IOWA STATE UNIVERSITY
Department of Natural Resource Ecology and Management

NREM 380 Field Ecology Research and Teaching
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# Teaching Benefits of Controlled Burning to Mitigate Prairie Plant Competition

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## Introduction

### Background

- Management activities such as controlled burning can reduce competition and promote biodiversity among native plants[1]
- Invasive species create a management challenge for ecosystems nationwide[1]

### Central Concept

- Management activities reduce competition between native and invasive plants, thereby promoting biodiversity[1]

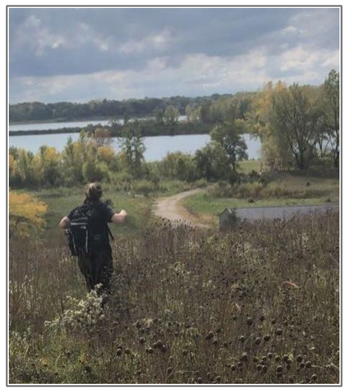

Figure 1. A reconstructed prairie. Photo credit: Dagney Paskach

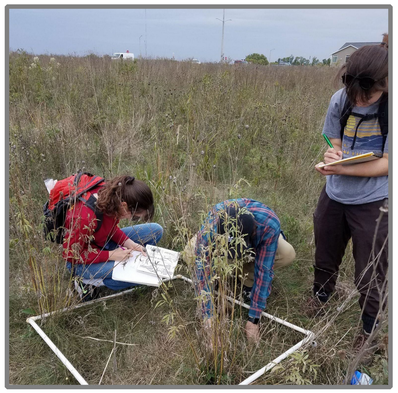

Figure 2. Assessing proportion of native and invasive plants in a prairie plot. Photo credit: Janette Thompson

## Lesson Overview

### Additional Learning Objectives

- Describe resources a plant needs to live and grow
- Explain how native and invasive plants compete for resources

### Audience and Context

- Intended for elementary school students (K–2)
- Conducted in a reconstructed prairie but could be conducted in any open area (Figures 1–2)
- Completed in 50 minutes

## Lesson Plan

### Materials and Preparation

- Laminate pictures
  - Controlled prairie burning (Figure 4)
  - Native plants and invasive plants (including root systems) (Figure 3)
- Mark off two 20'x20' areas
  - Habitat A (native plants present, as in Figure 5)
  - Habitat B (native *and* invasive plants present, as in Figure 6)
- Hide plastic eggs (representing resources) in each habitat (60 in A; 30 in B)

### Engagement

- Establish interest in surrounding plants
  - What do you notice about the plants around you?
  - How do these compare to the plants you might see around your house?
- Review resources plants need to survive (sunlight, water, space, nutrients)
  - What do the plants that we've talked about need to live?

### Exploration

- Group students into teams of 3 or 4
- Students search for eggs (resources) in either Habitat A or Habitat B
- Students calculate the total number of resources found in each habitat

### Concept Development

- Instructors reflect on the activity with the students and connected to ecological concepts
- Ask the following questions to facilitate learning:
  - Habitat B had invasive plants present. What do you think happens to native plants when invasive plants are present?
  - How could we make it easier for the native plants to get the resources they need?
  - How do native and invasive plants differ (Figure 3)?
  - Why should we manage prairies to promote biodiversity (Figure 4)?

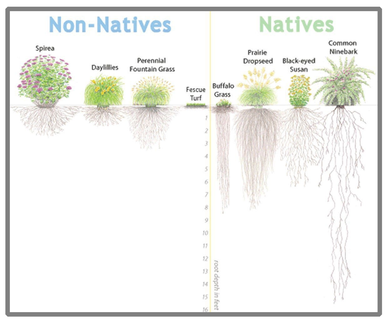


Figure 3. Data collection in a prairie, illustrating differences between root systems. Photo credit: Rain Gardens

Figure 4. Controlled prairie burning
Photo credit: Devyn Leeson

Figure 5. A prairie monoculture. Photo credit: Global Soil Biodiversity Initiative

Figure 6. A diverse prairie ecosystem. Photo credit: Global Soil Biodiversity Initiative

## Concept Application

- Plant taxon richness promotes habitat diversity for all biota
- Knowledge of the competition between native and invasive plants can lead to a desire to assist in land management efforts
  - How can we make it easier for native plants to get the resources they need to survive?
- We depend on ecosystems and their inhabitants for pollination, food, and recreational enjoyment
  - Why is it important to maintain an ecosystem with lots of different plants?
- If we want to have lots of different plants and animals, we need to help maintain the place where they live[2]

## Connections to Next Generation Science Standards

### Standard

- K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.[3]

### Science and Engineering Practice

- Making Observations: Students will make observations of how many resources are available to native plants in the presence or absence of invasive plants.

[1]Larson, D., Hernandez, D., Larson J., Leone J., Pennarola, N. (2020). Management of remnant tallgrass prairie by grazing or fire: effects on plant communities and soil properties. *Ecosphere 11*(8). 1–17.
[2]Hulbert, C. 1986. Fire effect on tall grass prairies. *Proceedings of the Ninth American Prairie Conference.* 138–142.
[3]NGSS Lead States. 2013. *Next Generation Science Standards: For States, By State*s. Washington, DC: The National Academies Press.