A Herpetological Survey of James River State Park

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Introduction

Annually the VHS picks a survey site in a location where little to no previous work has been conducted. James River State Park was selected because it met this criterion and appeared to have suitable habitat and facilities to host the VHS's largest yearly event. James River State Park is located in the middle of the James River watershed basin. This unique area serves as a crossroads of sorts where warm-loving species and cold-loving species ranges are ending or beginning. The location of this park is special in that the James River headwaters carve a path through the north/south mountains in Virginia and the river flows to the coastal plain. Being located in the piedmont, sandwiched between mountains to the west and the coastal plain to the east, the James River basin corridor has allowed the expansion and contraction of psychrophilus and thermophilus reptiles and amphibians as the climate has warmed and cooled throughout the past (Hoffman, 1987). The Piedmont can have a unique assemblage of species with a mix of cold and warm adapted animals. It was hoped that by selecting this park some interesting information could be gained about the biogeography of amphibians and reptiles in the area.

The James River watershed comprises about 25,900 square kilometers and covers approximately 25% of the state. Flowing through the drainage basin is the James, a 547 kilometer long river. This river begins in the Allegheny Mountains and flows in a west to east direction and empties into the Chesapeake Bay. Some 37 counties and 19 cities are impacted by the watershed. The Virginia Herpetological Society has surveyed sites within the upper, middle, and lower James numerous times (see discussion below).

James River State Park is located in Gladstone, Virginia and is found in Buckingham County. The park opened June 20, 1999. It is found in the piedmont physiographic province and the elevation ranges from 110 to 206 meters. The park consists of 632 hectares and has many trails, ponds, camping areas, and river front access for use by the public. The public mainly uses this park for camping, hiking, fishing, river access, and horseback riding.

Study Sites

James River State Park was divided into eleven distinct sites to survey. Because of limited groups and time, Sites 5 and 7 were not able to be examined during this survey. The sites which were surveyed are found below.

Site 1 (37° 36’ 54.30”N, 78° 48’ 37.05”W) This site was in the Southwestern corner of the Park, along the James River. It included the river, meadows and woodlands parallel to the river.

Site 2 (37° 37’ 11.61”N, 78° 49’ 9.88”W) Site 2 occupied the northwest side of the Park, along the James River. It included the River Trail, Cabell Creek Connector Trail and freshwater impoundments along the river. Dominant trees included the Silver Maple, Sycamore, Walnuts, and Box Elders. The understory included stinging nettle.

Site 3 (37° 37’ 51.51”N, 78° 48’ 59.19”W) Site 3 occupied a long narrow section along the northern side of the Park, along the James River. It included the River Trail which parallels the James River, and freshwater impoundments in the floodplain. Dominant trees included Silver Maple, Sycamore and Box Elder. The understory consisted of a lot of grasses along the River Trail, Raspberries and Poison Ivy.

Site 4 (37° 38’ 10.58”N, 78° 47’ 49.22”W) Site 4 occupied the northeastern side of the Park. It included the Branch Trail, Branch Pond Loop Connector Trail, and Branch Pond. The upland forest consisted of mixed pines and hardwoods

Site 6 (37° 37’ 40.08”N, 78° 47’ 48.61”W) Site 6 occupied the South central portion of the Park. It consisted of a mixed hardwood/pine forest with Loblolly Pine, Red Oak, Sassafras, Tulip Poplar, Sugar Maple, Red Maple, Dogwood and Beech. The understory included Devil’s Walking Stick, Paw Paw and Lycopodium. The site included part of the stream leading to Branch Pond.

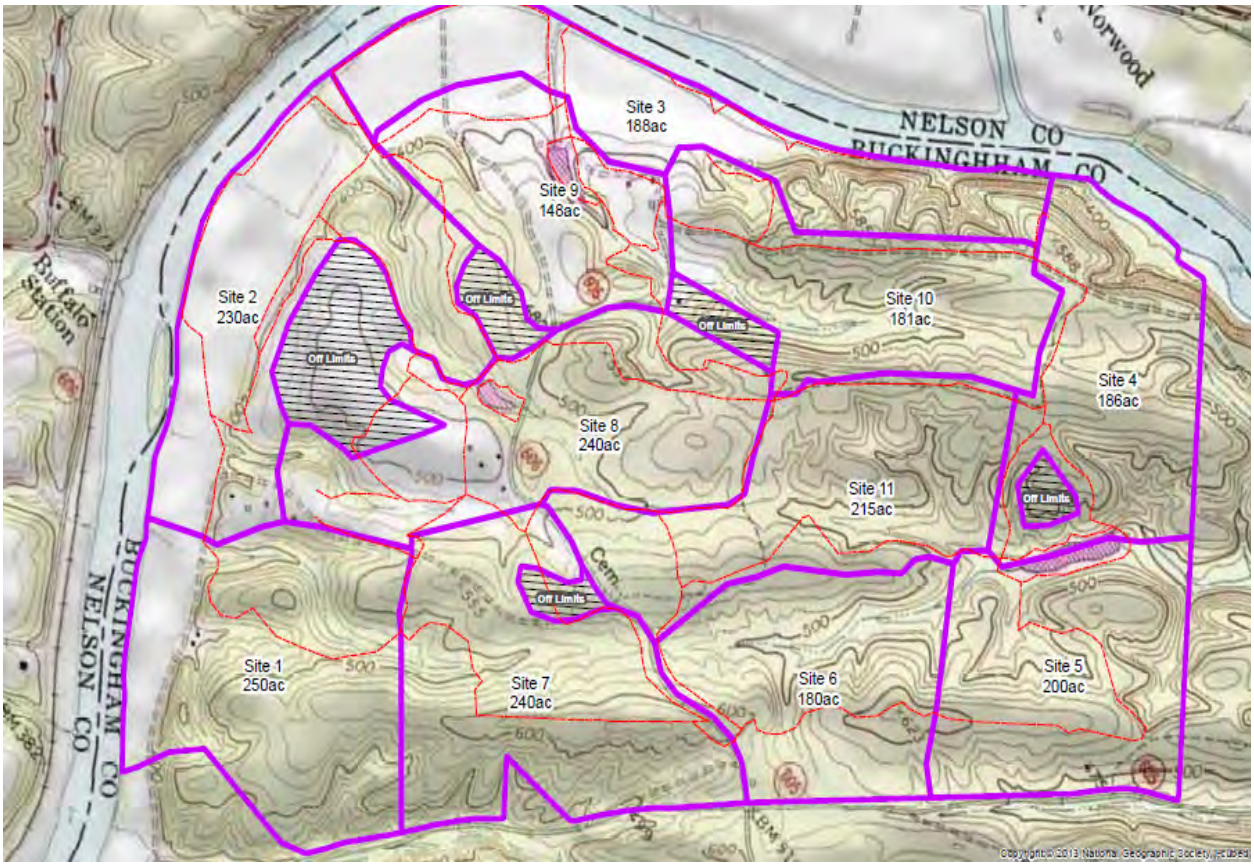
Site 8 (37° 37’ 28.45”N, 78° 48’ 31.19”W) Site 8 occupied the center of the Park. This site included Taylor Pond with the Cabin Loop Trail and two small vernal pools off the Dixon Trail. The terrain consists of upland Hardwood forest with Sweet Gum, Beech, Sugar and Red Maple, Tulip Poplar and White Oak predominating.

Site 9 (37° 37’3 7.50”N, 78° 48’5 6.19”W) Site 9 occurred in the central northern portion of the Park. It included Green Hill Pond and its Loop Trail, the stream coming out of Green Hill Pond, and portions of the Cabell and Dixon Trails. Dominant trees include Beech, Box Elder, Hickory, White Oak, Sweetgum, Dogwood, Red Maple and Lowbush Blueberries in the understory.

Site 10 (37° 38’ 18.15”N, 78° 47’ 58.45”W) Site 10 is located in the northern portion of the Park. It consists of rolling hills on a high ridge overlooking the floodplain of the James River. It includes the northern portion of the Cabell Trail down to the Tye River Overlook.

Site 11 (37° 37’ 50.29”N, 78° 48’ 0.84”W) Site 11 was located in the center of the Park, consisting of upland hardwood forest with White Oak, Red Cedar, American Birch, Tulip Poplar, Sassafras, Sycamore, Red Oak and Chestnut Oak. The understory included Blueberry, Mountain Laurel, Paw Paw and Lady Slipper Orchids.

Figure 1. Map showing survey areas.



Materials and Methods

During the survey weekend of 17-18 May 2014, 50 volunteers were divided into 8 survey groups. Each survey group was tasked to survey a specific site for the duration of the survey time period on 17 May. Additional sites were surveyed on 18 May. Survey techniques included dipnetting, overturning cover objects, visual encounter, listening for calling anurans, use of baited hoop turtle traps, hand capture, and observing roads for live and dead animals. Visual inspections were made of animals hand captured. These inspections looked for malformations, injuries, disease, and parasitic infections. Individual group leaders were tasked with recording all observations on standardized recording sheets. Digital photographs were taken of species thought to be rare, diseased, or county records.

Results

A total of 16 species of amphibians (eight anurans and eight salamanders) and 18 species of reptiles (five turtles, three lizards, and ten snakes) were found during the weekend survey. A total of 413 animals were found from Saturday to Sunday. Two new county records were found and include *Scincella lateralis* and *Storeria o. occipitomaculata*. A juvenile albino Northern Watersnake was discovered on the edge of a small stream at Site 2. Two species, *Lithobates palustris* and *Desmognathus fuscus* were found to be parasitized by intradermal trombiculid mite larvae. Table 2. summarizes the species and numbers of animals found at each survey site.

Table 2. Summary of the number of animals observed at each site, James River State Park.

Site	1	2	3	4	6	8	9	10	11	Total
Amphibians										
Acris crepitans	9	18	15	8		4	34	4		92
Anaxyrus a. americanus							1			1
Anaxyrus fowleri	1		4	1	1					7
Hyla versicolor						1C,1				2
Lithobates catesbeianus			1C			1				2
Lithobates clamitans	1		3, 2C	1C	1	2	1C			11
Lithobates palustris	2				1		1			4
Pseudacris crucifer						1, 40+				41
Ambystoma maculatum						8E				8
Ambystoma opacum						6L				6
Desmognathus fuscus	14	2		15	7					38
Eurycea cirrigera	2			1	7					10
Notophthalmus v. viridescens	5	6	1	6	5	2	24	11	4	64
Plethodon cinereus	11	7		3		1			7	29
Plethodon cylindraceous		1			3			1		5
Pseudotriton r. ruber				1	2			2		5
Reptiles										
Chelydra serpentina			4							4
Chrysemys p. picta			3					1		4
Pseudemys c. concinna			1				1	3		5
Sternotherus odoratus								2		2
Terrapene c. carolina	2	1		1	2			1	1	8
Plestiodon fasciatus	1	1		2	1	3		6		14
Sceloporus undulatus	1				1	3		2		7
Scincella lateralis		1								1
Agkistrodon contortrix mokasen	1									1
Carphophis a. amoenus	4	2		3	1	3	1	4	1	19
Coluber c. constrictor	3					1				4
Diadophis punctatus		1		1						2
Heterodon platyrhinos		1	1							2
Nerodia s. sipedon		1	3			1				5
Opheodrys aestivus		1						1		2
Pantherophis alleghaniensis	1		2	1S		1				5
Storeria o. occipitomaculata	1									1
Thamnophis s. sirtalis			2							2
	59	43	42	44	32	79	63	38	13	413

E=eggs, L=larvae, C=calling males.

Annotated Checklist

Amphibians
Anurans

1. *Acris crepitans* (Eastern Cricket Frog) Cricket Frogs were found at Sites 1, 2, 3, 4, 8, 9 and 10. It was the most numerous Amphibian found in the Park with a total of 92 recorded. They were found along creeks, on the short of ponds, and along the shore of the freshwater impoundments along the River.

2. *Anaxyrus a. americanus* (American Toad) A single American Toad was found at Site 9. It was found along the stream draining Green Hill Pond into the James River.

3. *Anaxyrus fowleri* (Fowler's Toad) Fowler's Toad was the more common toad found at James River State Park, which is not unexpected considering the sandy soil found along the river. They were found at Sites 1, 3, 4 and 8. They were found in a variety of habitats, including the grassy area around a barn, in the leaf litter in the forest, and along the River Trail near the James River.

4. *Hyla versicolor* (Gray Treefrog) On May 31, 2014, prior to the survey during one of the preliminary scouting trips with Mike Hayslett, one Gray Treefrog was heard and another seen near the vernal pools at Site 8.

5. *Lithobates catesbeianus* (American Bullfrog) Bullfrogs were reported from Sites 3 and 8. The Bullfrog at Site 3 was calling from one of the large freshwater impoundments along the river. The one at Site 8 was a large adult seen in one of two vernal pools.

6. *Lithobates clamitans* (Green Frog) Green Frogs were seen and heard at Sites 1, 3, 4, 6 and 8. The Green Frog at Site 1 was found dead in a marsh area. Others were either seen or heard calling from the ponds and vernal pools in the Park.

7. *Lithobates palustris* (Pickerel Frog) Pickerel Frogs were observed at Sites 1, 6 and 9. They were reported from streams and their banks. One found under a rock in a stream at Site 1 was infested with intradermal trombiculid mite larvae.

8. *Pseudacris crucifer* (Spring Peeper) Spring Peepers were found at one of the vernal pools in Site 8. One adult was observed on the bank of the pool and more than 40 tadpoles were observed in the pool.

Salamanders

9. *Ambystoma maculatum* (Spotted Salamander) One adult and 8 egg masses of Spotted Salamanders were observed in the vernal pools at Site 8. The eggs had already hatched.

10. *Ambystoma opacum* (Marbled Salamander) Six Marbled Salamander larvae were dipnetted from one of the two vernal pools on Site 8.

11. *Desmognathus fuscus* (Northern Dusky Salamander) Northern Dusky Salamanders were found at Sites 1, 2, 4 and 6. Most were found under rocks in streams or under logs nears streams. One from under a rock in a stream and one from under a log on land were found to be parasitized by intradermal trombiculid mite larvae.

12. *Eurycea cirrigera* (Southern Two-lined Salamander) Adult and larval Southern Two-lined Salamanders were found at Sites 1, 4 and 6. All were found in or along streams.

13. *Notophthalmus v. viridescens* (Red-spotted Newt) Newts were found at all nine sites surveyed. Most were the terrestrial eft stage found under logs or rocks on the forest floor, but some adults were found in the large water impoundments in the river's floodplain.

14. *Plethodon cinereus* (Eastern Red-backed Salamander) Red-backed Salamanders were found at Sites 1, 2, 4, 8 and 11. All were found under logs on the forest floor.

15. *Plethodon cylindraceous* (White-spotted Slimy Salamander) Slimy Salamanders were found at Sites 2, 6 and 10. All were found under logs on the forest floor.

16. *Pseudotriton r. ruber* (Northern Red Salamander) Red Salamanders were found within Sites 4, 6 and 10. All were found under logs on the forest floor.

Reptiles

Turtles

17. *Chelydra serpentina* (Snapping Turtle) Snapping Turtles were caught in a hoop trap in a large freshwater impoundment within Site 3.

18. *Chrysemys p. picta* (Eastern Painted Turtle) Painted Turtles were observed in the water or basking within Sites 3 and 9. At Site 3 one was observed basking on a mat of brambles about a meter from the shore and another in the water. Another was observed basking in Green Hill Pond in Site 9.

19. *Pseudemys c. concinna* (Eastern River Turtle) River Turtles were observed within Sites 3, 8 and 9. Several were observed basking in the James River or Green Hill Pond. A hoop trap set in Taylor Pond caught a male which was photographed prior to release.

20. *Sternotherus odoratus* (Eastern Musk Turtle) Two Musk Turtles were observed in Site 9. One was in an herbaceous wetland area and the other on a trail between streams.

21. *Terrapene c. carolina* (Eastern Box Turtle) Box Turtles were found in Sites 1, 2, 4, 6, 10 and 11. One was found dead, another shell was found. Others were out foraging although one was found under a brush pile.

Snakes

22. *Agkistrodon contortrix mokasen* (Northern Copperhead) A single copperhead was found under a tarp near a barn in Site 1.

23. *Carphophis a. amoenus* (Eastern Wormsnake) Wormsnakes were found in every site sampled except Site 3. They were found under rocks or logs, inside rotten logs, or under the bark of old logs.

24. *Coluber c. constrictor* (Northern Black Racer) Racers were found at Sites 1 and 8. They were found in a brush pile, under a tarp and one was crossing the road by the cabins. One of the Racers from under a tarp showed scars from a past injury.

25. *Diadophis punctatus* (Ring-necked Snake) Ring-necked Snakes were found one each in Sites 2 and 4. Both were found under logs in a forest habitat.

26. *Heterodon platyrhinos* (Eastern Hog-nosed Snake) Two Hog-nosed Snakes were found, one each in Sites 2 and 3. Both were found in the tall grass found along the River Trail as it runs along the James River. Both were the melanistic color phase.

27. *Nerodia s. sipedon* (Northern Watersnake) Watersnakes were found in Sites 2, 3 and 8. The one from Site 2 was a juvenile caught along a small stream which was albino. It was extensively photographed and donated to the Virginia Living Museum in hopes they would be able to maintain it in a captive setting as it was unlikely to survive in the wild. Others were observed in a small stream flowing from Green Hill Pond. One was observed basking on a tree branch along the shore of Taylor Pond.

28. *Opheodrys aestivus* (Northern Rough Greensnake) One Greensnake was observed on a log by one of the freshwater impoundments in Site 2. The other was seen in low bushes in Site 10.

29. *Pantherophis alleghaniensis* (Eastern Ratsnake) Ratsnakes were observed in Sites 1, 3, 4 and 8. A 1.2 meter adult was seen in a brush pile in Site 1. Two adults were observed along the James River, one in tall weeds along the River Trail and the second in a picnic area along the

River. A skin was found along the shore of Branch Pond. A final Eastern Ratsnake was found in grass beside a lone tree in a field near the Cabin Trail. This snake had a scar on its back from an old injury.

30. *Storeria o. occipitomaculata* (Northern Red-bellied Snake) A single Red-bellied Snake was found under a small piece of bark near the barn near Canoe Landing Road in Site 1. This represents the first record of this species in Buckingham County. A voucher photo was deposited in the VHS Archive #358.

31. *Thamnophis s. sirtalis* (Eastern Gartersnake) Two adults were found in the tall weeds growing along the River Trail near the James River in Site 3.

Lizards

32. *Plestiodon fasciatus* (Common Five-lined Skink) Both juveniles and adults were found basking on logs and buildings at Sites 1, 2, 4, 5, 6 and 8.

33. *Sceloporus undulatus* (Northern Fence Lizard) Fence Lizards were found basking on downed logs and trees at Sites 1, 5, 6, and 8.

34. *Scincella lateralis* (Little Brown Skink) A single Little Brown Skink was found running along the side of a downed log at Site 2. The lizard was captured, photographed, and released at the site of capture. A digital photograph was deposited in the VHS Archive (#359) as this represents a new record for Buckingham County.

Discussion

The Virginia Herpetological Society is beginning to have a major impact on how we view the distribution of reptiles and amphibians in Virginia. By sponsoring the journal Catesbeiana we allow authors to publish articles and field notes on species' distributions. The society also conducts at least two surveys each year, an annual spring survey and a HerpBlitz survey which allows members to aid in collecting distributional and natural history data on Virginia's herpetofauna. This accumulated knowledge is giving a better sense of species distribution around the state. The James River Watershed is a perfect example to see how the VHS, through surveys and the publication Catesbeiana, has allowed us to better understand the biogeography of reptiles and amphibians in Virginia. Viewed at a watershed level, the VHS has conducted surveys and published accounts of surveys extending from the headwaters of the James to its mouth (Hoffman, 1985; Wright, 1988; Buhlmann and Hayslett, 1991; Young, 1993; Sattler, 1995; Adams et.al., 1996; Roble, 1998; Roble, 1999; Greenlee and Pinder, 2000; Gibson 2001; Gibson, 2002; Gibson and Sattler, 2004; Gibson and Hobson, 2006; Dolan and Christensen, 2007; Watson, 2008; Christensen, 2009; Gibson, 2011; Gibson and Steele, 2014; and Gibson 2015). After reading these accounts and additional field notes, one can gain an interesting biogeographic perspective on the distribution of species from an east/west point of view.

The biogeography of the piedmont can sometimes be quite complex due to the east/west contraction and expansion of species through geologic time. Some species are surprisingly absent while others not suspected are found. The following section will discuss each amphibian and reptile group making biogeographic inferences and commenting on which species might be found in subsequent surveys of this park.

Not finding *Lithobates sylvaticus* is interesting since it has been found in Cumberland County (Mitchell and Rey, 1999) and recently reported in Powhatan County several counties to the east (Whitehurst and Wright, 2010; Gibson, 2015). Perhaps this suggests that the Powhatan records, which is the easternmost record for the James River basin, represent a relict population, left over from a cooler time period. *Gastrophryne carolinensis* and *Pseudacris feriarum* are both documented for the county, but not found during this survey. Surveys during early spring or later in the summer may yield observations of these species. *Lithobates sphenocephalus* was not seen during the survey but is documented east and west of Buckingham County. It is an early spring breeder (Mitchell, 1986), so future work at this park should search for this species during that time. *Hyla chrysoscelis* is documented one county to the east and along the James River. Cumberland County may very well represent its furthest western extension into the James River watershed basin. The last anuran that may be within the park boundaries is the secretive species *Scaphiopus holbrookii*. This species is documented in the James River watershed both upstream and downstream. The plentiful sandy sediments along the floodplain of the river is ideal habitat for this species.

Salamanders expected to be possible for the park include *Desmognathus monticola*, *Eurycea guttolineata*, *Hemidactylium scutatum* and *Ambystoma talpoideum*. *Eurycea guttolineata* is found in all surrounding counties and *Hemidactylium scutatum* and *Desmognathus monticola* are currently documented for the county (Mitchell and Rey, 1999). A cold spring within the park boundaries may even yield *Gyrinophilus p. porphyriticus*. Hayslett (2003) reports finding a large Mole Salamander metapopulation in the Piney River area of Amherst and Nelson Counties, just 20 km to the west of James River State Park. They have also been reported from Appomattox Court House National Historical Park, about 30 km to the south of the State Park (Hayslett, 2003, Mitchell, 2006). Hayslett (2003) suggests that floodplain pools along the James River in Buckingham County be examined for new populations of Mole Salamanders, similar to those found in Campbell County. Heavy rains just prior to the 2014 VHS survey put the James River at flood stage, where any small vernal pools in the floodplain would likely be underwater and inaccessible. The possibility that Mole Salamanders could be present in floodplain pools would be worth revisiting.

Turtle species that should be sought in future surveys include *Clemmys guttata* and *Kinosternon s. subrubrum*. Spotted Turtles have been found to the east and west in the James River Basin and Mud Turtles have been documented already for Buckingham County. Park managers should also be on the lookout for the invasive *Trachemys scripta elegans*. Red-eared Sliders are commonly released into ponds once pet owners get tired of caring for them.

Future surveys of this park may add three species of lizards to the park's herpetofauna: *Aspidoscelis s. sexlineata*, *Plestiodon inexpectatus*, and *Plestiodon laticeps*. Both *Plestiodon inexpectatus* and *Plestiodon laticeps* have been documented in counties adjoining Buckingham County (Mitchell and Reay, 1999). *Aspidoscelis sexlineata sexlineata* is documented widely in Virginia. Mitchell (1994) indicates that this species is most likely to be found during the warmest months, thus surveys of this park should include active searching during late June through August.

The hardest group of reptiles to find and document for the park will be the snakes. Eight snakes species have been documented for the county or found in surrounding counties but were not found during this survey: *Lampropeltis calligaster rhombomaculata*, *Lampropeltis gutula*, *Lampropeltis t. triangulum*, *Pantherophis guttatus*, *Regina septemvittata*, *Storeria d.*

dekayi, *Thamnophis s. sauritus*, and *Virginia v. valeriae*. With a lot of effort and some luck these species may be found inhabiting the park. Some exceedingly rare and hard to find snakes like *Cemophora coccinea copei* and *Tantilla coronata* are also possible snakes which could be found in James River State Park. It is expected that *Crotalus horridus* occurs inside James River State Park. The southeastern side of Spears Mountain has undocumented reports of Timber Rattlesnakes. There have been a couple of road kills just outside the Park. One specimen was found on St. Rt. 606 just east of the James River State Park entrance. Another was found in September of 2000 about 3 km south of the Park on St. Rt. 605 (Mike Hayslett, personal communication). There are additional unconfirmed reports of Timber Rattlesnakes encountered within the Park by Park Maintenance Staff. It would be expected they occur in the Park with so many reports from the area surrounding the Park. This is a secretive species which could probably be found with sufficient search effort, in the right time of the year.

The VHS did document two species which had not been previously vouchered for Buckingham County, *Scincella lateralis*, and *Storeria occipitomaculata*. Both species are found in several other adjoining counties so their presence in Buckingham is not surprising. The species are relatively small and secretive in habits, and are easily overlooked by casual observers. Finds like these point out the importance of having a large number of eyes in one area, even if for a brief period of time. In addition, we added a second record for the red salamander (*Pseudotriton ruber*) for the county. The only other record is from near Dillwyn Virginia, about 30 km west of James River State Park, in June of 2008. Photographs were deposited in the VHS Archive (#360 and 361).

The emerging infectious diseases caused by *Bactrachochytrium dendrobatidis* (Bd) and ranaviruses have been reported from areas within the James River Basin. Bd has been reported in three species of frogs and ranaviruses have been found in two species of aquatic turtles from three bodies of water from Prince Edward County (Goodman and Ararso, 2012; Goodman et.al., 2013). The impacts of these infectious pathogens to native species of amphibians and reptiles is yet to be seen. Another emerging threat to native herptiles is *Bactrachochytrium salamandrivorans*. This fungal pathogen is a relative of Bd and has recently has been reported to be infecting and killing amphibians in Europe (Martel, et.al., 2014). The recent emergence of this organism in Europe is thought to have spread from Asia via the pet trade, specifically coming from Asian salamanders. This fungus causes chytridiomycosis just like Bd. Asian amphibians are immune to the effects of Bsal but scientists think that this fungus will decimate certain populations of amphibians which lack immunity if it is introduced into the United States (Yap and Koo, 2015). Though not found in the United States yet, one could easily imagine a situation where a pet owner with an infected animal could release it into a body of water and thus introduce the disease. It is suggested that even fouled tank water could accidently release the fungus into the wild. Biosecurity plans should be developed for the park in helping to prevent the spread of these infectious diseases. At the very minimum park managers should educate the public about these threats and how each person can prevent or slow the spread.

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