part of dynamic soil properties investigations. POXC is a measure of carbon available to microbes and water stable aggregates measures a soil aggregate's ability to maintain cohesion when subjected to water submersion, which can be used as a proxy for other soil disturbances such as erosion. Staff also took samples to calibrate the Southwest Soil Survey Region's MIR machine located in Sonora, California.

Cullum-Muyres gave a presentation on the initial mapping and soils of Santa Cruz Island and led soil pit discussions for the Forestay and Topdeck soil series. Baker led soil pit discussions on the weathering of the schist parent material of the Delphine soil series and vertic properties of the Fiale soil series that are formed in volcanic parent material. The SPSP staff also discussed the soil variability within a soil pit, soil map unit design, and soil data collection.

The twenty-five conference attendees included several students on scholarship from Cal Poly San Luis Obispo and University of California (UC) Davis, faculty from UC Davis, employees of the UC Cooperative Extension program, consultants, and former California SPSP staff Dave Smith, Terry Cook, Kerry Arroues, and Jim Regal. In addition to an overview of the island soils, attendees learned about the geology and natural history of the island from UC Davis faculty Nicholas Pinter, Santa Cruz Island Reserve director Lyndal Laughrin, and Chumash historian and chairwoman Eleanor Fishburn.



Figure 4. The house cat-sized Santa Cruz Island fox (*Urocyon littoralis santacruzae*) on the porch of the UC field station.



Figure 5. The Island scrub jay (*Aphelocoma coerulescens insularis*) at the UC field station.



Figure 6. Hunting for scorpions around the field station with a black light was a favorite nighttime activity of participants.



Figure 7. The group contemplating gully erosion and piping in marine terrace sediments at the west end of the Santa Cruz Island fault trace. Santa Rosa Island (right) in background.