Prairie Climate Companion

Informing adaptive grassland management in the North Central region where winds are strong, the grazers are good-looking, and the temperature… is above average.

Invasive Species

The Issue

In grassland ecosystems, herbaceous invasive species decrease native species diversity, reduce forage quality and quantity for animals, alter habitat structure, and affect nutrient cycling and availability.

Plant communities become more susceptible to invasion following disturbances, which can be directly (drought, flood) or indirectly (land-use practices) influenced by climate change. These disturbances can create a pulse of resources that herbaceous invasives are able to exploit.

Many of the most pervasive and widespread herbaceous invasive species were planted extensively as livestock forage and have only recently been recognized as threats to native grasslands. These include the species pictured to the right.

- **Crested Wheatgrass**
  *Agropyron cristatum* (L.) Gaertn.
  Image: Russell Pfau

- **Yellow Bluestem**
  *Bothriochloa ischaemum* (L.) Keng
  Image: Billy Warrick

- **Smooth Brome**
  *Bromus inermis* Leyss.
  Image: Ohio State Weed Lab, The Ohio State University, Bugwood.org

- **Sweetclover**
  *Melilotus officinalis* (L.) Lam.
  Image: Wendy VanDyk Evans, Bugwood.org

- **Kentucky Bluegrass**
  *Poa pratensis* L.
  Image: Wikimedia Commons

- **Tall Fescue**
  *Schedonorus arundinaceus* (Schreb.) Dumort.
  Image: James H. Miller & Ted Bodner, Southern Weed Science Society, Bugwood.org
Implications for Grasslands Management

Which species are important to watch for in the North Central region? Given their low palatability to domestic livestock and wildlife, and their ability to invade even cheatgrass-infested areas, medusahead and ventenata are high priorities for early detection and eradication. Working with partners to the south will help anticipate other invasive species that may move northward in a changing climate.

Maintaining high diversity of native species in all parts of the food web will help to reduce invasibility as the climate changes by occupying all available environmental niches. Unlike the more arid west, fire in North Central grasslands tends to have either neutral or negative effects on herbaceous invasive species. Climate change effects that reduce managers’ ability to conduct prescribed fires will likely exacerbate invasions in these ecoregions.

Climate and carbon dioxide fertilization effects on the efficacy of chemical and biological control tools suggest that greater stress on early detection of new threats will be critical, as will flexibility and rapid adoption of new management strategies.

Selected Resources

USGS Invasive Species Habitat Tool (INHABIT) provides downloadable maps and tabular summaries of invasion risk for plant species.

North American Invasive Species Management Association (NAISMA) supports invasive species management professionals through trainings, outreach, and networking.

North Central Regional Invasive Species and Climate Change (RISCC) Network addresses invasives in a changing climate.

Contact

Dr. Amy Symstad
Research Ecologist, USGS
asymstad@usgs.gov

Dr. Chelsea Nagy
Research Scientist, Earth Lab, CU Boulder
chelsea.nagy@colorado.edu

Dr. Christy Miller Hesed,
Regional Climate Adaptation Scientist, NC CASC
christine.hesed@colorado.edu

Check out the synthesis report here!