Records of Amphibians and Reptiles from Breaks Interstate Park, Dickenson County, Virginia

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Introduction

Breaks Interstate Park is one of only two State parks with property in two adjacent states. It consists of 1860 hectares (4600 acres) in Pike County, Kentucky and Dickenson and Buchanan counties in Virginia. Breaks Interstate Park is termed the "Grand Canyon of the South" because it includes the deepest gorge east of the Mississippi River, cut by the Russell Fork River. It was discovered by a party led by Daniel Boone in 1767 and is the only pass through the 200 km (125 mi) long Pine Mountain. The section of Russell Fork that passes through the Breaks is one of the most treacherous whitewater rafting rivers in the United States, underscoring the rugged terrain of the area.

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The Park was formed in 1954, when both state legislatures approved the Breaks Interstate Park Compact and each donated $50,000 in start-up funds. From 1955-57, the Clinchfield Coal Company donated 457 ha (1129 acres), which comprises the majority of the current park. In 1955, Breaks Interstate Park was formally dedicated. Between 1957-58, infrastructure was added, including the entrance gate, guardrails, trails, and ground was broken for the Rhododendron Lodge. The dam on Laurel Branch, forming the 4.85 ha (12 acre) Laurel Lake, was completed in 1963.

Today, Breaks Interstate Park is financially self-sufficient and operated by the Breaks Interstate Park Commission. It consists of 1860 ha (4600 acres) with over 40 km (25 mi) of trails that meander through valleys and over ridges and along limestone cliffs that provide habitat for Green, Long-tailed, and Slimy Salamanders. It is located in the Appalachian Plateau Physiographic Province and Russell Fork flows northwest into the Big Sandy River, then the Ohio and Mississippi Rivers

The presence of Green Salamanders drew the VHS to Breaks Interstate Park initially from 10-12 July 2009 in hopes that members would be able to view this increasingly rare salamander as well as the possibility of finding Mountain Chorus Frogs. Hoffman (1981) reported *Pseudacris brachyphona* calling and found fresh egg masses in July at Grundy, Breaks Interstate Park, and Clintwood in Dickenson County. So we were hopeful this species could be found during our July survey. A return visit occurred from 13-15 June 2015. Breaks Interstate Park was also visited during 1-6 June 2008 and 5-9 May 2014 by zoology staff and volunteers of the Virginia Department of Conservation and Recreation, Division of Natural Heritage, who were primarily conducting arthropod surveys, but observations of reptiles and amphibians were recorded by Steve Roble. The results of the two VHS surveys and records obtained by the Virginia Natural Heritage Program are reported here.

Study Sites

Breaks Interstate Park was divided into 10 study sites for the VHS surveys conducted in 2009 and 2015. These sites were chosen for accessibility by groups of surveyors and for being the prime habitats to find reptiles and amphibians. A general description for each site and a central point GPS (Google Earth) reading appears below. A map of the survey sites is presented in Figure 1.

Site 1. Laurel Lake (37° 17’ 21.34”N, 82° 17’ 44.66”W)
This site is a large man-made lake. Visitors to the park can use this lake for fishing and can rent paddle boats to use within the lake. Cattails and Pickerel Weed are found along the margin. A mixed hardwood and Hemlock forest surrounds the lake. During the 2009 survey, baited hoop turtle traps were placed along various points of the lake.

Site 2. Beaver Pond and Beaver Pond Trail (37° 17’ 47.56”N, 82° 17’ 37.10”W)
Beaver Pond is a smaller man-made lake. Outlining the periphery of the lake is Beaver Pond Trail. This pond is bordered by a mixed hardwood forest.

Site 3. Laurel Branch Trail and Geological Trail (37° 17' 32.59"N, 82° 18' 6.52"W)
This site included two hiking trails, the Laurel Branch Trail 1.98 km (1.23 miles long) and the Geological Trail 0.56 km (0.35 miles long). The Laurel Branch Trail parallels Laurel Branch, a small stream which over the eons has cut through many layers of horizontally deposited sedimentary rock. This process has left a very interesting mix of rock formations with many small and large caves and rock crevices. The Geological Trail meanders through an area with numerous tall rock formations comprised of many horizontal layers of sedimentary rocks. Fault fractures are visible in some of the rock formations, as are fossils. Both trails pass through a mixed hardwood and Hemlock forest. In some places along the Laurel Branch there are thick Rhododendron and Mountain Laurel thickets. Dominant tree species include Hemlock, American Holly, Beech, Rhododendron, Mountain Laurel, White Oak, Tulip Poplar, Red Maple, Sour Gum, Fraser Magnolia, Basswood, Sourwood, and Sugar Maple. This vegetation gives the feeling of being in a more northerly oriented forest.

Site 4. Camp Branch Trail and Garden Hole (37° 16' 18.74"N, 82° 17' 41.70"W)
Garden Hole is a parking area and boat ramp next to the Russell Fork River. It has one of the lowest elevations in the Park at 262 m (860 feet). We tried to set turtle traps in the river at this site but were unable to place poles into the river bottom because it was solid rock. Camp Branch Trail is a 1.1 km (0.7 mile) trail that also passes through a mixed Hemlock and hardwood forest. In 2009, surveyors followed Camp Branch, the stream which parallels the trail. Camp Branch has eroded the rock layers here deeply and has formed a small gorge with many interesting rock outcrops.

Site 5. Debris pile near park entrance and maintenance area (37°17' 15.53"N, 82° 17' 35.80"W)
In addition to searching in debris piles near the park entrance, we also surveyed the maintenance area near the southeast corner of Laurel Lake.

Site 6. Road cruising all roads within park boundaries
When road cruising, we drove all main roads going through the entire park, including the parking lots at all the overlooks and at the water park adjacent to Laurel Lake.

Site 7. Cold Spring Trail (37° 17' 18.03"N, 82° 18' 2.46"W)
This site consists of Cold Spring Trail, a 0.8 km (0.5 mile) long hiking trail passing through a mixed Hemlock and hardwood forest. Near the trailhead and parking area is a boggy spring surrounded by grasses. The trail also passes through a Rhododendron thicket. Many outcrops of horizontally layered sedimentary rocks are visible on either side of the trail.

Site 8. Tower Tunnel Trail (37° 17' 8.77"N, 82° 18' 12.53"W)
This site is a very short trail leading to an overlook of the gorge created by the erosion of rock by the Russell Fork River. The surrounding forest is mixed but has a large shrub layer of blueberries.

Site 9. Center Creek Trail and Grassy Creek Trail (37 °17' 56.40"N, 82° 18' 31.46"W)
At this site there are two intersecting trails. The parking area leads to the beginning of Center Creek Trail. This is a 0.8 km (0.5 mile) trail which parallels Center Creek. Erosion of rock by this creek has created a small gorge with some treacherous and slippery hiking. Center Creek Trail ends at the intersection of Center Creek with Grassy Creek. Grassy Creek Trail is 0.8 km

(0.5 miles) long and parallels Grassy Creek. Grassy Creek is a larger stream that has cut through many layers of horizontally deposited sedimentary rocks. On either side of the creek are steep walls of rock. The trail ends where Grassy Creek empties into Russell Fork River. Dominant plant species present at this site include Hemlock, Red Maple, Basswood, Tulip Poplar, Chestnut Oak, Elm, Sycamore, American Beech, and Rhododendron.

Site 10. Horse stables and Mountain Bike Trail (37° 17' 56.30"N, 82° 17' 29.87"W)
This site consists of some horse stables, other outbuildings, a small grassy pasture, and the Mountain Bike Trail. The bike trail is 4.8 km (3 miles) long and passes through a mixed Hemlock and hardwood forest.

Figure 1. Map showing survey area.

Materials and Methods

During both VHS surveys, only one group of surveyors was formed (see Tables 1 and 2 for amount of survey effort expended at each site). The following methods were used during both surveys: hand capture, visual observations, listening for calling male frogs and toads, flipping cover objects, and dipnetting. On 10 July 2009, three hoop turtle traps, baited with sardines, were placed at three locations in Laurel Lake. Additionally road cruising was conducted to search for reptiles and amphibians at night. Animals thought to be county records were photographed. Animals hand captured were inspected for injury, disease, and external parasites. Data sheets were completed by the survey team leader. These sheets include information on the site location, time of survey work, weather conditions, and information on the animals encountered. All survey sheets are stored in the VHS archives housed in the science building at Liberty University.

Table 1: The amount of survey effort per site for the 2009 VHS survey.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8
Number of surveyors	7	5	15	4	10	4	4	2
Hours surveyed	0.5	0.75	2.5	1.83	1.25	1.5	0.6	1.85
Person hours of survey effort	3.5	3.75	37.5	7.32	12.5	6	2.4	3.7

Table 2: The amount of survey effort per site for the 2015 VHS survey.

	Site 2	Site 3	Site 3[a]	Site 7	Site 9	Site 10
Number of surveyors	20	21	2	2	16	4
Hours surveyed	0.78	5	2.5	2.5	1.33	1.08
Person hours of survey effort	15.6	105	5	5	21.28	4.32

3[a] = night hike at site 3 on 15 June 2015

Results

The observations made by Roble and other Virginia Natural Heritage Program personnel in 2008 and 2014 documented 24 total species (7 anurans, 7 salamanders, 3 turtles, 2 lizards, and 5 snakes; Table 5). The VHS surveys conducted in 2009 and 2015 yielded a total of 27 species (7 anurans, 10 salamanders, 2 turtles, 2 lizards, and 6 snakes). Collectively, 30 species were documented in the Park. A total of 152 animals were found in 2009 and 118 animals were found in 2015 (see Tables 3 and 4 for a complete list of species found at each site). The most commonly collected amphibians in 2009 were the slimy salamanders and the most commonly collected reptile was *Sceloporus undulatus*. The most commonly collected amphibians in 2015 were *Desmognathus monticola* and the slimy salamanders, and the most commonly collected reptile was *Agkistrodon contortrix mokasen*. County records for these surveys include *Pseudacris crucifer*, *Eurycea cirrigera*, *Pseudotriton r. ruber*, *Agkistrodon contortrix mokasen*, *Pantherophis alleghaniensis,* and *Storeria o. occipitomaculata.*. A Northern Map Turtle (*Graptemys geographica*) found in the Russell Fork River on the Kentucky side of Breaks Interstate Park by Roble in 2014 is a new drainage record (Big Sandy) for this species (Roble, 2016).

Table 3. Summary of the number of amphibians and reptiles observed at each site in 2009.

Sites	1	2	3	4	5	6	7	8	9	10	Total
Species											
Amphibians											
Aneides aeneus			3	1							4
Desmognathus fuscus				6							6
Desmognathus monticola			7	15			1				23
Eurycea cirrigera				2							2
Eurycea l. longicauda			5	1							6
Notophthalmus v. viridescens	1		3			2		1			7
Plethodon glutinosus/ Plethodon kentucki	1		19	7			1				28
Anaxyrus a. americanus					1	7		1			9
Hyla chrysoscelis	1					1					2
Lithobates catesbeianus		1				2					3
Lithobates clamitans	1	17	1			3					22
Lithobates palustris	4	1	1		3	2					11
Pseudacris brachyphona						1c					1
Pseudacris crucifer	1	12									13
Reptiles											
Chelydra. serpentina	3										3
Terrapene carolina					1						1
Plestiodon fasciatus					1						1
Sceloporus undulatus					4						4
Agkistrodon contortrix mokasen			1								1
Diadophis punctatus edwardsi			1		1						2
Nerodia. sipedon			1		1						2
Storeria o. occipitomaculata						1					1
Total Number of animals by site	12	31	42	32	12	19	2	2			152

c = calling anuran

Table 4. Summary of the number of amphibians and reptiles observed at each site in 2015.

Sites	1	2	3	3[a]	4	5	6	7	8	9	10	Total
Species												
Amphibians												
Aneides aeneus			2	14						1		17
Desmognathus fuscus			3									3
Desmognathus monticola			13	1						6		20
Eurycea cirrigera			4							1		5
Eurycea l. longicauda			11							2		13
Notophthalmus v. viridescens		1	2									3
Plethodon glutinosus/ Plethodon kentucki			11	9								20
Plethodon richmondi			1									1
Pseudotriton r. ruber			1									1
Anaxyrus a. americanus											1	1
Hyla chrysoscelis		2										2
Lithobates catesbeianus		3										3
Lithobates clamitans		4	2									6
Lithobates palustris			5					1		1		7
Reptiles												
Terrapene c. carolina										1	1,1S	2
Plestiodon fasciatus			1									1
Sceloporus undulatus			2									2
Agkistrodon contortrix mokasen			3							1		4
Diadophis punctatus edwardsii		2									2	4
Nerodia. sipedon		1										1
Opheodrys aestivus							1					1
Thamnophis s. sirtalis										1		1
Total Number of animals by site		13	61	24				1		14	4	118

3[a] = night hike at site 3 on the Geological Trail and Markers 16-18 on 6-15-15 (37°17’41.36”N, 82°18’17.02”W). S = turtle shell

Annotated Checklist

Amphibians

1. *Aneides aeneus* (Green Salamander)
   The Green Salamander is classified as a Tier 2 species by the Virginia Department of Game and Inland Fisheries. This designation means that it is in need of a very high level of conservation and it has a high risk of extinction or extirpation. In Virginia this species has a very limited distribution. The 2009 survey yielded four observations of this species. Green Salamanders were found clinging to the outside of rock outcrops and in rock crevices. Observations of one animal being beyond vertical and upside down on a rock face amazed all viewers. A temperature reading taken from one rock crevice was 65.6°F. In 2015, 14 Green Salamanders were found on one night hike at site 3[a] which lasted for 2.5 hours. Two juvenile salamanders were found at site 3; one had a total length measurement of 4.1 cm. Salamanders were found mainly at night, most were observed in rock crevices but one adult was found in a tree crevice 1.8 m (six feet) above ground surface. Salamanders were also observed in caves and on a damp rock face near Laurel Branch stream. In June 2008, a juvenile was discovered by Virginia Natural Heritage Program staff in a rotten log at the edge of the Garden Hole parking area and adults were seen by Roble at night on rock faces along the Geological Trail.

2. *Desmognathus fuscus* (Northern Dusky Salamander)
   Northern Dusky Salamanders were found at only one site in 2009. Salamanders were found mainly under rocks by the stream at site 4. One was found under a rubber inner tube by the same stream. The 2015 survey yielded only three salamanders from one site, site 3. One salamander was found under a rock by a stream, one was found in the steam, and another was found beside the stream. Larvae were present in seepage areas near site 7 in May 2014.

3. *Desmognathus monticola* (Seal Salamander)
   Seal Salamanders were found in rock crevices, under rocks by streams, under logs, and in streams. Larvae were observed swimming in streams. In 2009 seven were found at site 3, fifteen were found at site 4 and one was found at site 7. During the 2015 survey, fourteen were found at site 3 and six were found at site 9.

4. *Eurycea cirrigera* (Southern Two-lined Salamander)
   In 2009, two adult Two-lined Salamanders were found under rocks by a stream at site 4. In 2015, three adults and one larva were found at site 3 and one salamander was found under a rock on a cliff at site 9.

5. *Eurycea longicauda longicauda* (Long-tailed Salamander)
   Long-tailed Salamanders were encountered in rock crevices and under logs and rocks. In 2009, six salamanders were collected at two sites and in 2015 thirteen salamanders were also collected at two sites.

6. *Plethodon glutinosus* (Northern Slimy Salamander)
7. *Plethodon kentucki* (Cumberland Plateau Salamander)
   Both of these species were found during both VHS surveys in 2009 and 2015. We combined the records because of inconsistent reporting by group members of the physical characteristics of each slimy salamander found. These species are hard to differentiate and many group members had difficulty making a positive identification. We emphasized to group members that every animal seen did not have to be touched. Highton et al. (1989) used protein electrophoresis to differentiate between and describe sixteen different species in the *Plethodon glutinosus* species complex. These protein markers were used to positively identify *P. glutinosus* and *P. kentucki* after the 2009 survey, as described in: http://www.virginiaherpetologicalsociety.com/research/electrophoresis/
   In 2009 we found 28 slimy salamanders and in 2015 we found 20. Both juvenile and adult salamanders were observed. Slimy salamanders were found under logs, in rock crevices, on leaf litter, and on the walls of wet caves.

Plethodon kentucki above and *P. glutinosus* below.

8. *Plethodon richmondi* (Ravine Salamander)
   Only one juvenile Ravine Salamander was found under a log at site 3. This was observed during the 2015 survey.

9. *Pseudotriton ruber ruber* (Northern Red Salamander)
   In 2015, one juvenile Northern Red Salamander was found under a rock in water at site 3.

10. *Notophthalmus viridescens viridescens* (Red-spotted Newt)
In 2009, seven Red-spotted Newts were found in a variety of habitats including Beaver Pond, the shoreline of Laurel Lake, on a road at night, and on the path at Tower Tunnel Trail. Adults and eft stage newts were seen. In 2015 only three newts were found. These newts were observed in Beaver Pond, Laurel Lake, and leaf litter at site 3.

11. *Anaxyrus americanus americanus* (American Toad)
The first VHS survey conducted at Breaks Interstate Park found one American Toad in a debris pile at site 5 and another was found foraging in leaf litter at the Tower Tunnel Trail. Seven toads were found on the road while road cruising at night. During the second survey, one adult American Toad was found in leaf litter in the woods surrounding the Mountain Bike Trail at site 10. Tadpoles were observed by Roble in a small road rut near Beaver Pond and along the margins of the Russell Fork River in early May 2014.

12. *Hyla chrysoscelis* (Cope's Gray Treefrog)
Only calling males were found during the 2009 and 2015 surveys conducted by the VHS. In 2009, one lone *Hyla chrysoscelis* male was heard calling at the Beaver Pond during a night hike. In 2015, two calling Cope's Gray Treefrogs were heard calling from the woods surrounding Beaver Pond at site 2. A large chorus of *H. chrysoscelis* was heard at Laurel Lake in early May 2014.

13. *Lithobates catesbeianus* (American Bullfrog)
In 2009, American Bullfrogs were heard vocalizing at two sites; at the shore of the Beaver Pond and at the shoreline of Laurel Lake. In 2015, three adults were observed along the edge of Beaver Pond at site 2.

14. *Lithobates clamitans* (Green Frog)
Green Frogs were found on the shoreline of Laurel Lake and Beaver Pond, along the edge of Laurel Branch, by a spring at site 3 and on the road at night. Many males were heard vocalizing at night at sites 1 and 2 in 2009. During the 2015 survey three adults and one metamorph were observed at site 2. The adults were seen at the edge of Beaver Pond and the metamorph was found at the edge of the stream feeding the pond. One male was heard calling at this site. Additionally, two Green Frogs were seen in a seep by the dam forming Laurel Lake at site 3. At least one adult male was present at the spring at site 7 in May 2014.

15. *Lithobates palustris* (Pickerel Frog)
In 2009, *Lithobates palustris* was the most widespread anuran found during the survey period. Pickerel Frogs were observed along the shore of Laurel Lake, sitting on the Beaver Pond Trail at night, sitting on the earthen dam path leading to Laurel Branch Trail, along the edge of Laurel Branch stream, around debris piles, and in the pool parking lot at night. In 2105, five Pickerel Frogs were found at site 3; two adults and three juveniles. These frogs were observed in leaf litter, in the water in a spring coming out of a rock, and one was found under a log. One adult was found at site 7 in leaf litter by the trail. One adult was also observed in Center Creek at site 9.

16. *Pseudacris crucifer* (Northern Spring Peeper)
Northern Spring Peepers were only observed in the VHS survey in 2009. During that survey, one metamorph peeper was collected on the shore of Laurel Lake and numerous males were heard calling at night from the shoreline of Beaver Pond. Virginia Natural Heritage Program staff photographed a metamorph at Beaver Pond in June 2008. Large choruses of both *P. crucifer* and *H. chrysoscelis* were present at Laurel Lake in early May 2014.

17. *Pseudacris brachyphona* (Mountain Chorus Frog)
While road cruising at night in 2009, one male Mountain Chorus Frog was heard vocalizing near the lodge close to the entrance gate. A search of the area did not yield a chorus frog. In June 2008, Roble heard a nocturnal breeding chorus when standing at the Stateline Overlook. The frogs were apparently calling from somewhere along the Russell Fork River floodplain below, though it was uncertain if they were in Virginia or Kentucky. Later that same week Roble and Richard Hoffman also heard a male calling at a site at least 100 meters below Beaver Pond.

Reptiles

18. *Chelydra serpentina* (Eastern Snapping Turtle)
Three adult snapping turtles were caught in baited hoop turtle traps set in Laurel Lake in 2009. Roble observed one adult in the Russell Fork River in 2014.

19. *Terrapene carolina carolina* (Eastern Box Turtle)
A single adult female Eastern Box Turtle was found wedged under a log at a debris pile at site 5. One male turtle was found in the leaf litter at site 9. One shell and one adult male were found in a grassy field beside the Mountain Bike Trail at site 10. Roble found two shells in May 2014, one near Beaver Pond and the other in a Hemlock ravine.

20. *Plestiodon fasciatus* (Common Five-lined Skink)
Only two Common Five-lined Skinks were observed during the two VHS surveys. One skink was spotted around a debris pile at site 5 and one male skink was observed on a tree at site 3. In May 2014, a male was seen near the confluence of Grassy Creek and Russell Fork River (site 9 area).

21. *Sceloporus undulatus* (Fence Lizard)
Fence Lizards were observed on logs and rocks around the debris piles at site 5 and two adults were observed basking on a rock outcrop at the Stateline Overlook at site 3. In

May 2014, a juvenile was observed near the Geological Trail parking lot and two adults were seen near the Stateline Overlook, including an adult male performing push-up display behavior on a flat rock. On 13 May 2015, Roble observed an adult male on a log along Prospector Trail, about midway between the River Trail and Tower Tunnel Trail.

22. *Agkistrodon contortrix mokasen* (Northern Copperhead)
Northern Copperheads were found at sites 3 and 9. At site 3 one snake was found foraging in leaf litter at the base of a rock canyon in 2009. In 2015 three Northern Copperheads were found at site 3 and one was found at site 9. The snakes found at site 3 included an adult found under tree roots near a seep, one juvenile in leaf litter, and one neonate, still exhibiting the sulfur-colored tail, at the base of a rock outcrop in leaf litter. The juvenile snake found at site 9 was observed on a rock ledge in an outcrop of rocks above the walking trail. In June 2008, Roble observed an adult copperhead at night on a large boulder along the Geological Trail.

23. *Diadophis punctatus edwardsi* (Ring-necked Snake)
In 2009, two Ring-necked Snakes were found at two sites, one was found under bark and the other was found under tin at the debris pile at site 5. In 2015, one adult was found DOR at the intersection of the road leading to cottages and Deer Trail leading to Beaver Pond. This animal had no spots on its ventrum and a full neck band. A live adult was found under tree bark in the woods surrounding Beaver Pond at site 2. It also lacked spots on its ventrum and had a full neck band. Two adults were found under fallen tree bark at site 10.

24. Lampropeltis triangulum triangulum (Eastern Milksnake)
Roble observed an adult crossing Garden Hole Road near the parking area at Russell Fork River in June 2008 (see Roble and Hoffman, 2012).

25. *Nerodia sipedon* (Northern Watersnake)
In 2009, an adult Northern Watersnake was seen basking on floating debris in Laurel Lake and a juvenile snake was found between tin at a debris pile at site 5. One shed skin found beside Beaver Pond at site 2 was found in the 2015 survey.

26. *Opheodrys aestivus* (Northern Rough Green Snake)
One DOR specimen was found on Route 80 on the northern border of Breaks Interstate Park. Grassy Creek parallels the road where the snake was found.

27. Pantherophis alleganiensis (Eastern Ratsnake)
In June 2008, a DOR subadult was collected shortly after dark along the main park road by Virginia Natural Heritage Program staff.

28. Regina septemvittata (Queen Snake)
Roble observed a Queen Snake feeding on a recently molted crayfish in the Russell Fork River near the Garden Hole Road access in June 2008.

29. *Storeria o. occipitomaculata* (Northern Red-bellied Snake)
A single large adult Northern Red-bellied Snake was collected alive crossing the road leading to the campground during the 2009 survey. This represents an unusual observation because this species is not often observed in the day except under cover objects (Palmer and Braswell, 1995; Mitchell, 1994) and there is only one other known locality in the mountains of the southwest corner of the state (Scott County; FWIS Database).

30. *Thamnophis s. sirtalis* (Eastern Gartersnake)
One adult was found on a rock shelf at site 9.

Discussion

Breaks Interstate Park is located in one of the most remote areas in the Commonwealth. The rugged terrain and scarcity of improved roads is one of the major reasons the Park was originally established. Judging from the low number of amphibians and reptiles in the Virginia Department of Game and Inland Fisheries' Fish and Wildlife Information Service Database, it has not been subjected to many previous surveys. There were only 18 species of amphibians and 11 species of reptiles confirmed for Dickenson County prior to the recent surveys. The surveys reported here found 14 of the 18 amphibian species and 10 of the 11 reptile species (Table 5), making these

some of the most successful surveys to date. In addition, three species of amphibians and three species of reptiles not previously vouchered were reported, and one species of reptile (*Storeria o. occipitomaculata*) not found in the FWIS Database as even likely, was vouchered. The large number of species found highlights the real value of the VHS surveys, that so many eyes are available to find secretive animals. Many members go out on informal personal surveys and find many of the common species in an area. However, when more than a dozen people are looking, even many of the less common species are turned up. A special thank you goes to all members who made the long trek to participate in these surveys.

The three amphibian species newly vouchered by these surveys include *Pseudacris crucifer, Pseudotriton r. ruber,* and *Eurycea cirrigera*. Each of these species is documented from virtually all surrounding counties and thus not unexpected. Their lack of documentation prior to these surveys is probably more a factor of the lack of previous work in this region. The four species we failed to find were *Lithobates sylvaticus, Desmognathus ochrophaeus, Gyrinophilus porphyriticus,* and *Pseudotriton montanus*, each represented by one or two localities in the county, and usually a single specimen at each site (FWIS Database). Other amphibian species that may occur in the Park include *Anaxyrus fowleri, Cryptobranchus a. alleganiensis, Eurycea lucifuga*, and *Necturus m. maculosus*. All these species are found in other counties in the area and may occur in Dickenson County as well. It is particularly of interest whether *Cryptobranchus* and *Necturus* may occur in Russell Fork. Both were found in the 1994 Survey of Copper Creek (Sattler, 1994) in the Tennessee River drainage in Russell and Scott Counties to the south. Neither has been found in the Appalachian Plateau Big Sandy drainage in Virginia. The Hellbender is known from Wayne County, and the Mudpuppy from Wayne and Mingo Counties WV which include part of the Big Sandy drainage (Green and Pauley, 1987). Russell Fork is a formidable river, being the most dangerous whitewater rafting river in the eastern United States (Scales, 2011) and very difficult to survey. It is interesting to speculate as to what may be hiding in its waters. With eDNA technology becoming used on a routine basis, surveys for Hellbender and Mudpuppy DNA in this area should be conducted.

The three reptile species newly vouchered for Dickenson County are *Agkistrodon contortrix mokasen, Pantherophis alleghaniensis,* and *Storeria o. occipitomaculata*. Two of these, the Copperhead and Eastern Ratsnake are found in some of the surrounding counties, are widespread species and not unexpected (FWIS Database). The Northern Red-bellied Snake is only the third specimen from the southwest corner of the state. It joins a pair of specimens from the southeastern corner of Scott County collected in 2009 (FWIS Database). This new record verifies Mitchell's (1994) claim it occurs throughout Virginia despite a lack of verified records in some areas. The one reptile species previously recorded from Dickenson County but not found in the recent surveys is *Heterodon platirhinos*. This species does not appear to be common in the southwestern corner of the state and is represented in the county by a single specimen from near Clintwood (FWIS Database) and is documented in only Tazewell and Smyth counties (Mitchell, 1994) in the area. Reptiles that may still await discovery at Breaks Interstate Park include *Coluber c. constrictor*, *Carphophis a. amoenus*, *Crotalus horridus*, *Lampropeltis getula* and *Lampropeltis nigra*. Although not formally documented from Dickenson County, Austin Bradley (pers. comm.), the current superintendent, reports that Timber Rattlesnakes have been observed in the park. Most of the above species are found in at least one other county in the Appalachian Plateau (Mitchell and Reay, 1999).

Certainly the highlight of the VHS surveys was finding a large number of Green Salamanders. This striking species was not uncommon, particularly on night hikes along the limestone cliffs. It was extensively photographed by day and night, and was the first time many of the

survey participants were able to observe this species. The Park is well situated to preserve this important population. The recent find of Bd in this population is of concern (Blackburn et al., 2015). Moffitt et al. (2015) suggest that Bd could be a factor in addition to habitat loss and climate change in the decline of this species. Because the Breaks has a large population of Green Salamanders and is protected habitat, we would like to see the situation monitored over time. The Park is heavily visited throughout the year, it is possible that visitors may unintentionally bring in viral or fungal infections. We recommend that those involved with future surveys not touch the animals and take special precautions to disinfect all shoes and equipment, both as a protection for the salamanders in the Park, and to prevent the spread of Bd from these infected animals to other areas. Park managers should ensure any researchers coming into the park maintain strict disinfection protocols. This should be written into the rules for the collecting permit.

Table 5. Summary of species found in Breaks Interstate Park, Dickenson County, Virginia during each survey.

	Roble et al. 2008, 2014	Gibson & Sattler 2009	Gibson & Sattler 2015
Aneides aeneus	*	*	*
Desmognathus fuscus	*	*	*
Desmognathus monticola		*	*
Eurycea cirrigera	*	*	*
Eurycea l. longicauda	*	*	*
Notophthalmus v. viridescens	*	*	*
Plethodon glutinosus	*	*	*
Plethodon kentucki	*	*	*
Plethodon richmondi			*
Pseudotriton r. ruber			*
Anaxyrus a. americanus	*	*	*
Hyla chrysoscelis	*	*	*
Lithobates catesbeianus	*	*	*
Lithobates clamitans	*	*	*
Lithobates palustris	*	*	*
Pseudacris brachyphona	*	*	
Pseudacris crucifer	*	*	
Reptiles			
Chelydra serpentina	*	*	
Terrapene c. carolina	*	*	*

Plestiodon fasciatus	*	*	*
Sceloporus undulates	*	*	*
Agkistrodon contortrix mokasen	*	*	*
Diadophis punctatus edwardsi		*	*
Pantherophis alleghaniensis	*		
Lampropeltis t. triangulum	*		
Nerodia s. sipedon	*	*	*
Opheodrys aestivus			*
Regina septemvittata	*		
Storeria o. occipitomaculata		*	
Thamnophis s. sirtalis			*

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2014 surveys – Anne Chazal

Breaks Interstate Park staff:
Austin Bradley (current superintendent), Karl Mullins (retired naturalist)
Matt O'Quinn - previous superintendent (now manager of Powhatan State Park)