

AMPHIBIANS AND REPTILES OF THE PROPOSED DOVER KNOLLS  
DEVELOPMENT SITE

TOWN OF DOVER, DUTCHESS COUNTY, NEW YORK

*Existing Conditions*

Report prepared for Michael W. Klemens, LLC

By

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## INTRODUCTION

The site of the former Harlem Valley Psychiatric Hospital straddles New York State Rte.22 in the hamlet of Wingdale, in the Town of Dover, Dutchess County, New York. This site contains the core of the hospital and its operations, located in the valley adjacent to the Great Swamp and the Route 22 corridor. The western portion of the site is composed of undulating topography and is of low to moderate relief. The majority of this site is in post-agricultural lands, or in use as a golf course. Areas of forest occur here, as well as various wetlands. This area is dominated by calcareous bedrock, overlain by till and other soils. To the east of Rte. 22, the topography is quite rugged, and dominated by a steep ridge, that approaches 950 feet in elevation. The uplifted portion of the site is composed primarily of non-calcareous bedrock, and is dominated by a more acidic forest community and a variety of wetlands, including vernal pools. More detailed descriptions of the site are contained in a report prepared for Michael W. Klemens, LLC by Hudsonia Ltd. (Sullivan, *et al.* 2005) which is included as part of this submission. The entire site, including a parcel known as the Dykeman's pumpkin patch located on Dutchess Co. Route 21, composes close to 1,000 acres, making this the largest development undertaken within the Town of Dover, and one of the largest contemplated within Dutchess County. The significance of this project, both to the Town and to the region cannot be underestimated. This hospital complex has been largely vacant for over a decade, and the loss of close to 5,000 jobs when the facility closed created a major economic impact to this portion of the Harlem Valley. The re-development of the site has been a major goal of the community, and was in large part the driver for the formation of the Harlem Valley Partnership for Economic Development.

The site lies within the heart of the north flow of the Great Swamp ecosystem, one of New York's most ecologically significant and largest inland freshwater ecosystems (Siemann, 1999). The Great Swamp is known for a rich diversity of plant and animal life, including many endangered, threatened, and special concern species, and its unique geology, which includes botanically unique, dry and sandy, cedar-dominated marble knolls. Therefore, the site contains both a tremendous opportunity for development, re-development, and restoration, as well as an abundance of ecological constraints.

In November 2003 the Town of Dover approached Michael W. Klemens, LLC to serve as the Town's environmental consultant to review the submission of the Dover Knolls Development Company, LLC that was anticipated during 2004. At that time, with the cooperation of the all parties, it was concluded that there existed a potential on this project to eliminate a major source of conflict during the environmental review process. The usual "model" for such projects under SEQRA is for the developer's environmental consultants to spend some time collecting data, then have those data submitted to the Town for review (as part of the SEQRA process) and then have the Town's consultants opine on the quality of the data collected and its completeness. Because of the complexity of the

site, it was anticipated quite likely that the back and forth over the data collection and review could encompass two activity seasons (in short two calendar years). Recognizing the potential for this scenario, the Town entered into discussions with the Dover Knolls team, and a voluntary escrow account was set up by the developer to fund the environmental studies, under the direction of Michael W. Klemens, LLC, who sub-contracted the botanical and site characterization studies to Hudsonia, Ltd (see Sullivan *et al.*, 2005), and the breeding bird studies to Nicholas A. Miller, MS (see Miller, 2005).

By conducting these studies on a voluntary basis, it is the intent of all parties not to have protracted discussions about the quality and completeness of the data, but rather discussions about the site design and planning implications of those data. The goal of this collaborative procedure was to streamline the review process for the applicant, while ensuring that the highest quality data would be available to all involved parties.

## MATERIALS AND METHODS

This report contains the results of the herpetological studies, both the general survey for amphibians and reptiles, including State-listed species, and the specialized searches for the federally threatened (and NY State endangered) bog turtle (*Clemmys muhlenbergii*). The herpetological studies also placed a special focus on vernal pools, unique, intermittent woodland pools and wetlands that are critical for the production of amphibian biomass which drives the energy systems (food chain) in temperate forest ecosystems. The botanical and ornithological reports are submitted under separate cover. These three reports constitute the biological studies done on the site as part of the voluntary studies agreed to by the Dover Knolls development team.

A total of 197 person-hours were spent by Michael W. Klemens, PhD and his research assistants, Kevin J. Ryan and Brandon M. Ruhe, in the field actively searching for amphibians and reptiles. Additional time was spent on travel, research, data compilation, and other related field inventory tasks. These hours reflect actual field effort expended by trained herpetologists, and do not reflect the time of other individuals who accompanied the field team, and at times contributed to the search effort. The goals of the general herpetological inventory were to determine **both** species presence and abundance on the site as well as characterizing species habitat. **However, in the case of the bog turtle, the study was only to determine suitable habitat, (i.e., a Phase One assessment) not to determine actual presence of bog turtles.**

This latter concept may be confusing, and requires explanation. Under the guidelines of the federal recovery plan for the northern population of the bog turtle, a project applicant has two distinct choices to make when developing in wetlands and within areas with 0.5-1.0 mile of confirmed bog turtle habitats, such as exist in Wingdale and on the Dover Knolls site. The first option (which is more

economical and less time consuming) is to conduct a Phase One habitat assessment. ***Under the provisions of the Phase One assessment, the project applicant commits to treating habitats identified as bog turtle habitat as if the turtles actually were present (and in fact they may well be). Phase One assessments are not designed to physically locate individual bog turtles.*** The alternative option that a project applicant can follow (and the option not chosen by the Dover Knolls team) is a time consuming and costly Phase Two assessment, which actually searches for individual bog turtles. ***Therefore, on the Dover Knolls property, those habitats identified as potential bog turtle habitat will be treated as if they were all active bog turtle sites, unless the applicant opts to conduct a Phase Two assessment in 2005.***

The herpetological search effort was spread throughout the activity season—commencing on 4 April 2004 and ending on 25 September 2004. The major focus of the spring field work was the documentation of amphibian breeding activity. This occurred on April 4th, 5th, 11th, and 12th. Field work included intensive overland searching turning numerous cover objects surrounding vernal pools and wood swamp areas. With a team of 3 individuals, it was possible to turn over 200 objects per hour, meaning that during a typical field day over 1,000 cover objects were lifted, examined, and replaced. Cover objects included rocks, logs, and anthropogenic debris. Wetlands were examined to determine the presence of amphibian egg masses and/or the presence of sperm packets (spermatophores). Wetlands were also sampled by placing minnow traps in strategic positions (along logs, near spermatophores and eggs) within the wetlands, to intercept amphibians moving through the wetland. We also listened for the characteristic mating vocalizations of various frog species. Finally, we examined roads surrounding the site, and those that bisected the site, on rainy nights to observe amphibian movements.

The next band of field work occurred in May and June, specifically on May 4th, 10th, and 14th and on June 22nd, 23rd, and 24th. The focus of this work was to detect snakes and turtles, while continuing to gather data on vernal pools and amphibians where appropriate. Considerable effort was also spent examining the wetlands on the site to determine their suitability for bog turtles (*Clemmys muhlenbergii*). This activity is referred to as a Phase 1 bog turtle assessment as described in USFWS/Klemens 2001. Field techniques included visual searching for basking reptiles along the edges of habitat during the early portions of the day, observing basking turtles with binoculars, turning cover objects, and using baited hoop nets to sample turtles both in the Swamp River, the marsh associated with the reservoir, and in the large high bush blueberry and sphagnum swamp located behind the cemetery located on Old Pawling Road.

Late summer and fall sampling took place on August 6th and September 25th. This sampling is specifically targeted to detect the fall-breeding marbled salamander (*Ambystoma opacum*) and neonate snakes and turtles. Early

August sampling also detects near-metamorph larvae of spring-breeding *Ambystoma*. The value of sampling near-metamorph larvae is that is that by collecting them at the time of the year, they are relatively easy to rear in the lab and determine the species. Larvae were thus collected and reared from several pools on the study site to further refine and expand upon the amphibian data collected in the spring.

In summary, the value of sampling amphibians and reptiles intensely over and extended period (the entire activity season) is that it maximizes the detection of species, particularly the more secretive (and often rarer) species that all-too-often escape detection on more cursory surveys. This is often a failing of studies conducted to detect amphibian and reptile biodiversity, and specifically why this study was undertaken by the Town's consulting team, so that the Town would be ensured that due diligence and effort by qualified specialists had been conducted on this important parcel.

## RESULTS

The following species have been documented on the subject property in the following locations. See Sullivan *et al*, 2005 for site maps to determine the location of numbered vernal pools and marble knolls.

### SALAMANDERS

#### *Ambystoma jeffersonianum* (Jefferson Salamander)

The Jefferson salamander is a NY State-listed Special Concern species that is restricted to intact forested habitats and breeds in vernal pools. Its distribution on the site appears limited to the vernal pool system on the top of the west-facing ridge above the hospital in well-developed forested and ledge habitat. This salamander was confirmed by rearing larvae collected on August 6<sup>th</sup> breeding in the well-developed depressional "classic vernal pool" (see Calhoun and Klemens, 2002 for description of various vernal pool types) due north of the reservoir near the edge of the ridge bisected by the property line of the site and Barbara Clay's property (Vernal Pool No. 1). This species is also suspected breeding in a vernal pool lying due south of the reservoir access road (Vernal Pool No. 2). Egg masses referable to this species were found on April 11<sup>th</sup>. However, I was unable to confirm the presence of this species by larval rearing as Vernal Pool No. 2 dried-up completely in June before the larvae could complete their development.

#### *Ambystoma maculatum* (Spotted Salamander)

This is the most common of the three mole salamanders on the site, it occurs in four vernal pools on the west-facing ridge including the confirmed Jefferson salamander breeding pool (Vernal Pool 1), the two vernal pools lying to the south

of the reservoir access road (Vernal Pools 2 and 3), and a vernal pool located near the end of Johnson road at the Appalachian trail area. It is quite uncommon on the lower portions of the site. A small population was found associated with the high bush blueberry and sphagnum swamp located off of Old Pawling Road behind the cemetery. A few egg masses were observed here, and a single adult found under a cover object on April 11<sup>th</sup>. A single adult was also found DOR (dead-on-road) on Old Pawling Road at the low area leading down into this wetland on April 12<sup>th</sup>.

*Ambystoma opacum* (Marbled Salamander)

This is also a NY State-listed Special Concern species. It was confirmed breeding in a single vernal pool (Vernal Pool No. 1).

*Eurycea bislineata* (Two-lined Salamander)

The two-lined salamander is a common species found in seepages and springs and small streams, as well as floodplain swamps. It is however, quite uncommon on the site. All records are from spring and streams on the west-facing ridge behind the hospital, specifically near the spring house on the access above the water plant, and in a riparian corridor that flows northward into the reservoir.

*Plethodon cinereus* (Redback Salamander)

This common woodland salamander was very scarce in the low lying portions of the site west of Rte. 22. It was very abundant in the mature forest on the west-facing ridge above the hospital on the east side of Rte. 22. For example over 100 individuals were found in an hour of searching near Vernal Pool No. 1. The differences in numbers between the upland and lowland portions are attributable to the differences in microhabitat quality on the forest floor. On the west facing ridge the forest is mature, with a deep and well developed duff layer and many rotten logs. This is excellent salamander habitat, especially when interspersed with rock outcrops and ledges as a prevalent on the west facing ridge east of Rte. 22. The young second growth forest that characterizes the lower elevation habitats west of Rte. 22 lacks a well developed duff layer and rotten logs, and is a drier, much less hospitable salamander habitat. It takes decades to develop a rich woodland duff horizon such as occurs on the higher elevations of the site that allow woodland salamanders to flourish and reach high biomass levels.

*Notophthalmus viridescens* (Red-spotted Newt)

This aquatic salamander was distributed at various areas throughout the site, both in the low lying areas on the west side of the Swamp River as well as the west facing ridge on the east side of the site above the abandoned hospital complex. Newts were found in the two most productive vernal pools on the west facing ridge (Vernal Pools 1 and 2) as well as in the grassy northern end of the

reservoir. Newts were also found in the red maple floodplain forest of the Swamp River south of Wheeler Road, in the dug-out irrigation pond NE of the manor house, and in the high bush blueberry shrub swamp near the cemetery on Old Pawling Road.

## FROGS

### *Bufo americanus* (American Toad)

American toads were found at scattered locations on the site including Vernal Pools 1 and 2. This species was confirmed breeding in the irrigation pond northeast of the manor house, and several metamorphs were found on the road bordering the north end of the reservoir.

American toads were found during road running at night during the rain on the dirt roads bordering the western side of the Swamp River north and south of the Wheeler Road crossing, on Old Pawling Road near the cemetery, on Dutchess County Rte. 21 near the fen area at the Dykemans pumpkin patch, and within the hospital complex on Wheeler Road, on Hutchinson Road near the junction of New Rochelle Road, and on New Rochelle Road near the junction of Port Chester Road. American toads were also found on Johnson Road near the Appalachian Trail.

### *Hyla versicolor* (Gray Treefrog)

Gray treefrogs were confirmed by their distinctive calls at the wetland northeast of the junction of Hoag's Corner and Wheeler Roads, in the forested floodplain of the Swamp River near the sewage treatment plant, and the wetlands below the marble knoll located in the vicinity of the gravel pit that was accessed from the road at the sewage treatment plant.

### *Pseudacris crucifer* (Spring Peeper)

Spring peepers were widely distributed throughout the site, in habitats including floodplain swamp, vernal pools, grassy marsh areas, as well as a range of ponds and ditches. This species is the most ubiquitous anuran on the site.

### *Rana catesbeiana* (Bullfrog)

Bullfrogs were found at scattered locations on the site, in area that had large expanses of open permanent water including the golf course pond near the Swamp River and the north end of the reservoir.

*Rana clamitans* (Green Frog)

Green frogs were widely distributed on the site, including the various vernal pools, roadside ditches alongside Wheeler Road, floodplain of the Swamp River north and south of the Wheeler Road crossing, and the north end of the reservoir.

*Rana palustris* (Pickerel Frog)

Pickerel frogs were uncommon on the site found around Vernal Pool No. 1 and below the springhouse on the reservoir access road at the gate on the eastern portion of the site, and in grassy and gravel areas on the east and west sides of the Swamp River south of Wheeler Road.

*Rana sylvatica* (Wood Frog)

Wood frogs were observed throughout the site and confirmed breeding in the vernal pool along the Appalachian trail, both the large and small vernal pools south of the reservoir access road (Vernal Pools 2 and 3), the forested floodplain along the west side of the Swamp River, the small stream/ditch on the portion of the golf course south of Wheeler Road, and the high bush blueberry and sphagnum swamp behind the cemetery on Old Pawling Road. Wood frogs were also found around Vernal Pool No. 1 and were assumed to breed there too.

## TURTLES

*Cheyltra serpentina* (Snapping Turtle)

Snapping turtles are quite common on the site, especially abundant in the Swamp River and its associated wetlands, including the golf course pond just south of Wheeler Road. The dry, sandy knoll above the pump station is an important nesting area for this species, as are the gravel banks associated with the RR tracks just south of the old power station building on the east side of the Swamp River. Snapping turtles were also found in the reservoir. A juvenile was found in the high bush blueberry and sphagnum swamp behind the cemetery on Old Pawling Road.

*Chrysemys picta* (Painted Turtle)

Painted turtles were also common on the site, especially in the Swamp River and its associated wetlands, including the golf course pond just south of Wheeler Road. The knoll above the pump station is an important nesting area for this species, as are the gravel banks associated with the RR tracks just south of the old power station building on the east side of the Swamp River.

*Clemmys guttata* (Spotted Turtle)

This is a State-listed Special Concern Species and was found in the high bush blueberry and sphagnum swamp behind the cemetery on Old Pawling Road. Two specimens were live trapped, marked, and released.

Marked L-1 (notch in left first marginal scute) Male

Straight Line Carapace Length = 122 mm

Straight Line Plastron Length = 104.5 mm

Maximum Width = 89.5 mm

Maximum Height = 38.75 mm

Weight = 215 grams

Annuli = 14+

Marked L-2 (notch in left second marginal scute) Female

Straight Line Carapace Length = 117.5 mm

Straight Line Plastron Length = 108 mm

Maximum Width = 89.75 mm

Maximum Height = 39.5 mm

Weight = 225 grams

Annuli = 16+-

*Sternotherus odoratus* (Musk Turtle)

Although we did not collect any musk turtles in our turtle sampling, they do occur close to and likely within the boundaries of the site within the Swamp River. On September 25, 1998 five dead musk turtles were collected on the RR tracks 0.1 mi N of the intersection of Pleasant Ridge Road (Dutchess Co. Rte. 21) by Diane Murphy who was working on the Wildlife Conservation Society's Great Swamp biodiversity study. These shells are in the collection of the American Museum of Natural History in New York City.

## SNAKES

Snakes were very poorly represented in our sampling. We documented three species and received reliable reports of other species from areas adjacent to the site.

*Agkistrodon contorix mokasen* (Northern Copperhead)

I received reports of these snakes below Waldo Hill, in the vicinity of Old Pawling Road. Based on the knowledge of the reporters, I am convinced that they were able to distinguish this species from the more common milk snake (*Lampropeltis triangulum*). Although copperheads do occur here, no rattlesnakes (*Crotalus horridus*) have been reported on this side of Waldo Hill, though they occur in the

Burton Brook valley between West Mountain and Waldo Hill. These snakes travel into the Burton Brook valley from dens located on West Mountain.

*Diadophis punctatus* (Ring-neck Snake)

A single ring-neck snake was found by the Hudsonia field crew on one of the highest spots on the site, the 931 foot high hill between the reservoir wetlands and the cemetery.

*Nerodia sipedon* (Water Snake)

Despite the extensive amounts of wetland habitat, and large numbers of fish and frogs, water snakes were scarce. A single dead individual was found along the west bank of the Swamp River near the pumping station.

*Storeria dekayi* (Brown Snake)

I received a reliable report of two of these small snakes these found under debris in a yard, nor far from the Old Pawling Road sphagnum and high bush blueberry swamp. Although this species was not documented during our 2004 field investigations, the post agricultural edge habitats on the site are ideal for this species and I was surprised that we did not find any during the surveys.

*Thamnophis sirtalis* (Garter Snake)

Garter snakes were found scattered throughout the site in a variety of habitats, concentrated along edges and ecotones. Observations were concentrated along the floodplain of the west bank of the Swamp River with scattered observations in the low lying portions of the site, and this species was much scarcer on the west facing ridge on the eastern portion of the site.

## DISCUSSION

The field research conducted at the Dover Knolls documented an intact amphibian fauna on the eastern side of the site, associated with undisturbed forested areas on the west facing ridge. The herpetofauna documented here is consistent with other similar ridges to the south, such as Quaker Hill in Pawling and Corbin Hill on the Pawling-Dover town line. Reptile diversity is quite low on such ridges, while amphibian biomass and diversity is high. Although there are degraded habitats on the eastern ridge including dumps and post agricultural areas, the habitat is quite intact.

These findings are in marked contrast to the low lying portions of the site west of Rte. 22. Although I have documented a diverse herpetofauna both north and south of Wingdale, this actual stretch of the Great Swamp is remarkably devoid of many species of amphibians and reptiles, or if they do occur they are present

in very low numbers. Much of this is likely due to the land use history of the site. Examination of the USGS 7.5 minute topographic quadrangle readily shows that this stretch of the Swamp River has been channelized. There has been deposition of ash, dumping, and other activities in the low-lying portions of the site, which has had a profound effect on the ecologically sensitive amphibian and reptile faunas.

Based on data collected by the Wildlife Conservation Society's Great Swamp Study the following species could reasonably have been anticipated occurring in the forested swamp and adjoining dry sandy marble knolls. They may yet be found at the site, but if present, they are occurring at very low densities or are transient through the site. Records of these species occur at a diversity of sites, both north and south of the Dover Knolls complex including Kitchen Road, Camp Sharparoon, Chipewalla Road, Ontiontown, and Corbin Hill.

Jefferson Salamander (*Ambystoma jeffersonianum*)  
Marbled Salamander (*Ambystoma opacum*)  
Blue-spotted Salamander (*Ambystoma laterale*)  
Four-toed Salamander (*Hemidactylium scutatum*)  
Bog Turtle (*Clemmys muhlenbergii*)  
Wood Turtle (*Clemmys insculpta*)  
Box Turtle (*Terrapene carolina*)  
Black Racer (*Coluber constrictor*)  
Hognose Snake (*Heterodon platirhinos*)  
Milk Snake (*Lampropeltis triangulum*)  
Redbelly Snake (*Storeria occipitomaculata*)  
Ribbon Snake (*Thamnophis sauritus*)

## CONSERVATION RECOMMENDATIONS

Based on the data collected the following areas of concern are identified in the lowland areas of the site, west of Rte. 22.

The Swamp River floodplain and associated wetlands are critical ecological areas and should be protected with the full 100 foot DEC wetland setback. This will necessitate restoring (to shrub or wooded wetland) part of the golf course east of Marble Knoll No. 10. In the current golf-course configuration a significant portion of that green lies within a wetland and wetland buffer. Additional areas of the golf course to the west of Marble Knoll No. 10 also encroach into the wetland and wetland buffer, and these should also be reclaimed. There is no apparent high-quality (or even intermediate quality) bog turtle habitat in the western portion of the site south of Wheeler Road. The major function that these open and grassy wetlands may serve is for the occasional passage of bog turtles. By respecting the 100 feet DEC wetland setback (i.e., allowing no development in the set back including the golf course) conservation goals for the bog turtle in these wetlands will be addressed (see USFWS/Klemens 2001). The ditched

wetlands north of Wheeler Road (nr. the junction of Hoag's Corner Road) are so altered as to no longer render them viable for any use by bog turtles. This spring fed sloping area is completely ditched, drained, and channelized, and a large portion of the former wetland is now in agricultural production (i.e., corn).

The high bush blueberry and sphagnum swamp behind the cemetery on Old Pawling Road is a critical "cryptic vernal pool" (*sensu* Calhoun and Klemens, 2002) habitat. It contains breeding populations of two vernal pool obligate species: spotted salamanders and wood frogs, and two vernal pool facultative species: red-spotted newts and spotted turtles (the latter is State-listed Special Concern Species). To adequately protect this important resource I recommend applying the scientifically-determined, peer-reviewed development and protection standards set forth in Calhoun and Klemens (2002) that include complete protection of the wetland and the first 100 feet of upland surrounding the wetland, and a limitation on development to only 25% (using a composite development calculation totaling both existing off site development and proposed on site to be at 25% or less) of the next 100-750 feet of upland habitat. Note that development within the 100-750 foot zone is permissible up to 25% of the area, but it must be planned in accordance with the guidelines in Calhoun and Klemens (2002). Any areas within the first 100 feet of upland that are currently in agricultural production should be restored to native forest.

On the upland eastern portion of the site, amphibian protection should focus on Vernal Pools 1, 2, and 3. To adequately protect this important resource I recommend applying the development and protection scenarios discussed in Calhoun and Klemens (2002) that include complete protection of the wetland and the first 100 feet of upland surrounding the wetland, and to limit development to only 25% (using a composite development calculation totaling both existing off site development and proposed on site to be at 25% or less) of the next 100-750 feet of upland habitat. Development should be planned in accordance with the guidelines in Calhoun and Klemens (2002). Vernal Pool 1 contains breeding populations of all three species of Ambystomid salamander (Jefferson, marbled, and spotted). Both Jefferson and marbled salamanders are listed a Special Concern Species in New York. Vernal Pool 2 contains spotted salamanders and wood frogs, and possible Jefferson salamanders. The ledge habitat, with thick layers of duff, woody debris, and rotten logs serves as habitat for the hairy-tail mole (*Parascalops breweri*) a secretive species that may be near its southern range limit in the Harlem Valley on this site. According to Whitaker and Hamilton (1998: 64-66) the discovery of the hairy tail mole at Wingdale constitutes a range extension considerably southward of where this species has been previously reported in northern Dutchess and southern Columbia counties. Hairy tail moles are locally abundant around Vernal Pool 2 and a voucher specimen was collected on May 4<sup>th</sup> to document this discovery (MWK Field Catalogue No. 18198). This specimen will be deposited at the New York State Museum (Albany).

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