



COOPERATIVE ECOSYSTEM STUDIES UNITS
1849 C Street NW, Room 2737 • Washington, DC 20240 • 202.208.5972 • www.cesu.org

Heritage Documentation Using LiDAR Technology

Cooperative Ecosystem Studies Units allow partners with technical expertise and equipment to assist with cultural resource management activities in National Park Service units and other public lands. Professors and students participated in this project, which aimed to document, analyze, and preserve built environments and cultural and natural landscapes.



■ **Using modern technology to document the past.** Students and faculty set up equipment to scan the exterior of the Pedro Trujillo homestead house. (*Center for Preservation Research/University of Colorado Denver*)

Great Sand Dunes National Park and Preserve in Colorado is a treasure of visual, geological and biological surprises—a high mountain valley holding the highest dunes in North America and flanked by some of the highest peaks in the Rocky Mountains; unique wind-powered geologic systems; insects physically adapted to life in the sand and found nowhere else; alpine lakes and tundra; disappearing creeks; and inter-dunal wetlands. Park bound-

aries also include significant historical and cultural resources that contribute to the San Luis Valley settlement story.

In January 2012, the Trujillo Homesteads received National Historic Landmark designation. The sites represent the expansion of Hispano-American settlement in the part of the American Southwest newly-acquired by the United States in the 1848 Treaty of Guadalupe-Hidalgo. Teofilo and Andre-litta Trujillo and their son, Pedro, were

Rocky Mountains Cooperative Ecosystem Studies Unit

■ Project Partners



■ Project Contacts

Ekaterini “Kat” Vlahos
Kat.Vlahos@ucdenver.edu

Kathy Faz
kathy_faz@nps.gov

■ Project Type

Research

Technical Assistance

Education



■ **Using modern technology to document the past.** The team developed two virtual tours and several “images,” as seen above, of the Trujillo Homestead sites developed from the LiDAR scans. (Center for Preservation Research/University of Colorado Denver)

among the wealthiest Hispano ranchers in the San Luis Valley. All that remains at Teofilo’s homestead is archeological evidence, but Pedro’s two-story log house and some ranch outbuildings are extant.

The Trujillo Homesteads are located on land owned by The Nature Conservancy and within the boundary of Great Sand Dunes National Park and Preserve. In order to share the stories of the Trujillo Homesteads with visitors, the park wanted to create virtual tours accessible via their website. Having additional documentation of these cultural sites also benefitted resource and facility managers tasked with preserving them for future generations.

The College of Architecture and Planning at the University of Colorado Denver used terrestrial light detection and ranging (LiDAR) scanning equipment to collect data from about a dozen locations at the Teofilo and Pedro Trujillo

homestead sites. They also used high dynamic range imaging, which intensifies light and shadows, allowing for a broader range of contrast than traditional digital photography. With this data, the team of students and their advisors developed two virtual tours and several “images” of the sites developed from the LiDAR scans.

Easy Access to History

By marrying technology and history, cultural resource managers and university expertise, the Cooperative Ecosystem Studies Units Network allowed for in-person and virtual visitors to experience the Trujillo Homesteads. These types of projects focus on telling a narrative—a story of place—to reveal the traces of the past, to make the place resonate in the present, and to give consideration for the future of cultural landscapes.



Kathy Faz, Kat Vlahos, and Cheri Yost wrote this project spotlight in December 2012. Cooperative Ecosystem Studies Units provide research, technical assistance, and education to federal land management, environmental, and research agencies and their partners. Their broad scope includes the biological, physical, social, cultural, and engineering disciplines needed to address natural and cultural resource management issues at multiple scales and in an ecosystem context. There are seventeen CESUs, each composed of federal agencies, a host university, and partner institutions, which are linked together in a CESU network. For more information, see www.cesu.org or contact Dr. Thomas E. Fish, CESU National Coordinator, at tom_fish@nps.gov.