

## RESTORATION

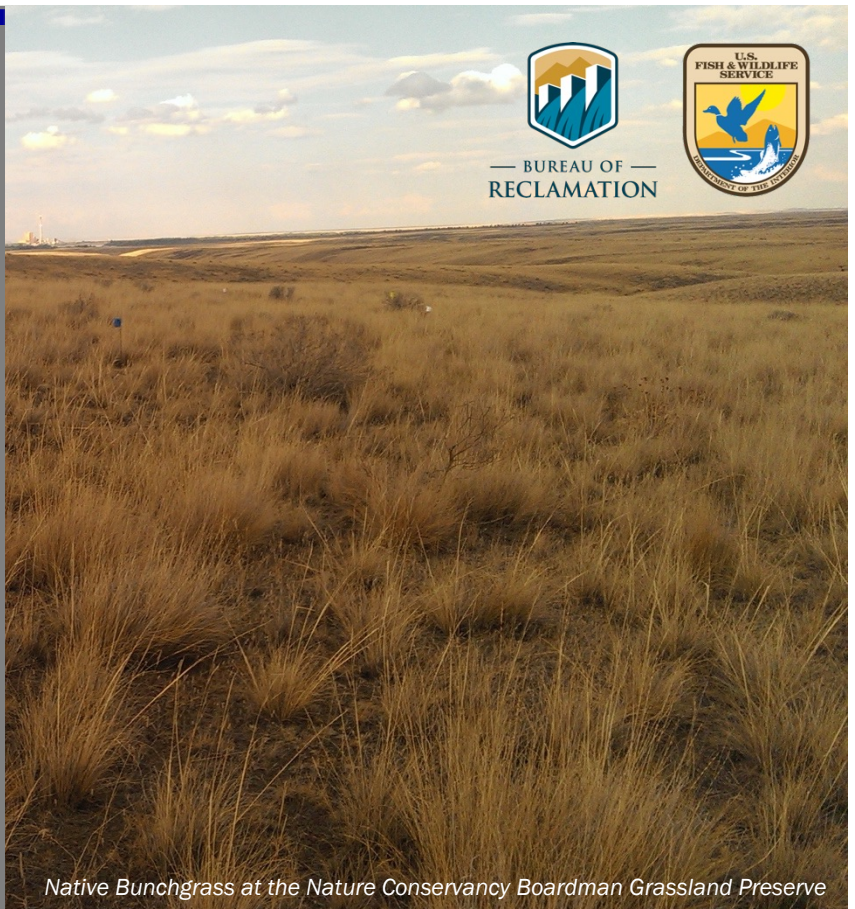
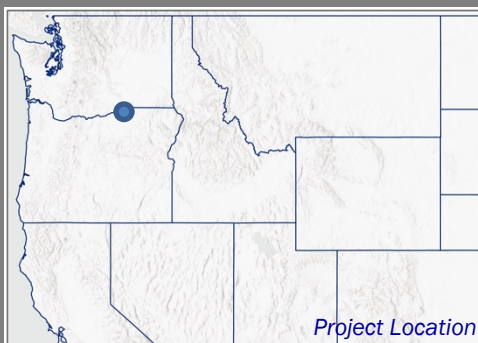
# Impacts of Grassland Restoration and Wildfire on Bee Populations in Eastern Oregon



Oregon State University



Both pollinator populations and grasslands are declining in eastern Oregon. Pollinators, especially native bees, are important for the health of grassland ecosystems. Current methods for grassland restoration remove invasive grasses with glyphosate and re-seed with native grasses. These methods do not account for all the pollinator community's needs. Researchers from Oregon State University studied how current restoration methods impact bees and could be augmented to meet more pollinator needs. During the study, a wildfire burned through the study site, providing a rare opportunity to also study how wildfires impact bees—and how fire could potentially be utilized as a tool for restoration.



*Native Bunchgrass at the Nature Conservancy Boardman Grassland Preserve*

## KEY ISSUES ADDRESSED

There is a lack of basic knowledge about the biology, abundance, and diversity of native bees and other pollinators in grasslands of eastern Oregon. The recent increase in grassland restoration projects provides an opportunity to learn more about grassland pollinators and understand how bees—a vital pollinator species for grasslands—are impacted by common glyphosate/re-seed methods. These methods effectively control invasive species, but may not benefit pollinators. Because of the difficulty of predicting future fires and gathering pre-fire data, little is known about how increasingly severe and common wildfires impact bees. A fire burning through the restoration study site allowed researchers to study the effects of wildfire on bees. The results of these studies can help researchers and managers better understand how to take bees' needs into consideration and combat their declining numbers.

## PROJECT GOALS

- Research how bees are affected by restoration work in the grasslands of eastern Oregon
- Assess how bees are impacted by increasingly common and severe wildfires
- Identify pollinator habitat elements to improve in grassland restoration projects



## PROTECTION FROM FIRE

Unburnt patches of vegetation and lightly burned areas likely allowed pollinators to find refuge from the fire and prevent populations from declining one year after the fire.

## LESSONS LEARNED

Researchers found that, across all their study sites, areas with taller vegetation had higher species richness but lower species diversity, possibly due to taller plant species providing more blooms but less diversity in different types of blooms through the season. Expanding the diversity of floral resources over the course of the growing season could help current restoration methods better support a diverse community of native pollinators.

Researchers also found that sites with more litter cover and diverse nesting habitats had more bees. Practitioners can enhance pollinator nesting habitat by increasing the abundance and diversity of litter at grassland restoration sites, while also including areas of bare ground for ground nesting pollinators.

Early season fires could be used to enhance native bee populations in Eastern Oregon's grasslands. After the early season wildfire, many environmental variables that foster bee populations improved: invasive plant cover decreased, and abundance of flowering forbs increased significantly at burnt sites. Other variables important for pollinators, such as maximum vegetation height and litter cover did not differ significantly in burned and unburned areas.

## NEXT STEPS

- Apply findings to future grassland restoration projects, and study impacts on native pollinator communities
- Compare how different seasonality and severity of burns impacts grassland pollinator communities to inform prescribed burns for grassland restoration

## PROJECT HIGHLIGHTS

**Restoration Practices Do Not Affect Bees:** Researchers found that common glyphosate/re-seed methods do not harm grassland bees. They also do not increase native bee populations, indicating that grassland restoration techniques could consider multiple pollinator needs in project design to benefit pollinators.

**More Flowers ≠ More Bees:** An increase in flowers alone was not found to increase native bee populations. Researchers suggest that nesting site availability, diversity and seasonality of blooms, and diversity and quantity of litter are important features of pollinator habitat to restore in addition to the number of flowering plants.

**Valuable Pre-Fire Data:** After the fire, native bee diversity and richness increased compared to pre-fire conditions. By analyzing key environmental variables that impact bees before and after the early season fire at the study site, researchers were able to understand how fire could potentially be used as a restoration tool in the future. Researchers suggest this might be due to additional nesting sites and/or increased floral resources after burns, but more direct investigations are necessary.

## Collaborators

- The Nature Conservancy in Eastern Oregon
- Oregon State University

CCAST Author: Marty Salamone, June 2022.  
Photos courtesy of Lauren DiCarlo/Westfield State University

For more information on CCAST, contact Genevieve Johnson ([gjohnson@usbr.gov](mailto:gjohnson@usbr.gov)) or Matt Grabau ([matthew\\_grabau@fws.gov](mailto:matthew_grabau@fws.gov)).

Visit CCAST:



For more information on this project, contact Lauren DiCarlo:  
[ldicarlo@westfield.ma.edu](mailto:ldicarlo@westfield.ma.edu)



Researchers in a Plot Dominated by Non-Native Cheatgrass