Herpetological Inventory of the
Designated Natural Areas of Bucks County, Pennsylvania

Conducted By Marlin D. Corn

Prepared for the Bucks County Natural Areas Inventory Update Project

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Acknowledgements

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Introduction

An inventory of the reptiles and amphibians that occur within the thirteen designated natural areas of Bucks County, Pennsylvania was initiated in February 2009. This inventory is a component of the Bucks County Natural Areas Inventory Update project, which is a follow-up to the original inventory completed in 1999; an attempt to inventory all the flora and fauna species within the designated natural areas of Bucks County. This herpetological inventory was conducted as an effort to document all reptile and amphibian species that currently exist, and to estimate their relative population distributions, within these areas. Surveys were conducted from February 2009 through October 2010, under Pennsylvania Fish & Boat Commission Scientific Collecting Permit No. 156, Type I. During the course of this inventory, 44 herpetological species were detected within Bucks County.

Project Objectives

1. **Compile a list of expected species**
   Before field investigations began, a list of potential species was compiled from existing records based primarily on voucher specimens currently held at the Carnegie Museum of Natural History, and the results of surveys previously conducted within the county. Field notes of acquaintances, conversations with Parks personnel and local enthusiasts, and personal data were also utilized.

2. **Document species and compile relevant data**
   During the course of field surveys, efforts were made to document observed species with digital photographs and GPS coordinates, and take notes on populations, breeding, and behavior.

3. **Determine and propose conservation and management measures**
   General recommendations for the conservation of the county’s herpetofauna, and specific recommendations for the conservation of concern species was an objective to be derived from resultant observations.
Methods

Seasonally Important Habitat Assessment
Habitat reconnaissance visits to the fourteen designated natural areas began in late February of 2009 in an effort to locate seasonally important habitat (e.g. seasonal pools, wetlands, and rocky outcroppings), then time/area-constrained searches were conducted at these sites. Seasonally important sites discovered after the appropriate season in 2009 were visited at the appropriate times during 2010. Seasonal pools are the sites of the earliest herpetological activity in a year and so received priority in late winter/early spring. Areas with records of rarer species generally received special attention, with repeat visits during the study, or until presence was reconfirmed.

Field Methods
General Herpetological Collecting (GHC), also known as ‘search and seizure’, during time/area constrained searches, was the primary method used for species detection during this inventory. Anuran Calling Surveys (ACS) was also conducted on occasions during anuran breeding months. Numbers of calling individuals were noted, and in the case of large choruses (primarily spring peepers), population sizes were estimated. ACS outings were conducted primarily via automobile, by slowly driving past known wetlands and back roads on moist evenings, listening for calling frogs. Employed GHC methods included:

a) traveling through survey areas by foot and observing exposed, active animals, searching under cover objects (stones, logs, human debris, etc.), wading through wetlands, streams and other water bodies.

b) searching wetlands at night with flashlights, slowly driving roads at night during wet weather (conducive to amphibian movements – usually in conjunction with ACS)

c) paddling waterways via canoe/kayak to search for basking, aquatic turtles and snakes, and to access islands.

d) scanning potential habitat for a variety of species with binoculars before close approaches.

Terrestrial herpetological specimens were generally captured by hand for documentation, but dip nets were also employed in the capture of aquatic species. Specimens found dead on roadways were also recorded and are noted DOR (Dead On Road). Weather conditions and the names of all surveyors present were recorded. A latitude/longitude coordinate was taken at least one location for each site, and additional GPS points were recorded at the exact locations that rare or uncommon species were observed. Digital photographs were taken for at least one representative of each species (and/or their eggs) in each survey location, on each survey date whenever possible. Notes were taken on habitat, microhabitat, species populations and behavior. At least one representative photograph of habitat was taken at each site visited.
List of Expected Species

**Caudata**
Spotted Salamander, *Ambystoma maculatum*
Marbled Salamander, *Ambystoma opacum*
Red-spotted Newt, *Notophthalmus viridescens viridescens*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *Plethodon glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Psuedotriton ruber ruber*
Northern Two-lined Salamander, *Eurycea bislineata*
Longtail Salamander, *Eurycea longicauda longicauda*
Four-toed Salamander, *Hemidactylium scutatum*

**Anura**
Eastern Spadefoot Toad, *Scaphiopus holbrookii holbrookii*
American Toad, *Anaxyrus americanus americanus*
Fowler’s Toad, *Anaxyrus fowleri*
Spring Peeper, *Psuedacris crucifer*
New Jersey Chorus Frog, *Pseudacris triseriata kalmi*
Northern Cricket Frog, *Acris crepitans crepitans*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvaticus*
Southern Leopard Frog, *Lithobates sphenocephalus utricularius*
Pickerel Frog, *Lithobates palustris*
Green Frog, *Lithobates clamitans melanota*
Bullfrog, *Lithobates catesbeianus*

**Chelonia**
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Spotted Turtle, *Clemmys guttata*
Bog Turtle, *Glyptemys muhlenbergii*
Wood Turtle, *Graptemys insculpta*
Eastern Box Turtle, *Terrapene carolina carolina*
Map Turtle, *Graptemys geographica*
Red-eared Slider, *Trachemys scripta elegans*
Redbelly Turtle, *Psuedemys rubriventris*
Painted Turtle, *Chrysemys picta/marginata*
Eastern Spiny Softshell Turtle, *Apalone spinifera spinifera*

**Order Squamata, sub-order Lacertilia**
Northern Fence Lizard, *Sceloporus undulatus*
5-Lined Skink, *Plestiodon fasciatus*

**Order Squamata, sub-order Serpentes**
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Smooth Earth Snake, *Virginia valeriae valeriae*
Northern Brown Snake, *Storeria dekayi dekayi*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Eastern Hognose Snake, *Heterodon platyrhinos*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Rat Snake, *Elaphe alleghaniensis*
Eastern Milksnake, *Lampropeltis triangulum*
Northern Copperhead, *Agkistrodon contortrix mokasen*
Results

Inventory of Species Detected

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<tr>
<th>Species</th>
<th>Number of Observations</th>
<th>2009 – 2010</th>
<th>2000 - 2010</th>
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</table>
**Species Accounts – Species Detected**

In many cases the numbers of species detected at a given site could only be estimated. This includes cases of large frog choruses, large congregations of basking turtles that dive into the water upon detection, large emergences of frog or toad metamorphs, or large numbers of fast swimming amphibian larvae. The numbers of those species are accompanied by a ‘+’.

In situations where only larvae were encountered, the species was only given a single number value for each water body; at least one adult had to be present to deposit eggs, but entire broods of amphibian larvae can perish if the natal water body dries up before metamorphosis is complete; something that has been observed numerous times by the lead surveyor of this project.

At the beginning of the account for each species, the number of specimens detected during the NAI update project (2009 – 2010) is noted to the right of each species name. The number of observations since 2000 follows that number, in parenthesis. All photos taken by Marlin D. Corn unless otherwise noted.

**Order Caudata**

**Spotted Salamander, *Ambystoma maculatum* – 44+ specimens detected (151+ since 2000)**

Found in all 13 designated natural landscapes, adult Spotted Salamanders, larvae, eggs or spermatophores were present in most vernal pools surveyed during the late winter – early spring months. Population size was generally, but not always, commensurate with vernal pool size. In several instances there was evidence of breeding in other types of water bodies (e.g. streams, swamps, man-made ponds). Occasionally adults were found under logs in upland forest habitat during diurnal surveys. During nocturnal surveys breeding events were sometimes witnessed; adults were encountered traversing wet forest floors and congregating in vernal pools, engaging in courtship rituals. On a few occasions adult Spotted Salamanders were observed swimming in small streams during breeding migrations.
Marbled Salamander, *Ambystoma opacum* – 1 specimen detected (7+ since 2000)

The first documentation of Marbled Salamanders in Bucks County occurred in 2002 when PHAP volunteer Jack Sliwinski found two larval stage specimens in the Coffman Hill landscape. During subsequent surveys targeting the same area in the spring of 2006, more than 20 larvae were found in a stream pool (one collected and reared to adult stage in captivity). An adult specimen was found during a survey in the same general location the following September, and another adult was found there in September of 2007. A visit to the same location turned up another adult specimen on September 3, 2010. All three of these adults were males, found during diurnal surveys under small pieces of bark on the ground in a section of forest that is seasonally flooded by a small stream. Several miles to the east in the Coffman Hill landscape, Harry McGarrity found several Marbled Salamander larvae in a small vernal pool on his property during March of 2008. An adult female, guarding eggs under a thick mat of moist deciduous leaves, was found by Harry in the same pool the following October. Reports of past Marbled Salamander observations were received for two other locations in the Coffman Hill landscape, but these are yet to be confirmed.

![Site marbled salamanders were first found](image1)

![Marbled Salamander, *Ambystoma opacum*](image2)

![Female guarding eggs](image3)

![Recently hatched larva](image4)

![Developing larva](image5)

![Marbled salamander metamorph](image6)

Red-spotted Newt, *Notophthalmus viridescens viridescens* – 9 specimens detected (12 since 2000)

Red-spotted Newts are a common species of salamander throughout much of Pennsylvania, but appear to be relatively uncommon in Bucks County. Only five specimens were found during the past two years, and the surveyor had only recorded four specimens previously in Bucks County during the past ten years. No sizable populations were observed in any of the numerous lakes, ponds, canals, vernal pools or other water bodies included in surveys. However, Red-spotted Newts are probably much more common than the data in this report might suggest. There is abundant private property with appropriate habitat that has yet to be surveyed. The species can be transient, disappearing from one location, and colonizing new locations via movements in stream courses by adults, and overland travel by the eft stage. They were documented in Bucks County during the original NAI project, and a number of anecdotal reports from various locations have been received through the years. Since 2000 they have been found in the Coffman Hill, Mid-county Ridges, Neshaminy Creek, and
Upper Tohickon Creek landscapes. Five of these specimens were the efts, found wandering in the open or under logs in woodland habitat, while the remaining four were adults in aquatic environs. Additional surveys targeting this species, particularly aquatic trapping surveys, would likely increase the known range of Red-spotted Newts in Bucks County.

Northern Redback Salamander, *Plethodon cinereus* – 381 specimens detected (886 since 2000)

As expected, the extremely common Northern Redback Salamander was found in abundance in all thirteen landscapes. The majority of observations were made in woodlands during the spring and fall, and most specimens were found under a variety of cover objects. Occasionally specimens were encountered under streamside rocks during the summer months. Several were encountered actively moving about in the open during nocturnal surveys. They were found in nearly all woodland habitat surveyed during spring and fall months. The Northern Redback Salamander is undoubtedly one of the most common herpetological species in Bucks County.

Northern Slimy Salamander, *Plethodon glutinosus* – 4 specimens detected (43 since 2000)

All specimens of Northern Slimy Salamanders were found under cover objects (usually stone, less often under logs, occasionally under bark or debris) in woodland habitat during spring or fall months. Slimy Salamanders can pose a challenge to the surveyor, particularly in Bucks County. This species is only above
ground for short periods in the spring and fall, and populations appear to be sporadic. The Northern Slimy Salamander appears to be most numerous in the northern parts of Bucks County where diabase boulders often represent the predominating cover objects; much of the forest in this area contains massive exposures of diabase. Such a landscape offers premium salamander habitat, but can prove challenging to survey; diabase boulders are often difficult to lift, either being too heavy, or embedded into the substrate due to their round shape. When other types of cover object were available, large numbers of slimy salamanders could be found in some of these areas. During the past ten years Northern Slimy Salamanders have been found in the Coffman Hill, Lower Tohickon Creek, Neshaminy Creek, Nockamixon-Haycock, Paunacussing and Tincum Creek Landscapes. A second-hand report of a Slimy Salamander in Five Mile Woods (Atlantic Coastal Plain landscape) was received, but surveys in that preserve did not turn up any specimens as part of this study. It is not unreasonable to believe that additional surveys, focused on woodland salamanders, would likely detect Northern Slimy Salamanders in additional landscapes.

Northern Slimy Salamander, *Plethodon glutinosus*

Northern Dusky Salamander, *Desmognathus fuscus fuscus* – 117 specimens detected (412+ since 2000)

Northern Dusky Salamanders were found in all but two conservation landscapes; Delaware and Lake Galena – Pine Run. They were found in a very few locations in the Neshaminy Creek landscape, and only one location in the Atlantic Coastal Plain landscape. As an indicator of good water quality, the apparent lack of Dusky Salamanders in these landscapes may possibly correlate to the fact that these are the most developed and heavily populated landscapes within the county. The majority of observations were made in the northern, less populated regions where they were often found in abundance. Additional surveys would likely expand their known range within the county.

All Northern Dusky Salamanders were found associated with seeps, springs or small to medium streams. Specimens were usually found under rocks along the water’s edge, and some neotenic forms were found under rocks in stream beds. On one occasion several adults were observed wandering out in the open on the bottom of a small woodland stream in warm sunny weather on an early spring day. On several occasions females were found guarding eggs under large slabs of stone on stream banks. An adult male was usually in close proximity to the female and her eggs in these cases.
Northern Red Salamander, *Psuedotriton ruber ruber* – 28 specimens detected (47 since 2000)

Northern Red Salamanders were not difficult to find in some of the watersheds noted for their exceptionally pristine condition, but appear to be uncommon or possibly absent throughout much of Bucks County. They are one of the best indicator species for stream water quality, yet they have turned up in unlikely places. George Carmichael, of southern Bucks County, knows of a small population of Northern red Salamanders that thrives in a tiny stream that runs through the middle of a Levittown neighborhood (documented prior to 2000 during the Pennsylvania Herpetological Atlas Project). Since 2000 they have been documented by the surveyor of this project in the Coffman Hill, Cooks Creek, Mid-County Ridges, Neshaminy Creek, Nockamixon-Haycock, and Pauncussing Creek landscapes. A large portion of these observations were made in the Rapp Creek and Cooks Creek drainages. Most specimens were found under cover objects (rocks, logs, mats of wet leaves) in seeps, or alongside streams. Some, including both adult and neotenic forms were found under rocks in the water of streams. One specimen was found inside of a large rotting log several yards from a stream. Additional surveys could increase the number of landscapes that Northern Red Salamanders are known to inhabit.

Northern 2-lined Salamander, *Eurycea bislineata* – 374 specimens detected (674+since 2000)

As the Northern Redback Salamander is the most common woodland salamander, so is the Northern Two-lined Salamander the most common streamside salamander in Bucks County. Apparently tolerant of less
than pristine water quality, this species was found in abundance in all conservation landscapes. Most specimens were found under rocks along stream edges, or in seeps, but some were found several yards from the water’s edge. It is difficult to walk along the edge of a stream anyplace in Bucks County and not find Northern Two-lined Salamanders by flipping over a few rocks.

Northern Two-lined Salamander, *Eurycea bislineata*

**Four-toed Salamander, *Hemidactylium scutatum* – 0 specimens detected (1 since 2000)**

Only a single Four-toed Salamander has ever been found by the lead surveyor of this project in Bucks County. This specimen was found in the Upper Unami Conservation Landscape in late-October of 2005. It was found in a small burrow atop a septic sand mound in the front yard of a private residence. The location is adjacent to classic Four-toed Salamander habitat; a hardwood swamp and associated open wetland with abundant sphagnum moss growth. No other official documentation of four-toed salamanders could be found for Bucks County, but Brandon Ruhe reported that he had found one in the Atlantic Coastal Plain landscape in the early 1990s (pers. conv.). This species was added to the state’s no-take list in recent years due to apparent population declines. Additional surveys focused on this species in appropriate habitat might yield more specimens of Four-toed Salamanders.
Longtail Salamander, *Eurycea longicauda longicauda* – 4 specimens detected (17 since 2000)

A relatively uncommon species in Bucks County, Longtail Salamanders were found in the Coffman Hill, Delaware River, Lower Tohickon Creek, Neshaminy Creek, Paunacussing Creek, and Tinicum Creek Conservation Landscapes. In most situations, only a single Longtail Salamander was detected during the course of a survey, but seven specimens were found in one location in the Tinicum Creek Conservation Landscape. Most specimens were found under rocks associated with streams and creeks, but a couple of Longtail Salamanders were found in terrestrial habitat. One specimen was found actively moving through the leaf litter of a forest floor.

LONGTAIL SALAMANDER, EURYCEA LONGICAUDA

Order Anura

Eastern Spadefoot Toad, *Scaphiopus holbrookii holbrookii* – 7 specimens detected (7 since 2000)

The detection of Spadefoot Toads during the course of this study constitutes a new herpetological record for Bucks County. All seven specimens were found by Brandon Ruhe, who is currently conducting a funded, state-wide research project to determine the distribution of Eastern Spadefoot Toads in Pennsylvania. Five adult specimens were found out actively moving at night during rain events in the Delaware River Conservation Landscape, and two metamorphs were found in a small pool, in open meadow habitat adjacent to a wetland, in the Atlantic Coastal Plain. It has long been suspected that this extremely secretive species might reside in Bucks County, as anecdotal reports have been received through the years. George Carmichael related second hand reports about Spadefoot Toads being found at a site in the Atlantic Coastal Plain during the 1960’s. Retired Council Rock High School teacher Bob Assetto reported students from the Washington Crossing area bringing numerous specimens in to his science class during the 1980’s. Searches during nocturnal rain events revealed no specimens in either of those localities during this study. However, continued searches in appropriate habitat during rain events might yield additional Eastern Spadefoot Toad discoveries in Bucks County.
American Toad, *Bufo americanus americanus* – 172+ specimens detected (384+ since 2000)

The cosmopolitan American Toad is widespread and common throughout Bucks County. It was found in all landscapes, in a variety of habitats. In the majority of cases, a single specimen was found under a cover object or moving through forest habitat. In some cases, larger numbers resulted from hearing small choruses, or witnessing breeding events on spring evenings. One large emergence of over 100 metamorphs was observed along the Neshaminy Creek in Dark Hollow County Park. A number of observations were made in gardens and lawns.

Fowler’s Toad, *Bufo fowleri* – 53+ specimens detected (154+ since 2000)

Considered a species of concern in Pennsylvania, Bucks County seems to hold a robust population of Fowler’s Toads. They were found in the Atlantic Coastal Plain, Delaware River, Lower Tohickon Creek and Neshaminy Creek landscapes. Most observations were made along creeks that drain directly into the Delaware River, or in flood plains associated with the Delaware. Breeding choruses were heard during nocturnal surveys,
but most visual observations occurred during diurnal surveys. Most of these specimens were found under cover objects, several were observed actively moving overland. It is likely that additional populations of Fowler’s Toads exist along the Delaware drainage in Bucks County than were detected during this study.

Spring Peeper, *Psuedacris crucifer crucifer* – 658+ specimens detected (7140+ since 2000)

Found in all landscapes, more observations of Spring Peepers were made than any other herpetological species since 2000. Clearly one of the most abundant herpetological species in Bucks County, it could be heard calling from most wetlands, or other body of water that had ample emergent vegetation along its shores, during evening surveys in early spring. The diversity of wetland habitat populated by Spring Peepers in Bucks County includes lake and pond shores, emergent wetlands of all sizes, woodland swamp, vernal pools, the Delaware Canal, and roadside ditches. Specimens were also heard calling sporadically during surveys on cloudy days during the spring and fall. Occasionally, individual Spring Peepers were encountered moving across overland in forests during summer and fall months. The numbers of individual frogs in larger choruses could only be estimated.
A single New Jersey Chorus Frog was captured in a wooded wetland in the Atlantic Coastal Plain on March 18, 2010 by Brandon Ruhe. Up to five chorus frogs were detected by call in a wetland pool of water (approx. 3 ft.) with emergent vegetation, including woody shrubs, at approximately 11:30 a.m., in mild but cloudy weather. Brandon also found an egg cluster, believed to be deposited by a female chorus frog, attached to a submerged plant stem.

The last prior documented observation of a New Jersey Chorus Frog in Pennsylvania was in the Yardley area in the mid-1980s, and the species has since largely been regarded as extirpated from the state. The new observation is significant in that it not only resurrects the species as extant in Pennsylvania, but is a significant distance from the Yardley site. Older historical records from the Bristol area indicate the species exist, but specific locality is vague; it is possible that this find represents a new site. Critically-timed surveys in appropriate habitat throughout the southern end of Bucks County may well yield additional undetected populations.

Northern Cricket Frog, Acris crepitans crepitans – 15+ specimens detected (28+ since 2000)

Because Northern Cricket Frog populations appear to have drastically declined in Pennsylvania, the documentation of an extant population in Bucks County is significant. The locations that specimens were found are all in relatively close proximity to each other (entire area approx. 2 square miles) in the Delaware River Conservation Landscape. Interestingly, the area is one of the most heavily impacted by industry in the county, yet this delicate species continues to thrive there. In all instances the frogs were detected actively moving through habitat, or by calling choruses. In the summer of 2001 George Carmichael discovered a small group of Northern Cricket Frogs calling from a roadside ditch. At another location numerous frogs were observed hopping through spatterdock and hunting small flies on a wetland mudflat during the month of September. Another site is a recently constructed mitigation wetland that was colonized by Northern Cricket Frogs. During a morning visit in early July, males were heard chorusing and several adults, tadpoles and metamorphs were observed moving through emergent vegetation. At another site several specimens were found moving about in upland forest habitat, also in late-September.

Intensive surveys in the southern region of the county could yield additional populations of Northern Cricket Frogs. Anecdotal reports of populations in the northern end of the county have been received, but follow-up investigations have failed to detect them. A locality in northeastern Bucks County was reported in
Gray Treefrog, *Hyla versicolor* – 242+ specimens detected (858+ since 2000)

Gray Treefrogs are abundant and widespread in Bucks County. During this project they have been detected in all but two of the Conservation Landscapes; the Mid-county Ridges and Upper Unami. It would not be surprising to learn that Gray Treefrogs do in fact, reside in these landscapes as well.

Nearly all Gray Treefrogs were detected by their calls. The majority of observations were made on moist-to-wet nights while driving slowly through the county. However, many were detected by diurnal calling, particularly on cloudy days. Most were calling from the branches of trees, but were also occasionally detected on the ground. On very rare occasions they were detected visually. One specimen was found hibernating in a depredated painted turtle nest during a late winter turtle-nesting habitat survey in the southeastern tip of the county.
Wood Frog, *Lithobates sylvaticus* – 155+ specimens detected (424+ since 2000)

Wood Frogs, their eggs, or their tadpoles were observed at most vernal pools visited during late-winter or spring months, often in the company of spotted salamanders. Breeding activity was observed on numerous occasions. Varying-sized adult phase frogs were occasionally found moving overland in forested habitat during spring, summer and fall months. Only a few times were Wood Frogs found under cover objects. They were documented in all but one Conservation Landscape; the Lake Galena-Pine Run landscape. The odds are they likely inhabit this landscape as well.

Southern Leopard Frog, *Lithobates sphenocephalus utricularius* – 8 specimens detected (32 since 2000)

Southern Leopard Frogs are currently known to exist in the Atlantic Coastal Plain and Delaware River Conservation Landscapes. Breeding populations were observed at two different sites, one in each landscape, during the spring of 2001 and 2002. Males were heard calling on most visits during early spring. A single frog was observed leaping through a grassy area of another site in the southern tip of the county in 2001. They have recently been reconfirmed at the two sites previously mentioned. During 2009 and 2010 Southern Leopard Frogs were found at three additional sites in the Atlantic Coastal Plain by Brandon Ruhe. Intensive searches of appropriate habitat in the southern region of the county could yield additional populations.
Pickerel Frog, *Lithobates palustris* – 272+ specimens detected (650+ since 2000)

Pickerel frogs are very common in Bucks County, but seem to become less common as one moves to the south in the county. The most robust numbers were encountered in northern open spaces where they seemed ubiquitous. They have been encountered in a variety of habitats, particularly in moist conditions. Pickerel Frogs were one of the most commonly observed species crossing roadways during nocturnal rain event surveys. They were often observed actively moving through forests, wetlands, and wet meadows, and were often found beneath streamside rocks, especially during fall surveys. Males were often heard calling during nocturnal surveys in early spring, from a variety of aquatic pools. This would include lakes, ponds, creek oxbows, vernal pools, wooded swamps and open wetlands. Males were sometimes observed calling while sitting on a pool bottom, beneath a few feet of water.

![Pickerel Frog, Lithobates Palustris](image)

Green Frog, *Lithobates clamitans melanota* – 1409+ specimens detected (2429+ since 2000)

Green Frogs are undoubtedly one of the most common herpetological species in Bucks County. They were observed in most aquatic situations in all Conservation Landscapes. Walking along most stream or pond banks will startle numerous green frogs stationed along the shorelines. Adults and/or tadpoles were generally obvious in most wetlands with standing water, swamps, lakes, artificial water gardens, creeks, the Delaware River and Delaware Canal. They were also one of the most commonly observed species crossing roads at night during rain events. Green Frogs were sometimes present in vernal pools, and occasionally observed moving overland through forest or meadow habitat. Green frogs were often heard calling, night and day, from water throughout most of the summer months. Frogs were often observed evenly spaced along shorelines and ‘wrestling matches’ were occasionally observed between males defending calling territories.

![Green Frog, Lithobates clamitans melanota](image)
Bullfrog, *Lithobates catesbeianus* – 119+ specimens detected (425+ since 2000)

Bullfrogs were found in all Conservation Landscapes, if not quite in the same abundance as Green Frogs. Almost always observed sitting on the bank of, or in the shallow water of a pond, lake, creek or river shore, they were occasionally the only frog species observed in these situations. They were found in all of the habitat types that other *Lithobates* species were found in, and occasionally observed feeding on the other species. This includes an observation of a Bullfrog swallowing a Pickerel Frog, a species considered relatively toxic to other frog species. Males were often heard calling, both night and day and bullfrogs were easily observed stationed in relatively even intervals along the shores of most ponds and small lakes.

*Order Chelonia*

**Common Snapping Turtle, Chelydra serpentina** – 43 specimens detected (259 since 2000)

Found in all landscapes, patient searching of aquatic habitats often turned up at least one Snapping Turtle. Due to its cryptic habits, the species is almost certainly much more common than the survey results might suggest. During most of the numerous surveys of the Churchville Reservoir usually only one or two ‘snappers’ were observed, but when a deer carcass ended up in this lake during the summer of 2008, at least eight large Snapping Turtles were observed lunging at, and tearing chunks of flesh from the decomposing carcass. At least three more snappers could be seen heading through the water towards the carcass from different directions.

Snapping Turtles were usually observed moving slowly on the bottom of water bodies, but were also often seen float-basking. Occasionally Snapping Turtles were observed basking on logs or shores. A number of specimens were encountered moving overland, and females were occasionally observed nesting. Numerous depredated snapping turtle nests were observed in close proximity to lake and pond shores. Hatchlings were usually encountered in shallow water conditions (e.g. in shallow streams, emergent wetlands and emergent plant zones of ponds and lakes).
Common Musk Turtle, *Sternotherus odoratus* – 12 specimens detected (25 since 2000)

Due to the secretive habits of Common Musk Turtles, this species is likely much more common than the number of observations might suggest. Most specimens were found grazing on algae or submerged plant growth on the bottom of shallow pools in creeks, streams and the Delaware Canal. Algae growth on the shells of many specimens provided excellent camouflage for these turtles. Some were observed actively swimming, with the downstream flow, of creeks and small streams. A couple of specimens were discovered moving overland near a large pond after a heavy rain event. Two shells of dead specimens were found. A single egg was found laying out in the open along the railroad tracks of the Churchville Reservoir, possibly a survivor of nest depredation. The jellybean-sized egg was collected and it hatched several days later. The hatchling was released in the emergent plant zone of the reservoir, close to where it was found.
**Eastern Mud Turtle, *Kinosternon subrubrum subrubrum* – 2 specimens detected (2 since 2000)**

The discovery of Eastern Mud Turtles in the Atlantic Coastal Plain and Delaware River Conservation Landscapes represent possibly the most significant herpetological find for Bucks County, if not for the entire state of Pennsylvania, in recent history. Prior to the observations described here, the Eastern Mud Turtle has not been documented in Pennsylvania since 1963. Prior to that single observation, it had not been documented since 1906.

In July of 2008, Brandon Ruhe discovered a DOR specimen in the Delaware River landscape. This discovery led to the funding of a study, headed by Mr. Ruhe and Dr. Tom LaDuke of East Stroudsburg University, as an attempt to determine the status of Eastern Mud Turtle populations in Pennsylvania. In the late summer of 2009, a specimen was observed basking on a shrub hammock in a wetland located in the Atlantic Coastal Plain, and was hand-captured by Mr. Ruhe (witnessed by lead herpetologist of the Bucks County NAI update project). The following March, an old female mud turtle was discovered by Mr. Ruhe in the same vicinity. This specimen was apparently emerging from a hibernaculum in forest habitat adjacent to the wetland. Trapping (aquatic hoop traps), and subsequent radio tracking efforts in the same wetland led to the discovery of six more Eastern Mud Turtles.
Eastern Box Turtle, *Terrapene carolina carolina* – 26 specimens detected (82 since 2000)

Eastern Box Turtles have been found in all Conservation Landscapes, an encouraging observation considering this species is regarded as having suffered drastic declines state-wide in recent history. Most specimens were observed actively moving through forest, meadow and wetland habitat. One specimen was discovered inadvertently while conducting a streamside salamander survey on a hot, dry summer day; the turtle was at the bottom of a pool of water in a small stream. Several other specimens were found swimming or wading in the shallows of ponds, artificial water gardens and flooded tire ruts of dirt roads. Some were observed feeding on berries, slugs and earthworms. Harry McGarrity reported observing two males fighting on his property, and one observation of a female nesting in a flower garden was made. Several observations were the shells of expired specimens, and a few were DOR casualties of automobiles.

![Eastern Box Turtle, Terrapene carolina carolina](image)

Spotted Turtle, *Clemmys guttata* – 18 specimens detected (35 since 2000)

Spotted Turtles were found in the Atlantic Coastal Plain, Coffman Hill, Nockamixon-Haycock, Upper Tohickon Creek, and Upper Unami Conservation Landscapes. Not always an easy species to detect, they likely reside in one or more additional landscapes as well. Another species that has apparently suffered significant declines in Pennsylvania during recent history, Spotted Turtles have at least two noteworthy populations in Bucks County, significant numbers of turtles were observed at two sites in the Atlantic Coastal Plain. Low counts of Spotted Turtles were observed at two sites in the northern end of the county where large tracts of wetland habitat exist, and further investigations at those sites might turn up significant numbers of turtles.

Spotted turtles were mostly observed basking on logs or hammocks, and some were observed actively moving overland, or swimming in open water in wetlands or wooded swamps. One individual was observed moving across a mudflat during a drought period in late summer, heavily caked in mud, suggesting it had possibly just emerged from aestivation. The earliest observation of a spotted turtle was in mid-April and the latest in late-October when a specimen was observed swimming underwater in a woodland swamp. A couple of specimens at a site in the southern end of the county exhibited severe limb deformities.
Bog Turtle, *Glyptemys muhlenbergii* – 0 specimens (1 detected since 2000)
Listed as threatened by the U.S. Fish and Wildlife Service, and as endangered by the state of Pennsylvania, Bog Turtles are also extremely rare in Bucks County. One specimen was found by the lead herpetologist of the Bucks County NAI update project in 2005. Several other relatively recent documentations exist as well. Additional surveys may eventually yield additional bog turtles. Bog Turtles will undoubtedly continue to be considered a rare species in Bucks County, even if additional populations are uncovered.
Wood Turtle, *Glyptemys insculpta* – 5 specimens detected (10 since 2000)

Wood Turtles are uncommon in Bucks County, and as with many other herpetological species in our region, probably much rarer than in the past. On the other hand, they are possibly not quite as rare as the numbers in this study might suggest. Most specimens were found in the northern end of the county, where large tracts of ideal habitat still exist, much of it on private land. As with spotted turtles, the spatial distribution of Wood Turtles in Bucks County is interesting. They were detected in the Atlantic Coastal Plain, Delaware River, Nockamixon-Haycock, Paunacussing Creek, and Upper Unami Creek landscapes, and a couple of specimens were found on a tract that lies between the Mid-County Ridges and Paunacussing Creek landscapes. Viewing these locations on a county map, it can be seen that they are widely distributed across the county, but with large gaps between the confirmed sites, with the Atlantic Coastal Plain site being the most isolated. A report of a Wood Turtle in the same general vicinity as the recent Atlantic Coastal Plain observation was received by Bobby Moyer in June of 2004. For many years, anecdotal reports were received that wood turtles used to be easily found in the Neshaminy Creek landscape as recently as the 1970’s. A reliable source reported a Wood Turtle in Penndel in the early 1990’s. During the current project, a Wood Turtle was observed basking in the Delaware Canal in the northeastern reaches of the county. This canal runs the entire length of the county’s eastern border. Further investigations would almost certainly add more landscapes to the list in which wood turtles are known to inhabit, particularly in the northern region of the county.

Most Wood Turtles were observed actively moving overland. Some were found resting in the shade of vegetation, and one was found feeding on the fruit of skunk cabbage. Three were observed basking on down trees at the edge of water bodies. A DOR specimen, observed in the region between the Mid-county Ridges and the Paunacussing Creek Landscapes, was reported by Joe Mihok in the spring of 2009.

![Wood Turtle, Glyptemys insculpta](image1)

![Wood Turtle plastron](image2)

Common Map Turtle, *Graptemys geographica* – 12 specimens detected (56 since 2000)

Common Map Turtles can easily be observed in the Delaware River in the southern half of Bucks County. Large numbers have been observed basking on bridge abutments and large rocks jutting out of the water, particularly in the rapids between Morrisville and Trenton. Map turtles were also observed basking or swimming in the Neshaminy Creek and the Delaware Canal. A couple of specimens were observed at the Churchville Nature Center; one was observed basking on a log in the lake, and a female was found nesting during a mid-day rain event. Generally considered a river turtle, the Churchville specimens have likely been artificially introduced.
Yellowbelly Slider, *Trachemys scripta scripta* – 1 specimen detected (1 since 2000)

A single observation of this non-native species was made in Lake Galena on May 30, 2010. Native to the southeastern U.S., this specimen was undoubtedly released as southeastern Virginia is the closest locale where yellowbelly sliders naturally occur. They occasionally turn up in Pennsylvania waters, possibly released by pet owners who purchased them at pet shops, or collected wild specimens while on vacation.

Red-eared Slider, *Trachemys scripta elegans* – 102 specimens detected (155 since 2000)

Red-eared sliders are an introduced species in Pennsylvania, the result of pet-owners releasing captive pets. In years past local pet shops and dime stores sold hatchlings by the thousands across the country. Growing to a burdensome size several years later, many ended up getting released into the wild. At the Churchville Nature Center in southern Bucks County the staff regularly encounters visitors seeking to release
pet turtles into the pond and reservoir. Specimens of all sizes have been observed, as have numerous nesting females. Silver Lake, to the south, and Lake Galena, to the north, both have large populations of breeding red-eared sliders. During one visit a total of 30 large Red-eared Sliders were observed in the eastern end of Lake Galena. Specimens have been detected throughout the county and have been observed in most large water bodies. They were also observed in a variety of water body types, including lakes, ponds, river, canal, creek and woodland swamp.

The introduction Red-eared Sliders, considered an aggressive competitor, introduced competition with native turtle species for feeding, nesting and basking sites. Of particular concern is competition with the Redbelly Turtle, listed as a threatened species in Pennsylvania, which inhabits most large water bodies in Bucks County. This species occupies the same ecological niche that Red-eared Sliders compete for. They have been observed in the Atlantic Coastal Plain, Coffman Hill, Delaware River, Lake Galena-Pine Run, Neshaminy Creek and Nockamixon-Haycock landscapes; precisely the same landscapes that Redbelly Turtles inhabit.

Redbelly Turtle, *Psuedemys rubriventris* – 128 specimens detected (380 since 2000)

This large aquatic turtle species was found in most large water bodies in Bucks County, including Lake Nockamixon, Lake Galena, Churchville Reservoir, Van Sciver Lake, and the Delaware River. They were also observed in smaller lakes, ponds, open wetlands, and the Delaware Canal. The conservation landscapes redbelly Turtles are currently known to inhabit include the Atlantic Coastal Plain, Coffman Hill, Delaware River, Lake Galena-Pine Run, Neshaminy Creek and Nockamixon-Haycock landscapes. The original distribution of redbelly turtles prior to the draining of the Great Swamp of the Quakertown area, and the creation of large, dammed lakes in Bucks County is an interesting question. Evidence of nesting has been observed numerous times through the years, usually in open areas with vegetation that is low at nesting season such as mowed fields and lawns, agricultural fields, athletic fields, and open floodplain. Red-eared sliders were observed in most locations that redbelly turtles were found. The removal of this aggressive, invasive species whenever possible is advisable to reduce competition for resources with native turtle species.
Redbelly Turtle, *Psuedemys rubriventris*

Painted Turtle, *Chrysemys picta/marginata* – 441 specimens detected (1255 since 2000)

Painted Turtle specimens that fit the description of both Eastern Painted Turtles, *Chrysemys picta*, and Midland Painted Turtles, *Chrysemys marginata*, have both been found in Bucks County. Since these two species are known to hybridize, all painted turtles in this inventory are viewed as a *picta/marginata* complex, and are generally referred to as ‘painted turtles, although the majority of painted turtles observed resemble the species *picta*. Painted Turtles are clearly the most common turtle in Bucks County, and were observed in most water bodies, in all of the Conservation Landscapes. Evidence of nesting by painted turtles was observed often, usually in the form of depredated nests. Numerous hatchlings, and DOR specimens have been observed.

Eastern Spiny Softshell Turtle, *Trionyx spiniferus spiniferus* – 19 specimens detected (38 since 2000)

Eastern Spiny Softshell Turtles were observed in the Delaware River and Neshaminy Creek Conservation Landscapes. Most specimens were observed swimming, float-basking, or basking on the banks of Neshaminy Creek. Swimming specimens were usually seen in large, calm pools with ample submerged vegetation.

When sightings of Spiny Softshell Turtles in Bucks County were first relayed to the field coordinator of the Pennsylvania Herpetological Project, the reports were met with skepticism until voucher photographs were
provided. They are referred to in the final report as a probable introduced species. If Spiny Softshell Turtles have been introduced to Bucks County, it was at least 25 years ago or more. In the mid-1980s, the Bucks County Courier Times newspaper featured an article showing a young boy holding a hatchling softshell that he had caught in the Neshaminy Creek. Anecdotal accounts softshell turtle captures and sightings from as far back as the 1960s have been received from several county residents.

![Eastern Spiny Softshell Turtle, *Trionyx spiniferus*](image)

**Order Squamata, sub-order Lacertilia**

**Five-Lined Skink, *Plestiodon fasciatus* — 5 specimens detected (10 since 2000)**

Five-lined Skinks were observed in only one locality since 2000, in southern Bucks County, just outside of the Neshaminy Creek Conservation Landscape. Jack Sliwinski located the population in August of 2002, and they were reconfirmed in 2009. All specimens were found within 50 yards of an active railroad line. A robust population of Northern Brown Snakes exists at the same site. A Five-lined Skink was reported at a local residence in a suburban neighborhood, approximately ¼ mile from the site.

Approximately one half of the specimens were observed out basking, while the rest were found under cover objects. Most specimens were juvenile forms, but a couple of large males with breeding coloration were also observed. Workers at a business adjacent the site reported seeing Five-Lined Skinks on a regular basis during summer months.

![Five-Lined Skink, *Plestiodon fasciatus*](image)  
![Breeding coloration in male Five-lined Skink](image)
Order Squamata, sub-order serpentes

Northern Water Snake, *Nerodia sipedon sipedon* – 48 specimens detected (97 since 2000)

The Northern Water Snake was observed in all Conservation Landscapes, usually in association with wetlands, swamps, streams, creeks, ponds, lakes, the Delaware River and Delaware Canal. Most were observed basking on waterside banks, or in the branches of trees overhanging water, but many were located under large, flat rocks bordering stream and creek banks. Some were observed actively swimming, and a few moving overland, sometimes more than 200 yards from the nearest water body. Some Northern Water Snakes were observed attacking frogs or other prey items, including the observation of a particularly large specimen swallowing a 6 – 8” catfish. One small specimen was found dead on a pond shore with a small perch lodged in its mouth, apparently too large for the snake to be able to swallow.

Northern Water Snake, *Nerodia sipedon sipedon*

Northern Brown Snake, *Storeria dekayii dekayii* – 9 specimens detected (11 since 2000)

Northern Brown Snakes were found at a few locations, scattered across the county. They were observed in the Delaware River, Lake Galena – Pine Run, Lower Tohickon, and Neshaminy Creek Landscapes. Documentations were also received by volunteers from Lahaska and Perkasie. A site outside of, but near the Neshaminy Creek Landscape produced the largest number of observations. All Northern Brown Snakes were found under cover objects, including boards, bark, shingles and leaf mats.

Northern Brown Snake, *Storeria dekayii dekayii*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis* – 60+ specimens detected (171+ since 2000)

Eastern Garter Snakes were the most commonly observed snake species in Bucks County, and numerous observations were made in all counties. Most specimens were observed out in the open basking or actively moving across the landscape, but many were also found under a variety of cover objects. Several mating balls were observed, a situation in which it was difficult or impossible to accurately count all male snakes present. Eastern Garter snakes were found in every nearly every habitat type surveyed.

Northern Ringneck Snake, *Diadophis punctatus edwardsii* – 30 specimens detected (64 since 2000)

Many Northern Ringneck Snakes have been observed through the years in Bucks County, and most specimens were located by flipping numerous rocks, in rocky habitat. Many were found under stones in gardens adjacent to residences, and several specimens were observed in the basements of old houses. Only one snake was observed actively moving out in the open. Northern Ringneck Snakes were detected in all Conservation Landscapes except the Delaware River landscape, where continued searches would undoubtedly yield specimens of this secretive, but common species.
Northern Black Racer, *Coluber constrictor constrictor* – 21 specimens detected (42 since 2000)

Northern Black Racers are probably much more common than the numbers detected would suggest. Alert and fast-moving, most racers observed out in the open bolted from the scene before they could be captured or photographed. Generally, only when they were found under cover objects and taken by surprise were they captured. Most specimens were found in open meadow, scrub, or edge habitat. They were detected in all Conservation Landscapes except the Pauncussing Creek and Tinicum Creek landscapes. Continued searches in those landscapes would undoubtedly yield specimens.

Northern Black Racer, *Coluber constrictor constrictor*, adult and juvenile form

Eastern Rat Snake, *Pantherophis alleghaniensis* – 2 specimens detected (15 since 2000)

A common snake throughout much of Pennsylvania, Eastern Rat Snakes are uncommon to rare in Bucks County, and were found only in the Nockamixon-Haycock Landscape. Most specimens were found at one location, during several different visits. A couple of observations are represented by DOR specimens, and several are represented by skin sheds. Most live specimens were observed basking in the open on the ground, or in trees. One large specimen was observed basking at the entrance of a cavity in a large tree, approximately 15 feet off the ground in the back yard of a home, where one of the residents reported seeing it there on a regular basis.

Eastern Rat Snake, *Pantherophis alleghaniensis*, adult and juvenile form
Eastern Milksnake, *Lampropeltis triangulum triangulum* – 14 specimens detected (22 since 2000)

A common but secretive species, most Eastern Milksnakes were found under cover objects, usually large, flat rocks. A few were found in the basements of old homes. One was observed crawling into the stone foundation of an old carriage house. Another was observed in a storm drain adjacent to a busy shopping center. A couple of specimens were observed basking out in open sunlight on early spring days. Eastern Milksnakes were observed in all Conservation Landscapes except the Delaware River and Mid-county Ridges landscapes, but a specimen was found in Lahaska, just outside of the Mid-county Ridges landscape.

Copperhead, *Agkistrodon contortrix mokasen* – 3 specimens detected (3 since 2000)

The Northern Copperhead, is possibly the rarest snake in Bucks County. Three specimens, a medium-sized female and two neonates, were located at one site in the Lower Tohickon Creek Landscape. This site is well known for its copperheads to many local snake enthusiasts, and many anecdotal reports have been received through the years. Reports have also been received for two other sites in northeastern Bucks County, but these have not been verified. Both sites are private residences and the home-owner of one residence displayed the preserved skin of a large copperhead that she said bit and killed a family pet dog several years ago. Ample habitat is present at that site, in the form of open, shale outcrops on a south-facing forested slope above a small stream with a bed of metamorphic rock.
Species Accounts - Undetected Species

Only three predicted species were not found during the course of this inventory: Northern fence Lizard, Smooth Earth Snake, and Eastern Hognose Snake. One of these species, the Northern Fence Lizard has the most recent record; a single specimen observed along the Delaware Canal by Brandon Ruhe and several other members of the Lehigh Valley Herpetological Society, during survey being conducted for the Pennsylvania Herpetological Atlas Project.

The Smooth Earth Snake Documentation is represented by museum specimen collected by Bob Hudson in the Warrington area in 1948.

Three Eastern Hognose Snakes, collected in Bucks County between 1942 and 1947, are held in a museum collection. The locations they were collected from are listed as, two from the Point Pleasant area, and one from Treasure Island in the Delaware River. The species is listed as a resident of Neshaminy State Park on a list of resident Reptile and Amphibians for that park. In conversation with the Park Superintendent he was unsure of the source for that listing, but seemed to think the last sighting was during the 1960s. An anecdotal report was recently received from a resident of the Cooks Creek landscape, who claimed they caught and identified an Easter Hognose Snake approximately fifteen years ago.

In addition to these three species, an anecdotal report was received for a northern spring salamander (Gyrinophilus porphyriticus porphyriticus) in the Cooks Creek watershed in recent years, and according to the final report of the PHAP, this species was documented in southern Lehigh County, close to the northwestern Bucks County border.

Discussion

Home to at least 44 out of the approximately 75 species currently known in the state of Pennsylvania, Bucks County is indeed herpetologically diverse. To the best of our knowledge, three species had never been officially documented in Bucks County before, and two species had largely been considered extirpated from the commonwealth of Pennsylvania. Since these surveys focused on the designated natural areas of Bucks County, a considerable amount of territory was not surveyed. However, the majority of the county’s undeveloped land does lie within the boundaries of the designated natural areas. It is entirely possible that additional, undetected, native herpetological species reside within the county borders. Observations of all species, with the exceptions the hognose snake and smooth earth snake, for which historical records exist, were made either during the course of this two-year study, or since the year 2000.

General Recommended Conservation Measures

At least 44 species of reptiles and amphibians are present in Bucks County. Of the species documented during this, and other surveys in recent years, one, the bog turtle is currently listed as federally threatened species. Six are listed by the state as endangered (eastern spadefoot toad, New Jersey Chorus Frog, Northern Cricket Frog, Southern Leopard Frog, Eastern Mud Turtle and Bog Turtle) one by the state as threatened (Redbelly Turtle), and eight are currently considered vulnerable by the state (Marbled Salamander, Four-toed Salamander, Fowler’s Toad, Spotted Turtle, Wood Turtle and Eastern Box Turtle, Five-lined Skink and Northern Copperhead). The Northern Cricket Frog was just recently elevated to state endangered status. Outside of Bucks County, there are only two other populations of Northern Cricket Frogs currently considered extant in Pennsylvania. At one of those sites observations of Northern Cricket Frogs has not been made for over eight years.

The eastern mud turtles discovered during the course of this study are the first specimens observed in Pennsylvania since 1963; it is very possible that this is the only population of still surviving in Pennsylvania. While all of the other species listed in this report are regarded more or less as common in Pennsylvania, reptiles and amphibians in general are sensitive to ecological disturbances. Below are some suggestions for the protection of Bucks County’s Herpetofauna.
Preserving and Protecting Habitat

As of 2004 the population of Bucks County was determined to be over 600,000 people, ranking it the fourth most populous county in Pennsylvania. Besieged by industry and the resultant waves of human population growth since the 1950s, the natural landscape Bucks County has suffered immense ecological impact, and the population continues to grow. From a herpetological perspective the changes were devastating for some of the species, particularly in the Atlantic Coastal Plain and Delaware River landscapes where herpetological diversity was likely greatest. Some large tracts of relatively undeveloped natural and agricultural land still exist, particularly in the northern reaches of the county, and efforts have protected much of it. As of October 2007, the Bucks County Open Space Program has completed over 290 projects totaling more than 13,500 acres. However, the majority of the rare species occur in the southern tip of the county where most open space is privately controlled and industrial impact has been, and continues to be greatest.

Unknown populations of rare herpetological species may still reside, undetected, in some of the natural habitat that remains. Many herpetological species are seasonal wanderers, instinctively following age-old travel routes over relatively large distances. Many require specific types of breeding and nesting habitat. Some of Bucks County’s rarest herpetological species rely on very specific habitat types, such as certain types of wetlands or rocky outcrops. Many amphibian species are particularly sensitive to water quality degradation. Protecting and improving remaining natural spaces and the quality of water in creeks, streams and other water bodies should be considered vital for protecting Bucks County’s most imperiled herpetofauna. Efforts should be made to reduce pesticide and fertilizer use, both in commercial agriculture, and from non-point sources.

Controlling Invasive Species

Non-native, invasive species of plants and animals were observed on virtually every site visited during this inventory. Invasive species are known to degrade habitat, reduce biodiversity, and ultimately impact native species in a given landscape. Invasive plants can alter and degrade terrestrial and aquatic herpetological habitat. Control of invasive plants is important but the use of pesticides in herpetologically sensitive areas should be avoided. Some rapid, large scale declines in certain amphibian species in Bucks County are suspiciously commensurate with the advent of large-scale pesticide use in agriculture.

Non-native, invasive earthworms, observed in all landscapes, and on most sites, impact forest ecology by reducing detritus. This may hold long-term consequences for woodland salamanders which depend on humus for moist cover, and as a food source of their prey species. This situation should be monitored while research for a solution continues. An overabundance of white-tailed deer continues to severely impact forest ecology, particularly at the ground level where most woodland herpetological species reside. Drastic reductions to the population of deer in Bucks County should be considered paramount in any effort to improve ecological conditions for all herpetological species.

Red-eared sliders, *Trachemys scripta elegans* is an introduced species of turtle, and an aggressive competitor for resources with native turtle species, particularly the state-threatened redbelly turtle. Red-eared sliders were observed in all large bodies of water, in all Conservation Landscapes. In Lake Galena they greatly outnumbered native turtle species in all visits to that site. Trapping campaigns to remove this species from Bucks County’s waters are recommended. The installation of artificial basking platforms in redbelly turtle habitat may help reduce competition for basking sites.

Awareness and Enforcement of Laws Prohibiting the Collection of Species

Public awareness campaigns about the plight of Bucks County’s imperiled herpetological species could have a positive impact. Vigilance on the part of land owners and land managers, and sharing information with the local Wildlife Conservation Officer about poaching and other illegal activities helps protect wildlife resources.
Reducing Roadkills
The relatively large home-ranges of some herpetological species often bring them in contact with roads. Numerous DOR specimens were observed during the course of these surveys. During nocturnal summer rain events, scores of DOR *Anurans* were observed in numerous locations. *Chelonians* represented the second most frequently observed DOR species, and fresh kills were most often observed following a significant rain event. Numerous DOR snakes were also observed on roadways, due in part to the fact that snakes will utilize roads for basking. Proactive measures to reduce the road mortality might include traffic-calming measures in areas of known populations, and the installation of culverts under roads and railroad lines at sites that herpetological species are frequently observed crossing (generally where roads traverse wetlands). Off-road activities should be strictly regulated in sensitive areas, to not only minimize direct mortality, but also to protect habitat from the severe erosion issues that often result from such activities.

![DOR Painted Turtle](image1.png)

![DOR American Toad](image2.png)
Species Categorized By Designated Landscape

Atlantic Coastal Plain Conservation Landscape

Order **Caudata**
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern two-lined Salamander, *Eurycea bislineata*

Order **Anura**
Eastern Spadefoot Toad, *Scaphiopus holbrookii holbrookii*
American Toad, *Anaxyrus americanus*
Fowler’s Toad, *A. woodhouseii fowleri*
Spring Peeper, *Pseudacris crucifer*
New Jersey Chorus Frog, *P.feriarum kalmi*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Southern Leopard Frog, *L. utricularia*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order **Chelonia**
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Eastern Mud Turtle, *Kinosternon subrubrum subrubrum*
Spotted Turtle, *Clemmys guttata*
Wood Turtle, *Glyptemys insculpta*
Eastern Box Turtle, *Terrapene carolina carolina*
Map Turtle, *Graptemys geographica*
Red-eared Slider, *Trachemys scripta elegans*
Redbelly Turtle, *Pseudemys rubriventris*
Painted Turtle, *Chrysemys picta marginata*

Order **Squamata, sub-order Serpentes**
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Coffman Hill Conservation Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Marbled Salamander, *A. opacum*
Red-spotted Newt, *Notophthalmus viridescens viridescens*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *P. glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Psuedotriton ruber ruber*
Northern two-lined Salamander, *Eurycea bislineata*
Longtail Salamander, *E. longicauda longicauda*

Order Anura
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Spotted Turtle, *Clemmys guttata*
Eastern Box Turtle, *Terrapene carolina carolina*
Red-eared Slider, *Trachemys scripta elegans*
Redbelly Turtle, *Pseudemys rubriventris*
Painted Turtle, *Chrysemys picta marginata*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Cooks Creek Conservation Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Red-spotted Newt, *Notophthalmus viridescens viridescens*
Northern Redback Salamander, *Plethodon cinereus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Psuedotriton ruber ruber*
Northern two-lined Salamander, *Eurycea bislineata*

Order Anura
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Gray Treefog, *Hyla versicolor*
Wood Frog, *L. sylvatica*
Pickerel Frog, *Lithobates palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta/marginata*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Delaware River Conservation Landscape

Order Caudata
Spotted Salamander, Ambystoma maculatum
Northern Redback Salamander, Plethodon cinereus
Northern two-lined Salamander, Eurycea bislineata
Longtail Salamander, E. longicauda longicauda

Order Anura
Eastern Spadefoot Toad, Scaphiopus holbrookii holbrookii
American Toad, Anaxyrus americanus
Fowler’s Toad, A. woodhouseii fowleri
Spring Peeper, Psuedacris crucifer
Northern Cricket Frog, Acris crepitans crepitans
Gray Treefrog, Hyla versicolor
Wood Frog, Lithobates sylvatica
Southern Leopard Frog, L. utricularia
Pickerel Frog, L. palustris
Green Frog, L. clamitans melanota
Bullfrog, L. catesbieana

Order Chelonia
Common Snapping Turtle, Chelydra serpentina serpentina
Common Musk Turtle, Sternotherus odoratus
Eastern Mud Turtle, Kinosternon subrubrum subrubrum
Wood Turtle, Glyptemys insculpta
Eastern Box Turtle, Terrapene carolina carolina
Map Turtle, Graptemys geographica
Red-eared Slider, Trachemys scripta elegans
Redbelly Turtle, Pseudemys rubriventris
Painted Turtle, Chrysemys picta /marginata
Eastern Spiny Softshell Turtle, Apalone spinifera spinifera

Order Squamata, sub-order Serpentes
Northern Water Snake, Nerodia sipedon sipedon
Northern Brown Snake, Storeria dekayi dekayi
Eastern Garter Snake, Thamnophis sirtalis sirtalis
Northern Black Racer, Coluber constrictor constrictor
Lake Galena – Pine Run Conservation Landscape

Order Caudata
Spotted Salamander, Ambystoma maculatum
Northern Redback Salamander, Plethodon cinereus
Northern two-lined Salamander, Eurycea bislineata

Order Anura
American Toad, Anaxyrus americanus
Spring Peeper, Pseudacris crucifer
Gray Treefrog, Hyla versicolor
Pickerel Frog, Lithobates palustris
Green Frog, L. clamitans melanota
Bullfrog, L. catesbeiana

Order Chelonia
Common Snapping Turtle, Chelydra serpentina serpentina
Common Musk Turtle, Sternotherus odoratus
Eastern Box Turtle, Terrapene carolina carolina
Yellowbelly Slider, Trachemys scripta scripta
Red-eared Slider, T. scripta elegans
Redbelly Turtle, Pseudemys rubriventris
Painted Turtle, Chrysemys picta /marginata

Order Squamata, sub-order Serpentes
Northern Water Snake, Nerodia sipedon sipedon
Northern Brown Snake, Storeria dekayi dekayi
Eastern Garter Snake, Thamnophis sirtalis sirtalis
Northern Ringneck Snake, Diadophis punctatus edwardsii
Northern Black Racer, Coluber constrictor constrictor
Eastern Milksnake, Lampropeltis triangulum
Lower Tohickon Creek Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *P. glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern two-lined Salamander, *Eurycea bislineata*
Longtail Salamander, *E. longicauda longicauda*

Order Anura
American Toad, *Anaxyrus americanus*
Fowler’s Toad, *A. woodhouseii fowleri*
Spring Peeper, *Psuedacris crucifer*
Gray Treefog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta marginata*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Northern Brown Snake, *Storeria dekayi dekayi*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Northern Copperhead, *Akistrodon contortrix mokasen*
Mid-county Ridges Conservation Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Psuedotriton ruber ruber*
Northern two-lined Salamander, *Eurycea bislineata*

Order Anura
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta /marginata*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Neshaminy Creek Conservation Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Red-spotted Newt, *Notophthalmus viridescens viridescens*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *P. glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Psuedotriton ruber ruber*
Northern two-lined Salamander, *Eurycea bishineata*
Longtail Salamander, *E. longicauda longicauda*

Order Anura
American Toad, *Anaxyrus americanus*
Fowler’s Toad, *A. woodhouseii fowleri*
Spring Peeper, *Psuedacris crucifer*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Eastern Box Turtle, *Terrapene carolina carolina*
Map Turtle, *Graptemys geographica*
Red-eared Slider, *Trachemys scripta elegans*
Redbelly Turtle, *Psuedemys rubriventris*
Painted Turtle, *Chrysemys picta marginata*
Eastern Spiny Softshell Turtle, *Apalone spinifera spinifera*

Order Squamata, sub-order Lacertilia
5-Lined Skink, *Plestiodon fasciatus*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Northern Brown Snake, *Storeria dekayi dekayi*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Nockamixon – Haycock Conservation Landscape

Order **Caudata**
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *P. glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern Red Salamander, *Pseudotriton ruber ruber*
Northern two-lined Salamander, *Eurycea bislineata*

Order **Anura**
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbeiana*

Order **Chelonia**
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Spotted Turtle, *Clemmys guttata*
Wood Turtle, *Glyptemys insculpta*
Eastern Box Turtle, *Terrapene carolina carolina*
Red-eared Slider, *Trachemys scripta elegans*
Redbelly Turtle, *Pseudemys rubriventris*
Painted Turtle, *Chrysemys picta marginata*

Order **Squamata, sub-order Serpentes**
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Rat Snake, *Elaphe alleghaniensis*
Eastern Milksnake, *Lampropeltis triangulum*
Paunacussing Creek Conservation Landscape

Order Caudata
Spotted Salamander, Ambystoma maculatum
Northern Redback Salamander, Plethodon cinereus
Northern Slimy Salamander, P. glutinosus
Northern Dusky Salamander, Desmognathus fuscus fuscus
Northern Red Salamander, Psuedotriton ruber ruber
Northern two-lined Salamander, Eurycea bislineata
Longtail Salamander, E. longicauda longicauda

Order Anura
American Toad, Anaxyrus americanus
Spring Peeper, Psuedacris crucifer
Gray Treefrog, Hyla versicolor
Wood Frog, Lithobates sylvatica
Pickerel Frog, L. palustris
Green Frog, L. clamitans melanota
Bullfrog, L. catesbieana

Order Chelonia
Common Snapping Turtle, Chelydra serpentina serpentina
Wood Turtle, Glyptemys insculpta
Eastern Box Turtle, Terrapene carolina carolina
Painted Turtle, Chrysemys picta /marginata

Order Squamata, sub-order Serpentes
Northern Water Snake, Nerodia sipedon sipedon
Eastern Garter Snake, Thamnophis sirtalis sirtalis
Northern Ringneck Snake, Diadophis punctatus edwardsii
Eastern Milksnake, Lampropeltis triangulum
Tinicum Creek Conservation Landscape

Order *Caudata*
Northern Redback Salamander, *Plethodon cinereus*
Northern Slimy Salamander, *P. glutinosus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern two-lined Salamander, *Eurycea bislineata*
Longtail Salamander, *E. longicauda longicauda*

Order *Anura*
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbieana*

Order *Chelonia*
Common Snapping Turtle, *Chelydra serpentina serpentina*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta marginata*

Order *Squamata*, sub-order *Serpentes*
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Eastern Milksnake, *Lampropeltis triangulum*
Upper Tohickon Creek Landscape

Order Caudata
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern two-lined Salamander, *Eurycea bislineata*

Order Anura
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Gray Treefrog, *Hyla versicolor*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbeiana*

Order Chelonia
Common Snapping Turtle, *Chelydra serpentina serpentina*
Spotted Turtle, *Clemmys guttata*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta marginata*

Order Squamata, sub-order Serpentes
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
Upper Unami Creek Conservation Landscape

Order *Caudata*
Spotted Salamander, *Ambystoma maculatum*
Northern Redback Salamander, *Plethodon cinereus*
Northern Dusky Salamander, *Desmognathus fuscus fuscus*
Northern two-lined Salamander, *Eurycea bislineata*
Four-toed Salamander, *Hemidactylium scutatum*

Order *Anura*
American Toad, *Anaxyrus americanus*
Spring Peeper, *Psuedacris crucifer*
Wood Frog, *Lithobates sylvatica*
Pickerel Frog, *L. palustris*
Green Frog, *L. clamitans melanota*
Bullfrog, *L. catesbeiana*

Order *Chelonia*
Common Snapping Turtle, *Chelydra serpentina serpentina*
Common Musk Turtle, *Sternotherus odoratus*
Spotted Turtle, *Clemmys guttata*
Wood Turtle, *G. insculpta*
Eastern Box Turtle, *Terrapene carolina carolina*
Painted Turtle, *Chrysemys picta /marginata*

Order *Squamata, sub-order Serpentes*
Northern Water Snake, *Nerodia sipedon sipedon*
Eastern Garter Snake, *Thamnophis sirtalis sirtalis*
Northern Ringneck Snake, *Diadophis punctatus edwardsii*
Northern Black Racer, *Coluber constrictor constrictor*
Eastern Milksnake, *Lampropeltis triangulum*
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