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CREATING NEW FOODSCAPES TO ENHANCE THE SUSTAINABILITY OF RANGELANDS IN THE WESTERN US

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ABSTRACT:

Approximately six million beef calves are produced annually in the western U.S., and ranchers must maintain profitable operations while addressing the growing number of consumers seeking environmentally, economically, and socially sustainable food. In response to such challenge, a diversity of deep-rooted perennial legumes and non-legume forbs high in nutrients and functional phytochemicals, are being grown and stockpiled in resource patches or "islands" across a "sea" of grass-dominated rangelands. These islands of multifunctional diversity are being tested across monotonous landscapes to be used as a low-cost and sustainable supplementation strategy for beef cattle with the aims of increasing biodiversity, animal productivity and health, while reducing environmental impacts. We are screening native and introduced plant species for their establishment and persistence in replicated studies at different ecosites in northern, central and southern Utah. Continuous culture fermenters are being used to evaluate how these forages and their combinations alter rumen fermentation, microbial growth, methane production, and nutrient digestibility. Some of these forages (sainfoin, small burnet, forage kochia, birdsfoot trefoil, alfalfa) are being strategically deployed in islands across the landscape aiming at higher probabilities for seedling success. This is achieved through the analysis of a temporal sequence of satellite imagery that locates pixels within a landscape whose greenness is greater than the average pasture greenness measured in mid-summer. Such foodscapes are being tested for their effects on beef cattle performance, habitat for pollinators, mammalian and avian wildlife, environmental impact (enteric methane, fecal and urinary nitrogen emissions), and economic viability. This research is being integrated at the regional and local level through the restructuring of grazing schools, producer engagement, and assessments of potential for adoption through online surveys and subsequent semi-structured in-depth interviews. This transdisciplinary project is progressing to create more sustainable beef production systems while engaging and educating current and future land stewards.