Widespread exotic annual grass invasion of western sage-steppe communities has resulted in increased fire size and frequency, which threatens the stability of sagebrush communities. Regeneration of landscapes post-fire involves competition between sagebrush, exotic annual grass, and perennial bunchgrasses (which are often seeded to prevent invasion/reinvasion of exotic annual grass), and these interactions are moderated by seasonal weather patterns. Climate change may shift future weather patterns in ways that have the potential to alter the species interactions in post-fire systems. This study utilizes a long-term post-fire dataset on functional group abundances over a 30-year time span to examine how weather variability moderates the interactions between perennial, exotic grass, and sagebrush establishment at landscape scales and how future climate scenarios might impact the balance between perennial grasses, annual grasses, and sagebrush recruitment. Preliminary results indicate that all functional groups typically increase with time after fire, with sagebrush more likely to occur by 8 years post-fire. Sagebrush was found to be slightly more sensitive to temperature variability than precipitation, but was substantially less sensitive to weather variability than annual grass. Perennial grass was not particularly sensitive to either temperature or precipitation and predicted accuracy was similar between a model that only incorporated time since fire and one that incorporated weather variables. Strong weather lag effects were not apparent for either sagebrush or perennial grasses but annual grass abundances were most sensitive to April and June precipitation in the prior five years. Simulations under future climate change scenarios will shed light on how the balance of these functional groups may change in the future.