The Greater Santa Fe Fireshed Coalition

BRIEFING PAPERS Pollinators

santafefireshed.org

POLLINATORS AND WILDFIRE

IMPORTANCE OF INSECT POLLINATORS IN A FIRE-ADAPTED ECOSYSTEM

Pollinating insects are nature's gardeners, in charge of maintaining and nurturing plant communities in all areas of the world. By moving pollen from one flower to another, these winged horticulturists allow plants to reproduce. In the southwestern United States, insect pollinators such as bees, butterflies, and flies are especially important due to the fire-adapted nature of the region. In fact, many plant species common in southwestern forests rely solely on bees for pollination (Nyoka 2010a). As landscapes are touched by fire, pollinators aid in regrowth of plant communities by pollinating plants in early successive stages following disturbance. Because fire has been a constant presence in western mountains for thousands of years, plants and trees here have adapted to coexist with fire in large variety of ways.

Pros and cons of differing fire severity on pollinator communities

Wildfire under certain circumstances has the ability to benefit plant and pollinator communities in several ways, including improving important pollinator habitat. Thick stands of trees limit the amount of sunlight that hits the forest floor, which curtails the spread of flowering plant communities. However, fires that reduce canopy cover in densely-forested areas can increase the domain available for growth of the plants on which pollinators depend (Pausas and Keeley 2019). Low to moderate intensity fires can also restart community succession by returning nutrients to the soil and creating a prime environment for flowering plants, stimulating flower growth and supporting pollinator communities. In 2010, S. Nyoka conducted a study of post-burn effects that found those effects to often include increases in bee abundance and diversity, which ultimately bolster the health and resiliency of fire-adapted systems.

Pollen-covered bee
Photo taken from fillyourplate.org

Feeding butterfly
Photo taken from Cityoflrving.org

While not all fires are a cause of concern to pollinators, some high severity fires can burn through everything, including trees, shrubs, flowering plants, roots, and even the soil. This reduces the quantity and quality of available pollen resources, diminishing the community's ability to support insect pollinator populations. Additionally, affecting soil composition and quality can create unsuitable nesting conditions for key pollinators such as ground-nesting bees (Nyoka 2010a). Wildfires that burn very hot over a large area put pollinators and their respective plant communities at risk, and reduce the community's chances of successfully regenerating.

POLLINATORS AND WILDFIRE

Prescription burns: ecological benefits

Prescribed burns and other forest management techniques can help improve pollinator habitat and abundance, if this management helps to reduce the risk of high-intensity fires while maintaining the natural cycle of succession in these communities (Nyoka 2010a). In her paper from 2010, S. Nyoka suggests that thinning and burning has the possibility to increase both the diversity and abundance of pollinator species, but only if restoration is designed with a "focus toward community interactions and ecosystem function … to ensure the long-term sustainability and productivity of understory plant assemblages and the wildlife species that depend on them". By accepting the role of stewards of the natural landscape and committing to responsibly and sustainably maintaining forest health, we can ensure the continued survival and success of these key players in the ecosystem.

Broad-tailed Hummingbird
Photo taken from allaboutbirds.org

WHAT ABOUT HUMMINGBIRDS?

Like bees and butterflies, hummingbirds are important pollinators in fire-adapted ecosystems, especially in the southwestern US. These nectarivorous birds aid in nurturing the post-disturbance successive growth of forest vegetation. However, wildfires of varying severity can affect hummingbird abundance and diversity. In March of this year, the US Forest Service published a literature review summarizing several studies on hummingbird response to fires, which is observed to vary depending on fire severity, region, and even species (Alexander et al. 2020). Alexander and associates found, in the Southern Rocky Mountain Region specifically, hummingbird species show higher abundance in burned forests than unburned forests. They also found that Broad-tailed Hummingbirds, which are declining across the region, show higher population densities in disturbed areas (including managed areas that receive thinning and logging treatment), than undisturbed areas. These responses are likely due to preference of open forest habitat for nesting and higher availability of flowering plants on which hummingbirds rely for food. Their results suggest that sustainable management practices that work to maintain forest health simultaneously benefit several important pollinating hummingbird species.

This briefing paper was produced by the Forest Stewards Guild and is based off of several published papers. Alexander, J.D.; Williams, E.J.; Gillespie, C.R.; Contreras-Martínez, S.; Finch, D.M. 2020. Effects of restoration and fire on habitats and populations of western hummingbirds: a literature review. Gen. Tech. Rep. RMRSGTR-408. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 64 p.. Nyoka, S. 2010a. Can restoration management improve habitat for insect pollinators in Ponderosa pine forests of the American southwest? Eco Restor 28 (3): 280-290. Nyoka, S. 2010b. Effects of fuel reduction treatments on pollinators in a pinyon-juniper woodland (Arizona). Eco Restor 28 (2): 119-121. Pausas, J. and Keeley, J. 2019. Wildfires as an ecosystem service. Front Ecol Environ 17(5): 289–295, doi:10.1002/fee.2044.

For more more information and to see all the briefing papers visit us at:

www.santafefireshed.org

The Greater Santa Fe Fireshed Coalition is a partnership of agencies, private organizations, and concerned citizens who are working to build resilient ecosystems, protect watersheds, and reduce wildfire risk to the forests and communities in and around Santa Fe.

USGS science for a changing world

Forest Stewards Guild putting the forest first