

## **Remote mapping of habitat suitability for at-risk plant species and its implications for restoration and reintroduction**

Finding suitable habitats in fragmented and degraded landscapes is a major challenge to restoration and reintroduction programs for plant species at risk of extinction. Desiccation and water stress are significant barriers to survival for over 40% of at-risk plant species that occur in dry or rocky habitats. We examine how microtopographic features that reduce water stress and increase resource availability can be modeled for landscape planning that can increase the success of restoration efforts in drylands. We developed a topographic habitat suitability model (HSM) from airborne Light Detecting and Ranging (LiDAR) data as a tool to enhance landscape planning for at-risk plant species reintroduction for a dryland landscape in Hawaii. The HSM identifies topographic depressions that are protected from prevailing winds (high suitability sites) and contrasts them with ridges and other exposed areas (low suitability sites). Our field tests of the HSM microclimatic conditions and plant-response traits indicated better growing conditions in high suitability sites compared to low suitability sites. The locations of six at-risk plant species showed associations with high suitability areas, and the survival of planted individuals of *Dodonaea viscosa* was less variable among high suitability plots. These results suggest that the HSM can improve plant establishment and survival, reduce the cost of restoration and reintroduction programs through targeted management activities in high suitability areas, and expand landscape-scale restoration planning capabilities.

## **Social and ecological factors influencing attitudes towards the application of high intensity prescribed burns to restore fire adapted grassland ecosystems**

Fire suppression in grasslands systems that are adapted to episodic fire is a major factor that has contributed to the recruitment of woody species into grasslands worldwide. Even though the ecology of restoring these fire prone systems back to a grassland state is becoming clearer, the major hurdle to reintroducing historic fire at a landscape scale is its social acceptability. Despite the growing body of literature on the social aspects of fire, an understanding of human dimensions of applying high-intensity prescribed burns in grassland and savanna systems is lacking. We used structural equation modeling to examine how landowners' attitudes towards high-intensity prescribed burns are affected by previous experience with burning, perceptions of brush encroachment, land condition, proximity constraints, risk orientation, their fire management knowledge and skill, access to fire management equipment, and subjective norms. Our results suggest that experience, risk taking orientation and especially social norms (perceived support from others) when implementing prescribed burns play important roles in determining attitudes towards the use of high-intensity prescribed burns. Concern over lack of skill, knowledge and insufficient resources have a moderately negative effect on attitudes towards high-intensity prescribed fires. Our results highlight the importance of targeted engagement strategies that address risk perceptions, subjective norms and landowners concerns in order to increase the adoption of high-intensity prescribed burns that lead to landscape-scale grassland restoration and conservation benefits.