



Research Brief for Resource Managers

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Effects of prairie restoration on butterfly communities

Jennifer A. Vogel, Diane M. Debinski, Rolf R. Koford, and James R. Miller. 2007. *Butterfly responses to prairie restoration through fire and grazing. Biological Conservation 140:78-90.*

Habitat loss and degradation threaten populations of butterflies (and other insects) throughout the upper Midwest. Restoration practices of prairie ecosystems commonly involve returning the historical disturbances of fire and grazing. Use of prescribed fire and/or grazing as restoration tools may have positive or negative effects on butterfly communities because individual species can respond differently to the changes in vegetation associated with these restoration practices.

This study was conducted in remnant prairies at the northern end of the Loess Hills Landform (Plymouth County, Iowa). The authors wanted to determine if restoration practices influenced butterfly communities, and if differences in butterfly communities were associated with vegetation characteristics. Treatments applied to management units were burn only, graze only, and burning followed by grazing. Butterfly and vegetation surveys were conducted at sites where restoration practices had been in place for a minimum of 4 years.

The response of number of individuals, species diversity, and species richness did not suggest one restoration practice out of the three to be more effective at improving butterfly habitat. The mean number of individual butterflies was greatest at the burn and graze sites (31.48) and lowest at burn only sites (20.17). However, the species richness and diversity were greatest in the burn only treatments.

Management Implications

- There is not a single best management practice for butterfly communities
- Knowledge of species present on site – and potential positive and negative responses – can help restoration planning
- Using a variety of management practices may be best way to increase species richness and abundance

Butterfly species which were classified as “habitat specialists” were not associated with a single restoration practice. **The butterfly community composition of burn only sites was significantly different from graze only sites.** Species associated with burning only included *Satyrrium titus*, *Hesperia ottoe*, *Celastrina landon*, while graze only sites were associated with *Lycaena dione*, and *Polites peckius*.

The vegetation characteristics that best predicted butterfly abundance were percent cover of bare ground and percent cover of forbs. The number of butterflies was lower on sites with a high proportion of bare ground (which leaves little cover) and was positively correlated with forb cover (forbs are a common source of nectar).

The varying response of the butterfly community is attributable to the different habitat requirements of individual species, which can change throughout the life-cycle, and require a mixture of vegetation structure and composition.



Photos from study site, provided by Jennifer Vogel. Top left: Broken Kettle Grasslands. Top right: Grazed site. Bottom left: Skipper butterfly. Bottom right: Regal Fritillary butterfly.

For additional information on the species mentioned here and other butterflies, visit <http://www.butterfliesandmoths.org>