Fire and Water: Assessing Springs Ecosystems Response to Fire

Sami Hammer, Louise Misztal, and Carianne Campbell
Springs

- Support disproportionately high levels of productivity, endemism, and biodiversity.
- Keystone ecosystems, with enormous effects on surrounding landscapes, biota, and economies.
- Provide climate refugia for migratory birds, reptiles, amphibians, and fish.
- Habitat for obligatory spring-dwelling animals and plants.
- Animals that rely on them at a landscape scale.
- Are important spiritual and cultural sites to Native Americans.
- Provide windows into ground water systems.
- Provide some of the only water sources for ranchers.

Despite the rarity and profound ecological importance of arid land springs, these sites are little-studied, neglected as important cultural, scientific and economic resources, and have a history of overuse and mismanagement.
The Sky Islands

- Isolated mountain ranges surrounded by desert or grassland “seas”
- Connect the temperate Rockies and neotropical Sierra Madre, and the Sonoran and Chihuahuan Deserts
- Biodiversity hotspot (7000 spp)
- Over 2200 mapped springs
- SIA has surveyed 180
Affected by Fire

- Coronado National Forest
- Since 2000, 46% of the forest has experienced wildfire
- 130 fires, 28 >5000 acres
- 34% of springs on the forest are within a fire perimeter
- How do fires (and fuel treatments) affect springs?
Spring Surveys

Catalinas

Pinaleños

Santa Ritas

Chiricahuas
11 springs
- 4 in a fire perimeter
  - 3 low severity
  - 1 moderate severity
- 5 unburned
- 2 in PERP (Pinaleño Ecosystem Restoration Project) treatment areas
Pinaleños: Observations

- Springs with wet meadows were low burn severity islands in higher severity areas.
- The edges of these wet meadows were the only places spruce and fir survived or were coming back.
Chiricahuas

- 12 springs
  - All in a fire perimeter
  - 7 low severity
  - 4 moderate severity
  - 2 high severity
Chiricahua: Observations

- Springs in low severity areas were relatively unaffected by fire.
- Springs in moderate and high burn severity areas had erosion problems.
- Springs near Rustler Park were trampled and eroded during the cleanup process.
15 springs
- 14 in a fire perimeter
  - 7 low severity
  - 5 moderate severity
  - 3 high severity
- 1 unburned
Springs in low severity areas were relatively unaffected by fire.

Some springs in moderate and high burn severity areas were ok.

3/8 springs in moderate or high severity areas were unlocatable.
Santa Ritas

- 27 springs
  - 9 in a fire perimeter
    - 6 low severity
    - 1 moderate
    - 1 moderate to high
  - 18 unburned
Santa Ritas: Observations

- Most of the springs we surveyed had not been obviously influenced by fire.
- Many of the springs in this range are developed.
Overview

Observations
- Low severity fire rarely harms springs.
- Springs can provide a refuge for regeneration.
- We need to identify springs to protect during post-burn work.

Questions:
- Is burn severity lower at springs?
- Do high severity fires destroy springs?

Plans
- Identify/map springs at risk for high-severity fire, or near high-threat fuels.
- Survey springs so we know their pre-fire condition!
- Suggestions?
Method

- Volunteer spring monitoring site – Hospital Flat
- Wet meadow
- Difficult to measure on the ground
- Landsat → Tasseled Cap → threshold to delineate area of wet meadow