

Rock Castle Gorge BioBlitz



Jason Gibson
Patrick Henry Community College
STEM Division
645 Patriot Avenue
Martinsville, Virginia 24112

Paul Sattler
Department of Biology
Liberty University
1971 University Blvd.
Lynchburg, Virginia 24502

Introduction

In September 2015 the Blue Ridge Parkway hosted a BioBlitz of Rocky Knob Recreation Area in Floyd and Patrick Counties. The Blue Ridge Parkway wildlife biologist, Bob Cherry, sent out an invitation for professional and amateur naturalists interested in all plant and animal wildlife to attend the event. The authors accepted the invitation and worked with the reptile and amphibian team. This report serves as an account of what our team found and a discussion of what possible species may be found in the future in this area. The BioBlitz officially lasted from 2:00 p.m. Friday 18 September to 2:00 p.m. Saturday 19 September. The main focus of this survey was Rock Castle Gorge but other areas within this recreation area were also surveyed.

Rock Castle Gorge BioBlitz

Rocky Knob Recreation Area extends from milepost 165 near Tuggles Gap to milepost 174 at Rock Castle Gap. It comprises some 1450 ha (3600 acres). This area is open to the public. There are many recreational opportunities including camping, hiking, fishing, and sightseeing. Rock Knob is found in the Blue Ridge physiographic province. It contributes water resources to both the New and Roanoke river watersheds. Elevation ranges from 567 m (1700 feet) at Rock Castle Creek to 1167 m (3500 feet) along the Parkway. This area has a mix of agricultural fields, second growth upland hardwood forests, Rhododendron thickets, seeps, streams, and bogs.

Study Sites

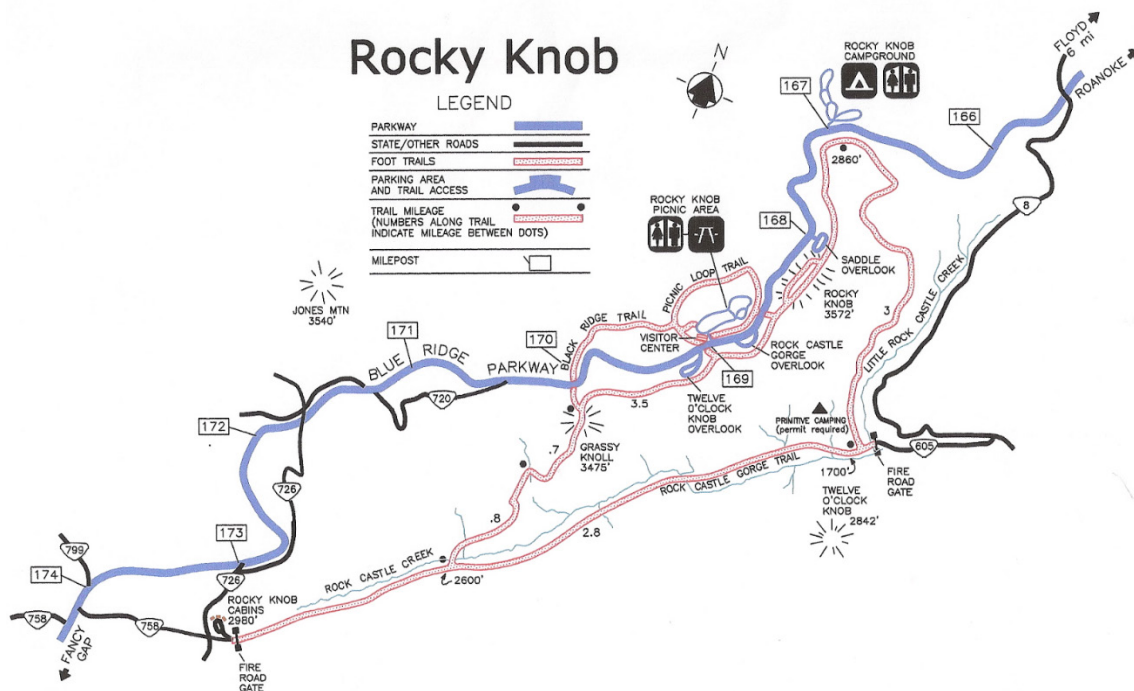
Site 1 Rock Castle Gorge Trail ($36^{\circ}48'25.92''N$, $80^{\circ}19'50.95''W$)

This site included Little Rock Castle Creek, Rock Castle Creek, and the trail paralleling Rock Castle Creek. Rock Castle Gorge Trail is found in Patrick County. At the parking lot the elevation is 570 m (1708 feet) and gradually rises as one walks southwest. Along the trail there are seeps, small streams flowing into Rock Castle Creek, bogs, and a mixed Eastern Hemlock, White Pine, and hardwood forest surrounding all of these features. Dominant tree species include Ironwood, Basswood, Yellow Birch, Tulip Poplar, Chestnut Oak, Eastern Red Maple, Sycamore, Frazier Magnolia, Black Walnut, Northern Red Oak, Black Oak, Eastern Hemlock, Black Cherry, White Pine, Shagbark Hickory, and Pignut Hickory. There are Rhododendron thickets along some portions of the trail.

Site 2 Picnic Loop Trail ($36^{\circ}48'52.15''N$, $80^{\circ}20'51.60''W$)

The second sight consists of walking trails weaving through a upland hardwood forest. These trails cross seeps and small streams. There are many downed logs and rocks serving as habitat for small snakes and salamanders. The elevation of this site is 1060 m (3186 feet) and lies in Floyd County.

Figure 1. Map showing survey area.



Materials and Methods

The following techniques were used by surveyors during the weekend survey: hand capture, visual observations, rolling over and replacing cover objects, listening for calling anurans, and road cruising at night. Animals that were hand captured were visually inspected for malformations, diseases, injury, and parasites. Salamanders were placed in ziploc sandwich bags for close inspection. Surveyors were instructed to use the bags only once. All animals if captured were immediately released at the site of capture. Digital photos were taken of all species. Data sheets with information about each animal and the survey habitat were completed by team leaders. See Table 1 for a summary of how much time was spent at each survey site.

Table 1: The amount of survey effort per research site.

	Site 1 ^a	Site 1 ^b	Site 1 ^c	Site 2 ^a	Site 2 ^b
Number of surveyors	3	2	9	7	4
Hours surveyed	2	.5	4.5	2	.5
Person hours of survey effort	6	1	40.5	14	2

1^a site visited during the day on 9-18-15, 1^b site visited on 9-18-15 at night, 1^c site visited on 9-19-15 during the day, 2^a site visited on 9-18-15, 2^b site visited on 9-19-15

Results

Over the course of two days of surveying a total of 10 species of amphibians (three anurans and 7 salamanders) and 4 species of reptiles (one turtle and 3 snakes) were observed. A combined total of 106 animals were found during the survey effort. Table 2 summarizes information about the diversity and abundance of each species found at each site.

Table 2. Summary of the number of animals observed at each site.

Sites	1 ^a	1 ^b	1 ^c	2 ^a	2 ^b	Total
Species						
Amphibians						
<i>Lithobates catesbeianus</i>			1			1
<i>Lithobates palustris</i>	1	1				2
<i>Pseudacris crucifer</i>	1					1
<i>Desmognathus planiceps</i>	5	6	39	8	3	61
<i>Desmognathus monticola</i>		4	2	1		7
<i>Desmognathus quadramaculatus</i>			3	1		4
<i>Eurycea cirrigera</i>	2		9	4		15
<i>Notophthalmus v. viridescens</i>	1		2			3
<i>Plethodon cinereus</i>	1		1	2		4
<i>Plethodon cylindraceus</i>	1		2	1		4

Rock Castle Gorge BioBlitz

Reptiles						
<i>Terrapene c. carolina</i>	1					1
<i>Agkistrodon contortrix mokasen</i>						1
<i>Diadophis punctatus edwardsi</i>				1		1
<i>Pantherophis alleghaniensis</i>	1					1
Total Number of animals by site	14	11	59	18	3	106

* The *Agkistrodon contortrix m.* was found AOR on the Blue Ridge Parkway near site 2.

Annotated Checklist

Amphibians

1. *Lithobates catesbeianus* (American Bullfrog)
One juvenile American Bullfrog was found in a small stream flowing into a bog at site 1.
2. *Lithobates palustris* (Pickerel Frog)
Two Pickerel Frogs were found at site 1. One was in leaf litter by Little Rock Castle Creek and the other was in Little Rock Castle Creek.
3. *Pseudacris crucifer* (Spring Peeper)
One male Spring Peeper was heard calling from the woods surrounding a bog at site 1.
4. *Desmognathus planiceps* (Flat-headed Salamander)
Sixty-one salamanders were found at sites 1 and 2. Salamanders were found under rocks in streams, under rocks beside streams, and under rocks in seeps.



5. *Desmognathus monticola* (Seal Salamander)
Seven adult salamander were found at sites 1 and 2. The six salamanders found at site 1 were found beside Rock Castle Creek under rocks. One adult female was gravid. The salamander found at site 2 was found under a rock sitting in a seep.

6. *Desmognathus quadramaculatus* (Black-bellied Salamander)

Three adult Black-bellied salamanders were found under rocks beside Rock Castle Creek at site 1 and one salamander was found under a rock in a seep at site 2.



7. *Eurycea cirrigera* (Southern Two-lined Salamander)

Fifteen salamanders were found during the survey at both sites 1 and 2. Salamanders were found under logs and rocks beside streams and in seeps.

8. *Notophthalmus v. viridescens* (Red Spotted Newt)

Three eft stage Red Spotted Newts were found at site one. Salamanders were found under logs and bark. One eft was observed missing a hind leg.

9. *Plethodon cinereus* (Eastern Red-backed Salamander)

Two adult Eastern Red-backed Salamanders were found at site 2 and one adult and one juvenile salamanders were found at site 1. Three of the salamanders were found under logs and one was found under a rock.

10. *Plethodon cylindraceus* (White Spotted Slimy Salamander)

Four adult slimy salamanders were found at sites 1 and 2. These salamanders were found under logs, tree bark, and one adult was found under a log in a primitive campground at site 1.

Reptiles

11. *Terrapene c. carolina* (Eastern Box Turtle)

One adult Eastern Box Turtle was found in a bog near Rock Castle Creek at site 1.

12. *Agkistrodon contortrix mokasen* (Northern Copperhead)

One Northern Copperhead was found (36°48'49.15"N, 80°20'44.47"W) while cruising the Blue Ridge Parkway at night on 9-18-15. The elevation at this site was 980 m (3213 feet.)

13. *Diadophis punctatus edwardsi* (Northern Ring-necked Snake)

One adult Northern Ring-necked Snake was found under a log at site 2.

Rock Castle Gorge BioBlitz

14. *Pantherophis alleghaniensis* (Eastern Ratsnake)

One adult Eastern Ratsnake was found basking beside Rock Castle Gorge Trail at site 1. On 19 September a DOR Eastern Ratsnake was found .5 miles north of the visitor center on the Blue Ridge Parkway.

Discussion

The Rocky Knob survey on the Blue Ridge Parkway was a geographically and time limited event. It covered two areas, each less than 250 hectares (600 acres), and a 24 hour time period. During that time a total of 10 amphibian species (3 anurans and 7 salamanders) and 4 reptile species (1 turtle and 3 snakes) were observed by the 15 participants. These areas are on the southeastern edge of the Blue Ridge Physiographic Province and are high elevation sites, particularly site 2 at just over 1000 m. At this high-elevation, cool site, amphibians predominate over reptiles as seen by our data (Table 2). Both Patrick and Floyd Counties have a good herpetofauna, with 50 species recorded for Patrick and 39 for Floyd. Amphibians predominate in both, at least slightly, with 26 amphibians and 24 reptile species for Patrick, and 25 amphibians and 14 reptiles for Floyd.

The ten species recorded during our survey do not represent any new records or unusual finds. All species observed were previously recorded for the counties. The real benefit of the survey was to document the species found at the Rocky Knob area of the Blue Ridge Parkway, and represented part of a larger effort to document all the different taxonomic units occurring there.

There have been other herpetological surveys in the Blue Ridge Physiographic Province. Fredericksen et al. (2010) used pitfall traps to compare small terrestrial vertebrates, including amphibians and reptiles, in two different forest types. They found 17 amphibian species and 10 reptiles in Franklin County, about 30 km east of our Blue Ridge Parkway sites. They found all the species we found near the Parkway except *Desmognathus quadramaculatus*, *Plethodon cinereus*, and *Agkistrodon contortrix*. Gibson and Sattler (2007) and Fredericksen and Boyd (2012) sampled Fairystone State Park about 30 km. east of the Parkway in Patrick County. Fredericksen and Boyd were comparing two different forest types and did not include any streamside salamanders, but recorded 9 amphibian and 7 reptile species. Gibson and Sattler (2007) reported on the first herp blitz at Fairystone and recorded 17 amphibian and 12 reptile species, including all species except *Desmognathus quadramaculatus*. Garriock et al. (1996) reported 18 amphibian and 10 reptile species in different locations in Floyd County encountered during Bog Turtle surveys. They found most of the same species as our Parkway survey, except *Desmognathus quadramaculatus*, *Eurycea cirrigera*, and *Diadophis punctatus*. Sattler and Gibson (2010) summarize the results of three surveys over three years in Pulaski County, just north of Floyd County in the Ridge and Valley Physiographic Province. They found 19 amphibian species and 8 reptile species, including all species found at Rocky Knob except *D. planiceps/fuscus* and *Plethodon cinereus*, although *P. cinereus* and *P. wehrlei* are parapatric, and *P. wehrlei* was found.

Two species are of particular interest. The range for *Plethodon yonahlossee* has not changed much since Hoffman (1992) described it. He mentioned three sites in Floyd County, the easternmost on Buffalo Mountain, is about 12 km. northwest of Rocky Knob. Another Yonahlossee site is located about 18 km. south of Rocky Knob at the Pinnacles of Dan in Patrick County. Rocky Knob is just east of the known range for the Yonahlossee Salamander and we were hoping it might extend to this high elevation site on the Blue Ridge Parkway. Site 2 up on

the Parkway itself is high elevation and includes some Rhododendron thickets, which seem to be associated with this species. Hoffman (1992) suggested they may be expanding their range eastward but that may be limited by human development. With two populations within 20 km of Rocky Knob, we had hoped to add another location to its range, however, we did not find it during our survey.

Another species of interest is *Desmognathus planiceps*. This species was recently described (Tilley et al., 2008) and is a cryptic species to *Desmognathus fuscus*. Morphologically, they are indistinguishable except for some dental characteristics which require an electron microscope to discern. They differ at several molecular traits, so mitochondrial DNA or isozyme protein electrophoresis analysis is required to correctly identify them. Two of the sites sampled by Tilley et al. (2008) are just northeast and northwest of Rocky Knob. The authors used protein electrophoresis (unpublished data) to determine *Desmognathus planiceps* occurs at Fairystone Farms Wildlife Management Area 20 km southeast of Rocky Knob. That puts the *Desmognathus* at Rocky Knob squarely within the range of *D. planiceps* rather than *D. fuscus*. Specimens from the area previously identified as *D. fuscus* are most likely *D. planiceps*. Unfortunately, molecular analysis is required to correctly identify and separate these species.

Literature Cited

- Fredericksen, T.S., J.D. Fiore, H.S. Shively, M.B. Webb, J.L. Scott, and R.L. S Smith. 2010. Activity patterns of small terrestrial vertebrates and relationship to coarse woody debris in Virginia piedmont forests. *Banisteria* 35: 53-60.
- Fredericksen, T.S. and S. Boyd. 2012. A comparison of lowland and upland forests of Fairy Stone State Park, Virginia II. Small terrestrial vertebrates and songbirds. *Banisteria* 39: 14-20.
- Garriock, S., M. Kirkendall, and S. Carter. 1996. Reptile and amphibian observations, Floyd County, Virginia. *Catesbeiana* 16: 44-45.
- Gibson, J.D. and P. Sattler. 2007. Herpetological records from the first annual herp blitz at Fairy Stone State Park and Fairystone Farms Wildlife Management Area. *Catesbeiana* 27: 15-23.
- Hoffman, R.L. 1992. The range of *Plethodon yonahlossee* in Virginia: defined at last? *Catesbeiana* 12:3-8
- Sattler, P. and J.Gibson. 2010. Blue Ridge Scout Reservation Surveys: Resource Ramble I, II, and III 2007-2009. *Catesbeiana* 30(2): 58-72.
- Tilley, S.G., R.L. Eriksen, and L.A. Katz. 2008. Systematics of dusky salamanders, *Desmognathus* (Caudata: Plethodontidae), in the mountain and Piedmont regions of Virginia and North Carolina, USA. *Zoological Journal of the Linnean Society*, 152(1): 115-130.

Rock Castle Gorge BioBlitz

Acknowledgments

We would like to thank the Blue Ridge Parkway staff for organizing this event. We thank all the volunteers who came out to help find amphibians and reptiles including: Stephanie Crawford, Marielle DeJong, Linda Gette, Jason Gibson, Kal Ivanov, Joe Klein, Ethan Leedom, Ryan Leedom, Amanda Morgan, Bob Rebmann, Dennis Ross, Steve Roble, Joe Sapienza, Paul Sattler, and Jack Walker.

