Red Rock Canyon Open Space Bioblitz
July 19-21, 2019

Submitted by Sharon Milito
Bioblitz Organizer
Science Education Consultant

Figure 1 Flame Skimmer Dragonfly

Abstract

Red Rock Canyon Open Space was chosen for the 2019 Bioblitz due to its prominence on the west side of Colorado Springs and its popularity. Because of the long history of human disturbance in the area we were curious to see how that affected the biodiversity.

1,098 Observations yielding 520 species were recorded in iNaturalist by 44 observers.

Introduction

Science teams were led by and represented by specialists from several regional establishments according to their specialty.

- **Mammals** Fort Carson- Roger Peyton; Bats: Colorado Parks and Wildlife- April Estep
- **Birds** Aiken Audubon Society- Anna Joy Lehmicke
- **Botany** Melissa McCormick
- **Insects** Mile High Bug Club- Eric Eaton, Bell Mead
- **Reptiles and Amphibians** Lauren Livo, Max Canestorp
- **Fungi** Denver Botanic Gardens
- **Education and General** TOPS Stewardship Rangers

The bioblitz was scheduled for July 19-21, however the herpetology team surveyed the area on an earlier date. Each team determined their field time and team members. Public hikes were held on Saturday and Sunday and several local organizations set up tables for public interaction.

Environment

Red Rock Canyon Open Space is located in the foothills on the west side of Colorado Springs at 3550 W. High Street. This City of Colorado Springs open space is comprised of three sections, Red Rock Canyon, White Acres and Section 16, totaling 1,474 acres. The variation in elevation, topography and soils provide for several different ecosystems within the property boundaries. The area is comprised of a series of hogbacks and valleys formed by uplift of a variety of rock types: granite, sandstone, shale and limestone. The elevation varies from approximately 6200 feet above sea level on the eastern border to about 8000 feet on the western boundary. Ecosystems studied here include grasslands, shrublands, mixed conifer and fir forests and riparian habitats.

Human disturbance includes the presence of past rock quarrying, gravel pits, a large landfill, and at one time, a trailer court. Presently Red Rock Canyon is a favorite for hikers, rock climbers, dog walkers and mountain bikers.

Limitations and Conditions

As in previous Bioblitzes, time in the field and size of the site were limitations in this year's Bioblitz. A three day event only provides a snapshot in time but to compensate for this we tried a new format for data collection in the iNaturalist website. This format allows for any observation made on any date within the project boundaries to be recorded. The administrators of the project may access data during any time period by changing the date constraints.

The largest numbers of observations were taken in easy to access locations. Fewer observations were made in the Section 16 area, which is more remote, and on the eastern side of the open space in Hogback Valley.

Mueller State Park scheduled a Bioblitz on the same dates as the Red Rock Canyon Bioblitz as such we lost members of our science teams to that event.

The weather conditions during the bioblitz were perfect, with a high temperature of 88 degrees and a low of 54. Precipitation for the month of July was over 2 inches and 6.5 inches for the year-to-date, providing for abundant plant growth.

At this time the full list of small mammals is not available, so the mammal count is incomplete.

Objectives

- To create a baseline of resource information with which to develop future natural and cultural resources and public use management strategies
- To discover and celebrate the resources in our parks and open spaces
- To find out what we have, what we need to protect, and what we need to improve
- To find out how Red Rock Canyon changes over time: how observations may be different in the future
- To involve the public in local science and nature experiences
- To use the information for education

Methodology

Leaders of each team gathered their own expert team members. Team sizes ranged from 2-10 members and procedures varied according to specialty. Teams used several different methods for collecting observations, including paper/pencil, global positioning system (GPS) attributes, photographs, and iNaturalist. For consistency, all data were eventually recorded at iNaturalist.org, an online web and smart phone application that records observations, photos, locations and assists in the identification of unknown species, as well as maintains the database.

Mammal live traps were placed onsite on Friday evening. At 8:00 AM the following day each trap was checked, and captured animals were weighed, measured and recorded and released. A “mist net” was erected over the pond adjacent to the Pavilion to capture bats.

Figures 2 and 3 Mule Deer fawn and Spotted Sandpiper chick

Results

The following chart shows the bioblitz species total and the grand total records as of November 22, 2019. For comparison purposes data from the month of the bioblitz as well as year-long observations are included. Ebird data are included to show all bird sightings over time by citizen scientists. The map below shows the locations of each observation taken during the month of the bioblitz. Fungi list is incomplete as lab analyisis must be done to identify many species.

2019 # of species	July 1-31, Month of Bioblitz	All observations 1/1/19-12/31/19
Birds	68	76/ 174 ebird
Mammals	9	11
Reptiles & Amphibians	4	4
Plants	139	213
Insects, spiders and other invertebrates	295	316
Fungi (incomplete)	5	19
Total Species	520	648 (with ebird data 741)

Figure 4 Colorado Parks and Wildlife Bat monitoring team

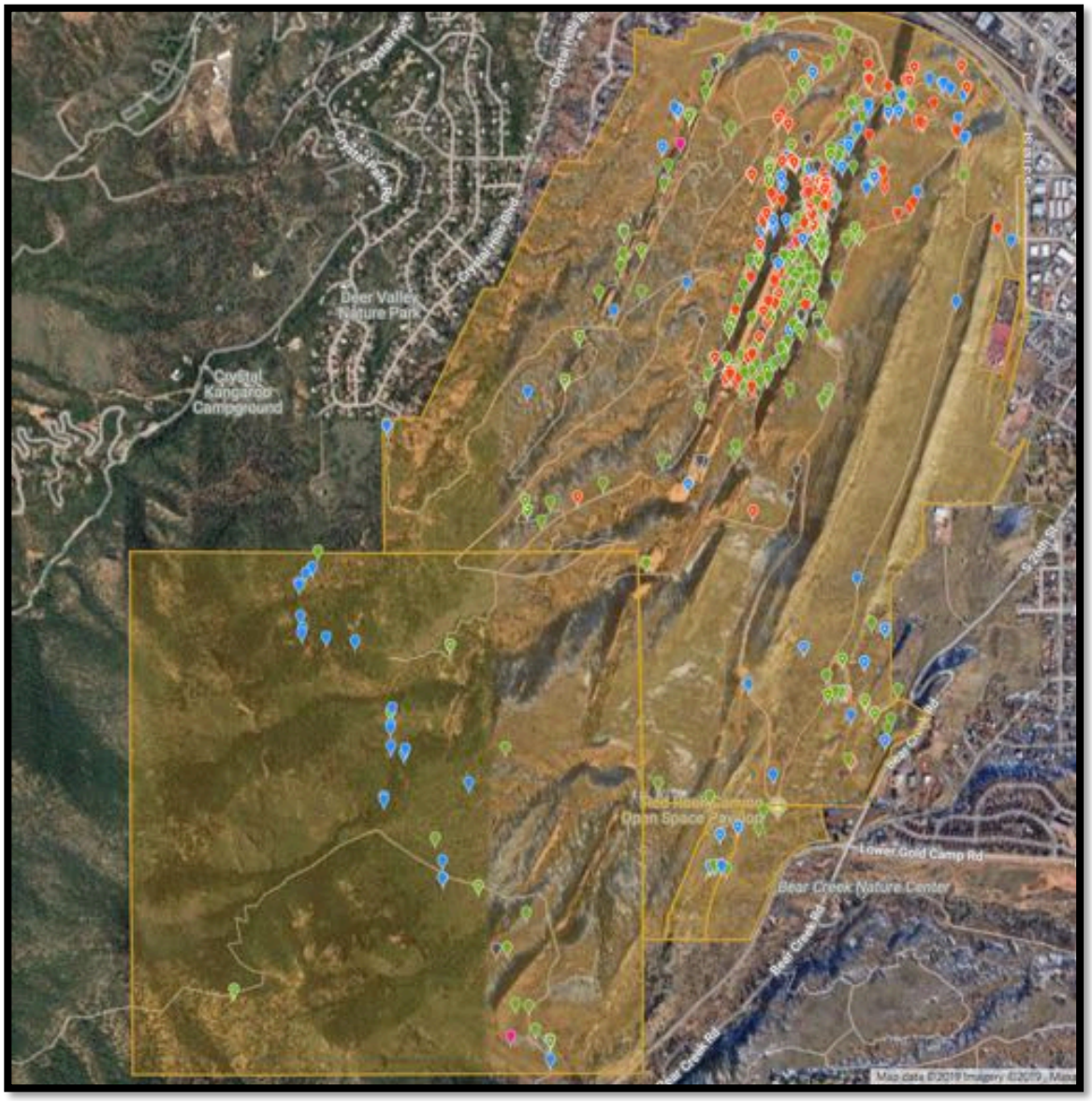

Figure 5 Map of Observations at Red Rock Canyon Bioblitz

Comparisons of species from all TOPS Bioblitzes

Bioblitzes to date	Blodgett Peak	Jimmy Camp Creek	Bluestem Prairie	Ute Valley	Corral Bluffs	Red Rock Canyon TOTAL through 12-16-19
Birds	38 (ebird 91)	138 (ebird)	53 (ebird 244)	50 (ebird 140)	76 (ebird 99)	76 (ebird) 174
Mammals	9	9 (+ 4 bats from Corral Bluffs Bioblitz)	7	9	9	11
Reptiles & Amphibians	3	8	3	3	9	4
Plants	52	112	55	107	197	213
Insects and spiders	189	207	200	191	317	316
Fungi (incomplete)	3	4	3	2	4	19
Total Species	**293**	**483**	**322**	**365**	**639**	**648**

Threatened species: According to iNaturalist the following threatened species were documented during the Red Rock Canyon Bioblitz:

- Golden Northern Bumblebee listed as Vulnerable in North America
- Cooper's Hawk listed as Vulnerable in North America (common in Colorado)
- Green Ash listed at Critically Endangered in North America (common in Colorado Springs)
- Rufous Hummingbird listed as Near Threatened in North America
- Flame Skimmer Dragonfly listed as Critically Imperiled in Colorado

Noteworthy results:

- State record for Clearwing moth, *Carmenta wildishorum*. This is a state record of this recently-described species (published 2 years ago)
- Mule deer are abundant in the open space and show little fear of humans. At least five fawns were seen but not formally recorded.
- Red-tailed hawks were common and often seen with kill.
- Good diversity of small mammals; high capture rate for one night of trapping. Could indicate high population
- Our data show 92 introduced plant species within Red Rock Canyon. State of Colorado Class "C" invasive plants observed are Cheatgrass (*Bromus tectorum*) , and Common Mullein (*Verbascum thapsus*) observed in eleven locations. Class B invasives observed are Diffuse Knapweed (*Centaurea difussa*) at four locations,

Russian Olive (*Elaeagnus angustifolia*) in two locations, and Balkan Toadflax at five locations. Thistle species were observed, but not indentified down to species level. Canada Thistle is a Class B invasive but from our data it is not known whether that is still present in Red Rock Canyon.

- Although not classified as a noxious weed, Russian Elm (Ulmus pumila) is considered an invasive plant and was documented in 11 locations.
- Of the noxious weeds listed in the Red Rock Canyon Open Space Master Plan, three were NOT observed during the Bioblitz: Myrtle Spurge (*Euphorbia myrsinites*), Canada Thistle (*Circium arvense*), and Tamarisk (*Tamarix chinensis*).

Conclusions

Red Rock Canyon Open Space shows the greatest number of species of all TOPS properties where a Bioblitz has been conducted through 2019. This could be due to the variety of plant and animal communities present in the property. It also may reflect this year's wet spring weather. Another possible reason for the high count is that our Bioblitz team is becoming more efficient, and/or that we added a half-day to the length of the Bioblitz. Another important point is that the dates for the bioblitz are open-ended, allowing data to be continually added.

Raptors are doing well. Thirteen types of raptors have been observed in Red Rock Canyon, but the only species known to nest in the area are Red-tailed Hawks and Cooper's Hawks. Raptor nests should be located and monitored by Colorado Parks and Wildlife if that is not already being done.

Figure 6 Red-tailed Hawk nest. Photo by Jim Merrit

There is also a surprising number of water birds in Red Rock Canyon; 24 different species of water/shore birds have been documented in eBird. The large number of goldfish in both ponds should be monitored to keep the water environment healthy. Too many fish create waste that acts as nutrients for algae.

Many bats were observed during the Saturday night bat capture event presented by Colorado Parks and Wildlife, but none were captured to allow positive identification. Acoustical identification of five species was completed. The bat population should be

monitored through additional capture or acoustics and it may be worthwhile to find roosting spots.

Native plants are thriving. Invasive plants continue to be a problem but seem to be diminishing. Control of these plants should continue especially in riparian areas.

Monitoring of flora and fauna should continue to document seasonal species and yearly changes. The iNaturalist website for species data collection for the Red Rock Canyon Bioblitz project can be kept open so additional observations by citizen scientists and from future events such as The City Nature Challenge can be added to the overall list. Additional observations should be taken in Section 16 and in Hogback Valley.

The 2019 Bioblitz shows that Red Rock Canyon Open Space is recovering well from the intense human disturbance that has occurred over the past 130 years.

References

Red Rock Canyon Open Space Master Plan
https://coloradosprings.gov/sites/default/files/parks_recreation_and_cultural_services/rrc_master_plan_2013.pdf

iNaturalist website: For complete list of species observed in Red Rock Canyon Open Space
https://www.inaturalist.org/projects/red-rock-canyon-open-space-bioblitz-colorado-springs-trails-open-spaces-and-parks

Bioblitz Organizational Guide, University of Connecticut
https://web2.uconn.edu/mnh/bioblitz/BioBlitzGuide.pdf

Figure 7 Colorado Chipmunk

Comments/Suggestions from Science Team Leaders

1. What interesting, remarkable or rare species did you find at either or both bioblitzes?

- The big winner on the entomology team at Red Rock Canyon was Rose Ludwig. She managed to photograph both sexes, on two different days no less, of a clearwing moth, *Carmenta wildishorum*. This is a state record of this recently-described species (published 2 years ago) for Colorado. We might also have a plant host record pending. Meanwhile, the biodiversity in the park is astounding, especially given the heavy use it gets. From deer that practically say "excuse me" as they pass you to get a drink, to bats, to insects never seen in Colorado before, the biota are a testament to excellent park management. Thanks to a very warm night, our blacklighting for moths and other insects Friday night was among the best we have had anywhere.

- It's very unlikely to capture rare (mammal) species with one trap night. However, the site is a very productive area with good small mammal biodiversity and excellent one night capture rate (could indicate a high population, but a mark/recapture would be needed for that).

2. What recommendations do you have for the city based on your observations at either or both bioblitzes?

- Keep having bioblitzes. As my wife pointed out, there are plenty more parks that need to be inventoried: Stratton Open Space, Garden of the Gods, Palmer Park....We also need to carefully assess our approach to urban growth, especially on the eastern boundary where sprawl threatens to fragment the prairie and compromise its ecological integrity (think Pronghorn, Golden Eagle especially). Stormwater mitigation projects should not be stripping riparian corridors of willow, cottonwood, and other vegetation or we will lose habitat for nesting and migrating birds. Are you listening, Water Resources Engineering and Colorado Springs Utilities? Maybe we need to ask the EPA for more time to do mitigation projects *correctly*. (Gets off soapbox)

- One night of (mammal) capture is not very scientific but is a wonderful opportunity for public engagement/education. I'd like to of had it advertised for up to 20 people to attend the small mammals event.

3. What do you feel went well that we should do again, organizationally speaking?

- Personally, I think these events are now flawlessly executed. Even the food is getting better....or was that just because of Sharon's award? ;-)

- The educational booths, food, and staff are always incredible.

4. What improvements can we make for future bioblitzes?

- Again, just keep having them, but probably two per year at maximum so we don't stretch resources too thin, or fatigue folks.

- If the desire is a scientific approach then the small mammal trapping session should last a minimum of 3 nights but preferably 4 nights.

5. Any other comments

- I continue to be impressed with the consistently high level of participation by professional and citizen scientists. That speaks well to how these events are run. We might want to consider a winter-time "summit" to discuss more specific results (I know the mycologists perform DNA work that makes their results a lot less immediate, for example); and, more to the point, talk about implications for city policy on urban growth and development, municipal codes (like "weed ordinances"), and related matters.

- Thanks for the opportunity and invite.

2019 Tabling Organization Contact Information

Cheyenne Mountain Zoo: Frankie edprograms@cmzoo.org
PPLD Green Team: Deb Vitulli DVitulli@ppld.org
Trails and Open Space Coalition: Susan Davies susan@trailsandopenspaces.org
Garden of the Gods: Bret Tennis brett.tennis@coloradosprings.gov
RMFI: Joe Lavorini joe@rmfi.org
Colorado Springs Utilities: Jerry Cordova jerry.cordova@coloradosprings.gov
Archaeology: Anna Cordova anna.cordova@coloradosprings.gov
Mile High Bugs: Bell Mead bell7738@gmail.com
Florissant Fossil Beds: Jeff Wolin jeff_wolin@nps.gov
Fountain Creek Watershed: Allison Plute aplute@csu.org
Colorado Parks & Wildlife: April Estep april.estep@state.co.us
Fountain Creek Water Sentinels: Amy Brautigan (Sierra Club) eekmeep@gmail.com
Rocky Mountain Dinosaur Resource Center: geri@rmdrc.com
Aiken Audubon Society Anna Joy Lehmicke alehmicke@gmail.com

2019 Science Team Leaders

Botany	Melissa McCormick mccormick_melissa@hotmail.com
Herpetology	Max Kevin Canestorp kmax1350@mesanetworks.net
	Lauren Livo ljlivo@aol.com
Mycology	Ed Lubow edlubow@gmail.com
	Ikuko Lubow mycothree@gmail.com
	Vera Evenson theevensons@earthlink.net
	EvensonV@botanicgardens.org
Mammals	April Estep april.estep@state.co.us
	Roger Peyton roger.d.peyton.civ@mail.mil OR roger508@gmail.com
Birds:	Anna Joy Lehmicke alehmicke@gmail.com
Insects:	Eric Eaton BugEric247@gmail.com
	Bell Mead bell7738@gmail.com
	Heidi Eaton hcgenter@gmail.com

Bioblitz Organizer: Sharon Milito sharon.milito@comcast.net
Organizational Support J.B. Boyle photaur56@gmail.com
Friends of Red Rock Canyon David Valier t.valier@att.net
David Schell schell221@gmail.com