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JOURNAL INFORMATION

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(Editorial policy continued on inside back cover)

Cover Photo: Mud Salamander (*Pseudotriton montanus*) from Big Woods Survey, Spring 2018.

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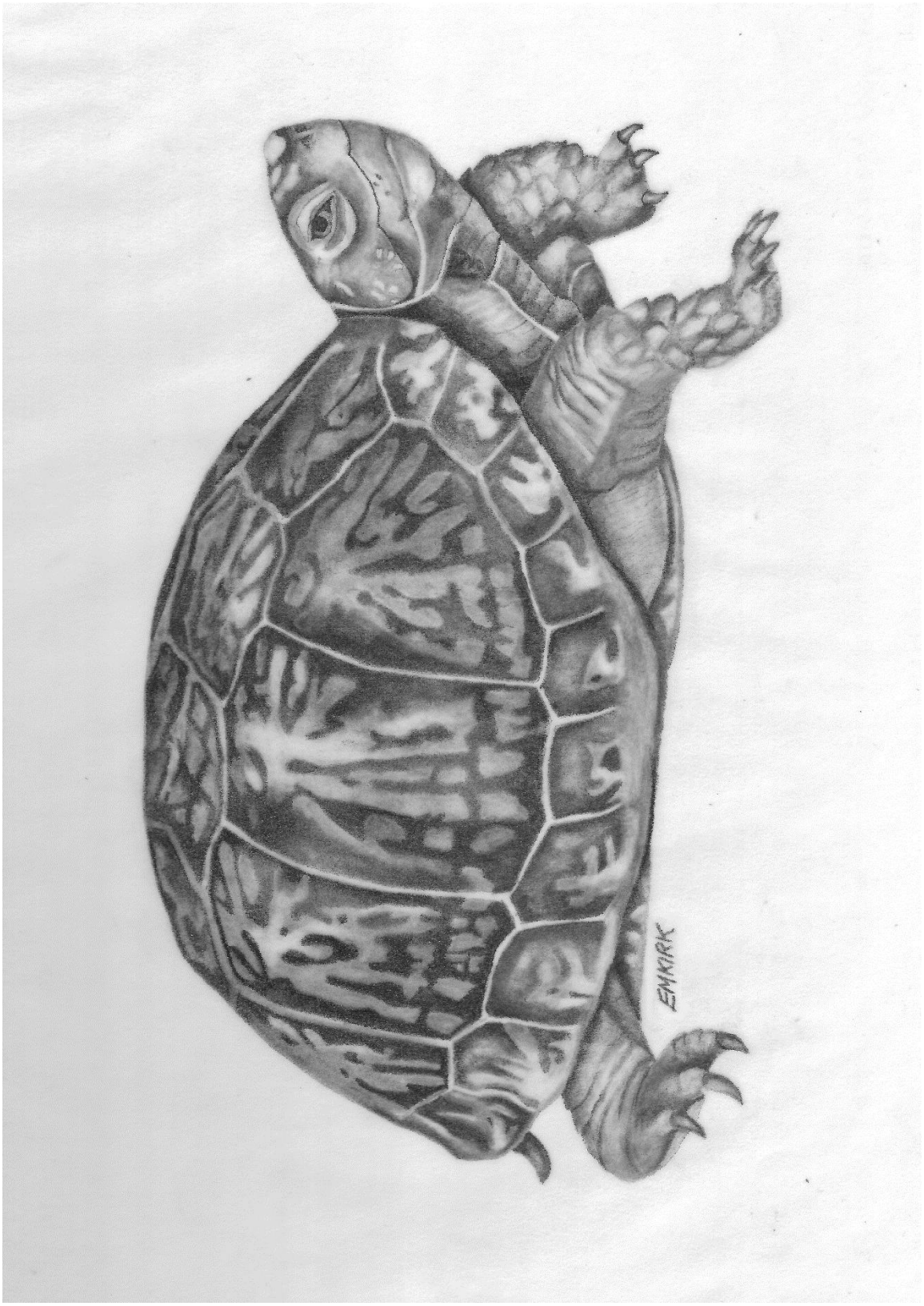
EMKIRK

Herpetological Survey of Big Woods State Forest & Wildlife Management Area

23 April & 7 May, 2017
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Introduction

Big Woods State Forest (BWSF) and Wildlife Management Area (BWWMA) are located in Sussex County. BWSF was acquired from the Nature Conservancy in 2010 and is comprised of 885.2 hectares (2188 acres) of pine forest and wetlands. BWWMA is comprised of two separate tracts. One tract, acquired from the Nature Conservancy in 2010, is adjacent to BWSF and consists of 886.3 hectares (2190 acres) of Pine Forest and wetlands. These properties are jointly and cooperatively managed by the Virginia Department of Forestry (VDOF) and the Virginia Department of Game and Inland Fisheries (VDGIF). These properties are located east of Beaver Pond Road (Rt. 606). The second BWWMA property is named Parker's Branch Tract (BWPBT) and is located near the other properties but is west of Beaver Dam Road. BWPBT was acquired by VDGIF from the nature conservancy in 2016 and consists of 795.2 hectares (1965 acres) of upland Loblolly pine forest and mature forest swamp. All these properties were logged and managed by the timber industry prior to Nature Conservancy ownership.

Each of these properties is being managed to develop additional habitat for the federally endangered Red-cockaded Woodpecker (RCW), which has been documented and is being monitored at the northern most edge of its range in the adjacent property of Piney Grove Nature Preserve of the Nature Conservancy. Another objective is to help restore the Long Leaf Pine forest to the area. These management strategies require a continued thinning of the forest and reduction of the forest understory through prescribed burns. RCWs require live mature pine trees to produce nesting cavities and mature open forests are ideal habitat. The impact of prescribed burns on amphibian and reptile populations is unclear.

All of the Big Woods properties are of interest to the VHS Conservation Committee because 16 herpetological species having a Virginia Department of Game and Inland Fisheries (VDGIF) conservation status of Tier I-IV have been documented for Sussex County.

Due to the large area to be surveyed, two Sunday survey dates, 23 April and 7 May 2017 were selected. Sunday was the day chosen to avoid any safety concerns with spring turkey hunting season (Monday-Saturday). Ten participants surveyed BWSF/BWMA/BWPBT ("BW") on 23 April and fourteen participants surveyed on 7 May.

Survey Sites

The following is a general description of the survey sites. Coordinates were specific GPS coordinates provided by the group leaders at the survey starting point. GPS coordinates for the beaver pond within BWSF was also recorded.

Site-1-Grassy Marsh (36.95951 º N, -77.05955 º W) Site-1 is located south of the portion of New Cut Road within BWWMA that forms the border with the Piney Grove Nature Preserve. This area is a grassy marsh with water depths less than 0.5 meters backing up to pine woods. This site was surveyed on 23 April and late in the afternoon of 7 May. A prescribed burn occurred in the marsh area between the survey dates.

Site-2-Ellis Path Creek (36.94250 º N, -77.05740 º W) Site-2 includes the creek and wetlands on both sides of Ellis Path within BWWMA and the pine woods area to the east and west of Ellis Path. The west pine woods area was burned about 5 weeks prior to 23 April. There was substantial charring of the forest floor and logs, but the understory vegetation was recovering. The east pine woods area to Faison Path had been previously burned but the understory vegetation was more fully developed. This site was surveyed on 23 April and minnow traps were placed in the creek on 22 April and 6 May and were retrieved and inspected on 23 April and 7 May.

Site-3- Knob Path North (36.93870 º N, -77.07475 º W) Site-3 includes the pine woods north of Knob Path and its ancillary trails as well as the north side of the beaver pond (36.93611ºN, -77.08586) which bisects Knob Path within BWSF. The eastern portion of Knob Path and its ancillary trail to the north were surveyed on 23 April. This area consisted of pine woods and had previously been burned but the understory vegetation was recovering. The western portion of Knob Trail and the northern side of the beaver pond were surveyed on 7 May. The area to the north of Knob Trail had been burned shortly before the 7 May survey. The pine woods forest floor and log debris were completely charred and understory vegetation was non-existent.

Site-4-Faison Path East (36.95155 º N, -77.03830 º W) Site-4 included the area north and south of Faison Path east of New Cut Road within BWWMA. This site consisted of pine woods, laden with log debris, and marsh and wet areas. The area had been burned at some time in the past but the understory was recovering. This site was surveyed on 7 May.

Site-5-Horse Path (37.93000 º N, -77.05251 º W) Site-5 was the area north and south of the Horse Path to the east of Line Pine Road within BWWMA. The area consisted of pine woods and some hardwoods and was thick with understory vegetation. This site was surveyed on 7 May.

Site-6- Parker's Branch South (36.93774º N, -77 º.12479W) Site-6 includes the area south of the last parking lot within BWPBT between Assamoosick Swamp to the west and Parker's Branch to the east. This site includes trails, pine woods and swamps. Some hardwoods, including maple, poplar, dogwood and sumac were also present. This site was surveyed on 7 May.

Site-7-Parker's Branch West (36.95310 º N, -77.13368 º W) Site -7 includes the trail to the north of Summerfield Road (Rt. 604) that borders the edge of Assamoosick Swamp. In addition to forest swamp, the area includes pine woods, some hardwoods and an open area with woody debris. This site was briefly visited on 23 April and surveyed on 7 May.

Figure 1. Map showing the survey area within BWWMA and BWSF. Survey sites are indicated by numbers.

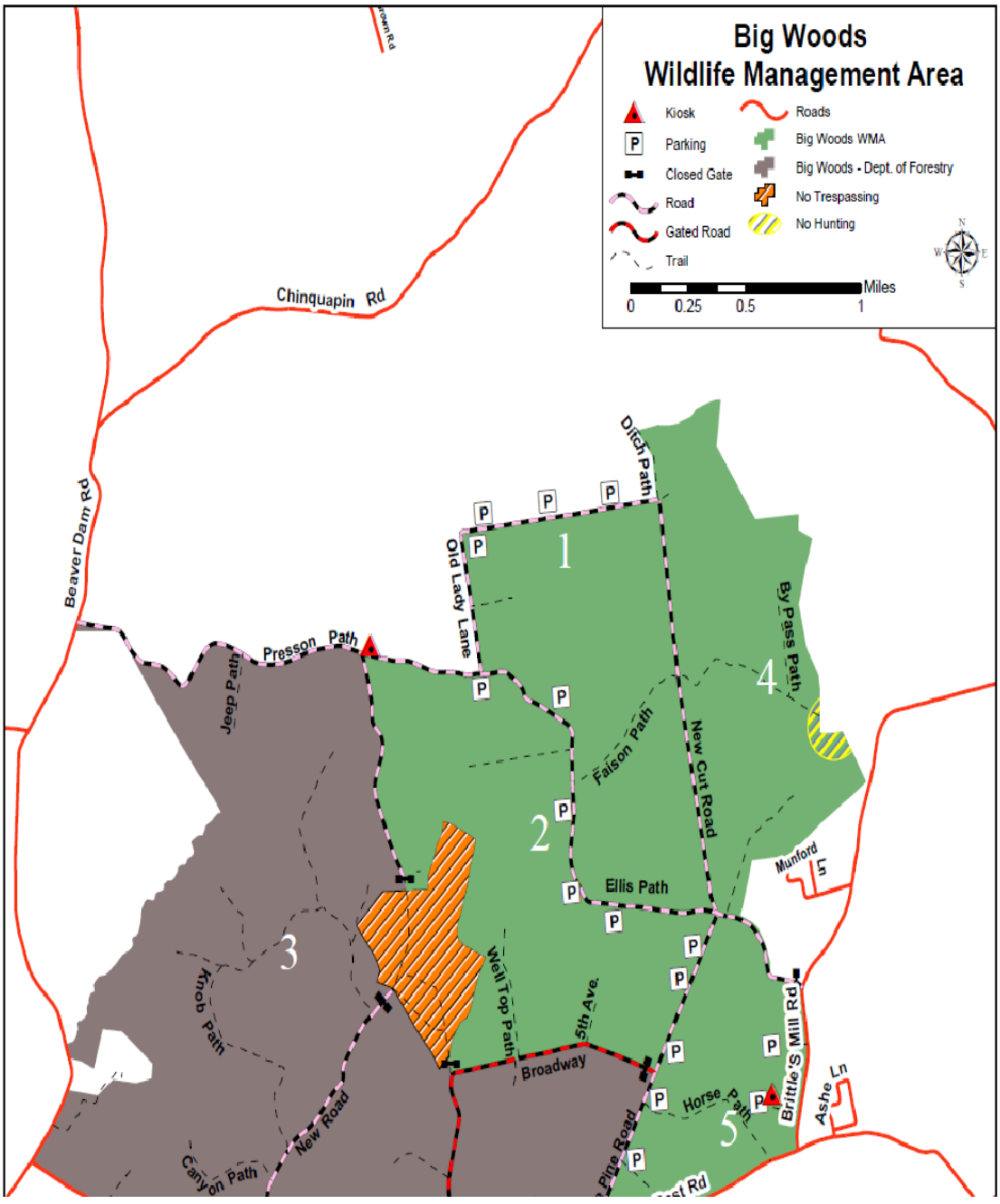
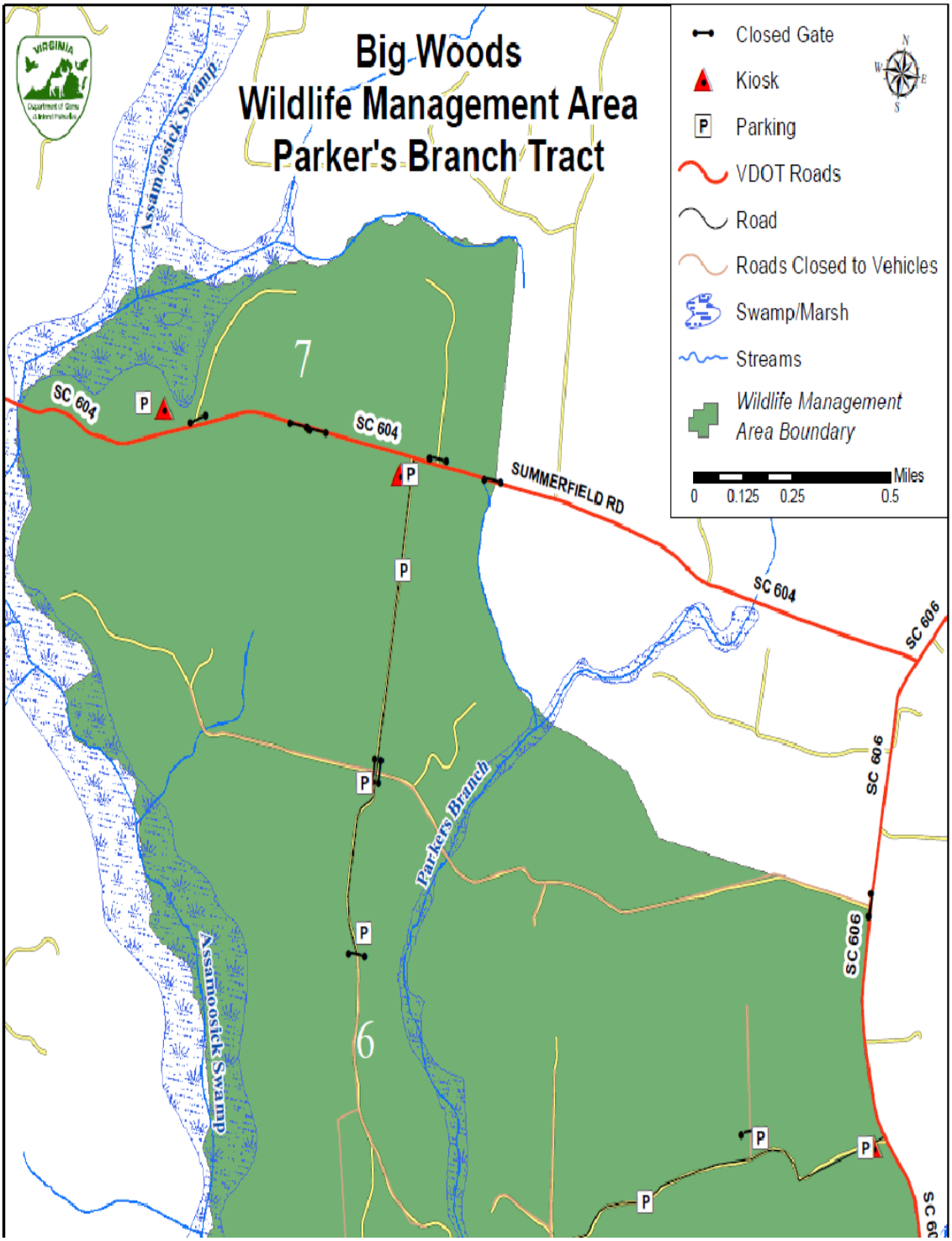


Figure 2. Map showing survey sites within BWPBT. Survey sites are marked by numbers.



Materials and Methods

Several traps were used to try to capture tadpoles, frogs and turtles. One hoop turtle trap, baited with sardines, was positioned during the afternoon of 22 April in the swamp area within Site-7. Eight minnow traps were also positioned on the afternoon of 22 April. Four minnow traps were placed in the creek on both sides of Ellis Path within Site-2. Two minnow traps were placed in the creek on the east side of New Road within Site-3 and two minnow traps were placed in Assamoosick Swamp within Site-7.

Ten volunteers participated in the survey for approximately four hours (from 09:00 to 13:00h) in the field on 23 April for a net survey total of about 35 person hours (subtracting travel time between sites). Due to the limited number of participants, one survey group was organized to survey four sites within CWMA (Sites-1 through 3 and 7 as described above). Weather conditions were unfavorable for most of the survey, with overcast skies and drizzle throughout the day. Temperatures remained unseasonably cool and constant at about 12 -13^{o} C.
Prior to each survey, all participant footwear and survey gear (snake hooks, field sticks, dip nets etc.) were disinfected using Nolvasan® Solution (chlorhexidine diacetate). Survey participants on both survey days used multiple collecting methods to find amphibians and reptiles, including visual observation, listening for calling anurans, hand capture and over-turning objects with snake hooks and field sticks. All captured animals were observed to identify possible malformations, injuries or disease and other unique markings and characteristics. Digital photos were taken of many of the captured animals prior to their release at the site of capture. Survey group leaders summarized and submitted all relevant data on VHS survey group data sheets.
On the afternoon of Saturday 6 May, a hoop turtle trap baited with sardines was placed in the beaver pond on the north side of Knob Path within Site-3. Ten minnow traps were also positioned during the afternoon of 6 May. Two were placed in the grassy marsh within Site-1, four were placed in the creek on both sides of Ellis Path within Site-2 and four were placed in the beaver pond on both sides of Knob Path within Site-3.

Fourteen volunteers participated in the survey on 7 May from 09:00 to 15:30 for a net survey total of about 84 person hours (subtracting travel time between sites). Due to the large area to be surveyed, the volunteer participants were split into groups. One group surveyed Sites-1, 3, 4 and 5 and the other survey group surveyed Sites-6 and 7. Skies were mostly clear and sunny, although the air temperature remained unseasonably cool and ranged from 11-18 ^{o}C. There was some light rain in the afternoon. The following tables summarize the survey effort.

Table 1. Summary of the survey effort on 23 April 2017.

Survey Site	No. of Surveyors	Hours	Estimated Person Hours
1-Grassy Marsh	10	1	**10**
2-Ellis Path Creek	10	1	**10**
3-Knob Path North	10	1	**10**
7- Parker's Branch West	10	0.5	**5**
Total			**35**

Table 2. Summary of the survey effort on 7 May 2017.

Survey Site	No. of Surveyors	Hours	Estimated Person Hours
1-Grassy Marsh	6	0.5	**3**
3-Knob Path North	6	2.5	**15**
4-Faison Path East	6	1.5	**9**
5-Horse Path	6	1.5	**9**
6-Parker's Branch South	8	5.0	**40**
7-Parker's Branch West	8	1.0	**8**
Total			**84**

Results

During the two days of survey a total of 33 species were captured or positively identified, including 18 Amphibians and 15 Reptiles (Table 3). The survey produced a total of nine anuran, nine salamander, five snake, eight turtle and two lizard species. More than 107 animals were captured or positively identified. However, only five of the previously documented 16 Sussex County species with VDGIF conservation status tier I-lV were found (Tier III *Lithobates virgatipes, Terrapene c. carolina* and Tier IV *Heterodon platirhinos, Pseudotriton m.montanus,Trachemys s. scripta*). Three new Sussex County records were documented (*Hemidactylium scutatum, Plethodon cylindraceus, Pseudotriton m. montanus)*. One recently discovered Virginia species, *Lithobates Kauffeldi* was also documented. Table 3 summarizes the results for both survey dates.

Table 3. Survey Results

Site	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Class Amphibia								
Anuran Species								
Acris gryllus	CM	1	2	3		1	1	**>9**
Anaxyrus fowleri		1						**1**
Gastrophryne carolinensis						1		**1**
Lithobates clamitans		3	1		1			**5**
Lithobates kauffeldi						1		**1**
Lithobates sphenocephalus	3			10		1	1	**15**
Lithobates virgatipes			1					**1**
Pseudacris crucifer	1							**1**
Pseudacris feriarum	CM							**>1**
Total Anurans	**>6**	**5**	**4**	**13**	**1**	**4**	**2**	**>35**

Site	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Totals**
Salamander species								
Ambystoma maculatum						7		**7**
Ambystoma opacum						21		**21**
Desmognathus auriculatus						1		**1**
Eurycea cirrigera		1						**1**
Hemidactylium scutatum							1	**1**
Notophthalmus v. viridescens						1		**1**
Plethodon chlorobryonis					2		3	**5**
Plethodon cylindraceus		1						**1**
Pseudotriton m. montanus							1	**1**
Total Salamanders		**2**			**2**	**30**	**5**	**39**
Total Amphibians	**>6**	**7**	**4**	**13**	**3**	**34**	**7**	**>74**
Class Reptilia								
Snake Species								
Carphophis a. amoenus	1		1			1		**3**
Coluber c. constrictor						5		**5**
Heterodon platirhinos			1					**1**
Nerodia s. sipedon			2					**2**
Storeria o. occipitomaculata			1					**1**
Total Snakes	**1**		**5**			**6**		**12**
Turtle species								
Chelydra serpentina			1					**1**
Kinosternon s. subrubrum						2		**2**
Pseudemys c. concinna						1		**1**
Pseudemys c. floridana						1		**1**
Pseudemys rubriventris			1					**1**
Sternotherus odoratus			1					**1**
Terrapene c. carolina		1	4	4		1		**10**
Trachemys s. scripta			1					**1**
Total Turtles		**1**	**8**	**4**		**5**		**18**
Lizard Species								
Sceloporus undulatus							2	**2**
Scincella lateralis			1			1		**2**
Total Lizards			**1**			**1**	**2**	**4**
Total Reptiles	**1**	**1**	**14**	**4**		**12**	**2**	**34**

Key: Site 1. Grassy Marsh, Site 2. Ellis Path Creek, Site 3. Knob Path North, Site 4. Faison Path East, Site 5. Horse Path, Site 6. Parker's Branch South, Site 7. Parker's Branch West

Annotated Checklist

Amphibians

1. *Acris gryllus* (Southern Cricket Frog) More than nine Southern Cricket Frogs were observed throughout the survey and were found at all of the survey sites except Site-5. Several males could be heard calling from the marsh area within Site-1 on 23 April but they were not heard during a brief return visit during the afternoon of 7 May. One adult was observed on the forest floor in the burned area within Site-2. Two adult Southern Cricket Frogs were observed in a puddle near the creek within Site-3. Three adult Southern Cricket Frogs were observed hopping in a wet area in the woods within Site-4. One adult Southern Cricket Frog was captured along the trail within Site-6 and photographed. One adult Southern Cricket Frog was captured in a tire rut puddle on the trail within Site-7 and was photographed. All of the observed Southern Cricket Frogs appeared to be healthy.

2. *Anaxyrus fowleri* (Fowler's Toad) One adult Fowler's Toad was observed under a charred log near the creek within Site-2 and was captured and appeared to be healthy.

3. *Gastrophryne carolinesis* (Eastern Narrow-mouthed Toad) One adult Eastern Narrow-mouthed Toad was captured alongside Route 604 while traveling from Site-6 to Site-7. The individual appeared to be healthy.

4. *Lithobates clamitans* (Green Frog) Four adult Green Frogs and one juvenile were observed during the survey. Three adult Green Frogs were observed in the creek within Site-2. One adult male could be heard calling from the beaver pond within Site-3. The juvenile Green Frog was observed in a water slough within Site-5 and was captured by dip net. There did not appear to be any obvious health issues for any of the Green Frogs

5. *Lithobates kauffeldi* (Atlantic Coast Leopard Frog) One adult Atlantic Coast Leopard Frog was found in a tire rut on the trail within Site-6 and was captured. Photographs were taken and this individual appeared to be healthy. This is a newly discovered Virginia Species.

6. *Lithobates sphenocephalus* (Southern Leopard Frog) Fifteen Southern Leopard Frogs were observed during the survey. Three Southern Leopard Frog Tadpoles were captured by dip net from the marshy area within Site-1. Ten Southern Leopard Frog Tadpoles were captured by dip net from a wet area within Site-4. One adult Southern Leopard Frog was observed alongside the swamp within Site-6 was captured and photographed. One young adult Southern Leopard Frog was observed in a tire rut puddle on the trail within Site-7 was captured and photographed. All of the captured animals appeared to be healthy.

7. *Lithobates virgatipes* (Carpenter Frog) A single adult male Carpenter Frog could be heard calling from the beaver pond within Site-3 during the afternoon of 6 May when the turtle and minnow traps were being positioned. A single male was heard calling during the afternoon of 7 May and was later captured by dip net and photographed. It is not known if these were the same specimens and only one individual is recorded in this report.

8. *Pseudacris crucifer* (Spring Peeper) One Spring Peeper tadpole was captured with a dip net from the marsh within Site-1 and appeared to be healthy.

9. *Pseudacris feriarum* (Upland Chorus Frog) Several male Upland Chorus Frogs could be heard calling from the marsh within Site-1 on 23 April. They we not heard during a brief return visit on the afternoon of 7 May.

10. *Ambystoma maculatum* (Spotted Salamander) Seven Spotted Salamander larvae were captured and photographed within Site-6. Two Spotted Salamander larvae were found in a tire rut puddle in the trail and 5 more were observed in a large puddle in the southernmost trail within Site-6. All Spotted Salamander larvae appeared to be healthy.

11. *Ambystoma opacum* (Marbled Salamander) Twenty one Marbled Salamanders were observed within Site-6. One adult Marbled Salamander was found under a log in a predominantly pine forest area and was photographed. Ten Marbled Salamander larvae were found in a tire rut puddle in the trail and were photographed. Ten more were observed in a large puddle in the southernmost trail within Site-6 and were captured. All of the Marbled Salamanders appeared to be healthy.

12. *Desmognathus auriculatus* (Southern Dusky Salamander) One adult Southern Dusky Salamander was observed alongside downed logs near the swamp edge within Site-6. The Southern Dusky Salamander was captured, photographed and appeared to be healthy.

13. *Eurycea cirrigera* (Southern Two-lined Salamander) One adult Southern Two-lined Salamander was found under a log near the creek within Site-2 in the prescribed burn area. The Southern Two-lined Salamander was captured, photographed and appeared to be healthy.

14. *Hemidactylium scutatum* (Four-toed Salamander) One adult Four-toed Salamander was found under a log near the edge of pine forest and an open area within Site-7. The Four-toed Salamander was captured and photographed to document a new Sussex County record. The Four-toed Salamander appeared to be healthy.

15. *Notophthalmus v. viridescens* (Red-spotted Newt) One adult Red-spotted Newt was found under a log at the edge of pine woods and an open area within Site-6. The Red-spotted Newt was captured, photographed and appeared to be healthy.

16. *Plethodon chlorobryonis* (Atlantic Coast Slimy Salamander) Five adult Atlantic Coast Slimy Salamanders were observed during the survey. Two adult Atlantic Coast Slimy Salamanders were found under a large pine tree branch of a downed tree 3 meters from Horse Path trail within Site-5 Three adult Atlantic Coast Slimy Salamanders were observed within Site-7. All were observed under logs; one near the trail, one near the swamp edge and one in an open area. All five adult Atlantic Coast Slimy Salamanders were captured, photographed and appeared to be healthy.

17. *Plethodon cylindraceus* (White-spotted Slimy Salamander) One sub-adult White-spotted Slimy Salamander was found under a log in the prescribed burn area within Site 2. The White-spotted Slimy Salamander was captured and photographed to document a new Sussex County record. The White-spotted Slimy Salamander appeared to be healthy.

18. *Pseudotriton m. montanus* (Eastern Mud Salamander) One adult Eastern Mud Salamander was found under a log at the edge of pine woods and an open area within Site-7. The Eastern Mud Salamander was captured and photographed to document a new Sussex County record. The Eastern Mud Salamander appeared to be healthy.

Reptiles

19. *Carphophis a. amoenus* (Eastern Wormsnake) Three adult Eastern Wormsnakes were observed during the survey. One adult was under a log within Site-1 near Old Lady Lane in an area that had not been burned. Another adult was observed under a log along one of the ancillary paths north of Knob Path in an area where vegetation was recovering from a previous prescribed burn. One adult Eastern Wormsnake was found under a log within Site-6. All of the Eastern Wormsnakes were captured, photographed and appeared to be healthy.

20. *Coluber c. constrictor* (Northern Black Racer) Five adult Northern Black Racers were observed during the survey. All of these observations were within Site-6, two were captured and one was photographed. One adult was observed crossing the road. Two Northern Black Racers were basking, one in an open spot in the woods and the other in an open field near the woods and the parking lot. Two adults were observed fleeing, one into a thicket the other from a basking spot up into a small tree. All of the Northern Black Racers appeared to be healthy.

21. *Heterodon platirhinos* (Eastern Hog-nosed Snake) One adult black phase Eastern Hog-nosed Snake was discovered basking in Knob Path within Site-3, about 2 meters from the recent prescribed burn area north of Knob Path. The snake was heading in a direction away from the burn area. The Eastern Hog-nosed Snake was captured and photographed. After handling a small toad was regurgitated and the death act followed. This Individual appeared healthy with an overall length of approximately 51 cm.

22. *Nerodia s. sipedon* (Northern Watersnake) Two adult Northern Watersnakes were captured in a single minnow trap within the beaver pond south of Knob Path within Site-3. One specimen was much larger than other. Both individuals were photographed and appeared to be healthy.

23. *Storeria o. occipitomaculata* (Northern Red-bellied Snake) One sub-adult Northern Red-bellied snake was found under a charred log about 2 meters into the recent prescribed burn area north of Knob Path within Site-3. The Northern Red-bellied Snake was captured, photographed and appeared to be healthy.

24. *Chelydra serpentina* (Snapping Turtle) An adult Snapping Turtle was observed basking on a log in the beaver pond to the north of Knob Path within Site-3.

25. *Kinosternon s. subrubrum* (Southeastern Mud Turtle) Two adult Southeastern Mud Turtles were observed on the forest floor within Site-6. Both turtles were captured, photographed and appeared to be healthy.

26. *Pseudemys c. concinna* (Eastern River Cooter) The shell of a deceased Eastern River Cooter was found next to a log in the woods by the swamp within Site-6.

27. *Pseudemys concinna floridana* (Coastal Plain Cooter) One large adult Coastal Plain Cooter was discovered crossing Route 604 while traveling from Site-6 to Site-7. The turtle was captured and photographed and appeared to be healthy.

28. *Pseudemys rubriventris* (Northern Red-bellied Cooter). The shell of a deceased adult Red-bellied Cooter was found about ten meters north of Knob Path and about five meters from the beaver pond on the afternoon of 6 May within the recent prescribed burn area. The carapace was substantially cracked and bleached but the plastron retained its color and was fully intact. Although the shell was in the recent prescribed burn area, it was not charred. The remains appeared to have been there for a while.

29. *Sternotherus odoratus* (Eastern Musk Turtle) The bleached shell of an Eastern Musk Turtle was found on the forest floor near the beaver pond on the south side of Knob Path within Site-3.

30. *Terrapene c. carolina* (Woodland Box Turtle) Ten adult Woodland Box Turtles were observed during the survey. Five of these specimens were alive and five were deceased. One adult Male Woodland Box Turtle was observed partially buried on the forest floor next to a tree within Site-2. This large male (carapace length of 13 cm) had some minor damage on one carapace scute. Three healthy adult Woodland Box Turtles were discovered within Site-3 Two adult males were observed on south side of Knob Path near the beaver pond and an adult female was found on the north side of Knob Path near the beaver pond but within the recent prescribed burn area. One healthy adult male Woodland Box Turtle was found basking on the trail within Site-6. This individual was captured, photographed and appeared to be healthy. The faded shells of four adult Box Turtles were discovered within Site-4. The condition of the shells indicated that they had been deceased for a while. Three of the remains were found on the forest floor, one of which was beneath a tree. The last of the remains was found on top of a tree stump. One recently deceased male Woodland Box Turtle was discovered on the afternoon of 6 May north of Knob Path about three meters into the recent prescribed burn area within Site-3. This turtle did not appear to be significantly charred and the spot beneath it was unburned. It appears to have been a victim of the prescribed burn and is depicted below.

31. *Trachemys s. scripta* (Yellow-bellied Slider). An adult female Yellow-bellied Slider was found heading into the recent prescribed burn area about 1 meter from Knob Path. The adult female appeared to be starting to dig a hole. The turtle was captured, photographed, measured (carapace length of 25 cm) and appeared to be healthy.

32. *Sceloporus undulatus* (Eastern Fence Lizard).Two adult Eastern Fence Lizards were observed basking within Ste-7. One was on the ground near the road and the other was basking on a pine tree near the trail.

33. Scincella lateralis (Little Brown Skink) Two adult Little Brown Skinks were observed during the survey. One adult was found under a charred log about 2 meters into the recent prescribed burn area north of Knob Path within Site-3. One adult Little Brown Skink was observed in leaf litter within Site-6.

Discussion

During the two day survey of "BW", the VHS survey groups positively identified more than 107 specimens representing thirty three species (Table 3). There were eighteen species of amphibians (nine frogs and nine salamanders) and fifteen species of reptiles (five snakes, eight turtles and two lizards). Thirty of the thirty three species encountered had been previously documented for Sussex County. Three new county records, *Hemidactylium scutatum* , (Four-toed Salamander), *Plethodon cylindraceus* (White-spotted Slimy Salamander) and *Pseudotriton m. montanus* (Eastern Mud Salamander) were documented. *H. scutatum* had previously been documented in Dinwiddie County adjacent to and west of Sussex County. However, *P. cylindraceus* had not been previously documented from any county adjacent to Sussex. Chesterfield is the closest county with a record for this species. *P. m. montanus* had previously been documented in Surry County adjacent to and northeast of Sussex County. A recently discovered Virginia species, *Lithobates kauffeldi* was also documented in "BW" during the survey.

There were five species, captured and photographed, with a designated conservation status as defined in "Virginia's 2015 Wildlife Action Plan" published by VDGIF ; *Heterodon platirhinos* (Eastern Hog-nosed Snake), *Lithobates virgatipes* (Carpenter Frog) , *Pseudotriton m. montanus* (Eastern Mud Salamander), *Terapene c. carolina* (Woodland Box Turtle) and *Trachemys s. scripta* (Yellow-bellied Slider). *H. platirhinos, P. m. montanus* and *T. s. scripta* have a conservation status of "*Tier lV. Moderate Conservation Need." L. virgatipes* and *T. c. carolina* have a conservation status of *"Tier lll. High Conservation Need."* In addition, VDGIF gives each tiered species a conservation opportunity ranking of **A, B or C.** An **A** ranking indicates "on the ground" species or habitat management strategies have been identified that are expected to benefit this species, at least some of which can be implemented with existing resources and have a reasonable chance of improving the species conservation status. A **B** ranking indicates only research needs have been identified for this species or "on the ground" conservation actions cannot be implemented due to resource constraints. A **C** ranking indicates no "on the ground" conservation actions or research needs that could benefit this species have been identified or all identified conservation opportunities for a species have been exhausted. *L. virgatipes, P. m. montanus* and *T. c. carolina* have an **A** ranking. For each of these species habitat conservation and restoration are underway (wetlands preservation and water quality improvement for the

aquatic species and open canopy forest and meadows preservation for *T. c. carolina)*. *T. s. scripta* has a **B** ranking. Inter-breeding with the non-native subspecies *Trachemys scripta elegans* (Red-eared Slider) threatens the genetic integrity of *T. s. scripta*. Before conservation actions can be identified, more research is required to more fully determine the extent to which *T. s. scripta* and *T.s.elegans* have interbred and to determine if it is feasible to remove and prevent the future introduction of *T. s .elegans*. *H. platirhinos* has a **C** ranking. No threat, research or conservation actions have been identified for this species. Despite its Tier III status, *T. c. carolina* was the most frequently observed reptile during the survey. Five living individuals were captured and five deceased specimens were observed during the survey and were found at four of the seven survey sites. The carapace remains of five adults were found at Site-3 (one) and Site-4 (four). All carapace remains from Site-4 were substantially faded, indicative that mortality was not recent. The recently deceased adult within Site-3 was approximately three meters into the recent prescribed burn area and an apparent victim.

Twelve other species with VDGIF conservation status Tier IV-II, which had previously been documented for Sussex County, were not observed during the survey. These are *Ambystoma mabeei* (Mabee's Salamander), *Anaxyrus quercicus* (Oak Toad), *Cemophora coccinea copei* (Northern Scarletsnake), *Clemmys guttata* (Spotted Turtle), *Farnacia a. abacura* (Eastern Mudsnake), *Farancia e. erytrogramma* (Common Rainbow Snake), *Hyla gratiosa* (Barking Treefrog), *Necturus punctatus* (Dwarf Waterdog), *Pseudacris nigrita* (Southern Chorus Frog), *Pseudacris ocularis* (Little Grass Frog), *Scaphiopus holbrookii* (Eastern Spadefoot) and *Thamnophis s. sauritus* (Common Ribbonsnake).

The portion of Site-2 west of Ellis Path and north of the creek underwent a prescribed burn approximately five weeks prior to the VHS survey of this site on 23 April. Five amphibians (*Acris gryllus, Anaxyrus fowleri, Eurycea cirrigera, Lithobates clamitans* and *Plethodon cylindraceus)* and one reptile species (*terrapene c. carolina)* were documented in this area. All the animals were found either on the forest floor or under logs except for 3 specimens of *L. clamitans,* which were all in the creek. All of the animals appeared to be alive and healthy.

The literature contains contradictory reports on the impact of prescribed burns on amphibian and reptile populations in Virginia. Keyser et al (2004) reported no difference in the relative abundance of all amphibians and reptiles captured in 1996 in unburned and seasonally burned (winter, spring, summer of 1995) oak wood and other hardwood stands within Horsepen Wildlife Management Area in the Virginia Piedmont (Buckingham County). In their study, 133 individuals of ten species were captured over 12,270 pitfall trap nights. Two species of amphibians, *Anaxyrus a. americanus* (Eastern American Toad) and *Plethodon cinereus* (Eastern Red-backed Salamander) were captured in equal abundance in burned and unburned stands. Three species of reptiles, *Sceloporus undulatus, Scincella lateralis* and *Plestiodon inexpectatus* (Southeastern Five-lined Skink) combined were captured more frequently in burned vs. unburned stands.

Mitchell (2000) reported that six species of amphibians and reptiles were found in unburned sections and eight species were found in the still smoldering burnt area of Fort A. P. Hill within the Upper Coastal Plain of Virginia (Caroline County). However, more individual amphibian

specimens were found in the unburned stands (46) compared to the burned stands (15). Adults of two species *Anaxyrus a. americanus* and *Plethodon cinereus* were found dead under logs. Mitchell's survey was conducted immediately after the prescribed burn in comparison with the multi-month time lapse in the Keyser study.

The area within Site-3 to the north of Knob Path west to the beaver pond was burned a few days prior to the 7 May survey. This area was only surveyed in the near proximity (up to 10 meters) to Knob Path. No amphibian species were encountered. A single specimen of five reptile species, *Heterodon platirhinos, Pseudemys rubriventris, Scincella lateralis, Storeria o. occipitomaculata* and *Trachemys s. scripta* was documented. Two specimens of *Terrapene c. carolina* were found. *S. lateralis* and *S. o. occipitomaculata* were found under charred logs about two meters off Knob path. Each appeared to be healthy. *H. platirhinos* was basking on Knob Path about 2 meters from the prescribed burn area heading away from it. The snake regurgitated a small toad as it was being handled. *T. s. scripta* was observed about 1 meter into the burn area and appeared to be starting to dig a nest hole. The deceased remains of *Pseudemys rubriventris* were about 10 meters north of Knob Path near the beaver pond. The carapace was cracked and bleached and death pre-dated the prescribed burn. A healthy adult female *T. c. carolina* was found on the charred forest floor near the beaver pond and a recently deceased adult male *T. c. carolina* was about 3 meters from Knob Path, an apparent victim of the prescribed burn. The ground all around the turtle was charred but there was only minor charring of the turtle remains. The spot beneath the turtle was not charred or burned.

Hingtgen (2000) summarized the observations of park personnel from 14 state parks of southwestern Florida providing anecdotal information on the interaction of wildlife and fire during the period of 1977 t0 1996. Fire associated activities of 7 species of amphibians and 28 species of reptiles were included. Most amphibians observed were fleeing the fire, jumping ahead of the flames or concentrating in wetlands and puddles within the burn zone. None were observed consumed by flames nor were any carcasses observed. Several instances of predation on amphibians were observed during and immediately after burns.

Among the reptiles, several species seemed to suffer inordinately high mortality from fire, or their carcasses were simply more likely to be noticed. Many observations noted that fire killed *Terrapene c. carolina* (70% of box turtle observations). Snakes were most often reported fleeing from fires, sometimes in large numbers. Other observations suggested that some snakes may have been hunting prey flushed by fires. *Thamnophis s. sirtalis* (Eastern Gartersnake) captured and consumed *Anaxyrus terrestris* (Southern Toad) within minutes after a burn and *Coluber constrictor priapus* (Southern Black Racer) did the same with *Hyla cinerea* (Green Treefrog). The *Heterodon platirhinos* observed basking in Knob Path within Site-3 on 7 May could have been similarly opportunistic.

When Site-1 was surveyed on 23 April, there was no evidence of a prescribed burn. Several *Acris* gryllus and *Pseudacris feriarum* calling males could be heard in the marsh area. Site-1 was briefly visited at about 15:00h on both 6 & 7 May to place and retrieve minnow traps. The marsh area had been burned between the survey dates and there were no frog calls heard on either day. The continued use of prescribed burns at BW to expand habitat opportunity for RCW and Long Leaf Pines will also provide a potential opportunity to further research interaction with fire by native Virginia species of amphibians and reptiles.

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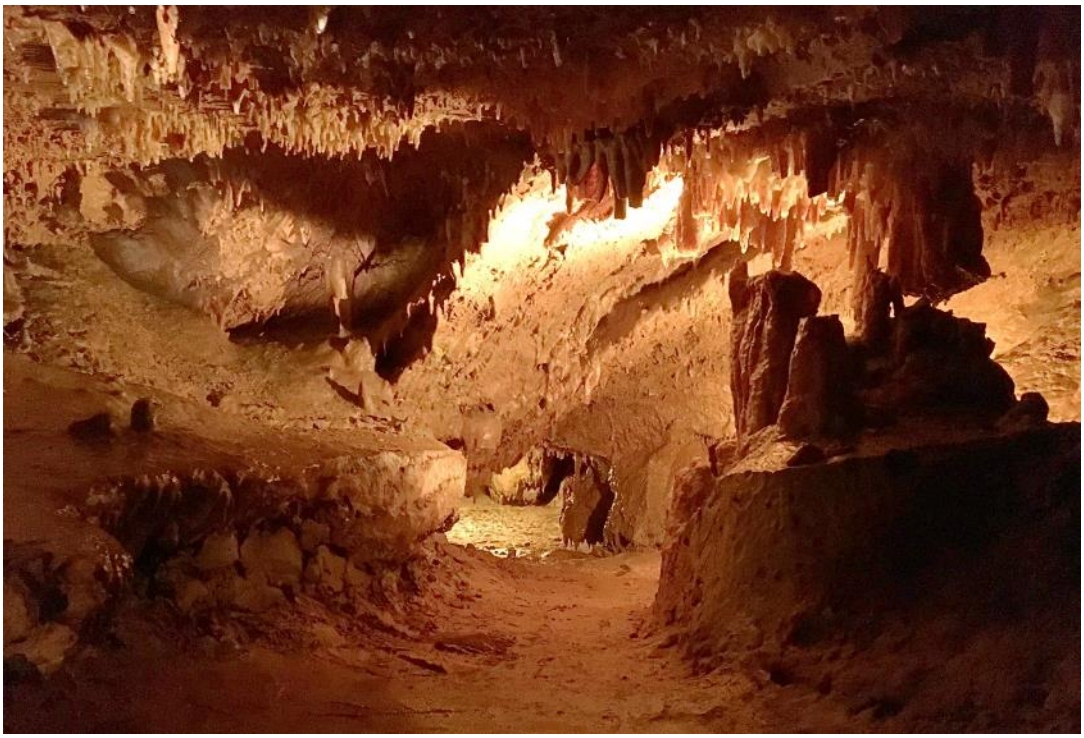
A Herpetological Survey of Dixie Caverns and Explore Park in Roanoke, Virginia and the Wehrle's Salamander



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Introduction

The Virginia Herpetological Society (VHS) Dixie Caverns Survey was held at Dixie Caverns and Explore Park in Roanoke County, Virginia on 24 September 2016. According to legend, Dixie Caverns was discovered in 1920 by two young men after their dog Dixie fell through a hole that led to the caves. In honor of their dog's discovery, they decided to name the caverns Dixie. One of those boys was Bill "Shorty" McDaniel who would later go on to work at the caverns for more than 50 years and was known fondly for his sometimes embellished stories (Berrier, 2014). In actuality, the presence of Dixie Caverns, according to The Roanoke Times, was known as early as 1860 and had been mapped in the early 1900's (Berrier, 2014). Guided tours of the caverns began in 1923 and still occur today with about 30,000 people visiting annually (Berrier, 2014).

Dixie Caverns is located in Roanoke County which is in the Valley and Ridge and Blue Ridge provinces (Mitchell, 1999). A key feature of the Valley and Ridge is karst topography with soluble rocks such as limestone which create caves and caverns when weathered (Tobey, 1985). Over millions of years the caverns were formed as water dissolved the limestone that created

holes and even larger passageways. Many of the rock formations in Dixie Caverns are made of calcite which was formed by dripping water that evaporated leaving behind tiny particles which eventually created stalactites (Berrier, 2014). The cave stays close to 11.5°C year-round with high humidity (Fowler, 1951).

Dixie Caverns was selected as a survey site to see a rare form of *Plethodon wehrlei* (Wehrle's Salamander). *Plethodon wehrlei* was discovered in 1917 by naturalist RW Wehrle in Indiana, Pennsylvania (Fowler and Dunn, 1917). They are a medium-sized woodland salamander attaining a length of 66 mm SVL (Hulse et al, 2001) with 17 costal grooves and webbed hind-feet (Petranka, 1998). They are a brownish-purple salamander with white to cream-colored spots that fuse to form irregular blotches on their flanks (Conant and Collins, 1998). Hatchlings and young *P. wehrlei* often have paired reddish spots on their back that disappear as they age (Mitchell and Gibbons, 2010). Although *P. wehrlei* is pretty widespread throughout northern Appalachia, their habitat is confined to rocks and logs on forested hillsides, especially north facing slopes, and cave entrances (Martof et al, 1980) from elevations as low as 180 m to as high as 1400 m (Petranka, 1998).

In 1949, a new species of salamander was described living only in Dixie Caverns and was named *Plethodon dixi* (Pope and Fowler, 1949) also known as the Roanoke Salamander (Burger, 1958). A paper in 1946 first noted the presence of *P. wehrlei* in Dixie Caverns, which extended their range into the Valley and Ridge Province of Virginia, but didn't mention coloration of the specimens found (Netting et al, 1946). This salamander was described as being similar to *P. wehrlei*, but smaller in size and coloration. Adult males averaged 55 mm snout-vent length (SVL) and this salamander's coloration was a deep purplish-black with bronzy mottling on its back (Pope and Fowler, 1949). Juveniles of this new species lack the paired reddish dorsal spots seen in young *P. wehrlei* (Pope and Fowler, 1949). This new species was only found in the immediate area around the caverns (Pope and Fowler, 1949). A few years later, *P. dixi* was also described as far as 3.86 kilometers (km) east of Dixie Caverns in Blankenship Cave, Roanoke County, Virginia (Fowler, 1951). In 2015, a specimen was seen 18.35 km southeast of Dixie Caverns in Franklin County, Virginia (Figures 1 and 2) out during the day on exposed rocky outcroppings (Alex Bentley, pers. comm.). A few decades after their discovery, *P. dixi* was reduced to a variant of *P. wehrlei* based on pattern variability across the range (Highton, 1962) and later by modal number of trunk vertebrae (Highton, 1972).

Figure 1. Dorsum of a Dixie Cavern variant of *P. wehrlei*

Figure 2. Diurnal activity and habitat of Dixie Cavern variant of *P. wehrlei*

Explore Park is a 450 ha park in the eastern part of Roanoke County that opened in October 2013. There are over 22.5 km of trails that wind through sloping wooded forests and numerous streams. Explore Park is also right off the Blue Ridge Parkway. This park is owned and maintained by the County of Roanoke.

Study Sites

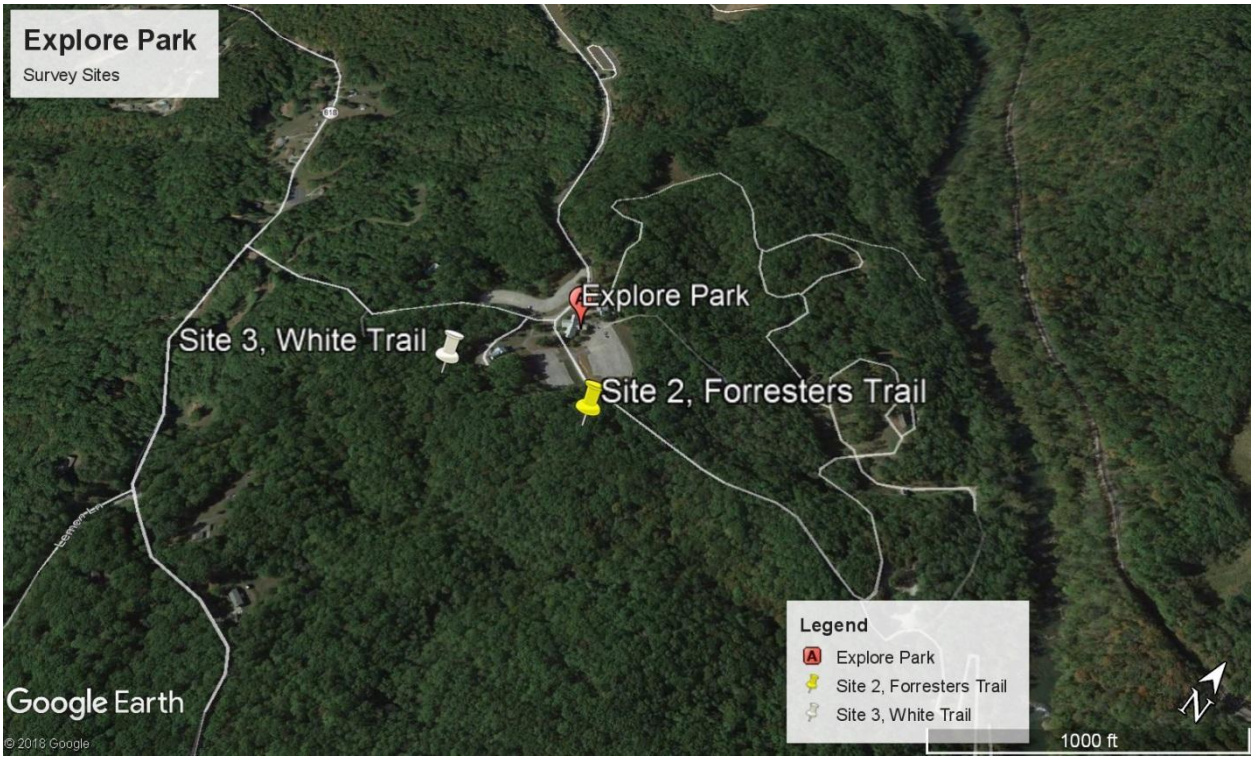
There were three study sites. Site 1 was at Dixie Caverns and Sites 2 and 3 were at Explore Park (Figure 3).

Site 1 – Dixie Caverns (37°15’9”N, 80°10’34”W)
This site was Dixie Caverns. There were rocky outcroppings, cave formations, seeps, and small pools.

Site 2 – Forresters Trail, Explore Park (37°14’13”N, 79°51’7”W)
This site was an upland forest that went down a ravine and had small streams, rocky outcroppings, and a small spring house.

Site 3 – White Trail, Explore Park (37°14’18”N, 79°51’12”W)
This site was an upland forest that went down a ravine and had small streams and a pond.

Figure 3. Map showing the survey area of Explore Park



Materials and Methods

On Saturday 24 September 2016, 15 participants were together as one group during the morning survey conducted at Dixie Caverns. For the afternoon portion of the survey at Explore Park, participants were divided into two groups of seven persons each. Once at the survey sites, methods used to find animals included hand capture, visual observation, listening for calling frogs, and flipping over cover objects. Each species was photographed as a voucher specimen and animals with abnormal patterning, signs of disease, or injury were especially noted. Group leaders were tasked with recording all observations on standardized recording sheets which included information on: the physical environment, weather, animal health, and microhabitat. Other data collected included morphometric measurements of rare species, age, and sex. Site 1 was surveyed in the morning from 0930hr – 1040hr. Sites 2 and 3 were surveyed in the afternoon from 1230hr – 1530hr (see Table 1 for amount of survey effort expended at each site).

Table 1. The amount of survey effort per site for the Dixie Caverns and Explore Park Survey.

	Site 1	Site 2	Site 3	**Total**
No. Surveyors	15	7	7	-
Hours Surveyed	1.0	3.0	3.0	-
Person Hrs of Survey effort	15.0	21.0	21.0	**57.0**

Results

There were 15 participants in attendance for the Dixie Caverns portion of the survey and 14 participants for the survey at Explore Park. Over 300 individual animals of 19 species of herpetofauna were documented on 24 September 2016, as noted in Table 2.

Table 2. Summary of the number of amphibians and reptiles observed at each site.

Sites	**1**	**2**	**3**	**Total**
Amphibians				
Anaxyrus americanus		1		1
Desmognathus fuscus		5		5
Desmognathus monticola		5	7	12
Eurycea cirrigera		4, 2†	2	8
Lithobates clamitans		1	6, 200†	207
Lithobates sylvaticus			3	3
Notophthalmus viridescens viridescens			1	1
Plethodon cylindraceus		1		1
Plethodon glutinosus		3		3
Plethodon wehrlei	60			60
Pseudacris crucifer		1*		1
Pseudotriton ruber ruber		4†	1	5
Reptiles				
Carphophis amoenus		2	1	3
Nerodia sipedon		2		2
Pantherophis alleghaniensis	1			1
Plestiodon spp.		1	2	3
Sceloperus undulatus		1		1
Terrapene carolina			2	2
Total:	**61**	**33**	**224**	**319**

†larvae, *auditory

Amphibians

1. *Anaxyrus americanus* (American Toad) An adult *A. americanus* was found in the open, foraging in a ravine leading to a small stream.

2. *Desmognathus fuscus* (Northern Dusky Salamander) Five *D. fuscus* were found at site 2 in a stream under small rocks.

3. *Desmognathus monticola* (Seal Salamander) Twelve *D. monticola* were found at sites 2 (5) and 3 (7) respectively. All individuals were found in a small stream under rocks.

4. *Eurycea cirrigera* (Southern Two-lined Salamander) Six adult *E. cirrigera* were noted at sites 2 and 3 under rocks in a stream and under logs approximately 30 m from a stream, respectively. One individual at site 3 was missing its entire tail. Two larval specimens were noted in a stream at site 2.

5. *Lithobates clamitans* (Green Frog) Seven adult *L. clamitans* were noted at both sites 2 and 3 under a rock in a headwater stream and at the edge of a pond, respectively. Approximately 200 tadpoles were noted at site 3 in a pond as well.

6. *Lithobates sylvaticus* (Wood Frog) Three adult *L. sylvaticus* were observed at site 3 in a ravine approximately 20 m from the bottom.

7. *Notophthalmus viridescens viridescens* (Red-spotted Newt) A juvenile *N. v. viridescens* was noted under a log at site 3. This individual was the terrestrial eft form under 2.5 cm total length.

8. *Plethodon cylindraceus* (White-spotted Slimy Salamander) Three adult *P. cylindraceus* were noted under logs on NE and SW facing slopes leading to a stream. One adult had a prominent mental gland. Another individual was in the process of regenerating its tail. Note the light gray/white chin.

9. *Plethodon glutinosus* (Northern Slimy Salamander) An individual adult female *P. glutinosus* was noted at site 2 under a log on a slope leading to a stream on a NE facing slope. Note the black chin.

10. *Plethodon wehrlei* (Wehrle's Salamander) 60 *P. wehrlei* were observed at site 1 in the "Cascades" formation and the "Bat Room" areas of Dixie Caverns. Salamanders of varying age classes were observed out and in the rock formations of the cave. Most of the area that the

salamanders were observed was fairly wet, but lacked standing water.

11. *Pseudacris crucifer* (Spring Peeper) One *P. crucifer* was heard calling at the end of the trail at site 2. The call was heard several times by the whole group at approximately 1500 hrs. The frog was calling from the canopy of the forest; no water was nearby.

12. *Pseudotriton ruber ruber* (Northern Red Salamander)
One adult and 4 larval *P. r. ruber* were noted at sites 3 and 2 respectively. The 5 cm adult was found under a log approximately 25 m from a ravine stream. The four larval *P. r. ruber* were found under rocks in a stream.

Reptiles

13. *Carphophis amoenus* (Eastern Wormsnake) Three *C. amoenus* were noted at both sites 2 and 3. At site 2 two were found under cover objects in a ravine, and at site 3 one was found under a rock with termites.

14. *Nerodia sipedon* (Northern Watersnake) Two juvenile *N. sipedon* were noted at site 2. One individual was found under a rock in a small stream and the other was seen under an embankment further upstream.

15. *Pantherophis alleghaniensis* (Eastern Ratsnake) One juvenile *P. alleghaniensis* was noted at the entrance of the cavern at site 1. It was active and climbing on the rock formations.

16. *Plestiodon spp.* (Common Five-lined Skink, Southeastern Five-lined Skink) Two *Plestiodon spp.* were noted at sites 2 and 3. At site 2, an adult individual was seen sunning on a log and scampered away when the group approached. At site 3, a juvenile was seen basking on a log. Neither individual was apprehended for a closer inspection of scalation.

17. *Sceloperus undulatus* (Eastern Fence Lizard) An adult *S. undulatus* was observed basking on a tree towards the end of the trail at site 2.

18. *Terrapene carolina* (Eastern Box Turtle) Two adult males were seen on the forest floor at site 3.

Discussion

Dixie Caverns in Roanoke County, Virginia was a neat place to do a herpetological survey due to its unique location and its rare variation of *P. wehrlei* found within the cavern. Explore Park, also in Roanoke County, was the second location of this survey. This park was chosen due to its proximity to Dixie Caverns as well as the potential for cave dwelling species being found above ground around rocky outcroppings within the park. Explore Park had a number of habitats such as upland forests, rocky outcroppings, streams, ponds, and an open field. The Virginia Herpetological Society's database for Roanoke County shows that there are 40 species of herpetofauna documented, 20 species of amphibians and 20 species of reptiles (VHS Herp Database).

The Dixie Caverns Survey was the second herpetological survey to occur in Roanoke County, Virginia. The first time was at the Haven's Wildlife Management Area (HWMA) in March 2010 - October 2011 (Bentley, 2012). The HWMA is located in the north central part of Roanoke County, 8 km northeast of Dixie Caverns. The HWMA survey was conducted over a period of several months and documented 10 species of amphibians and 16 species of reptiles (Bentley, 2012).

Dixie Caverns is located in the northwestern part of Roanoke County. During the first portion of the survey, the only amphibians that were encountered were *P. wehrlei*. Salamanders were found on the rock formations of the "Cascades", the same area where they were found by James A. Fowler back in 1946; although *P. wehrlei* did not occur in densities as high - Fowler described seeing as many as 322 individuals in this area (Fowler, 1951). Salamanders were also found in decent numbers in the "Bat Room" (Tyler Hall, pers. comm.), but they were found more sporadically than around the "Cascades" formation. Although other species of salamanders have not been documented in Dixie Caverns (Fowler, 1951), it was surprising not to see normal cave-dwelling species such as *Gyrinophilus porphyriticus porphyriticus* (Spring Salamander), *Eurycea longicauda* (Long-tailed Salamander), and *Eurycea lucifuga* (Cave Salamander), especially since several pools seen within the cave would have been suitable for larvae.

Explore Park is located in the southeastern part of Roanoke County at 330 m elevation. Explore Park is on the opposite side of Roanoke County from Dixie Caverns and HWMA. Seventeen species of reptiles (5) and amphibians (12) were found at Explore Park, however many more species were expected. According to the VHS Database there are 17 herp species (2 lizards, 4

snakes, 3 frogs, and 8 salamanders) that have not been verified in Roanoke County and are common elsewhere in the state.

There are two species of lizard suspected in Roanoke County. One of them, *Scincella lateralis* (Little Brown Skink) has not been documented in Roanoke County, although it is expected (VHS database). It is found in neighboring Bedford County to the east and Franklin County to the south (VHS database). *Aspidoscelis sexlineata sexlineata* (Eastern Six-lined Racerunner) is found in neighboring Bedford County to the east and Botetourt County to the northeast (VHS database). There was ample habitat for both of these lizards in the western part of site 2, leaf litter and detritus for foraging and basking areas (Conant and Collins, 1998).

There were four snakes that have been found in counties surrounding Roanoke, but have not been documented in Roanoke County yet. *Lampropeltis getula* (Eastern Kingsnake) is in nearby Bedford County to the east and Floyd County to the south (VHS database). The habitat for *L. getula* is the edges of wooded areas under cover objects such as logs and boards. They can also be found in moist areas near marshes and swamps (Linzey and Clifford, 1981). Open fields close to wooded areas were seen at the end of the Forresters Trail at site 2. *Storeria dekayi dekayi* (Northern Brownsnake) is found to the north in Botetourt County and to the east in Bedford County (VHS database). *Storeria occipitomaculata occipitomaculata* (Northern Red-bellied Snake) is found in Franklin County to the south and Botetourt County to the north (VHS database), but has not been documented in Roanoke County. The habitat for both *S. d. dekayi* and *S. o. occipitomaculata* is damp cover objects such as logs, boards, and rocks in wooded areas (Linzey and Clifford, 1981) which is similar to habitat seen at sites 2 and 3. *Thamnophis sauritus sauritus* (Common Ribbonsnake) is found in nearby Botetourt County to the north and Montgomery County to the southwest (VHS database), but hasn't been documented yet in Roanoke County. *Thamnophis s. sauritus* can be found in grasses and branches close to the water's edge of ponds and boggy areas (Linzey and Clifford, 1981) which is present at site 3 and other trails within Explore Park that were not surveyed.

Three species of frogs were expected to be encountered and haven't been documented in Roanoke County; they are: *Acris crepitans* (Eastern Cricket Frog), *Anaxyrus fowleri* (Fowler's Toad), and *Hyla versicolor* (Gray Treefrog). *Acris crepitans* has been found in Botetourt County to the north and is expected to be found in Montgomery County to the southwest (VHS database). There is suitable habitat at sites 2 and 3 and the many creeks around Explore Park. Other sites that were not surveyed have vegetation surrounding wetlands which is ideal habitat for this species (Martof et al, 1980). *Anaxyrus fowleri* has also been found in Botetourt to the north and Montgomery to the southwest (VHS database). Moist woodland and vernal pool areas that this species prefers (Conant and Collins, 1998) were found at site 3 and also expected in other areas within Explore Park. *Hyla versicolor* has been found in the neighboring counties of Montgomery, Franklin, Bedford, Botetourt, and Craig (VHS database), but has not been documented in Roanoke County. Their preferred habitat is shrubs or small trees near a shallow body of water (Conant and Collins, 1998) which was seen in site 3 and other parts of the park that were not surveyed.

There were eight species of salamanders that were expected to be found at both sites 2 and 3, but were not documented. *Hemidactylium scutatum* (Four-toed Salamander) is a woodland species that breeds in boggy vernal pools, usually associated with sphagnum (Conant and Collins, 1998). Although breeding areas for this species was not documented at sites 2 or 3, Explore Park had appropriate woodland habitat to uncover this species. *Hemidactylium scutatum* is found in five counties neighboring Roanoke: Montgomery, Floyd, Franklin, Botetourt and Bedford (VHS database).

The next two species of salamanders that have not been documented in Roanoke County belong to the family Ambystomatidae that are hard to document outside of their breeding season (Conant and Collins, 1998). *Ambystoma jeffersonianum* (Jefferson Salamander) breeds in the early spring and *Ambystoma opacum* (Marbled Salamander) breeds in the early fall (Conant and Collins, 1998). Both of these species occur in wooded forests and are seen during their breeding seasons in and near vernal pools or slow moving bodies of water (Mitchell and Gibbons, 2010). Both *A. jeffersonianum* and *A. opacum* are found in counties surrounding Roanoke County: Craig, Botetourt, and Montgomery (VHS database).

The next five species that are thought to be found in Roanoke County are stream-dwelling salamanders in the genera *Desmognathus* and *Eurycea*. Four of these species, *Desmognathus ochrophaeus* (Allegheny Mountain Dusky Salamander), *Desmognathus orestes* (Blue Ridge Dusky Salamander), *Desmognathus quadramaculatus* (Black-bellied Salamander), and *Eurycea guttolineata* (Three-lined Salamander), can be found under logs and rocks near and in streams (Petranka, 1998) which are present at sites 2 and 3. Another species within *Eurycea* thought to be found in Roanoke County is *Eurycea lucifuga* (Cave Salamander) which is found in cave entrances and deep within caves (Petranka, 1998) found at sites 1 and 2. *Desmognathus ochrophaeus* and *D. orestes* are species that closely resemble one another (Mitchell and Gibbons, 2010). *Desmognathus ochrophaeus* is found in two counties that surround Roanoke County, Craig to the north and Montgomery to the west (VHS database), while *D. orestes* is found in Floyd County to the south (VHS database). It is likely that an individual encountered would be *D. ochrophaeus* since Roanoke County is in the middle of its range, while for *D. orestes*, Roanoke would be the northernmost county of its range in Virginia (VHS database). It would not be a stretch to find *D. quadramaculatus* in future surveys as five counties that surround Roanoke have reported sightings: Craig, Montgomery, Floyd, Franklin, and Bedford (VHS database). *Eurycea guttolineata* is found in neighboring counties to the east: Floyd, Franklin, and Bedford (VHS database), a sighting in Roanoke County would not be surprising, but would be a range extension west. *Eurycea lucifuga* is found in neighboring Craig and Botetourt Counties (VHS database) to the west; the sighting in Botetourt County is very close to the border shared with Roanoke County, a county record would not be out of the realm of possibility. Additional surveys of Roanoke County could uncover these 17 undocumented species.

Other Variations and Future of *Plethodon wehrlei*

Plethodon dixi (Roanoke Salamander) is not the only variation of *P. wehrlei*. Two other forms of *P. wehrlei* have been found since the description of *P. dixi*. Newman (1954) found a similar type of salamander resembling *P. wehrlei* that was bluish-black with orange-red spots on its back in its adult form; this new species was named *Plethodon jacksoni* (Figure 4). This color-form was

only found around the Blacksburg area of Virginia and was also known as the Blacksburg Salamander (Burger, 1958). This species was also small like *P. dixi* with an average SVL of 57 mm (Newman, 1954). Similar to the fate of *P. dixi*, *P. jacksoni* was reduced to *P. wehrlei* based on variable coloration throughout the range of Wehrle's Salamander (Highton, 1962) and later separated from *P. punctatus* by the number of trunk vertebrae (Highton, 1972). It should be noted that genetic work has not been done to confirm this.

Figure 4. *Plethodon wehrlei* from Southwestern Virginia showcasing the red spots on its back similar to the *P. jacksoni* form Newman described.

Additionally, in 1983 another color form of *P. wehrlei* was discovered. This variant was described as brown with two rows of irregular, yellow spots down its back (Figure 5). It was a smaller size, like the Dixie Caverns variant, with adults measuring 55 mm SVL (Cupp and Towles, 1983). Its habitat is shale-rock cliffs in West Virginia and Kentucky. Since then additional disjunct populations have been discovered in other parts of West Virginia (Highton, 1987)(Waldron et al, 2001), Tennessee (Redmond and Jones, 1985) and North Carolina (Beane and Somers, 1994)(Beane et al, 2001).

Figure 5. *Plethodon wehrlei* from Kentucky showcasing paired yellow spots.

These different types of *P. wehrlei* have been lumped together via number of trunk vertebrae (Highton, 1972), but the difference in habitat, coloration, and size show stark differences.

Habitat: *Plethodon wehrlei* is found in forested hillsides and caves (Martof et al, 1980), *P.* "*dixi*" in and around limestone caves near Roanoke County (Pope and Fowler, 1949), *P.* "*jacksoni*" around cave entrances near Montgomery County (Newman, 1954), and the yellow-spotted variant in shale-rock cliffs and outcroppings (Cupp and Towles, 1983).

Coloration: *Plethodon wehrlei* is brownish-purple with white to cream-colored flecks on its sides that usually fuse together to form continuous blotches (Petranka, 1998), *P. "dixi"* is a purplish-black salamander with profuse bonzey mottling on its back (Pope and Fowler, 1949), *P. "jacksoni"* is bluish-black with orange-red spots on its back (Newman, 1954), and the yellow-spotted variant is a brown salamander with two rows of yellow spots (Cupp and Towles, 1983).

Size: *Plethodon wehrlei* averages 66 mm SVL (Hulse et al, 2001), *P.* "*dixi*" averages 52 mm SVL (Pope and Fowler, 1949), *P.* "*jacksoni*" averages 57 mm SVL (Newman, 1954), and the yellow-spotted variant averages 52 mm SVL (Cupp and Towles, 1983).

These numerous differences should warrant a second look at speciation within *P. wehrlei*. Highton et al. (2012) looked at the genetic differences between five populations of the *P. wehrlei* group: four *P. wehrlei* from different locales and *P. punctatus*. The DNA sequencing from that study indicated that *P. wehrlei* from Southwestern Virginia (formerly *P. "dixi"* and *P. "jacksoni"*) were different from other populations of *P. wehrlei* and cluster more closely with *P. punctatus* (Highton et al, 2012). It was suggested that an allozyme study be completed for this group to determine if unrecognized species exist (Highton et al, 2012). At the time of press a larger study was published analyzing the taxonomy of *P. wehrlei*. This study suggested a modest split of *P. wehrlei* would be to recognize *P. dixi* as a separate species and suggested further work be completed looking at the distinction of the southern population of *P. wehrlei* from the northern population (Kuchta et al, 2018). It should read: It is a neat time to be interested in a species that has had little taxonomic interest since *P. punctatus* was split from *P. wehrlei* in 1972.

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A Herpetological Survey of Mole Hill in Rockingham County, Virginia

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Introduction

The Virginia Herpetological Society (VHS) Mole Hill Survey was held at Mole Hill in Rockingham County, Virginia on 14 May 2017. This was the first herpetological survey held at this site (Gerald Knicely, pers comm). There were several different types of habitat on Mole Hill: rocky outcrops, upland forests, forested hillsides, and open meadows. The plethora of habitats are optimal for documenting different species of herpetofauna. Mole Hill is 18.6 hectares of privately owned land that is protected through a conservation easement with the Virginia Outdoors Federation (Kelly, 2012). The parking area was at 476 m elevation and the summit was just over 580 m.

Mole Hill was selected as a survey site because of its unique geology, being an extinct volcano. The last time Mole Hill erupted was over 46-48 million years ago (Kelly, 2012). Mole Hill is located in the Valley and Ridge province of Virginia (Fleming, 2016). Key features of the northern and central Ridge and Valley Province are shale ridges and knobs with limestone and karst formations below (Mitchell and Reay, 1999). Mole Hill is a unique area in this province because it is made of a type of rock called basalt, which forms due to cooling magma, and stands taller than the surrounding valley of limestone (Brent, 1960). These type of rocks can also be found in the nearby Shenandoah Mountains and Blue Ridge (Sherwood, n.d.), which is also home to endemic salamanders. While it is not thought there is a new species of salamander there, it is possible some of the local salamanders may have adapted to live in this unique environment. Mole Hill is owned and maintained by Mole Hill Bikes in Dayton, Virginia.

Study Site

Site 1 – Mole Hill (38°27'8.6"N 78°57'7.3"W)
This site started in the parking area and followed the road up to the summit and back down the other way. The Trail used is seen in Figure 1 below.

Figure 1. Map showing area surrounding Mole Hill and survey path

Materials and Methods

On Sunday, 14 May 2017 survey participants were together as one group for the entirety of the survey. Methods used to find animals included hand capture, visual observation, and flipping over cover objects. All animals were photographed as voucher specimens and animals with signs of disease, or injury were especially noted. Group leaders filled out survey data sheets to record all animals encountered on standardized recording sheets. Data sheets included information on: the physical environment, weather, animal health, and microhabitat. Other data collected included morphometric measurements of rare species, age, and sex. Site 1 was surveyed from 0945hr – 1345hr (see Table 1 for amount of survey effort expended at each site).

Table 1. The amount of survey effort per site for the Mole Hill Survey.

	Site 1
Number of Surveyors	13
Hours Surveyed	4
Person Hours of Survey effort	52

Results

There were 13 participants in attendance for the Mole Hill Survey conducted 14 May 2017 with a total of 52 person hours. Over 140 individual animals of 3 species of herpetofauna were documented (see Table 2). A pre-survey was conducted of the same survey site on 15 April 2017 by 4 participants for a total of 13 person hours; and 132 animals were observed (130 *Plethodon cinereus* and 2 *Thamnophis sirtalis sirtalis*). The results from the pre-survey are not included in Table 2.

Table 2. Summary of the number of amphibians and reptiles observed at each site.

	Total
Amphibians	
Plethodon cinereus	138
Reptiles	
Diadophis punctatus edwardsii	1
Thamnophis sirtalis sirtalis	2
Total:	**141**

Annotated Checklist

Amphibians

1. Plethodon cinereus (Eastern Red-backed Salamander) A total of 138 *P. cinereus* were found under cover objects such as boards, logs, and rocks throughout the study site.

Reptiles

2. *Diadophis punctatus edwardsii* (Northern Ring-necked Snake) One *D. p. edwardsii* was found under a log while leading up to the summit.

3. *Thamnophis sirtalis sirtalis* (Eastern Gartersnake) Two *T. s. sirtalis* were noted heading up towards the summit. One individual was basking and another was seen slithering away.

Discussion

Mole Hill is an 18.6 hectare privately owned site in Rockingham County, Virginia. What is neat about this site is that it is an extinct volcano that last erupted 49-47 million years ago (Kelly, 2012). Mole Hill is made up a metamorphic rock which is different from the surrounding limestone valley (Brent, 1960). There was a variety of habitats at Mole Hill such as: upland forests, forested hillsides, rocky outcroppings, and an open meadow at the summit. This was the first herpetological survey conducted at Mole Hill, however the area is frequently used by the Geology Department at James Madison University (JMU) (Gerald Knicely, pers comm).

Rockingham County has been surveyed before by Harry Jopson of the VHS from 1936-1984 (Jopson, 1984). Over the course of 48 years Jopson documented over 50 species of herps: 11 anurans, 17 salamanders, 5 turtles, 2 lizards, and 15 snakes (Jopson, 1984). He surveyed a majority of the land in the county from rivers around 270 meters in elevation to mountains above 1200 meters. It should be noted that Jopson found *Pituophis melanoleucus melanoleucus* (Northern Pine Snake), which is now believed to be extirpated from Virginia (Tobey, 1985). Mitchell also mentions the Rockingham population of *P. m. melanoleucus* and lists it as unvouchered (Mitchell, 1994). Also, of the 17 salamanders Jopson found, one was *Desmognathus monticola jeffersoni* (Virginia Seal Salamander) which is not currently recognized today. The Virginia Seal Salamander was thought to be a different subspecies of the Seal Salamander based on a difference in color that is unique to the region of the Shenandoah River where they were believed to be geographically isolated (Hoffman, 1951). Petranka mentions this subspecies under his account of *D. monticola* and does not agree with the designation based off dorsal patterning since their pattern is variable throughout their range (Petranka, 1998).

It was surprising that only three species of herps were documented at the Mole Hill Survey when there has been over 55 species of herpetofauna observed in Rockingham County, Virginia (VHS Database). There was ample habitat for basking reptiles and plenty of moist, shaded habitat for salamanders in the genus *Plethodon*. That being said, there were not any bodies of water such as creeks, seeps, or ponds, so that could eliminate the possibility of observing stream-dwelling salamanders and aquatic turtles.

As mentioned, Rockingham County has a pretty robust number of herp species documented. It can be assumed that because of Rockingham's proximity to the City of Harrisonburg and to James Madison University many species have already been documented, however there are still a few species to be observed. One is *Anaxyrus fowleri* (Fowler's Toad). Although there was not any breeding habitat observed at Mole Hill, nearby properties had farmland which contained ponds that would be suitable for amphibian breeding. *Anaxyrus fowleri* has been documented in the surrounding counties of: Augusta, Albemarle, Page, and Shenandoah. It should be noted, Jopson confirmed this species in Rockingham County (Jopson, 1984), but there is a possibility it was unvouchered. Another species that is thought to be in Rockingham, but is still not documented is *Plestiodon fasciatus* (Common-Five Lined Skink). There was abundant habitat for this species at the summit of Mole Hill as well as open sunny patches along the trail leading to the summit. *Plestiodon fasciatus* can be found in nearby Augusta, Albemarle, Greene, and Shenandoah counties. Another species that went undiscovered in Rockingham until late last year is *Virginia valeriae valeriae* (Eastern Smooth Earthsnake). Jopson noted that although he had not

observed *V. v. valeriae* over 30 years ago, he assumed it to exist in Rockingham County (1984) and it was finally found in a garden in Rockingham County (Bolgiano, 2017). Future surveys in Rockingham may uncover the fairly widespread *A. fowleri* and *P. fasciatus*.
A fair number of the *P. cinereus* found at this site were noted having an interesting reddish-brown coloration during the survey 14 May 2017. Similarly, an odd coloration was noted on a number of *P. cinereus* during the pre-survey on 15 April 2017. These *P. cinereus* were brown and had a greenish iridescence. This greenish iridescence may have been apparent on the pre-survey and not the actual survey possibly due to excess light from the leaves on the trees having not grown in yet. Also an interesting note, the two main color-phases of *P. cinereus* (the red-striped form and the un-striped lead-back form) found were at the roughly the same proportions on both the pre-survey (80:50) and the survey (86:51); around 62% were the red-striped form. Although *P. cinereus* was found in these ratios at this site, they vary widely from locality to locality. In some studies there have been as many as 85% red-striped variants in a population (Highton, 1959) where other localities see as many as 71% unstriped morphs (Burger, 1935). Highton has found that their pattern has a genetic basis, but how these multiple genes interact and how they are affected by environmental factors remains to be seen (Highton, 1974). Some studies have shown differences in behavior between the two morphs, such as habitat preference (Moreno, 1989) and predator responses (Venesky and Anthony, 2007). Moreno found that dryer, warmer habitats supported more unstriped variants, whereas cooler, wetter habitats supported more striped variants (Moreno, 1989). This could support why there were more red-striped variants found than lead-backed forms. Venesky and Anthony found that red-backed variants tended to stay motionless and postured versus their lead-backed counterparts that were more likely to flee when faced with a snake predator. That study also observed that the lead-backed forms tended to have their tails in the process of regenerating in the wild more than the red-backed counter parts (Venesky and Anthony, 2007). Could this suggest the presence of salamander-consuming snakes influence the color ratios of *P. cinereus* in the wild as well? Although *P. cinereus* are fairly common salamanders, there is still much more to be learned about them.

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An investigation of co-infection by *Batrachochytrium dendrobatidis* and *Ranavirus* (FV3) in anurans of two natural areas in Anne Arundel County, Maryland and Fairfax County, Virginia, USA.

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Introduction

Since the 1980s, amphibian populations have experienced global population declines and extinctions (Skerratt et al., 2007; Robert, 2010). Enigmatic events, including the emergence and spread of infectious diseases, are associated with many of these recent declines (Daszak et al., 2003; Stuart et al., 2004; Bielby et al., 2008; Olson et al., 2013). Globally-occurring mass mortality events of amphibians have been associated with two pathogens in particular: the chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*), and ranaviruses (specifically *Ranavirus* type species Frog Virus 3 [hereafter FV3]; Chinchar, 2002; Fox et al., 2006; Lips et al., 2006; Haislip et al., 2011; Echaubard et al., 2016). Both *Bd* and the ranaviruses are listed as notifiable pathogens by the World Organization for Animal Health (OIE, 2008; Echaubard et al., 2016).

Bd and ranaviruses are both known to occur globally, and across broad geographic and host ranges (Schock et al., 2010; Bancroft et al., 2011; Miller et al., 2011). Data indicate that *Bd* is widespread and often highly prevalent in the mid-Atlantic United States and that it often occurs without concomitant population declines (Longcore et al., 2007; Grant et al., 2008; Rothermel et al., 2008; Pullen et al., 2010; Lannoo et al., 2011; Petersen et al., 2016; Fuchs et al., 2017; Tupper et al., 2017). Conversely, data on FV3 in mid-Atlantic amphibians are limited. However, FV3 infections in this region have been documented, and have also been associated with localized mortality events and declines (Petranka et al., 2003; Harp and Petranka, 2006; Schock et al., 2009; Davidson & Chambers, 2011; Hoverman et al., 2012; Fairfax County Park

Authority, 2015; Duffus et al., 2015). Although deficiencies in FV3 data may be due to sparse sampling, it may also reflect the disease's biology. FV3 is highly virulent and can cause > 90% mortality in some cases (Green et al., 2002). This virulence can make sub-lethal infections difficult to detect, as deceased frogs may be less conspicuous and/or available for sampling (Harp and Petranka, 2006).

Bd and *Ranavirus* FV3 have been found to co-occur and co-infect individual hosts in various habitats (Whitfield et al., 2013; Warne et al., 2016; Rosa et al., 2017). Throughout North America, co-occurrence of *Bd* and FV3 has been reported in a number of aquatic communities. However, concurrent infections within an individual host has not yet been demonstrated *in situ* (Fox et al., 2006; Hoverman et al., 2012; Souza et al., 2012; Whitfield et al., 2013). Although data on concurrent infection are limited, it is suspected that the pathogens interact synergistically, promoting greater infection intensity and disease progression within the host due to the initial immunocompromising-effects from the primary invading pathogen (Garyfer et al., 2012; Warne et al., 2016). The objective of our study was to determine whether infection by these pathogens (both *Bd* and FV3) was occurring concurrently in anurans at two natural areas in Virginia and Maryland where *Bd* is known to occur (*see* Fuchs et al., 2017; Tupper et al., 2017). We also aimed to provide baseline data on rates of FV3 infection across anuran species of the mid-Atlantic that could be incorporated into a growing body of literature on FV3 infection.

Methods

We collected samples at the Smithsonian Environmental Research Center (hereafter SERC; 38°53'17.41"N; 76°33'15.52 W) in Anne Arundel County, MD (for more about SERC, *see* Tupper et al., 2016), and at Huntley Meadows Park (hereafter HMP; 38°45'36.57" N; 77°05'44.13" W) in Fairfax County, Virginia (for more about HMP, *see* Tupper et al., 2017) between 13 March and 25 September 2016. Following Virginia Herpetological Society biosecurity protocols (VHS, 2016), we opportunistically hand-captured and sampled anurans at various locations throughout each study site. To sample for FV3, we chose a minimally-invasive method that has previously been used to detect the virus (Driskell et al., 2009; Gray et al., 2009; Pessier and Mendelson, 2010; Miller et al., 2015). This method consisted of collecting epithelial cells of the oropharyngeal region by circling the swab along the tongue, roof and sides of the mouth, and the pharynx (San Diego Zoo ICR, 2016). All swabs were stored in 1.5 mL microcentrifuge tubes and kept frozen until molecular analyses could be performed. To sample for *Bd*, we swabbed several skin surfaces (following methods of Hyatt et al., 2007) using a sterile dry swab (no. MW113, Medical Wire and Equipment Company, Durham, NC).

DNA was eluted from each swab using the Purification of Total DNA from Animal Tissues protocol (Qiagen®, Valencia, CA). To assay for FV3, we prepared a PCR master mix which contained 10µL SSo Advanced™ universal probes supermix (Bio-Rad, Hercules, CA), 2µL eluted DNA, 0.6 µL forward primer, 1.8µL reverse primer (Mao et al., 1996), 0.5 µL MGB probe, and 5.1µL sterile water, for a 20µL reaction total (Brunner and Collins, 2009). We

included DNA elusion and amplification positive and negative controls with each PCR run. We amplified the DNA using a CFX96 Touch™ Real-Time PCR Detection System (Bio-Rad, Hercules, CA). We ran samples at 95°C for 15 minutes, followed by 40 cycles of 95°C for 15 seconds, 54°C for 30 seconds, and 72°C for 15 seconds. We performed at least two rounds of PCR on each sample; samples with inconsistent results were run through a third cycle. We considered any sample that fluoresced prior to the 40th cycle of the PCR reaction on at least two occasions to be positive. The *Bd* PCR techniques followed methods described by Boyle et al. (2004). For a more detailed description of these methods, *see* Fuchs et al. (2017) and Tupper et al. (2017).

We chose multiple logistic regression analysis with stepwise variable selection (Zar, 2009) to determine if *Bd* was associated with FV3 infection. To determine the total rates of infection across both sites, we calculated the proportion of *Bd* and FV3 positive samples for five grouping variables: anuran species, sampling month, ecological guild, and sex and age classes (*see* Tupper et al., 2017). Statistical analyses were completed in Minitab version 18 (www.minitab.com).

Results

We collected samples from a total of 100 anurans at HMP, and 88 anurans at SERC between 13 March and 25 September 2016. We sampled for FV3 in 170 anurans; all samples tested negative for the virus. Of the 186 testable *Bd* samples, 59 tested positive for an overall infection rate of 31.7% (Table 1). We found that the highest *Bd* infection rates occur in March and April (59.3% and 59.1%, respectively; Table 2), in male adults (43.7%; Table 3), and in Southern Leopard (*Lithobates sphenocephalus*; 66.7%) and Pickerel Frogs (*Lithobates palustris*; 63.6%; Table 1). Anurans sampled in the aquatic guild resulted in a higher percent of *Bd* positive individuals (40.3%) than in the terrestrial/arboreal guild (17.9%; Table 3). Logistic regression could not be completed due to the paucity of FV3 positive results.

Table 1. Proportion of *Bd* and *Ranavirus* FV3 positive samples by species. AMTO = Eastern American Toad (*Anaxyrus americanus*); BUFR = American Bull Frog (*Lithobates catesbeianus*); CGTF = Cope's Gray Tree Frog (*Hyla chrysoscelis*); CRFR=Eastern Cricket Frog (*Acris crepitans*); GRFR = Green Frog (*Lithobates clamitans*); GTFR = Green Tree Frog (*Hyla cinerea*); PIFR = Pickerel Frog (*Lithobates palustris*); SLFR = Southern Leopard Frog (*Lithobates sphenocephalus*); SPPE = Spring Peeper (*Pseudacris crucifer*); WOFR = Wood Frog (*Lithobates sylvaticus*). * = Aquatic guild. Species without an asterisk indicates terrestrial/arboreal guild.

Species	N (FV3)	% FV3 Positive	N (*Bd*)	% *Bd* Positive
AMTO	26	0	26	26.9
BUFR*	26	0	25	24
CRFR*	13	0	17	5.9
CGTF	12	0	12	16.7
GRFR*	34	0	33	36.4
GTFR	12	0	12	8.3
PIFR*	10	0	11	63.6
SLFR*	31	0	33	66.7
SPPE	5	0	16	6.3
WOFR*	1	0	1	0
Total	170	0	186	31.7

Table 2. Proportion of FV3 and *Bd* positive individuals grouped by sampling month.

Month	N (FV3)	% FV3 Positive	N (*Bd*)	% *Bd* Positive
MARCH	22	0	27	59.3
APRIL	22	0	22	59.1
MAY	75	0	74	27.0
JUNE	12	0	24	12.5
JULY	5	0	5	20.0
AUG	5	0	5	0.0
SEPT	29	0	29	24.1

Table 3. Proportion of FV3 and *Bd* positive individuals grouped by sex (and by default, age class) and ecological guild.

Sex/Guild	N (FV3)	% FV3 Positive	N (*Bd*)	% *Bd* Positive
Female	66	0	64	26.6
Juvenile	34	0	51	23.5
Male	70	0	71	43.7
Aquatic	114	0	119	40.3
Terrestrial/arboreal	56	0	67	17.9

Discussion

Ranavirus infections, including FV3, have been documented in Maryland and Virginia (Davidson and Chambers, 2011; Hamed et al., 2013; Scott et al., 2016), however, FV3 was not detected in any of our samples. Our results reflect one of two possibilities, either FV3 was not present at either location, or the pathogen was present, but we were unsuccessful in detecting it due to our sampling techniques. In order to limit stress to the animal, we chose the least intrusive sampling method shown to detect FV3, (oropharyngeal swabbing; *see* Driskell et al., 2009; Pessier and Mendelson, 2010; Miller et al., 2015; San Diego Zoo ICR, 2016). Despite being less invasive, swabbing is also less reliable than lethal techniques, such as liver tissue sampling, and may produce more false negatives than other non-lethal techniques, such as toe and tail clips (Miller et al., 2008; Gray et al., 2012; Forzán et al., 2017). Therefore, it is possible that even if an anuran was carrying the virus, our sampling method may not have been sensitive enough to detect it.

Though *Ranavirus* has low host specificity, larvae and metamorphs of certain species show far greater susceptibility to infection than others (Daszak et al., 1999; Brunner et al., 2004; Robert et al., 2005; Robert, 2010; Lesbarréres et al., 2012; North et al., 2015). For instance, larval and recently metamorphosed Wood Frog (*Lithobates sylvaticus*), Gopher Frog (*Lithobates capito*) and Eastern Spadefoot Toad (*Scaphiopus holbrookii*) are among the most susceptible to FV3 (Goodman and Araraso, 2009; Haislip et al., 2011; Hoverman et al., 2011; Miller et al., 2011; Lesbarréres et al., 2012; Earl and Gray, 2014; Forzán et al., 2017). Because anurans in our study were captured opportunistically, we were unable to adequately sample the most susceptible species. While oropharyngeal swabbing can effectively detect *Ranavirus* in tadpoles (Gray et al., 2012; Kolby et al., 2015), this method would likely damage oropharyngeal tissues in smaller anurans. Therefore, we chose to restrict our sampling to metamorphosed anurans.

Although we did not detect FV3 at either of our sampling sites, *Ranavirus* has been documented in both Virginia and Maryland (Davidson and Chambers, 2011; Hamed et al., 2013; Smith et al., 2016). Additionally, FV3 has been confirmed as the likely cause of a recent Wood Frog tadpoles die-off at the nearby Old Colchester Park and Preserve in Fairfax County, VA (Fairfax County Park Authority, 2015). We therefore suggest continued FV3 monitoring at HMP and SERC and recommend that future studies focus sampling efforts on larval Wood Frog and Eastern Spadefoot Toad (while minimizing harm to anurans). We also suggest continued monitoring for *Bd*, which is already known to be prevalent at both locations (Fuchs et al., 2017; Tupper et al., 2017). Our study confirms that *Bd* remains prevalent at both SERC and HMP, with an overall infection rate that is among the highest in the region (31.72%; *see also* Hughey et al., 2014). Notably, a post-hoc analysis of data collected over a three-year period (2014-2016) revealed a nearly-20% increase in the infection rate of *Bd* at SERC (Tupper and Fuchs, unpublished data; Fuchs et al., 2017). Continued monitoring of both pathogens will facilitate more informed management decisions, and will allows us to better understand the effects of their interactions within anuran hosts.

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Ambystoma maculatum (Spotted Salamander). VA: Prince George Co., Disputanta (N37°11'55.126" W77°8'52.771") 23 March 2018. Samantha Rodriguez.

County Record: A Spotted Salamander was found on personal property while moving old wood for the purpose of getting ready for planting. Photos were taken of the salamander and it was released where it was found, and the wood replaced so as not to disturb the salamander any further. A digital photograph was sent to the Virginia Herpetological Society for identification and I was informed it was a Spotted Salamander with abnormal patterning. The salamander was missing the distinctive yellow spotting along its back but still retained the whitish-blue spots on its legs.

This is the second example of an "unspotted" Spotted Salamander in Virginia, the first being from Fairfax County (John White, 2008. *Ambystoma maculatum: Field Note. Catesbeiana 28(2):67-68.)*

Additionally, the Spotted Salamander has not previously been vouchered in Prince George County, so this report represents the first verified record for the county. A digital photograph was submitted to the VHS Archive (# 484) as a voucher.

Samantha Rodriguez
14501 Lancaster Farms Drive
Disputanta, VA 23842

***Ambystoma opacum* (Marbled Salamander).** VA: Lunenburg Co. (36.902234, -78.278545). 2 November 2017. Audrey and Esther Lacks.

County Record. On 2 November 2017, Audrey and Esther Lacks found a black and white salamander under a bucket in our yard. For safe-keeping we put it in a shallow container with some water, and the next morning there was an egg mass with the salamander. A digital photo was sent to the VHS for identification of the species, and we were informed it was a Marbled Salamander, and there was no previous record for this species in Lunenburg County, although it is found in all surrounding counties. This observation thus represents a new record for Lunenburg County. The digital photo (Archive #471) serves as the voucher for this record.

Audrey and Esther Lacks
Reedy Creek Road
Lunenburg, VA

***Eurycea longicauda longicauda* (Long-tailed Salamander).** VA: Clarke Co., private property about 4 km west of the town of Paris (39 deg 00' 29.66" N, 77 deg 59' 30.25" W). 24 Sept. 2017. Greg Zell, Zac Zell, and Ben Sothmann.

County Record: A single adult specimen of Eurycea longicauda longicauda was found in a rock pile on a relatively dry ridge at an elevation of 380 m. The observation was approximately 170 m from the nearest local spring or seep. The observation represents a new county record for Clarke County. *Eurycea longicauda* has been documented in all four of the adjacent counties, so this report fills a gap in northern Virginia. Digital photographs were submitted to the VHS for documentation (VHS Archive #472-473).

Greg Zell
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Fairfax, VA 22030

***Lithobates palustris* (Pickerel Frog).** VA: Surry County, Chippokes Plantation State Park (37° 08' 00.0600"N; 76° 43' 12.3240"W) 9 August 2017. David Weisenbeck.

Cloacal Prolapse: At 1140 h on 9 August 2017, an adult *Lithobates palustris* (SVL = 71 mm; 36.1 g) was encountered on the edge of a sand-bottomed stream running through a ravine seepage swamp community at Chippokes Plantation State Park in Surry, VA. When the animal was spotted, it had 7 mm of tissue protruding from its cloaca. The tissue showed no signs of necrosis. Aside from the prolapse, the animal presented no other symptoms, signs of abnormal activity, or hindered mobility. The animal was captured, measured, and released after being photographed. A digital photograph of the animal was submitted to the VHS archive (#485). Though the specimen could not be examined in a lab, the prolapsed tissue appeared consistent with bladder tissue based on similar cases in captive amphibians (Hildabrand, A. DVM, pers. comm.).

Exact causes of prolapse are often difficult to determine, but commonly include nematode infection and gastrointestinal impaction, hypocalcemia, neoplasia, toxins, and red-leg syndrome. (Wright K.M. and B.R. Whitaker 2001, Amphibian Medicine and Captive Husbandry. Krieger Publishing Company, Malabar, Florida. 570 pp.). Cloacal prolapse is a relatively common condition in captive amphibians, but has, to the author's knowledge, been documented only once in wild frogs. Phillott A.D. and S. Young (2009, Occurrence of cloacal prolapse in wild hylids in the Wet Tropics, Australia. Diseases of Aquatic Organisms. 86:77–80) report prolapse occurring in several individuals of the hylid *Ranoidea rheocola* (as *Litoria rheocola*), with no other species in the study being observed with this condition, suggesting that certain life history traits, including consumption of intermediate parasite hosts or differences in preferred substrate, may contribute to increased occurrences of prolapse. Though prolapse can lead to mortality in amphibians and immediate veterinary care is recommended in captive animals, wild frogs have been shown to recover spontaneously from prolapse (Phillott A.D. and S. Young, op. cit.).

Whereas the cause of the observed cloacal prolapse cannot be determined for this animal, this account documents the occurrence of a rarely recorded condition in a wild amphibian. Future surveys in the area should take care to record similar instances of cloacal prolapse and determine potential causes.

David Weisenbeck
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Lithobates palustris (Pickerel Frog). VA: City of Danville, Anglers Park (36°33'45.07"N, 79°21'35.67"W). 2 March 2017. Jason D. Gibson.

Parasite confirmation: Intradermal mites of the genus *Hannemania* (Acari: Leeuwenhoekiidae) were first reported to infect *Lithobates palustris* in Virginia in the 1950's (Loomis, R.B. 1956. The chigger mites of Kansas. University of Kansas Science Bulletin 37: 1195 - 1443.) In Loomis' account no specific locality data for the parasitized frogs was provided. Mitchell (2004. Occurrence of intradermal mite, *Hannemania sp*. (Acarina: Trombiculidae), parasites in two species of amphibians in Virginia. Banisteria 23: 50-51) reported finding a Pickerel Frog with mites in Prince George County but only identifies the mites to the genus *Hannemania*. Four other reports of parasitism of this frog species by mites are reported by Watson and Gibson (2010. Occoneechee State Park survey. Catesbeiana 30(2): 43-57), Gibson (2015. Belmead bioblitz and ninth annual herpblitz: summary of two herp surveys in Powhatan County, Virginia. Catesbeiana 35(1): 3-16), Gibson (2015. Amphibian and reptile survey at Westmoreland State Park. Catesbeiana 35(2): 47-58), and Sattler and Gibson (2016. A herpetological survey of James River State Park. Catesbeiana 36(1): 21-34. In all four of those accounts the mites were not identified.

In this note we report finding a DOR frog adjacent to a mitigation wetlands pond in Anglers Park, a public park in the City of Danville. The frog was found on 2 March 2017. Twenty-two DOR American Toads were also collected and inspected for mites but all were free of parasites. The Pickerel Frog measured 61 mm SVL and was found in be infested with mites on both back hind legs. A small patch of skin with the chiggers was cut from one hind leg and sent to CW. CW identified the parasites as *Hannemania dunni*. This observation represents the second report of this parasite species in Virginia and the only known location.

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STEM Division
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Cal Welbourn
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***Lithobates sylvaticus* (Wood Frog).** VA: Pittsylvania County, Gretna, private residence (N 37.07214, W 079.38446), 27 February 2018. Huldah Schultz, Matthew H. Becker, and Kyle J. Harris

County Record: On the afternoon of 11 February 2018, one of the authors (HS) found an amphibian egg mass in a small road pool on private property in Pittsylvania County, VA (Figure 1). A week later, pictures were obtained to show KH to determine the species of the egg mass (Figure 2). It was speculated the egg mass belonged to wood frogs (*Lithobates sylvaticus*). On February 27 KH and MB led a biology class to the private land for a bio-blitz and the roadside pool was examined. KH and MB then confirmed that the egg masses were wood frog masses. In addition to seeing the wood frog egg masses, 10 eastern newts (*Notophthalmus viridescens viridescens*) and three spotted salamander (*Ambystoma maculatum*) egg masses were found in the pool. Logs adjacent to the pool also had five red-backed salamanders (*Plethodon cinereus*) underneath. Further on the property in a larger pond, another wood frog egg mass was found and identified for a total of 3 egg masses found in Pittsylvania County. Digital photographs were obtained and represent the first vouchers for Pittsylvania County. Digital photos were placed in the VHS Archive (#482) as a voucher.

Huldah Schultz, Matthew H. Becker, and Kyle J. Harris
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Department of Biology and Chemistry
Lynchburg, VA

Figure 1. Photograph of road pool where wood frog egg masses were found.

Figure 2. Wood frog egg masses found in road pool.

***Plethodon hoffmani* (Valley and Ridge Salamander).** VA, Amherst County, Sheppe Pond, George Washington National Forest (N 37 36'44.1"; W 79 23'10.6"), February 22, 2018. Kelsey Mitchell, Sara Edwards, Huldah Schultz, Kyle J. Harris, Matthew H. Becker.

County Record: In the afternoon of 22 February 2018, the Environmental Biology class of Liberty University traveled to Sheppe Pond in Amherst County, VA in search of spotted salamanders (*Ambystoma maculatum*) and wood frogs (*Lithobates sylvaticus*). A single valley and ridge salamander (*Plethodon hoffmani*) was found by KM approximately 25 m from the edge of the pond underneath a log in the woods where there was a make shift fort of fallen trees (Figure 1). Photographs were obtained showing the ventral and dorsal side of the animal, as well as the long length of the tail. Photographs were archived in the VHS archive (voucher #480). This represents the first voucher of *P. hoffmani* for Amherst County. Later, HS discovered another *P. hoffmani* underneath a log. Additional salamander species were found at this site during the survey. This included spotted salamander eggs masses within Sheppe Pond and wood frog egg masses in a nearby vernal pool. Four four-toed salamanders (*Hemidactylium scutatum*) were found in sphagnum moss on the bank of the vernal pool.

Kelsey Mitchell, Sara Edwards, Huldah Schultz, Kyle J. Harris, and **Matthew H. Becker**
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Lynchburg, VA

***Anolis carolinensis* (Green Anole).** VA: City of Virginia Beach. 4948 Cliffony Drive, Virginia Beach, Virginia. 26 June 2009. John D. Kleopfer and Jessica Ruthenberg.

Introduced Species: The Green Anole reaches the northernmost extent of its range in northeastern North Carolina. Observations within this region have been recorded at Merchants Millpond State Park in Gates County, which could be released pets or hitchhikers; just north of Kitty Hawk in Dare County; and from Point Harbor in the southern tip of Currituck County (Jeff Beane, North Carolina State Museum of Natural Sciences, pers. comm. 2017). However, Green Anoles have been introduced into several areas around Hawaii (Gibbons, W., J. Greens, and T. Mills. 2009. Lizards & Crocodilians of the Southeast. University of Georgia Press. Athens, Georgia. 235 pp.). Mitchell (1994. Reptiles of Virginia. Smithsonian Institution Press, Washington D.C. 352 pp.) reported on a verbal description of a Green Anole provided to Richard Hoffman in the 1940s. However, the observation was not verified. Here we report on the first documented observation of this species in Virginia.

On 2 November 2017, co-author Jessica Ruthenberg was informed by a resident of Virginia Beach that she had observed and photographed on 9 June 2013 a Green Anole in her backyard. Since this observation occurred within a residential neighborhood, it is believed to be an introduction and not a natural range extension. The lizard was never observed again. A photograph was verified by State Herpetologist John (J.D.) Kleopfer and deposited in the VHS archives (#470).

John (J.D.) Kleopfer and **Jessica Ruthenberg**
Virginia Department of Game and Inland Fisheries
3801 John Tyler Memorial Highway
Charles City, Virginia 23030

***Apalone spinifera spinifera* (Eastern Spiny Softshell Turtle).** VA:. Buchanan Co. Grundy, Levisa Fork River (37º 16' 41.3" N; 82º 06' 02.6" W). 4 June 2016. Christine Wright

County Record. The Eastern Spiny Softshell Turtle has a southwestern distribution in Virginia, being reported from Wise, Scott, Russell, Washington and Smyth counties. This report extends the known range in Virginia approximately 40 km northwards to Grundy in Buchanan County. The Levisa Fork River flows west and north into the Big Sandy River, and eventually the Ohio River. Thus, additional populations may occur further north in the county. Their range is known to extend up into Kentucky and Ohio (Ernst, C.H. and J.E. Lovich. 2009. Turtles of the United States and Canada, Second Edition. The Johns Hopkins University Press, Baltimore, MD. 827 pp.)

On 4 June, 2016, while walking next to the Levisa Fork River, I and my husband observed a female Eastern Spiny Softshell Turtle (according to color and patterning of the shell), sitting on the walkway. I photographed her without incident. Although cautious, she did not move to bite. I stood after taking the photos and she moved to go back to the water, at which time she appeared unable to climb back over the curb on her own. We placed her on the river side of the curb, at which time she quickly returned to the river. Her shell was approximately 30 cm long and 25-28 cm inches wide, therefore an adult. This indicates a breeding population probably exists in the Levisa River. Photographs were submitted for confirmation to the VHS website where a positive identification was obtained. Photographic vouchers were submitted to the VHS Archive (#438).

Christine Wright
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Grundy, VA. 24614

***Chrysemys picta picta* (Eastern Painted Turtle).** VA: Fairfax Co., Mason Neck State Park. 30 April 2017. John M. Orr and Soo Yee.

Reproduction: At 0945 h on 30 April 2017, a female *Chrysemys picta picta* was found nesting at Mason Neck State Park near the bird blind on the Bay View Trail. This is the earliest nesting record for a painted turtle in Virginia. Nesting has been reported from 16 May to 13 July in Virginia (Mitchell, J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington, D.C. 352 pp.), from 27 May to 4 July in Fairfax County (Ernst, C.H., S.C. Belfit, S.W. Sekscienski & A.F. Laemmerzahl. 1997. The amphibians and reptiles of Ft. Belvoir and northern Virginia. Bulletin of the Maryland Herpetological Society 33(1): 1-62.) and from 29 May to 25 June at the Mason Neck National Wildlife Refuge (Gotte, S.W. 1988. Nest site selection in the snapping turtle, mud turtle, and painted turtle. M.S. Thesis. George Mason University, Fairfax, Virginia. 135 pp.). The beginning of nesting season has been correlated with mean temperature of the previous year (Christens, E. & J.R. Bider. 1987. Nesting activity and hatching success of the painted turtle (*Chrysemys picta marginata*) in southwestern Quebec. Herpetologica 43(1): 55-65.). 2016 was an unusually warm year in northern Virginia. The weather station at Ronald Reagan Washington National Airport recorded the second highest average annual temperature of all years from 1871 to 2016 (National Climate Data Center; www.ncdc.noaa.gov). A digital photo was submitted as a voucher (#479)for this record.

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***Clemmys guttata* (Spotted Turtle).** VA: King and Queen County locality information withheld. 28 June 2017. Laura Perkins.

County Record: On the morning of 28 June 2017, I was jogging in southern King and Queen County when I heard a rustling in the leaves at the side of the road. Stopping to see what was making the noise, I found a Spotted Turtle (Clemmys guttata) crawling by the road. It was heading away from a Creek towards a small swampy pond. I photographed the turtle and sent the photo to the Virginia Herpetological Society for confirmation on its identity, and was informed it was a Spotted Turtle. Spotted Turtles are known for several of the counties surrounding King and Queen, including Caroline to the north, King William to the west, and Middlesex to the southeast, but not Essex or Richmond to the east. Neither the VHS web site nor the FWIS database contains a record for the Spotted Turtle in King and Queen County, so this report is the first. The photograph was submitted to the VHS Archive (#455) as a voucher.

Laura Perkins

Clemmys guttata (Spotted Turtle). VA: Albemarle County, Location withheld. 28 February 2018. Devin Floyd.

County Record: On this warm late winter day, I ventured into a wetland in Albemarle County. The site is along a stretch of floodplain with numerous examples of seepage swamp habitats and scattered occurrences of the state rare purple fringeless orchid. Long and linear swales are common in the habitat type of this drainage, some being flood scour swales, and others being remnants of agricultural trenching. Many of these linear swales and drainage trenches now host vernal and permanent pools. On this particular outing I was inspecting the pools along the north edge of the wetland for *Ambystoma maculatum* egg masses (of which five were located). While kneeling to inspect a salamander egg mass, a spotted turtle (*Clemmys guttata)* emerged from underwater leaf litter about a foot away. I picked the turtle up to inspect the tiny yellow spots on the carapace and the patterning on the plastron. Characteristic black blotches marked the plastron away from the plate sutures and midline. The carapace was 4.5 inches long. Three

photographs were taken with a Cannon Powershot SX710HS camera. These photographs were cross-referenced with images available at the Virginia Herpetological Society website, and other potential species matches were ruled out easily. The range map at the same website suggests that the species might be in Albemarle County, but no historical observation point existed. This species report affirms its presence in Albemarle County, and provides a connection from the Piedmont to the disjunct occurrence in Augusta County. A digital photo was submitted to the VHS Archive (#481) as a voucher.

Devin Floyd
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187 Bryan Court
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***Diadophis punctatus edwardsii* (Northern Ring-necked Snake).** VA: Orange Co., Stone Woods, Unionville, VA (38° 13' 40" N, 77° 52' 24" W). 5 April 2017. Daniel Neff, Roger Neff, and Matthew Neff.

County Record: On 5 April 2017 an individual *D. p. edwardsii* was observed while raking the yard. The observation of the Northern Ring-necked Snake is a new county record and has not been previously documented for Orange County by Mitchell and Reay (1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries. Richmond, VA 122pp.). *Diadophis p. edwardsii* was previously known in counties surrounding Orange County: Albermarle, Greene, Madison, Culpepper, and Spotsylvannia (VAFWIS database). A digital photograph of the specimen was submitted to the VHS archives (#430).

Daniel Neff
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Unionville, VA 22567

***Graptemys pseudogeographica* (False Map Turtle).** VA: City of Alexandria, Potomac River. 12 August 2017, 20 August 2017, 3 September 2017, 10 September 2017, 17 September 2017, 7 October 2017, 15 October 2017. William D. Robertson

Introduced Species: On August 12, 2017, the author digitally photographed a False Map Turtle in the Potomac River at Alexandria, Virginia. The specific location was a small bay between Daingerfield Island and Ronald Reagan Washington National Airport, where Four Mile Run discharges into the Potomac. The author then returned on a weekly basis until the end of October to survey the site for additional individuals. In total there were thirteen instances in which a False Map Turtle was photographed. Two of these digital photographs have been submitted to the archives the Virginia Herpetological Society (# 489-490).

The turtles photographed exhibited wide variations in eye color, skin markings, and carapace morphology. In some cases these variations allowed individual turtles to be distinguished, and it could be determined that there were at least seven distinct individuals present at the site. The variations extended to traits used to differentiate *G. pseudogeographica pseudogeographica* from *G. pseudogeographica kohnii* (iris color, presence or absence of a transverse dark bar in the iris, and shape of the marking behind the eye), raising the possibility that these turtles are descended from a founder population containing individuals of both subspecies.

The False Map Turtle is not native to Virginia. Its natural range is within the drainage basin of the Mississippi River and other rivers of the central United States (Powell, R., R. Conant, and J. T. Collins. 2016. Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America Fourth Edition. Houghton Mifflin Harcourt Publishing Company. New York NY. 494 pp.). An introduced population has been found to exist in Lake Maury in the City of Newport News (Savitzky, B. A., and J. C. Mitchell. 2001. *Graptemys pseudogeographica kohnii*. Herpetological Review 32: 191-192).

False Maps Turtles have occasionally been reported in and around the Potomac River in the northern Virginia area. In 1901 a specimen was collected at Custis Spring in Arlington County (USNM 45617), and in 1940 another was collected in the Potomac west of Theodore Roosevelt Island (Fowler, J. A. 1943. Proceedings of the Biological Society of Washington 56: 168). In 2017 Ratcliffe photographed an individual at the Jackson Miles Abbott Wetlands Refuge in Fairfax County (Ratcliffe, M. 2017. Grapytemys pseudogeographica (False Map Turtle). Catesbeiana 37: 133). In addition, the citizen science web site iNaturalist.com records four instances in which G. pseudogeographica has been sighted and photographed in the vicinity of the Anacostia River, a tributary of the Potomac in Washington, DC, since 2012 (https://www.inaturalist.org/taxa/39847-Graptemys-pseudogeographica).

The presence of multiple False Map Turtles at this site in Alexandria strengthens the possibility that the species is established in the Potomac River in northern Virginia. A potential source for an introduced population would be the live turtles of the genus *Graptemys* which were sold for food in Washington, DC, in the early part of the Twentieth Century as a replacement for *Malaclemys terrapin*, the species traditionally used in turtle soup (Clark, H. W. and J. B Southall. 1920. Fresh-water Turtles: A Source of Meat Supply. U S. Bureau of Fisheries Document 889. 20 pp.).

William D. Robertson
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Alexandria, VA, 22302

***Plestiodon fasciatus* (Common Five-lined Skink).** VA: Northampton Co.: Savage Neck Dunes Natural Area Preserve (37.324307, -76.015280). 17 July 2017. Sean M. Hartzell.

Limb Malformation: On 17 July 2017, I observed, photographed, and released an adult male *Plestiodon fasciatus* bearing a malformation on its right hindlimb. The upper portion of the hindlimb bore a normal morphology; however, the lower portion (below the joint) was truncated into a small structure, reminiscent of a scaly toe and bearing a short, blunt claw at its distal end. Otherwise, the lizard appeared to be in good condition and bore normal external morphology on its other limbs and the reminder of its body, with the exception of a recently autotomized tail tip. When released, the lizard swiftly ran under cover, suggesting minimal impairment of locomotion despite its malformed limb; however, potentially other activities (e.g., climbing) might have been impaired. Malformations in lizards are occasionally observed and typically consist of tail bifurcation or trifurcation resulting from damage *via* predation attempts (e.g., Pheasey et al. 2014. Herpetol. Rev. 138-139; Monte de Andrade et al. 2015. Herpetol. Bull. 131:28-29; Koleska et al. 2017. Herpetol. Notes 10:363-364). However, occasionally, other malformations such as polydactyly and limb malformations, are reported in lizards (e.g., Monte de Andrade et al. 2015, *op. cit*.; Gkourtsouli-Antoniadou et al. 2017. Herpetol. Notes 10:233-234). Recently, Gkourtsouli-Antoniadou et al. (2017, *op. cit*.) reported a somewhat similar case of hindlimb malformation in the lizard *Podarcis erhardii* in which the lower left hindlimb was truncated into a "tail-like" structure, likely due a mutation during development. The limb malformation I observed in the *P. fasciatus* appears to be consistent with a mutation, rather than as a result of injury (e.g., a predation attempt) although this cause cannot completely be ruled out. Regardless of the specific cause of the malformation, reporting incidences of morphological anomalies in herpetofauna has value to our understanding of these organisms as it contributed data to broaden our understanding of the distribution and occurrence of these phenomena (Gkourtsouli-Antoniadou et al. 2017, *op. cit*.). Digital photographs were submitted to the VHS Archive to support this observation (#474-475).

Sean M. Hartzell
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***Pseudemys rubriventris* (Red-bellied Cooter).** VA: Chesterfield County, Midlothian, (37.465939, -77.626674), 14 June 2017, Declan Edwards (age 5 at time), Susan Edwards.

County Record: On 14 June 2017 Declan and I found a large turtle in our yard. For reference, the landscaping block is 12 inches long in the photo below. The turtle was found on an asphalt driveway at 12307 Boxford Ln. in Midlothian, Chesterfield County The turtle was boxed in by the landscaping blocks, fencing, and our house foundation. Another neighbor (12305 Boxford Ln) had also witnessed the turtle on her back patio that morning. Her wooded property runs unobstructed (no fencing) to Falling Creek, making it likely the turtle was a female looking for a nesting site. I submitted photos and a video of the turtle to the VHS via Facebook; replies indicate the turtle was a Red-bellied Cooter and a new county record. A digital photo was deposited in the VHS Archive (#487) as a voucher.

Susan and Declan Edwards
12309 Boxford Ln.
Midlothian, VA 23114

Pseudemys rubiventris (Northern Red-bellied Cooter). VA: Spotsylvania County, Lee's Hill Subdivision (38° 14' 6.612"N 77° 29' 15.558"W). 4 September 2017. Tony G. Oliver.

County Record: I spotted a Turtle in my yard in Spotsylvania County, Virginia on Monday September 4th 2017 at 1100 h. The weather was clear and sunny and the temperature was 24ºC. It appeared to be coming from the woods and a creek drainage east of my home, and headed north towards a woods and Massaponnax Creek, which is a tributary of the Rappahannock River. I took photos, but otherwise did not disturb the Turtle. The Turtle was moving swiftly, and deliberate in direction. It was very skittish. Thinking it was an Eastern River Cooter, I emailed the Virginia Department of Game and Inland Fisheries, and included photos of the Turtle. J.D. Kleopfer identified the turtle as a Northern Red-bellied Cooter (*Pseudemys rubriventris*), based on shell and head patterns. There are no previous records of the Red-bellied Cooter from Spotsylvania County (Mitchell, J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington D.C. 352 pp. and the FWIS Database) although there are from neighboring Caroline County to the east and Hannover to the south. A digital photo was submitted to the VHS Archive (# 462) as a voucher.

Tony G. Oliver
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Scincella lateralis (Little Brown Skink). VA: Albemarle County, The Hedgerow Property (38° 0'37.39" N 78°34'47.57" W) 13 June 2017. Devin Floyd.

County Record: While preforming biological survey transects at the site of the future Albemarle County Park known as "Hedgerow", I encountered *Scincella lateralis* on numerous occasions. Dates observed were 05/02/2017, 05/09/2017, 05/30/2018, and 06/13/2017. I was able to finally photograph one at the south end of the Hedgerow Property on 13 June 2017. It was captured and held for about 1 minute to accomplish photo-documentation of head and body, and then released at the point of capture. Three photographs were taken with a Cannon Powershot SX710HS camera.

The individual *Scincella lateralis* reported here was observed hunting among the leaf litter under a dense forest canopy, at the edge of a rock outcrop. *Scincella lateralis* individuals observed during surveys on the Hedgerow Property during 2017 were most numerous, and almost always found in association with, large flat rock outcrops. They were particularly predictable at the upper margins of some of the area's most notable examples of the globally rare Piedmont Mafic Barren plant community type. Here they enjoy the reliably dense combined ground cover of *Brodesme rupestre* (rock spike-moss) and *Chielanthes lanosa* (hairy lipfern). They were often heard before seen, having scampered across the dry rock to make an escape into a thicket of spike-moss and ferns. This disappearing act afforded only split-second glimpses. They were also observed at rock outcrops on south facing slopes in Basic Oak-Hickory Forests and upon the shallow, rocky soils of Basic Woodlands and Heath Forest. A digital photograph was deposited in the VHS Archive (#483) as a voucher.

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***Scincella lateralis* (Little Brown Skink).** VA: Albemarle County, Gilbert Station (N38°08.865'; W078°22.451'.) 28 April 2018. Steve Ferguson.

County Record Confirmation: In April of 2018, I noticed a small lizard moving under the grass in my yard. I captured, photographed and released an adult Little Brown Skink. It was approximately 9 cm long and appeared to be missing the end of its tail. Digital photographs were taken of this animal and submitted to VHS (Archive # 486). At the time of the reporting,

Little Brown Skinks had not been verified in Albemarle County, although the Note by Floyd (Scincella lateralis: Field Note, Catesbeiana 38(1):73) predates this find. My report thus confirms the occurrence of Little Brown Skinks in Albemarle County.

Steve Ferguson
4161 Gilbert Station Road
Barboursville, VA 22923

***Sternotherus odoratus* (Eastern Musk Turtle).** VA: Bland County, (37° 06' 08.42"N; 81° 02' 33.55W) 7 July 2017. Amy Roberts.

County Record: While performing road surveys for the Virginia Department of Game and Inland Fisheries along Walkers Creek Road (Co. Rt. 604) in Bland County, I spotted a small turtle at the edge of the paved road in the shade of a large Sycamore (*Platanus occidentalis*). I inspected and photographed the turtle and then released it within three minutes of the point of capture. Four photographs were taken with an Android Razor cellular phone.

The musk turtle was 10.2 cm long (max. carapace length). It had two white lines on each side of the head, one running above and one below the eyes. The carapace was covered in algal growth and the reduced plastron was pink. Adjacent to the road was Walker Creek. It created a wetland area adjacent to the road where the turtle was found. The Eastern musk turtle has been reported in Giles and Pulaski counties to the east, Wythe County to the south, and Smyth and Tazewell Counties to the West, but this is the first record from Bland County. Digital photos were deposited in the VHS Archive (#477-478) as vouchers.

Amy Roberts
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Radford, VA 24142

Storeria occipitomaculata occipitomaculata (Northern Red-bellied Snake). VA: Hanover Co., 13450 Cross Rd. (37.784329, -77.493521), and at 20280 Ben Gayle Rd. (37.963806, -77.662777) 15 May 2015 and 17 August 2015. Ralph Mills.

County Record: On May 15, 2015 I was checking under artificial cover hoping to find and photograph mole kingsnakes that I had previously located when I came across a single adult Red-bellied snake under a piece of tin about five feet inside of the woodline from the edge of a field. Digital photographs were taken. On August 17, 2017 I was checking under artificial cover on Ben Gayle Rd. for ground skinks when I found an apparent neonate Red-bellied snake under a small piece of tin about eight feet inside the woodline from the edge of a horse pasture. Digital photograph was taken of each specimen and deposited in the VHS Archives (#466-467). This is the first record of the Northern Red-bellied Snake in Hanover County, although it has been reported from all surrounding counties and thus fills a gap in the distribution.

Ralph Mills
20280 Ben Gayle Rd
Beaverdam, VA 23015

Cross Rd. May 15, 2015.

Ben Gayle Rd. August 17, 2017.

***Thamnophis sirtalis sirtalis* (Eastern Gartersnake).** VA: Spotsylvania Co., Morgan II Subdivision between Eds Road and Bills Road, 2 November 2017. Stacy Sayer.

County Record: The Eastern Gartersnake is native to Virginia, found throughout the state. However there is a gap in northcentral Virginia where it has not been reported from Spotsylvania, Orange or Culpeper Counties. This is the first recorded instance of this species in Spotsylvania County. The location of the observation is a wooded area (deciduous and mixed forest) about 50 m from Lake Anna near a spring fed stream. I was walking through the woods conducting a botanical survey of the area under a Dominion powerline right-of-way when the snake was observed.

A Digital photograph was taken and deposited in the VHS Archive (#476) as a voucher.

Stacy Sayer
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***Trachemys scripta elegans* (Red-eared Slider).** Va: Wise Co, Pound River (37° 8' 14" N; 82° 36' 15" W) 21 May 2018 James Sumner and Dennis Baker

County Record: A Red-eared Slider was observed by our Wastewater Treatment Plant Outfall while the operator was conducting field tests; crawling away from the river towards the inside of the facility. This species of turtle had not previously been observed at our site. I did an online check to see if I could find information on the turtle, and found that the species had not been recorded in Wise County Va. I contacted the Virginia Herpetological Society with our information and was asked to send a photo to confirm the species identity. The identity was confirmed with the photo below. This report makes the first vouchered record of the Red-eared Slider in Wise County. The Digital photo was submitted as a voucher to the VHS Archive (#488).

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Snake Fungal Disease: MD. Anne Arundel Co. Smithsonian Environmental Research Center (38°53’24.81”N 76°33’27.04”W). 29 April 2017. Todd A. Tupper, Robert Aguilar, Lauren D. Fuchs

Snake fungal disease (SFD) has been associated with widespread morbidity and mortality in a multitude of North American snake species (Guthrie et al. 2016. Detection of snake fungal disease due to *Ophidiomyces ophiodiicola* in Virginia, USA. Journal of Wildlife Diseases 52:143-149) and poses a challenge for snake conservation (Lorch et al. 2016. Snake fungal disease: an emerging threat to wild snakes. Philosophical Transactions of the Royal Society B 371:20150457). SFD is attributed to *Ophidiomyces ophiodiicola* (*Oo*), a fungal pathogen known only to infect snakes (Dolinski et al. 2014. Systemic *Ophidiomyces ophiodiicola* infection in a free-ranging plains garter snake [*Thamnophis radix*] Journal of Herpetological Medicine and Surgery 24:7-10; Allender et al. 2015. The natural history, ecology, and epidemiology of *Ophidiomyces ophiodiicola* and its potential impact on free-ranging snake populations. Fungal Ecology 17:187-196; Par**é** and Sigler. 2016. An overview of reptile fungal pathogens in the genera *Nannizziopsis*, *Paranannizziopsis*, and *Ophidiomyces*. Journal of Herpetological Medicine and Surgery 26: 46-53). Symptoms of infection include scabs or crusty scales, superficial pustules and subcutaneous nodules, dysecdysis, and ocular cloudiness (Dolinski et al., 2014; McBride et al., 2015. *Ophidiomyces Ophiodiicola* dermatitis in eight free-ranging timber rattlesnakes [*Crotalus horridus*] from Massachusetts. Journal of Zoo and Wildlife Medicine 46:86-94; Tetzlaff et al. 2015. First report of snake fungal disease from Michigan, USA involving Massasaugas, *Sistrurus catenatus* [Rafinesque 1818]. Herpetology Notes 8:31-33). Facial swelling and disfiguration, and invasion of skeletal muscle, maxillary bone and lungs have also been reported (Rajeev et al 2009. Isolation and characterization of a new fungal species, *Chrysosporium ophiodiicola*, from a mycotic granuloma of a black rat snake [*Elaphe obsolete obsoleta*]. Journal of Clinical Microbiology 47:1264-1268; Allender et al., 2011. *Chrysosporium* sp. infection in Eastern Massasauga rattlesnakes. Emerging Infectious Diseases 17:2383-2384; Latney and Wellehan 2013. Selected emerging infectious diseases of squamata. The Veterinary Clinics of North America. Exotic Animal Practice 16:319-338; Tetzlaff et al., 2015; Lorch et al., 2016). In wild populations, SFD infections are typically chronic and mortality likely results from secondary complications and exposure due to altered behavior rather than direct fungal infection (Lorch et al., 2016). SFD has the potential to severely impact snake populations (Clark et al., 2011. Decline of an isolated timber rattlesnake [*Crotalus horridus*] population: Interactions between climate change, disease, and loss of genetic diversity. Biological Conservation 144:886-891; Allender et al., 2015), yet the precise mechanisms that influence lethal outcomes are multifaceted and still unclear (Lorch et al., 2015; Guthrie et al., 2016). Therefore, increased monitoring for the disease through photographic documentation and via molecular analyses are necessary for the eventual management of the disease.

In September, 2014 four *Nerodia sipedon* (one of which was swabbed) that displayed symptoms consistent with SFD were observed at the Smithsonian Environmental Research Center (SERC) in Anne Arundel County, Maryland (Tupper et al., 2015. Northern Water Snake [*Nerodia s. sipedon*] MD: Anne Arundel Co. Smithsonian Environmental Research Center [38°53’24.81”N 76°33’27.04”W]. Catesbeiana 35:36-37). Although that note represented the first published report of clinical symptoms of SFD in Maryland, it was unconfirmed molecularly. The presence of SFD in the swabbed *N. sipedon* at SERC has since been confirmed via qPCR conducted by

specialists at the Veterinary Diagnostic Laboratory, College of Veterinary Medicine, University of Illinois, Urbana-Champaign. Additionally, over the last three years, we have consistently observed *N. spiedon* at the same location, presumably a hibernaculum, with the following symptoms: (1) major swelling, hyperkeratosis, or cracking and bleeding of the supralabials, infralabials, rostral and gulars, and (2) scute and body scale degradation and body scale nodules.

Although this note describes observations and confirmation of snake fungal disease in Anne Arundel County, Maryland, the site is only approximately 43 km from the western shore of the Potomac River in Virginia. This region includes several natural areas vital to the persistence of certain squamatids throughout Northeastern Virginia. Therefore, to reduce transmission of SFD, we recommend that VHS members photo document symptomatic snakes, and implement biosecurity measures when handling snakes and traveling between and within sites in Virginia and Maryland. If VHS members visit SERC and observe signs of SFD, please contact Robert Aguilar of the Smithsonian Environmental Research Center.

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President's Corner

Greetings fellow herp enthusiasts,

With the steamy summer days upon us we can reflect about the spring days when the herping was great. We had a pretty busy spring coordinating a total of 6 surveys and a 7th one is on the books for the fall. A big thanks goes out to Dave, Jason, Kelly, and Travis for planning and leading our surveys and also for all of our participants that tagged along!

The Longwood BioBlitz occurred at Longwood University in Prince Edward Co., Virginia on April 21st and was led by Dave Perry. The BioBlitz focused on all types of flora and fauna with 3 participants focusing on herpetofauna. Between the three participants 11 amphibians and reptiles were documented, including a Northern Black Racer which was a new record for the survey area.

The Survey of Ware Creek Wildlife Management Area in New Kent Co., Virginia was also led by Dave Perry. The survey occurred on two dates, April 29th and May 6th, where we had 15 and 14 volunteers respectively. Between the two dates there were 26 species documented – 12 amphibian species (8 anurans and 4 salamanders) and 14 reptile species (5 snakes, 4 lizards and 5 turtles).

I led the Annual Spring Survey at Lake Anna State Park in Spotsylvania Co., Virginia which occurred May 19-20th. We had over 60 participants between Saturday and Sunday (despite iffy weather on Saturday). Between the pre-survey and the actual survey 38 species of herps were documented, 10 of which were new county records for Spotsylvania Co., Virginia.

We also had the Reston BioBlitz led by Kelly Geer at Walker Nature Center in Fairfax Co., Virginia on June 2-3 and the 13th Annual HerpBlitz led by Jason Gibson at "The Cedars" Natural Area Preserve in Lee Co., Virginia on June 9-10th. Both of these surveys did not have totals of participants or animals at press time.

We still have at least one more survey on the books, our Vice President Travis Anthony will be leading a survey of Appomattox State Forest in Appomattox Co., Virginia. The state forest has over 22,000 acres, so only a smaller portion of the forest will be surveyed. The date is scheduled for the fall and is TBD.

Since my last correspondence we have been involved in more than just surveys. Funding grants focusing on Virginia's herpetofauna is also an important part to our organization. This past winter we voted on funding two research grants. The funding for the first grant went to Courtney Check of the College of William and Mary. Courtney will be using harmonic direction to track the American Toad (*Anaxyrus americanus*) and Fowler's Toad (*Anaxyrus fowleri*) to determine habitat utilization outside of the breeding season. The second grant that was funded went to Nathan Richendollar of Washington and Lee University. His project is comprised of a five-day survey looking for the Southern Dusky Salamander (*Desmognathus auriculatus*) and seeing if habitat declines are the reason why they haven't been documented in the past few VHS surveys.

Another project we have been in the works with is creating Frogs of Virginia. This will be detailed accounts of each frog species that occurs in Virginia written by the knowledgeable Joe

Mitchell, Virginia's premier herpetologist. Each account will be available on our website and it will be in the same vein as his 1994 work Reptiles of Virginia. We are still working out the logistics and hopefully will have some examples to show you all soon.
We all hope that you have a safe and cool summer and we'll see you in the Fall!

Matt Neff
VHS President

Treasurer's Report

A Treasurer's Report was not provided for the June Catesbeiana.

Virginia Herpetological Society
Winter Teleconference, 3 April 2018
Minutes of Meeting

Matt Neff, President of the Virginia Herpetological Society (VHS), opened the meeting at approximately18:04 hr. EST and provided the agenda for the meeting. VHS Executive Committee Members, Travis Anthony, Matt Becker, Jason Gibson, Larry Mendoza, John Orr, Dave Perry, Mike Salotti, Paul Sattler and John White also participated in the teleconference.

1. Surveys

a. Spring Survey

Matt Neff indicated the announcement for the Spring Survey at Lake Anna State Park (LASP) for the weekend of May19-21 was posted on the VHS website in January and to date 30 people have registered. It is anticipated that this will be a busy weekend at LASP and all campsites have been already filled. Parking is expected to be tight and VHS surveyors will be encouraged to arrive early. Sometimes the LASP entry gates can close by mid day due to capacity constraints although VHS park passes should be honored at the gate window (Matt Neff to verify). There are extensive hiking trails within the park which should provide for good survey opportunities away from the crowds. There is a ten bed bunkhouse at LASP and Matt Neff will also explore its potential availability for VHS members.

b. Herp Blitz

Jason Gibson, VHS Survey Committee Chair, provided an update on potential sites for the 2018 Herp Blitz. False Cape State Park (FCSP) is a leading candidate for this year. It is possible that the green anole may be present within FCSP. Jason has contacted Kyle Barbour, FCSP Park Manager about potential June dates. It will be important to reserve the FCSP school bus for transportation as there is no other vehicular access and FCSP is a multi-mile walk in from the entrance to Back Bay National Wildlife Refuge. June is apparently a busy time for school bus tours at FCSP. If a June date is not possible for FCSP, other potential Herp Blitz survey sites would include Northwest River National Preserve near Chesterfield (Cottonmouths, Canebrake Rattlesnakes and several species of Treefrogs) and Thompson Wildlife Management Area in northern Virginia.

c. Conservation Committee There are two potential survey events for this year.

i. Longwood University BioBlitz Dave Perry, VHS Conservation Committee Chair, mentioned that Sujan Henkanaththe Gedora, Biology Professor at Longwood, had requested VHS participation in the BioBlitz that he is coordinating and which is planned for April 21 from 09:00-13:00 hr for the wooded wetlands alongside Longwood's Lancer Park athletic fields in Farmville (Prince Edward County). A pre-survey site visit has been completed and the area is comprised of bottomland woods and wetlands adjacent to Buffalo Creek and the Appomattox River with good herp potential. A VHS website announcement for survey volunteers will be posted once registration information is received from Sujan.

ii. Ware Creek WMA Contact has been made with David Garst, supervisor of Ware Creek about a potential survey there this spring. VHS had worked with David in 2016 on the survey of

Chickahominy WMA. David seems enthusiastic about a Ware Creek VHS survey this spring. Ware Creek is a new WMA comprised of more 2600 acres of woodland and marsh. Two Sunday survey dates will be needed due to the acreage to be surveyed and the need to avoid the spring turkey hunt. Preliminary dates are April 29 and May 6. An announcement confirming these dates will be posted to the VHS website once a pre-survey site visit is completed and the dates are confirmed with David Garst.

2. Catesbeiana

Catesbeiana Vol. 37 No. 2 was published in November and Catesbeiana Vol. 38 No. 1 will be published in June. Paul Sattler, VHS Journal Editor, introduced Matt Becker as Co-Editor. Matt is currently employed by Liberty University and was previously employed by the Smithsonian Institution.

3. Newsletter

Bonnie Keller, VHS Newsletter Editor, was unable to participate in the teleconference. Matt Neff mentioned that the next Newsletter will probably have an end of March publication target date. Larry Mendoza, VHS Regulatory Affairs Chair, is planning to provide an outline of the Red Salamander state approval process for inclusion in the March Newsletter.

4. Website

Mike Salotti, VHS Community Outreach Committee Chair, temporarily filled in for John White, VHS Webmaster after the 2017 Fall Meeting and has been named Co-Website Manager. Mike will be fully trained by John. John is currently updating the website framework which requires the password be changed every few days in an automatic change cycle. Once the website framework changes are complete, John will share the password with Mike and select members of the Executive Management Committee. Meanwhile, all of the texts of “The Reptiles of Virginia” and 30 pages of reference notes have been added to the web page.

5. Permits

Susan Watson, VHS Permits Committee Chair, was unable to participate in the teleconference but reports that both the VDGIF Display/Exhibitor and Scientific Collection permits have been updated for 2018 and were sent out to the VHS Executive Management Committee.

6. Regulatory Affairs

In addition to assisting with the legislative effort to nominate the Red Salamander as the Virginia State Salamander, Larry Mendoza has been working with the government personnel in Richmond to develop common sense exotic snake regulations.

7. Amphibians/Frogs of Virginia

Jason Gibson led the discussion on the possibility of retaining Joe Mitchell for amphibian/frog species accounts as a follow-up to the conversation initiated at the 2017 Fall Meeting. Jason emphasized the vast knowledge and unique data base possessed by Joe Mitchell as evidenced by

his previous publication "The Reptiles of Virginia" and the recent Virginia bibliography project Joe completed for VHS. There was no disagreement about Joe Mitchell's qualifications to complete extensive Frog species accounts. Also the importance of the potential project, its contribution to the VHS legacy was noted and generally accepted.

However, the issue of the cost associated with the potential project prompted a lot of discussion. Joe has provided an estimate of $1.0-1.5k per frog species account. Species with fewer data records, i.e Mountain Chorus Frog could be completed at the lower dollar estimate whereas species with voluminous data records, i.e. Green Frog would require the higher dollar estimate. There are 28 Virginia frog species, which would bring the total project cost to $28-42k. Matt Close, VHS Treasurer, could not participate in the teleconference and the current VHS treasury balance was not available during the teleconference. After some discussion, the group estimated that current cash on hand is probably $10-12k (Matt Close to confirm). Mike Salotti suggested that VHS should limit its current year financial participation to the estimated revenue of annual membership renewals in order to maintain the VHS cash position. This was the approach successfully taken with the Virginia herpetological bibliography project. Mike reported that VHS currently has 225 members of which 50 are Lifetime members. Membership should increase as we approach the Spring Survey dates. Mike estimated that VHS could anticipate annual revenue of $2.5-3.0k through membership renewals and new lifetime memberships. With this financial limitation, many years would be required to complete the frog project. Alternative fund raising methods (Go Fund Me Page?) will be required to complete the project in a timely manner. Other fundraising events could occur as well as looking for applicable grants to fund the project.

Many of the participants recommended that VHS fund two frog species accounts for 2018, one each at the lower and higher end of the cost estimate range. Matt Neff directed Jason to proceed to obtain a memorandum of understanding to be executed between Joe Mitchell and the VHS President. Authorization to expend the funds was put to a voice vote of the VHS Executive Committee Members in attendance and was unanimously approved.

8. Grants Update

Kory Steele, VHS Grants Committee Chair, was unable to participate in the teleconference but did report on 3 VHS grant proposals under consideration for 2018.

Blaine Hiner-Snake Survey in the College Woods @ William & Mary **(denied)**

Courtney Check-Movement Ecology and Non-Breeding Habitat of Two *Anaxyrus* Species **(approved)**

Nathan Richendollar-A Proposal to Survey *Desmognathus auriculatus* in Southwest Virginia **(likely to be approved with limitations)**

9. Facebook

John White indicated that VHS needs to improve its response time to herp ID requests on Facebook. Current members with administrative access to Facebook include Bonnie Keller, Matt Neff, Dave Perry, Matt Salotti and Kory Steele.

10. Logo Update

John White reported that the most popular new logo candidate is based on Paul Sattler's suggestion: black border surrounding the green Commonwealth of Virginia, the state snake and the state salamander. VHS will proceed with a vote for the new logo at the Spring Business Meeting provided Larry Mendoza can confirm that the Governor has signed the Red Salamander legislation into law.

11. Other Items

John White suggested VHS consider dropping the student membership with its $8 dollar annual fee. It is hard to verify student status as related email addresses are often not connected to the academic institution. Mike Salotti checked the membership listing and identified 22 current student members out of a total membership of 225 or approximately 10%. With the low% it was decided not to change the current student membership fee program. Also, the experience of the student outreach program of Dave McLeod in Harrisonburg was cited. It was difficult to get students to participate in surveys. As VHS hopes to attract more student involvement, perhaps the grant program could be of benefit.

Travis Anthony, VHS Vice President, highlighted two projects he is working on. The first is the possibility of establishing a VHS license plate. A minimum of 450 subscribers would be necessary to get a customized VHS license plate. Some participants suggested that it might be easier to get to 450 or more license plate commitments if it was a general herp theme rather than a license plate specific to VHS. Travis has also developed a preliminary listing of potential autumn survey sites, which he will further refine over the next few months.

Paul Sattler mentioned that the increased page count of recent issues of Catesbeiana have made mailing of paper copies more bulky and difficult. Currently, 9 or 10 paper copies are mailed but 4 to 5 of those are for the archives of museums. Some of the participants suggested that VHS charge an extra fee for 5 non-museum recipients. No decision was taken.

With no additional topics to discuss, the meeting was adjourned by Matt Neff at approximately 19:00 hr EST.

David A. Perry
VHS Secretary

Virginia Herpetological Society
Spring Survey Business Meeting
18 May 2018
Minutes of Meeting

Matt Neff, President of the Virginia Herpetological Society (VHS), opened the meeting at approximately18:30 hr. EDT and provided the agenda for the meeting. VHS Executive Committee Members, Travis Anthony, Kelly Geer, Jason Gibson, Larry Mendoza, Dave Perry, and Kory Steele also participated in the meeting.

1. Surveys

a. Longwood BioBlitz 4/21

Dave Perry, VHS Conservation Committee Chair, briefly summarized the results of the third annual Longwood University BioBlitz. The area north and east of Lancer athletic fields in Farmville was surveyed for all species on Saturday April 21, 2018 from 9:00 to 12:00 hr. The habitat is mixed woods and wetlands between Buffalo Creek and the Appomattox River. It appeared there were more than 70 participants, although the final headcount statistics are not yet available. There were only 3 participants focused on amphibians and reptiles. More than 226 species were documented including 11 amphibians and reptiles. A captured Northern Black Racer was a new record for the survey area. A survey summary has not yet been posted to the VHS website as we are awaiting a preliminary report from Longwood University.

b. Ware Creek WMA 4/29, 5/6

Dave Perry provided a summary of the results of the Ware Creek surveys on April 29 and May 6, 2018. A total of 15 (4/29) and 14 (5/6) herpers participated. Despite unseasonably cool conditions on April 29 and overcast skies on May 6, 26 amphibian and reptile species were documented. Four species with VDGIF conservation status were observed, including Tier IV, Common Ribbon Snake and Eastern Mud Salamander (larvae) and Tier III Spotted Turtle and Woodland Box Turtle. Three adult Spotted Turtles were found in 3 different creeks and wet areas which feed the brackish marsh along the York River.

c. HerpBlitz

Jason Gibson, VHS Survey Committee Chair, provided a preview of the 2018 HerpBlitz, scheduled for June 9-10. The selected survey site is “The Cedars” Natural Area Preserve in Lee County, which will be the most southwest survey VHS has ever conducted. This area has only been surveyed twice, by Steve Roble and Chris Hobson between 1995-2002 and somewhat by Joe Mitchell. The site is a series of separate blocks of acreage with extensive limestone ridges, sinkholes, sinking streams and caves. Interesting species with document potential include Green and Cave salamanders, Map Turtles and Eastern Black Kingsnakes. A pre-site survey will happen within the next two weeks. To date 9 potential participants have pre-registered. Jason said there was an attempt to make False Cape State Park the site for the 2018 HerpBlitz but his contacts were not sufficiently responsive this year. False Cape State Park is a potential 2019 HerpBlitz candidate.

d. Fall Survey

Travis Anthony, Vice President of VHS, updated the status of the planned 2018 Fall VHS survey, Appomattox State Forest has been selected as the survey site. However, this site consists of approximately 20, 000 acres, which is an enormous tract. Holiday Lake State Park is nearby. The next step is a pre-site survey to select the tract(s) to be surveyed. Travis will try to identify the first 2000 acres of targeted survey area soon. A Sunday survey date in September is the current plan. Kory Steele, VHS Grants Committee Chair, suggested that the 20,000 acres of Appomattox State Forest might be a good location for a multi-year survey.

e. Reston BioBlitz

Kelly Geer provided details about the annual Reston BioBlitz which is scheduled for June 2 & 3. Kelly and Caroline Seitz will be guiding the herpetological effort. Reston has more than 1300 acres of open area and groups will be assigned to survey a specific area. Kelly indicated that the city of Reston had undertaken substantial stream restoration and added 14 miles of paved trails. Volunteers can register on the VHS website and can meet in either the morning or afternoon at the Walker Nature Center in Reston.

2. License Plates

Travis Anthony outlined the state requirements for a VHS license plate. A minimum of 450 people would need to apply in order for legislative consideration, which will be an impossible target for VHS. The application fee is $25 per person. Susan Watson, VHS Permits Chair, told Travis that VDGIF might pursue wildlife conservation license plates and was enthusiastic about the possibility of including the Virginia State Snake (Eastern Garter Snake) and Virginia State Amphibian (Red Salamander) in their license plate program.

3. VHS Graphics

a. Logo

John White, VHS webmaster, was unable to attend the meeting but provided a new proposed VHS logo that included an Eastern Garter Snake and Red Salamander, against a green Commonwealth with a black border. In general the logo concept was very well received but there were concerns about the quality of the Eastern Garter Snake image. Matt Neff will contact John to see if the quality can be improved. The 60 year logo is now on the VHS website.

b. T-shirt

John White has proposed two new T-shirt designs. The first contains an image of a Green Salamander and the other contains an image of a Timber Rattlesnake. There was no vote taken on T-shirt preferences. There was discussion about T-shirt inventory issues. Past problems have included pre-order amounts and T-shirt size projections. One suggestion was to include T-shirt questions with membership renewal registration, such as quantity desired, size and pattern preference.

4. Online Stuff
a. Website

Passwords are now shared between John White and Mike Salotti, VHS Community Outreach Committee Chair. There are several new items that have been added to the VHS website including Milk Snake identification graphics, Red-bellied Cooter vs. Red-eared Slider identification graphics, Eastern Painted Turtle vs. Red-eared Slider identification graphics and a Frog Call quiz. The Joe Mitchell bibliography was updated with John Orr providing meticulous edits.

b. Facebook

VHS members posting on the VHS Facebook page need to make sure they respond in a timely manner to questions concerning the original post. Uniformed pattern Northern Watersnake identification & information was added.

c. ID

With the addition of two more VHS members with Facebook administrative access, herp ID response time has significantly improved. Location (county/city) information should be requested from the person asking for an ID. The location given should be checked against the known VA range to identify new county/city records. The procedure for checking the VDGIF and VHS database for the current known range of a species can be found here: http://virginiaherpsociety.com/cr/

5. Frog Accounts

VHS has discussed the possibility of retaining Joe Mitchell to develop Frog species accounts similar to the detailed reptile accounts in his book "The Reptiles of Virginia". The preliminary price range provided by Joe Mitchell is $1,000-1,500 per species account. The lower figure would pertain to species with fewer records (small species account) such as the Mountain Chorus Frog and the higher figure would pertain to species with more numerous records (large species account) such as the Green Frog. Virginia has 28 frog species. The total funds required to complete the project would be $28-42k. A discussion about funding ensued. It was felt that a Go Fund Me or similar fund raising effort would be required to complete the project. Evidently, Joe Mitchell would be prepared to acknowledge individual or group sponsorship for each species account. The discussion shifted to the current VHS Treasurer summary report, which was provided by Matt Close, VHS Treasurer, who was unable to attend the meeting. The current VHS bank account balance is $14,243.15. However, $794.00 VHS Grants have been awarded but the checks are not yet cashed. The current net balance is $13,449.15. VHS can easily fund the first two frog species accounts. It was decided that VHS should proceed with two Joe Mitchell frog species accounts and fund these. It was requested that Matt Neff execute a Memorandum of Understanding (MOU) with Joe Mitchell. The first two species will be defined in the MOU. Once these species accounts are completed to VHS satisfaction, public fund raising options will be considered.

6. Catesbeiana

Neither Paul Sattler,VHS Journal Editor, nor Matt Becker could attend the business meeting. However, they did provide a written report. The June 2018 issue of Catesbeiana will contain three survey reports and a paper on anuran disease in northern Virginia and Maryland and about 20 field notes. A full issue is anticipated. Specific manuscripts are **1**-Herpetological Survey of Big Woods State Forest and Wildlife Management Area 23 April & 7 May 2017, David A. Perry **2**-A Herpetological Survey of Dixie Caverns and Explore Park in Roanoke, Virginia and the Wehrle's Salamander, Matthew Neff, **3**-A Herpetological Survey of Mole Hill in Rockingham County, Matthew Neff, **4**- An investigation of co-infection by *Batrachochytrium dendrobatidis* and *Ranavirus* (FV3) in anurans of two natural areas in Anne Arundel County, Maryland and Fairfax County, Virginia, USA, Lauren D. Fuchs, Todd A. Tupper, Christine A. Bozarth, David Fernandez, Robert Aguilar.

7. Newsletter/Catesbeiana Dates

Catesbeiana: June/November, Newsletter: March/September

8. Regulatory Affairs

Larry Mendoza, VHS Regulatory Affairs Chair, described his support to Anna Kim and the 4H Club and their effort to get legislative approval for the Red Salamander as the Virginia State Salamander and his visit to the senate to support the legislation(although in the end his testimony was not required). The Richmond City Animal Control has been slow to draft a City Ordinance regarding snake ownership. Larry will have the opportunity to review a draft of the ordinance, once it is ready. Larry has been very active with education and exhibitions and brought live snakes to several events. Exhibitions included Science Day at J. Sargent Reynolds Community College (3/14), Virginia Living Museum Reptile Day (3/17, 3/18), Waynesboro Riverfest (4/28) and Mason Neck Eagle Fest (5/12). Larry conducted two educational/training events including a herpetology presentation for the Faquier County Junior SPCA Volunteer Program (3/26) and field herpetology training for 50 teachers from two different independent school districts in Texas, sponsored by Jason Osborne, Chief Innovation Officer, for the Ector County Independent School District. He also attended a Venomous Handling Certification Course in Atlanta provided by the Eastern Diamondback Conservation Foundation.

9. Treasurer

Matt Close provided some written suggestions for funds usage to improve the VHS image and experience. Some of the suggestions included **outreach materials** such as better signage, more/better event promotional materials (decals, t-shirts etc.) and more live animal cages, **awards/recognition** for both VHS members (Member of the year) and other individuals actively involved in herp education, **Fall Meeting improvements** such as more refreshments and different venues and **survey equipment and materials** such as folding tables and chairs, snake hooks dip nets and waders.

10. Outreach

Mike Salotti, VHS Community Outreach Committee Chair, was unable to attend the meeting. However, the Community Outreach Committee effort to remind annual VHS members to renew their membership appears to be paying off as VHS currently has 215 annual members. Total membership, which includes 51 lifetime members, is now 266, which is the highest total in recent years.

11. Grants update

Kory Steele stated 3 of 4 2018 grant applications had been approved and one was not approved. Kory indicated that he had issues receiving VHS emails (VHS Newsletter link) and thought other members might also have issues. He suggested VHS consider Constant Contact, an email marketing tool. Documents like the Newsletter could be burnt into an email blast and each recipient can determine whether to click onto the Newsletter. With Constant Contact, the sender could also see who accessed what. At a minimum it was suggested that a test email be sent to all members to verify successful transmission.

12. Follow up from Winter Teleconferences

With the addition of two new people with Facebook administrative access, response times appear to have improved. VHS will be reaching out David Mcleod of James Madison University, to get more students involved. David is currently out of the country. No decision was taken on whether to charge an additional fee for the 5-6 non-museum recipients of printed copies of Catesbeiana. There were some opinions that the fee recovery potential is not worth the effort.

13. Other Topics

Larry Mendoza suggested that VHS provide a Certificate of Appreciation or some other formal acknowledgement to Anna Kim and the 4H Club for their effort to get the Red Salamander accepted as the Virginia State Salamander and a similar acknowledgement should be provided to the person(s) behind the Eastern Garter Snake selection as Virginia State Snake.

With no additional topics to discuss, the meeting was adjourned by Matt Neff at approximately 19:30 hr EDT.

David A. Perry

VHS Secretary

Field Notes

The field notes section of *Catesbeiana* provides a means for publishing natural history information on Virginia's amphibians and reptiles that does not lend itself to full-length articles. Observations on geographic distribution, ecology, reproduction, phenology, behavior, and other topics are welcomed. Field Notes will usually concern a single species. The format of the reports is: scientific name (followed by common name in parentheses), state abbreviation (VA), county and location, date(s) of observation, observer(s), data and observations. The name(s) and address(es) of the author(s) should appear one line below the report. Consult the editor if your information does not readily fit this format. **All field notes must include a brief statement explaining the significance of the record** (e.g., new county record) **or observation** (e.g., unusual or rarely observed behavior, extremely early or late seasonal record, abnormal coloration, etc.). Submissions that fail to include this information are subject to rejection. Relevant literature should be cited in the body of the text (see Field Notes in this issue for proper format). All submissions will be reviewed by the editor (and one other person if deemed necessary) and revised as needed pending consultation with the author(s).

If the field note contains information on a **new county (or state) record**, **verification is required in the form of a voucher specimen** deposited in a permanent museum (e.g., Virginia Museum of Natural History) or a **photograph** (print, slide, or digital image) **or recording** (cassette tape or digital recording of anuran calls) deposited in the archives of the Virginia Herpetological Society. Photographs and recordings should be sent to the editor for verification and archiving purposes; the identity of voucher specimens must be confirmed by a museum curator or other qualified person. Include the specimen number if it has been catalogued. Prospective authors of distribution reports should consult Mitchell and Reay (1999. *Atlas of Amphibians and Reptiles in Virginia*), Mitchell (1994. *The Reptiles of Virginia*), and Tobey (1985. *Virginia's Amphibians and Reptiles: A Distributional Survey*) [**both atlases are available on-line on the VHS website**] as well as other recent literature to determine if they may have a new county record. New distribution records from large cities that formerly constituted counties (Chesapeake, Hampton, Newport News, Suffolk, and Virginia Beach) are acceptable, but records from smaller cities located within the boundaries of an adjoining county will only be published if the species has not been recorded from that county. Species identification for observational records (e.g., behavior) should be verified by a second person whenever possible.

PHOTOGRAPHS

High contrast photographs (prints, slides, or digital images) of amphibians and reptiles will be considered for publication if they are of good quality and are relevant to an accompanying article or field note. Digital images are preferred. Prints should be on glossy paper and no larger than 5 x 7 inches. Published photographs will be deposited in the Virginia Herpetological Society archives.

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