

Occoneechee State Park Survey

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Introduction

The Virginia Herpetological Society (VHS) annually selects sites within the Commonwealth and surveys those locations for herpetofaunal species. The VHS typically selects sites that are within localities lacking official records of native and naturalized reptiles and amphibians, or localities lacking recent records of native and naturalized herpetofauna. Through these surveys, the VHS is able to obtain distributional, behavioral, morphological, and physiological data. Relative abundance of species may also be assessed during these surveys.

From 1 May through 3 May, 2009, VHS held its Annual Survey and Meeting at the Virginia Department of Conservation and Recreation's (VDCCR) Occoneechee State Park, in Mecklenburg County. This property contains mixed upland forests, riparian areas along the John H. Kerr Reservoir (also known as Buggs Island Lake), wooded wetlands and beaverponds, and open areas. Occoneechee State Park (OSP) was surveyed in 1982 (Pague and Larson, 1982), but since that data is about to become historic, and this data comprises most of the herpetofaunal records for Mecklenburg County, the VHS decided this would be a good place for a herpetofaunal survey in 2009.

OSP is 1,092 ha (2,698 ac) in size and the property provides a unique

mix of upland forest habitats and riparian habitats bordered by the reservoir, as well as an historically interesting property. The Occaneechi Indians lived on an island in the vicinity of the current park location until 1676. The Occaneechi were decimated to only a few members as a result of Bacon's Rebellion, and they were forced to move south to an area that is now Hillsboro, North Carolina. In 1839, William Townes built Occaneechee Plantation, and this 1,255 ha (3,100 acre) plantation was located on much of the current park property plus Occaneechee Island. In 1947, The U.S. Army Corps of Engineers began building John H. Kerr Dam, which was completed in 1953, forming John H. Kerr Reservoir (or more commonly known as Buggs Island Lake). In 1968, Virginia began leasing the land for recreational use, which became Occaneechee State Park (dcr.virginia.gov/state_parks/, July 2010).

Study Sites

Site 1: Beaver Pond Trail (North Side of trail) ($36^{\circ}37'14.32''\text{N}$, $78^{\circ}30'27.93''\text{W}$)

The Beaver Pond Trail is a 2.75 km gravel path which leads through a mixed hardwood and pine forest. The north side of the trail has active beaver ponds, several small streams and a few woodland vernal pools. Dominant tree species include Oak, Tulip Poplar, Hickory, American Holley, Beech, Sweetgum, and Virginia Pine. The understory is open and contains mostly blueberry bushes.

Site 2: Beaver Pond Trail (South Side of trail) ($36^{\circ}37'13.38''\text{N}$, $78^{\circ}30'26.31''\text{W}$)

The south side of Beaver Pond Trail appears to be a fire controlled portion of the park. The forest is still a mixed hardwood and pine forest but with much evidence of recent burns. Main species include oaks, maples, sweet gum, tulip poplar with very few species of herbaceous plants with the exception of ferns. This site has many tree root cavities, mounds from blown over trees, and many downed decaying trees. One stream with water and four dry stream beds completes the features seen at this site.

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Site 3: Tutelo Birding Trail (36°37'51.65"N, 78°31'28.04"W)

Tutelo Birding Trail is a 1.75 km well-maintained hiking trail which winds through a mixed hardwood and pine forest. There is very little understory with the exception of blueberry bushes. There is much evidence for burning; there are many fallen logs and burned vegetation. A gas line right of way passed through a portion of this trail (unrelated to the fire evidence). This trail crosses two small intermittent streams. Many piles of rocks can be seen while following this trail and represent likely historical agricultural land use practices.

Site 4: Warriors Path Trail and south side of Mossey Creek Nature Trail (36°37'46.84"N, 78°31'54.07"W)

Warriors Path Nature Trail is a 0.65 km trail extending off the Mossey Creek Nature Trail. Mossey Creek Nature Trail is a 1.1 km trail winding through a mature mixed oak pine forest. Dominant plant species include oak, hickory, beech, sweetgum, Virginia pines, with an open understory of blueberry and greenbrier. The trail parallels a stream with many small stagnant pools of water but no flowing water. The trailhead begins in a small logged clear cut.

Site 5: North side of Mossey Creek Nature Trail (36°37'54.04"N, 78°31'48.77"W)

See site 4 description.

Site 6: Visitor Center Peninsula (36°37'28.54"N, 78°31'36.99"W)

The Visitor Center Peninsula contains a small visitor center, park office, two picnic shelters, a boat ramp, playground, and a small reproduction of an Indian dwelling. The interior portion of this peninsula is a mixed hardwood and pine forest with large quantities of poison ivy along the edge habitat. The perimeter of the peninsula has a steep topography as it interfaces with Buggs Island Lake. There is a lot of washed up woody debris and trash on the shore.

Site 7: Stream that crossed the road near the Panhandle Trail (36°37'32.34"N, 78°31'18.69"W)

Site 7 consists of a small flowing stream running through a mature

hardwood forest. Many fallen logs and rock debris line the bottom and sides of the stream.

Site 8: Panhandle Trail (36°37'1.52"N, 78°30'12.98"W)

The Panhandle Trail is a 12.0 km trail extending to the furthest eastern portions of the park. During the survey period we only visited a small portion of this trail. On the southern side of the trail there is lots of shoreline with huge quantities of rip rap logs and debris. The trail seems to follow an upland ridge. There are varied habitats including mature hardwood forest, fields of grass, and a very well maintained gravel road.

Materials and Methods

The 2009 VHS Annual Survey meeting began on the morning of 2 May and lasted until 1200h 3 May. A night hike of Beaver Pond Trail was conducted between 2054h and 2130h on 2 May. 36 people came to Occoneechee State Park for this survey. Table 1 indicates the number of surveyors, time spent surveying, and total number of person hours spent at each site. A wide range of collecting techniques were utilized during the survey weekend including hand capture, visual encounter, road cruising, listening for vocalizing anurans, flipping debris, tearing apart logs and bark, setting bottle funnel traps, minnow traps, crayfish traps, and baited hoop turtle traps. Each survey team had a member who visually inspected each animal to document parasitism and disease. Digital voucher photos were taken of each species collected. A group leader recorded all data on data sheets. Data collected included a site description, number of animals collected, any interesting or unusual behaviors of phenotypes, and observation of disease or parasitism.

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

Site	1	1 ^a	2	3	4	5	6	7	8
Number of hoop net sets	6								
Crayfish traps	4		4						
Bottle Funnel Traps	10		6						
Minnow Traps	4								
Number of surveys	11	9	9	11	7	11	9	7	20
Hours surveyed	3.5	.33	6	2	1	1.5	1	.33	1
Person hours of survey effort	38.5		54	22	7	16.5	9	2.31	20

Results

Over the course of the survey time period 28 species were documented (11 frogs, 5 salamanders, 3 turtles, 3 lizards, and 6 snakes) with a total of 297 animals captured. Table 2 summarizes the species collected and the number of animals observed at different sites. Different trapping methods yielded mixed results. Hand capture and visual encounters led to the largest number of observations. Six baited hoop turtle traps yielded two turtles. Sixteen 2-liter bottle funnel traps yielded two marbled salamander larvae, two tadpoles, and one red spotted newt. Four minnow traps yielded five red spotted newts, one juvenile bullfrog, and two bullfrog tadpoles. An annotated checklist follows. Numbers in brackets indicate the survey sites where each species was encountered. *Pseudacris feriarum* appears to be the only possible county record.

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

Sites	1	1 ^a	1 ^b	2	3	4	5	6	7	8
Species										
Amphibians										
<i>Acris creptians</i>	67	2		11	2		6	1	1	
<i>Anaxyrus americanus</i>	1	4		2	1	1				
<i>Anaxyrus fowleri</i>	2	39		5			2			1
<i>Hyla versicolor</i>	2	3								
<i>Hyla chrysoscelis</i>							1			
<i>Pseudacris c. crucifer</i>				1						
<i>Pseudacris feriarum</i>				2					1	
<i>Lithobates catesbeianus</i>			3							
<i>Lithobates clamitans</i>	3	3							1	
<i>Lithobates palustris</i>				1						
<i>Lithobates sphenoccephalus</i>	1									
<i>Ambystoma opacum</i>	5		5	2						
<i>Desmognathus fucus</i>	1									
<i>Eurycea cirrigera</i>									1	
<i>Plethodon cylindraceous</i>	2				1	1				2
<i>Notophthalmus viridescens</i>	2		5	3						1
Reptiles										
<i>Chelydra s. serpentina</i>			1	1						
<i>Chrysemys picta picta</i>	2		1							
<i>Terrapene c.</i>	4			9	4		2			2
<i>Plestiodon fasciatus</i>	4			3	1	3	1	4		
<i>Scincella lateralis</i>	3			2						4
<i>Sceloporus undulatus</i>	3			5		1		2		1
<i>Agkistrodon contortrix</i>				1						
<i>Carphophis a. amoenus</i>	3			5	3		1			8
<i>Coluber c. constrictor</i>	1			1				2		1
<i>Diadophis punctatus</i>	1			2			1			1
<i>Pantherophis alleghaniensis</i>				1						
<i>Virginia valeriae</i>				1						
Total Number of animals by site	107	51	15	59	12	6	14	9	4	21

1a = Night hike Beaver Pond Trail 2 May. 1b = Traps 3 May 2009.

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Annotated Checklist

Amphibians

1. *Acris crepitans* (Northern Cricket Frog) – [1,1a, 2,3,5,6,7]

Northern Cricket Frogs were found in a variety of habits including stream edges, in streams, under logs in mature forest, in leaf litter, and at the edge of Buggs Island Lake. Many males were heard calling from beaver ponds on 1 May and several were found on Beaver Pond Trail during a night hike on 2 May.

2. *Anaxyrus americanus* (American Toad) – [1,1a,2,3,4]

Both adults and tadpoles were observed in various habits. Tadpoles were collected in stagnant pools in three ephemeral stream beds at Mossey Creek Nature Trail, in a stream at the intersection of Panhandle Road and Occoneechee Park Road, and in a stream adjacent to Warriors Path Trail. Males were heard calling from a beaver pond at site 1 and foraging in leaf litter.

3. *Anaxyrus fowleri* (Fowler's Toad) – [1,1a,2,5,8]

Adults of this species were found under logs, under pine bark, and foraging in leaf litter. 6-10 males were heard calling on 1 May at 2000h near the beaver ponds at site 1. Thirty nine juvenile Fowler's Toads were collected on Beaver Pond Trail during a night hike on 2 May. Five juvenile toads were found to have an infestation of chigger mites. The mites were located on the venter of each animal.

4. *Hyla chrysoscelis* (Cope's Gray Treefrog) – [5]

Only one male Cope's Gray Treefrog was heard calling by a stream along Mossy Creek Trail.

5. *Hyla versicolor* (Gray Treefrog) – [1,1a]

Three *Hyla versicolor* males were heard at site one during the 2 May night hike. These males were vocalizing near a series of beaver ponds.

6. *Lithobates catesbeianus* (American Bullfrog) – [1b]
One juvenile and two tadpole American Bullfrogs were captured in minnow traps at site one.
7. *Lithobates clamitans* (Green Frog) – [1,1a,7]
Three males were heard calling from a beaver pond and the outflow creek of a beaver pond on 1 May. Only one adult was found on Beaver Pond Trail during the 2 May night hike.
8. *Lithobates palustris* (Pickerel Frog) – [2]
One Pickerel Frog was collected at site 2 in leaf litter next to an active stream. This animal was parasitized by 6 chigger mites on the ventral side of its rear legs.
9. *Lithobates sphenoccephalus* (Southern Leopard Frog) – [1]
One adult Southern Leopard Frog was observed basking on the shore of a beaver pond on 1 May.
10. *Pseudacris crucifer* (Spring Peeper) – [2]
Three *Pseudacris crucifer* males were heard calling on 1 May adjacent to a beaver pond at site 1. One adult was found in leaf litter at site 2.
11. *Pseudacris feriarum* (Upland Chorus Frog) – [2,7]
Upland Chorus Frogs were found foraging in leaf litter and one was found inside a log along a stream with water.
12. *Ambystoma opacum* (Marbled Salamander) – [1,1b,2]
Ambystoma opacum larvae were dipnetted and caught in bottle traps in beaver ponds at site 1. Several adults were found under logs at site 2
13. *Desmognathus fuscus* (Northern Dusky Salamander) – [1]
One Northern Dusky Salamander was found under a rock in a small stream at site 1.
14. *Eurycea cirrigera* (Southern Two-lined Salamander) – [7]
One Two-lined Salamander was found in a stream at site 7.

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15. *Plethodon cylindraceous* (White-spotted Slimy Salamander) – [1,3,4,8]

Six White-spotted Slimy Salamander adults were collected under logs at four sites. One adult male was observed with a mental gland. Another adult was parasitized with two chigger mites; one mite was found on its left front foot and another mite was found on its tail.

16. *Notophthalmus viridescens viridescens* (Red-spotted Newt) – [1,1b,2,8]

Three adult Newts were captured in minnow traps at the beaver ponds at site 1. Red eft stage juveniles were found under logs, in leaf litter, inside rotting logs, and under rocks at three sites.

Reptiles

17. *Chrysemys picta picta* (Eastern Painted Turtle) – [1,1b]

Two Eastern Painted Turtles were observed sunning on logs in a beaver pond at site 1. One adult turtle was captured in a baited hoop turtle trap in a beaver pond.

18. *Chelydra serpentina serpentina* (Eastern Snapping Turtle) – [1,1b]

A small Eastern Snapping Turtle was observed swimming in a beaver pond at site 1. A large adult was caught in a turtle trap. This animal had 1 leach attached and several bleeding lesions were observed on its plastron. The damage appeared to be caused by its own claws digging into its shell.

19. *Terrapene carolina carolina* (Eastern Box Turtle) – [1,2,3,5,8]

A total of 19 Eastern Box Turtles were collected during the weekend. Six of the 19 turtles were female, 12 were males, and one could not be sexed. These turtles were found in leaf litter, in grassy fields, and under logs. One male/female pair were mating. One DOR hatching was found on the road. Two dry shells were collected. One was found burned and dead in a forest floor.

20. *Plestiodon fasciatus* (Common Five-lined Skink) – [1,2,3,4,5,6]
The Five-lined Skink was the most commonly collected lizard with 16 animals having been collected or observed. Animals were observed under bark, on edges of log piles, under logs, on trees, and at the base of a retaining wall near the boat ramp. Several parasite species were observed on some animals collected. Parasites include mites and ticks. One adult was observed up a tree eating an unidentified caterpillar.

21. *Scincella lateralis* (Little Brown Skink) – [1,2,8]
Little Brown Skinks were observed under logs, on the ground foraging, and in grass next to a log pile by woods.

22. *Sceloporus undulatus* (Eastern Fence Lizard) – [1,2,4,6,8]
Twelve *Sceloporus undulatus* were collected at 5 sites. Animals were found under logs, on logs, on the ground, and under bark. One male was courting a female on a large oak tree.

23. *Agkistrodon contortrix mokasen* (Northern Copperhead) – [2]
One AOR (alive on road) juvenile Northern Copperhead was found at 2054h on Panhandle Road just past Cabin Road on 2 May. One adult copperhead was found under a log in a log pile at the edge of a forest next to an open field at site 2.

24. *Carphophis amoenus amoenus* (Eastern Wormsnake) – [1,2,3,5,8]
Eastern Wormsnakes were found in the most locations and in the largest numbers compared to all the other snakes. A total of 20 were collected. Adults were found under logs, inside rotten logs, in a pile of rocks from an old foundation of a house, under leaf litter by a stream edge, and in a rock pile, under a log in a burned area at site 2.

25. *Coluber constrictor constrictor* (Northern Black Racer) – [1,2,6,8]
A total of 5 Racers were found. Animals were observed sunning in greenbriers, dry leaf litter, and in an open field near the forest edge.

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26. *Diadophis punctatus* (Ring-necked Snake) – [1,2,5,8]
Ring-necked Snakes were found under the bark of fallen logs and under logs at four sites. Four of the five snakes were intergrades, exhibiting complete neck bands and a ventrum with spots. One of the snakes had a complete neck band with a solid ventrum.

27. *Pantherophis alleghaniensis* (Eastern Ratsnake) – [2]
One Eastern Ratsnake was found on the ground next to a log at site 2.

28. *Virginia valeriae valeriae* (Eastern Smooth Earthsnake) – [2]
One adult was found under loose bark on a fallen log.

Discussion

Combining the results of work done by Pague and Larson (1982) with the work done by the VHS in this report, 29 species have been documented for Occoneechee State Park (see Table 3). This number reflects perhaps half of the total that is possible. Eighteen additional species not found in the park are documented for Mecklenburg County and ten more are found in surrounding counties or are so widespread as to be possible for residing in the boundaries of the park. The list of frogs appears to be complete with the exception of *Scaphiopus holbrookii*. This species is wide spread in Virginia and is found in surrounding counties. Surveys during strong thunderstorms could produce an observation of this species.

The number of salamander species documented for the park is surprisingly low. *Ambystoma maculatum*, *Eurycea guttolineata*, *Hemidactylum scutatum*, and *Pseudotriton montanus* have been found in Mecklenburg County but not in the park. *Ambystoma talpoideum* has been documented in Halifax County to the west. *Plethodon cinereus*, *Pseudotriton ruber* and other species could be found in future surveys of Occoneechee. A future investigation related to salamanders may be needed in delineating the contact zone between *Plethodon cylindraceus* and *Plethodon chlorobryonis*. Both species are documented for Mecklenburg County and both may be in the park or the hybrid offspring.

A molecular study is warranted to differentiate between these species. Occoneechee State Park is located near the most northern range of *Eurycea quadridigitata*. It is very likely that a relict population of this species could be found in this area. This species prefers to reproduce in ephemeral ponds and this habitat is represented within the park.

The amount of turtle diversity documented by Pague and Larson (1982) and this study is extremely low. *Clemmys gutatta*, *Pseudemys concinna*, *Sternotherus odoratus*, and *Trachemys scripta* are documented in Mecklenburg County with *Kinosternon subrubrum* being found in surrounding counties but were not found in the park. A more concerted trapping effort could significantly increase the turtle species count for the park. Park officials should be on the lookout for the introduced Red-eared Slider (*Trachemys scripta elegans*). This species is often sold in the pet trade and can be introduced into the park by releasing them.

Four lizard species might be found in the park in future hunts. *Aspidoscelis sexlineata*, *Plestiodon inexpectatus*, and *Ophisaurus attenuatus* are documented for Mecklenburg County and one species *Plestiodon laticeps* is found in a surrounding county.

The greatest increase in herpetological diversity will probably come from an increase in snake observations. There are eleven species of snakes not documented for the park but are documented for Mecklenburg County. Many of these snakes are common (*Heterodon platirhinos*, *Lampropeltis calligaster rhombomaculata*, *Lampropeltis guttata*, *Lampropeltis triangulum*, *Nerodia sipedon*, *Opheodrys aestivus*, *Regina septemvittata*, *Storeria dekayi*, *Storeria occipitomaculata*, *Thamnophis sirtalis*, and *Virginia valeriae*). Five additional species (*Cemophora coccinea copei*, *Pantherophis guttatus*, *Tantilla coronata*, *Thamnophis sauritus*, and *Virginia striatula*) are found in surrounding counties. More work needs to be done to fully elucidate the total amphibian and reptile diversity within Occoneechee State Park.

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Our overall impression of the park is that it is very well maintained, clean, and staffed with very friendly and helpful personnel. We would encourage the park to allow nonhazardous debris piles to form as opposed to removing them off-site or burning them. Debris piles make great habitat for amphibians and reptiles and other wildlife. Just a note of caution, it is our experience, and the literature supports the observation, that using erosion and deer netting is a source of snake mortality. Snakes are easily entangled in the netting and subsequently die from the injuries. The only source of this netting that we observed at the park was at the Native American reconstructed dwelling. Some parks wrap supplies of wood they sell to the public with this netting, but we did not observe the supply of wood at Occoneechee. In addition, we always encourage parks to keep mud puddles or other temporary water sources instead of draining them. These are great habitats for amphibians which can only breed in temporary or ephemeral water sources.

As a final note, we did witness an emergence of periodical cicada at site 8. This was fascinating to observe.

Table 3. Comparison of species found during the Pague survey (CAP) verses the Virginia Herpetological Society's (VHS) survey.

Species	CAP	VHS
Amphibians		
<i>Acris creptians</i>	*	*
<i>Anaxyrus americanus</i>		*
<i>Anaxyrus fowleri</i>	*	*
<i>Gastrophryne carolinensis</i>	*	
<i>Hyla versicolor</i>	*	*
<i>Hyla chrysoscelis</i>	*	*
<i>Pseudacris crucifer</i>		*
<i>Pseudacris feriarum</i>		*
<i>Lithobates catesbeianus</i>		*
<i>Lithobates clamitans</i>		*
<i>Lithobates palustris</i>		*

Species	CAP	VHS
<i>Lithobates sphenoccephalus</i>	*	*
<i>Ambystoma opacum</i>		*
<i>Desmognathus fucus</i>		*
<i>Eurycea cirrigera</i>		*
<i>Plethodon cylindraceous</i>		*
<i>Notophthalmus v. viridescens</i>	*	
Reptiles		
<i>Chelydra serpentina serpentina</i>		*
<i>Chrysemys picta picta</i>		*
<i>Terrapene carolina carolina</i>	*	*
<i>Plestiodon fasciatus</i>	*	*
<i>Scincella lateralis</i>	*	*
<i>Sceloporus undulatus</i>	*	*
<i>Agkistrodon contortrix mokasen</i>		*
<i>Carphophis amoenus amoenus</i>		*
<i>Coluber constrictor constrictor</i>		*
<i>Diadophis punctatus</i>		*
<i>Pantherophis alleghaniensis</i>		*
<i>Virginia valeriae valeriae</i>		*

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