

Program: Conservation Enhancements for a Living Landscape

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2007 Conservation Progress E.L. Rose Conservancy



The cooperative conservation effort by the Cornell Conservation Education group, E.L. Rose Conservancy members, and volunteers continued to make great progress in 2007. Under the program's umbrella, we continued research on the effects of deer browsing on seedling growth and survival; we held joint educational outreach activities; we designed and implemented a frog call survey; and we trained a cadre of volunteers to collect data as part of the survey effort. This year's activities continued to address the benefits of restoring and creating habitat to conserve biodiversity, and to study the effects of overabundant wildlife on forest habitat. In addition, we increased our focus on amphibian inventory efforts to complement new statewide monitoring initiatives and to establish baseline information for long-term monitoring efforts in Susquehanna County. Overall, the collaboration between the Conservation Education Group and the Conservancy has resulted in many accomplishments in the regions of outreach, research, and conservation.

Educational Outreach

At the core of our outreach efforts this year was a presentation on frogs and toads of Susquehanna County. The presentation included basic information about amphibians and reptiles with emphasis on the important roles they play as part of healthy functioning ecosystems. We also shared species-specific information about frogs and toads in the local area, their preferred habitats, and the potential threats to those species. At that event, we trained individuals to recognize the calls of frogs and toads in the area, and used the opportunity to launch a new local amphibian monitoring program.

To supplement the new amphibian monitoring program and to engage Conservancy and community members in learning about amphibians, we developed two additional fact sheets this year (Appendix A). In *Frogs and Toads of Susquehanna County* we developed an aid for volunteers in their frog call survey efforts. Our intent for *Susquehanna County Amphibians and Reptiles of Concern* was to serve as a guide to local species of concern. This dovetails with a statewide effort called the Pennsylvania Online Herpetological Atlas. Through this program, volunteers can help contribute valuable location information for rare species, and species whose populations are declining.



The northern leopard frog is a species of concern found in Susquehanna County, Pennsylvania



In addition to the amphibian education efforts, we led a woods walk at Highpoint Preserve highlighting a variety of habitat enhancements for wildlife. Topics of discussion included woodland pools, use of cavity trees and dead wood by wildlife, deer browsing and possible control techniques, and examples and impacts of invasive species.

Habitat Enhancements/ Demonstrations



This year, we continued to collect data on seedling growth and survival for the Deer Exclusion experiment at Longford Lake. In addition, we began monitoring species colonization and use of the newly created vernal pools. At the analytical level, these data are being compared to similar experimental research data at our Cornell study sites.



Deer Exclusion

In 2005, Conservancy members and volunteers constructed a deer exclusion at Longford Lake. Volunteers planted red oak and black cherry seedlings both inside and outside the exclusion to study the effects of deer browsing on woody vegetation. We have collected seedling survival and growth data annually since planting. This marked the second year of such measurements. Our objective for this exclusion experiment is to determine and demonstrate the severity of impacts deer are having on vegetation and potential forest regeneration in the area.



Deer browsing outside of the exclusion (pictured left) is affecting growth and survival of tree seedlings. Inside the exclusion (pictured right), seedlings are growing well.

The study continues to highlight the effects of deer on vegetation on Conservancy lands and in the region. Twenty-one months following planting, deer have browsed 100% of the seedlings planted outside the exclusion. This is in stark contrast to the value of 0% browsed seedlings inside the exclusion. It is clear that browsing has had significant effects on both seedling survival and seedling growth. The differences are most striking for red oak, which exhibited 86% survival inside the exclusion, and only 38% survival outside (Figure 1). Black cherry had 98% survival rate inside the exclusion and 94% survival outside. Interestingly, these values for the first two seasons may steadily increase as cumulative effects of browsing manifest themselves in future years.

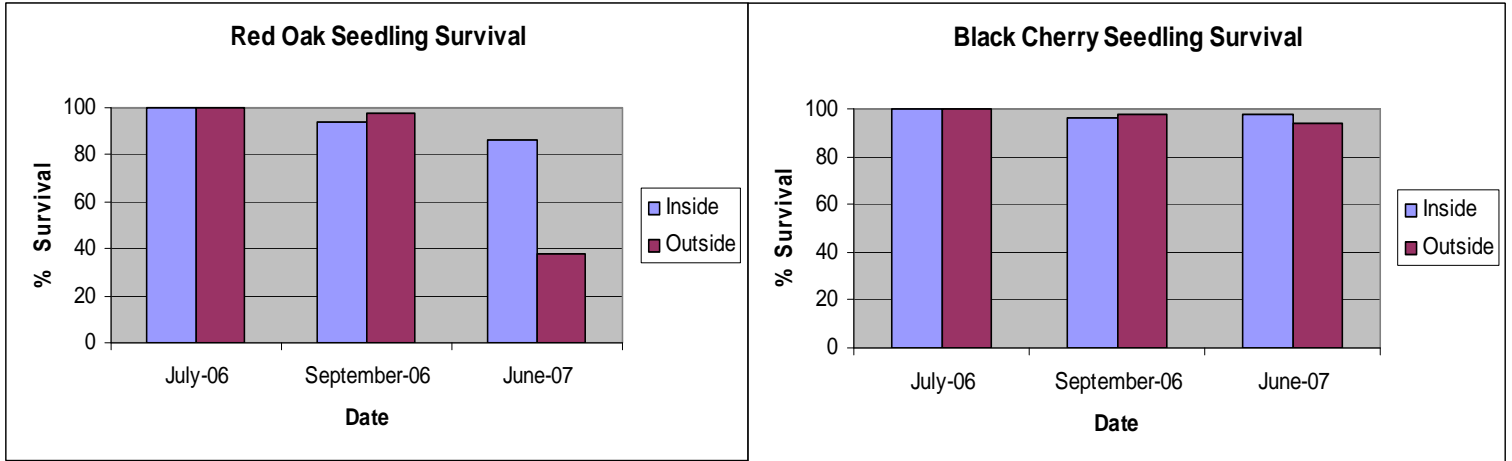


Figure 2. Seedlings inside the enclosure had greater survival than those outside.

As a harbinger of longer term impacts, there was a statistically significant difference between seedling height inside and outside of the enclosure. The mean height of black cherry seedlings inside the fence was 26 inches, whereas the mean seedling height outside the fence was only 16 inches ($t=9.48$, $p=0$) (Figure 3). Similarly, the mean height of red oak seedlings inside the enclosure (24 inches) was significantly greater than those outside the enclosure (13 inches; $t=4.91$, $p=0$). As this experiment progresses, we continue to see that deer are having a tremendous impact on the vegetation in the area, and likely are delaying or even preventing natural forest regeneration.

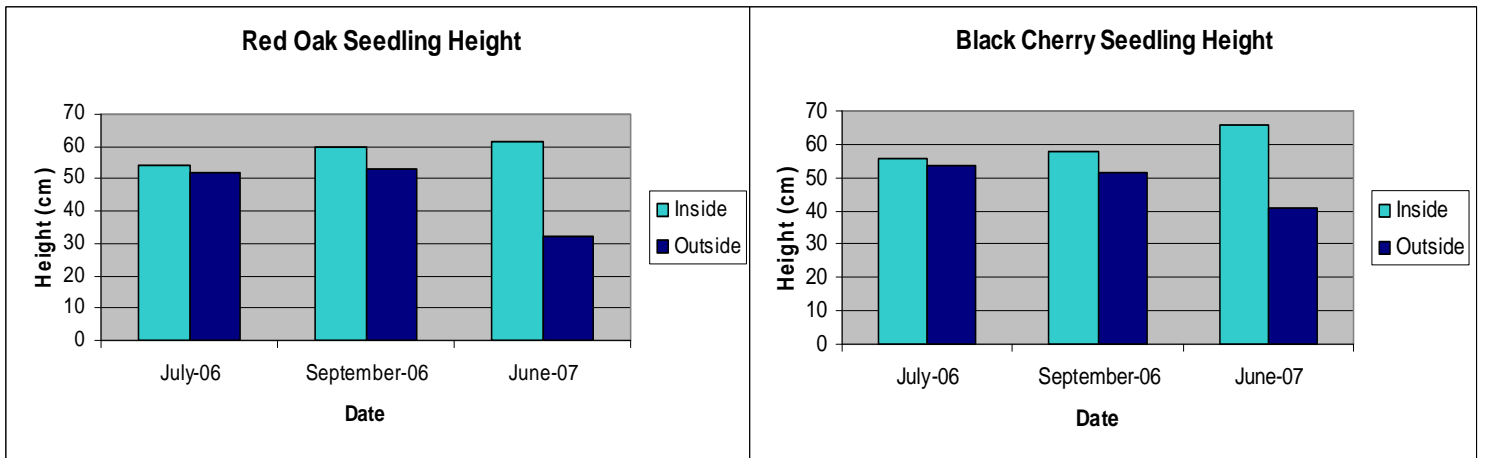


Figure 3. Mean height of seedlings inside the enclosure was significantly higher than the mean height of seedlings outside the fence.

Monitoring Newly Created Vernal Pools

We monitored 3 vernal pools created by volunteers and Conservancy members last year. Groundwater provided the main source of water feeding into each of the pools, with some surface water flows supplementing pools during times of rain. These pools



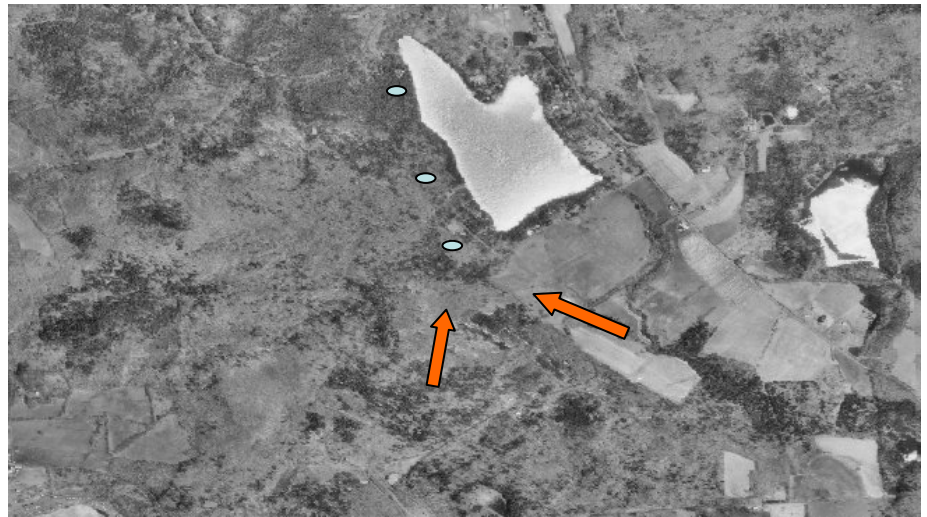
Adult wood frog

held water year-round, and successfully attracted animals immediately. Green frogs, which typically colonize rapidly, were found in each of the pools beginning fall 2006. The southernmost pool (in open field) was colonized by wood frogs in early spring 2007. We counted fifteen egg masses, which translates to thousands of eggs. In late June, many larvae were still present in the pool. Because wood frogs were present in the southernmost pool only, we suspect that the source population for these animals was located to the south of Highpoint Preserve, possibly from the forest west of the pasture area at the southern end of the lake (Figure 4). We will continue to monitor these pools in the future to chart the progression of the amphibian communities in the pools over time. After only one year, these great sites are already showing their potential for enhancing habitat and biodiversity in the area. We anticipate a continued progression of amphibians across the landscape to all pools in coming years.



Wood frog egg masses

Figure 4. Wood frogs colonized the newly created vernal pool from the south.



Frog Call Survey

Using trained volunteers, we initiated a frog call survey that began in May 2007. Participants chose one or more survey sites. In the course of training, volunteers learned frog calls in advance of going in the field. Participants stopped at each designated location for a 3-minute period, recording all species heard during the visit. They also recorded the intensity of calls which is used as an indication of number of animals.

In all, 7 dedicated volunteers participated, and monitored a total of 12 sites (Figure 5) for 14 survey nights. Six species of frogs, including the green frog (*Lithobates clamitans*), pickerel frog (*Lithobates palustris*), bullfrog (*Lithobates catesbeiana*), spring peeper (*Pseudacris crucifer*), American toad (*Anaxyrus americanus*) and gray treefrog (*Hyla* sp.), were detected during the survey (Figure 6). The most widespread species, found at all 12

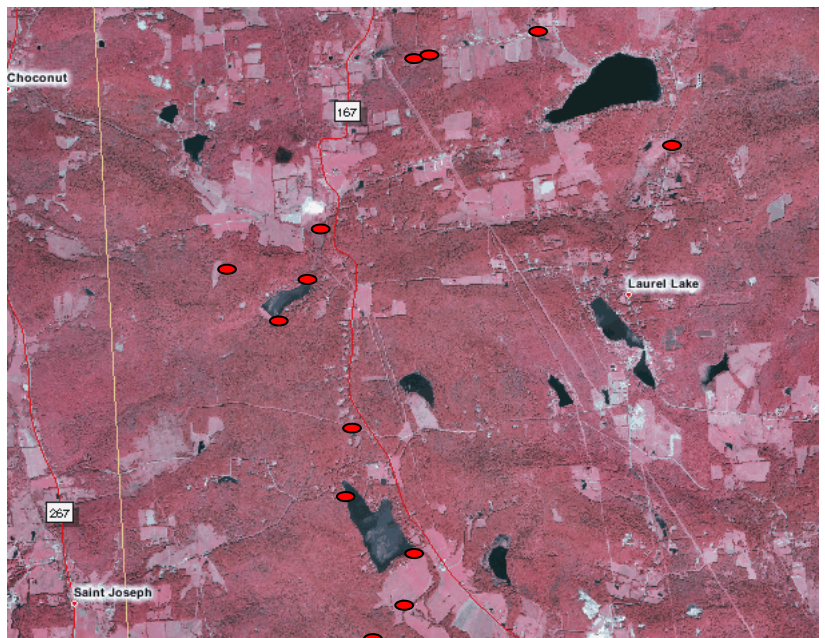


Figure 5. Twelve different sites were surveyed, and provided good local coverage.

sites was the green frog, followed by the spring peeper, pickerel frog, gray treefrog, American toad, and bullfrog (Table 1).

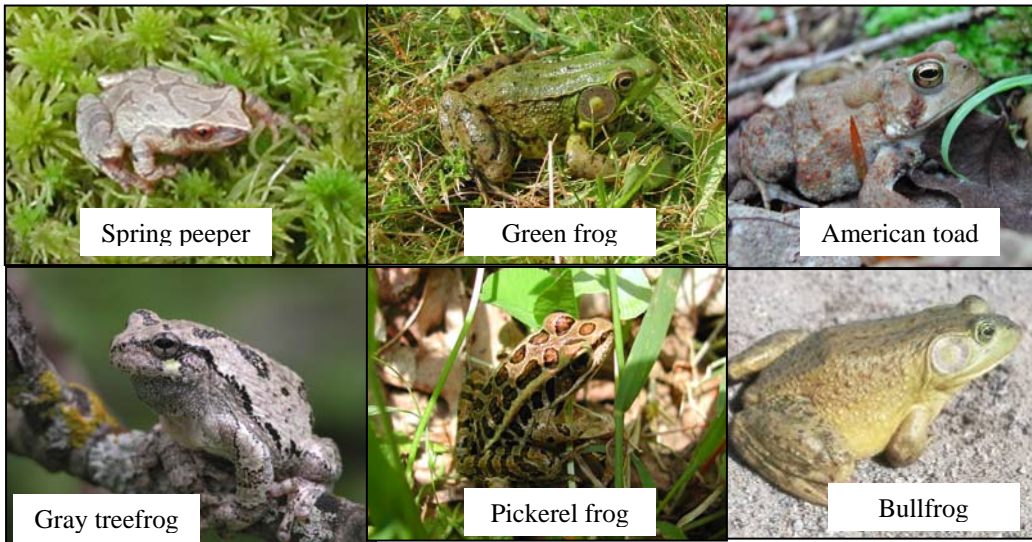


Figure 6. Six frog species were detected during frog call surveys in 2007.

Species	# of Stops
Green Frog	12
Spring Peeper	10
Pickerel Frog	7
Gray Treefrog	6
American Toad	5
Bullfrog	3

Table 1. Number of survey sites (of 12) by species

We plotted the calling intensity for each species by date (Figure 7). Establishing calling phenology will enhance future survey efforts, helping us to determine optimal survey times in Susquehanna County and possibly to track population abundance. These data will also help to establish baseline information for long-term monitoring. For example, solid baseline data will be critical for monitoring effects of climate change on frog calling phenology in the area. Results from this year indicate that spring peepers, pickerel frogs and toads, were most likely to be detected from early May to early June. In contrast, green frogs and gray treefrogs were calling at their highest intensity from late May to mid July. Bullfrogs are the latest breeders, and are most vocal from mid-June to late July. As we gather more data in upcoming years, we can further refine our interpretations of calling phenology. Data gathered should also allow us to determine the effects of temperature and rainfall on frog calling intensity, and to establish a correlation between habitat type, landscape configuration, and the presence or absence of individual species.

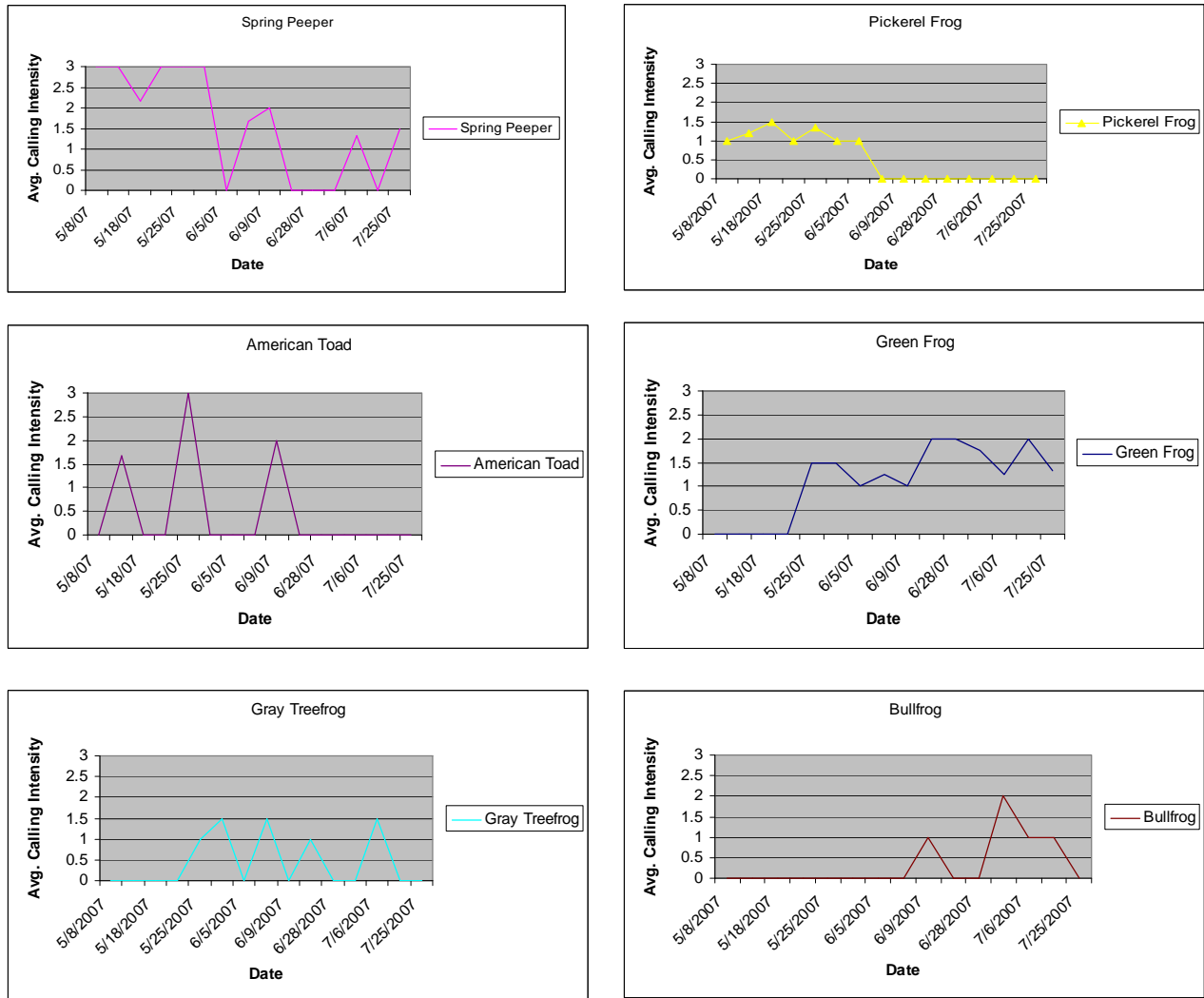


Figure 7. Calling intensity by species and date.

Potential Topics and Issues to Address 2008

Efforts in 2008 will build upon groundwork laid by past cooperation among the E.L. Rose Conservancy, Rockwell-Collins volunteers, and the Cornell Conservation Education Program. We plan to increase efforts aimed at collecting baseline data to serve as the foundation for long-term monitoring. These efforts will simultaneously further the knowledge of natural resources on Conservancy lands and the surrounding landscape, and provide a means to measure environmental change. We will also continue to provide outreach to Conservancy members and local community members, empowering them to take an active role in natural resource conservation, and enhancing awareness of the critical conservation role that the E.L. Conservancy plays in their community and beyond. Outreach efforts will focus on current issues, such as invasive species management and habitat enhancement techniques, as well as critical emerging issues like bat white nose disease, which highlights the critical need to immediately target conservation efforts toward these animals.

The following potential projects will provide integrated opportunity for conservation, research, habitat enhancement, and outreach.

Long-term Monitoring of Amphibians, Birds, and Forest Vegetation Plots

The Cornell Conservation team will initiate and expand current long-term monitoring efforts in conjunction with volunteers, and a summer intern.

Egg mass and amphibian inventory in Highpoint Preserve and surrounding landscape

We propose to continue the colonization study initiated last year to determine which species are present in the area surrounding Highpoint Preserve and which might colonize the newly created vernal pools. As part of the study, we will continue conducting springtime egg mass survey of nearby ponds and wetland areas, including the inlet and outlet of Silver Lake and nearby farm ponds (with permission). We will also survey the newly created vernal pools in early spring to determine which species have begun to colonize the sites. Location data will be geo-referenced to enable spatial analysis and to guide management decisions. Information from the surveys will enable us to determine whether and where additional habitat enhancements might facilitate colonization of species that are already present in the surrounding landscape.

Frog call survey

In March, we will hold an informal refresher course for last year's frog call survey participants and invite new participants as well. During this training, we will re-visit frog call identification, answer questions about calling intensity and protocols, and encourage participants to expand their geographic coverage. Last year's participants have requested the refresher, and holding it in March will allow us to detect species like the wood frog, which begin calling later that month. We will also highlight features for identifying the northern leopard frog. Although the leopard frog was not detected during the calling survey last year, participants reported visual observations of this species of special concern. We will hone efforts to detect and document this species in the area, and report all data to the new Pennsylvania On-line Herp Atlas for species of concern.

Bird census

A summer intern will be trained to recognize birds by sight and sound. The intern will revisit sites established by Charles Smith and Vanessa Lane in a previous year. These longitudinal census data will help us determine if species composition has changed.



Permanent forest inventory plots

Our natural environment is facing a many different pressures today, including climate change, invasive plants and insects (e.g. Emerald ash borer), emerging diseases, fragmentation, and others. By establishing Permanent Forest Inventory (PFI) plots, we can provide information on species composition, species distribution, presence of invasives, and forest health indicators. A summer intern will be trained to establish PFI plots at the Arnot Forest using methodology

developed and implemented over the last 6 years (see Appendix B for description of methodology). Similar plots would be established at High Point Preserve and at least one other Conservancy-owned property. These plots will be re-measured annually and changes to these plots over time can serve as an early indicator of potential problems, potential successful strategies, or urgent issues to be addressed.

Mammals and Mammal Conservation



Little brown bats

Bats conservation and management

Bats are interesting and diverse animals that are important to our ecosystems. At the same time, they are threatened by many factors. In the last year, scientists have been discovering hundreds of bats infected with an unknown disease called “bat white nose disease”. Populations of bats in some New York caves, where animals overwinter, have plummeted from over 1,000 animals last year, to less than 100 this year. This phenomenon is also being experienced in Vermont and Pennsylvania. The cause of the disease is unknown, but the potential consequences for bat populations throughout the northeast are alarming.

We will use our Anabat detector (an electronic acoustical decoding device) and analytical software to inventory the bat species present in the Silver Lake area. Knowing which species are present will help to better target habitat enhancements to those species in the area. Such species-specific enhancements could include planting trees that are beneficial to certain bats as roosting sites, or constructing bat boxes at designated locations.

Public Programs/Outreach

Past and future efforts (described above) could serve as the basis for a variety of outreach and educational efforts including:

Self-guided trail brochure

We would like to develop a self-guided trail brochure for Highpoint Preserve that includes stops along the way highlighting the work done by Rockwell Collins Volunteers, Cornell, and the Conservancy along with providing education on key features. Potential stops might include: the new bridges, the salamander coverboard trail, the butterfly garden, the new vernal pools, the site of the recent bear encounter, a barberry bush, a tree that has fallen into the lake, and a spring seep area. Each stop would include a conservation message detailed within the brochure. Landowners, home school groups, or other community members, could use the brochure during guided or self-guided walks.

Bat program

An educational program on current threats to bats, the natural history of bats, bat conservation, and keeping bats out of places where they are not wanted would be an ideal add-on

to bat inventory work. Following an indoor talk, we could go outside and use the Anabat detector to hear the otherwise inaudible ultrasonic calls of bats.

Appendix A – New Publications/Outreach Materials Developed in 2007

Frogs and Toads of Susquehanna County



Pickerel frog (*Lithobates palustris*)

The pickerel frog is a semi-aquatic species. This frog uses temporary ponds in woodlands and in fields, borders of streams and rivers, and the shallow, weedy areas of permanent ponds and lakes. Away from the water, these frogs frequently are found in damp, grassy meadows and moist woodlands. The pickerel frog can be distinguished from the leopard frog by the yellow coloring on the inside thighs.



Northern leopard frog (*Lithobates pipiens*)

The northern leopard frog is a semi-aquatic animal that lives in riparian floodplains, wet meadows, cattail marshes and temporary ponds. This species has been declining in numbers in Pennsylvania and many other Northeast states.



Bullfrog (*Lithobate catesbeiana*)

The bullfrog is the largest frog in the Northeast. They may be found in a wide variety of habitats, from small farm ponds and the margins of large lakes, to small streams and large rivers. The bullfrog is our most aquatic frog species and requires permanent bodies of water.



Green frog (*Lithobates clamitans*)

The green frog is a habitat generalist that requires a permanent water source to complete its life cycle. Green frogs may be found in small ponds, marshes and swamps, and along borders of large lakes. They may also inhabit flowing water, from tiny streams to the banks of large rivers.



Wood frog (*Lithobates sylvatica*)

The wood frog inhabits moist or lowland deciduous forests. During the breeding season, wood frogs can be seen in or near standing water, either temporary or permanent. During the rest of the year, they spend their time in the forest, often under the forest floor litter.



Spring peeper (*Pseudacris crucifer*)

The spring peeper inhabits deciduous woodlands and swamps, and adjacent marshy fields and meadows. They breed in marshes, small woodland ponds, and along margins of larger ponds and lakes. During the breeding season they are most commonly seen in open areas, after which these frogs move into the woods. An identifying feature of the spring peeper is the characteristic brown "X" on the back.



Gray tree frog (*Hyla* sp.)

Gray tree frogs are moderate-sized frogs. The light gray to green or greenish gray on the back of this frog is blotchy and has the appearance of bark. Tree frogs have long toes with large toe pads that help them climb. These animals spend most of their time in trees in deciduous woodlands, but spend time on the ground during the breeding season. They are usually found in the vicinity of pools, ponds, or roadside ditches.



American toad (*Anaxyrus americanus*)

The American toad is a very terrestrial species and a habitat generalist. Outside the breeding season, toads can be found in upland habitats such as forests, fields, meadows, and rocky hillsides. They can also be found on agricultural land and in backyards. During the breeding season, toads use both permanent and temporary bodies of water. They will often use roadside ditches, tire ruts filled with water, and large puddles in fields or woodlands, in addition to larger ponds and pools.

Susquehanna County Amphibians and Reptiles of Concern

Salamanders

Jefferson salamander (*Ambystoma jeffersonianum*)

Four-toed salamander (*Hemidactylium scutatum*)

Hellbender (*Cryptobranchus alleganiensis*)

Frogs and Toads

Fowler's toad (*Anaxyrus fowleri*)

Northern leopard frog (*Lithobates pipiens*)

Turtles

Wood turtle (*Clemmys insculpta*)

Common map turtle (*Graptemys geographica*)

Snakes

Timber rattlesnake (*Crotalus horridus*)

Copperhead (*Agkistrodon contortrix*)

Eastern hognose snake (*Heterodon platyrhinos*)

Smooth green snake (*Opheodrys vernalis*)

Eastern ribbon snake (*Thamnophis sauritus*)

**Appendix B – Permanent Forest Inventory Plot Methodology (for
2008)**

Permanent Forest Inventory (PFI) Plots

(Developed May 2002, revised June 2004)

Objective: Establish permanent plot samples throughout the forest to measure the change in various forest characteristics through time. Be able to describe changes in forest species composition, structure, and habitat availability that result from natural forest dynamics and as result from management practices.

Assumptions/Constraints: Plots will be established annually, beginning in 2002, until approximately 150 plots are accumulated. Each point will be re-sampled every 5 to 8 years and allow an analysis of change through time. Some plots may be sampled more frequently to assess short-term forest dynamics. Except for 20 randomly selected plots serving as controls, forest management will occur in and around the plots and may result in "resetting" of the data following a harvest that removes the entire overstory. Control plots will have a buffer of approximately 2 chains (40 m) around the plot's perimeter. All variables are defined on the variables definitions page. All tree species are characterized by numeric code on the species list.

Methods: Establish 10 plots per year, randomly distributed throughout the Arnot. Plots will be numbered sequentially starting in the NW corner of a lot and incrementing from west to east and north to south, within and among lots. Office work will involve locating the approximate location of the plot on a soils map and stand history map to ensure the plot is in a homogenous area (i.e., not on a boundary). Boundary plots are discarded and the next set of coordinates selected. In the field, plots that are located on a boundary should be systematically moved at 2 chain iterations on latitude and longitude towards property center until a suitable location is achieved. For example, if a boundary plot is located in the northeastern quadrant of Arnot, relocate the plot center to the west and then the south on 2 chain intervals.

Plot center is marked with a white 2.5" PVC pipe 5" long. Two "witness trees" will be painted with two bright blue bands to aid in plot relocation. A GPS unit will be used to record UTM coordinates. All measurement will be in English (non metric) units. Each plot will include:

- Data collected on NEDLITE (herbs also recorded on paper tally)
- A fixed radius overstory plot (0.25 acres, 58.9 ft. radius) where all live trees $\geq 4"$ dbh will be tagged with aluminum numbered tags and aluminum nails at 12" above ground, and tallied by species, dbh, presence of cavities $> 1"$ diameter, and general timber quality category (UGS, AGS, CT), and crown class. DBH will be measured to the nearest 0.1 inch using a diameter tape located at the top of a 3.5' stick placed on the nail. Nails should face plot center. All dead trees will be tallied by species (if possible, otherwise UNK) and by diameter.
- Within each overstory plot record, aspect, % slope, concavity, percent cover fern, presence or absence of grass, and presence of any seeps or wet areas.
- Within each plot, N/S and E/W line transects the diameter of the plot will be established to record the percent cover of coarse woody debris $> 3"$ diameter at the point of their intersection with the transect. Record diameter at the intersection, condition, and whether the bark is loose.
- At the north and south cardinal directions on the edge of the overstory plot, establish sapling/ground layer plots having an 11.8' radius to equal 0.01 acres each. Subplot centers

should be marked with a 30" wooden stake and flagged. Record the number of woody stems by species in the ground layer (height of 4" - 54") and sapling/shrub layer (height > 54" up to 3.99" dbh).

- [record on PDA and paper tally] Within each sapling subplot (11.8' radius), record number of herbaceous stems as a count using decadal increments (1-10 by one; 11 to 100 by tens; 101+ by hundreds) of the following herbs: sensitive fern, maiden-hair fern, Christmas fern, true ginseng, dwarf ginseng, blue cohosh, baneberry, jack-in-the-pulpit trillium, garlic mustard, barberry. Within each of the four clusters of nested plots, record if there is a developed litter layer or if only one year's leaf litter is apparent.

Equipment per team: PVC pipe, hammer, bright spray paint, PDA with hard-shell, GPS unit, diameter tape, compass, distance tape, clinometer, dbh stick (3.5'), clip board, tally sheets, wooden stakes, variable definition sheets, and species codes.

Definition of Variables Recorded in the Arnot Forest Permanent Forest Inventory (PFI) with PDA

(based on NED – 1; adapted for Arnot June 2004)

Paper – “Permanent Plot Location”

Lot	Enter the lot number from the Arnot grid map
Plot number	Enter # of the permanent plot
Stand	enter the stand number of the plot
Deer impact	Enter an estimate of the amount of browsing pressure that deer are having on tree seedlings in the area of the sample plot. Codes are 1 = low pressure, 2 = low/medium, 3 = medium, 4 = medium/high, 5 = high.
Soils	collect A horizon soils, below the organic layer, from 5 points in the plot, mix the soils, and retain them in a paper bag labeled with the plot number.
Travel Description	Enter a narrative description of travel from the nearest permanent location. Complete for original and repeated sampling.
Map	hand sketch a map of the travel description.

Inventory data [enter from “welcome” page before collecting any data]

NED Version	NED – 1
Cruise type	fixed area plot
Overstory plot size	0.25 acre (= 58.9 ft radius)
Understory plot size	0.01 acre (= 11.8 ft. radius on ground)
Ground plot size	0.01 acre (= 11.8 ft. radius on ground)
Transect length	117.8 ft (N:S and E:W = 2 x 117.8)

Stand Data [create new stand then tap on stand label, e.g., “stand 1” at Welcome page]

Tally date	enter the month/day/year of the inventory
Area	Leave blank
Age	Use an increment core to estimate average age from 3 canopy dominates
Forest type	Leave blank
Land cover	Either “forest” or “brush, transitional” – don’t sample any other type
ELT	Leave blank
PHYS/SOIL (of plot)	<ul style="list-style-type: none"> • Elevation – record in feet • Aspect • Slope % • Slope shape (visually) • Slope position (from topo sheet) • Loose rocks, rock piles, rock crevices, caves
H2O (in or near plot)	<ul style="list-style-type: none"> • % riparian • % wetland • seeps, streams, temporary ponds, permanent ponds, adjacent to water, CWD in water
VEG (of plot)	<ul style="list-style-type: none"> • site index = leave blank • site index species = primary species for age determination • height to canopy base = average of stand • live cavity, dead cavity, high perch, low perch
FEATURES (of plot)	<ul style="list-style-type: none"> • complete as possible

Overstory Plot Data [From “welcome” page, tap on number beneath “O”, then tap on plot label, e.g., “Plot1:1”]

S O U G T

Plot name	Change to PFI plot #
Plot riparian	Riparian areas include stream channels, lakes, wetlands, floodplains, and immediately adjacent terrestrial ecosystems
X & Y Pos	Record 8-digit UTM coordinates from GPS
Comments	Record diameter and species of trees used for witness. Paint two trees with two broad bands as witness trees. Record their diameter and species. Select healthy trees.
DETAIL	Leave “size class” blank. Fill all other variables as appropriate

Tree Observation

Observation – record the tag number for the stem. Tag multiple stems that fork below 4.5’ height.

Species - For every tallied tree, enter the tree species using either the 3-digit Forest Survey code (such as 318 for sugar maple). Use accompanying species list.

dbh - Enter the diameter at breast height for each tallied tree. Diameter should be recorded as the actual measurement down to a 1/10 inch.

Living - Enter "yes" if the tree is alive.

Timber quality - A determination if the tallied tree will produce a sawtimber product. AGS means Acceptable Growing Stock for timber - capable of producing sawtimber when it reaches appropriate size, and expected to live at least 15 years; UGS = Unacceptable Growing Stock for timber - not capable of producing sawtimber at any time in future and/or not expected to survive for 15 years; CT = Crop tree - an extremely desirable (i.e., straight trunk with few blemishes in the first 17') acceptable growing stock tree.

Cavity - Enter "present" if the tree contains a cavity at least 1" in diameter.

Crown class - Determine the position of the tree crown using the following codes:

1 = open grown - a tree that is free of competition and receives light on top and on all sides of the crown as a result of a very heavy thinning or being in an isolated, open-grown position.

2 = dominant - a tree with the crown extending above the general level of the main crown canopy and receiving full light from above and partly from the sides.

3 = codominant - a tree with a crown forming the general level of the main canopy, receiving full light from above but little from the sides.

4 = intermediate - a tree with a crown extending into the lower portions of the main crown canopy, but shorter than the codominants and receiving little direct light from above and none from the sides.

5 = suppressed - a tree whose crown is entirely below the general level of the canopy and receives no direct light from either above or the sides.

Ground Cover

S	O	U	G	T
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[note, with NED-1, use the "G" or ground cover plots for ground cover and saplings]

Ground subplot information [tap on plot label, e.g., "plot1:1" in GROUNDCOVER table]

X Position	Either N or S for north or south point
COVER	See below
	% ground cover of all leafy vegetation (maximum 100%)
	Rock barrier to regeneration, check if excessively rocky
	Wetness barrier to regen, check if subplot is excessively moist
	% moss, % rock, % grass/sedge,
	Enter % cover by litter if there is more than one year's accumulated leaf litter. If last season's intact leaves are directly on organic soils then enter 0%.
	% inhibiting fern species such as hay-scented, NY, or wood fern
	% other fern species
PLOT DETAIL	See below
	% regen from sprouts (stump sprouts)
	Evaluate other features: flowers to soft mast
SHRUBLAYER	Evaluate shrub layer % cover and if greater than 1 then report on other variables

Ground subplot species data [tap on number beneath “observations” in GROUNDCOVER table]

NEW	Creates a new observation for stems more than 3” tall and less than 3.99” dbh
Species	<ul style="list-style-type: none"> Record woody species using Forest Service numeric code Record the following herbs using the alphabet codes at the end of the species list: sensitive fern, maiden-hair fern, Christmas fern, true ginseng, dwarf ginseng, blue cohosh, baneberry, jack-in-the-pulpit, trillium, garlic mustard, barberry
Count	<ul style="list-style-type: none"> If less than 4.5’ tall, record number of stems as a count using decadal increments (1-10 by one; 11 to 100 by tens; 101+ by hundreds) If more than 4.5’ tall, record total number of stems to 50 by ones, thereafter by tens.
% cover	Don’t use
Height	Don’t use
Height class	<ul style="list-style-type: none"> If less than 4.5’ tall, record “G” for ground cover If more than 4.5’ tall, record “S” for sapling/shrub cover

Also complete the appropriate section of the paper ground cover tally sheet as a back up.

Coarse Woody Debris (CWD) Transect

[tap on transect label, e.g., “plot1:1” in TRANSECTS table or tap “NEW” for new intersection of a down stem]

S	O	U	G	T
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TRANSECT INFO	Record whether there is high (> 6’) and low (<6’) of fresh slash from recent harvests
Species	Don’t record
Diameter	Enter the diameter of each downed log you walk over along the tape line running N:S and E:W. Measure only downed logs with a diameter of at least 3 inches and a length of at least 3 feet long.
Condition	Enter the condition of the downed logs as hard or soft
Bark	Check if the bark on the log is loose.

Variable Definitions

Seeps - Enter "present" or "absent" as to the presence of seeps or springs within or adjacent to the plot. A seep is a source of surface ground water without a well defined point of origin. A spring has a well defined point of origin. Seeps and springs may or may not have vegetation around them.

Stream - Enter "present" if perennial streams are within the stand or immediately adjacent to (bordering) the stand.

Temporary ponds - Enter "present" if any temporary or vernal ponds are within or adjacent to the plot. Temporary ponds must be greater than 6 inches deep and greater than 1 square yard;

water must be present for at least two months during the growing season. The exact month differs for each species that uses temporary ponds. Areas covered by a fine layer of silt and depressions filled with blackened leaves may serve as dry season indicators of temporary ponds.

Permanent ponds - Enter "present" if any permanent ponds or lakes are within or adjacent to the plot. Permanent ponds are any size or depth, but larger is generally better; water must be present year-round, although the top layer can freeze.

Logs in water - Enter "present" if any downed logs are partially or wholly in a permanent water source.

High perch - Enter "present" if any high exposed perches occur in the stand. A high perch is any live or dead tree that clearly towers above the canopy such as a supracanopy white pine, or a single tree or group of trees standing above ground vegetation such as a lone elm in a pasture or a snag in a clearcut.

Low perch - Enter "present" if any low exposed perches occur in the stand. Low perches are any exposed perches less than 10 feet tall. Examples include fences, isolated shrubs, clumps of woody sprouts, tree tops remaining after harvesting, and short tree stubs.

Soft mast - Enter "present" if there are any plant species in or near the plot providing soft mast such as berries.

Hard mast - Enter "present" if there are any plant species in or near the plot that provide hard mast such as acorns or hickory.

Loose soils - Enter "present" if there is soil that can be easily burrowed into.

Rock piles - Enter "present" if there are any natural or man-made piles (rock walls), as long as they provide hiding places for small mammals, amphibians, or reptiles.

Rock crevices - Enter "present" if there are openings in the rocks that lead below the frost line.

Caves - Enter "present" if there are any caves or larger rock openings that lead below the frost line.

Live cavities - enter "present" if there are any live trees in or near the plot with cavities at least 1" in diameter. This is collected in the overstory plot and may be determined from the field data.

Dead cavities - enter "present" if there are any dead trees in or near the plot with cavities at least 1" in diameter. This is collected in the overstory plot and may be determined from the field data.

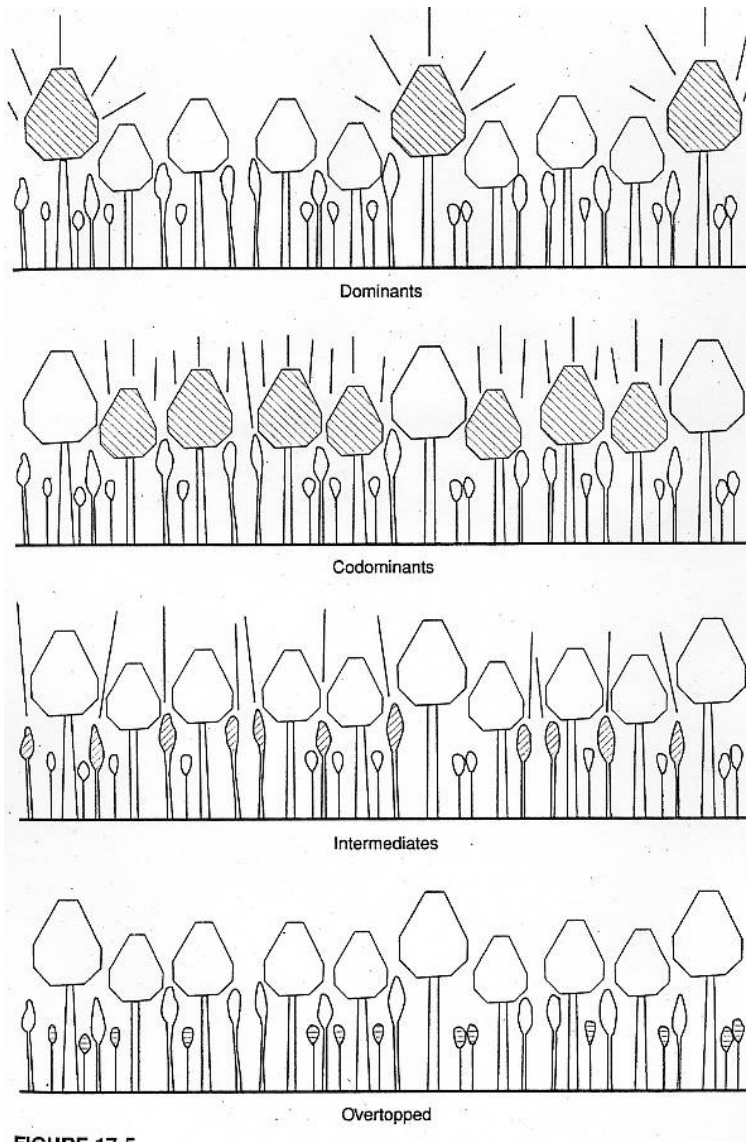


FIGURE 17.5