High-tech models help guide restoration efforts to save threatened plants

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A team of scientists from the USDA Forest Service's Pacific Southwest Research Station (PSW) and two universities will begin research using sophisticated topographic models to identify areas within dry forests that have the most potential for ecological restoration.

The research team, which includes Dr. Susan Cordell, PSW research ecologist; Dr. Erin Questad, assistant professor, Biological Sciences Department at California State Polytechnic University, Pomona; and Dr. James R. Kellner, assistant professor, Department of Geography at the University of Maryland, recently received a $1.4 million grant from the U.S. Department of Defense's Environmental Security Technology Certification Program (ESTCP) to conduct their work on the 105,000-acre Pohakuloa Training Area on the island of Hawaii.

The research team developed topographic models using elevation measurements from high-resolution airborne light detecting and ranging (LiDAR) that accurately predicted habitat suitability for existing threatened, endangered and at-risk plant species, which occur in dry environments. In dry ecosystems, high-quality areas are often topographic depressions where soil and water accumulate and where plants are protected from strong winds. The scientists will expand this technology by using data collected from high-resolution stereographic satellite observations to create digital elevation models which will further gauge habitat suitability. Because satellite imagery is readily available for locations across the globe, the methodology the team develops can be used to generate habitat suitability models for threatened and endangered

species recovery for dry sites anywhere in the world. These models will help determine which areas are most suitable for plant growth and survival, and guide effective restoration efforts.

The four-year project will begin in June. The team will first develop a habitat suitability model, and then will set up a demonstration plot where they will test plant survival across a range of predicted suitability.

"Overcoming barriers to plant restoration in dry environments is especially critical for threatened and endangered species management. In Hawaii alone, the DoD spends nearly $10 million annually on environmental programs to protect these species and their associated critical habitat," says Cordell. "Outside of Hawaii, the top 10 DoD installations in the U.S. with the greatest number of federally listed species occur in dry ecosystems. This work could potentially re-define the way conservation-related land management agencies in dry ecosystems manage their restoration programs by providing a set of quantitatively based and spatially explicit tools to ensure effective and compliant land use management for species recovery."

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