

## Handout #2. Planning Framework to Prepare for Extreme Weather in California

### Grasslands

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<b>Planning Supplement:</b>	
<b>1) Grazing Management Plan</b>	
a. Resource conditions and vulnerabilities to variable and extreme weather	i. Climate and weather history ii. Soils and sites vulnerable to erosion during storms and flooding iii. Special resources and elements of livestock operation vulnerable to temporary weather extremes
b. Goals, Objectives, and Performance Standards, including to sustain the special resources, productive capacity, and livestock operations	
c. Predicted effects of typically variable as well as extreme weather on the rangelands and the livestock operation, and their resiliency	i. Numerous reports about drought effects on livestock operations and assistance ii. Native grass populations fluctuate more in association with weather year cycles than management, and occur at sites of relatively low fertility (Spiegel et al. 2014; Hayes and Holl 2011) iii. Non-native forage grasses and their seed bank persist during droughts and over-use, but composition can change (Bartolome 1976 and 1979)
d. Guidance for flexibility of grazing management and provision of livestock needs	i. Grass-banks within properties or in regional networks ii. Core habitat versus flexible-use fields distinguished iii. Alternative watering sources and delivery means prepared in advance iv. Removal to home ranch or sacrifice fields
e. Sustainability of the livestock operation to provide conservation services and other stewardship	i. Integration with regional socio-economic systems ii. Guidelines, incentives, and contingencies for operations (for flexibility to adapt to extreme events and changing conditions)
f. Monitoring to efficiently provide accurate information for short-term management decisions and long-term adaptations of plans	i. Defined variables (related to weather effects), methods, standards, and schedule
<b>2) Monitoring Reports</b>	
a. Sections on observed weather trends, weather effects, grazing effects that exceeded standards, adaptive responses to extreme weather, and recommended next actions	
<b>3) Adaptation of Management Actions</b>	
a. Specified responses to results that exceed standards	
<b>References:</b>	
Bartolome, J.W. 1976. Early rains alter range forage. <i>California Agriculture</i> . 30(12):14-15.	
Bartolome, J.W. 1979. Germination and seedling establishment in California annual grassland. <i>J. Ecology</i> 67:273-281.	
Hayes, G.F. and K.D. Holl. 2011. Manipulating disturbance regimes and seeding to restore mesic Mediterranean grasslands. <i>Applied Vegetation Science</i> 14:304-315.	
Melillo, J.M., T.C. Richmond, and G.W. Yohe (Eds.). 2014. Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841p.	
Spiegel, S., L. Larios, J.W. Bartolome, and K.N. Suding. 2014. Restoration management for spatially and temporally complex Californian grassland. Chapter 4 in: P. Mariotte and P. Kardol (Eds.). <i>Grasslands: habitat management, impacts of plant diversity and restoration strategies</i> . Nova Science.	