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Impacts of Invasive Species Removal on Soil Health and Species Composition

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Abstract: Himalayan Blackberry (*Rubus armeniacus*) is recognized as an invasive plant species in California, often dominating the landscape in which it resides. Despite removal efforts, this species often exhibits regrowth after vegetation management is implemented. Lower Bidwell Park in Chico, California, has experienced a vast accumulation of *R. armeniacus*, and removal strategies generally involve hand removal in addition to grazing by goats. More recently, restorative measures have been performed, and native plant species have been planted after removal. However, it is unclear how the disturbance of these management strategies could impact key metrics of soil health, such as soil carbon and nitrogen content. In this study, a paired plot method was used to investigate how disturbance from invasive species removal impacts soil health. A total of 30 soil samples were collected from three different sites with varying time since invasive species removal. These samples were dried and processed for determination of carbon and nitrogen content via an elemental analyzer. Once the samples are run through the analyzer, we will be able to determine how time since invasive species removal impacts soil health across Lower Bidwell Park. Additionally, a species composition analysis will be conducted within these sites. Relative cover of each species present within a 1 m × 1 m frame will be recorded within the same areas where the soil samples had been taken. Additionally, we will measure a variety of plant traits on those same species (e.g., plant height, leaf area, pubescence). From these data, we will calculate species richness, evenness, Shannon diversity index, as well as the functional diversity within these communities. Assessment of functional diversity can reveal the significance of functional traits at the community level within each site. The mean and variation of the above-mentioned traits will allow us to determine how these traits may contribute to ecosystem functioning. We hypothesize that we'll observe no significant difference in soil health between these sites and a possible increase in species richness of native plants in treated areas. If the data support this hypothesis, land managers can continue with this management strategy knowing they are not negatively influencing soil health.

Keywords: *invasive species, disturbance, soil health, species composition, functional diversity*