

Menu of Adaptation Strategies and Approaches

Developed for Grasslands

Strategy 1: Restore and maintain the extent of grasslands across the landscape.

- 1.1. Conserve existing intact grasslands and high-value sites.
- 1.2. Address major mechanisms of grassland conversion.
- 1.3. Create or maintain grassland habitats that include heterogeneity and redundancy in site types and environmental conditions.
- 1.4. Restore or establish grasslands in locations expected to remain suitable under future climate conditions.

Strategy 2: Increase landscape-scale resilience under future climate conditions.

- 2.1. Maintain or create movement corridors.
- 2.2. Reduce fragmentation and create stepping-stones.
- 2.3. Protect habitat along species range edges.

Strategy 3: Maintain fundamental ecosystem functioning in grasslands.

- 3.1. Maintain or restore soil quality and nutrient cycling.
- 3.2. Emulate natural disturbance processes from grazing.
- 3.3. Emulate natural disturbance processes from natural and indigenous fire.
- 3.4. Maintain or restore hydrology.
- 3.5. Maintain pollination services.

Strategy 4: Increase biodiversity and heterogeneity in grassland communities.

- 4.1. 4.1. Maintain or restore genetic diversity of ecological communities.
- 4.2. Maintain or restore a diversity of native plants and functional groups (e.g., C3 and C4).
- 4.3. Maintain and restore heterogenous vegetation
- 4.4. structure.
- 4.5. Maintain or restore grassland-embedded wetland vegetation.

Strategy 5: Reduce the impacts of ecological and climate stressors.

- 5.1. Reduce the impacts of climate on ecosystem functioning.
- 5.2. Reduce the impacts of climate on grassland wildlife.
- 5.3. Control woody encroachment.
- 5.4. Control invasive species.
- 5.5. Promote beneficial practices on agricultural lands.

Strategy 6: Adjust site-level management to align with new climate conditions.

- 6.1. Adjust timing, frequency, and intensity of management actions (such as fire, grazing, and mechanical treatments etc.).
- 6.2. Adjust planting and restoration practices to promote establishment of grassland vegetation under climate change.
- 6.3. Adjust the management of grassland-embedded
- 6.4. wetlands to account for changes in hydroperiod, precipitation events, and drought.

Strategy 7: Facilitate transitions under climate change.

- 7.1. Promote climate-tolerant plant genotypes and facilitate community shifts to better align with future climate conditions.
- 7.2. Engage in assisted migration to facilitate species range shifts.
- 7.3. Convert non-grassland systems to grassland where climate can no longer support current landcover.
- 7.4. Identify areas where continued investment in grassland conservation is a poor use of resources and allow transition.

Strategy 8: Engage human communities in grassland conservation and adaptation.

- 8.1. Respect and incorporate indigenous knowledge and values in grassland management.
- 8.2. Invest in outreach and support for landowners and producers.
- 8.3. Develop and promote economic incentives for grassland climate adaptation and conservation on private lands.
- 8.4. Involve communities in management activities.

MORE INFORMATION: *This menu of adaptation strategies and approaches can be used within the Adaptation Workbook decision-support framework found in Swanston, C.W.; Janowiak, M.K.; Brandt, L. A.; Butler, P.R.; Handler, S. D.; Shannon, P.D.; Derby Lewis, A.; Hall, K.; Fahey, R.T.; Scott, L.; Kerber, A.; Miesbauer, J.W.; Darling, L.; Parker, L.; St. Pierre, M. 2016. **Forest adaptation resources: climate change tools and approaches for land managers, 2nd ed.** Gen. Tech. Rep. NRS-GTR-87-2. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 161 p. doi.org/10.2737/NRS-GTR-87-2.*

SOURCE: Bernath-Plaisted, J.S.; Handler, S.D.; Ahlering, M.; Brandt, L.A.; Maresh Nelson, S.B.; Niemuth, N.D.; Ontl, T.; Peterson, C.L.; Ribic, C.A.; Strohmeyer, D.; Zuckerberg, B. 2025. **A climate adaptation menu for North American grasslands.** *Conservation Science and Practice*. 7(4): e700017. doi.org/10/1111/csp2.70017.

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