

Do ember showers bring more flowers?
Understanding the effects of high severity fire on
meadow restoration efforts

Angela White, Gina Tarbill & Rahel Söltmann





Recognition of the importance of pollinator ecosystem services led to the 2015 Presidential Memorandum and Pollinator Research Action Plan (PRAP), calling for research to *focus and coordinate efforts to understand pollinator habitat requirements and identify and manage habitats effectively temporally and spatially.*

Climate Change



Post-fire Management



Plant Community

Bloom time
Nectar load

Diversity
Composition
Structure



Migrating
hummingbirds



Breeding
hummingbirds



Native
bees



Honeybees



Migrating
butterflies



Resident
butterflies

Research Article

Bumble Bee Use of Post-Fire Chaparral in the Central Sierra Nevada

HELEN L. LOFFLAND, The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, CA 94956, USA

JULIA S. POLASIK, ² The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, CA 94956, USA

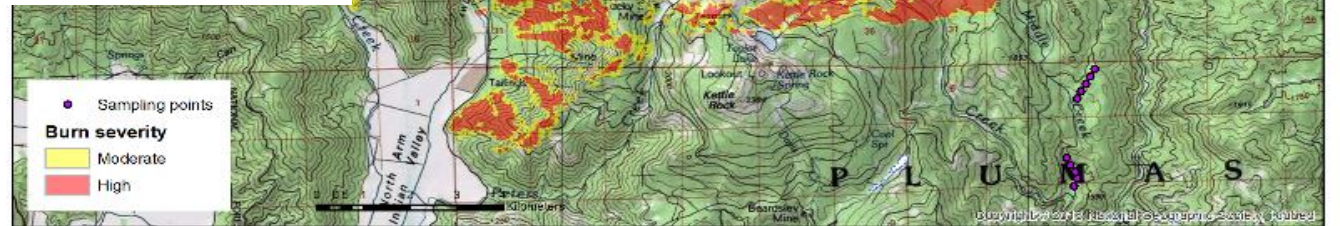
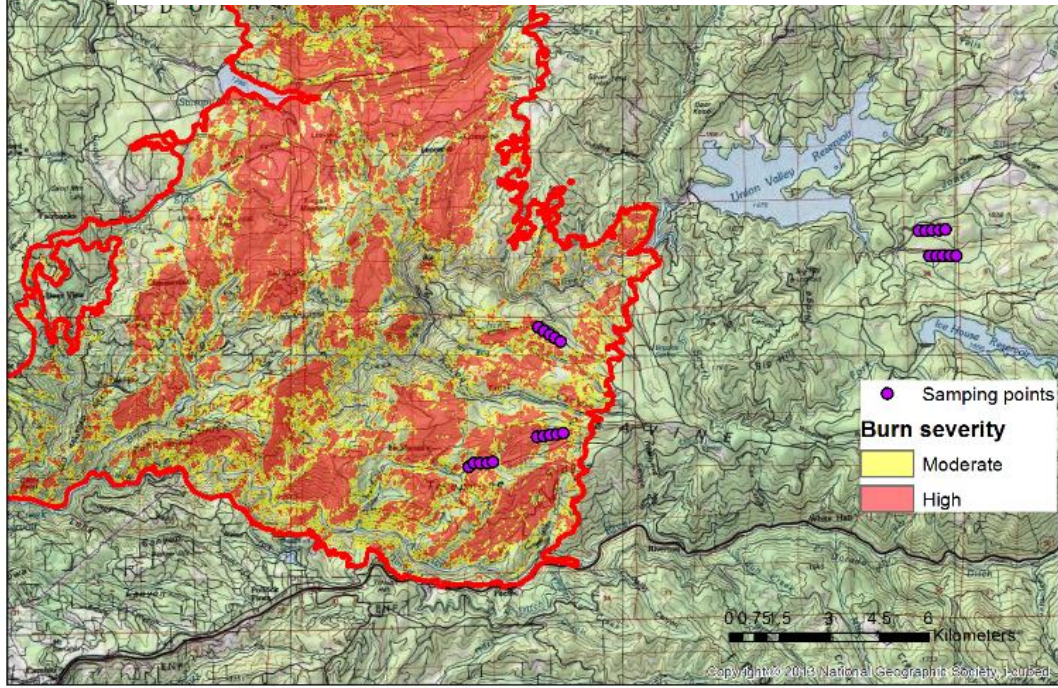
MORGAN W. TINGLEY, Ecology and Evolutionary Biology, University of Connecticut, 75 N. Eagleville Road, Unit 3043, Storrs, CT 06269, USA

ERIN A. ELSEY, Department of Biology, San Francisco State University, 1600 Holloway Avenue, San Francisco, CA 94132, USA

CHUCK LOFFLAND, Amador Ranger District, Eldorado National Forest, USDA Forest Service, 26820 Silver Drive, Pioneer CA 95666, USA

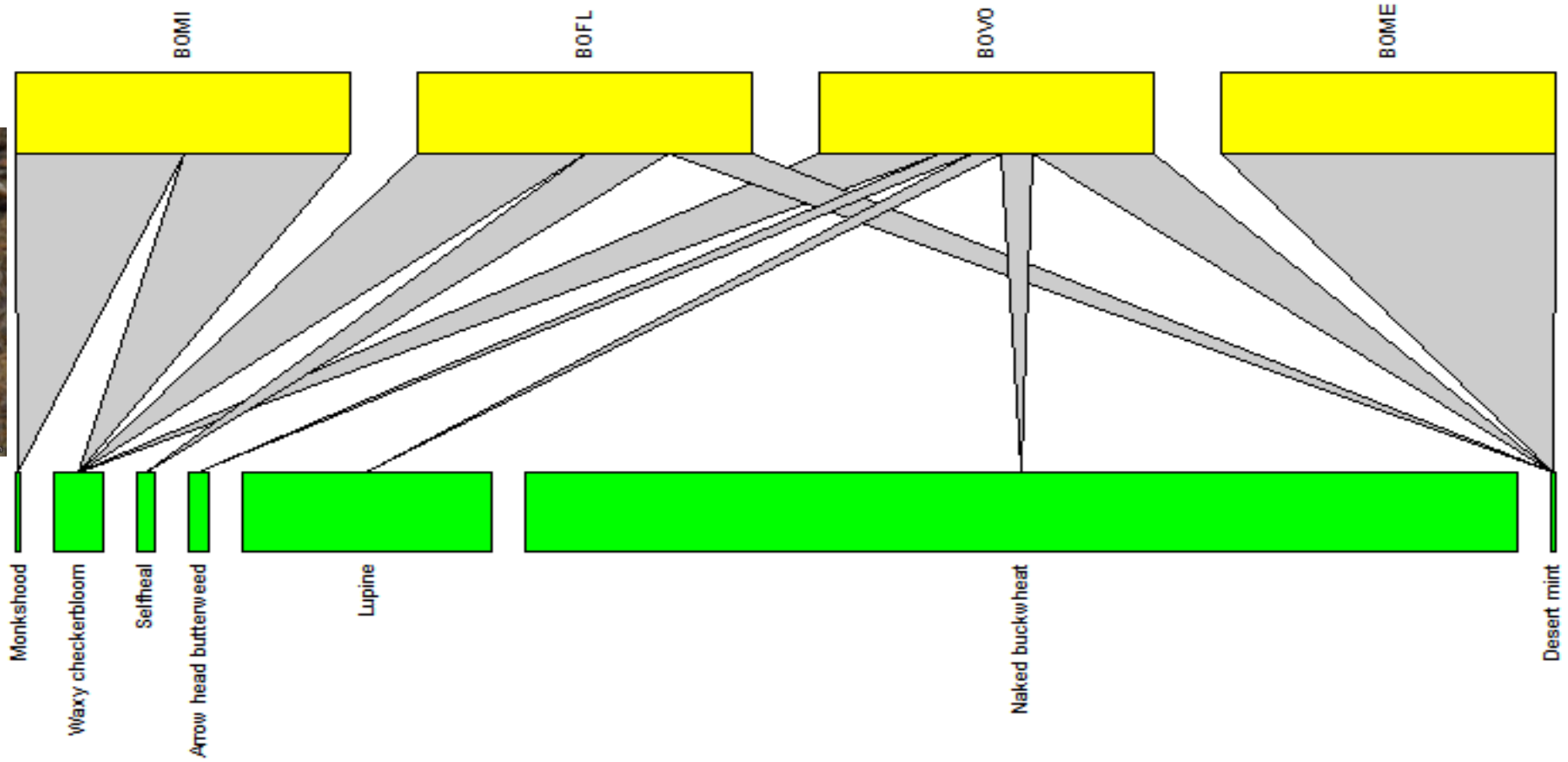
GRETCHEN LEBUHN, Department of Biology, San Francisco State University, 1600 Holloway Avenue, San Francisco, CA 94132, USA

RODNEY B. SIEGEL, ¹ The Institute for Bird Populations, P.O. Box 1346, Point Reyes Station, CA 94956, USA



King fire (2014): burned upland, meadows (burned→unburned)
Moonlight fire (2007): meadows (burned)





- Fringed willowherb
- Groundsmoke
- Spanish lotus
- Madia spp.
- Mountain violet
- Sunflower family

Unburned upland



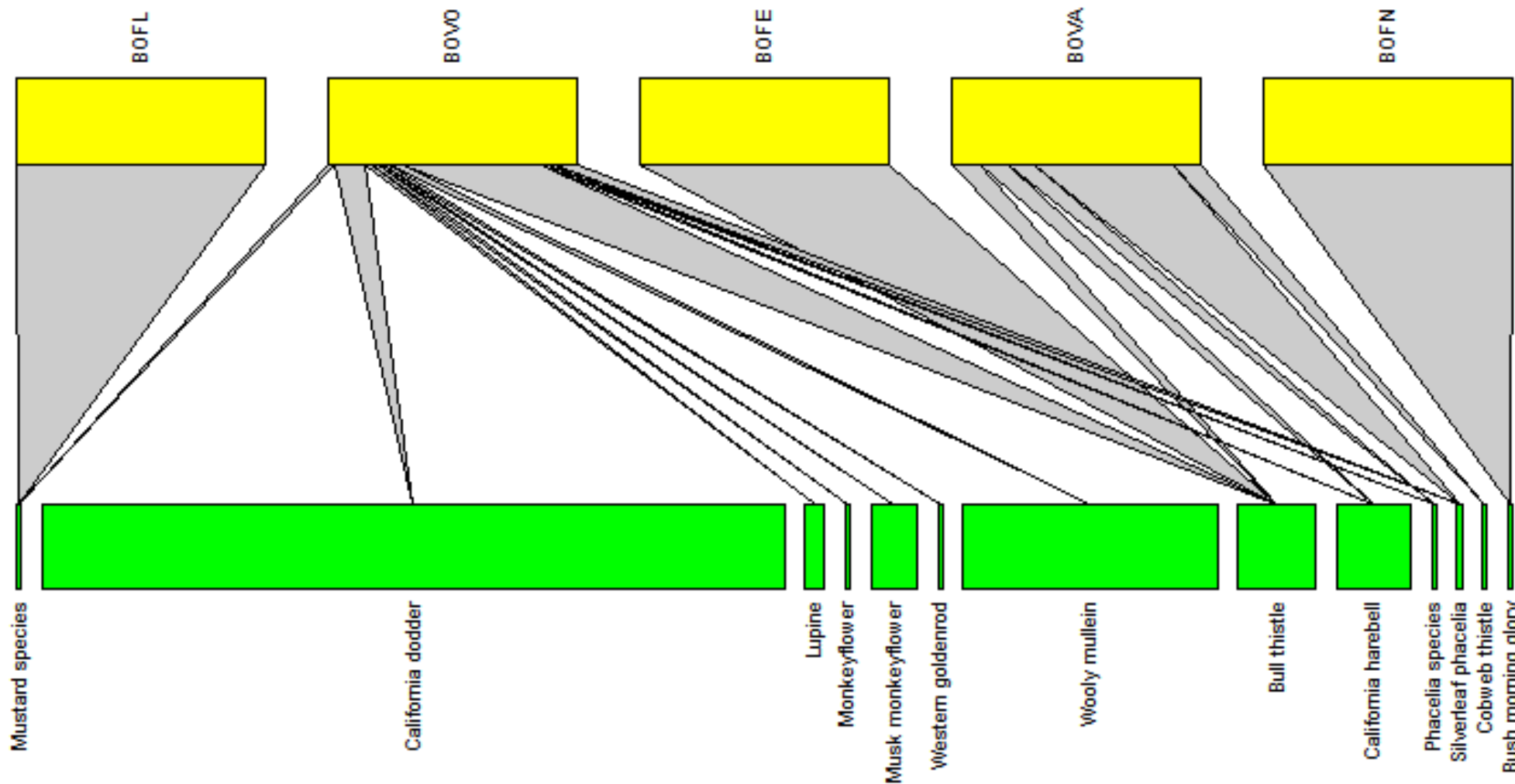
GROUNDSMOKE

SPANISH LOTUS

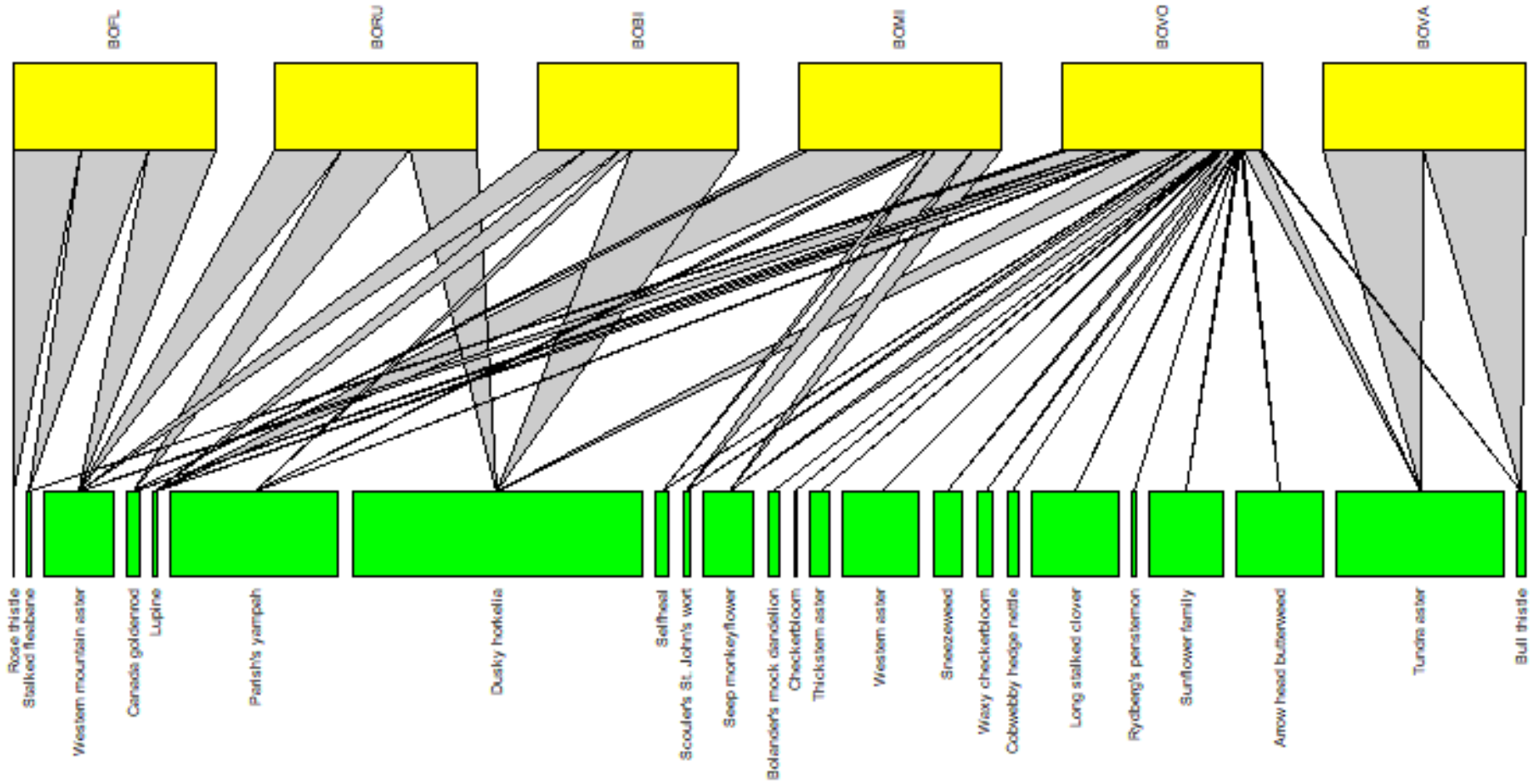
Narrow-leaved lotus

Willow herb

Bull thistle

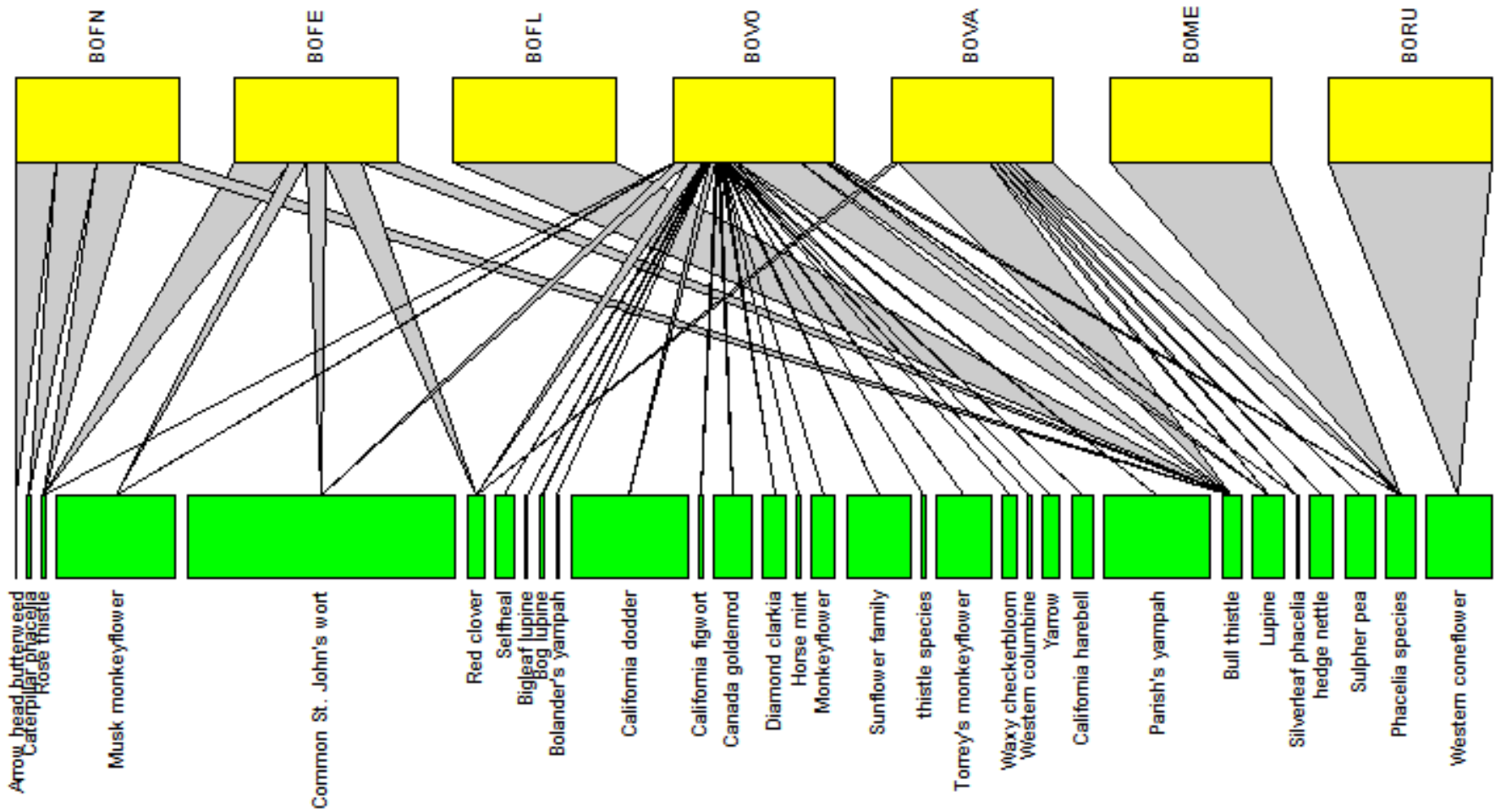


Burned upland



- Parish's yampah
- Western mountain aster
- American bistort
- Sneezeweed
- Fringed willowherb*
- Sunflower family
- Tundra aster

Unburned meadows



FRINGED WILLOW HERB

Willow herb

Spanish lotus

Groundsmoke

Seep monkeyflower

Narrow-leaved lotus

Bay forget-me-not

Musk monkeyflower


PARISH'S YAMPAH

Selfheal

Torrey's monkeyflower

WESTERN MOUNTAIN ASTER

Burned meadows



In newer fires burned forest created floral resources that supported a diverse bumblebee community

Burned meadows had the highest diversity of flowers and bees early in the season

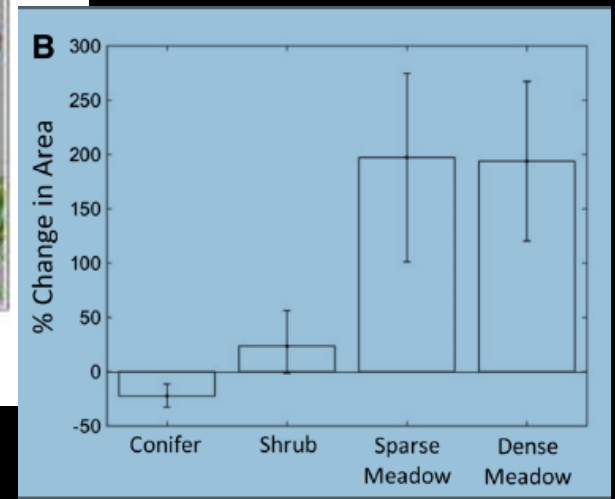
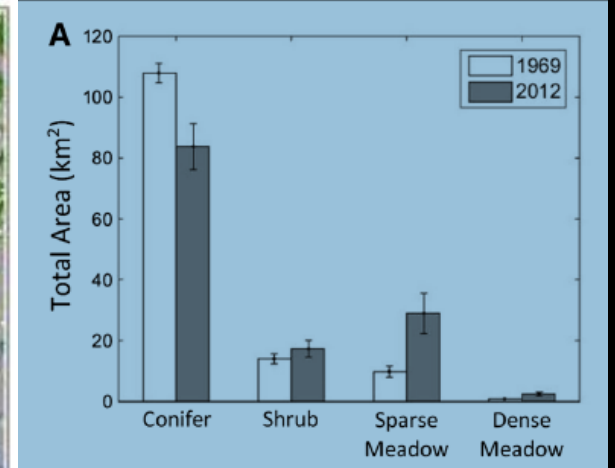
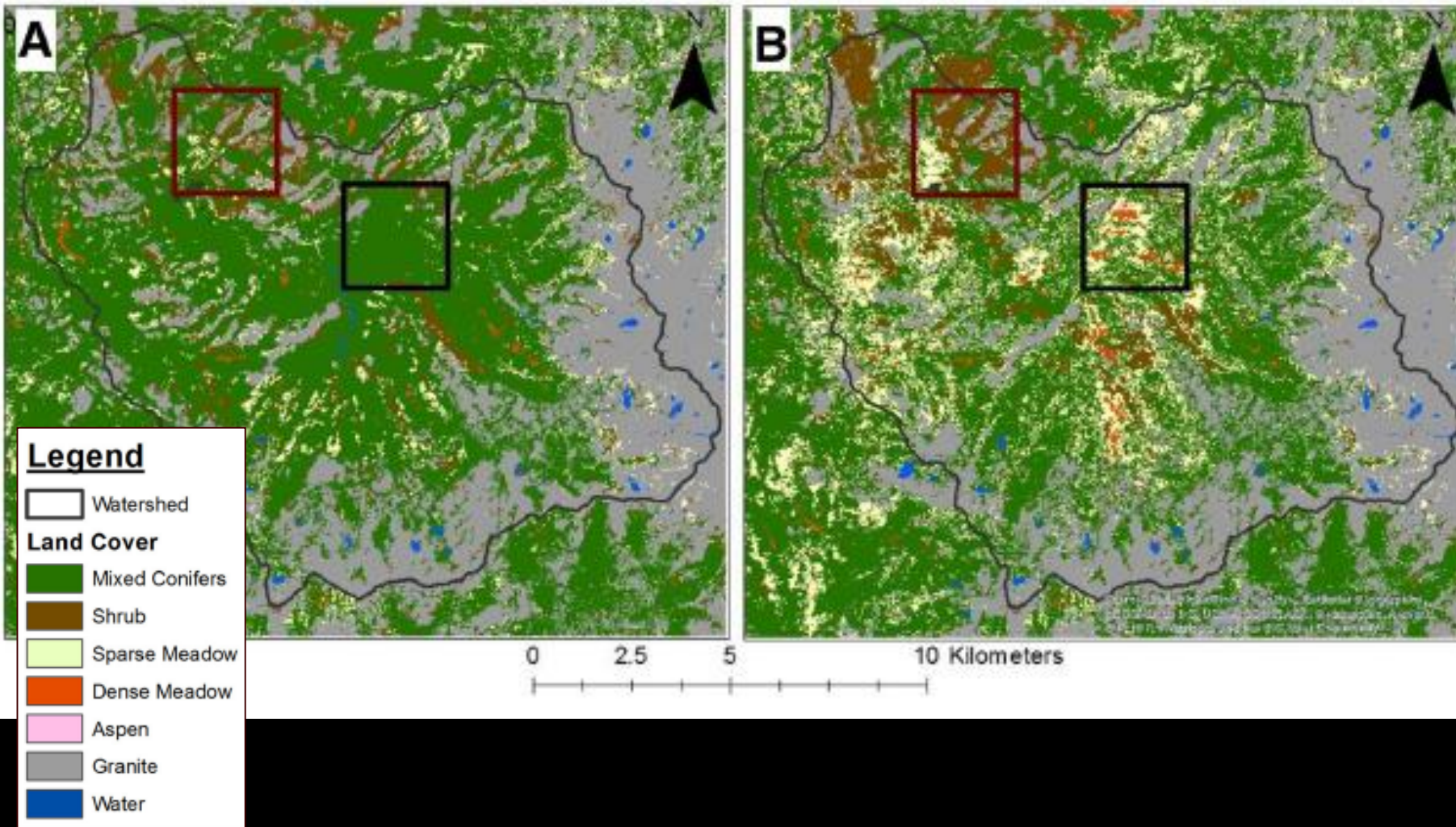
All flowers not created equal

Burned meadows contained more upland and invasive species

Many forested areas contained wetland associates—and big trees

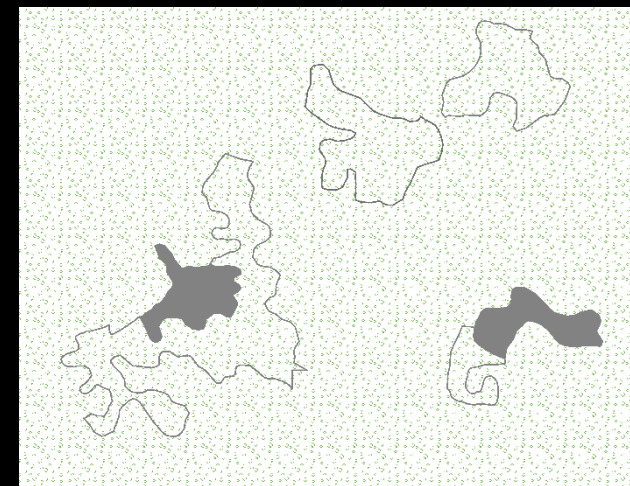
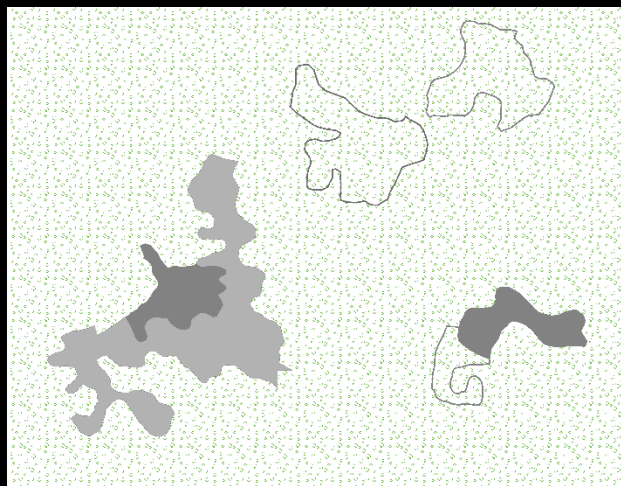
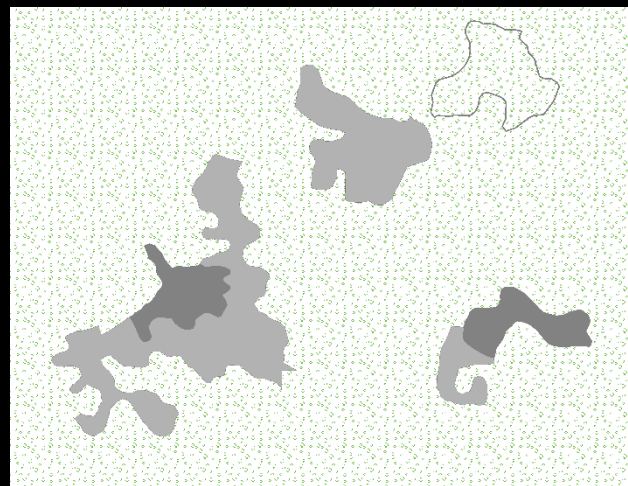
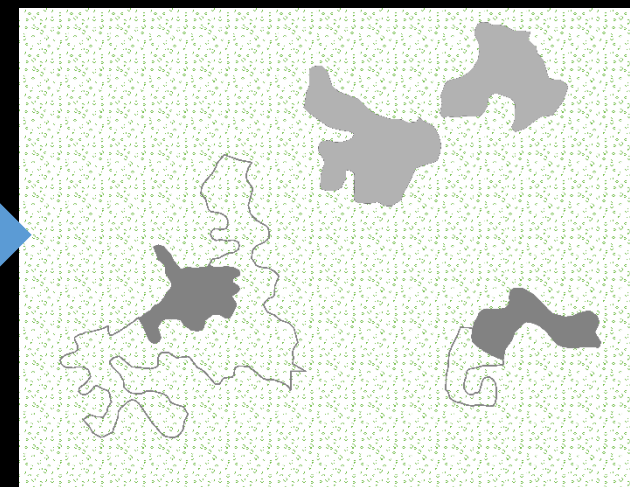
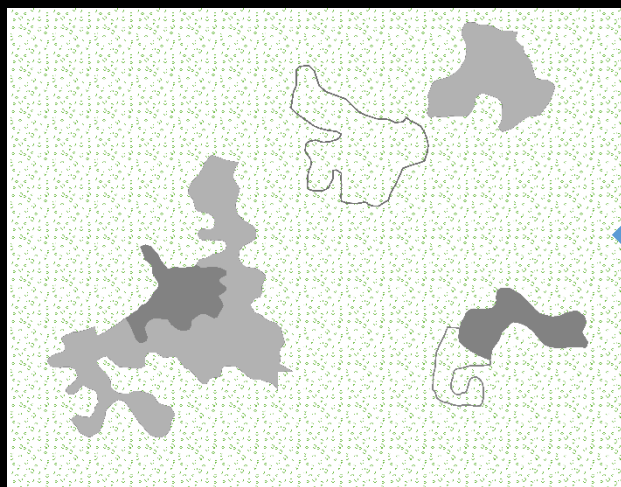
1969

2012

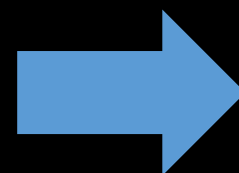
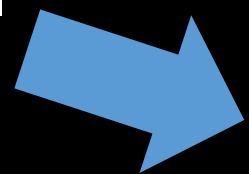
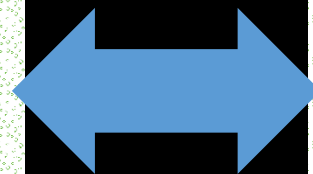
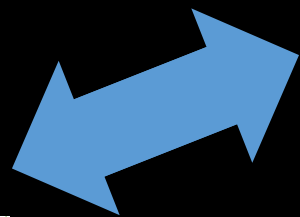


Boisramé *et al.* 2017. Managed Wildfire Effects of Forest Resilience and Water in the Sierra Nevada. *Ecosystems*.

Disturbance



No disturbance



A photograph of a meadow with a forest in the background and people in the distance. The meadow is green with some yellow flowers. The forest is composed of tall, dark evergreen trees. The sky is blue. A semi-transparent brown box is overlaid on the image, containing text.

What is a functional meadow?

“Dry” meadows and grasslands are important for pollinators and are likely important for habitat connectivity to “source” populations of wetland associated species

Reforestation where forest burned may not be appropriate

Conifer encroachment in meadows may have longer-term consequences

