

Survey of Havens Wildlife Management Area and Surrounding Areas

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Introduction

The Havens Wildlife Management Area occupies 2,910 hectares of land on Fort Lewis Mountain in the Appalachian highlands of Southwestern Virginia. In Roanoke County it borders the City of Salem. Fort Lewis Mountain is a long ridge bounded by State Route 311 to the East, and State Route 622 to the North. Route 622 wraps around the far western end of the mountain, which lies in Montgomery County. Both Interstate 81 and the city of Salem lie 2.4 kilometers south of the mountain. The wildlife management area consists predominantly of rough, steeply inclined, and inaccessible habitat 99 percent covered by forest. Fort Lewis Mountain primarily hosts a mixed mesophytic forest consisting of *Quercus*, *Pinus*, and *Carya*. The protected area of the WMA descends from an elevation of 975 meters at its highest peak, to 457 meters at its lowest point. There are also largely untouched forested areas surrounding the Havens that are not protected as wildlife management areas by the Department of Game and Inland Fisheries, nor by any other organization. The habitat of these unprotected areas is similar to habitat in the Havens WMA. The only water sources on the mountain are small, seasonal streams and a few small ponds installed on the top of the mountain by the Virginia Department of Game and Inland Fisheries. The Department originally purchased roughly 2400 hectares (6,000 acres) of land at \$2.61 an acre for the Havens in 1930. At that time the Havens was the only management area owned by the Virginia Department of Game and Inland Fisheries.

The Hanging Rock Battlefield Trail is a 2.75 km paved trail that runs along Mason Creek at the eastern base of Fort Lewis Mountain. The Trail is not a part of the Havens WMA, but was surveyed because of *Catesbeiana* 32(2): 51-64

its close proximity to the WMA. At the Northern trailhead there is an unpaved spur trail that meanders through a less developed area. The trails were installed by the Department of Game and Inland Fisheries in 1999 and sit at an elevation of 340 meters at the northern most point. The lowland area surrounding the trails and creek is dominated by a mixed mesophytic forest similar to that found in the Havens WMA. Green Ridge rises about 40 meters above Mason Creek and the forest consists primarily of *Pinus*. The dirt, spur trail leads to a section of the creek that runs into a low-lying area that has been damned by beavers, creating a swampy area with many dead trees floating and standing in the water.

Study Sites

Study Site #1

Site #1 is a section of Mason Creek in the Havens Wildlife Management Area on the northern base of Fort Lewis Mountain. This section of the creek runs along the bottom of the mountain flowing east. Because of the creek's position against the base of the mountain, it receives less sun in comparison to the section of creek in Study Site #2. The reduced exposure to light creates a cooler microclimate than Study Site #2, and consequently herp species that are more tolerant of cooler weather were observed at this site. The forest surrounding this section of creek is mostly dominated by *Pinus*. The creek bed is wide and rocky, and the creek banks for the most part are also rocky, with the occasional small, sandy bank. Running parallel with the creek on its northern side is State Route 622, which marks the edge of the Havens WMA.

Study Site #2

Site #2 is another section of Mason Creek outside of the Havens WMA, southeast of Fort Lewis Mountain. A small part of this section of creek runs against the northern end of Green Ridge, which shades the creek for most of the day. Along this small part of the creek *Pinus* dominates the forest and there is little undergrowth. Further downstream the creek turns around the edge of Green Ridge, where it

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receives more sunlight daily. The creek then splits into two sections. The left fork of the creek splits into dozens of small streams that run through the forest and then come back together in a wide depression in the land. In this lowland area beaver activity has caused the creek to back up and form a wide, shallow swamp. This wetland is bordered by a low ridge to the east and flat woodlands to the north and west. Along the southern end of the wetland runs Interstate 81. The runoff from the wetland briefly runs west parallel to I-81 until it hits the right fork of Mason Creek. The right fork of the creek runs straight south, reunites with the runoff from the wetland, and continues south. The section of creek below I-81 was not surveyed. The forest surrounding the lower section of creek not sheltered by Green Ridge is dominated by a mix of *Pinus*, *Quercus*, and *Carya*.

Study Site #3

Site #3 is on the southeastern end on Fort Lewis Mountain in the Havens Wildlife Management Area. The key feature of this site is an open area in the forest where an old, abandoned trailer is sited, presumably a structure once used by the Department of Game and Inland Fisheries. This open area is on a southern facing slope at an elevation of 700 meters. The building sits against the forest south of the open area, which is flat and then turns into a steep and rocky slope up to more forest. In the flat open area were large boards and other debris that provided cover for herps, scattered around the trailer. Because of this area's high exposure to sunlight during the day, and the shelter provided by the trailer and debris surrounding it, this area was a hotspot for reptiles. In particular this area fostered species that were rarely found or not found at all in other areas, such as *Crotalus horridus horridus*.

Methods and Materials:

From March through October of 2010 and 2011 opportunistic searches for reptiles and amphibians were utilized as a means for collecting data. Searches were conducted by one to five people who spread out and walked over the area being surveyed at the time, often stopping to flip rocks and logs, or check rock crevices. All areas of the mountain

were surveyed, including small streams, fields, and woodlands, at all elevations. Areas surrounding the Angeline hunter access trail on the northern side of the mountain were surveyed more thoroughly than most other areas. Other habitats that were more heavily studied include the land west of the Carroll access road on the mountain's southern side, and portions of land in the far northeast region of the Wildlife Management Area on the southern side of the mountain. When animals were encountered they were captured if possible, then photographed and released back into the wild. Nets were often utilized for capturing amphibians. Salamanders were also regularly kept in plastic bags after capture in order to take photographs and identify the species. Snake hooks were frequently used for the capture of venomous snakes, while all other herps were hand caught. Most herps were found through targeted searches where specific habitats and sites were being surveyed; however, many reptiles and amphibians were observed by chance encounters.

Annotated Checklist

Amphibians

Anurans

1. *Anaxyrus americanus* (American Toad): Twenty-five + specimens. American Toads were abundant in both terrestrial and semi-aquatic areas all over the mountain. American Toads were, in most cases, found on the forest floor, and in one case under a piece of carpet. American toads were also abundant in close proximity to Mason creek near Hanging Rock. During the spring, egg masses and breeding toads were found in small pools of water in a swampy area near the main creek.

2. *Lithobates clamitans melanota* (Northern Green Frog): Seventeen specimens.

Green Frogs were observed in a small, seasonal stream on the southern side of the mountain. Green Frogs were only encountered at elevations below 610 meters, sometimes found resting on the bank of the stream and often under rocks in the streams. Northern Green

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Frogs were common in both Mason Creek on the northern side of Fort Lewis Mountain and at Hanging Rock, as well as in the swampy area just east of the main creek at Hanging Rock.

3. *Lithobates catesbeianus* (American Bullfrog): Seven specimens. American Bullfrogs were prevalent in small, seasonal streams on the northern side of the mountain. American Bullfrogs occurred only at elevations below 610 meters, sometimes encountered under rocks in the stream and sometimes on the stream bank. American Bullfrogs were also found both in Mason Creek and in the swampy area at Hanging Rock

4. *Lithobates palustris* (Pickerel Frog): Five specimens. Pickerel frogs were found in a small, seasonal stream on the southern side of the mountain. Pickerel frogs were only present at elevations below 610 meters, found resting under rocks in the stream. Pickerel Frogs were found only along Mason Creek at Hanging Rock and in small streams running into the lowland swamp off of the main creek.

Salamanders

5. *Desmognathus monticola* (Seal Salamander): Ninety specimens. Seal Salamanders were very common throughout small streams at all elevations of the mountain. Seal Salamanders were only found under rocks or in rock crevices in the streams. Seal Salamanders were also observed with frequency under stones in and on the bank of Mason Creek At Hanging Rock and along the north side of Fort Lewis Mountain.

6. *Desmognathus fuscus* (Northern Dusky Salamander): Five specimens. Dusky Salamanders were found in multiple small streams under rocks and in rock crevices.

7. *Eurycea cirrigera* (Southern Two-lined Salamander): Seventeen specimens. Two-Lined Salamanders were present in both small streams under rocks and under debris on the banks of small streams all over the

mountain. Southern Two-lined Salamanders were found under stones along the edge of Mason Creek at Hanging Rock.

8. *Plethodon cylindraceus* (White-Spotted Slimy Salamander): Two specimens.

Two Slimy Salamanders were found under flat pieces of cement at the base of the mountain on the northern side of the mountain.

9. *Gyrinophilus porphyriticus porphyriticus* (Northern Spring Salamander): One specimen.

One Northern Spring Salamander was found under a rock in a dry section of a small stream on the northern side of the mountain at an elevation of 650 meters.

10. *Notophthalmus viridescens viridescens* (Red-spotted Newt): Seven specimens.

Red-spotted Newts emerged in abundance all over the mountain following rainfall. The Newts were found roaming the forest floor. All of the Red-spotted Newts were in the eft stage.

Reptiles

Lizards

10. *Plestiodon fasciatus* (Common Five-lined Skink): Fifteen specimens.

Several Five-lined skinks were observed on the trunks of trees (*Quercus*) on the southeast side of the mountain. Skinks were also common near Mason Creek at Hanging Rock in forested areas dominated by *Pinus* and were often found on fallen or standing trees basking in the sun. This represents a new record for Roanoke County. A digital photograph was deposited in the VHS Archive (#226) as a voucher.

11. *Sceloporus undulates* (Eastern Fence lizard): Nineteen specimens.

Fence lizards were commonly found under boards and on tree trunks throughout all terrestrial habitats on the mountain. Eastern Fence

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Lizards were also abundant in all areas surrounding the Hanging Rock Battlefield Trail.

Turtles

12. *Terrapene carolina carolina* (Eastern Box Turtles): Three specimens.

Eastern Box Turtles were observed all over the mountain in terrestrial areas traveling over the forest floor.

13. *Chrysemys picta picta* (Eastern Painted Turtle): One specimen. One Painted Turtle was found basking on a log in the swampy area of Mason Creek at Hanging Rock.

14. *Sternotherus odoratus* (Eastern Musk Turtle): Two specimens. Musk Turtles were found walking along the bottom of Mason Creek in several places in the creek just down stream of Electric Road bridge.

Snakes

15. *Agkistrodon contortrix mokasen* (Northern Copperhead): Four specimens.

Multiple Copperheads were encountered around an abandoned forestry building, lying beneath boards and in rock crevices. One Copperhead was found under a board in a stand of *Equisetum hyemale*. The board was along the bank of one of the small side creeks that runs off Mason Creek at Hanging Rock.

16. *Crotalus horridus horridus* (Timber Rattlesnake): Three specimens.

Rattlesnakes were found at elevations above 690 meters in oak dominated forests on the southern side of the mountain. Rattlesnakes were mostly encountered at the abandoned forestry building resting under boards or at the base of rocks. However, some individuals were found in an open, rocky outcropping at another location on the southern side of the mountain.

17. *Diadophis punctatus edwardsii* (Northern Ring-Necked Snake): Twenty-five specimens.

Ring-Necked Snakes were abundant near small streams and beneath shale fragments on ridges at varying elevations on the northern side of the mountain. One Ring-Necked Snake was found under a rock along the point of high elevation on Green Ridge near Hanging Rock.

18. *Ophedrys aestivus* (Rough Greensnake): Two specimens.

One Rough Greensnake was observed on a steep, wooded ridge of the northern side of the mountain. The snake was found slithering across a path on the ground. One other Rough Greensnake was found crossing a path about 10 meters from Mason Creek at Hanging Rock.

19. *Pantherophis alleghaniensis* (Eastern Ratsnake): Five specimens.

One Eastern Ratsnake was encountered in a mixed pine and oak forest on a steep north ridge of the mountain. One juvenile Eastern Ratsnake was found slithering along the spur trail about 15 meters from Mason Creek at Hanging Rock. One individual was found crossing Electric Road at Hanging Rock and two others were found dead on Electric Road.

20. *Pantherophis guttatus* (Red Cornsnake): Two specimens.

One Red Cornsnake was found dead on Route 311 just across the creek from the North trail-head of the Hanging Rock Battlefield Trail. The dead snake was on the side of the road closest to Mason Creek, about 10 meters from the creek. A second Cornsnake was found under a board exposed to the sun on the southern side of Fort Lewis Mountain. The elevation of the location where the snake was found is 698 meters. The forest surrounding the open area where the snake was found is mainly composed of *Pinus* with some *Quercus*.

21. *Coluber constrictor constrictor* (Northern Black Racer): Two specimens.

Black Racers were found in open areas slithering amongst the leaf litter, several hundred meters from Mason Creek at Hanging Rock.

22. *Nerodia sipedon sipedon* (Common Watersnake): Fifteen specimens.

Watersnakes were found in Mason creek at Hanging Rock, in the small

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creeks that run into the lowland swamp, and in the swamp itself. The majority of the watersnakes were observed basking on rocks and logs along the main creek.

23. *Regina septemvittata* (Queensnake): Ten specimens.

Many Queensnakes were observed basking on logs and branches overhanging Mason Creek at Hanging Rock and in the small creeks that run into the swampy area. Many of the Queensakes were found basking in tree branches several meters above the creek.

24. *Thamnophis sirtalis sirtalis* (Eastern Gartersnake): Two specimens. Gartersnakes were found slithering along the forest floor in areas near Mason Creek at Hanging Rock as well as at higher elevations along Green Ridge.

25. *Thamnophis sauritus sauritus* (Common Ribbonsnake): One specimen.

One Ribbonsnake measuring 60.5 cm total length was found slithering along the bank of Mason Creek at Hanging Rock. The section of bank where the snake was found was exposed to sun and was covered mostly by stones with isolated patches of grass. This specimen represents a new record for Roanoke County. A digital photograph was deposited in the VHS Archive (#227) as a voucher.

Discussion

A total of 10 different species of amphibians were found in the Havens WMA, while six species of amphibians were found in the areas surrounding the Hanging Rock Battlefield Trail. Eight reptile species were encountered in the Havens WMA and 14 species of reptiles were found around the Hanging Rock Battlefield Trail. A total of 10 different species of amphibians were found from both surveyed locations, and 16 total species of reptiles were found at the two locations.

The higher diversity of species in the areas surrounding the Battlefield Trail is most likely due to the variety of different habitats in the area and accessible water sources. The area hosts a large stream,

smaller streams, a swamp, elevated pine forest and lowland mixed mesophytic forest. Mainly the accessibility of water in numerous places is the source of such diversity of species around the Battlefield Trail. The majority of the reptiles found around the Battlefield Trail were in close proximity to some source of water, as were most of the amphibians.

Species of snakes known to be present in Roanoke County, but not observed in the Havens WMA are *Carphophis amoenus amoenus* (Eastern Wormsnake), *Heterodon platirhinos* (Eastern hog-nosed Snake), *Lampropeltis calligaster rhombomaculata* (Mole Kingsnake), *Lampropeltis getula getula* (Eastern Kingsnake), and *Storeria occipitomaculata occipitomaculata* (Northern Red-bellied Snake). The Kingsnakes were likely not found because the surveyed areas are on the edge of the Kingsnakes' natural range, and they were therefore likely not present in the Havens or along the Battlefield Trail. The other species of snakes may have been present but not found simply because of their secretive nature.

Frog species that were not observed in the Havens WMA or the surrounding areas but are common in Roanoke County include *Pseudacris crucifer* (Spring Peeper) and *Hyla versicolor* (Gray Treefrog). These frogs were likely present in the surveyed areas but never encountered. Also, I had several unconfirmed sightings of *Anaxyrus fowleri* (Fowler's Toad) in the Havens WMA, where photographic evidence was not detailed enough to distinguish between *Anaxyrus fowleri* and *Anaxyrus americanus* (American Toad).

There are many species of salamanders that are known to be, or are likely found in Roanoke County, that were not observed in the Havens WMA or the surrounding areas including *Ambystoma jeffersonianum* (Jefferson Salamander), *Ambystoma maculatum* (Spotted Salamander), *Desmognathus orestes* (Blue Ridge (Dusky Salamander), *Hemidactylium scutatum* (Four-toed Salamander), *Plethodon cinereus* (Eastern Red-backed Salamander), *Plethodon glutinosus* (Northern Slimy Salamander), *Plethodon wehrlei* (Wehrle's Salamander), and *Pseudotriton ruber ruber* (Northern Red Salamander). Many of these species could possibly be present in the

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Havens or the surrounding areas but were not found because of their reclusiveness. Other species such as *Ambystoma jeffersonianum* live in isolated populations in other counties near Roanoke County and are more than likely not present in the Havens or the surrounding areas because the populations are so scattered. Some species like *Desmognathus orestes*, for example, are likely not present in the surveyed areas because they occupy similar niches as *Desmognathus fuscus* (Northern Dusky Salamander) and *Desmognathus monticola* (Seal Salamander), species that are common in the Havens and around the Battlefield Trail. Despite *D. Orestes* being slightly more terrestrial than *D. fuscus* and *D. monticola* there may be enough overlap in their specific niches that *D. orestes* was outcompeted by the other species. The inaccessibility of the Havens also inhibited thorough searches of the habitat at high elevations because hiking to these places was difficult and time consuming. Some of these salamander species and other herps may not have been found because they inhabit such inaccessible areas. Further, none of the surveys in this study were conducted with more than five people but had there been surveys consisting of 20 people or more, most likely there would have been more species found. If thorough surveys were to be continued many of the species previously mentioned might be encountered.

Lizards that are present in Roanoke County but not observed in the Havens WMA or the surrounding areas are *Aspidoscelis sexlineata sexlineata* (Eastern Six-lined Racerunner), *Plestiodon inexpectatus* (Southeastern Five-lined Skink), and *Plestiodon laticeps* (Broad-headed Skink). The Havens WMA and the surrounding areas are on the edge of the natural distribution of all these species of lizards, so they were likely not found because they were not present in the surveyed areas.

Chelydra serpentina serpentina (Eastern Snapping Turtle) was the only turtle species indigenous to Roanoke Co. that was not found. Eastern Snapping Turtles were likely present around the Hanging Rock Battlefield Trail, and possibly present in the Havens, and they would have likely been found had hoop traps been used in the survey.

Fortunately for the wildlife in the Havens Wildlife Management Area, the inaccessibility of the mountain keeps the area mostly untouched by humans. Other than hunters and the occasional hiker, the Havens WMA experiences little impact from humans, therefore, the habitat in the Havens WMA is pristine and unspoiled. One potential threat to the Havens may be development, though this should not seriously endanger the populations of reptiles and amphibians as long as the Havens continues to have a protected status throughout all 2,910 hectares of land. The area surrounding the Hanging Rock Battlefield Trail, on the other hand, is much more exposed to human influence and is far less isolated than the Havens WMA. The protected area surrounding the Battlefield Trail and the spur trail is bordered by busy roads on all sides. To the north and east lies Electric Road and to the south runs Interstate 81. These two roads are extremely busy day and night, and Kessler Mill Road, which lies on the west side of the surveyed area, receives a steady flow of traffic as well. These busy roads pose a threat to herps that try to cross them. A couple of Eastern Ratsnakes and a Red Cornsnake were found dead on roads surrounding the surveyed area. This is a very difficult problem to deal with but there are measures that can be taken to lessen the impact of roads on the populations of reptiles and amphibians in this area. Fencing could be installed along the roads, preventing herps from crossing roads. This measure would likely be most effective along Kessler Mill Road where Mason Creek runs directly next to the road. Multiple Queen snakes and Common Water snakes were observed in close proximity to the road where it is closest to the creek, thus some sort of fence would help keep herps off of the road whether they are seeking to bask or trying to cross. One other threat to herps is the excessive amount of trash in and around Mason Creek. There is a large convenience store and a gas station right next to Mason Creek on the north side of the surveyed area. There is a large amount of trash directly behind the gas station on the banks of the creek, and a lot of the trash downstream is likely from these businesses or their customers. This trash is damaging to the environment in general and can be harmful to reptiles and amphibians. Snakes and other herps can get tangled in all sorts of trash such as mesh wiring or landscaping mesh and end up starving because they cannot eat. Thus, it would be very beneficial to the wildlife in this area if periodic trash clean ups

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were organized for the Battlefield Trail and the Mason Creek area. In addition, signage should be posted along the creek and the Battlefield Trail, especially around the businesses, warning against littering.

In the mid 1970's, several wildlife ponds were installed by the Department of Game and Inland Fisheries along the fire road that runs across the top of Fort Lewis Mountain. Originally the purpose of these wildlife ponds was to provide a source of water for animals on the top of the mountain. During the survey of the Havens WMA one of these water holes was closely monitored for signs of amphibians. The pond was found to be devoid of life and no herps were found in the area. Presumably, the lack of herptofauna around that pool was because there was no shelter for animals in the area. Over the years it appears that these ponds have become filled in by leaf litter so that they are no longer ponds but mud holes. There is only about an inch of water in the hole on top of a thick, deep layer of muck. For the ponds to really be usable by herps the managers of the Wildlife Management Area could dig the ponds back out. Deeper water is essential for most amphibians to use the ponds for refuge and reproduction. In addition, there is no grass on the banks of the ponds, nor any shrubs or other plant life for shelter surrounding the water holes. The lack of any undergrowth on the forest floor surrounding the pond is likely due to the fact that the forest canopy blocks all light from reaching the ground. If the areas surrounding the ponds were to be opened up by clearing out some of the nearby trees it would allow for more growth around the ponds. If the areas around the ponds were cleared and some shrubs and water plants were put in around and in the ponds then more reptiles and amphibians could be attracted to them. The installation of these ponds was a good idea, but their utility for amphibians and reptiles could be increased by making them more "natural" and resembling vernal ponds.

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