Abstract:

Tallgrass prairie, arguably the most fire-dependent system in North America, is a Biome that has been essentially eliminated and is now exceedingly rare. Absent frequent disturbance, remnant tallgrass prairie rapidly converts to a dominant cover of woody plants. This creates unique challenges for conservation of prairie-specialist insects dependent on increasingly small and isolated habitats prone to direct and indirect threats from climate variability, habitat degradation, and management activities; or lack thereof. Regal fritillary butterflies (*Speyeria idalia*) exemplify this problem, with sharp population declines in recent decades and considerable disagreement on management practices, particularly in the use of prescribed burning to maintain habitat. Spanning 20-years (1997–2016), we evaluated regal fritillary populations within seven sites in relation to fire, habitat, and climate records to better understand these interacting effects on interannual and long-term population changes. Though fire had short-term negative effects on regal fritillary abundance, habitat quality was one of the most important factors explaining populations and was positively associated with prescribed fire. Burning every 3–5 years maximized regal fritillary abundance, but even annual burning was more beneficial to regal populations than no burning at all. Unburned refugia are important in maintaining populations, but creating and maintaining high quality habitat with abundant violets (Viola spp) and varied nectar sources, may be the most impactful management and conservation tool. Regal fritillary butterflies were consistently more than twice as abundant on high quality habitats and this relationship held across, and often dwarfed the effects of, various prescribed fire regimes or climate variability.

URL: https://doi.org/10.1016/j.biocon.2017.10.034