To Whom It May Concern,

This document is a report summarizing a volunteer reptile and amphibian project performed at the request of the Township of Hamilton in Mercer County, New Jersey. The area of focus for this project was the Sayen Gardens property and the adjacent Hoagland Nursery property, both located on Hughes Drive in Hamilton. This project was officially initiated in January of 2015, although some preliminary observations were taken in October and November of 2014. This document was prepared for the Township of Hamilton.

General Profile:

Sayen Gardens is a municipal park and botanical garden with an area of approximately 30 acres. The features of the park include a historical house, maintenance building, several man-made structures (including three fountain ponds), as well as a wooded area with trails, and a small section of the Miry Run Brook. The Hoagland property is the site of a former nursery with an area of approximately 5 acres. A variety of natural and man-made habitats are present on the two properties, including a small field (Hoagland), a small deciduous forest (both), a stream (Sayen), and several ponds (Sayen). There are three naturally occurring intermittent ponds, one of which was observed with an obligate vernal pool species (the wood frog, *Lithobates sylvaticus*) breeding in it. The properties are located on the physiographic region known as the Inner Coastal Plain.

General Fauna Profile:

The Sayen property provides a variety of habitats for native fauna to flourish. Many species of invertebrates have been observed in the park. Checking under debris reveals centipedes, slugs, earthworms, pillbugs, ants, and harvestmen. Ticks are rarely found on the Sayen property, however they are occasionally seen on the Hoagland property. Only dog and lone star ticks have been found, however visitors should assume the presence of deer ticks, the major vector of Lyme disease. Several species of dragonfly have been seen near the ponds, including common whitetails and twelve-spotted skimmers. The native and non-native wildflowers attract many species of bees and wasps, including paper wasps, mud daubers, yellow jackets, bald-faced hornets, and honey bees. Bumblebees are especially common. Several species of Lepidoptera (moths and butterflies) can be seen among the wildflowers, including monarch, cabbage white, black swallowtail, Eastern tiger swallowtail, mourning cloak, red admiral, painted lady, and red-spotted purple butterflies. Hummingbird moths are occasionally seen. Many species of spiders are observed, including many orb weavers (*Araneidae, including Araneus and Micrathena*), jumping spiders (*Salticidae*), orchard weavers (*Leucauge*), funnel weavers (*Tenegaria*), fisher spiders (*Dolomedes tenebrosus*), and others.

Several fish species are present in the fountain pond located within Sayen Gardens. At least one species of carp are present, as well as sunfish and bullhead catfish.

While these properties do not maintain the same diversity of bird species throughout the year as some larger local preserves, they provide an excellent place for the beginning or casual birder to observe a healthy number of the common year-round resident birds in New Jersey, as well as some

summer or winter residents, and the occasional spring or fall migrant. The properties also provide a small and well-maintained place for local birders to study common species. Winter birding consistently provides visuals of cardinals, robins, blue jays, downy woodpeckers, white-throated sparrows, and dark-eyed juncos. Titmice, Carolina chickadees, and white-breasted nuthatches can often be found by following their vocalizations. Carolina wrens are often heard but not often seen without careful searching. There are several nesting specimens of the red-bellied woodpecker and Northern (yellow shafted) flicker, both of which are large and beautiful woodpecker species. The flickers are sometimes seen on the Hoagland property foraging on the ground. A yellow-bellied sapsucker was observed in January 2015 on the Hoagland property, and signs of the yellow-bellied sapsucker were observed on a tree later in the winter. Hairy woodpeckers were occasionally seen. A red-tailed hawk was consistently seen at the Sayen property throughout the winter, a Cooper's hawk was observed at the Hoagland property in the spring. Several pairs of mallards visited the ponds during the year, and a pair of wood ducks was seen in the pond between Sayen Gardens and the baseball field behind the property (Pecci Fields).

Spring birding resulted in the sighting of many summer residents. Red-eyed vireos, great-crested flycatchers, and wood thrushes were often heard within the forest. Pewees, house wrens, and ovenbirds were also occasionally heard. Catbirds abound throughout the park, and in the area near the corner of Hughes Drive and Mercer Street, song sparrows and goldfinches are consistently seen and heard. Cedar waxwings are also common in this area of the park in spring and early summer. Several American redstarts were seen or heard on several occasions throughout the spring and early summer.

Several mammal species were observed, including gray squirrels, Eastern chipmunks, Eastern cottontail rabbits, groundhogs, red fox, and white-tailed deer.

Survey Methodology:

The herpetological data collected during this project was taken using both visual and auditory surveys. Cover objects were turned in appropriate habitat. Species-specific searches were done using patterns in breeding phenology and habitat preferences for various species. Coverboards were employed for use in collection of snake data. Frog call surveys were done in the evenings during appropriate times of the year, as well as incidental frog call data collected during daytime surveys. Care was taken not to excessively disturb any sensitive habitat, such as vernal pools or rotting logs. The specimens were not harmed, nor were they unnecessarily handled. Snake specimens were routinely handled to be checked for signs of *Ophidiomyces* infection. A single specimen showed possible signs of infection and was reported to the State of New Jersey. No equipment was used that might transmit fungal infections. All data was recorded including the date, time of visit, and weather conditions. In lieu of a GPS, a map was printed and divided into sections, and the locations of the finds were reported as sections on the map. This data will be provided along with the report.

Survey Results: Overall, the Sayen Gardens and former Hoagland properties have healthy populations of several robust and common reptile and amphibian species. Initial observations were made during a walk on the 28th of October, 2014, and several red-backed salamanders (*Plethodon cinereus*) and a wood frog (*Lithobates sylvaticus*) were found in the wooded area near the Pecci fields. A single male Northern

spring peeper (*Pseudacris crucifer crucifer*) was heard calling near dusk. Another visit on the 2nd of November also produced red-backed salamanders (2 specimens), and a single dead specimen of the red-eared slider (*Trachemys scripta elegans*) was found next to the front fountain point (labeled FF2 on the map). The first official herp survey of 2015 turned up very healthy breeding populations of Northern spring peepers during the beginning of the amphibian spring emergence (March 26th). This was a brief observation done by driving into the Pecci Field parking lot to listen for vocalizations coming from the Sayen property. Many territorial vocalizations were heard within the chorus, suggesting very heavy population densities. No other frog species were heard on the 26th.

During a visit on the 2nd of April, spring peepers were once again heard near the Pecci Fields, and within the front fountain pond (FF2) location. A third breeding chorus was heard within the Sayen woods, and when identifying the location of that chorus, a breeding chorus of wood frogs was identified. The wood frog is an obligate vernal pool breeder, and this qualifies this location as a certifiable vernal pool. On the 2nd of April, a single Northern green frog (*Lithobates clamitans melanota*) was located in the Pecci Field Pond, as well as several red-backed salamanders, and a single Eastern garter snake (*Thamnophis sirtalis sirtalis*). The garter snake was located on a rotting stump, which it may potentially have used as a hibernaculum location for overwintering.

A visit on the 18th of April, a day with particularly beautiful weather, turned up healthy populations of bullfrogs (*Lithobates catesbeianus*), as well as Northern green frogs and Eastern painted turtles (*Chrysemys picta picta*) within the ponds. 2 red-eared sliders were also seen in the ponds. 8 Eastern garter snakes were located, 7 of them being near the connector stream between FF1 and FF2. One was an unusually large female of over 2.5 feet in length, and of particular interest was a mating ball of 6 garter snakes found in a bush. Another specimen was found elsewhere in the park. One very brief observation was made of a Northern water snake (*Nerodia sipedon sipedon*) moving quickly into the connector stream.

A walk on May 2nd revealed the first observations of the year of a Northern gray treefrog (*Hyla versicolor*) calling, with a single male calling from a location near the stream. Also of interest was the observation of a large Northern water snake eating a catfish in the S35/S44 pond. Reliable observations of bullfrogs, green frogs, painted turtles, and garter snakes were made on subsequent walks.

On May 25th, several male Northern water snakes were seen maintaining close proximity to a large female, and they may have been courting. No actual mating was observed. Subsequent observations did not show any signs of gestational basking, although timing of the outings may have been a factor.

A quick drive into the park on May 27th, a rainy evening, revealed two wood frogs crossing the road. An outing on June 3rd provided the first observation of an Eastern box turtle (*Terrapene carolina carolina*). Subsequent visits in June and July showed stable numbers of pond turtles and bull and green frogs.

As temperatures rose over the summer and a dry period began from the end of July into August, the number of garter snake and frog observations decreased, as should be expected. No log flipping was

done to preserve integrity of moist areas beneath rotting logs, as any amphibians or invertebrate decomposers were already stressed by the dry conditions.

A specimen of a garter snake was found on August 12th that potentially showed signs of a fungal infection. The snake was not captured, however it was photographed and the photos were sent to a state biologist. Further info may be provided upon request.

During a brief morning walk on August 23rd, a single specimen of a yellow-bellied slider (*Trachemys scripta scripta*) was observed in the S35/S44 pond. This species is non-native and more detail is given regarding this observation later in the report.

In general, the ongoing visits throughout the summer consistently provided records of the same common species in the same areas, demonstrating stability of their population. Many species are widespread throughout the park, limited only by appropriate habitat. Due to population densities of many species identified in the survey, it is likely that these species are maintaining breeding populations at this location. The Eastern garter snake population is dense at this location, probably supported by the availability of hibernacula, basking, and sheltering sites created by the landscaping at Sayen and the rock piles and debris at Hoagland Nursery. Northern gray treefrogs continued to advertise their calls on humid days. Northern water snake observations were patchy, and almost all observations were at the S35/S44 pond. Eastern garter snakes were seen physically mating on the site, and population densities are high. Several juveniles were observed during the survey. Northern water snake populations are also moderately healthy, and it is likely that they have bred on site. Observations of the S35/S44 pond revealed bullfrog egg masses, and bullfrog and green frog tadpoles. Wood frog, spring peeper, Northern green frog, American bullfrog, and Northern gray treefrog breeding vocalizations were heard, although due to a very dry spell in the spring, metamorphosis of early spring breeders could not be observed. Several of the painted turtles and red-eared sliders appeared to be very young. The presence of suitable year-round habitat, as well as appropriate prey items in adequate numbers, reinforces the notion that these populations are stable.

Cumulative Assessment Total-Complete Species List for 2015 for Sayen Gardens and the former Hoagland Nursery Property (10 Species)*

- Eastern red-backed salamander (*Plethodon cinereus*)
- Northern gray treefrog (*Hyla versicolor*)
- Northern spring peeper (*Pseudacris crucifer crucifer*)
- American bullfrog (*Lithobates catesbeianus*)
- Northern green frog (*Lithobates clamitans melanota*)
- Wood frog (*Lithobates sylvaticus*)
- Eastern painted turtle (*Chrysemys picta picta*)
- Eastern box turtle (*Terrapene carolina carolina*)
- Northern water snake (*Nerodia sipedon sipedon*) **
- Eastern garter snake (*Thamnophis sirtalis sirtalis*) **

*The red-eared and yellow-bellied sliders were not included in the list, as they are not native

**There are no venomous snake species found within the park

Data Breakdown:

1. Totals:

    - Turtles (2 species)
    - Frogs/Toads (5 species)
    - Salamanders (1 species)
    - Snakes (2 species)
    - Total (10 species)

2. Park/State Comparison for this assessment-totals of each for Sayen Property vs. statewide totals documented by NJ Fish and Wildlife (**including** extirpated species):

    - Salamanders 1/16 (6%)
    - Frogs and Toads 5/16 (31%)
    - Turtles 2/13 (15%)
    - Lizards 0/3 (0%)
    - Snakes 2/23 (9%)
    - Total 10/71 (14%)

3. Park/County Comparison corrected for Sayen Property vs. the number of species potentially present in Mercer County as documented by NJ Fish and Wildlife (**not including** extirpated species):

    - Salamanders 1/11 (9%)
    - Frogs and Toads 5/11 (46%)
    - Turtles 2/11 (18%)
    - Lizards: 0/2 (0%)
    - Snakes: 2/15 (13%)
    - Total: 10/50 (20%)

Species of Special Interest:

4. Endangered/threatened species found: none

5. Species of Special Concern (1): http://www.state.nj.us/dep/fgw/ensp/pdf/spclspp.pdf

    - Eastern box turtle (Terrapene c. carolina)

These species are listed as Species of Special Concern by the State of New Jersey, as there is concern over their habitat loss and their vulnerability because of it. Box turtles are declining in number because of several threats. Nest predation is very common, and habitat fragmentation has resulted in the road mortality of many females from turtle populations because of their nesting migration, frequently made across roads. There is also concern about illegal collecting. This species is in need of monitoring and protection within its range in New Jersey.

Vernal Pool Breeders:

Many amphibians and some reptiles use temporary pools created by snowmelt or spring rains. These pools are selected by amphibians largely because of the lack of fish predation on the tadpoles. In some cases, amphibians will use permanent ponds such as those located at the Sayen Properties, provided that they are free of potential predators, and provided that the pools contain water for the duration of the development of the tadpole. There are at least three such ponds at the Sayen Properties. Vernal pool breeders are classified as either *obligate breeders*, which are species that must use a vernal pool to breed, or *facultative species*, which will gravitate toward vernal pools if available, but will use other semi-permanent or permanent wetlands if vernal pools are not found.

6. Obligate vernal pool species found: (1)

    - Wood frog (*Lithobates sylvaticus*)

7. Facultative vernal pool species found (5)

- Northern gray treefrog (*Hyla versicolor*)
- Northern spring peeper (*Pseudacris crucifer crucifer*)
- American bullfrog (*Lithobates catesbeianus*)
- Northern green frog (*Lithobates clamitans melanota*)
- Eastern painted turtle (*Chrysemys picta picta*)

Other Species:

8. Species of *Possible* Occurrence: (3)

- Black rat snake (*Pantherophis alleghaniensis*)
- Northern black racer (*Coluber constrictor*)
- Fowler's toad (*Anaxyrus fowleri*)

The species of possible occurrence are listed above because of the presence of prey and habitat (including potential hibernacula) within the property that will support these species, and the fact that the property is within their natural range in New Jersey. Although this list is speculative, it details species that may potentially occur and were not discovered because of the limitations of the survey, and it also potentially details species which may have historically occurred but no longer breed or exist on

the property. This list does not include species which are considered extirpated from New Jersey (e.g. the queen snake, *Regina septemvittata*), nor does it speculate the presence of any rare or endangered species that may currently occur within Mercer County (e.g. the wood turtle, *Glyptemys insculpta*).

The first species, the black rat snake (*Pantherophis alleghaniensis*), is a large, nonvenomous constrictor occasionally occurring in open space areas on the inner coastal plain, and even occasionally found in suburban areas. The species has been seen with some regularity in Hamilton Veteran's Park, and in a conversation with animal control agents last year, it was discussed that some specimens of the black rat snake are relocated from local suburban backyards to Hamilton Veteran's Park when residents call to have the snake removed. The Sayen properties contain appropriate prey (rodents, birds) and habitat for the black rat snake, and old rotting stumps and crevices provide potential winter hibernacula.

The second species of likely occurrence is the Northern black racer (*Coluber constrictor*). This nonvenomous colubrid snake is not a constrictor as its Latin name suggests, but is a dietary and habitat generalist known for occasionally being ophidiophagous and resistant to the venom of the pitvipers on which it sometimes feeds within a shared range. This species occurs in Mercer County, and is sometimes common in fields bordering wooded areas. As with the black rat snake, the Sayen properties contain appropriate prey, habitat and hibernacula for this species.

The third species of likely occurrence is the Fowler's toad (*Anaxyrus fowleri*). Like many amphibians, this once abundant 'hop-toad' has recently faced a population decline because of habitat destruction and pollution of breeding pools. Although declining in its overall range, the Fowler's toad is still commonly seen in some areas in Hamilton, especially on the road after summer rains. No breeding vocalizations of this species were heard on the Sayen properties, however this species may still be present because of its distribution within its range, and the appropriate habitat provided by the wooded areas at the Sayen properties.

Advisories:

The red-eared slider (*Trachemys scripta elegans*) and yellow-bellied slider (*Trachemys scripta scripta*) are not native turtles, and are sometimes problematic as an invasive species in the presence of native turtles. Red-eared and yellow-bellied sliders (aka *pond sliders*) are often taken from their native habitat for the pet trade, and the owners of these turtles sometimes release them back into the wild for various reasons. These turtles may introduce diseases where they are released, and pond sliders often outcompete native turtles for basking sites. Basking is a crucial activity for turtles, especially to build the immune system post-hibernation, and also during times of stress such as illness. It is likely that the red-eared slider has established a breeding population at Sayen Gardens, based on population density, as well as the presence of juvenile sliders. The yellow-bellied slider has only been observed once (8/23). Some parks systems may opt to have them removed.

Recommendations:

1) Two of the man-made ponds (map locations S35/S44 and FF2) appear to sometimes be overgrown with standing or floating vegetation. At one point in late June, it appeared that much

of the floating vegetation was removed from the S35/S44 location. It is recommended to continue monitoring overgrowth of floating vegetation in S35/S44, as overgrowth of floating vegetation may be problematic. Turtles, water snakes and fish were sometimes seen tangled in the vegetation. Also, reducing the penetration of sunlight into a pond may also cause a reduction in dissolved oxygen, increasing the chance of a kill if water temperature hits a critical level.

2) Leave coverboards for future checks. Coverboards often take several years to develop a full moisture seal, making them more attractive for thermoregulation and ecdysis (shedding). Also, rodents will sometimes nest under these boards over time, and some species of snakes will follow rodent scent trails and establish themselves beneath the boards. Any further discoveries will be documented and the updated report sent to the Township of Hamilton.

3) In 2013, the Township of Hamilton had a vernal pool survey done and the Sayen Gardens property was surveyed, however the vernal pool with the breeding wood frogs was missed. Whatever steps may be taken to have the wood frog breeding pond updated as a certified vernal pool may be desired by the Township of Hamilton.

Limitations of the Survey:

As with all reptile and amphibian surveys, incidence of occurrence may be skewed by weather patterns, long-term wet or dry spells, and existing habitat preferences. The latter may be exemplified by some existing immovable cover (ex. metal storage bins) providing shelter for certain snakes that would consequently not shelter under the coverboards. Timing of visits with breeding phenology is sometimes problematic. Therefore, any lack of herpetofauna diversity reported in the totals may not be a reflection of the actual number of species present, but instead may reflect limitations on time spent assessing the area, incorrect timing, or other biotic or abiotic environmental factors.

Acknowledgements and Thanks:

Permission was given for the initiation of this survey by Mr. Marty Flynn, Director of Parks and Recreation for Hamilton Township. The survey was enthusiastically supported by Mr. Marty Flynn, and also by Mr. Kevin Flynn, the General Supervisor of Parks for Hamilton Township. Mr. Kevin Flynn, along with one of his crew members, generously provided coverboards and help with the placement of them. Captain DeBoskey of the Hamilton Township Police Department coordinated permission with Mr. Flynn to grant access to the park at night. Mr. Ian Biazzo, naturalist for the Monmouth County Parks Commission, accompanied me on several occasions and helped with specimen identification and with the collection of herpetological data.

Summary:

The Sayen Gardens and Hoagland Nursery Properties maintain a diversity of reptiles and amphibians comparable to those expected in a relatively clean, preserved open-space area in Central New Jersey. The presence of certain species of amphibians, especially wood frogs, is an indication of a healthy ecosystem. This park will continue to be monitored on occasion, and any new or unusual finds will be reported to the Township of Hamilton. The data for this survey was collected and vouchered on a

volunteer basis. This data was collected to the best of ability and all specimens were personally observed and positively identified. These specimens were photo vouchered where possible and these photographs are available upon request.

Thank you for your consideration,

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