

Herpetofaunal Survey of Mason Neck State Park and Mason Neck National Wildlife Refuge

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Introduction

Mason Neck, a peninsula of approximately 3600 hectares (9,000 acres) on the Potomac River, is located less than thirty-two kilometers from Washington DC. In 1965, plans were made to develop the area. Concerned citizens and conservationists rallied to protect the last place near the nation's capital where the bald eagle nested. The local, state, and federal governments intervened with the help of the Nature Conservancy to purchase land on Mason Neck. In contrast to most of Northern Virginia today, Mason Neck remains largely undeveloped with approximately 2400 hectares (6,000 acres) of public land on the peninsula. This public land includes Mason Neck State Park, Mason Neck National Wildlife Refuge, Gunston Hall Plantation (George Mason's home), Pohick Bay Regional Park, and the Bureau of Land Management's Meadowood Recreation Area.

This survey took place within Mason Neck State Park and the adjacent Mason Neck National Wildlife Refuge which are both primarily mixed deciduous upland forest. American beech (*Fagus grandifolia*), sweet gum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), and red maple (*Acer rubrum*) are the main trees with a few older oaks

(*Quercus* sp.) and hickories (*Carya* sp.). Holly (*Ilex opaca*) is common in the understory. Wetlands habitat consists of shoreline along the Potomac River and Belmont Bay as well as the Great Marsh, the largest freshwater marsh in Northern Virginia. Kane's Creek, Raccoon Creek, smaller creeks, ponds, and vernal pools are within the survey area. The area also contains a few managed grasslands that are either mowed regularly or on a three-year mowing cycle. A few buildings, parking lots, and roads form the only other breaks in the forest canopy.

Klimkiewicz published the earliest reptile (1972a) and amphibian (1972b) surveys of Mason Neck, documenting twenty-four species of reptiles (six turtles, three lizards, fifteen snakes) and twenty-four species of amphibians (eleven salamanders and thirteen anurans). Dr. Carl Ernst and his students used the Mason Neck National Wildlife Refuge for field studies for more than twenty years starting in the early 1980s. Ernst et al. (1997) reported twenty-five reptiles (eight turtles, three lizards, fourteen snakes) and twenty-six amphibians (eleven salamanders and fifteen anurans) from the Mason Neck National Wildlife Refuge. Reptiles have been common at Mason Neck since before European colonization. Excavation of a Native American site located within the state park revealed hundreds of reptile bones, principally from turtles (Norton & Baird, 1994).

Study Sites

The park was divided into five parts to accommodate six survey groups. Groups picked their destinations at random covering many different habitats and microhabitats. Five groups surveyed the state park while Group 6 surveyed the national wildlife refuge (Figure 2). The only restriction to each group was to avoid eagle-nesting areas. Within each site, groups decided to split their sections further in order to accommodate morning and afternoon surveys. The descriptions that follow give a glimpse of some of the attributes of each site. GPS coordinates represent a point taken at the center of each section for each site. GPS coordinates were obtained from Google™ Earth.

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Site 1: Eastern most section of the park overlooking part of the bay. It was split into three sections: 38°38'07.56"N, 77°12'27.91"W, 38°37'55.03"N, 77°12'27.16"W and 38°37'55.02"N, 77°12'39.35"W. It is comprised mostly of field edges, road side, tidal marshes, old buildings and some hardwood forest.

Site 2: North-east of Site 1 also overlooking part of the bay, this was an easier trail and site to survey: 38°38'35.97"N, 77°11'57.01"W. This site was surveyed by two groups. This section contained two ponds near a boat landing as well as a beach and a small creek.

Site 3: This site is further inland and followed one of the trails in the park. This site was split into three main sub sections: 38°38'38.32"N, 77°11'31.85"W, 38°38'52.76"N, 77°10'57.15"W and 38°38'41.47"N, 77°10'59.20"W. This site was surveyed by two groups in conjunction with Site 4 and encompassed mostly old growth forest along with tidal marshes and road side areas.

Site 4: This site is located east of Site 3 and follows the border of Mason Neck National Wildlife refuge. This site was split into three main sub sections: 38°38'39.40"N, 77°10'17.05"W, 38°38'38.81"N, 77°10'26.48"W, 38°38'28.23"N, 77°10'07.80"W. This site comprises mostly old growth forest, road edges and areas surrounding a house.

Site 5: This site was comprised mostly of the Mason Neck National Wildlife Refuge along with areas within the southern part of the state park. This site was split into multiple parts including the following: 38°38'06.24"N, 77°10'18.14"W, 38°37'37.68"N, 77°10'20.76"W, 38°37'23.01"N, 77°11'16.76"W, and 38°37'34.15"N, 77°11'23.84"W. This site was comprised of various habitats including vernal pools, roadside edges, hardwood forest, marshes and field edges.

Materials and Methods

The 2010 VHS spring survey began the morning of 22 May, starting at 0800h for a briefing at which point six groups were formed and spread throughout the state park with one group surveying the National Wildlife Refuge in addition to areas within the state park (Figure 2). The number of persons per group varied (Table 1). Additionally, four turtle traps and three crayfish traps were also placed in two ponds near the park information center. The two larger turtle traps were placed in the larger pond next to the boat ramp, and two smaller ones in the small pond next to the road on the way to the ramp. One crayfish trap was placed in the small pond and two in the larger pond. These were placed and checked by Group 5 and Group 2. Table 1 summarizes the amount of survey effort per group. At each site surveyors implemented standard collecting techniques including hand capture, visual observation, flipping surface debris, dip netting, and listening for calling anurans. Figure 1 and Table 2 summarize the total number of each species and the number of animals observed at each site, respectively.

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

	Site 1	Site 2	Site 3 & 4	Site 5	Site 6
Number of turtle traps	-	-	-	4	-
No. of crayfish traps	-	-	-	3	-
Number of surveyors	9	7	7	6	12
Hours surveyed	7	7	7	7	7
Person hrs survey effort	63	49	49	42	84

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

Site	1	2	3 \ 4	5	6	Other Sites
Species						
Amphibians						
Anurans						
<i>Acris crepitans</i>	8		1	7	3	
<i>Anaxyrus americanus</i>	1	2	1	1	1	1
<i>Anaxyrus fowleri</i>		3	1			
<i>Hyla cinerea</i>		4		4		
<i>Hyla chrysoscelis</i>	1			2	1	~20
<i>Lithobates catesbeianus</i>		4	1	1	1	3
<i>Lithobates clamitans melanota</i>	1	4	1	2	4	2
<i>Pseudacris crucifer crucifer</i>	1				1	
<i>Scaphiopus holbrookii</i>						DOR*
Salamanders						
<i>Ambystoma maculatum</i>	6		1		4	
<i>Ambystoma opacum</i>				3		
<i>Hemidactylium scutatum</i>		1				
<i>Notophthalmus v. viridescens</i>	1		2			
<i>Plethodon cinereus</i>			1			
<i>Plethodon cylindraceus</i>			3	3		
Reptiles						
Snakes						
<i>Carphophis amoenus amoenus</i>	10	18	6	9	17	
<i>Coluber c. constrictor</i>	6		2	1	2	
<i>Diadophis punctatus edwardsii</i>			1	3	1	
<i>Heterodon platyrhinos</i>						1 DOR
<i>Nerodia sipedon sipedon</i>		9	7	1	3	
<i>Pantherophis alleghaniensis</i>	4	2	2			

Site	1	2	3/4	5	6	Other Sties
<i>Regina septemvittata</i>		1				
<i>Storeria dekayi dekayi</i>					1	
<i>Thamnophis sauritus sauritus</i>					3	
Lizards						
<i>Plestiodon fasciatus</i>	4	20	3	4	4	
<i>Plestiodon laticeps</i>		1				
<i>Scincella lateralis</i>		2			1	
Turtles						
<i>Chelydra serpentina</i>	1	1*		1	1	1
<i>Chrysemys picta</i>	4			4	1	
<i>Kinosternon s. subrubrum</i>		2		3		
<i>Terrapene carolina carolina</i>	9		2	1	7	
Total Number of animals/site	58	75	35	50	56	~29

* = Pohick Bay Regional Park Area

Annotated Checklist

Anurans

1. *Acris crepitans crepitans* (Northern Cricket Frog) (1, 3/4, 5, 6)

This was the most numerous amphibian found in the survey. It breeds from April 10 to July 25 at Mason Neck National Wildlife Refuge (Ernst et al., 1997). Northern Cricket Frogs were found in a variety of microhabitats including in leaf litter at site 1, on land near the river in leaf litter at site 3/4, on gravel and in grass in sites and forest floor near fallen trees at sites 5 and 6.

2. *Anaxyrus americanus americanus* (Eastern American Toad)
(1, 2, 3/4, 5, 6)

This toad is one of the most abundant amphibians in Northern Virginia (Ernst et al., 1997). During the survey, Eastern American Toads

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were found among leaf litter near fallen logs at site 1, underneath a boardwalk at site 2, near fallen trees on the forest floor at site 3/4, on a tree stump at site 5 and on a dirt road at site 6.

3. *Anaxyrus fowleri* (Fowler's Toad) (2, 3/4)

Fowler's Toads were found underneath logs at sites 3/4 and 2 and on the forest floor at site 2.

4. *Hyla cinerea* (Green Treefrog) (2, 5)

The Green Treefrog was listed as common at several sites within the Mason Neck National Wildlife Refuge (Ernst et al., 1997). During the survey, 2 Green Treefrogs were spotted in the men's bathroom at site 2 as well as on a log near a the maintenance building at site 5.

5. *Hyla chrysoscelis* (Cope's Gray Treefrog) (1, 5, 6)

Mitchell and Reay (1999) listed only *Hyla chrysoscelis* from Fairfax County but Ernst et al. (1997) stated that *Hyla versicolor* is also common at Mason Neck National Wildlife Refuge. Gope's Gray Treefrogs were found in woods calling at sites 1 and 5 and in a dry ravine at site 6.

6. *Lithobates catesbeianus* (Bullfrog) (2, 3/4, 5, 6)

The Bullfrogs were also common and were found calling from a bog at site 2 and 6, at the water's edge of a creek at site 3/4 and caught in a trap at site 5.

7. *Lithobates clamitans melanotus* (Green Frog) (1, 2, 3/4, 5, 6)

The Green Frog is very abundant almost anywhere near shallow water (Ernst et al. 1999). The Green Frog was also a very common amphibian during the survey. The microhabitats of the Green Frog elucidated from the survey include a swamp at site 1, sitting on a log in a bog at site 2, sitting in the water in a marshy swamp at site 3/4, sitting on a log in the hardwoods near maintenance building at site 5, and in vernal pools at site 6.

8. *Pseudacris crucifer crucifer* (Spring Peeper) (1, 6)

This frog is declining in Northern Virginia. Choruses of 1000 males or more were heard in Fairfax County during the 1970s but today the choruses are smaller (Ernst et al., 1999). Spring peepers were not as common during this survey but were found around fallen logs at the edge of swamps at site 1 and at the roadside at site 6.

9. *Scaphiopus holbrookii* (Eastern Spadefoot) (Pohick Bay Regional Park)

Prior to the current survey, this species had been documented only three times in Fairfax County, always at Mason Neck (Norton & Baird, 1994, Ernst et al., 1997). Mason Neck is the only verified locality for this species in Northern Virginia (Mitchell & Reay, 1999). No Eastern Spadefoot Toads were found on the designated sites, however, members of group two were driving on the road and found a dead spadefoot toad within the confines of Pohick Bay Regional Park, which is adjacent to Mason Neck Park.

Salamanders

10. *Ambystoma maculatum* (Spotted Salamander) (1, 3/4, 6)

This is the most common large, lunged salamander in Northern Virginia (Ernst et al., 1999). Microhabitats for the Spotted Salamander included under logs near swamps at site 1, under bark near a fallen tree at site 3/4, and under stumps at site 6.

11. *Ambystoma opacum* (Marbled Salamander) (5)

Marbled Salamanders were not as common as the Spotted Salamanders and were found at site 5 under logs in hardwood forest.

12. *Hemidactylium scutatum* (Four-toed Salamander) (2)

The Four-toed Salamander was also rare and was found at site 2 under some bark in a ravine bog.

13. *Notophthalmus viridescens viridescens* (Red-spotted Newt)
(1, 3/4)

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The red eft form of the Red-spotted Newt was found at sites 1 and 3/4 under a log near a field and under rotting logs in hardwood forest.

14. *Plethodon cinereus* (Northern Redback Salamander) (3/4)

This species is abundant in all Northern Virginia jurisdictions and was listed as the most abundant amphibian or reptile at Mason Neck National Wildlife Refuge (Ernst et al., 1997). The red back salamander was found at site 3/4 under a rotting log.

15. *Plethodon cylindraceus* (White-spotted Slimy Salamander)
(3/4, 5)

White Spotted Slimy Salamanders were found at sites 3/4 and 5 under rotting logs in hardwood forest.

Reptiles

Snakes

16. *Carphophis amoenus amoenus* (Eastern Worm Snake)
(1, 2, 3/4, 5, 6)

This was the most numerous reptile found in the survey. It is the most abundant snake in the Northern Virginia area (Ernst et al., 1997) with an estimated density of 9.7 individuals per hectare on the Mason Neck National Wildlife Refuge (Creque, 2001). It was found in every site under logs and rocks, near swamps and in hardwood forests.

17. *Coluber constrictor constrictor* (Northern Black Racer)
(1, 3/4, 5, 6)

This snake has the largest biomass of any snake on the Mason Neck National Wildlife Refuge and is second in density only to *Carphophis amoenus* (Creque, 2001). Northern Black Racers were also fairly common and were found in almost all sites with the exception of site 2. Habitats included in fields, trash piles, basking on the ground in hardwood forest near fallen trees, on gravel service roads and in grass.

18. *Diadophis punctatus edwardsii* (Northern Ringneck Snake)
(3/4, 5, 6)

Creque (2001) listed this snake as uncommon in the refuge but added

that it is present in larger numbers than thought. Northern Ringneck Snakes were found under rotting logs at sites 3/4, 5 and 6.

19. *Heterodon platyrhinos* (Eastern Hognose Snake)

(DOR in Pohick Bay Regional Park)

Ernst et al. (1997) noted that some are killed by cars each year. The dead Eastern Hognose Snake was found DOR outside of Mason Neck Park but was found in the adjacent Pohick Bay Regional Park.

20. *Nerodia sipedon sipedon* (Northern Water Snake) (2, 3/4, 5, 6)

This is the third most numerous snake species on the refuge with the second largest biomass (Creque, 2001). Northern water snakes seemed to be abundant during the survey and were found at almost every site with the exception of site one. Most water snakes were found in the water on the bay or basking on logs near the water's edge.

21. *Pantherophis alleghaniensis* (Eastern Rat Snake) (1, 2, 3/4)

This snake is listed as common by Creque (2001). Eastern Rat Snakes were also fairly common. The microhabitats for the Eastern Rat Snakes included basking on fallen tree branches as the one found at site 1, moving along trails as in site 2, and waiting to shed while sunning on fallen rotten logs in hardwood forests.

22. *Regina septemvittata* (Queen Snake) (2)

The Queen Snake seems to be declining in Northern Virginia (Ernst et al., 1997). It was not found by Klimkiewicz (1972a) or Creque (2001) though Creque notes that it was formerly not uncommon in the Great Marsh. Only one Queen Snake was found at site 2 near the water's edge of a swamp.

23. *Storeria dekayi dekayi* (Northern Brown Snake) (6)

Klimkiewicz (1972a) listed this snake as common but Creque (2001) listed it as uncommon. This snake's population may be declining at Mason Neck as succession takes place. One Northern Brown Snake was found at site 6 underneath the bark of a rotting log.

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24. *Thamnophis sauritus sauritus* (Eastern Ribbon Snake) (6)

This snake was listed as uncommon by both Klimkiewicz (1972a) and Creque (2001). Three Ribbon Snakes were found at site 6 at the bottom of a ravine.

Lizards

25. *Plestiodon fasciatus* (Five-lined Skink) (1, 2, 3/4, 5, 6)

Five-lined Skinks were very common and found at every site. Microhabitats include under the bark of fallen trees, on live trees and near or on trails.

26. *Plestiodon laticeps* (Broadhead Skink) (3/4)

Ernst et al. (1997) noted that the Broadhead Skink was common at the Mason Neck National Wildlife Refuge. One Broadhead Skink was found at site 3/4 on a fallen rotten tree.

27. *Scincella lateralis* (Ground Skink) (2, 6)

Ground skinks were found at site 2 and 6 in leaf litter and under rotting logs.

Turtles

28. *Chelydra serpentina* (Common Snapping Turtle) (1, 2, 5, 6)

Common Snapping Turtles were noted at all of the sites with the exception of site 3/4. One snapping turtle was found dead on the road at Site 2. Other microhabitats include: a creek at site 6, on top of a hill near a swamp nesting at site 1, and in a mulch pile at site 5.

29. *Chrysemys picta* (Northern Painted Turtle) (5, 6)

This is the most common basking turtle in Northern Virginia (Ernst et al., 2001) and in this survey. They are known to nest from 27 May to 4 July in Fairfax County. The Northern Painted Turtle was found in a pond at site 6 and in a trap at Pond 1 and Pond 2.

30. *Kinosternon subrubrum subrubrum* (Eastern Mud Turtle)
(2, 5)

An Eastern Mud Turtle was also caught in a trap at Pond 1 as well as

one walking along a marsh at site 2.

31. *Terrapene carolina carolina* (Eastern Box Turtle) (1, 3/4, 5, 6)
This turtle is abundant at Mason Neck but has been declining across the region due to the development of habitat and increased traffic on rural roads (Ernst et al., 1997). Eastern Box Turtles were very common during the survey and were found at almost every site, with the exception of site 2. Microhabitats include: a field and field edges, under a dead cedar bush at site 1, by a marsh and near dead trees at site 3/4, in leaf litter in hardwood forests at site 5 and under logs at site 6.

Discussion

During this survey no new species were documented for Fairfax County. The county's proximity to the Smithsonian and several research universities means it has been extensively surveyed. A large amount of fieldwork has been done at Mason Neck in the past, which allows us to draw comparisons to past surveys.

Many of the species that were present before European colonization can still be found at Mason Neck. *Scaphiophis holbrooki*, *Rana catesbeiana*, *Coluber constrictor*, *Terrepenne carolina*, *Kinosternon subrubrum*, *Sternotherus odoratus*, *Chrysemys picta*, and *Chelydra serpentina* have been identified from bones at a Native American site in Mason Neck State Park (Norton & Baird, 1994) and still occur at Mason Neck (Ernst, 1997). Other species excavated from the site including *Malaclemys terrapin*, *Graptemys geographica*, and *Apalone* sp., are not found in Northern Virginia today (Mitchel & Reay, 1999). *Malaclemys terrapin* may have occurred at Mason Neck in the past when drier conditions pushed the salt wedge up the Potomac. *Graptemys geographica* and *Apalone* are currently known in Virginia only from the Tennessee River drainage (Mitchel & Reay, 1999).

The survey was notable for which species were not found as much as those that were found. The absence of a normally common species, the Eastern Garter Snake *Thamnophis sirtalis*, from the present

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study seems unusual. Klimkiewicz (1972a) recorded it as abundant at Mason Neck but Creque (2001) listed it as uncommon less than thirty years later. Reductions in garter snake populations, if real, could be a result of forest succession and reductions in their amphibian prey among other causes. Klimkiewicz (1972a) recorded the Northern Red-bellied Snake, *Storeria occipitomaculata*, from Mason Neck. Extensive surveying has not revealed any additional records of this species (Ernst et al., 1997; Creque 2001). *Plethodon cinereus*, the Northern Redback Salamander, was listed as abundant by Ernst et al. (1997) but was represented by only a single individual in the current survey. The Brown Water Snake and Northern Leopard Frog have not been recorded from Mason Neck since Klimkiewicz (1972a, 1972b) and were likely cases of mistaken identity. Neither species is found in northern Virginia (Mitchell & Reay, 1999).

The presence of an invasive fish species at Mason Neck is a concern. Three Northern Snakeheads, *Channa argus*, were captured in a turtle trap placed in a pond. The impact of this species on native wildlife is a concern. One Northern Snakehead from the Potomac River contained a frog in its stomach (Odenkirk & Owens, 2007). Snakeheads are known to eat frogs and smaller reptiles in their native range (Courtenay & Williams, 2004). The excellent amphibian and reptile records for Mason Neck and its proximity to Dogue Creek, the epicenter of the Potomac snakehead population (Owenkirk & Owens, 2007) would make it an excellent study site for the impact of the snakehead on native populations.

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