APPENDIX I

Timber Rattlesnake Habitat Assessment

Randy Stechert
Timber Rattlesnake Consultant
50 School St.
Narrowsburg, NY 12764

TO: Fred Wells, RLA
Tim Miller Associates, Inc.

DATE: 30 May, 2009

RE: Timber Rattlesnake *(Crotalus horridus)* Habitat Assessment and Presence-Absence surveys on the Double Diamond Lost Lake Resort project property in the Town of Forestburgh, Sullivan County, New York.

Introduction

Situated approximately eight miles south of Monticello, the Lost Lake Resort project is a proposed multiresidential and recreational community on 2,091 acres, extending south from the Thompson-Forestburgh town line east of St. Josephs and Merriwold Lakes, west of Cold Spring Rd., and north of the old gravel pit on the west side of Cold Spring Rd. (see Figure 1). Within this delineated area is a mosaic of forested uplands interspersed by a large DEC-recognized linear northwest to southeast oriented wetland no. HA 40, some smaller wetlands and ponds, and the drainage from Lost Lake.

Based on four personally identified Timber Rattlesnake den sites occurring in the Neversink River Gorge ca. 2.3 to 3.5 mi. east and southeast of the project site, DEC Region 3 staff expressed a valid concern regarding the possibility of a currently unknown den site existing closer or within the Double Diamond property. The significance of the rattlesnake's ancestral den site is that if it is compromised by natural (e.g. forestation) or anthropogenic (e.g. mining or developmental) causes, the result may ultimately be the extirpation of the local rattlesnake population. Additionally, development within a population's core migratory range (≥ one mile) can lead to a nonviable reduction in population demographics. Due to possible anthropogenic impacts, DEC Region 3 personnel required the current rattlesnake habitat assessment and presence-absence surveys.

Methods

The initial component of the field surveys involved a comprehensive assessment of potential Timber Rattlesnake den sites and basking habitat on the

Double Diamond Lost Lake property. Environmental Scientist-Planner Brian Bury from Tim Miller Associates accompanied me on the five field survey days, and contributed his extensive on-site experience toward locating the aforementioned habitats.

During the first survey day (23 April) we identified two potential den sites-basking areas (PDA 1 and PDA 2; Figure 1) on the Lost Lake property. In addition, the old gravel pit near the southeast corner of the property and three areas on and immediately adjacent to the DEC-owned Neversink River Unique Area on the east side of Cold Spring Rd. were also targeted for habitat surveys based on their topographic features, visible rock structure, proximity to the project site, i.e. within 1.0 mi., and the two nearest personally identified rattlesnake dens (S-2 and S-30 in the New York Natural Heritage Program database) located 2.3 mi. east of the project site.

Habitat Description and Survey Dates

Over the next four survey days (24, 28, 29, and 30 April) we repeatedly checks PDA 1 and PDA 2 for Timber Rattlesnake presence. PDA 1 is a southwest-oriented series of Catskill Sandstone ledges with a ≥ 75% canopy cover of various Oaks (*Quercus spp.),* White Pine *(Pinus strobus)*, and Eastern Hemlock *(Tsuga canadensis)*, situated ca. 0.6 mi. (1km) southwest of St. Joseph's Rd. (CR 108) and ca. 300m east-northeast of DEC state wetlands no. HA 40. A moderate-sized talus slope and a small open area of potential basking habitat on the rim of the ledge above the talus prompted the four subsequent surveys, although no rattlesnake sightings were reported by the nearest local residents along St. Joseph's Rd.

PDA 2 is a relatively exposed, low rolling ridge with scattered southeast-facing ledge and rock outcrops under a ca. 40%-50% canopy cover of mostly Chestnut Oak (*Quercus prinus)* and White Pine, interspersed with a few open, exfoliated ledge surfaces surrounded by Huckleberry and Blueberry *(Vaccinium spp.)*. Again, despite the location of Merriwold Park and Lake ca. 1.0 mi. to the west, longterm residents had no reports of rattlesnake sightings.

The three aforementioned areas in the Neversink River Unique Area were also checked despite their distance from the project site, due to the summer migratory range of individual male and female rattlesnakes extending ≥ 2.0 mi. from their dens. Although two of the areas exhibited shaded talus slopes, no associated open basking habitat was identified. On 29 April we briefly visited dens S-2 and S-30 to verify appropriate basking conditions, and observed 14 rattlesnakes basking at and adjacent to the two den sites. On April 30 I also checked the old gravel pit for potential basking habitat, and found it being used as a shooting range for local hunters. It should be noted that the Lost Lake's

geographical location near the southeast corner of the Catskill Plateau is situated on gently rolling terrain with a relative paucity of exposed rock structure compared to the deeply eroded Neversink River Gorge.

Results

Despite four intensive surveys of PDA 1 and PDA 2, and peripheral surveys of the gravel pit, the old railroad berm, the slopes around the drainage of Lost Lake, the northwest end of DEC wetlands no. HA 40, and the three slopes within 1.0 mi. east of the project site, no rattlesnakes were observed. However, the occurrence of harmless snakes both on and off-site was partially represented by the documented presence of two Garter Snakes *(Thamnopis sirtalis)* and a Garter Snake and a Ringneck Snake *(Diadophis p. edwardsi)* shed skin at PDA 1, two Ringneck Snakes at PDA 2, and a Garter Snake observed in the Neversink River Unique Area. Other documented amphibian and reptile species on-site included two Redback Salamanders *(Plethodon cinerus)*, three Two Lined Salamanders *(Eurycea bisliniata)*, Spotted Salamander *(Ambystoma maculatum)* egg masses, Wood Frog *(Rana sylvatica)* egg masses, Spring Peeper *(Pseudacris crucifer)* choruses, Green Frogs *(Rana clamitans)*, a Gray Treefrog *(Hyla versicolor)*, a Painted Turtle *(Chrysemys picta)*, and two predated Painted Turtle nests from 2008. Peripheral wildlife observations included a Pied-Billed Grebe *(Podilymbus podiceps)* and a sub-adult Black Bear *(Ursus americanus)* and its den. Several bear trails and numerous Coyote *(Canis latrans)* scat were evident on the project site (see survey data sheets 1-5).

Conclusions

Based on the results of the five field survey days and 40 years of personal experience in both the Neversink River Gorge and in recognized Timber Rattlesnake habitat southeast and southwest of the Lost Lake project site, a few conclusions regarding the potential developmental impacts to the nearest rattlesnake population can be explained without compromising my concern for the welfare of the species. Although I have no supportive data, the possibility still exists of a currently unknown den site occurring in the Neversink River Gorge ≥ 1.0 mi. east of the Lost Lake property. However, the absence of reported rattlesnake sightings by residents along Cold Spring Rd. (e.g. former Eden Brook Hatchery caretaker Floyd Wayman, and current resident Jon Wallach) appears to contraindicate this possibility. The nearest sightings were reported by Jon Wallach and a homeowner (pers. comm.) on Hartwood Rd., and involved one adult and two adults, respectively, observed at the junction of Hartwood Rd. and Cold Spring Rd. several years ago. These three snakes were probably migratory individuals emanating from den S-2 located 1.7 mi. southeast of the junction.

In conclusion, I believe these data support my opinion that the Lost Lake

Resort property is rarely, if ever, used as foraging habitat by individual rattlesnakes from the nearest documented or possibly unknown den, and therefore residential and recreational development on the property should not constitute a threat to the peripheral rattlesnake population. Please call me if you have any questions.

Sincerely,

Randy Stechert

Randy Stechert
ph. 845-252-3517

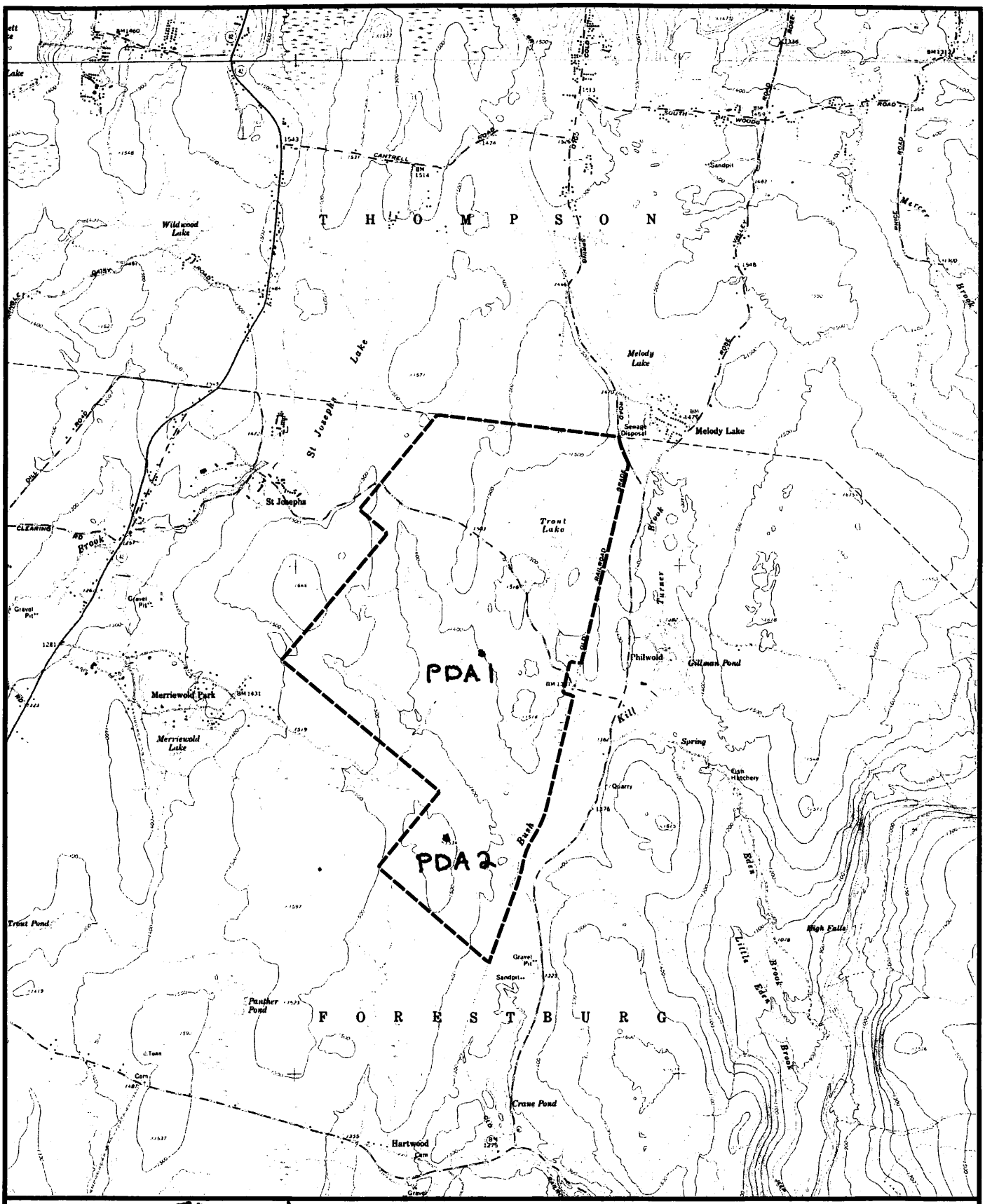

Figure 1.

Site Location Map

Double Diamond Property

Town of Forestburgh, Sullivan County, New York

Base Map: USGS 7.5-minute Topographic Map, Hartwood Quad

Scale: 1" = 4,000'

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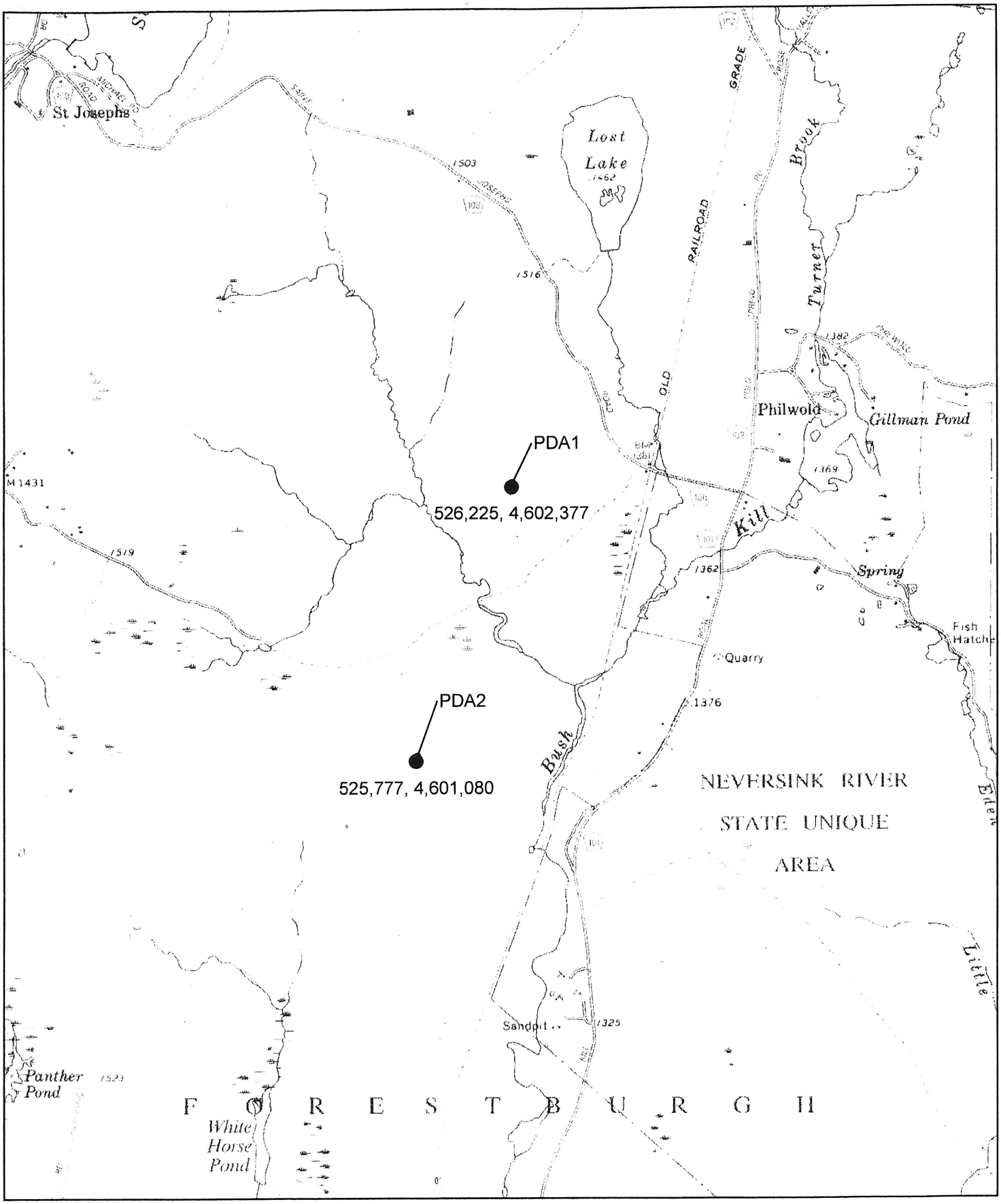

Figure 2 (NAD 83). Scale = 1:24,000

SURVEY DATA SHEET

Sheet No. 1

Site Lost Lake, Forestburgh

Date: 4/23/09 Weather Conditions: Mostly cloudy

Investigators R. Stechert, B. Bury

Temp.: 13 °C Humidity: 40 % Wind: 10-20 mph from SW Time: From: 0915 h To: 1630 h

9 hrs, 60 mi. total

	Size (")	Weight (g)	Sex	Color	Rattle Count	No.	Location
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

* Southern property & SW boundary

	Other Species	Location
1	1 redback salamander	in upland forest
2	3 two lined salamanders	in upland stream
3	wood frog egg masses	in vernal pools
4	spotted salamander eggs	" " "
5	spring peepers	calling near dam
6	1 ringneck snake shed	under rocks on ledges (PDA1
7	1 garter snake shed	" " " " "
8	1 colubrid sp? skeleton	on SE-facing ledge near →
9	1 sub-adult black bear	SE section, W boundary near PDA1
10		
11		
12		

SURVEY DATA SHEET

Sheet No. 2
Site Lost Lake, Forestburgh

Date: 4/24/09 Weather Conditions: Mostly sunny, hazy

Investigators R. Stechert, B. Bury

Temp.: 21 °C Humidity: 30 % Wind: 5-15 mph from W Time: From: 1000 h To: 1730 h

8.5 hrs, 60 mi.

	Size (")	Weight (g)	Sex	Color	Rattle Count	No.	Location
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	Other Species	Location
1	2 green frogs	in vernal pool
2	2 green frogs	in wetland by Bush Kill Stream
3	predated painted turtle eggs	by railroad bridge over Bush Kill
4	1 pie-billed grebe	S end of Crane Pd.
5		
6		
7		
8		
9		
10		
11		
12		

SURVEY DATA SHEET

Sheet No. 3

Site Lost Lake, Forestburgh

Date: 4/28/09 Weather Conditions: Mostly sunny, hazy

Investigators R. Stechert, B. Bury

Temp.: 29 °C Humidity: 27 % Wind: 0-15 mph from W Time: From: 0915 h To: 1530 h

8 hrs. 60 mi.

	Size (")	Weight (g)	Sex	Color	Rattle Count	No.	Location
1	PDA 1 (Potential Den Area 1) GPSed at E0526225, N4602377, ± 17' (NAD 83)						
2							
3	PDA 2 GPSed at						E0525777, N4601080, ± 22'
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	Other Species	Location
1	1 garter snake	DOR on Oakland Valley Rd.
2	2 ringneck snakes	at PDA-2
3	1 garter snake	at PDA-1
4	1 gray treefrog	at PDA-1
5		
6		
7		
8		
9		
10		
11		
12		

SURVEY DATA SHEET

Sheet No. 4
Site Lost Lake, Forestburgh

Date: 4/29/09 Weather Conditions: Mostly sunny, hazy

Investigators R. Stechert, B. Bury

Temp.: 20.2 °C Humidity: 20 % Wind: 5-15 mph from S Time: From: 1000 h To: 1700 h

8 hrs, 66 mi.

	Size (")	Weight (g)	Sex	Color	Rattle Count	No.	Location
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	Other Species	Location
1	1 redback salamander	by PDA 1
2	1 painted turtle	by pond on St. Joseph Rd.
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

SURVEY DATA SHEET

Sheet No. 5

Site Lost Lake, Forestburgh

Date: 4/30/09 Weather Conditions: Mostly cloudy

Investigators R. Stechert, B. Bury

Temp.: 15 °C Humidity: 38 % Wind: 5-10mph from W Time: From: 1000 h To: 1430 h

5.5hrs. 64 mi.

	Size (")	Weight (g)	Sex	Color	Rattle Count	No.	Location
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

	Other Species	Location
1	1 garter snake	under rock at PDA 1
2	1 ringneck snake shed	" " " " "
3	1 garter snake	on Hartwood Club ridge
4	multiple bear trails	surrounding PDA 2
5		
6		
7		
8		
9		
10		
11		
12		

16 rattlers

Species:

√ *Crotalus horridus*
? *Agkistrodon contortrix*
_____ *Sistrurus catenatus*

Site # Pike-14

SURVEY INFORMATION

Survey Date: 4/26/09 Survey Time: 0930h - 1205h

Investigators: R. Stechert, B. Wickness

Weather Conditions: Skies: Mostly sunny Wind: 5-10 mph from W
Air Temp: 27.6 °C ~~Substrate Temp:~~ RH: 36%

Species Observed: 2 Rattlesnakes, 2 milk snakes. 2-33" YL. sub-adults found by rock on top of ledge above stream near post no. 58 on NE edge of pipeline at E 0572639, N 4459290 (±36') NAD 83; SG-1). 2 Colorful sub-ad. milks found under rocks.

Comments:

Species:

√ *Crotalus horridus*
_____ *Agkistrodon contortrix*
_____ *Sistrurus catenatus*

Site # * S-2, * S-30

SURVEY INFORMATION

Survey Date: 4/29/09 Survey Time: 1230h - 1600h

Investigators: R. Stechert*, B. Bury

Weather Conditions: Skies: Mostly sunny Wind: 5-15 mph from S
Air Temp: 20.2°C ~~Substrate Temp:~~ RH: 20%

Species Observed: 14 Rattlesnakes. 1-36" YL. ♀ with 4, 1-41" BL. ♂ with 7 found in SW den. 1-39" YL. ♀ with 7, 1 sub-ad. rattler obs. above den. 1-38" BL. ♀ with 7, 1-38" YL. ♀ with 13 (found by blind), 1-39" YL. gr. ♀ with 8 found on top of SW den ledge, SE den; 1420h. 1-33" BL. ♀ with 7, 1-36" YL. ♀ with 7 found

Comments: above den. 1 YL. 1yr. old, 1 YL. 2 gr. old found under rocks in quarry, 1 YL. 1yr. old found under rock in den. S-30; 1525h. 1-38" YL. pp ♀ recap.* from 5/8/08, 1-38" BL. ad. obs. in Lower quarry.* Marked 8 rattlers.

Timber Rattlesnake Survey Methodology
Lost Lake Site

Purpose

To determine if Timber Rattlesnake (*Crotalus horridus*) exists or is likely to exist on the Lost Lake property of approximately 2080 acres in the Town of Forestburgh. Currently there are no known dens on the property, however, the property is relatively remote and has not been surveyed for the presence of rattlesnakes. A habitat assessment will be conducted, and a presence/absence survey performed to determine if rattlesnakes are present in any areas identified as potential habitat.

Experience of the Timber Rattlesnake consultant, Randy Stechert: Developed a standard Timber Rattlesnake survey protocol for AI Breisch in the NYSDEC Endangered Species Unit, and the New York Natural Heritage Program in 2007. This protocol is based on 42 years of research with the species, and 170 dens personally identified in New York. Additionally, spent 40 years investigating a few personally identified rattlesnake populations some 2 miles east and southeast of the project site. Despite the aforementioned research period, and numerous conversations with local residents, only four rattlesnake sightings were reported nearby; the closest sighting being a black morph rattlesnake observed by former DEC Region 3 forester Bruce MacMillan (pers. comm.) in the Neversink River gorge ca. 4800' east of the project site on 15 June, 1993. Has already amassed a significant database (42 years) on rattlesnake occurrence in Sullivan County, and throughout their range in New York. Has 12 years of radiotracking experience in 4 study areas in Rockland, Orange, and Delaware Counties.

Habitat Assessment - Presence/Absence Surveys [1]

The timber rattlesnake habitat assessment will involve field survey of the property and immediately adjacent areas looking for potential denning sites, basking and/or gestating areas. Information regarding known rattlesnake dens in relation to this property would be incorporated into the habitat assessment. The presence/absence study will involve emergence and post-emergence surveys in the spring (2009) at potential den and basking areas identified. At the end of this period it should be known with a high level of confidence whether there are any previously unknown dens located on or near the property.

The Habitat Assessment-Presence/Absence surveys can be conducted in tandem on mild, sunny to partly cloudy days with shade temperatures between 17°C-25°C (63°F-77°F). Will verify spring emergence by checking one known den in Rockland County and three dens in Orange County on 17 and 18 April (2009). Rattlesnakes at these dens emerge 1-3 days earlier than at dens in Sullivan County. Once emergence has been verified, surveys will begin on and within a ca. 0.7 mi. radius of the Lost Lake project site. Slopes facing aspects conducive for den sites, ie. from 95° east-southeast around the southern points to 270° due west, will be checked for the appropriate Catskill sandstone rock structure.

These surveys will be combined during the rattlesnake's spring emergence period in Sullivan County; ideally on mild, sunny to partly cloudy days between 25 April and 15 May (2009). This

[1] Timber Rattlesnake Survey Methodology is based on Survey Protocol Report to Natural Heritage Program 2007 by Randy Stechert.

chronological period encompasses general and peak emergence, and can be conducted over a maximum of five eight-hour survey days.

Approximately 5 emergence surveys will be conducted on optimal days at each of the potential den and basking areas identified during the Phase 1 assessment. GPS locations of areas identified as potential dens and basking areas would be recorded. Photos of potential den and basking areas will be taken. Any evidence of snake activity, such as remnants of shed skins, will also be documented.

If a new den site is discovered by rattlesnake presence on or within about 0.6 mi. (1 km) of the property, then additional radiotelemetry studies may be required by the NYS Department of Environmental Conservation Region 3 Endangered Species Unit (ESU).

Following the survey of the property, a report will be written, mapping and describing any potential timber rattlesnake habitats and activity on the property. Such report will be submitted to the ESU if the species is found.

A wildlife biologist with knowledge and experience with rattlesnake studies will conduct or direct all work.

Potential Radiotelemetry Studies

Describing this potential component of the rattlesnake study at the current time is somewhat premature. If an undiscovered den is found on or off-site, then one or a combination of two study methods are generally employed. If a den is found less than 0.6 mile off-site, a limited sample of up to 10 rattlesnakes are usually outfitted with tapped-on external ATS transmitters and radiotracked twice a week until their first seasonal shed (generally in June), when the transmitters are sloughed along with the snake's old epidermal layer.

Subsequently, any rattlesnakes that have shown a directional proclivity toward the project site, or any rattlesnakes found on-site (up to six individuals), are surgically implanted with internal Holohil transmitters and tracked twice weekly through their active season until mid-October to determine their habitat parameters.

Radio tracking would be GPSed onto the Hartwood topographic quadrangle map to illustrate home range parameters and potential site usage. Based on these data, if necessary, an on-site mitigation plan can be implemented.

A wildlife biologist certified by NYSDEC to capture and handle rattlesnakes will conduct this work.

A detailed report including radiotracked rattlesnake movements, identified habitat, and possible mitigation recommendations will be submitted at the end of the season.

April 20, 2009